BY SOLAX
TRIPLE
POWER

T-BAT-SYS-HV-S50E-D

Installation Manual

Version 5.0

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eManual in the QR code or at
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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.

BMS	Battery pack
TBMS-MCS0800E-D	TP-HS50E

Note:

In the case of one tower, there are 3 parts of the T-BAT system, which includes BMS, battery pack(s) and Base. In case of two towers, there 4 parts of the system, such as, BMS, battery pack(s), Base and Series Box. For details, please refer to the Chapter 11 "Technical Data".

Target Tower

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.
WARNING	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 04 (Nov, 15, 2024)

Updated "11 Technical Data" (updated fuse information)

Version 03 (Oct, 24, 2024)

Updated "11 Technical Data" (added fuse information)

Version 02 (Aug. 29, 2024)

Updated "5.2 Scope of Delivery" (added optional cable)

Updated "6.2 Installation Procedure" (added the notice of male and female terminals)

Updated "6.2.1 Floor Mounting" (added the caution of cover)

Updated "6.3 Capacity Expansion and Parallel Connection" (added the connection between the battery and TCBox-70)

Updated "9.3 Maintenance" (added the solution of reporting error messages)

Updated "Contact Information" (updated Australia service email)

Version 01 (Jun. 24, 2024)

Updated "5.2 Scope of Delivery" (added an accessory kit)

Version 00 (May. 23, 2024)

Initial release

Table of Contents

1 Safety

1.1 General Safety

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

Before installing the device, carefully read, fully understand and strictly follow the detailed instruction of the *User Manual* and other related regulations. And the safety instructions in this document are only supplements to local laws and regulations.

SolaX shall not be liable for any consequences caused by the violation of the storage, transportation, installation, and operation regulations specified in this document, including, but not limited to:

- Rechargeable battery damage due to force majeure, such as earthquake, flooding, thunderstorm, lighting, fire hazard, volcanic eruption, overvoltage, etc.
- Rechargeable battery damage due to man-made cause
- Rechargeable battery used or operated against any items in local policy
- 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
- Rechargeable battery damage caused during transportation by the customer
- Storage conditions that do not meet the requirements specified in this document
- Failure to adequately maintain the equipment
- 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.

1.2 General Safety Precautions

- 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.

1.3 Battery Handling Guide

Do's

- 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'ts

- 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.

1.4 Response to Emergency Situations

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/60°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.

⚠ 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-HV relating to electrical connection and installation must be carried out by qualified personnel.

⚠ 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.

2 Product Overview

2.1 System Description

A battery management system (hereinafter referred to as BMS) is an electronic system that manages a rechargeable battery.

A battery pack is a type of electrical battery which can charge or discharge loads.

Series Box is designed to connect the second tower in series through BMS wiring.

In case of a tower, the whole system mainly comprises a BMS, battery pack(s) and Base. In case of two towers, the whole system comprises a BMS, battery packs, Bases and Series Box.

2.2 Appearance

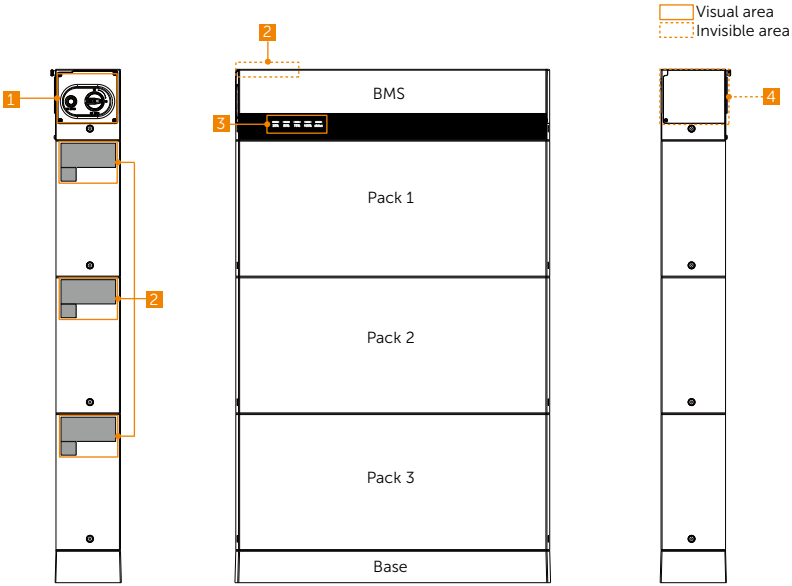


Figure 2-1 Appearance

Table 2-1 Description of appearance

No.	Item	Description
1	Button/Switch	Power on or off the system. Please refer to "Chapter 2.2.1 BMS (TBMS-MCS0800E-D)" for details.
2	Labels	Including performance label, which clearly identifies the device type, serial number, parameters, certification, etc., and manufacturer label describing name and address of manufacturer. Please refer to "Chapter 2.2.2 Label" for details.
3	Indicator panel	Provide a human-readable indication of an instrument signal. For details, please refer to "Chapter 2.2.6 Indicator Panel".
4	Electrical connection area	Including B+/B- ports, communication port, heat port, grounding port, etc. Please refer to "Chapter 2.2.1 BMS (TBMS-MCS0800E-D)" for details.

Weight and Dimensions

Table 2-2 Weight and Dimension

	BMS (TBMS-MCS0800E-D)	Battery pack (TP-HS50E)	Base	Series Box
Length (mm)	730	730	730	167
Depth (mm)	150	150	150	121
Width (mm)	165	318	75	91.5
Net weight (kg)	9.7	47.0	3.9	1.3

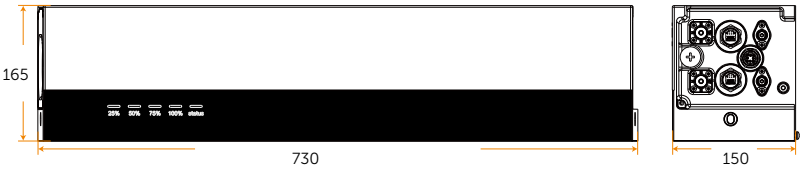


Figure 2-2 Dimension: BMS (TBMS-MCS0800E-D)

Figure 2-3 Dimension: Battery pack (TP-HS50E)

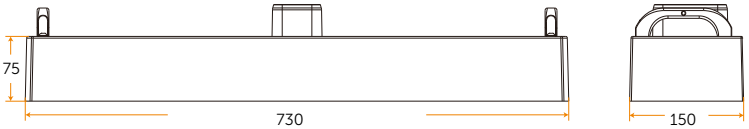


Figure 2-4 Dimension: Base

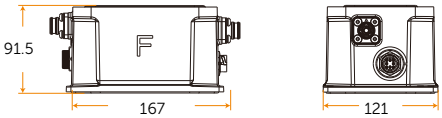


Figure 2-5 Dimension: Series Box

2.2.1 BMS (TBMS-MCS0800E-D)

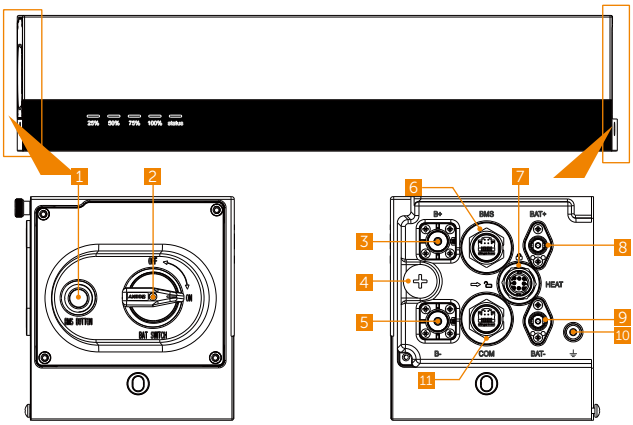


Figure 2-6 BMS (TBMS-MCS0800E-D)

Table 2-3 Description of ports

No.	Item	Description
1	BAT BUTTON	Start/shut down system.
2	BAT SWITCH	A switch for battery's input and output.
3	B+ port	Connect BMS's B+ to BMS's B- (or to the Series Box's B+)
4	"DIP Switch"	Realize battery's parallel function (a reserved function).
5	B- port	Connect BMS's B- to BMS's B+ (or to the Series Box's B-)
6	BMS port	Connect to the "BMS" port on the inverter.
7	HEAT port	Connect the HEAT port of the Series Box (if any), or a short-circuit plug must be inserted into the port.
8	BAT+ port	Connect to the "BAT+" port of the inverter.
9	BAT- port	Connect to the "BAT-" port of the inverter.
10	GND port	Connect to the grounding port of the inverter, and the grounding port of the Series Box (if any).
11	COM port	Connect the COM port of the Series Box (if any); or it doesn't need to be connected

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.

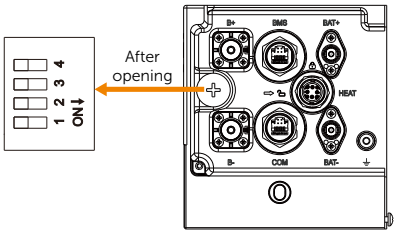


Figure 2-7 DIP Switch

Default Configuration

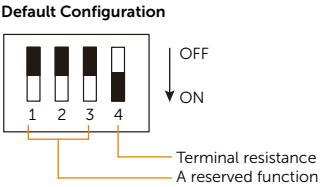


Figure 2-8 Default configuration

NOTICE!

- The DIP switch 4 shall be flipped down (open the circuit) when connecting the BMS to inverter.
- The DIP switch 4 is pressed at the factory settings.
- To adjust the DIP switch, a small flat-head screwdriver shall be prepared by users themselves.
- 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.

2.2.2 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 system performance label of the BMS consists of the following parts:

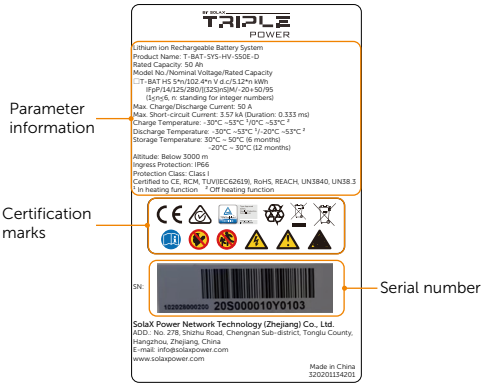
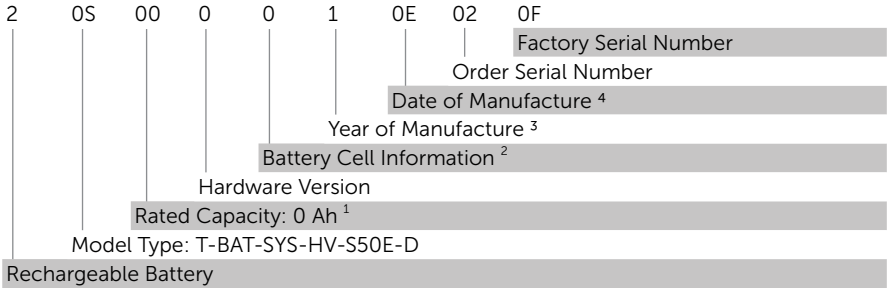


Figure 2-9 Performance label

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

32-base Nomenclature



1 Since the label will be attached on the BMS and the BMS is not equipped with a battery cell, the rated capacity is 0 Ah.
2 The BMS is not equipped with a battery cell.
3 0-2023, 1-2024, 2-2025 ..... A-2033, B-2034 .....
4 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.

2.2.3 Battery pack (TP-HS50E)

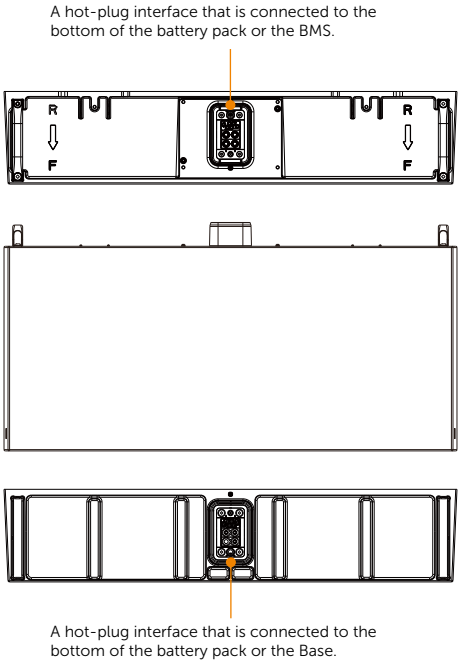


Figure 2-10 Details: Battery pack (TP-HS50E)

2.2.4 Base

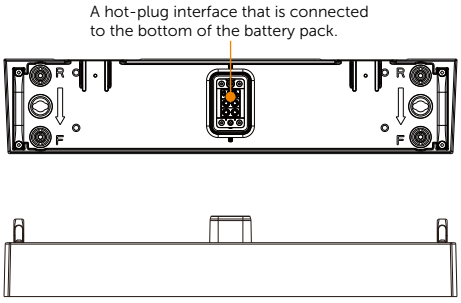


Figure 2-11 Details: Base

2.2.5 Series Box

The Series Box shall be installed in case the battery packs purchased exceed 4 sets (including 4).

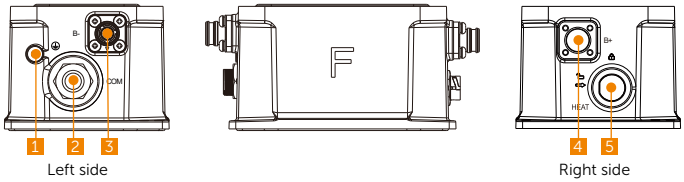


Figure 2-12 Details: Series Box

Table 2-4 Description of ports

No.	Port	Description
1	GND port	Connect to the grounding port of the BMS.
2	COM port	Connect to the COM port of the BMS.
3	B- port	Connect to the B- of the BMS.
4	B+ port	Connect to the B+ of the BMS.
5	HEAT port	Connect to the HEAT port of the BMS.

2.2.6 Indicator Panel

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

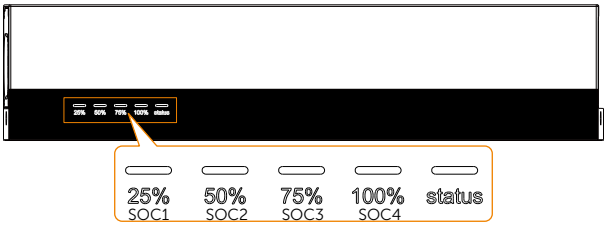


Figure 2-13 Indicators

Table 2-5 Definition of indicators

Indication	LED	Colour	State
Self-test	Status light	Yellow	Fast blink
	SOC power indicators	/	Off
Start up	Status light	Green	Flashing
	SOC power indicators	/	Off
Shut down	Status light	Green	Solid → Off
	SOC power indicators	Green	Flashing → Off
Standby	Status light	Green	Flashing
	SOC power indicators	/	Off
Charging	Status light	Green	Solid
	SOC power indicators	Please refer to "Indicator information while charging".	
Discharging	Status light	Green	Solid
	SOC power indicators	Please refer to "Indicator information while discharging".	
Fault	Status light	Red	Solid
	SOC power indicators	Green	Flashing
Warning	Status light	Yellow	Flashing
	SOC power indicators	Green	Flashing
Black Start	Status light	Please refer to "Black Start".	
	SOC power indicators		

NOTICE!

