



TP-LD53

User Manual

Version 6.0

www.solaxpower.com



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About This Manual

Scope of Validity

This manual is an integral part of T-BAT Series. It describes the installation, electrical connection, commissioning, maintenance and troubleshooting of the product. Please read it carefully before operating.

Battery pack
TP-LD53

Note:

In the case of floor mounting, it contains battery pack(s) only. In the case of wall mounting, it contains battery pack(s) and wall bracket(s). For details, please refer to "12 Technical Data".

Target Group

The installation and maintenance can only be performed by qualified personnel who

- Are licensed and/or satisfy state and local jurisdiction regulations.
- Have good knowledge of this manual and other related documents.

Conventions

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

Symbol	Description
⚠ DANGER	Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
MARNING	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
CAUTION!	Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
NOTICE!	Provides tips for the optimal operation of the product.

Change History

Version 05 (2025-10-13)

Updated cover page (Changed the figure, QR code and website)

Updated <u>"2.2 Product Appearance"</u> (Modified the product weight)

Updated "2.3 Indicator Panel" (Adjusted the content)

Updated <u>"2.5 DIP Switch"</u> (Modified the address assignment)

Updated <u>"5.2 Scope of Delivery"</u> (Modified the quantity and figure)

Updated <u>"12 Technical Data"</u> (Modified the DOD value)

Remove contact information and QR code from back cover

Version 05 (2025-4-30)

Updated <u>"2.4 Black Start"</u> (Changed the duration of button press)

Updated <u>"7.2 Electrical Wiring"</u> (Added operation of DIP switch)

Updated "8 Parallel Connection" (Adjusted the content)

Updated <u>"9 System Commissioning"</u> (Changed power-on and power-off information)

Version 04 (2025-2-18)

Updated "1.3 Battery Handling Guide" (Added prohibition of using battery in lead-acid mode)

Updated <u>"5.2 Scope of Delivery"</u> (Altered part C communication cable)

Updated "5.2 Scope of Delivery" and "6.2.2 Wall Mounting" (Added circle drawing board and deleted waterproof plug)

Updated "7 Wiring" (Deleted the step of covering waterproof plug)

Added "8 Parallel Connection"

Added "9 Connection to the Third-party Inverter"

Updated "11.1 Troubleshooting" (Altered error code)

Updated "Contact Information" (Altered the Australia e-mail)

Version 03 (2024-08-05)

Updated "1.3 Battery Handling Guide" (Deleted "DON'T store or install the battery module in direct sunlight")

Updated "4.1.1 Environment Requirement"

Updated "Back Cover" (Deleted the company website)

Updated temperature (Altered 302°F/60°C to 302°F/150°C)

Updated warranty claim (Deleted 120 months warranty claim)

Version 02 (2024-05-07)

Updated "5.2 Scope of Delivery"

Updated "9.2 Powering On/Off the System" (Added a matter to be noted)

Version 01 (2024-01-18)

Updated "6 Mechanical Installation" (Altered torque information)

Version 00 (2023-10-20)

Initial Release

Table of Contents

1	Sarety	1
	1.1 General Safety	1
	1.2 Battery Safety	2
2	Product Overview	5
	2.1 Introduction	5
	2.2 Product Appearance	5
	2.2.1 Product Introduction	5
	2.2.2 Parts Introduction	7
	2.3 Indicator Panel	9
	2.4 Black Start	
	2.5 DIP Switch	
	2.6 Label	
_	2.7 Explanation of Symbols and Icons	
3	Transportation and Storage	16
	3.1 Transportation Requirements	
	3.2 Storage Requirements	17
4	Preparation before Installation	18
	4.1 Selection of Installation Location	18
	4.2 Installation Environment Requirement	18
	4.2.1 Installation Carrier Requirement	19
	4.2.2 Clearance Requirement	
	4.3 Installation Option	
	4.4 Tools Requirement	
	4.5 Additionally Required Materials	
5	Unpacking and Inspection	24
	5.1 Unpacking	24
	5.2 Scope of Delivery	25
6	Installation and Wiring about One Battery Pack	27
	6.1 Installation Procedure	27
	6.1.1 Floor Mounting	27
	6.1.2 Wall Mounting	
	6.2 Electrical Wiring	39
	6.2.1 PE Connection	40

	623	Communication Connection	42
	6.2.3		
		Cable Connection for One Battery Pack	
7		ion and Wiring about Two or More Battery Packs	
		llation Procedure	
	7.1.1	Floor Mounting	
	7.1.2	Wall Mounting	
	7.2 Elect	rical Wiring	63
	7.2.1	PE Connection	64
	7.2.2	Communication Connection	66
	7.2.3	Ring Terminal Installation	67
	7.2.4	Female Connector Installation	68
	7.2.5	Cable Connection for Two or More Battery Packs	72
8	Parallel	Connection	78
	8.1 Mate	rials Requirement	78
	8.2 Para	lel Cable Connection	79
9	System	Commissioning	82
	9.1 Ched	cking before Power-on	82
	9.2 Pow	ering on the System	82
	9.2.1	Battery System Connecting to SolaX Inverter	82
	9.2.2	Battery System Connecting to the Third-party Inverter	84
	9.3 Pow	ering off the System	86
10	Trouble	shooting and Maintenance	87
	10.1 Trou	bleshooting	87
	10.2 Main	tenance	91
11	Decom	missioning	92
	11.1 Disas	ssembling the Battery	92
	11.2 Pack	ing	94
	11.3 Disp	osing of the Rechargeable Battery	94
12	Technic	al Data	95

1 Safety

1.1 General Safety

Before transporting, storing, installing, operating, using and/or maintaining the device, please carefully read and understand the document, and strictly follow the instructions and safety precautions given herein, as well as symbols affixed on the device. The safety instructions herein are only supplements to local laws and regulations.

The operator should not only abide by all safety precautions provided in the document, including but not limited to the "Danger" sign, "Warning" sign, "Caution" sign, and "Notice" sign, but also comply with relevant international, national and local laws, regulations, standards, guidelines and industry rules in the process of transportation, storage, installation, operation, and maintenance. SolaX will not assume any responsibilities for the loss caused by improper operation, or violation of safety standards for design, production and equipment suitability.

SolaX will not be liable for maintenance for possible device failure, device malfunction, or parts damage, nor will the company assume any liability to pay compensation for the possible physical and property damage resulting from the installation environment that does not meet the design requirements.

The device is well designed and tested to meet all applicable state and international safety standards. However, like all electrical and electronic equipment, safety precautions must be observed and followed during the installation of the device to reduce the risk of personal injury and to ensure a safe installation.

SolaX will not assume any responsibilities if any of the following circumstances occur, including but not limited to:

- Device damage due to force majeure, such as earthquake, flooding, thunderstorm, lighting, fire hazard, volcanic eruption, war, typhoon, tornado, etc.
- Device damage due to human causes.
- Device used or operated against local policy or regulations.
- Failure to follow the operation instructions and safety precautions on the product and in this document.
- Installation and use under improper environment or electrical condition.
- Unauthorized modifications to the product or software.
- Device damage caused during transportation by the customer or the third party.
- Battery damage caused by strong vibrations from external factors before, during and after installation.
- Storage conditions that do not meet the requirements specified in this document.
- Use of incompatible inverters or devices.
- Installation and commissioning operated by unauthorized personnel who are not licensed and /or satisfy state and local jurisdiction regulations.

♠ DANGER!

- Overvoltage or wrong wiring may damage the battery pack and cause combustion which may be extremely dangerous;
- Leakage of electrolytes or flammable gas may be occurred due to any type of product breakdown;
- Do not install the battery pack in places where flammable and combustible materials are stored, and in which an explosive atmosphere is present;
- The battery pack wiring must be carried out by qualified personnel;
- Battery pack must be serviced by qualified personal;
- Ensure that the grounding cable is connected before handling the battery pack.

1.2 Battery Safety

♠ DANGER!

- DO keep the battery pack away from flammables materials, heat sources, and water sources;
- DO keep the battery pack out of reach of children and animals;
- DO practice proper battery storage by keeping the battery pack in a clean environment, free of dust, dirt and debris;
- DO store the battery pack in a cool and dry place;
- DO seal the outer cable connection hole to prevent ingress of foreign objects;
- DO confirm that the wiring of the device must be correct;
- DO install the device according to the local standards and regulations.
- DON'T use SolaX lithium battery in Lead-acid mode. Lead-acid mode not only reduce the lifespan of lithium batteries, but may also cause safety issues under extreme conditions. Any consequences arising from the use of lead-acid mode shall be borne by users themselves, and SolaX will not provide warranty!
- DON'T expose the battery pack to an open flame, or the temperature in excess of 140°F/60°C;
- DON'T install or operate the battery pack in places where there is excessive moisture or liquids;
- DON'T place the battery pack in a high-voltage environment;
- DON'T disconnect, disassemble or repair the device by unqualified personnel. Only
 a qualified personnel is allowed to handle, install and repair the device;
- DON'T damage the device by dropping, deforming, impacting, cutting or penetrating with a sharp object. Otherwise, it may cause a fire or leakage of electrolytes;
- DON'T touch the device if liquid spill on it. There is a risk of electric shock;
- DON'T step on the packaging or the device may be damaged;
- DON'T place any objects on top of the battery pack;
- DON'T charge or discharge a damaged battery pack;
- DON'T dispose of the battery pack in a fire. It may cause leakage or rupture;
- DON'T mix different types or makes of the battery pack. It may cause leakage or rupture, resulting in personal injury or property damage.

NOTICE!

In case the battery pack leaks electrolyte or any other chemical materials, or gas may be generated due to the leakage of battery pack, be sure to avoid contact with the discharge at all times. In case of accidentally coming into contact with them, please do as follows:

- In case of inhalation: Leave the contaminated area immediately, and seek medical attention at once:
- In case of contact with eyes: Rinse eyes with running water for 15 minutes, and seek medical attention:
- In case of contact with skin: Wash the contacted area thoroughly with soap, and seek medical attention;
- In case of ingestion: Induce vomiting, and seek medical attention.

If a fire breaks out where the battery pack is installed, please do as follows:

- In case the battery pack is charging when the fire breaks out, provide it is safe to do so, disconnect the battery pack circuit break to shut off the power charge;
- In case the device is not on fire yet, use a Class ABC fire extinguisher or a carbon dioxide extinguisher to extinguish the fire;
- If the battery pack catches fire, do not try to put out the fire, and evacuate immediately.
- The battery pack may catch fire when it is heated above 302°F/150°C; and in case of catching fire, it will produce noxious and poisonous gas, DO not approach and keep away.

Effective ways to deal with accidents

- In case of the damaged battery pack, place it into a segregated place, and call the local fire department at the place where the user lives or qualified personnel.
- If any part of the battery pack, or wiring is submerged, DO stay out of the water and DON'T touch anything; If the battery pack gets wet, DON'T touch it.
- If the battery pack is damaged, DON'T use it. Otherwise, it may result in both personal injury and property damage.
- DON'T use the submerged battery pack again, and contact the qualified personnel for assistance.
- DO contact SolaX immediately for assistance if the user suspects that the battery pack is damaged.

! CAUTION!

 If the battery pack is not installed within a month after receipt, it must be charged for maintenance. Non-operational batteries should be discarded according to the local regulations.

! WARNING!

- Do not crush or impact battery, and always dispose of it according to relevant safety regulations.
- The battery pack may catch fire when heated above 150°C/302°F.
- In case of catching fire, the battery pack will produce noxious and poisonous gases, and please keep away the battery.
- Damaged batteries may leak electrolyte or produce flammable gas. If users suspect that the battery is damaged, please immediately contact SolaX for advice and information.
- All operations of T-BAT-SYS-LD relating to electrical connection and installation must be carried out by qualified personnel.

2 Product Overview

! WARNING!

• The bi-directional energy storage inverter connected with the battery pack must be an isolated inverter.

2.1 Introduction

The battery system consists of one or more rechargeable batteries. A battery pack is a type of electrical battery which can charge or discharge loads.

There are two installation options, such as floor mounting and wall mounting, that a user can select from.

2.2 Product Appearance

2.2.1 Product Introduction

Product appearance

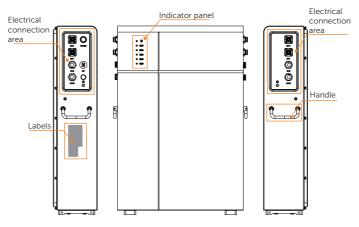


Figure 2-1 Appearance

Table 2-1	Description
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Item	Description
<u>"2.6 Label"</u>	Including performance label, which clearly identifies the device type, serial number, parameters, certification, etc., and manufacturer label describing name and address of manufacturer.
Electrical connection area	Including BAT+/BAT- ports, communication port, BMS port, grounding port, DIP, and POWER button. Please refer to <u>"Introduction of Electrical Connection Area"</u> for details.
Indicator panel	Provide a human-readable indication of an instrument signal. For details, please refer to <u>"2.3 Indicator Panel"</u> .
Handle	Lift the battery conveniently.