- The function of **Self Test** will be performed when users turn the system on, with a duration of 3 to 4 seconds. In the meantime, the status light will flash yellow light, and all the SOC power indicators are off.

Indicator information while charging

Table 2-6 Indicator information while charging

SOC value	Status light	SOC1	SOC2	SOC3	SOC4
0% ≤ SOC < 25%	Green	Flash	Light off	Light off	Light off
SOC < 50%	Green	Light on	Flash	Light off	Light off
SOC < 75%	Green	Light on	Light on	Flash	Light off
SOC < 100%	Green	Light on	Light on	Light on	Flash
SOC = 100%	Green	Light on	Light on	Light on	Light on

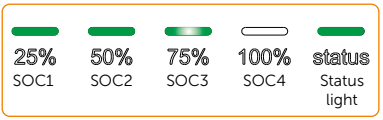


Figure 2-14 Charging

If the battery level is between 50% and 75%, the SOC power indicators will show as follows:

- The first two SOC power indicators (SOC1 and SOC2) will remain on solid green light;
- The SOC3 will flash green light.
- The SOC4 will be off.

Indicator information while discharging

Table 2-7 Indicator information while discharging

SOC value	Status light	SOC1	SOC2	SOC3	SOC4
SOC ≥ 75%	Green	Flash	Flash	Flash	Flash
SOC ≥ 50%	Green	Flash	Flash	Flash	Light off
SOC ≥ 25%	Green	Flash	Flash	Light off	Light off
SOC ≥ 0%	Green	Flash	Light off	Light off	Light off

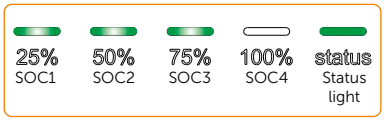


Figure 2-15 Discharging

If the battery level is between 50% and 75%, the SOC power indicators will show as follows:

- The first three SOC power indicators (SOC1, SOC2, and SOC3) will flash green light.
- The SOC4 will be off.

NOTICE!

In case of pressing and holding BMS BUTTON, there are two circumstances as follows:

- Press and hold BMS BUTTON for more than 5 seconds but less than 20 seconds, the system will enter a startup mode of inverter.
- Press and hold BMS BUTTON for more than 20 seconds, the system will enter the Black Start.

Black Start

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 for **Black Start** is as follows:

- When pressing and holding the **BMS BUTTON** for less than 20 seconds, the status light will flash green light for 1 second and then turn off for 4 seconds, with a period of 5 seconds.
- And when pressing and holding the **BMS BUTTON** for more than 20 seconds, the status light will come on solid green light, and SOC power indicators will flash as follows:
  - » Firstly, the indicator SOC3 comes on green, and the rest of the indicators are off;
  - » Secondly, the indicators SOC2 and SOC4 come on blue, and the rest of the indicators are off;
  - » Thirdly, the indicator SOC1 comes on green, and the rest of the indicators are off;
  - » Finally, all SOC power indicators are off. The time interval between each step is 0.1 seconds.

NOTICE!

- After pressing and holding the **BMS BUTTON** over 20 seconds, you can release it at anytime.

2.2.7 Symbols on the Label

Table 2-8 Description of symbols

Symbol	Description
	CE mark. The rechargeable battery complies with the requirements of the applicable CE guidelines.
	TUV certified.
	RCM 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.
	Danger of high voltages. Danger to life due to high voltages in the rechargeable battery!
	Danger. Risk of electric shock!
	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.
	Keep the battery system away from children.
	Keep the battery system away from open flames or ignition sources.

2.3 Features

The T-BAT SYS-HV is one of the most advanced energy storage systems on the market today, using state-of-the-art technology, and having the characteristics of high reliability and convenient control. Characteristics are shown as follows:

- 90% DOD;
- 95% Battery Round-trip Efficiency;
- Cycle Life > 6000 Cycles;
- Secondary Protection;
- IP66 Protection Level and Protection Class I;
- Safety & Reliability;
- Small Occupied Area;
- Floor Mounting and wall mounting.

2.4 Certifications

BAT system safety	CE, RCM, IEC 62619, IEC 63056, IEC 62620, IEC 62477-1, IEC 60730 Annex H, IEC 62040, VDE-AR-E2510, IEC 60529, UN38.3
UN number	UN 3480
Hazardous materials classification	Class 9
UN transportation testing requirements	UN 38.3
International protection marking	IP66, Protection Class I

3 Transportation and Storage

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

Transportation

- 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 (net weight: 47 KG). Two installers are recommended.
- 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.

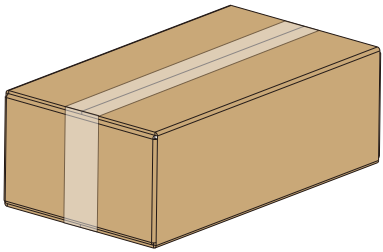


Figure 3-1 Handle position of carton

Storage

- 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℃ and +50°C, or it may be up to 12 months in case the temperature is between -20℃ and +30°C. The relative humidity should be between 5% and 95%.
- 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.

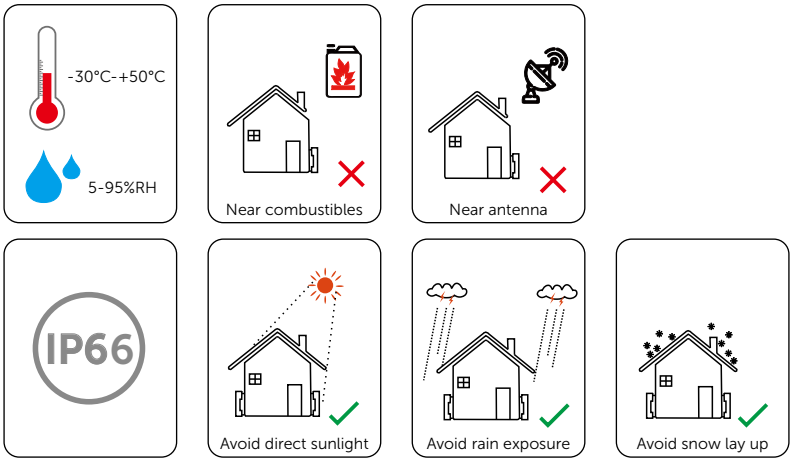
- Flaunting an IP66 enclosure, the battery can be used outdoors and indoors;
- The installation position shall be convenient for wiring connection, operation and maintenance.

4.1.1 Environment Requirement

Make sure the installation site meets the following conditions:

- The ambient temperature: -30°C to +50°C;
- The humidity shall be between 5-95%;
- 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. Direct sunlight, rain exposure and snow laying up is not allowed.

NOTICE!
• For outdoor installation, precautions against direct sunlight, rain exposure and snow layup 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.



4.1.2 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, or mounting surface with equivalent strength;
- Please ensure that the bearing capacity of the ground and the wall, respectively, that are used to install the battery system must be over 900 kg, which is determined based on option C. If option D is chosen by the user, the bearing capacity of the ground and the wall, respectively, must be over 1050 kg;
- Please ensure that the thickness of any part of the wall should not be less than 150 mm if the wall mounting is selected;
- The device must not be installed on the wood wall.

4.1.3 Clearance Requirement

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

- At least a distance not less than 710 mm high shall be provided to give access to install the inverter.
- A distance between 250 to 300 mm wide shall be provided on both sides of the device.
- Please reserve enough distance from the device to the ceiling (or the grounding) for capacity expansion.

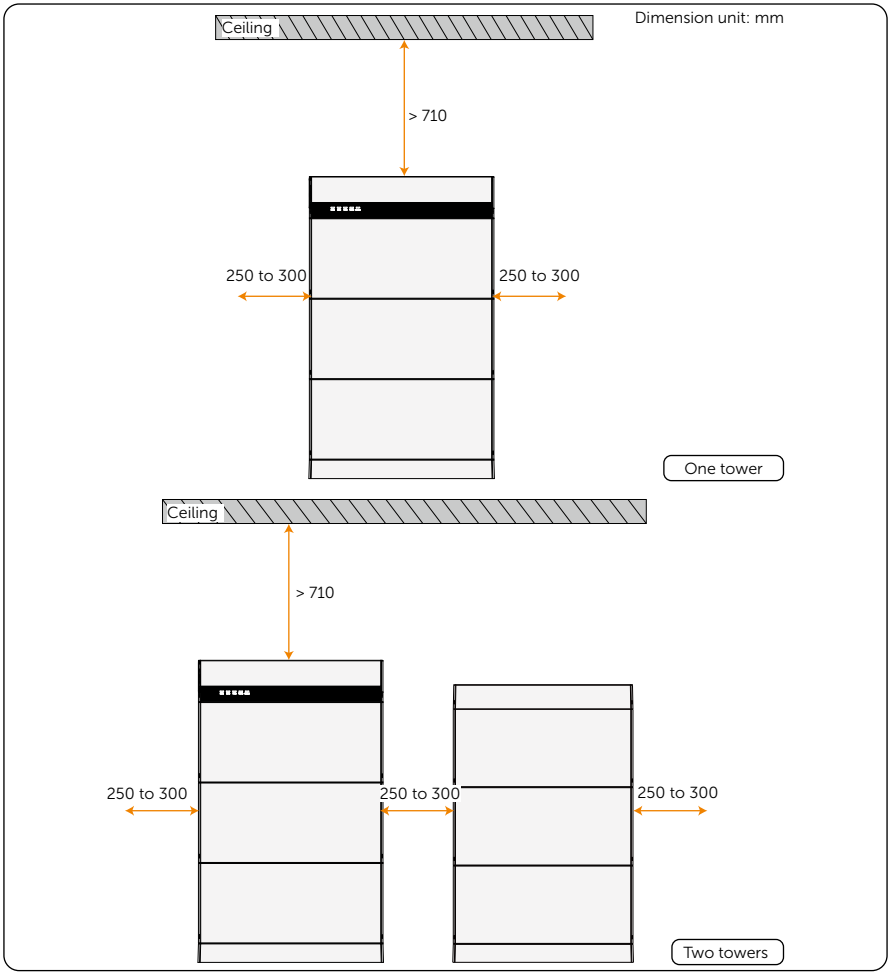


Figure 4-1 Clearance requirement

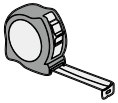
NOTICE!

- The distance from the BMS to the ceiling must be over 710 mm.

4.2 Tools Requirement

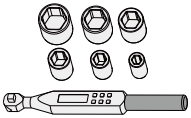
Installation tools include but are not limited to the following recommended ones. If necessary, use other auxiliary tools on site.


Hammer drill (Ø8mm, Ø10 mm)


Measuring tape

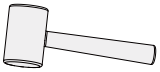

Utility knife

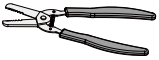

Marker

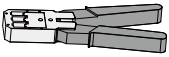

Torque wrench

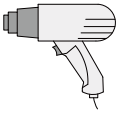

Cross screwdriver


Flat-head screwdriver

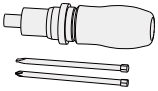

Rubber mallet


Wire stripper


Crimping tool for RJ45


Heat gun


Heat shrink tubing (Ø12 mm)


Torque screwdriver (Flat-head: M12) (Phillips head: M5)

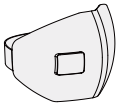

Spirit level


Vacuum cleaner


Insulating gloves


Safety boots


Safety goggles


Anti-dust mask

4.3 Additionally Required Materials

Table 4-1 Additionally required wires

No.	Required Material	Type	Conductor Cross-section
1	Additional PE wire	Conventional yellow and green wire	4 mm^2

Table 4-2 Additionally required material

No.	Required Material	Type	Diameter
1	Protective pipe	Corrugated pipe	External diameter: over 65 mm

5 Unpacking and Inspection

The number of cartons will be different due to different modes of mounting. Therefore, please check whether the number of cartons received are correct before unpacking. For details, please refer to the following table.

Table 5-1 Number of cartons

	One Tower	Two Towers
Floor Mounting	A BMS carton, and carton(s) of battery packs	A BMS carton, a Series Box carton, and carton(s) of battery packs
Wall Mounting	A BMS carton, a base support carton, and carton(s) of battery packs	A BMS carton, two base support cartons, a Series Box carton, and carton(s) of battery packs

NOTICE!

- As for the number of cartons of battery packs, it depends on how many battery packs the users purchased.

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.
- Unpack the BMS a according to the following figures. If there are other cartons, such as the battery pack carton, base support carton, and Series Box carton, the unpacking procedure can also be referred to the following figures.