Weight and Dimension

Table 2-2 Weight and dimension of a battery pack

	Battery pack (TP-LD53)
Length (mm)	430
Width (mm)	150
Height (mm)	645
Net weight (kg)	48.5

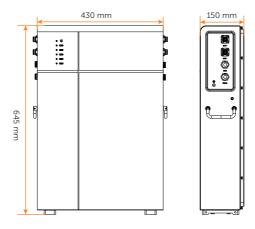


Figure 2-2 Dimension: Battery pack (TP-LD53)

2.2.2 Parts Introduction

Introduction of Electrical Connection Area

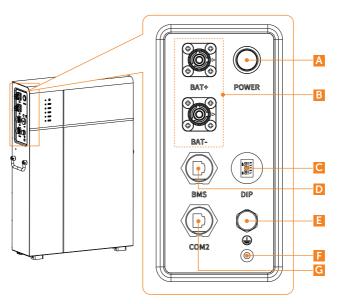


Figure 2-3 Left side of battery pack

Table 2-3 Description of ports and keys

Item	Description
А	Power button: Start/shut down system.
В	BAT+/BAT- port: Connect to the BAT+/BAT- port of the inverter or the adjacent battery pack.
С	"2.5 DIP Switch": Realize battery's parallel function (a reserved function).
D	"BMS" port: Connect to the "BMS" port on the inverter. Or, it shall be covered by a waterproof plug if it is not connected.
E	Breather valve: To balance the pressure differentials inside and outside a battery pack.
F	Grounding port: Connect to the grounding port of the battery pack or BMS.
G	COM2 port: Connect to the COM1 port of the neighbouring battery pack (if any). Or, it shall be covered by a waterproof cap if it is not connected.

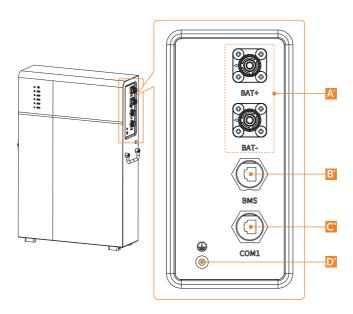


Figure 2-4 Right side of battery pack

Table 2-4 Description of ports

Item	Description
A'	BAT+/BAT- port: Connect to the BAT+/BAT- port of the inverter or the adjacent battery pack
В'	"BMS" port: Connect to the "BMS" port of the inverter, or it doesn't need to be connected. Or, it shall be covered by a waterproof plug if it is not connected.
C'	COM1 port: Connect to the COM2 port of the adjacent battery pack (if any). Or, it shall be covered by a waterproof cap if it is not connected.
D'	Grounding port: Connect to the grounding port of the neighbouring battery pack.

2.3 Indicator Panel

The battery pack is equipped with a monochrome status light (blue) and five tri-colour SOC power indicators (green/yellow/red) to show its operating status. The SOC power indicators show the current battery percentage.

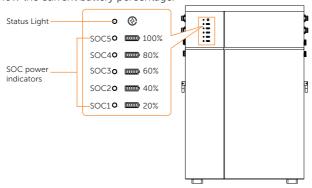


Figure 2-5 Indicators

Table 2-5 Information on indicators

Indication	LED	Description	Figure Illustration	
C1 1	Status light	Flash green		
Start up	SOC power indicators	Solid blue		
Self test	Status light	Solid yellow		
Sell test	SOC power indicators	Solid blue		
Ctandby	Status light	Solid green		
Standby	SOC power indicators	Solid blue		
	Status light	Flash green		
Charging	SOC power indicators	Please refer to <u>"Indicator information while charging"</u> for details.		
	Status light	Flash green		
Discharging	SOC power indicators	Please refer to "Indicator information while discharging" for details.		
	Status light	Solid yellow → Off	$\longrightarrow \longrightarrow$	
Shut down	SOC power indicators	Solid blue → Off	─ →	
Fourth	Status light	Flash red		
Fault	SOC power indicators	Solid blue		
Black start	Status light	Disease vertex to "2.4 Disease Chart" for details		
plack start	SOC power indicators	 Please refer to <u>"2.4 Black Start"</u> for deta 		

Indicator information while charging

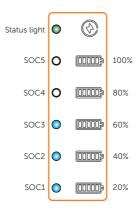


Figure 2-6 Indicator information while charging

If the battery level is at 60%, the SOC power indicators will show as follows:

- The first three SOC power indicators (SOC1, SOC2 and SOC3) will flash blue light every 1 second;
- The remaining SOC power indicators (SOC4 and SOC5) will be off.

Table 2-6 Indicator information while charging

SOC value	Status light	SOC1	SOC2	SOC3	SOC4	SOC5
80% < SOC ≤ 100%	Flash	Flash	Flash	Flash	Flash	Flash
60% < SOC ≤ 80%	Flash	Flash	Flash	Flash	Flash	Off
40% < SOC ≤60%	Flash	Flash	Flash	Flash	Off	Off
20% < SOC ≤ 40%	Flash	Flash	Flash	Off	Off	Off
0% < SOC ≤ 20%	Flash	Flash	Off	Off	Off	Off
SOC = 0%	Flash	Off	Off	Off	Off	Off

Note: The light for the status light is green and for the SOC power indicators is blue.

Indicator information while discharging

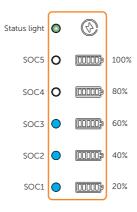


Figure 2-7 Indicator information while discharging

If the battery level is at 60%, the SOC power indicators will show as follows:

- The first three SOC power indicators (SOC1, SOC2, and SOC3) will remain on solid blue light;
- The remaining SOC power indicators (SOC4 and SOC5) will be off.

Table 2-7 Indicator information while discharging

SOC value	Status light	SOC1	SOC2	SOC3	SOC4	SOC5
80% < SOC ≤ 100%	Flash	Solid	Solid	Solid	Solid	Solid
60% < SOC ≤ 80%	Flash	Solid	Solid	Solid	Solid	Off
40% < SOC ≤60%	Flash	Solid	Solid	Solid	Off	Off
20% < SOC ≤ 40%	Flash	Solid	Solid	Off	Off	Off
0% < SOC ≤ 20%	Flash	Solid	Off	Off	Off	Off
SOC = 0%	Flash	Off	Off	Off	Off	Off

Note: The light for the status light is green and for the SOC power indicators is blue

2.4 Black Start

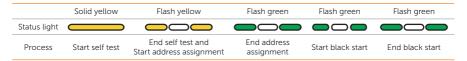
! WARNING!

- Except for the following two circumstances, do not use black start.
 - » The after-sales personnel checks the problem.
 - » The inverter is not turned on and requires the battery to supply power to it.

The equipment can provide Black Start capacity, meaning that our energy storage inverter and battery can continue to run even if the power grid and photovoltaic panel are out of service. The startup procedure is as follows:

Long press **POWER** button of the master battery pack for over 5 seconds. You can see the changes of status and SOC lights. See the following table and figure.

Table 2-8 Description of status light



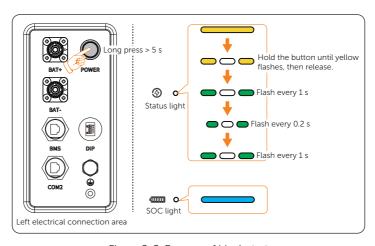


Figure 2-8 Process of black start

2.5 DIP Switch

A DIP Switch is actually a set of small manual electronic switches that are designed to be packaged with other circuits. It is currently equipped with the battery pack.

The location of the DIP switch and the factory defaults are shown as below.

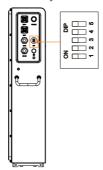


Figure 2-9 DIP Switch

Default Configuration

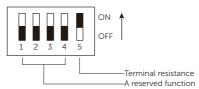


Figure 2-10 Default configuration

There are two circumstances, with details below:

- If there is onty one battery pack, keep the DIP switch as factory defaults (switch 5 in ON position).
- If the system is in parallel with two or more battery packs,
 - » For power expansion.
 - 1. If you connect the system to SolaX inverter, keep the **DIP** switch of all battery packs as by default. You could set it via the inverter screen. For details, see the user manual of inverter.
 - 2. If you connect the system to the third-party inverter, keep the **DIP** switch 5 in **ON** position and flip the **DIP** switch 1~4 to **ON** position on the primary battery pack (the one connects to inverter). Keep the **DIP** switch of secondary battery packs as by default.
 - » For capacity expansion, keep the **DIP** switch of all battery packs as by default.

NOTICE!

• To adjust the **DIP** switch, a small flat-head screwdriver should be prepared by the users themselves. **Do not use a pencil**. Graphite from the pencil is conductive and may damage the **DIP** switch.

2.6 Label

Some kinds of labels, such as a performance label, a manufacturer label, etc., should be pasted on the battery pack. The above-mentioned labels are located on the right side of the battery pack. For example, the performance label consists of the following parts:

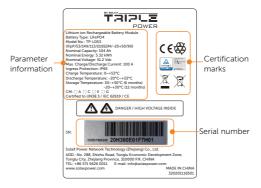
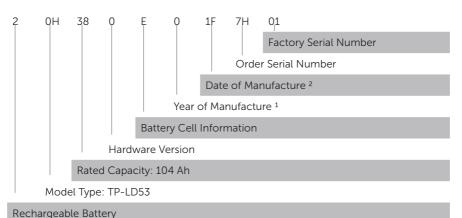


Figure 2-11 Label

Notice

 Regarding the SN, 32-base nomenclature is adopted to identify the type, specific features, manufacture date, order serial number, and factory serial number.

32-base Nomenclature



- 1 0-2023, 1-2024, 2-2025 A-2033, B-2034
- The two digits represent the week of when the battery pack was produced. There are totalling 52 weeks in a year, and the first week is represented by the number 00, and the second week is represented by the number 01. Do the rest in the same manner in accordance with the 32-base coding rule.

2.7 Explanation of Symbols and Icons

The meaning of the symbols and icons on the labels is shown as follows:

Table 2-9 Description of symbols

Table 2-9 Description of symbols			
Symbol	Description		
C€	CE mark. The rechargeable battery complies with the requirements of the applicable CE guidelines.		
TOWN-before CENTITO TOWN-before TOWN-	TUV certified.		
	The battery system must be disposed of at a proper facility for environmentally-safe recycling.		
	The battery pack may explode. The rechargeable battery can become hot during operation. Avoid contact during operation.		
A	Danger of high voltages. Danger to life due to high voltages in the rechargeable battery!		
\wedge	Danger. Risk of electric shock!		
(i)	Observe enclosed documentation.		
	The rechargeable can not be disposed together with the household waste.		
	The rechargeable can not be disposed together with the household waste.		
Tri S	Keep the battery system away from children.		
(b)	Keep the battery system away from open flames or ignition sources.		

3 Transportation and Storage

If the rechargeable battery are not put into use immediately, the transportation and storage requirements needs to be met:

3.1 Transportation Requirements

- Observe the caution signs on the packaging of battery before transportation.
- Pay attention to the weight of the rechargeable battery. Be cautious to avoid injury when carrying battery pack (TP-LD53). Regarding the actual number of installers, please strictly comply with the local laws and regulations where the user is located.
- Wear protective gloves when carrying the equipment by hand to prevent injuries.
- When lifting up the rechargeable battery, hold the handle position and the bottom position of the battery. Keep the rechargeable battery horizontal in case of falling down due to tilt.

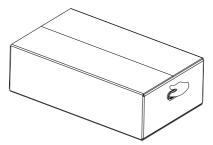


Figure 3-1 Handle position of carton

3.2 Storage Requirements

- Do not remove the original packaging material and check the outer packaging material regularly.
- The required storage temperature: the service life may be up to 6 months in case the temperature is between 30°C and +50°C, or it may be up to 12 months in case the temperature is between -20°C and +30°C. See Table 3-1. Regarding charging interval, please refer to "10.2 Maintenance".

Table 3-1 Storage temperature and time

Storage Temperature	Storage Time
30°C to 50°C	6 months
-20°C to 30°C	12 months

- The relative humidity should be between 4% and 100%.
- Stack the battery in accordance with the caution signs on the battery carton to
 prevent their falling down and device damage. Do not place it upside down.
- If the rechargeable battery has been stored for more than 1 year, it must be checked and tested by professionals before use.

4 Preparation before Installation

4.1 Selection of Installation Location

The installation location selected for the rechargeable battery is quite critical in the aspect of the guarantee of machine safety, service life and performance.

- It has the IP65 ingress protection, which allows it to be installed outdoor;
- Before installing the battery system, lay out available floor space or wall space including aisles for installation, maintenance and possible battery pack replacement.

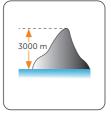
4.2 Installation Environment Requirement

Make sure the installation site meets the following conditions:

- The operating temperature: -20°C to +53°C;
- The humidity shall be between 4-100%;
- Do not install the rechargeable battery in the areas where the altitude exceeds 3000 m;
- Install the rechargeable battery in a well-ventilated environment for heat dissipation;
- Do not install the rechargeable battery in areas with flammable, explosive and corrosive materials:
- Do not install the rechargeable battery in areas near combustibles and antenna
- You are recommended to install an awning over it.