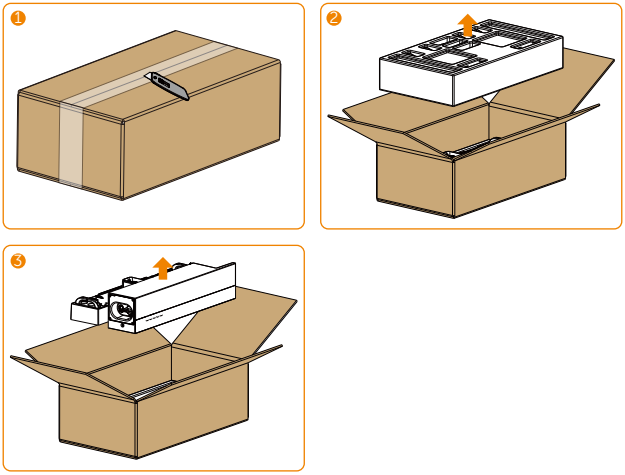


Figure 5-1 Unpacking the BMS

- 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

BMS (TBMS-MCS0800E-D)

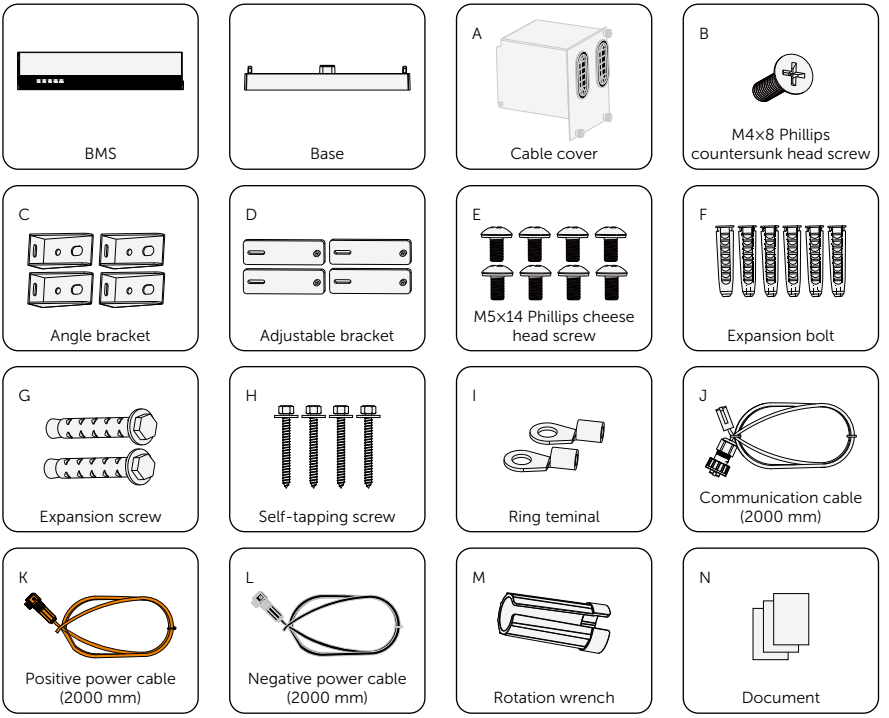


Table 5-1 Packing list of BMS

Item No.	Description	Quantity (Unit: pc)
/	BMS	1
/	Base	1
A	Cable cover	1
B	M4×8 Phillips countersunk head screw	1
C	Angle bracket	4
D	Adjustable bracket	4
E	M5×14 Phillips cheese head screw	8

Item No.	Description	Quantity (Unit: pc)
F	Expansion bolt	6
G	Expansion screw	2
H	Self-tapping screw	4
I	Ring terminal	2
J	Communication cable (2000 mm)	1
K	Positive power cable (2000 mm)	1
L	Negative power cable (2000 mm)	1
M	Rotation wrench	1
N	Document	/

NOTICE!

- As for one end of the communication cable that connects to the inverter, the connector is delivered with the accessories kit for the inverter.

One Battery pack (TP-HS50E × 1)

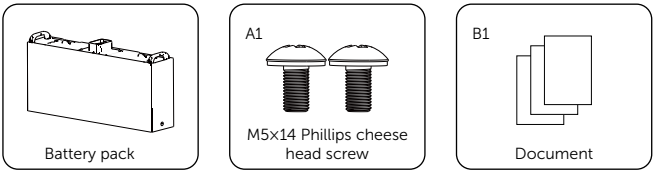
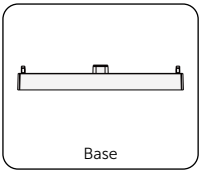
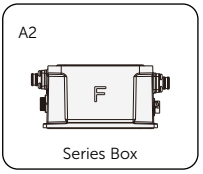


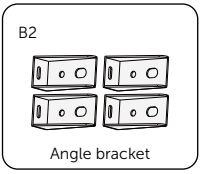
Table 5-2 Packing list of battery pack

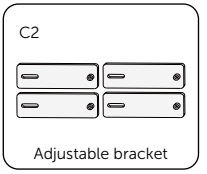
Item No.	Description	Quantity (Unit: pc)
/	Battery pack	1
A1	M5×14 Phillips cheese head screw	2
B1	Document	/

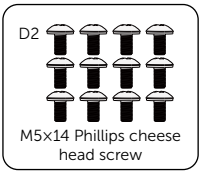
Series Box (For two towers only)

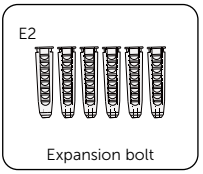


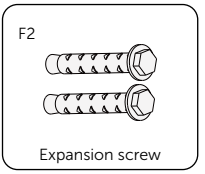


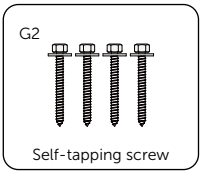


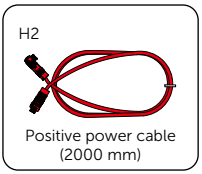


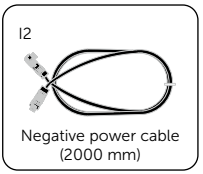


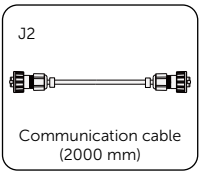


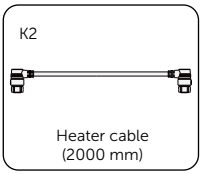


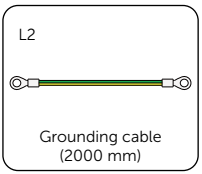


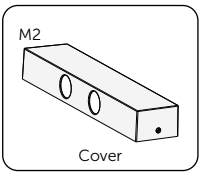












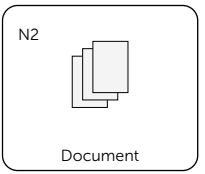
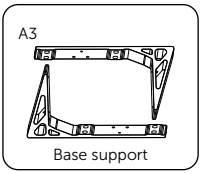


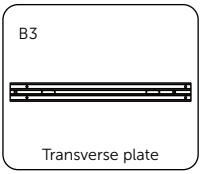
Table 5-3 Packing list of Series Box

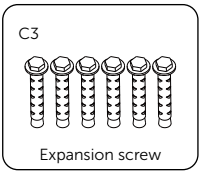
Item No.	Description	Quantity (Unit: pc)
/	Base	1
A2	Series Box	1
B2	Angle bracket	4
C2	Adjustable bracket	4
D2	M5x14 Phillips cheese head screw	12
E2	Expansion bolt	2
F2	Expansion screw	6
G2	Self-tapping screw	4
H2	Positive power cable (2000 mm)	1
I2	Negative power cable (2000 mm)	1

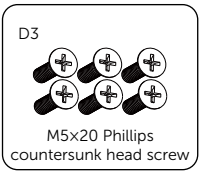
Item No.	Description	Quantity (Unit: pc)
J2	Communication cable (2000 mm)	1
K2	Heater cable (2000 mm)	1
L2	Grounding cable (2000 mm)	1
M2	Cover	1
N2	Document	/

Base Support (For wall mounting only)









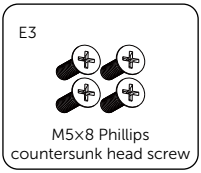


Table 5-4 Packing list of base support

Item No.	Description	Quantity (Unit: pc)
A3	Base support	2
B3	Transverse plate	1
C3	Expansion screw	6
D3	M5×20 Phillips countersunk head screw	6
E3	M5×8 Phillips countersunk head screw	4

Cable (Optional)

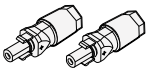
A4

Positive power y cable (2000 mm)

B4

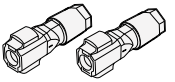
Negative power y cable (2000 mm)

C4



Male Phoenix terminal

D4



Female Phoenix terminal

E4

RNB14-5 ring terminal

Item No.	Description	Quantity (Unit: pc)
A4	Positive power y cable (2000 mm)	1
B4	Negative power y cable (2000 mm)	1
C4	Male Phoenix terminal	2
D4	Female Phoenix terminal	2
E4	RNB14-5 ring terminal	2

NOTICE!

- As for the installation steps for power y cables, please refer to the inverter's *User Manual*.
- Users can purchase the accessory kit (Cable) based on their actual needs.
- Do not use the above-mentioned power y cables if the equipment is in parallel.
- The RNB14-5 ring terminal is suitable for 10 mm^2 grounding wire.

6 Mechanical Installation

6.1 Installation Options

One Tower

Table 6-1 Height and weight

	Option A	Option B	Option C	Option D
Height (mm)	558	876	1194	1512
Net Weight (kg)	60.2	107.2	154.2	201.2

NOTICE!

- The above-mentioned net weight just includes the weight of the BMS, battery pack(s), and Base, not the base support and other accessories.

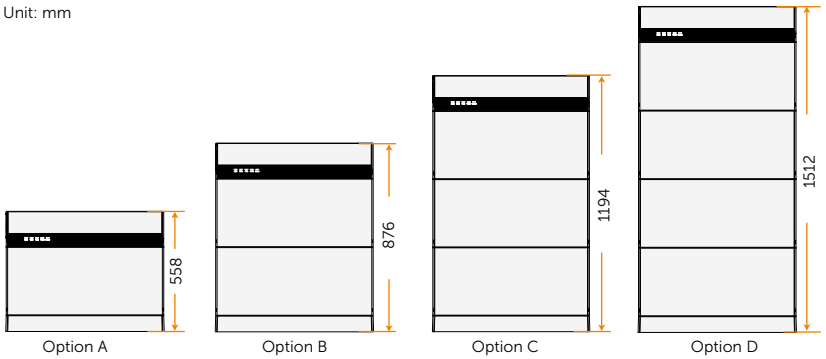


Figure 6-1 Installation option for one tower

Two Towers

Table 6-2 Height and weight

	Option E		Option F		Option G		Option H	
	Left tower	Right tower	Left tower	Right tower	Left tower	Right tower	Left tower	Right tower
Height (mm)	876	809	1194	491	1194	809	1194	1127
Net Weight (kg)	107.2	100.5	154.2	53.5	154.2	100.5	154.2	143.6

NOTICE!

- The above-mentioned net weight just includes the weight of the BMS, battery packs, Series Box (installed in the right tower), and Base, not the base support and other accessories.

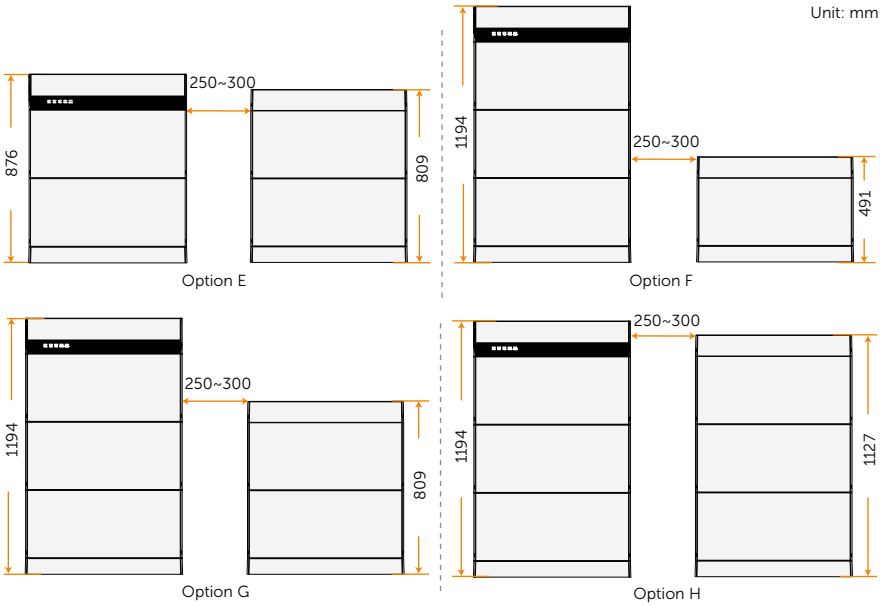


Figure 6-2 Installation option for two towers

NOTICE!

- If the installation form of one tower is likely to be chosen, option C is recommended.
- The above-mentioned installation options apply to the modes of floor mounting and wall mounting.

6.2 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.

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.
- Use insulated tools and wear individual protective tools when installing the battery.

NOTICE!

- The users may choose one of the following options based on their actual installation condition and aesthetics.

Options / Numbers of batteries	Option A	Option B	Option C	Option D	Option E	Option F	Option G	Option H
One battery	√							
Two batteries		√						
Three batteries			√					
Four batteries				√	√	√		
Five batteries							√	
Six batteries								√

- In the case of floor mounting, the assembled brackets (attaching angle bracket and adjustable bracket together) must be installed when assembling the Base and the uppermost battery pack. In the case of wall mounting, the assembled brackets must be installed when installing the uppermost battery pack.
- In case the number of battery packs in a tower is no more than 3 (including 3), please ensure that the bearing capacity of the supporting surface for the system must be over 900 kg.
- In the case of option D, please ensure the bearing capacity of the supporting surface for the system must be over 1050 kg.
- The device must not be installed on the wood wall.
- At least a distance not less than 710 mm high shall be provided to give access to install the inverter.
- At least two persons are required to move the battery pack.
- Please reserve enough distance from the device to the ceiling (or the grounding) for capacity expansion.

NOTICE!

- The connector of the BMS is completely insulated through insulating head.
- No circuit presents on male terminals until female terminals or another module connected.
- Access to directly touch female terminals by fingers is not available as they are IP2X rated.
- In case of measuring the battery's voltage, the battery must be placed on the base, ensuring male and female terminals are in contact before they present circuit.

6.2.1 Floor Mounting

One Tower for Floor Mounting

NOTICE!

- The mode of floor mounting is given priority for installation.
- Take the installation procedure for Option C as an example.

Step 1: Remove dust covers from the Base, battery pack(s) and BMS before installation.

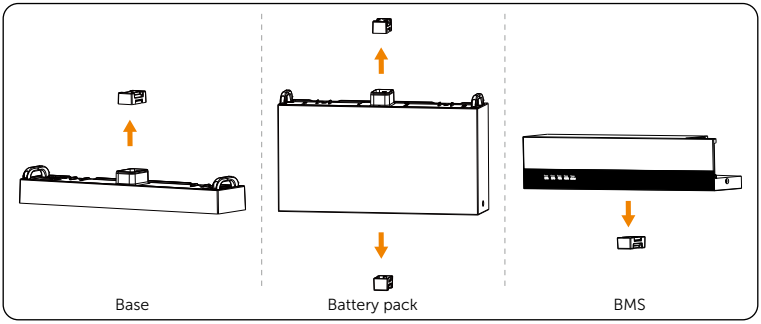


Figure 6-3 Removing dust covers

CAUTION!

- The dust cover can only be removed during installation and must be reattached after removing the battery.
- Do not touch the terminals during installation or removal of the battery.

Step 2: Place a spirit level to check whether the Base is even. If yes, refer to the Step 4; if no, refer to the Step 3. The side with "R" shall be against the wall.