NOTICE

- For outdoor installation, precautions against direct sunlight, rain exposure and snow laying up are recommended.
- Exposure to direct sunlight raises the temperature inside the battery. This temperature rise poses no safety risks, but may impact the battery performance.

4.2.1 Installation Carrier Requirement

The mounting location must be suitable for the weight and dimensions of the product and the support surface for installation must be made of a non-flammable material.

- Solid brick/concrete;
- Either floor mounting or wall mounting, the bearing capacity of the area to place or install a battery pack must be over 200 kg;
- Please ensure that the thickness of any part of the wall should not be less than 100 mm:
- The device must not be installed on the wood wall

4.2.2 Clearance Requirement

To guarantee proper heat dissipation and ease of disassembly, the minimum space around the rechargeable battery must meet the standards indicated below.

- No matter which floor mounting or wall mounting is chosen, a distance between 200 and 300 mm wide shall be provided from the wall to the edge of the battery pack.
- No matter which floor mounting or wall mounting is chosen, a distance between 400 and 600 mm wide shall be provided from the left side edge of a battery pack to the right side edge of the neighbouring battery packs.
- In the case of floor mounting, a distance of 55 mm shall be provided from the rear side of the battery pack to the wall.
- In the case of wall mounting, the distance between 300 and 350 mm shall be provided from the grounding to the bottom of the battery pack.

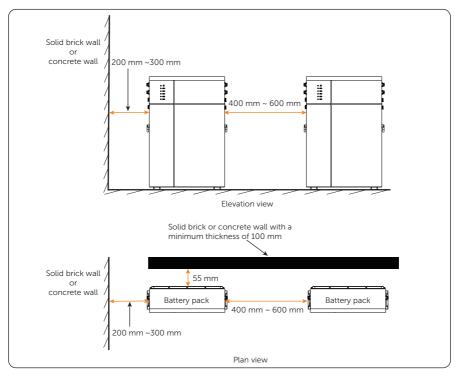


Figure 4-1 Clearance requirement about floor mounting

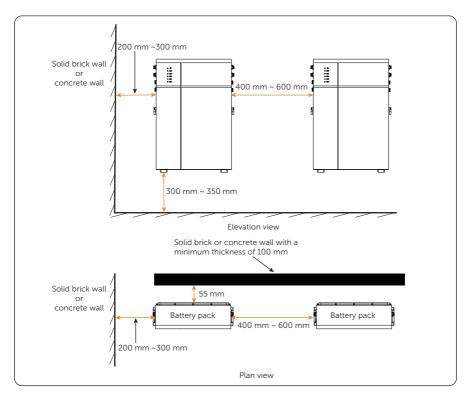


Figure 4-2 Clearance requirement about wall mounting

4.3 Installation Option

There are two options: floor mounting, and wall mounting.

• Both the floor and wall mounting may withstand up to sixteen battery packs.

Table 4-1 Number of battery pack

	Floor mounting	Wall mounting
Max. number of battery packs	16	16

 Either the floor or wall mounting, the bearing capacity of the grounding or the wall, which enables it to bear the loads from the whole battery system, must be over 200 kg.

Table 4-2 Bearing capacity

	Floor mounting	Wall mounting
Bearing capacity of the supporting surface of a battery pack	≥ 200 kg	≥ 200 kg

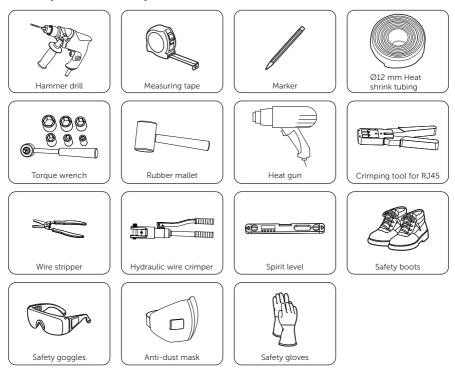
• Either the floor or wall mounting, the distance from the battery pack to the wall, the neighbouring battery pack, or the grounding shall be provided as below.

Table 4-3 Distance requirement

	Floor mounting	Wall mounting
Distance from the edge of the battery pack to the wall	200 mm ~ 300 mm	200 mm ~ 300 mm
Distance from the back of the battery pack to the wall	55 mm	55 mm
Distance from the edge of the battery pack to the edge of the neighbouring battery pack	400 mm ~ 600 mm	400 mm ~ 600 mm
Distance from the bottom of the battery pack to the ground	/	300 mm ~ 350 mm

4.4 Tools Requirement

Installation tools include but are not limited to the following recommended ones. If necessary, use other auxiliary tools on site.



4.5 Additionally Required Materials

The following is a recommended list of equipment required for installation of the battery system.

Table 4-4 Additionally required wires

No.	Required Material	Type	Diameter/ Conductor Cross-section
1	Protective pipe	Corrugated pipe	External diameter: over 60 mm
2	Grounding cable	/	16 mm²

5 Unpacking and Inspection

5.1 Unpacking

- The rechargeable battery undergoes 100% testing and inspection before shipping
 from the manufacturing facility. However, transport damage may still occur.
 Before unpacking the rechargeable battery, please verify that the model and outer
 packing materials for damage, such as holes and cracks.
- Unpacking the battery pack according to the following figures. If there are other
 cartons, such as the rack carton, cabinet carton, cables carton, or cartons about
 wall mounting, the unpacking procedure can also be referred to the following
 figures.

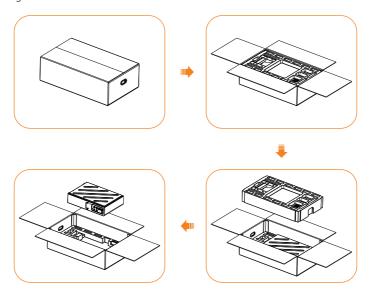
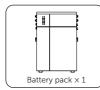


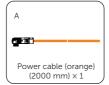
Figure 5-1 Unpacking the battery pack

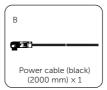
- Be careful when dealing with all package materials which may be reused for storage and relocation of the rechargeable battery in the future.
- Upon opening the package, check whether the appearance of the rechargeable battery is damaged or lack of accessories. If any damage is found or any parts are missing, contact your dealer immediately.

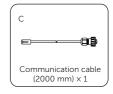
5.2 Scope of Delivery

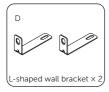
One Battery Pack (TP-LD53)

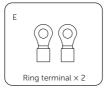


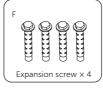




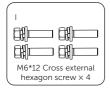


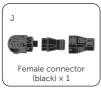


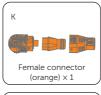


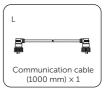


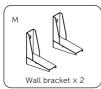












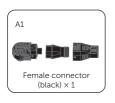


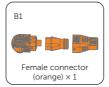


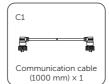
NOTICE

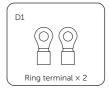
- The above accessories kit applies to the installation options of both floor mounting and wall mounting.
- The above items are only for one battery pack. Our company will provide corresponding components according to the battery packs.

Accessories Kit for Cables (for two adjacent battery packs)









NOTICE

• The above accessories required for parallel operation are included in the battery accessories kit and do not need to be purchased. Only in the event of missing or damaged accessories on site is it necessary to purchase accessories kit.

6 Installation and Wiring about One Battery Pack

6.1 Installation Procedure

∕¶ WARNING!

- Only the qualified personnel can perform the mechanical installation following the local standards and requirements.
- Check the existing power cables or other piping in the wall to prevent electric shock or other damage.
- The bi-directional energy storage inverter connected with the battery pack must be an isolated inverter.

! CAUTION!

- Always be aware of the weight of the battery. Personal injuries may result if the battery is lifted improperly or dropped while being transported or mounted.
- Be sure you have all the proper protective clothing, safety tools, and equipment on hand before stating the installation.
- Keep the work area clean and well lit. Cluttered or dark areas invite accidents.

6.1.1 Floor Mounting

WARNING!

• The site for installing the battery pack must be level (no slope, no pothole).

NOTICE

- Allow sufficient clearance between adjacent walls or equipment for proper installation of the battery pack.
- The following steps take one (1) battery pack as an example.

Step 1: Fix the L-shaped wall bracket (Part D) to the battery pack with M6*12 cross external hexagon screw (Part I) $(\times 2 \text{ pcs})$, but do not tighten them fully.

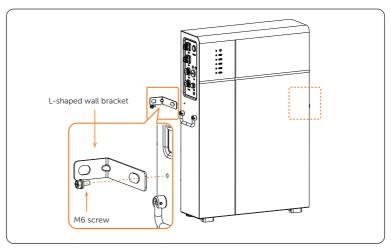


Figure 6-1 Fixing L-shaped wall bracket to the battery pack

NOTICE

• Do not tighten the screws fully.

Step 2: Locate the L-shaped wall bracket against the wall.

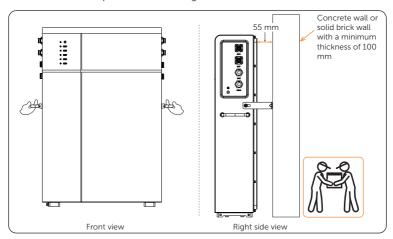


Figure 6-2 Locating the battery pack against the wall

NOTICE!

• At least two persons are required to lift the battery pack.

Step 3: Draw a circle along the inner ring, with one on each side. Then gently move the battery pack aside.

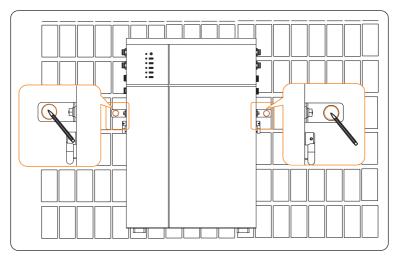


Figure 6-3 Drawing circles

Step 4: Drill two holes at a depth of more than 60 mm in the concrete wall (or solid brick wall) by using a Drill (Ø10 mm).

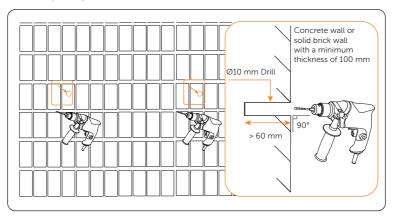


Figure 6-4 Drilling holes

NOTICE!

- The battery pack can only be installed on the concrete wall or the solid brick wall.
- To prevent angled holes from being drilled, it is suggested to use a Ø8 mm Drill to drill holes first, and then change to a Ø10 mm Drill.
- An electric drill dust collector is recommended.

Step 5: Insert the expansion bolt (Part G) (x 2 pcs) into the two holes.

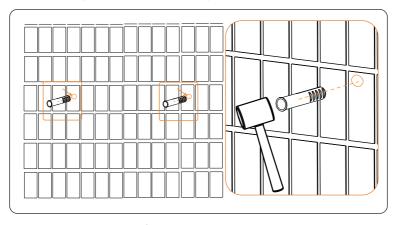


Figure 6-5 Inserting expansion bolts

Step 6: Gently move the battery pack against the wall, and align the holes drilled previously.

Correctly insert and tighten self-tapping screw (Part H) (x 2 pcs) to secure the L-shaped wall bracket on both sides to the wall (Tightening torque: 6-8 N·m).

Fully tighten the M6*12 cross external hexagon screw (\times 2 pcs) on both sides (Tightening torque: 4-5 N·m).

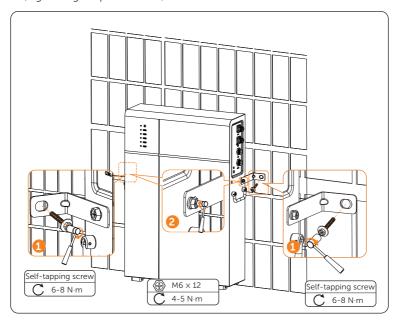


Figure 6-6 Tightening tapping screws and M6 screws

NOTICE

• At least two persons are required to lift the battery pack.

6.1.2 Wall Mounting

Step 1: Attach the circle drawing board to the wall, and make sure that it is level via the cylindrical plastic bubble spirit level on the board.

Draw a circle along the inner ring on the board, with a total of 4 circles.

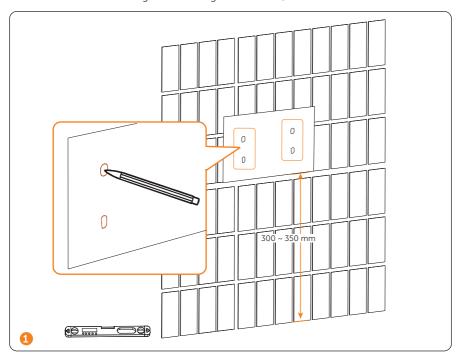


Figure 6-7 Drawing circles

NOTICE

• A distance between 300 and 350 mm from the bottom of the circle drawing board to the ground must be reserved.

Step 2: Remove the circle drawing board, and then drill four holes at a depth of more than 90 mm in the concrete wall (or solid brick wall) by using a Drill (Ø12 mm).

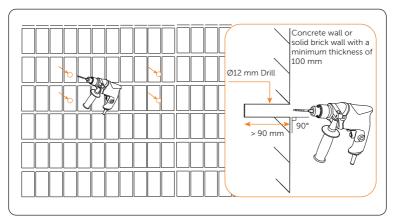


Figure 6-8 Drawing holes

- To prevent angled holes from being drilled, it is suggested to use a Ø10 mm Drill to drill holes first, and then change to a Ø12 mm Drill.
- Currently, the battery pack can only be installed on the concrete wall or the solid brick wall.
- An electric drill dust collector is recommended.

Step 3: Attach the wall bracket to the wall, and correctly insert and tighten expansion screw (Part F) (\times 4 pcs) to secure the wall bracket (Tightening torque: 14-16 N·m).

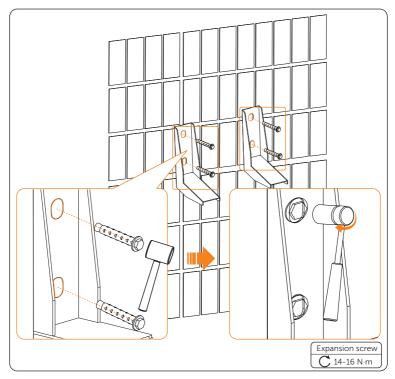


Figure 6-9 Tightening expansion screw

 Please make sure that it is level via the cylindrical plastic bubble spirit level on the wall bracket.

Step 4: Fix the L-shaped wall bracket (Part D) to the battery pack with M6*12 cross external hexagon screw (Part I) $(x \ 2 \ pcs)$, but do not tighten them fully.

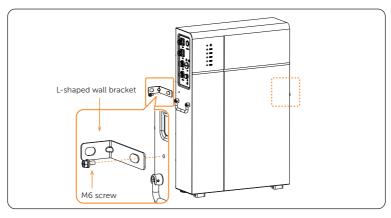


Figure 6-10 Fixing L-shaped wall bracket to the battery pack

• Do not tighten the screws fully.

Step 5: Gently lift the battery pack onto the wall bracket, and locate it against the wall bracket.

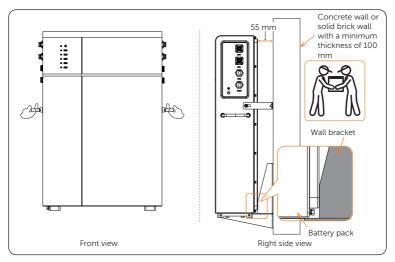


Figure 6-11 Lifting the battery pack

- At least two persons are required to lift the battery pack.
- The battery pack shall be located against the wall bracket.

Step 6: Draw a circle along the inner ring, with one on each side.

Then gently carry the battery pack down to the ground.

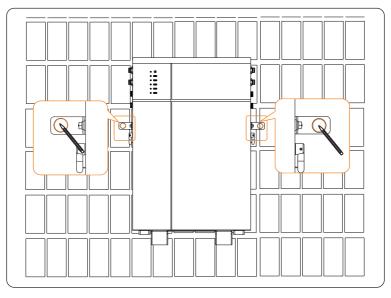


Figure 6-12 Drawing circles

NOTICE

• It needs a second person to hold the battery pack to prevent it from falling from the wall bracket when installation.

Step 7: Drill two holes at a depth of more than 60 mm in the concrete wall (or solid brick wall) by using a Drill (Ø10 mm).

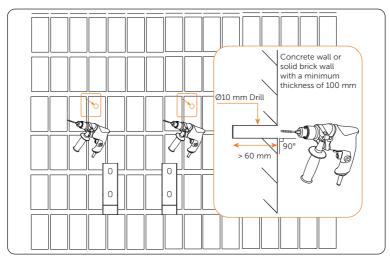


Figure 6-13 Drilling holes

- Currently, the battery pack can only be installed on the concrete wall or the solid brick wall.
- To prevent angled holes from being drilled, it is suggested to use a Ø8 mm Drill to drill holes first, and then change to a Ø10 mm Drill.
- An electric drill dust collector is recommended.

Step 8: Insert the expansion bolt (Part G) (x 2 pcs) into the two holes.

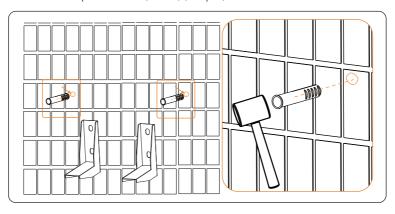


Figure 6-14 Insert expansion bolts

Step 9: Gently lift the battery pack onto the wall bracket, and locate it against the wall bracket.

Correctly insert and tighten self-tapping screw (Part H) (x 2 pcs) to secure the L-shaped wall bracket on both sides to the wall (Tightening torque: 6-8 N·m).

Fully tighten the M6*12 cross external hexagon screw (\times 2) on both sides (Tightening torque: 4-5 N·m).

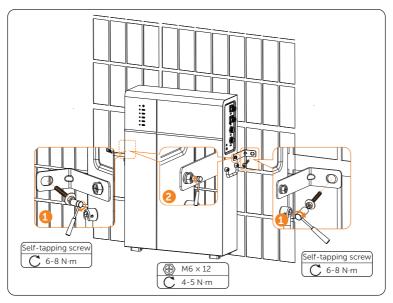


Figure 6-15 Tightening tapping screws and M6 screws

NOTICE

• At least two persons are required to lift the battery pack.

6.2 Electrical Wiring

NOTICE

- Regarding the PE and communication cable, of which one end connects to the inverter, it shall be made before conducting wiring.
- Regarding the power cable connecting two adjacent battery packs, the female connector onto the power cable must be made before conducting wiring.

 If any of the following ports BAT+/BAT-, BMS, or COM1/COM2:
- are connecting cables, please remove waterproof caps;
- aren't connecting cables, please don't remove waterproof caps.

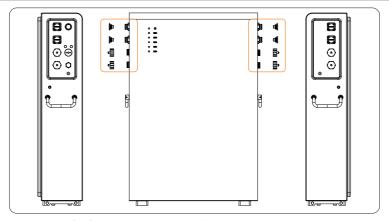


Figure 6-16 Removing waterproof caps when connecting cables

The installation diagram about one battery pack with an inverter, see the following figure:

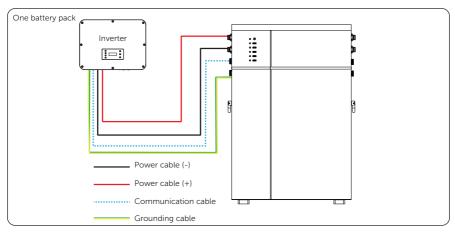


Figure 6-17 Installation diagram for one battery pack

Cables in the Accessories Kit for Battery pack

Table 6-1 Cable information

Cable	Length	Description
Power cable (+)	2000 mm	"BAT+" port of battery pack \rightarrow "BAT+" port of inverter.
Power cable (-)	2000 mm	"BAT-" port of battery pack \Rightarrow "BAT-" port of inverter.
Communication cable	2000 mm	"BMS" port of battery pack \rightarrow "BMS" port of inverter
Communication cable	1000 mm	"COM1" port of battery pack → "COM2" port of adjacent battery packs.

6.2.1 PF Connection

The steps for making PE connection are shown as follows:

Step 1: Strip the cable jacket about 12 to 15 mm from the end.

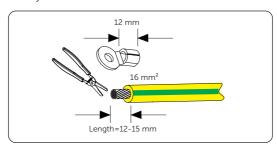


Figure 6-18 Striping cable jacket

Step 2: Cut the heat-shrink tubing to about 28 to 30 mm long, carefully slide it onto the end of the cable, and then carefully slip the wires all the way into the ring terminal (Part E).

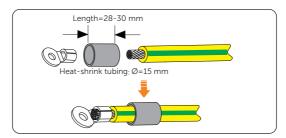


Figure 6-19 Cutting heat-shrink tubing

Step 3: Crimp the terminal, and heat the heat-shrink tubing after it wraps the end of terminal.

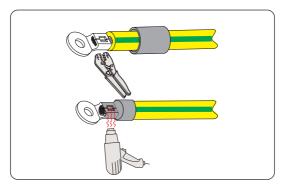


Figure 6-20 Crimping and heating

Step 4: Unscrew the M5 screw, and then connect the assembled grounding cable to the grounding port of the battery pack, and then tighten M5 screw (Tightening torque: 2.5-3 N·m).

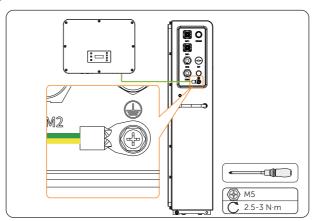


Figure 6-21 Tightening M5 screws

NOTICE

 Regarding the grounding cable that is prepared by the user, a wire size of 16 mm² for the cable is recommended.

6.2.2 Communication Connection

To ensure normal operation between the battery pack and inverter, the communication cable connecting from the battery pack to the inverter is required to connect RJ45 connector.

Make sure that the "BMS" port on the battery pack connects to the inverter is Pin to Pin. The "BMS" port pin assignment is shown as follows:

Table 6-2 "BMS" port pin assignment

PIN	1	2	3	4	5	6	7	8
BMS	RS485B	RS485A	GND	CAN-H	CAN-L	12V-OUT	MASTER-IN	/

The wire sequence of one terminal connecting to the inverter is the same as the wire sequence of the other terminal, connecting to the battery pack.

The wire sequence is shown as follows:

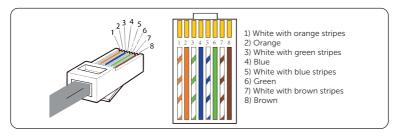


Figure 6-22 Wire sequence

The steps for making RJ45 connector to communication cable (Part C) are shown as follows:

- **Step 1:** Strip the cable jacket about 15 mm down from the end.
- **Step 2:** Carefully insert the wires all the way into the RJ45 connector, making sure that each wire passes through the appropriate guides inside the connector.
- **Step 3:** Push the RJ45 inside the crimping tool and squeeze the crimper all the way down.

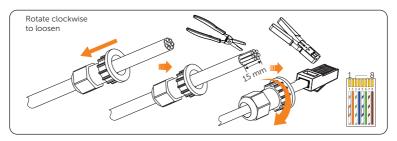


Figure 6-23 Making RJ45 connector to communication cable

- The communication cable shall have a shield layer.
- The communication cable is delivered with the Accessories Kit for Cables.

6.2.3 Female Connector Installation

A power cable consists of a flexible cord with connectors, male and female. Since the power cables provided are only attached to the male connector, the female connector must be installed onto the power cable by the user himself/herself before conducting wiring between **battery packs**. The installation procedure of female connector onto the power cable is shown as follows:

Step 1: Take out the power cables (Parts A and B), and connectors (Parts J and K) (including connector body, cable seal ring, and tail cover).

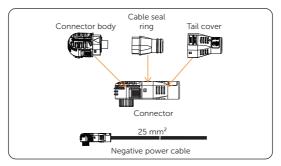


Figure 6-24 Taking out accessories

NOTICE!

 To ensure that both connectors and power cables are connected correctly, an orange female connector shall be connected to the orange power cable, as well as a black female connector to the black power cable.

Step 2: Orderly insert the stripped wire into the tail cover and cable seal ring.

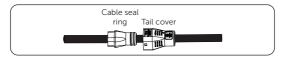


Figure 6-25 Inserting the stripped wire

Step 3: With care, strip the cable jacket about 15 ± 1 mm from the end.

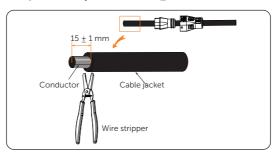


Figure 6-26 Striping cable jacket

- DO NOT damage the conductor while sliding the jacket off the power cable end.
- The wire size of the power cable delivered with the accessories kit is 25 mm² (UL10269 3 AWG).

Step 4: Fit the connector body over the conductor strands, and squeeze the crimper to crimp the terminal. The conductor strands exposed shall not be over 1 mm.

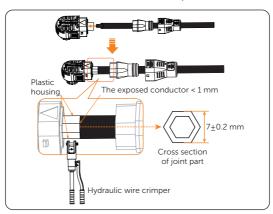


Figure 6-27 Fitting connector body and crimping terminal

- Properly place the plastic housing into a hydraulic wire crimper.
- DO NOT place the conductor insulation into the connector body.
- DO NOT crush the plastic housing while crimping.
- DO NOT crush or damage the conductor insulation while crimping.

Step 5: Orderly push the cable seal ring and tail cover into the body. The sound of "Click" will be heard when the tail cover is properly plugged into the body.