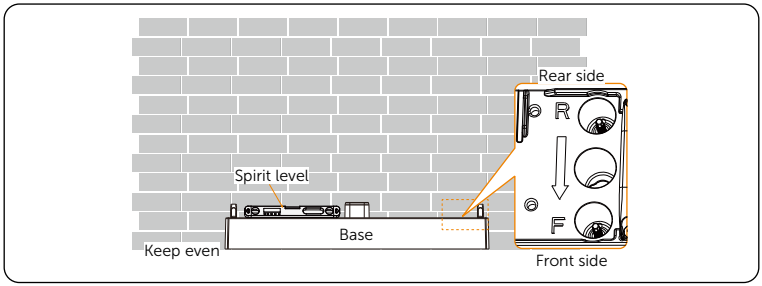


Figure 6-4 Determining whether the Base is level

Step 3: Rotate the adjustment screws clockwise to ensure that it is even.

Turn clockwise to lower the Base, and turn anticlockwise to raise the Base.

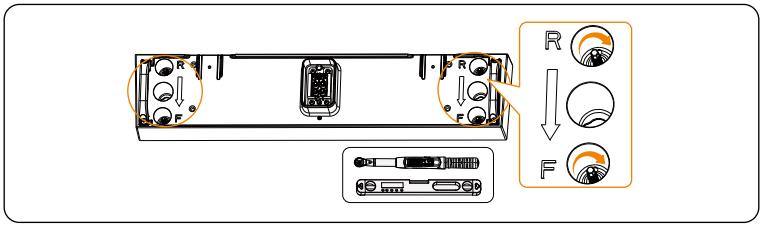


Figure 6-5 Rotating adjustment screws

NOTICE!

- Use a spirit level to measure both side of the Base to ensure that the base is even;
- If not, please rotate the adjustment screws by a torque wrench being to ensure that the Base is even.

Step 4: Locate the Base 90 mm away from the wall, accurately mark the location of the Base on both side with a marker.

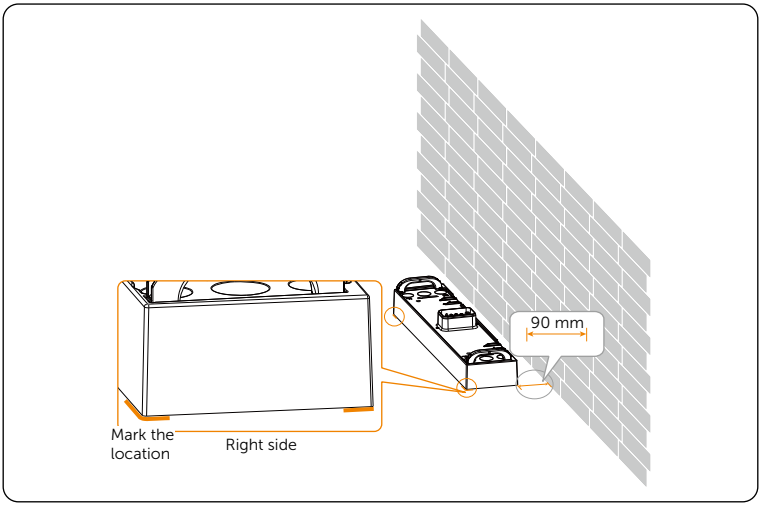


Figure 6-6 Placing the Base

Step 5: Attach the angle bracket (Part C) and adjustable bracket (Part D) together by using M5×14 Phillips cheese head screw (Part E), but do not fully tighten them.

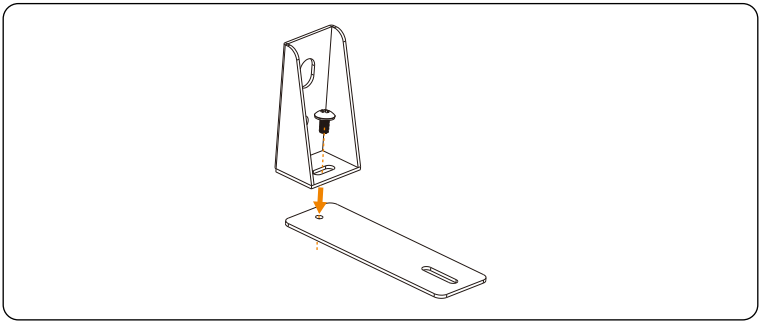


Figure 6-7 Attaching two brackets

Step 6: Place the assembled bracket on the wall, align the hole to the hole on the battery pack; and circle along the inner ring of the holes on the angle brackets. Totalling 2 assembled brackets need to be installed.

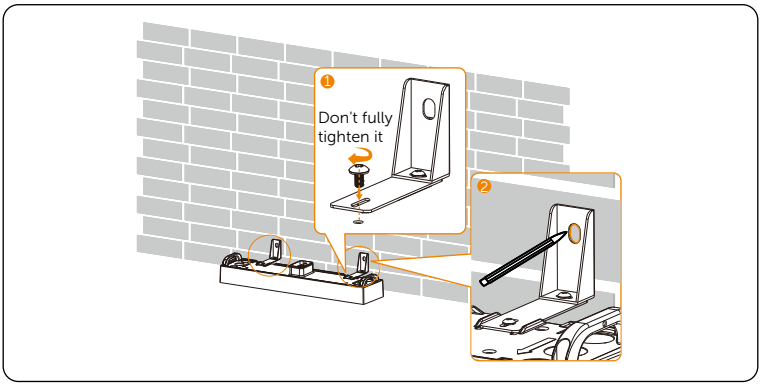


Figure 6-8 Circling inner ring of holes

NOTICE!

- Don't tighten screws fully until the angle bracket is secured on the wall.

Step 7: Remove the assembled bracket, and then drill two holes at a depth of more than 60 mm in the concrete wall by using a Drill (Ø10 mm).

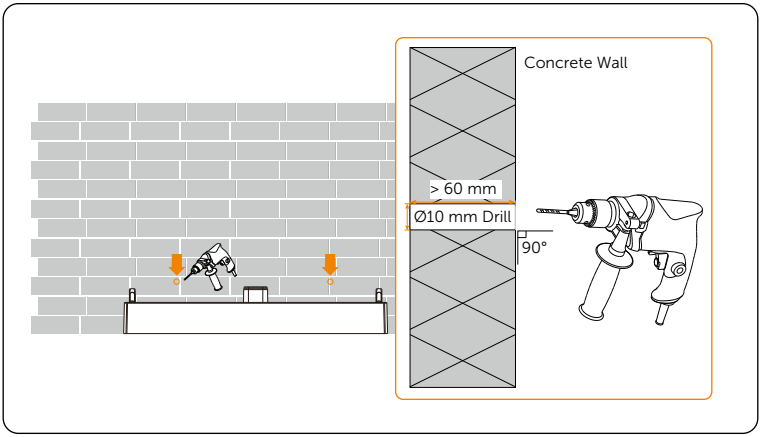


Figure 6-9 Drilling holes

NOTICE!

- An electric drill dust collector is recommended.
- To prevent dust from being released into the hot plug when drilling holes, users may use the package bag of the device or other materials to fully cover the battery pack.

Step 8: Insert the expansion bolt (Part F) (× 2 pcs) into two holes, tighten the self-tapping screw (Part H) (× 2 pcs) to secure the assembled bracket on the wall (torque: 8-10 N·m), and then tighten M5×14 screws on both sides (torque: 2.2-2.5 N·m).

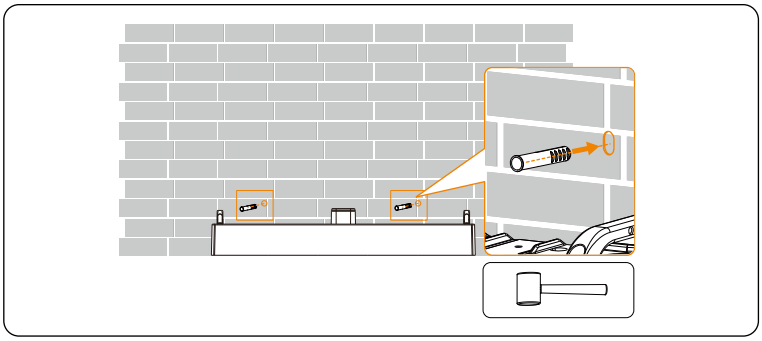


Figure 6-10 Inserting the expansion bolt

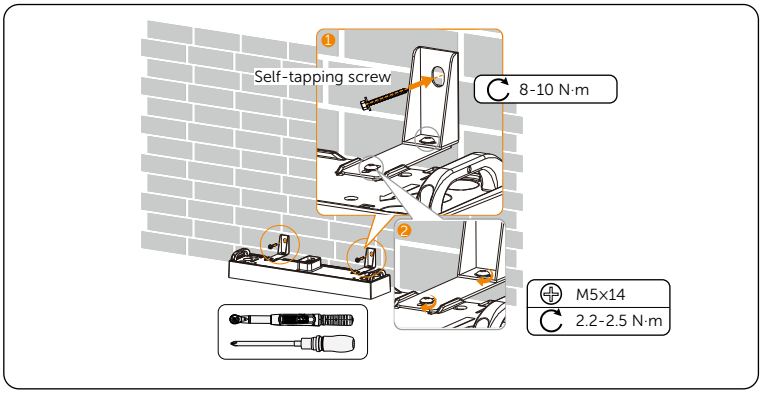


Figure 6-11 Securing the assembled bracket

NOTICE!

- If the Base is shifted before securing assembled bracket, move it to its original location according to the mark previously drawn.

Step 9: Place a battery pack on the Base.

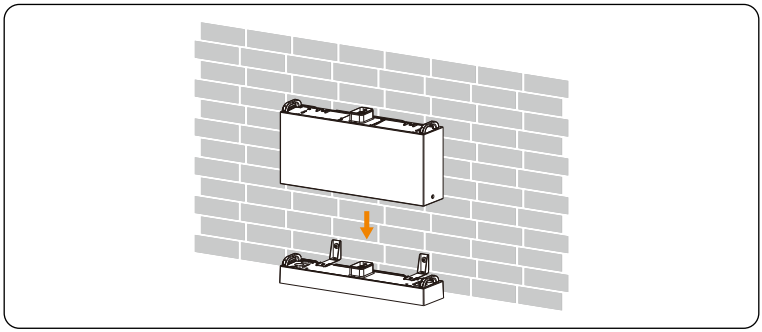


Figure 6-12 Placing the battery pack

NOTICE!

- At least two persons are required to move the battery pack.
- Please ensure that the side with "R" shall be against the wall.

Step 10: Insert and tighten M5x14 Phillips cheese head screw (Part A1) (× 2 pcs) on both sides (torque: 2.2-2.5 N·m).

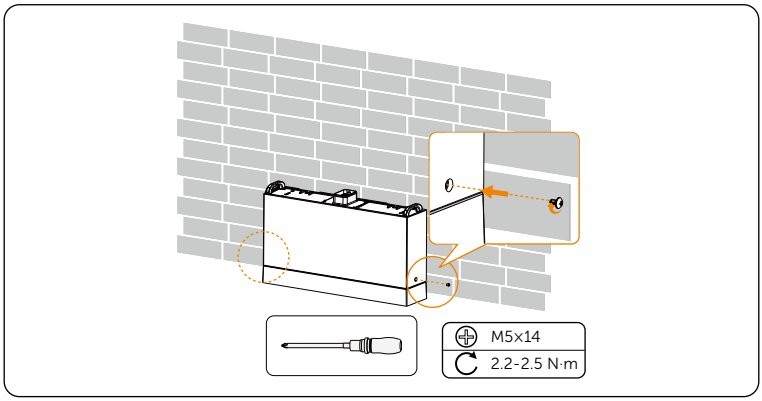


Figure 6-13 Tightening screws

NOTICE!

- Please make sure that the corners and edges of the Base and battery pack are aligned before tightening screws.

Step 11: Place the second and third battery packs, and make sure that the corners and edges of the battery packs are aligned.

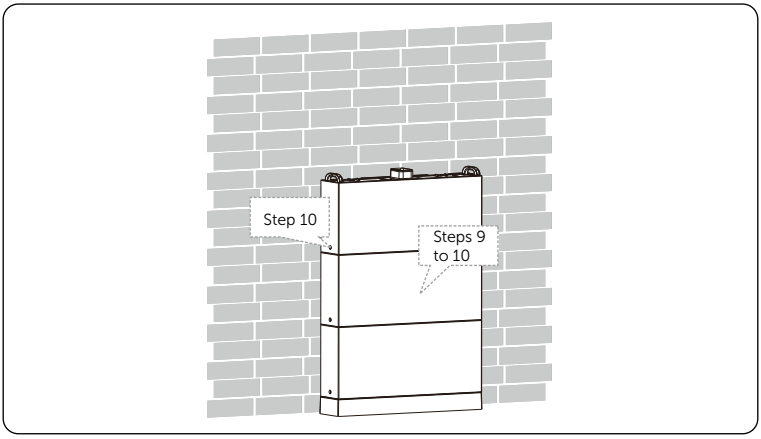


Figure 6-14 Placing battery packs

Step 12: Secure the assembled brackets on the wall.

1. Attach the angle bracket and adjustable bracket together;

2. Place such assembled bracket on the wall, and align its hole to the hole on the battery pack;

3. Circle along the inner ring of two holes on the angle bracket;

4. Remove such assembled bracket, and then drill two holes at a depth of more than 60 mm in the concrete wall by using a Drill (Ø10 mm);

5. Insert the expansion bolts into such two holes;

6. Secure such assembled bracket using tapping screws and washers, and then tighten M5×14 screws.

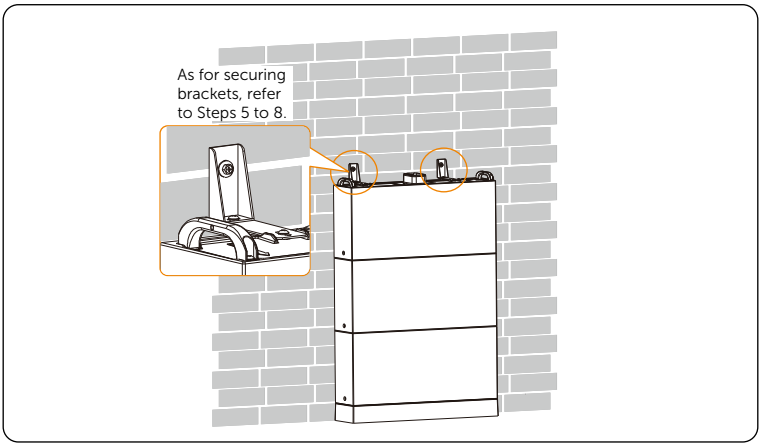


Figure 6-15 Securing assembled bracket

NOTICE!

- An electric drill dust collector is recommended.
- To prevent dust from being released into the hot plug when drilling holes, users may use the package bag of the device or other materials to fully cover the battery pack.