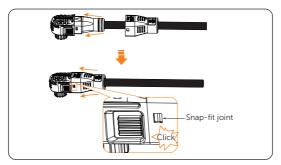


Figure 6-28 Assembling connector

 User should hear the sound of "Click" while pressing the tail cover into the location position.

Step 6: Make the positive power cable according to the above steps.

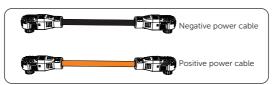


Figure 6-29 Making positive power cable

After finishing the installation of the female connector onto the power cable, and due to the special terminal connector on the power cable, please note the following details.

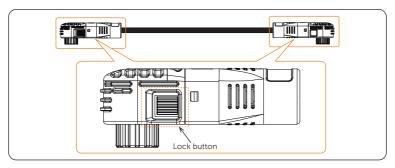


Figure 6-30 Lock button

- The Figure 6-33 is the power cable that finishes the installation of the female connector.
- Press and hold the "Lock button" while unplugging the power cable. Otherwise, it cannot be pulled out.
- Don't violently remove the power cables when they are locked.

6.2.4 Cable Connection for One Battery Pack

№ WARNING!

- Only the qualified personnel can perform the wiring.
- Follow this manual to wire connection. The device damage caused by incorrect cabling is not in the scope of warranty.
- Inspect each terminal for visual signs of mechanical defects.
- The order of power cable connection: negative power cable → positive power cable.

! CAUTION!

- Use insulated tools and wear individual protective tools when connecting cables.
- Do not bend the power cable, particularly at the point where the cable joins the connector, at 90° while conducting wiring.
- When the cable insulation layer is chewed through, this can cause short circuits and
 potentially start an electrical fire. Therefore, where there is a risk of pests, rodents, or
 termites, protective barriers or additives are suggested to be added to the cables to
 prevent damage.

NOTICE!

- The electrical connection areas on both sides of the battery pack are allowed to conduct wiring with the inverter.
- The wiring procedure applies to both floor mounting and wall mounting.

The left electrical connection area for one battery pack

Step 1: Connect the negative power cable to the "BAT-" ports of the battery pack and inverter

Connect the positive power cable to the "BAT+" ports of the battery pack and inverter.

Connect the communication cable (Part C) to the "BMS" ports of the battery pack and inverter.

Make sure that power cables and communication cable are wired correctly, as shown in Figure 6-34. Failing to do so may cause severe damage to your battery pack.

Table	6-3	Cable	inforr	mation

Cable	Length	Purpose (from battery pack to inverter)	Qty
Communication cable	2000 mm	"BMS" port to "BMS" port	1 рс
Power cable (black)	2000 mm	"BAT-" port to "BAT-" port	1 рс
Power cable (orange)	2000 mm	"BAT+" port to "BAT+" port	1 рс

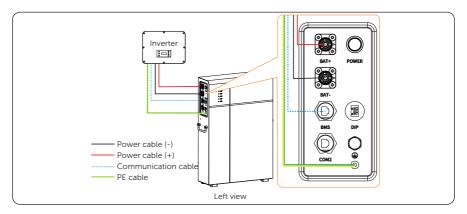


Figure 6-31 Cable connection of the left electrical connection area

- Regarding the making process of grounding cable, please refer to "PE Connection".
- Regarding the making process of communication cable, please refer to <u>"6.2.2"</u> Communication Connection".
- While plugging in the power cables, a "Click" sound indicates that the cable connectors are properly plugged into the port.
- The waterproof cap has been covered before delivery.
- Don't violently remove the power cables when they are locked.

Tip: Use safety gloves when connecting battery packs.

The right electrical connection area for one battery pack

Step 1: Connect the negative power cable to the "BAT-" ports of the battery pack and inverter.

Connect the positive power cable to the "BAT+" ports of the battery pack and inverter.

Connect the communication cable (Part C) to the "BMS" ports of the battery pack and inverter.

Ensure that power cables and communication cable are wired correctly, as shown in Figure 6-35. Failing to do so may cause severe damage to the battery pack.

	Table	6-4	Cable	info	ormation
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Cable	Length	Purpose (from battery pack to inverter)	Qty
Communication cable	2000 mm	"BMS" port to "BMS" port	1 рс
Power cable (black)	2000 mm	"BAT-" port to "BAT-" port	1 рс
Power cable (orange)	2000 mm	"BAT+" port to "BAT+" port	1 pc

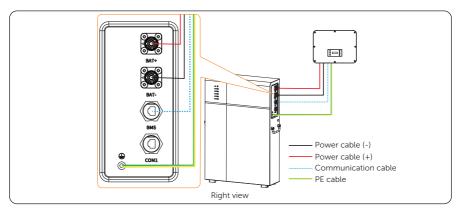


Figure 6-32 Cable connection of the right electrical connection area

- Regarding the making process of grounding cable, please refer to "PE Connection".
- Regarding the making process of communication cable, please refer to <u>"6.2.2"</u> Communication Connection".
- While plugging in the power cables, a "Click" sound indicates that the cable connectors are properly plugged into the port.
- The waterproof cap has been covered before delivery.
- Don't violently remove the power cables when they are locked.

7 Installation and Wiring about Two or More Battery Packs

7.1 Installation Procedure

/!\ WARNING!

- Only the qualified personnel can perform the mechanical installation following the local standards and requirements.
- Check the existing power cables or other piping in the wall to prevent electric shock or other damage.
- The bi-directional energy storage inverter connected with the battery pack must be an isolated inverter.

! CAUTION!

- Always be aware of the weight of the battery. Personal injuries may result if the battery is lifted improperly or dropped while being transported or mounted.
- Be sure you have all the proper protective clothing, safety tools, and equipment on hand before stating the installation.
- Keep the work area clean and well lit. Cluttered or dark areas invite accidents.

7.1.1 Floor Mounting

WARNING!

• The site for installing the battery pack must be level (no slope, no pothole).

- Allow sufficient clearance between adjacent walls or equipment for proper installation of the battery pack.
- The following steps take one (1) battery pack as an example.

Step 1: Fix the L-shaped wall bracket (Part D) to the battery pack with M6*12 cross external hexagon screw (Part I) $(\times 2 \text{ pcs})$, but do not tighten them fully.

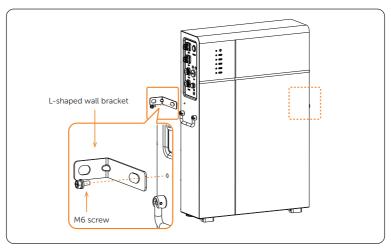


Figure 7-1 Fixing L-shaped wall bracket to the battery pack

• Do not tighten the screws fully.

Step 2: Locate the L-shaped wall bracket against the wall.

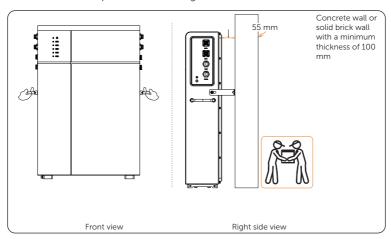


Figure 7-2 Locating the battery pack against the wall

• At least two persons are required to lift the battery pack.

Step 3: Draw a circle along the inner ring, with one on each side. Then gently move the battery pack aside.

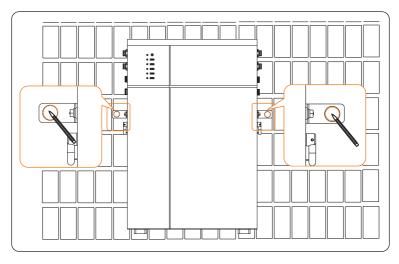


Figure 7-3 Drawing circles

Step 4: Drill two holes at a depth of more than 60 mm in the concrete wall (or solid brick wall) by using a Drill (Ø10 mm).

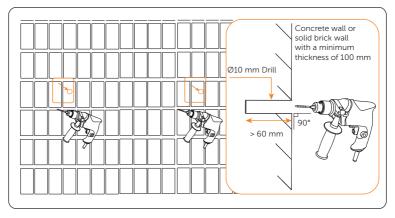


Figure 7-4 Drilling holes

- The battery pack can only be installed on the concrete wall or the solid brick wall.
- To prevent angled holes from being drilled, it is suggested to use a Ø8 mm Drill to drill holes first, and then change to a Ø10 mm Drill.
- An electric drill dust collector is recommended.

Step 5: Insert the expansion bolt (Part G) (x 2 pcs) into the two holes.

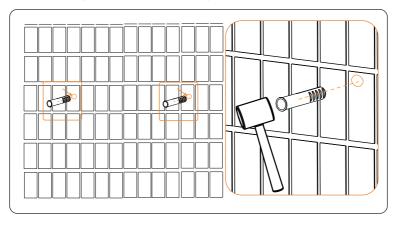


Figure 7-5 Inserting expansion bolts

Step 6: Gently move the battery pack against the wall, and align the holes drilled previously.

Correctly insert and tighten self-tapping screw (Part H) (\times 2 pcs) to secure the L-shaped wall bracket on both sides to the wall (Tightening torque: 6-8 N·m).

Fully tighten the M6*12 cross external hexagon screw (\times 2 pcs) on both sides (Tightening torque: 4-5 N·m).

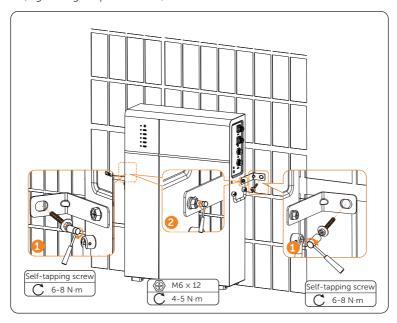


Figure 7-6 Tightening tapping screws and M6 screws

NOTICE

• At least two persons are required to lift the battery pack.

Step 7: Repeat steps 1 to 6 to install the second battery pack, as well as the remaining battery packs (if any).

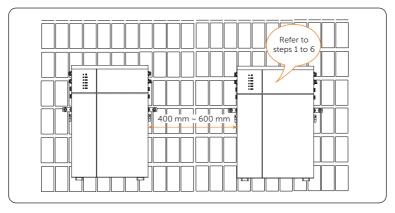


Figure 7-7 Installing the remaining battery pack

- The distance between 400 and 600 mm wide shall be provided from the left side edge of a battery pack to the right side edge of the neighbouring battery pack.
- Up to sixteen (16) battery packs can be installed in a straight line.

7.1.2 Wall Mounting

Step 1: Attach the circle drawing board to the wall, and make sure that it is level via the cylindrical plastic bubble spirit level on the board.

Draw a circle along the inner ring on the board, with a total of 4 circles.

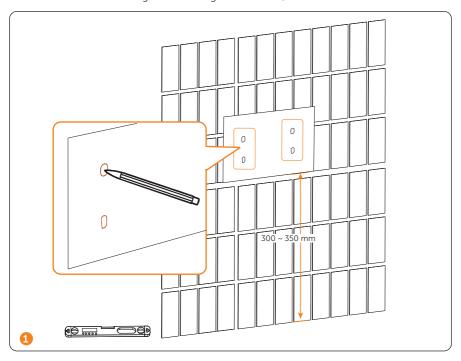


Figure 7-8 Drawing circles

NOTICE

• A distance between 300 and 350 mm from the bottom of the circle drawing board to the ground must be reserved.

Step 2: Remove the circle drawing board, and then drill four holes at a depth of more than 90 mm in the concrete wall (or solid brick wall) by using a Drill (Ø12 mm).

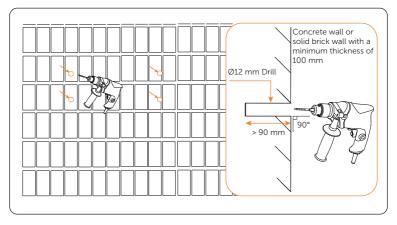
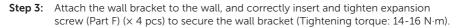


Figure 7-9 Drawing holes

- To prevent angled holes from being drilled, it is suggested to use a Ø10 mm Drill to drill holes first, and then change to a Ø12 mm Drill.
- Currently, the battery pack can only be installed on the concrete wall or the solid brick wall.
- An electric drill dust collector is recommended.



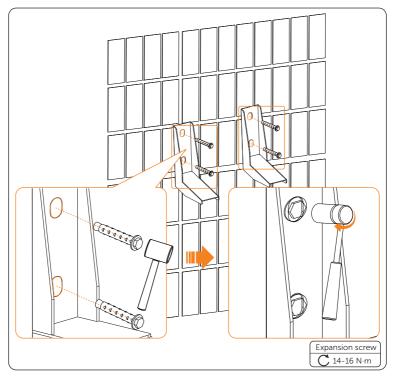


Figure 7-10 Tightening expansion screw

 Please make sure that it is level via the cylindrical plastic bubble spirit level on the wall bracket. **Step 4:** Fix the L-shaped wall bracket (Part D) to the battery pack with M6*12 cross external hexagon screw (Part I) (\times 2 pcs), but do not tighten them fully.

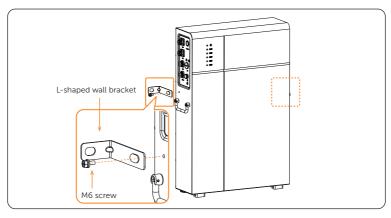


Figure 7-11 Fixing L-shaped wall bracket to the battery pack

NOTICE!

• Do not tighten the screws fully.

Step 5: Gently lift the battery pack onto the wall bracket, and locate it against the wall bracket.

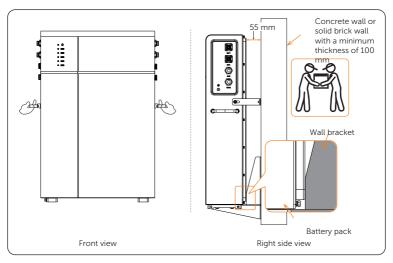


Figure 7-12 Lifting the battery pack

- At least two persons are required to lift the battery pack.
- The battery pack shall be located against the wall bracket.

Step 6: Draw a circle along the inner ring, with one on each side.

Then gently carry the battery pack down to the ground.

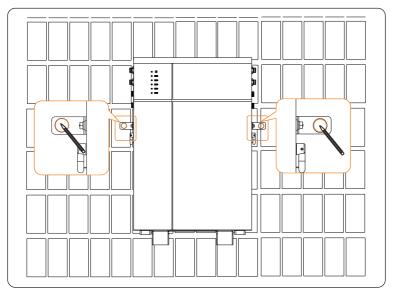


Figure 7-13 Drawing circles

NOTICE

 It needs a second person to hold the battery pack to prevent it from falling from the wall bracket when installation.

Step 7: Drill two holes at a depth of more than 60 mm in the concrete wall (or solid brick wall) by using a Drill (Ø10 mm).

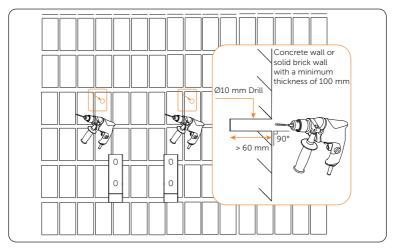


Figure 7-14 Drilling holes

- Currently, the battery pack can only be installed on the concrete wall or the solid brick wall.
- To prevent angled holes from being drilled, it is suggested to use a Ø8 mm Drill to drill holes first, and then change to a Ø10 mm Drill.
- An electric drill dust collector is recommended.

Step 8: Insert the expansion bolt (Part G) (x 2 pcs) into the two holes.

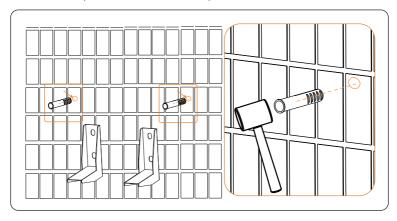


Figure 7-15 Insert expansion bolts

Step 9: Gently lift the battery pack onto the wall bracket, and locate it against the wall bracket.

Correctly insert and tighten self-tapping screw (Part H) (x 2 pcs) to secure the L-shaped wall bracket on both sides to the wall (Tightening torque: 6-8 N·m).

Fully tighten the M6*12 cross external hexagon screw (x 2) on both sides (Tightening torque: $4-5 \text{ N} \cdot \text{m}$).

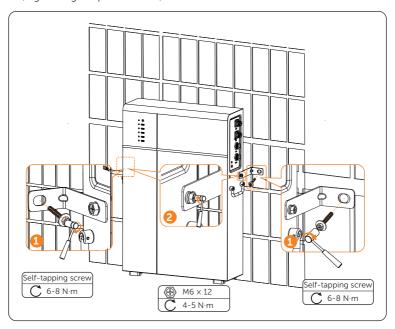
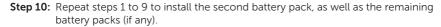


Figure 7-16 Tightening tapping screws and M6 screws

NOTICE!

• At least two persons are required to lift the battery pack.



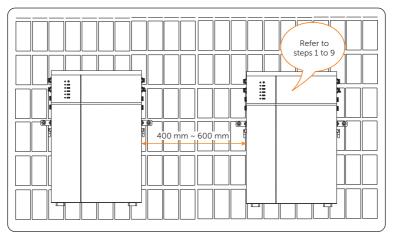


Figure 7-17 Installing the remaining battery pack

- The distance between 400 and 600 mm wide shall be provided from the left side edge of a battery pack to the right side edge of the neighbouring battery packs.
- Up to sixteen (16) battery packs can be installed in a straight line.

7.2 Electrical Wiring

NOTICE

- Regarding the PE and communication cable, of which one end connects to the inverter, it shall be made before conducting wiring.
- Regarding the power cable connecting two adjacent battery packs, the female connector onto the power cable must be made before conducting wiring.

 If any of the following ports BAT+/BAT-, BMS, or COM1/COM2:
- are connecting cables, please remove waterproof caps;
- aren't connecting cables, please don't remove waterproof caps.

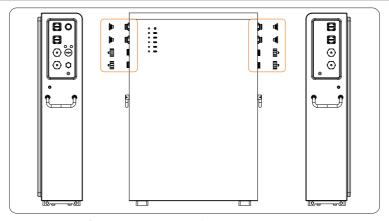


Figure 7-18 removing waterproof caps when connecting cables

The installation diagram about two or more battery packs with an inverter, see the following figure:

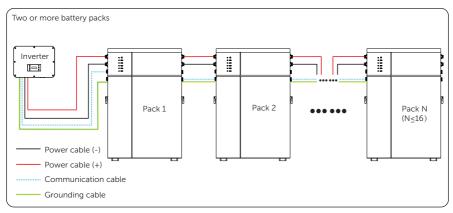


Figure 7-19 Installation diagram for two or more battery packs

Cables in the Accessories Kit for Battery pack

Table 7-1 Cable information

Cable	Length	Description
Power cable (+)	2000 mm	"BAT+" port of battery pack \rightarrow "BAT+" port of inverter.
Power cable (-)	2000 mm	"BAT-" port of battery pack \Rightarrow "BAT-" port of inverter.
Communication cable	2000 mm	"BMS" port of battery pack \rightarrow "BMS" port of inverter
Communication cable	1000 mm	"COM1" port of battery pack → "COM2" port of adjacent battery packs.

Cables in the Accessories Kit for Cables (for two adjacent battery packs)

NOTICE

• The cables in the following table are delivered with the Accessories Kit for Cables, which needs to be purchased separately.

Table 7-2 Cable information

	Cable	Length	Description
Communication cable		1000 mm	"COM1" port of battery pack \rightarrow "COM2" port of adjacent battery packs.

7.2.1 PE Connection

The steps for making PE connection are shown as follows:

Step 1: Strip the cable jacket about 12 to 15 mm from the end.

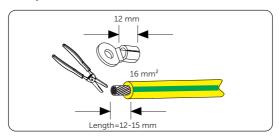


Figure 7-20 Striping cable jacket

Step 2: Cut the heat-shrink tubing to about 28 to 30 mm long, carefully slide it onto the end of the cable, and then carefully slip the wires all the way into the ring terminal (Part E).

64

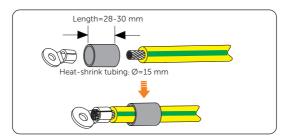


Figure 7-21 Cutting heat-shrink tubing

Step 3: Crimp the terminal, and heat the heat-shrink tubing after it wraps the end of terminal.

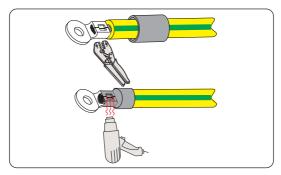


Figure 7-22 Crimping and heating

Step 4: Unscrew the M5 screw, and then connect the assembled grounding cable to the grounding port of the battery pack, and then tighten M5 screw (Tightening torque: 2.5-3 N·m).

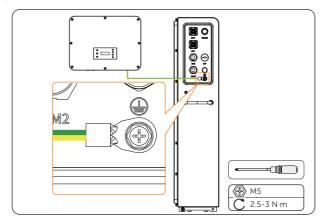


Figure 7-23 Tightening M5 screws

 Regarding the grounding cable that is prepared by the user, a wire size of 16 mm² for the cable is recommended.

7.2.2 Communication Connection

To ensure normal operation between the battery pack and inverter, the communication cable connecting from the battery pack to the inverter is required to connect RJ45 connector.

Make sure that the "BMS" port on the battery pack connects to the inverter is Pin to Pin. The "BMS" port pin assignment is shown as follows:

Table 7-1 "BMS" port pin assignment

PIN	1	2	3	4	5	6	7	8
BMS	RS485B	RS485A	GND	CAN-H	CAN-L	12V-OUT	MASTER-IN	/

The wire sequence of one terminal connecting to the inverter is the same as the wire sequence of the other terminal, connecting to the battery pack.

The wire sequence is shown as follows:

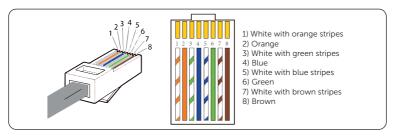


Figure 7-24 Wire sequence

The steps for making RJ45 connector to communication cable (Part C) are shown as follows:

- **Step 1:** Strip the cable jacket about 15 mm down from the end.
- **Step 2:** Carefully insert the wires all the way into the RJ45 connector, making sure that each wire passes through the appropriate guides inside the connector.

Step 3: Push the RJ45 inside the crimping tool and squeeze the crimper all the way down.

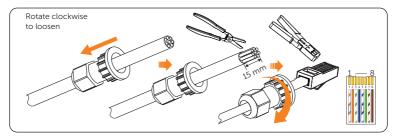


Figure 7-25 Making RJ45 connector to communication cable

NOTICE!

- The communication cable shall have a shield layer.
- The communication cable is delivered with the Accessories Kit for Cables.

7.2.3 Ring Terminal Installation

Ring terminals are connectors for power cables. They are designed to connect the end of a power cable to a circuit point.

To connect the power cable to the circuit point on the **inverter**, a ring terminal is required to be fit over the power cable. The installation procedure of ring terminal onto the power cable is shown as follows:

Step 1: Take out the power cables (Parts A and B), and with care, strip the cable jacket about 10 mm from the end.

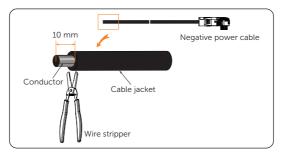


Figure 7-26 Stripping power cable

NOTICE!

• DO NOT damage the conductor while sliding the jacket off the power cable end.

Step 2: Fit the ring terminal over the conductor strands, and squeeze the crimping tool to crimp the terminal.

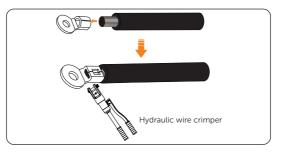


Figure 7-27 Crimping terminal

NOTICE!

• Properly place the ring terminal into the MC4 crimping tool.

Step 3: Make the positive power cable according to the above two steps.

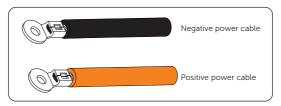


Figure 7-28 Making power cables

NOTICE!

- The ring terminals are delivered with the inverter's accessories kit.
- Please refer to the inverter's User Manual for further installation steps.

7.2.4 Female Connector Installation

A power cable consists of a flexible cord with connectors, male and female. Since the power cables provided are only attached to the male connector, the female connector must be installed onto the power cable by the user himself/herself before conducting wiring between **battery packs**. The installation procedure of female connector onto the power cable is shown as follows:

Step 1: Take out the power cables (Parts A and B), and connectors (Parts J and K) (including connector body, cable seal ring, and tail cover).

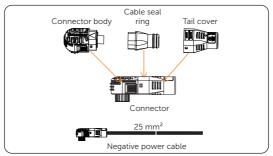


Figure 7-29 Taking out accessories

NOTICE!

 To ensure that both connectors and power cables are connected correctly, an orange female connector shall be connected to the orange power cable, as well as a black female connector to the black power cable.

Step 2: Orderly insert the stripped wire into the tail cover and cable seal ring.

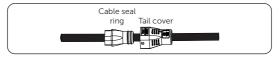


Figure 7-30 Inserting the stripped wire

Step 3: With care, strip the cable jacket about 15±1 mm from the end.

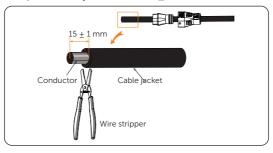


Figure 7-31 Striping cable jacket

NOTICE!

- DO NOT damage the conductor while sliding the jacket off the power cable end.
- The wire size of the power cable delivered with the accessories kit is 25 mm² (UL10269 3 AWG).

Step 4: Fit the connector body over the conductor strands, and squeeze the crimper to crimp the terminal. The conductor strands exposed shall not be over 1 mm.

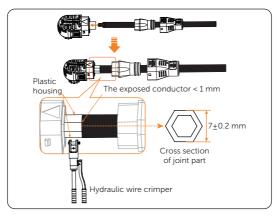


Figure 7-32 Fitting connector body and crimping terminal

NOTICE!