Step 13: Place the BMS, and then tighten the M5×14 screws on both sides (torque: 2.2-2.5 N·m)

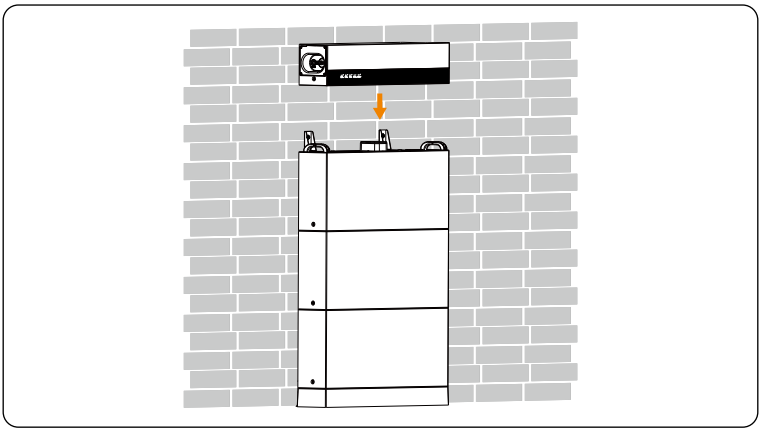


Figure 6-16 Placing the BMS

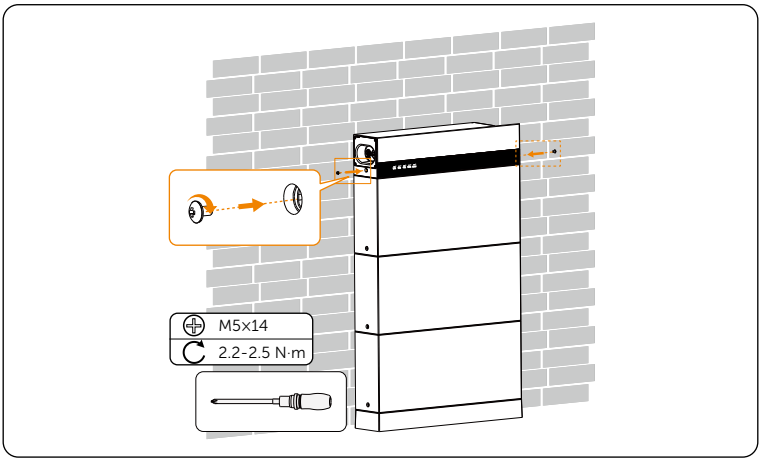


Figure 6-17 Tightening M5 screws

NOTICE!

- Please make sure that the corners and edges of the BMS and battery pack are aligned before tightening screws.

Two Towers for Floor Mounting

NOTICE!

- Take the installation procedure for option H as an example.

Step 1: As for the installation steps for the following figure, please refer to the installation procedure for "One Tower for Floor Mounting" (Steps 1 to 13). The installation procedure for both left and right towers is the same.

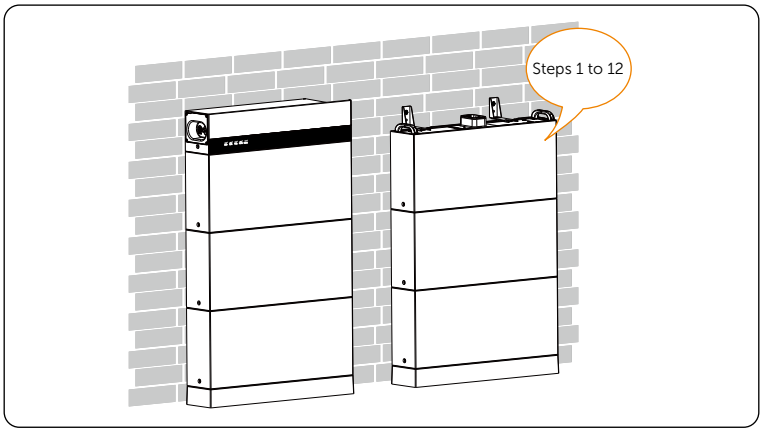


Figure 6-18 Installing two towers

Step 2: Place the Series Box (Part A2), insert and tighten M5x14 screws (Part D2), with totalling 4 screws (torque: 2.2-2.5 N·m).

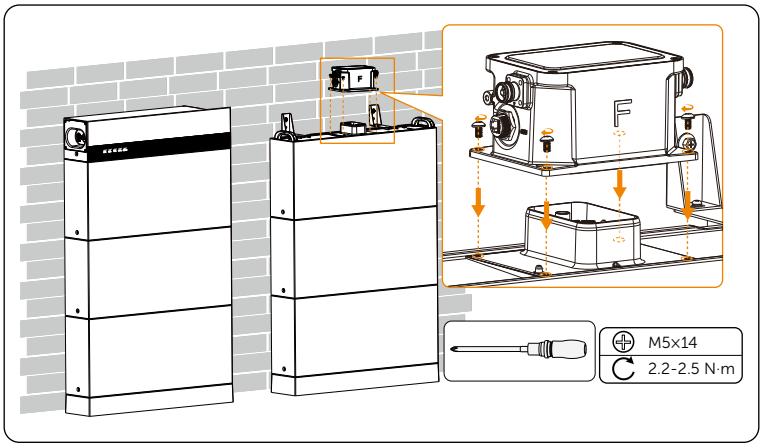


Figure 6-19 Placing the Series Box

NOTICE!
• The side of the Series Box with "R" shall be against the wall.

6.2.2 Wall Mounting

One Tower for Wall Mounting

NOTICE!
• Take the installation procedure for three battery packs as an example.

Step 1: Remove dust covers from the Base, battery pack(s) and BMS before conducting installation.

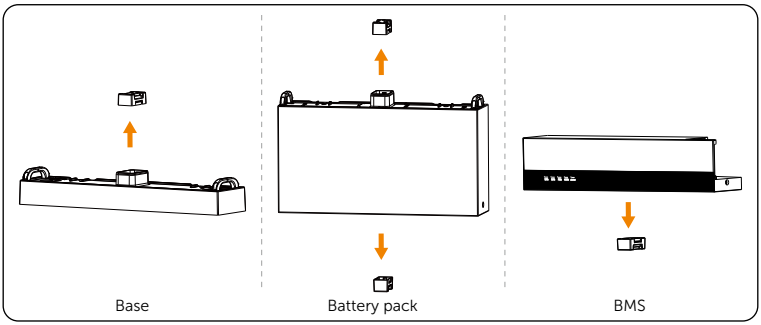


Figure 6-20 Removing dust covers

Step 2: Tighten M5×8 screws on both sides to attach the base support (Part A3) (× 2 pcs) and transverse plate (Part B3) together (torque: 2.2-2.5 N·m).

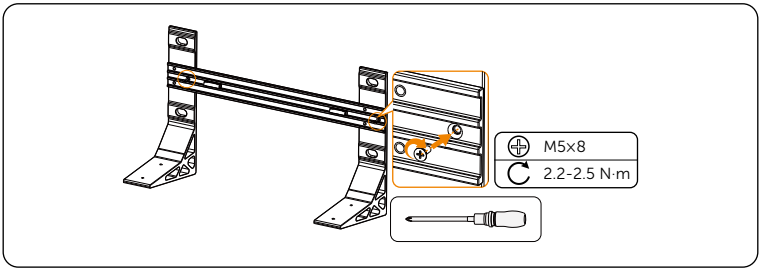


Figure 6-21 Attaching base support and transverse plate

Step 3: Place the assembled base support and transverse plate on the wall, check the cylindrical plastic bubble spirit level on the transverse plate. If the bubble isn't in the centre, slightly bow it to the horizontal.

Then circle along the inner ring of the four holes.

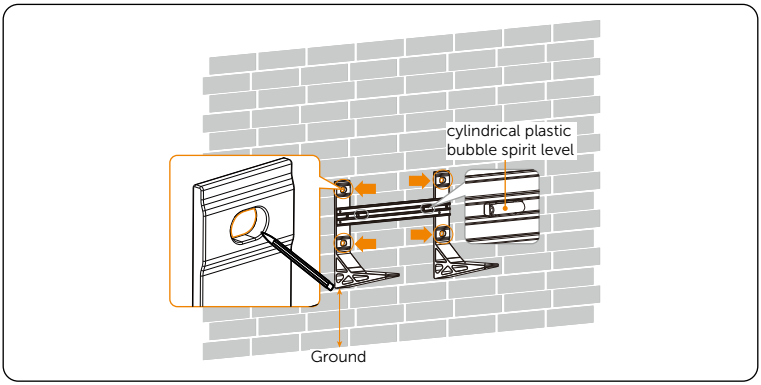


Figure 6-22 Drawing circles

NOTICE!

- The distance from the base support to the ground is decided according to the local regulations. And it is also the distance from the Base to the ground. For the safety concerns, it is suggested that the height from the ground not be too high.
- Please leave enough distance to the ceiling to install the inverter.

Step 4: Remove the assembled base support and transverse plate, and then drill four holes at a depth of at least 110 mm by using a Drill (Ø15 mm).

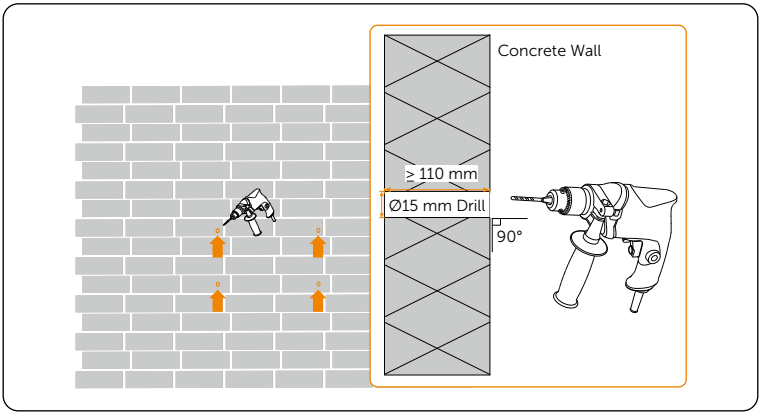


Figure 6-23 Drilling holes

NOTICE!

- An electric drill dust collector is recommended.
- To prevent dust from being released into the hot plug when drilling holes, users may use the package bag of the device or other materials to fully cover the Base.

Step 5: Place the assembled base support and transverse plate on the wall again, and check whether the bubble is in the centre.

Attach the expansion screw (Part C3) (× 4 pcs) to such four holes, hit it by using rubber mallet, and then tighten it by using torque wrench (torque: 20-25 N·m)

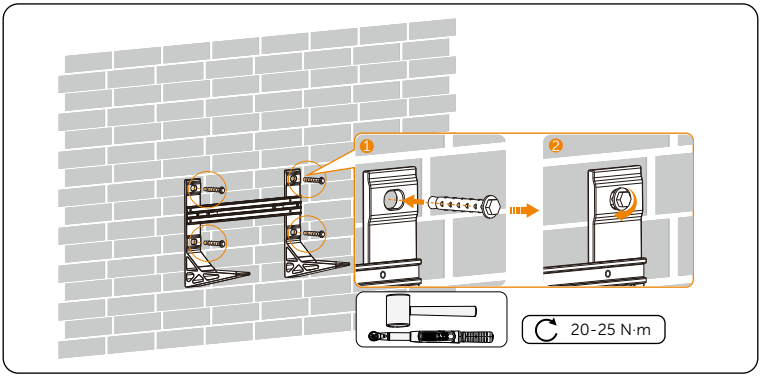


Figure 6-24 Tightening expansion screws

Step 6: Place the Base on the base support, and secure both left and right sides with M5×20 Phillips countersunk head screw (Part D3) (× 4 pcs) (torque: 2.2-2.5 N·m).

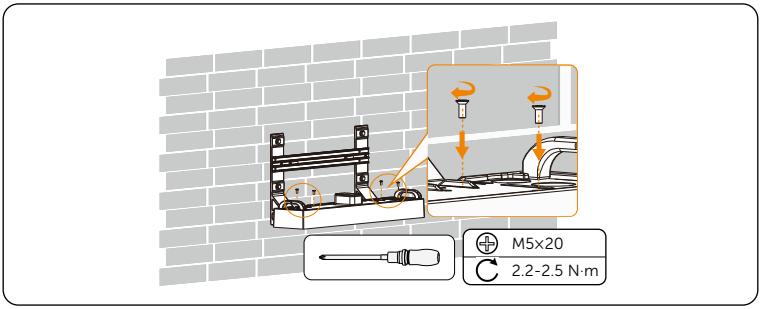


Figure 6-25 Securing the Base

Step 7: Place the battery pack on the Base.

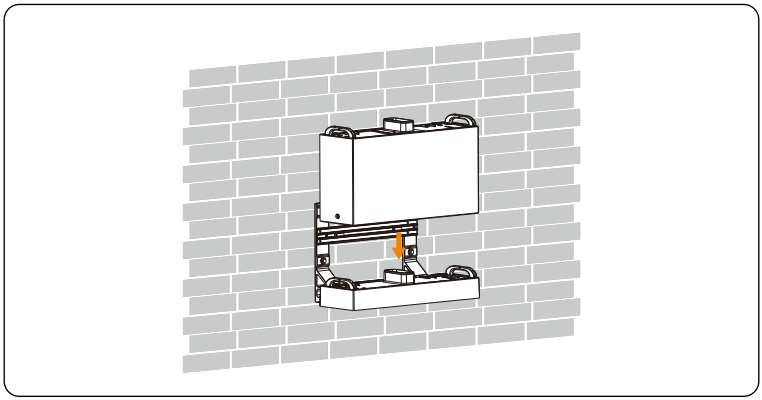


Figure 6-26 Placing battery pack

NOTICE!

- At least two persons are required to move the battery pack.
- Make sure that the side of the Series Box with "R" shall be against the wall.

Step 8: Insert and tighten M5×14 Phillips cheese head screw (Part A1) (× 2 pcs) on both sides (torque: 2.2-2.5 N·m).

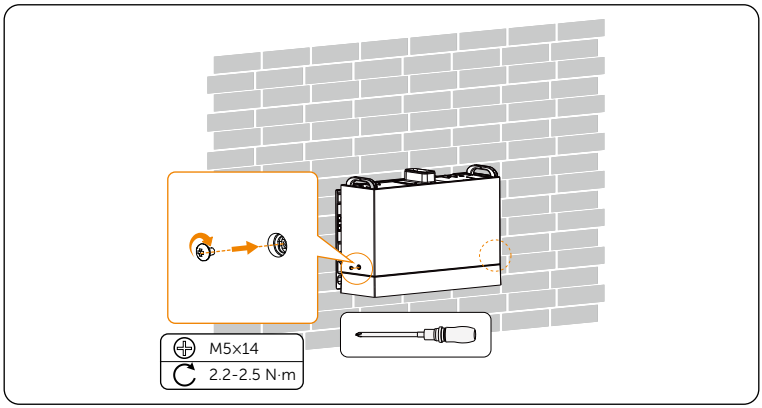


Figure 6-27 Tightening screws

NOTICE!