- Properly place the plastic housing into a hydraulic wire crimper.
- DO NOT place the conductor insulation into the connector body.
- DO NOT crush the plastic housing while crimping.
- DO NOT crush or damage the conductor insulation while crimping.

Step 5: Orderly push the cable seal ring and tail cover into the body. The sound of "Click" will be heard when the tail cover is properly plugged into the body.

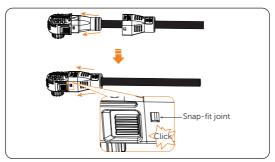


Figure 7-33 Assembling connector

NOTICE

 User should hear the sound of "Click" while pressing the tail cover into the location position.

Step 6: Make the positive power cable according to the above steps.

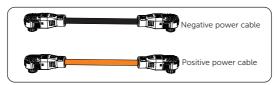


Figure 7-34 Making positive power cable

After finishing the installation of the female connector onto the power cable, and due to the special terminal connector on the power cable, please note the following details.

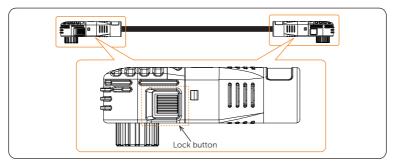


Figure 7-35 Lock button

NOTICE

- The Figure 7-35 is the power cable that finishes the installation of the female connector.
- Press and hold the "Lock button" while unplugging the power cable. Otherwise, it cannot be pulled out.
- Don't violently remove the power cables when they are locked.

7.2.5 Cable Connection for Two or More Battery Packs

∕!\ WARNING!

- Only the qualified personnel can perform the wiring.
- Follow this manual to wire connection. The device damage caused by incorrect cabling is not in the scope of warranty.
- Inspect each terminal for visual signs of mechanical defects.

↑ CAUTION!

- Use insulated tools and wear individual protective tools when connecting cables.
- Do not bend the power cable, particularly at the point where the cable joins the connector, at 90° while conducting wiring.
- When the cable insulation layer is chewed through, this can cause short circuits and
 potentially start an electrical fire. Therefore, where there is a risk of pests, rodents, or
 termites, protective barriers or additives are suggested to be added to the cables to
 prevent damage.

NOTICE!

- The electrical connection areas on both sides of the battery pack are allowed to conduct wiring with the inverter.
- The wiring procedure applies to both floor mounting and wall mounting.

/ WARNING!

The order of power cable connection: negative power cable → positive power cable.

The left electrical connection area for two or more battery packs

Since the wiring procedure of two battery packs is the same as that of more than two battery packs, the wiring procedure of two battery packs is taken as an example.

The detailed connection procedure is shown as follows:

Step 1: Connect the negative power cable to the "BAT-" ports of the battery pack and inverter.

Connect the positive power cable to the "BAT+" port of the battery pack and inverter.

Connect the communication cable (Part C) to the "BMS" port of the battery pack and inverter.

Make sure that power cables and communication cable are wired correctly, as shown in Figure 7-36. Failing to do so may cause severe damage to your battery pack.

Table 7-1 Cable information

Cable	Length	Purpose (battery pack to inverter, battery pack to battery pack)	Qty
Communication cable	2000 mm	"BMS" port to "BMS" port	According
Power cable (black)	2000 mm	"BAT-" port to "BAT-" port	to the actual number of the
Power cable (orange)	2000 mm	"BAT+" port to "BAT+" port	battery packs

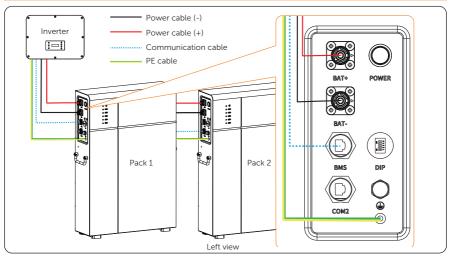


Figure 7-36 Cable connection of the left electrical connection area

NOTICE!

- Regarding the making process of grounding cable, please refer to "PE Connection".
- Regarding the making process of communication cable, please refer to "6.2.2 Communication Connection".
- While plugging in the power cables, a "Click" sound indicates that the cable connectors are properly plugged into the port.
- The waterproof cap has been covered before delivery.
- Don't violently remove the power cables when they are locked.

Step 2: Connect the negative power cable to the "BAT-" ports of adjacent battery packs.

Connect the positive power cable to the "BAT+" ports of adjacent battery packs.

Connect the communication cable (Part L) to the "BMS" ports of adjacent battery packs.

Make sure that power cables and communication cable are wired correctly, as shown in Figure 7-37. Failing to do so may cause severe damage to your battery pack.

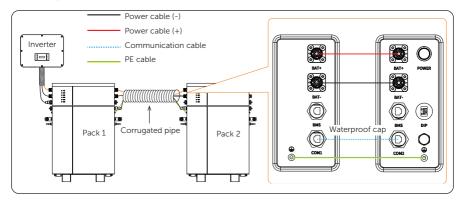


Figure 7-37 Cable connection between adjacent battery pack

NOTICE!

- Regarding the making process of power cable, please refer to "Installation of Female Connector onto Power Cable".
- A corrugated pipe with an external diameter of 60 mm is recommended for use to keep cable insulation in place and avoid potential damages, when conducting wiring between two adjacent battery packs.
- While plugging in the power cables, a "Click" sound indicates that the cable connectors are properly plugged into the port.
- Don't violently remove the power cables when they are locked.

Tip: Use safety gloves when connecting battery packs.

DIP switch under capacity expansion

The system supports SolaX inverter and the third-party inverter. No matter which inverter (SolaX inverter or the third-party inverter) is connected, you should not operate the DIP switch.

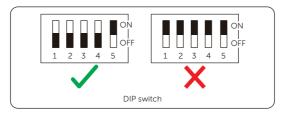


Figure 7-38 DIP Switch state

The right electrical connection area for two or more battery packs

Since the wiring procedure of two battery packs is the same as that of more than two battery packs, the wiring procedure of two battery packs is taken as an example.

The detailed connection procedure is shown as follows:

Step 1: Connect the negative power cable to the "BAT-" ports of the battery pack and inverter.

Connect the positive power cable to the "BAT+" ports of the battery pack and inverter

Connect the communication cable (Part C) to the "BMS" ports of the battery pack and inverter.

Make sure that power cables and communication cable are wired correctly, as shown in Figure 7-39. Failing to do so may cause severe damage to your battery pack.

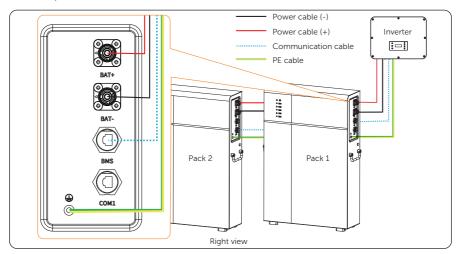


Figure 7-39 Cable connection of the right electrical connection area

NOTICE!

- Regarding the making process of grounding cable, please refer to "PE Connection".
- Regarding the making process of communication cable, please refer to "6.2.2 Communication Connection".
- While plugging in the power cables, a "Click" sound indicates that the cable connectors are properly plugged into the port.
- Don't violently remove the power cables when they are locked.

Step 2: Connect the negative power cable to the "BAT-" ports of adjacent battery packs.

Connect the positive power cable to the "BAT+" ports of adjacent battery packs.

Connect the communication cable (Part L) to the "BMS" ports of adjacent battery packs.

Make sure that power cables and communication cable are wired correctly, as shown in Figure 7-40. Failing to do so may cause severe damage to your battery pack.

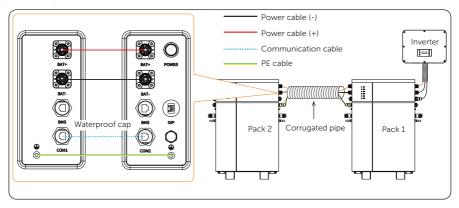


Figure 7-40 Cable connection of two adjacent battery pack

NOTICE!

- Regarding the making process of power cable, please refer to "Installation of Female Connector onto Power Cable".
- A corrugated pipe with an external diameter of 60 mm is recommended for use to keep cable insulation in place and avoid potential damages, when conducting wiring between two adjacent battery packs.
- While plugging in the power cables, a "Click" sound indicates that the cable connectors are properly plugged into the port.
- Don't violently remove the power cables when they are locked.

Tip: Use safety gloves when connecting battery packs.

DIP switch under capacity expansion

The system supports SolaX inverter and the third-party inverter. No matter which inverter (SolaX inverter or the third-party inverter) is connected, you should not operate the DIP switch.

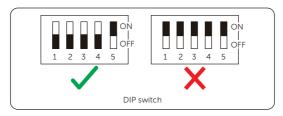


Figure 1-1 DIP Switch state

8 Parallel Connection

8.1 Materials Requirement

The battery is allowed to be connected in parallel by installing a combiner box. If you want to connect in parallel, please prepare a combiner box and related cables in advance.

Power cable requirement

When connecting cables between the battery pack and combiner box, you could modify the power cables within the accessory kit, or select the correct cable size according to the current. See the table below.

Table 1-1 Power cables for parallel connection

No.	Current (A)	Cross-sectional Area (mm²)
1	200	≥ 50
2	250	≥ 70
3	300	≥ 95
4	400	≥ 120

Table 1-2 Recommended cable length and ring terminal

	Length of power cable (+)	Length of power cable (-)	Ring terminal
Battery side	≤ 3 m	≤ 3 m	KST RNBL38-8
Inverter side	According to the specification of inverter		

NOTICE

• The length of all power cables should be consistent.

Requirements for copper bar within combiner box

Please select a combiner box according to the following figures.

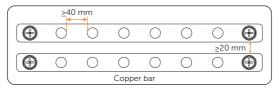


Figure 8-1 Distance requirement

NOTICE

- You must select a copper bar according to the actual current value.
- The figure about the copper bar is for reference only.

8.2 Parallel Cable Connection

The wiring diagram among inverter, combiner box and battery clusters is shown as follows:

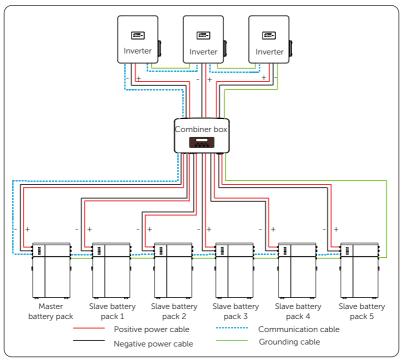


Figure 8-2 Wiring diagram of parallel connection (left electrical area)

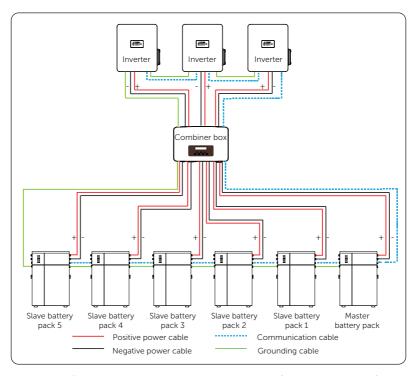


Figure 8-3 Wiring diagram of parallel connection (right electrical area)

NOTICE

When connecting in parallel, you have to dismantle the inverter or the battery. In that case, please strictly follow the *User Manual* to remove or install.

- Please confirm that there is enough space to increase the number of battery clusters.
- Please make sure that the ground and wall that are used to install the new battery clusters can handle the additional weight.

DIP switch under parallel connection

The system supports SolaX inverter and the third-party inverter.

If you connect the system to SolaX inverter, do not operate the DIP switch. You
could set it via the inverter screen. For details, see the *User Manual* of inverter.

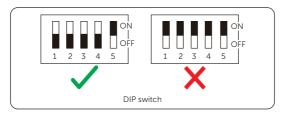


Figure 8-4 DIP Switch state for SolaX inverter

 If you connect the system to the third-party inverter, must flip down the DIP switches 1~4 of the master battery pack to ON position. Do not operate the DIP switches of slave battery packs.

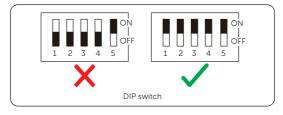


Figure 8-5 DIP Switch state of the master battery pack for third-party inverter

9 System Commissioning

9.1 Checking before Power-on

- a. Check the device installed correctly and securely;
- b. Make sure that Power button is OFF:
- c. All cables are connected correctly and securely;
- d. All unconnected port are covered;

9.2 Powering on the System

- Initial Startup refers to powering on the system for the first time after receiving the package.
- Startup after Capacity Expansion and Reduction refers to powering on the system for the first time after adding or removing battery packs in the system.
- Subsequent Power-on refers to powering on the system after it has been previously shut down.

9.2.1 Battery System Connecting to SolaX Inverter

Initial Startup/Startup after Capacity Expansion and Reduction

Long press **POWER** button of the master battery pack for over 5 seconds. You can see the changes of status and SOC lights. See the following table and figure.