- Please make sure that the corners and edges of the Base and battery pack are aligned before tightening screws.

Step 9: Place the second and third battery packs, and make sure that the corners and edges of the battery packs are aligned.

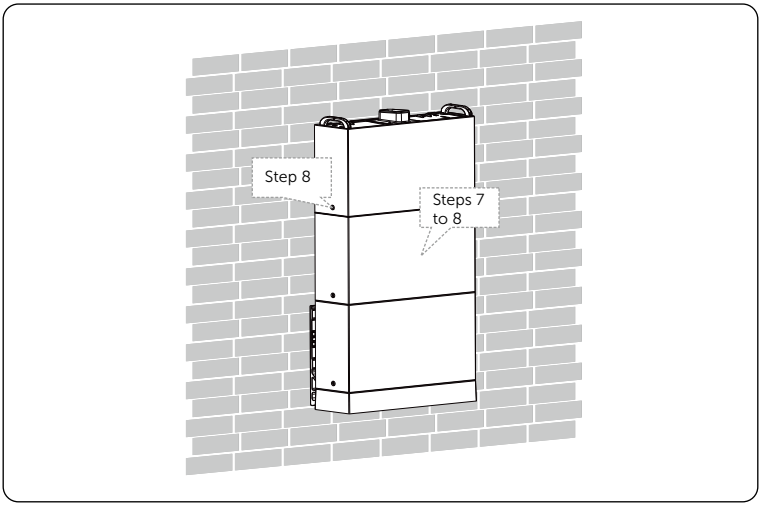


Figure 6-28 Placing battery packs

Step 10: Attach the angle bracket (Part C) and adjustable bracket (Part D) together by using M5×14 Phillips cheese head screw (Part E), but do not tighten them for a while.

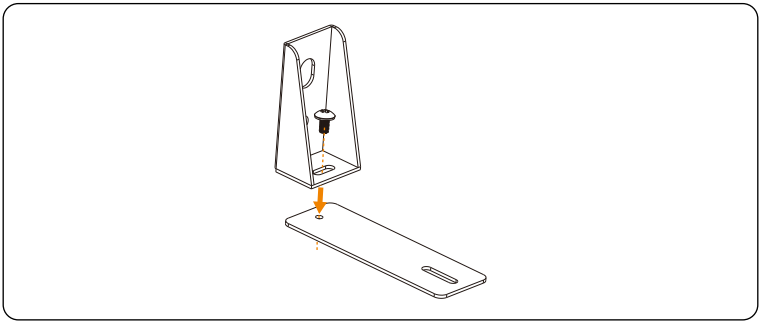


Figure 6-29 Attaching two brackets

Step 11: Place the assembled bracket on the wall, align the hole to the hole on the battery pack; and circle along the inner ring of two holes on the angle brackets. Totalling 2 assembled brackets need to be installed.

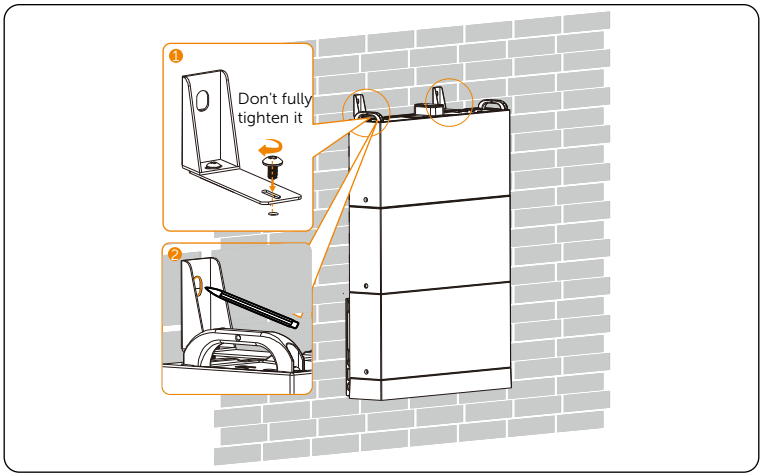


Figure 6-30 Circling inner ring of holes

NOTICE!

- Don't tighten screws fully until the angle bracket is secured on the wall.

Step 12: Remove the assembled brackets, and then drill two holes at a depth of more than 60 mm in the concrete wall by using a Drill (Ø10 mm).

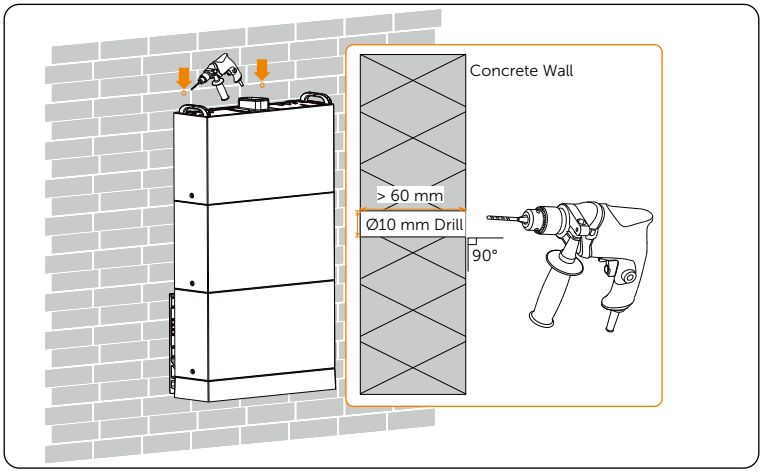


Figure 6-31 Drilling holes

NOTICE!

- An electric drill dust collector is recommended.
- To prevent dust from being released into the hot plug when drilling holes, users may use the package bag of the device or other materials to fully cover the battery pack.

Step 13: Insert the expansion bolt (Part F) (× 2 pcs) into such two holes, tighten the self-tapping screw (Part H) (× 2 pcs) to secure the assembled bracket on the wall (torque: 8-10 N·m), and then tighten M5×14 Phillips cheese head screw on both sides (torque: 2.2-2.5 N·m).

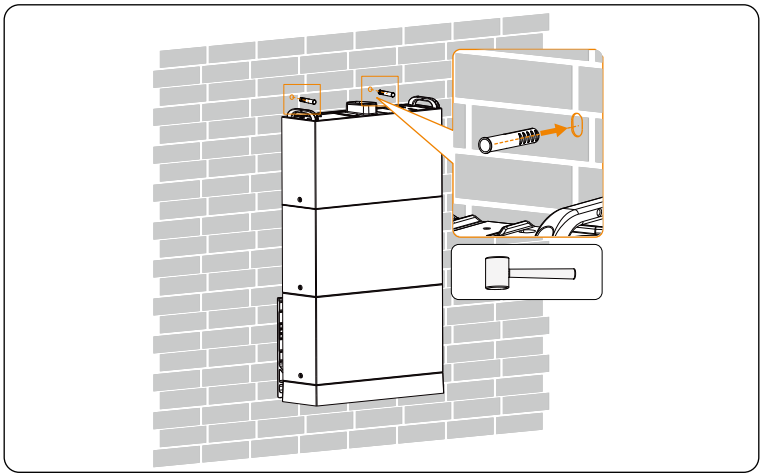


Figure 6-32 Inserting the expansion bolt

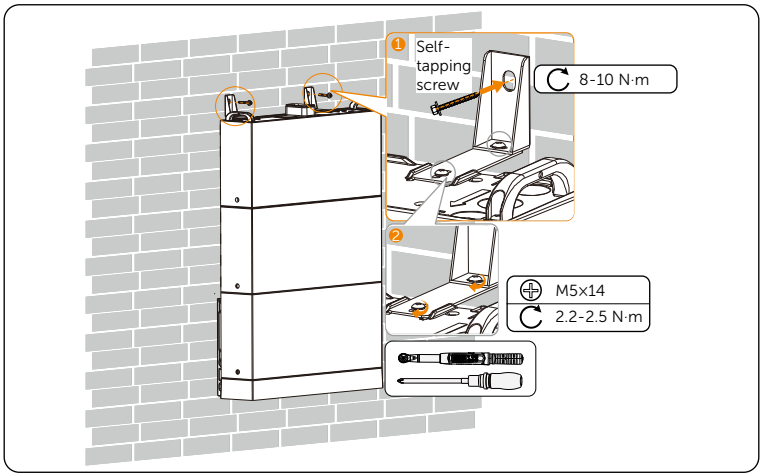


Figure 6-33 Securing the assembled bracket

Step 14: Place the BMS, and tighten the M5×14 screws on both sides (torque: 2.2-2.5 N·m)

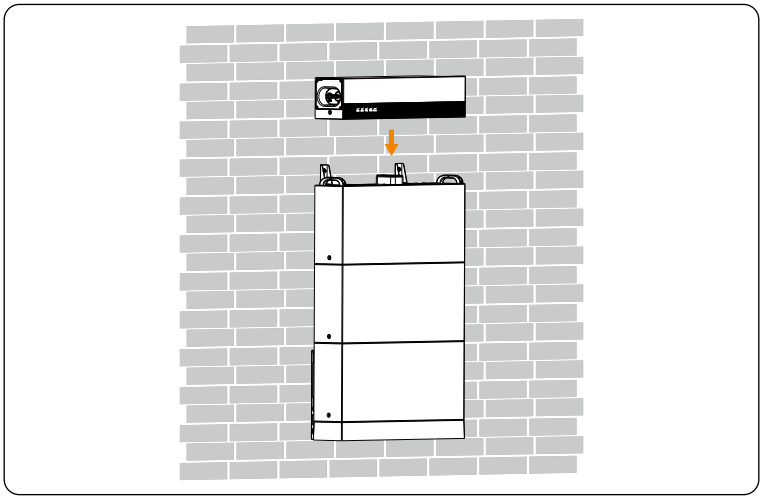


Figure 6-34 Placing the BMS

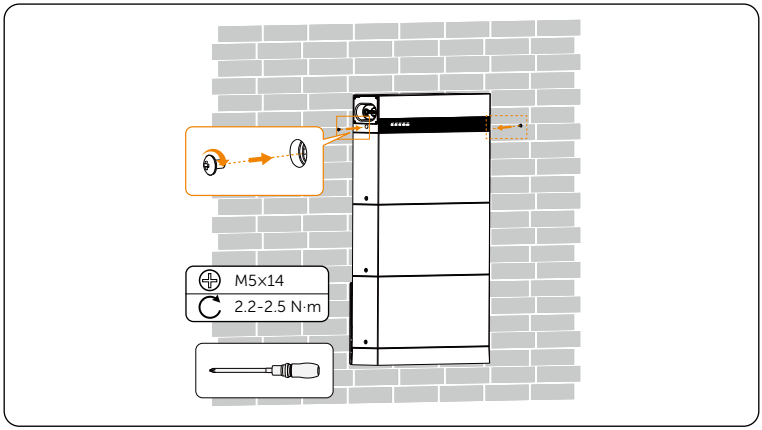


Figure 6-35 Tightening M5 screws

NOTICE!

- Please make sure that the corners and edges of the BMS and battery pack are aligned before tightening screws.

Two Towers for Wall Mounting

NOTICE!

- Take the installation procedure for six battery packs as an example.

Step 1: As for the installation steps for the following figure, please refer to the installation procedure for "One Tower for Wall Mounting" (Steps 1 to 14). The installation procedure for both left and right towers is the same.

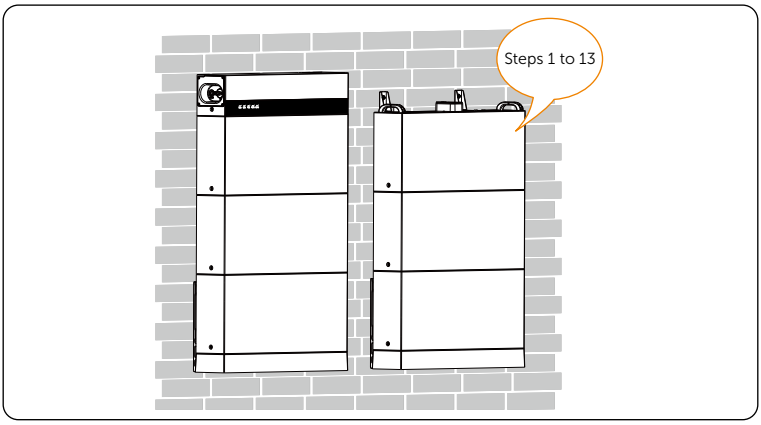


Figure 6-36 Installing two towers

Step 2: Place the Series Box (Part A2), insert and tighten M5x14 screws (Part D2), with totalling 4 screws (torque: 2.2-2.5 N·m).

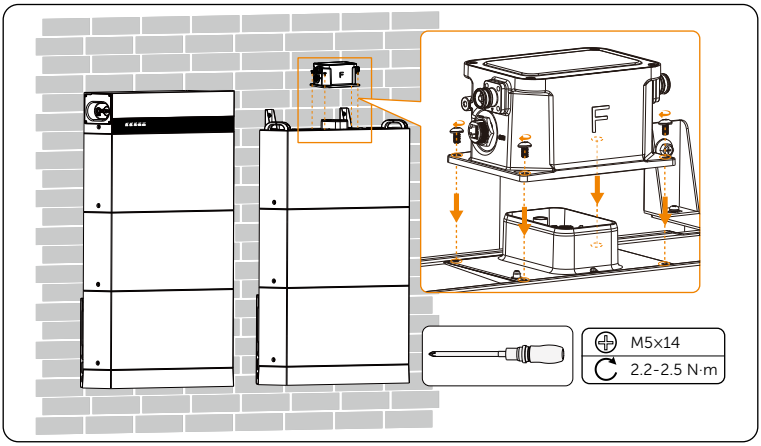


Figure 6-37 Placing the Series Box

NOTICE!

- The side of the Series Box with "R" shall be against the wall.

6.3 Capacity Expansion and Parallel Connection

- The device is allowed to increase the number of battery packs to achieve capacity expansion.

NOTICE!

As for the battery capacity expansion, it may have to dismantle the inverter. In that case, please strictly follow the *User Manual* to remove or install the inverter.

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

- To render it highly suitable for scenarios that demand ample capacity, the battery pack can be connected in parallel by installing TCBox-70 (hereinafter referred to as Box).
- Users can purchase the Box based on their actual needs.
- Regarding the connection between the battery and the Box, please scan the QR code below to refer to the *Installation Manual of TCBox-70*.

QR code of the *Installation Manual of TCBox-70*

⚠ WARNING!

- Whether in series or parallel, do not flip the DIP switch.

7 Wiring

7.1 Details of Cables

7.1.1 BMS to Inverter

- Communication cable (2000 mm): There are two terminals at both ends. One connects to the "BMS" port of the BMS, and the other connects to the "BMS" port of the inverter.

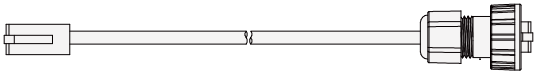


Figure 7-1 Communication cable

- Positive power cable (2000 mm): There are two terminals with the same function at both ends. One connects to the "BAT+" of the BMS, and the other connects to the "BAT+" of the inverter.

Figure 7-2 Positive power cable

- Negative power cable (2000 mm): There are two terminals with the same function at both ends. One connects to the "BAT-" of the BMS, and the other connects to the "BAT-" of the inverter.

Figure 7-3 Negative power cable

CAUTION!

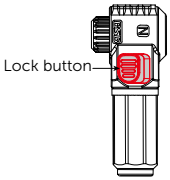


Figure 7-4 Connector

- Press and hold the lock button while unplugging the power cable, or it cannot be pulled out.
- Don't violently remove the cable when it is locked. Otherwise, the connector will be damaged.

- Positive power y cable (2000 mm): is a cable that has one connector on one end and two connectors on the other end. The end with one connector the "BAT+" of the BMS, and the other connects to the "BAT+" of the inverter.

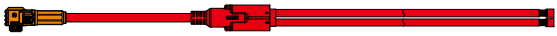


Figure 7-5 Positive power y cable

- Negative power y cable (2000 mm): is a cable that has one connector on one end and two connectors on the other end. The end with one connector the "BAT-" of the BMS, and the other connects to the "BAT-" of the inverter.

Figure 7-6 Negative power y cable

CAUTION!

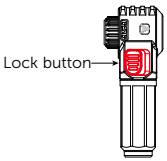


Figure 7-7 Connector

- Press and hold the lock button while unplugging the power cable, or it cannot be pulled out.
- Don't violently remove the cable when it is locked. Otherwise, the connector will be damaged.

NOTICE!

- A connector should be made to the end connecting to the inverter.

7.1.2 BMS to Series Box

- Communication cable (2000 mm): There are two terminals at both ends. One connects to the "COM" port of the BMS, and the other connects to the "COM" port of the Series Box.

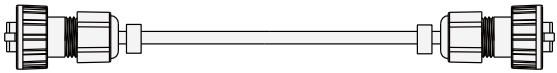


Figure 7-8 Communication cable

- Heater cable (2000 mm): There are two terminals at both ends. One connects to the "HEAT" port of the BMS, and the other connects to the "HEAT" port of the Series Box.

Figure 7-9 Heater cable

- Positive power cable (2000 mm): There are two terminals with the same function at both ends. One connects to the "B+" of the BMS, and the other connects to the "BAT+" of the Series Box.

Figure 7-10 Positive power cable

- Negative power cable (2000 mm): There are two terminals with the same function at both ends. One connects to the "B-" of the BMS, and the other connects to the "BAT+" of the Series Box.

Figure 7-11 Negative power cable

- Grounding cable (2000 mm): There are two terminals at both ends. One connects the grounding port of the BMS, and the other connects to the grounding port of the Series Box.

Figure 7-12 Grounding cable

CAUTION!

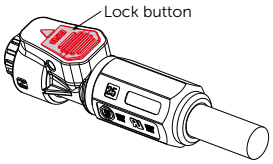


Figure 7-13 Connector (BMS side)

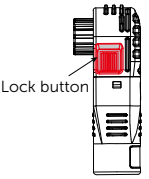


Figure 7-14 Connector (Series box side)

- Press and hold the lock button while unplugging the power cable, or it cannot be pulled out.
- Don't violently remove the cable when it is locked. Otherwise, the connector will be damaged.

NOTICE!

- The above-mentioned cables are delivered with the **Accessories of Series Box**.

7.2 PE Connection

Regarding the PE cable between the inverter and BMS, the steps for making PE connection are shown as follows:

Step 1: Strip the cable jacket about 6 to 8 mm from the end.

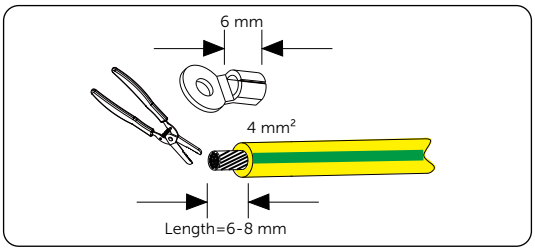


Figure 7-15 Striping cable jacket

Step 2: Cut the heat-shrink tubing to about 12 to 15 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 I).

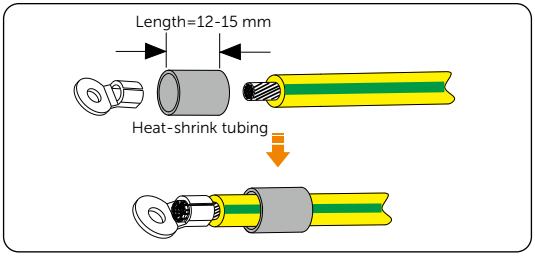


Figure 7-16 Cutting heat-shrink tubing

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

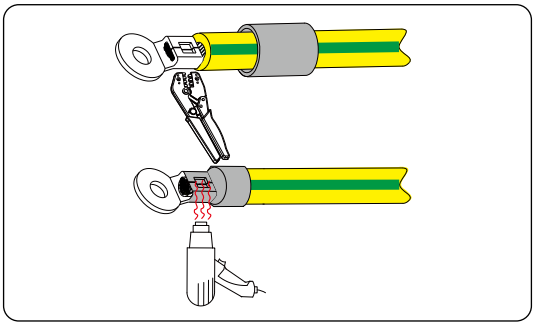


Figure 7-17 Crimping and heating

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).

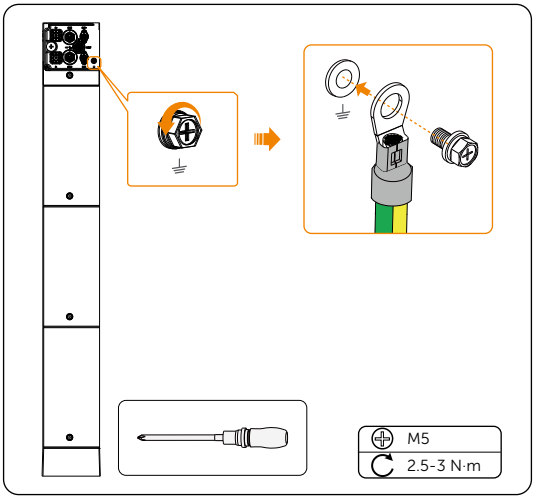


Figure 7-18 Tightening M5 screws

NOTICE!

- Regarding the grounding cable that is prepared by the user, a wire size of 4 mm^2 for the cable is recommended.

7.3 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.

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 communication cable pin assignment is shown as follows:

Table 7-1 Communication cable pin assignment

PIN	1	2	3	4	5	6	7	8
Communication cable	/	GND	/	BMS_H	BMS_L	/	A1	B1

The wire sequence is shown as follows:

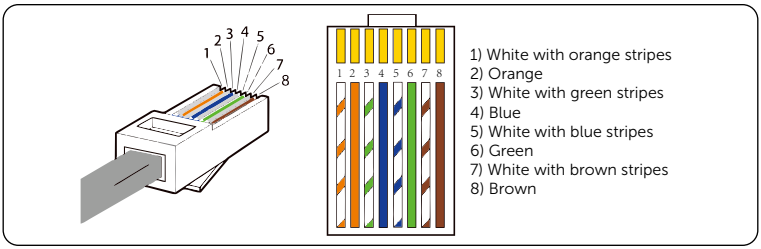


Figure 7-19 Wire sequence

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.

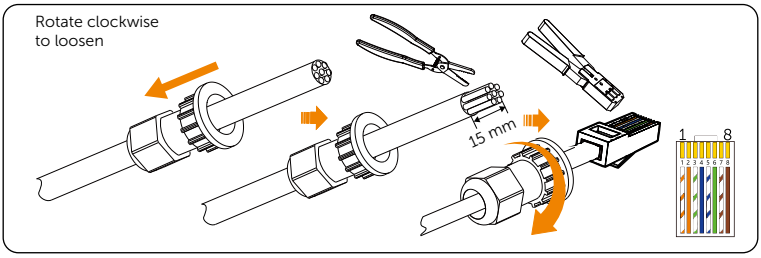


Figure 7-20 Making RJ45 connector to communication cable

NOTICE!

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

7.4 Wiring Procedure

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.

CAUTION!

- Use insulated tools and wear individual protective tools when connecting cables.

7.4.1 Wiring for One Tower

CAUTION!

- The short power cable, short-circuit plug, and waterproof cap will be connected before delivery. In that case, the short power cable, short-circuit plug, or waterproof cap shall not be removed.

NOTICE!

- The wiring procedure for both floor mounting and wall mounting is the same.
- Before wiring, one end of the following cables connecting to the inverter, positive and negative power cables, communication cables should be made with a connector.

Step 1: Correctly connect the grounding cable. Please refer to "Chapter 7.2 PE Connection".

Step 2: Plug the positive power cable (Part K) into the "BAT+" port on the BMS and "BAT+" port on the inverter, as well as the negative power cable (Part L) into the "BAT-" port on the BMS and "BAT-" port on the inverter.

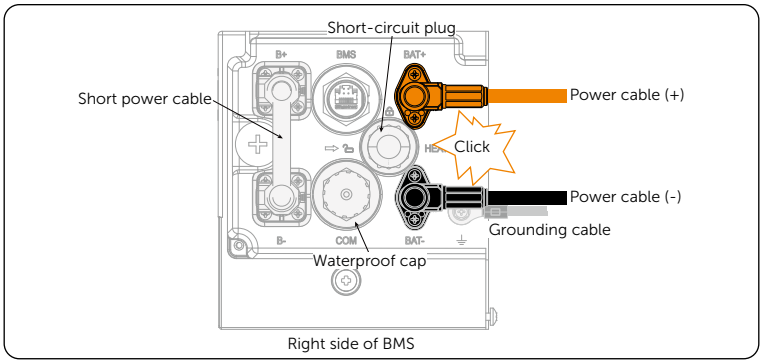


Figure 7-21 Plugging power cables

Step 3: Correctly plug the communication cable (Part J) into the "COM" port on the BMS and " COM" port on the inverter

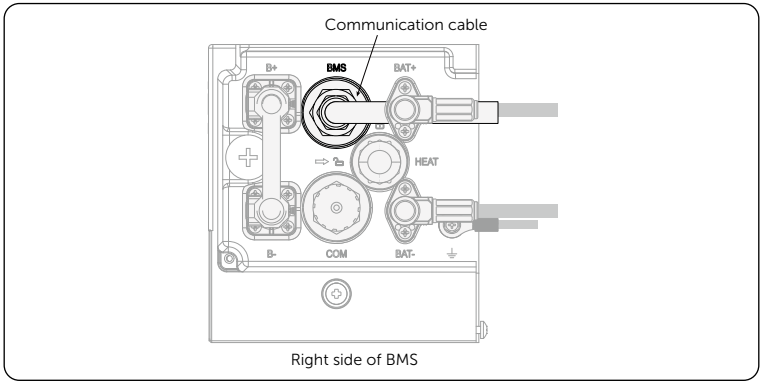


Figure 7-22 Plugging communication cable

CAUTION!

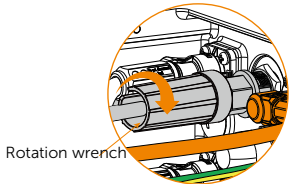


Figure 7-23 Rotating rotation wrench

- The end of the communication cable shall be closed by using a rotation wrench (Part M).

Step 4: Thread cable through the holes on the cable cover (Part A).

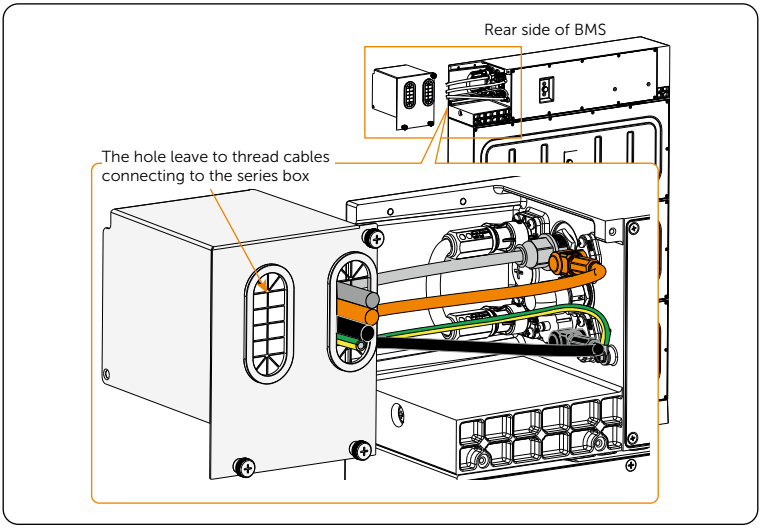


Figure 7-24 Threading cables

Step 5: Insert the M4*8 Phillips countersunk head screw (Part B) to fix the cable cover (torque: 1.0-1.2 N·m).

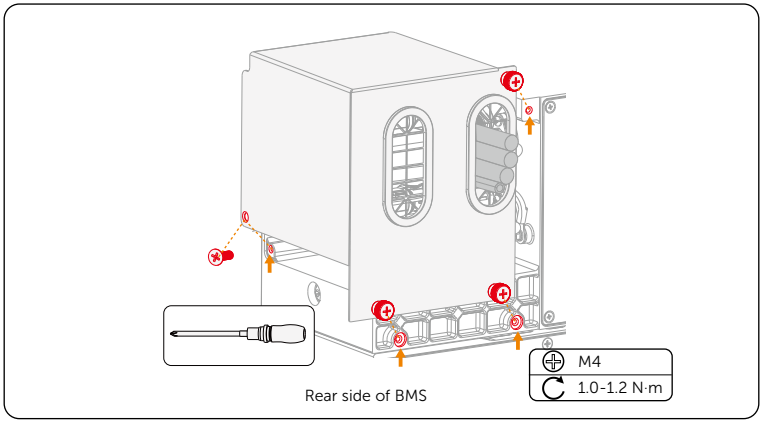


Figure 7-25 Fixing cable cover

7.4.2 Wiring for Two Towers

NOTICE!

- The wiring procedure for both floor mounting and wall mounting is the same.
- Before wiring, one end of the following cables connecting to the inverter, positive and negative power cables, communication cables should be made with a connector.

Step 1: Before conducting wiring, press and hold the lock button to unplug the short power cable.