Table 9-1 Description of status light

	Solid yellow	Flash yellow	Flash green
Status light			
Process	Start self test	End self test and Start address assignment	End address assignment

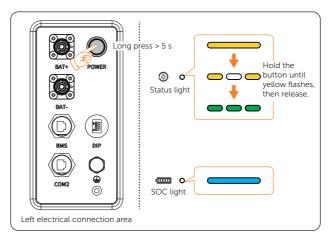


Figure 9-1 Powering on system

Subsequent Power-on

Long press **POWER** button of the master battery pack for less than 3 seconds. You can see the changes of status and SOC lights. See the following figure.

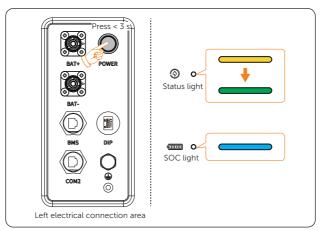
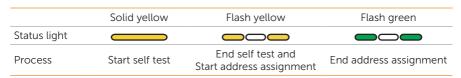


Figure 9-2 Powering on system

9.2.2 Battery System Connecting to the Third-party Inverter

Step 1: Long press **POWER** button of the master battery pack for over 5 seconds. You can see the changes of status and SOC lights. See the following table and figure.

Table 9-2 Description of status light



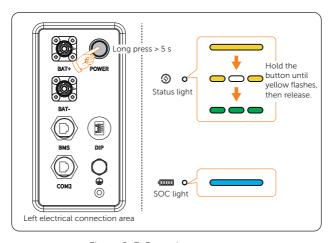


Figure 9-3 Powering on system

Step 2: Press and then release the **Power** button continuously for 3 times within 10 seconds, to ensure that the battery system could communicate with the third-party inverter normally.

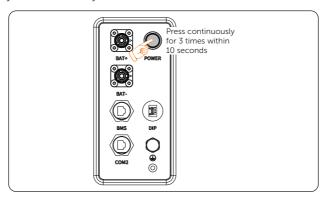


Figure 9-4 Pressing continuously

Subsequent Power-on

Step 1: Long press **POWER** button of the master battery pack for less than 3 seconds. You can see the changes of status and SOC lights. See the following figure.

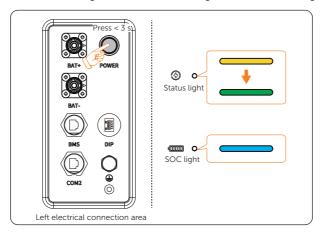


Figure 9-5 Powering on system

Step 2: Press and then release the **Power** button continuously for 3 times within 10 seconds, to ensure that the battery system could communicate with the third-party inverter normally.

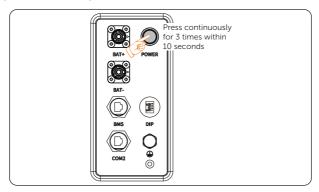


Figure 9-6 Pressing continuously

NOTICE

- The inverter should be included in *PYLON CANBUS Protocol*.
- After successfully powered on:
 - » If the battery is running properly, it will be charging all the time.
 - » If there is any fault, the battery will power off first to resolve the fault, and then automatically power on.

9.3 Powering off the System

∕!\ WARNING!

 After the battery pack powers off, there will still be the remaining electricity and heat which may cause electric shocks and body burns. Please wear personal protective equipment (PPE) and begin servicing the battery five minutes after power off.

NOTICE!

• If you press the button frequently, a system problem might occur. Hence, you should wait at least 10 seconds and then try again.

Long press the POWER button (> 3 s) until the status light turns yellow. Then release the button.

10 Troubleshooting and Maintenance

10.1 Troubleshooting

This section contains information and procedures for resolving possible problems with the rechargeable battery and provides the troubleshooting tips to identify and solve most problems that may occur. Please conform the state of the indicators to check the status of the T-BAT system, check the warning or fault information via the monitoring software on the inverter, and read the suggested solutions below when error occurs.

In case of the following circumstances, e.g. voltage or temperature exceeds the limit specified, a warning state will be triggered.

The battery management system (BMS) of the T-BAT system will periodically report its operating state to the inverter. Therefore, when a warning is reported, the inverter will stop working immediately.

Contact SolaX Customer Service for further assistance. Please be prepared to describe the details of your system installation and provide the model and serial number of the rechargeable battery.

Error Code	Fault	Diagnosis and Solution
Cell Overvoltage	Battery cell overvoltage fault	Battery (cell) overvoltage: Tap "Power Off" on the inverter screen until the fault is rectified. Contact the after-sales personnel of our company.
Cell Undervoltage	Battery cell undervoltage fault	Battery (cell) undervoltage: Make sure that the inverter is connected to the grid and that there is successful communication between the battery and inverter to ensure that the battery is charged. Contact the after-sales personnel of our company.
High Cell Vol Diff	The pressure difference between cells in the battery is too large	 The pressure difference between cells in the battery is too large: Restart the BMS. Contact the after-sales personnel of our company.

Diagnosis and Solution
Diagnosis and Solution
 Total voltage overvoltage: Tap "Power Off" on the inverter screen until the fault is rectified. Contact the after-sales personnel of our company.
Total voltage undervoltage: • Make sure that the inverter is connected to the grid and that there is successful communication between the battery and inverter to ensure that the battery is charged. • Contact the after-sales personnel of our company.
The temperature of the BMS is too high: • Cool down the BMS to normal temperature, and then restart it. • Contact the after-sales personnel of our company.
 The temperature of the BMS is too low: Warm up the BMS to normal temperature, and then restart it. Contact the after-sales personnel of our company.
Self-test fault of the BMS: Restart the BMS. Contact the after-sales personnel of our company.
 External short circuit of the BMS: Check the external connection and restart the BMS. Contact the after-sales personnel of our company.
Temperature sampling anomaly: Restart the BMS. Contact the after-sales personnel of our company.
Slave control of abnormal current exists in the system: Restart the BMS. Contact the after-sales personnel.

Error Code	Fault	Diagnosis and Solution
Didchrg Overcurrent	Discharge overcurrent of BMS	Discharge overcurrent of BMS: Restart the BMS. Contact the after-sales personnel of our company.
Chrg Overcurrent	Overcurrent charging of BMS	Overcurrent charging of BMS: Restart the BMS. Contact the after-sales personnel of our company.
AFE Comm Fault	AFE communication fault	AFE communication loss: Contact the after-sales personnel of our company.
Mid Comm Fault	The communication between the master and slave is abnormal	 The communication between the master and slave is abnormal: Restart the BMS. Contact the after-sales personnel of our company.
Voltage Sensor Fault	Voltage sensor fault	Voltage sampling fault of the BMS: Restart the BMS. Contact the after-sales personnel of our company.
ID Duplicate	The slave controller with the same number exists in the system.	The slave controller with the same number exists in the system: Restart "Black Start". Contact the after-sales personnel of our company.
Current Sensor Fault	Current sensor fault	Current sampling fault of the BMS: Restart the BMS. Contact the after-sales personnel of our company.
Power Line Open	The power cable is not properly plugged in.	Improper connection of the power cable: Rewire the power cables. Contact the after-sales personnel of our company.
Flash Error	Flash fault	Flash fault: Contact the after-sales personnel of our company.

Error Code	Fault	Diagnosis and Solution
AFE Protect Fault	AFE self- protection failure	AFE self-protection failure: Contact the after-sales personnel of our company.
Charge Request Fault	Charging request not responded	Inverter does not respond the charging request. Restart the BMS or the inverter. Contact the after-sales personnel of our company.
BMS_LOST	Communication loss of the BMS	 Communication loss of the BMS: Ensure that the communication cable is properly connected. Contact the after-sales personnel of our company.
ALM_ID_BAT_TYPR_CFG_ ERR	Error of battery type	Error of battery type: Check whether the communication cable is properly connected after shutting down all the battery packs, and then restart Black Start.
ALM_ID_BATT_VOLT_ HIGH	BMS overvoltage	Overvoltage of a single battery pack: Contact the after-sales personnel of our company.
ALM_ID_BAT_BMS_CELL_ FAULT	Battery cell fault of the BMS	Battery cell fault of the BMS: Check the fault carefully. Contact the after-sales personnel of our company.
ALM_ID_BAT_BMS_ COMM_FAULT	BMS communication fault	BMS communication fault: Check the fault carefully. Contact the after-sales personnel of our company.
ALM_ID_BAT_CURR_ HIGH	Battery current too high	Too much current is drawn by a load:Decrease the load powerContact the after-sales personnel of our company.
ALM_ID_BAT_SOC_LOW	Low SoC	Low SoC: Check the fault carefully. Contact the after-sales personnel of our company.

10.2 Maintenance

Regular maintenance is required for the rechargeable battery. Please pay attention to the following precautions for expressing the optimum device performance. More frequent maintenance service is needed in the worse work environment. Please make records of the maintenance

Precautions

- If the ambient temperature for storage is between 30°C and 50°C (86°F to 122°F), please recharge the battery packs at least once every 6 months.
- If the ambient temperature for storage is between -20°C and 30°C (-4°F to 86°F), please recharge the battery packs at least once every 12 months.
- For the first installation, the interval among manufacture dates of battery packs shall not be exceed 3 months.
- If a battery pack is replaced or added for capacity expansion, each battery's SOC should be consistent. The max. SOC difference should be +5%.
- If users want to increase their battery system capacity, please ensure that the SOC of the existing system capacity is about 40%. The manufacture date of the new battery pack shall not exceed 6 months. If the manufacture date of the new one exceeds 6 months, please charge it to around 40%.

/ WARNING!

- Only qualified person can perform the maintenance for the rechargeable battery.
- Only use the spare parts and accessories approved by SolaX for maintenance.

11 Decommissioning

11.1 Disassembling the Battery

∕!\ WARNING!

- Before unplugging the cables, ensure that your hands are dry and free from moisture. This will help prevent electrical shock and ensure a secure grip on the plug.
- When disassembling the battery, strictly follow the steps as below.

NOTICE

• No matter how many battery packs are installed, the unplugging procedure is the same. For details, refer to the following steps.

Step 1: Press the POWER button to shut down the system before unplugging.

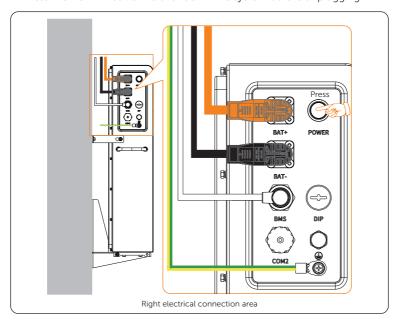


Figure 11-1 Pressing power button

Step 2: Hold down two lock buttons on both sides of the connector firmly to unplug the power cable. Avoid pulling on the cable itself, as this can potentially damage the cable and the port on the battery pack.

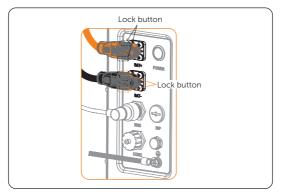


Figure 11-2 Unplugging power cables

Step 3: Remove the communication cable.

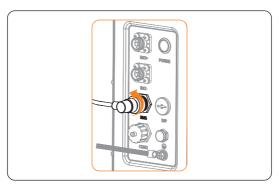


Figure 11-3 Removing communication cable



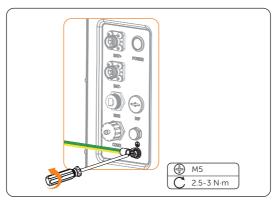


Figure 11-4 Removing grounding cable

11.2 Packing

- Load the battery pack into the original packing material if possible.
- If the original packing material is not available, you can also use the packing material which meets the following requirements:
 - » Suitable for the weight of product.
 - » Easy to carry.
 - » Be capable of being closed completely.

11.3 Disposing of the Rechargeable Battery

Please dispose of the rechargeable battery or accessories in accordance with the disposal regulations for electronic waste which is applied at the installation site.

12 Technical Data

Performance Parameter

Battery pack	TP-LD53
Nominal Voltage (d.c. V)	51.2
Operating Voltage Range (d.c. V)	45-58
Nominal Capacity (Ah)	104
Nominal Energy (kWh)	5.32
Usable Energy 95% DOD (kWh) ¹	5.05
Max. Output Current (d.c A) ²	100
Peak Charge/Discharge Current (d.c. A)	200 (10 seconds)
Battery Round-trip Efficiency (0.2 C, 25°C/77°F)	95%
Cycle Life 95% DOD ³	> 6000 cycles
Charge Temperature	0°C ~ 53°C
Discharge Temperature	-20°C ~ 53°C
Storage Temperature	30°C ~ 50°C (6 months), -20°C ~ 30°C (12 months)
Ingress Protection	IP65
Protection Class	I I

NOTICE

- ¹ Test conditions: 95% DOD, 0.5 C charge & discharge @ +25°C.
- ² Current is affected by the number of batteries connected in parallel as well as temperature and SOC.
- ³ Test conditions: 25 ± 2°C, 0.5C charge & discharge, 70%EOL.



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