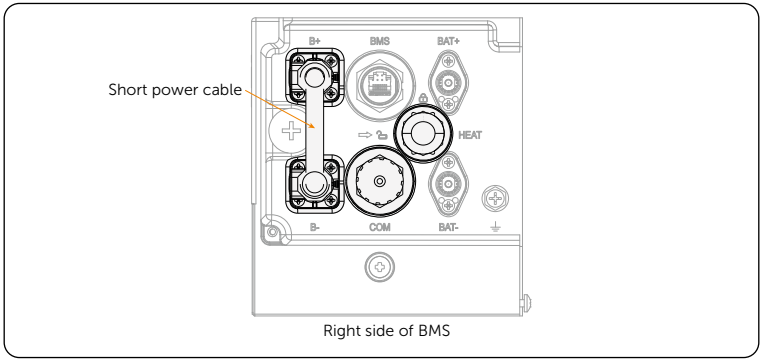


Figure 7-26 Removing short power cable

CAUTION!

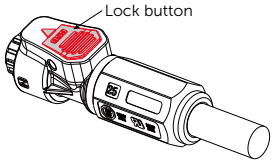


Figure 7-27 Connector

- Press and hold the lock button while unplugging the short power cable, or it cannot be pulled out.
- Don't violently remove the cable when it is locked. Otherwise, the connector will be damaged.

Step 2: Rotate the waterproof cap anti-clockwise to remove it. And rotate the short-circuit plug anti-clockwise. When the arrow on the rotating ring is aligned with the arrow on the panel, the short-circuit plug can be remove.

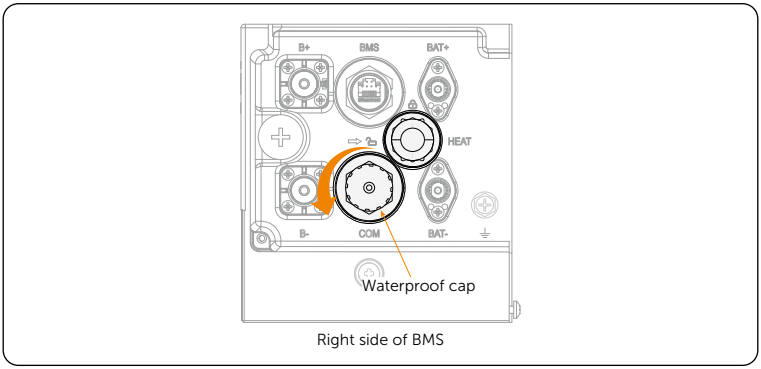


Figure 7-28 Removing waterproof cap

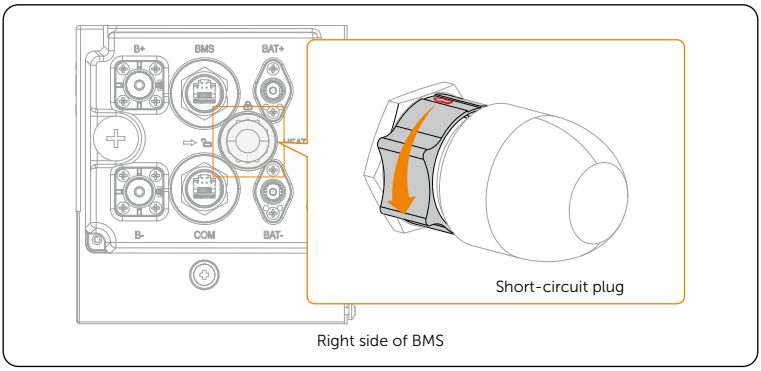


Figure 7-29 Removing short-circuit plug

NOTICE!

- Press and hold the lock button while unplugging the power cable, or it cannot be pulled out.
- Don't violently remove the short-circuit plug before the arrow on the rotating ring is aligned with the arrow on the panel.
- Don't violently remove the cable when it is locked.

Step 3: Correctly plug heater cable (Part K2) to connect "HEAT" port of the BMS and "HEAT" port of the Series Box;

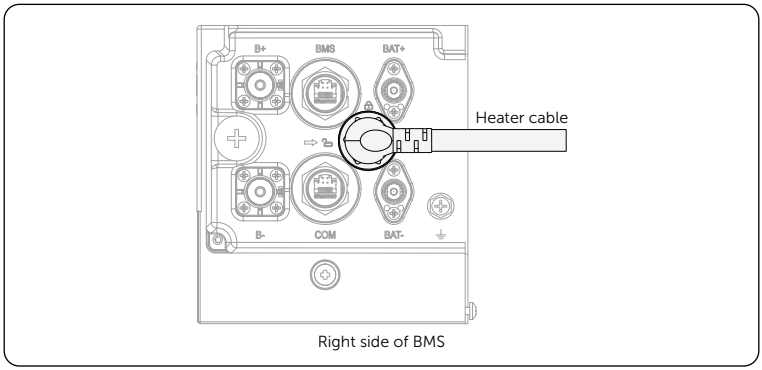


Figure 7-30 Plugging heater cable

CAUTION!

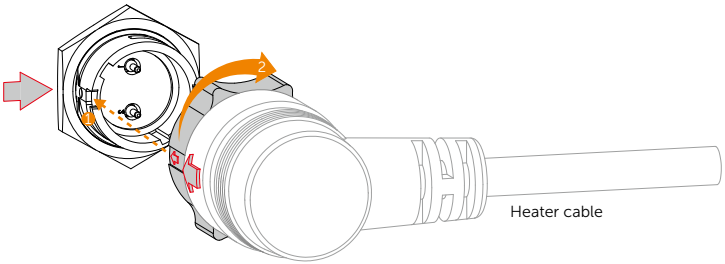


Figure 7-31 Inserting heater cable

- Align the groove according to the arrows.

Step 4: Correctly insert the grounding cable. Please refer to "Chapter 7.2 PE Connection".

Step 5: Correctly plug the positive power cable (Part K) into the "BAT+" port on the BMS and "BAT+" port on the inverter, as well as the negative power cable (Part L) into the "BAT-" port on the BMS and "BAT-" port on the inverter.

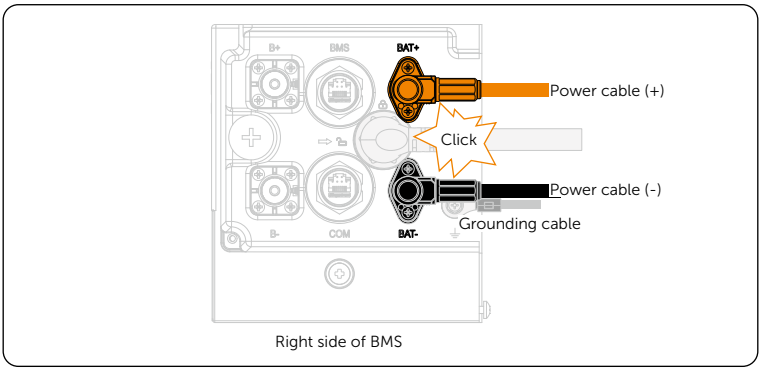


Figure 7-32 Pluggingg power cables

Step 6: Correctly plug the communication cable (Part J) into the "COM" port on the BMS and "COM" port on the inverter

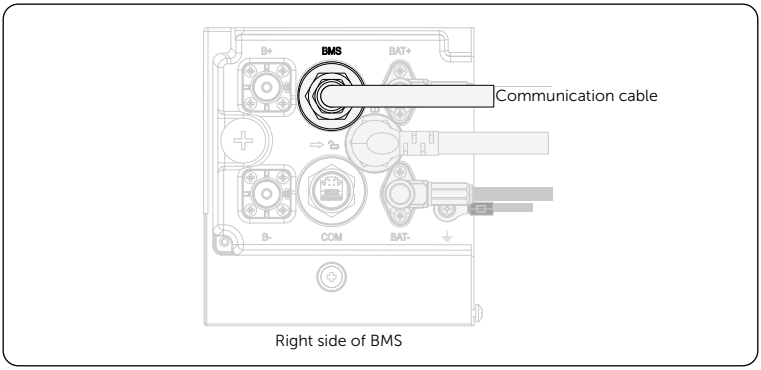


Figure 7-33 Plugging communication cable

Step 7: Correctly plug positive power cable to connect "B+" of the BMS and "B+" of the Series Box (Part H2);

Correctly plug negative power cable to connect "B-" of the BMS and "B-" of the Series Box (Part I2);

Correctly plug communication cable (Part J2) to connect "COM" port of the BMS and "COM" port of the Series Box, and then tighten it by rotation wrench (Part M);

Correctly plug grounding cable (Part L2) to connect the grounding port of the BMS to the grounding port of the Series Box.

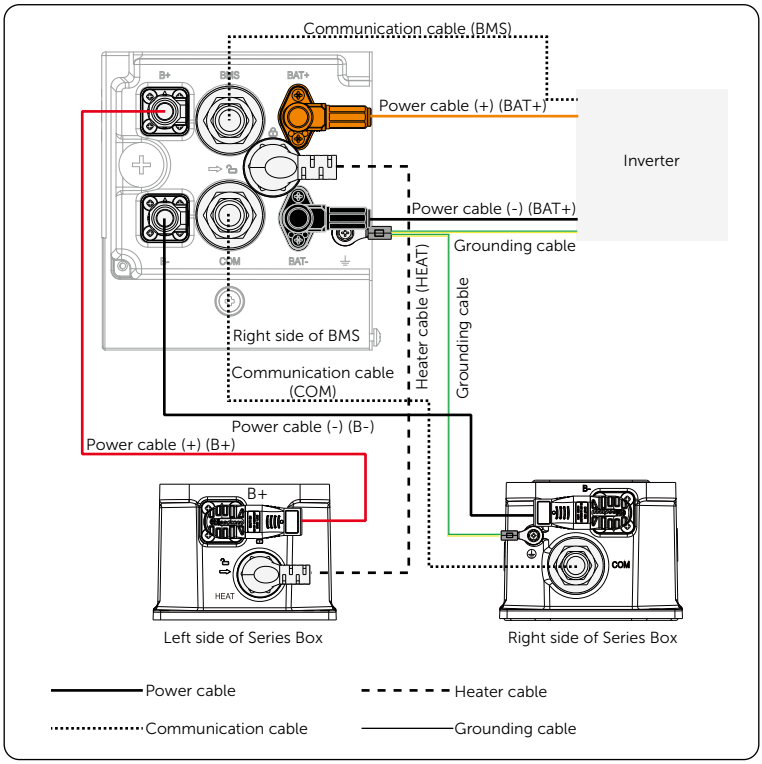
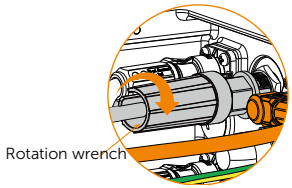


Figure 7-34 Wiring diagram

CAUTION!



- The ends of the communication cables shall be closed by using a rotation wrench.

Figure 7-35 Rotating rotation wrench

NOTICE!

- After the wiring for the battery pack is complete, please install the cable cover and corrugated pipes.

Step 8: Thread cable through the holes on the cable cover (Part A), see "Figure 7-25 Fixing cable cover".

Step 9: Insert the M4*8 Phillips countersunk head screw (Part B) to fix the cable cover (Part A) on the BMS (torque: 1.0-1.2 N·m).

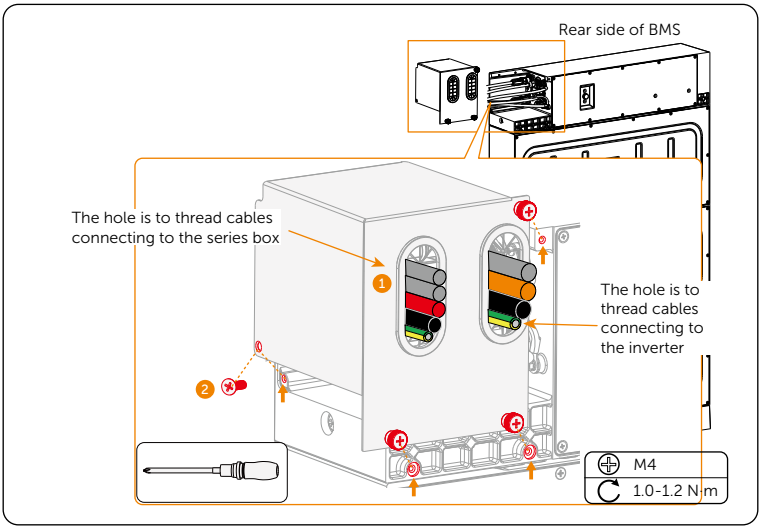


Figure 7-36 Tighten M4 screws

Step 10: Pull cables through corrugated pipes.

Pull the power cables, communication cable and grounding cable that connect to the inverter through pipe 1,

Pull the positive power cable and heater cable that connect to the series box through pipe 2, as well as the negative power cable, communication cable and grounding cable through pipe 3.

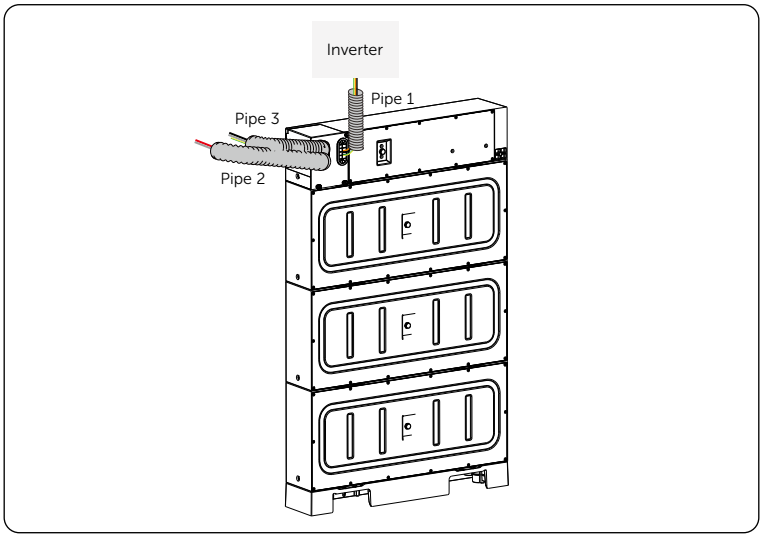


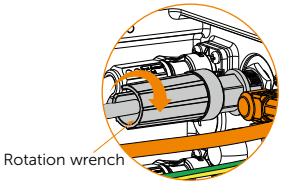
Figure 7-37 Pulling cables

NOTICE!

- A corrugated pipe should be prepared by the users themselves.
- A corrugated pipe with an external diameter of 67.2 mm is recommended for use to keep cable insulation in place and avoid potential damages.

Step 11: Connect the cables between the BMS and series box, see "Figure 3-34 Wiring diagram".

CAUTION!



- There are two terminals on both ends of the power cable;
- Both ends of the communication cable shall be closed by using a rotation wrench.

Figure 7-38 Rotating rotation wrench

Step 12: Insert pipes into the holes on the cover, and then connect the cables to the Series Box.

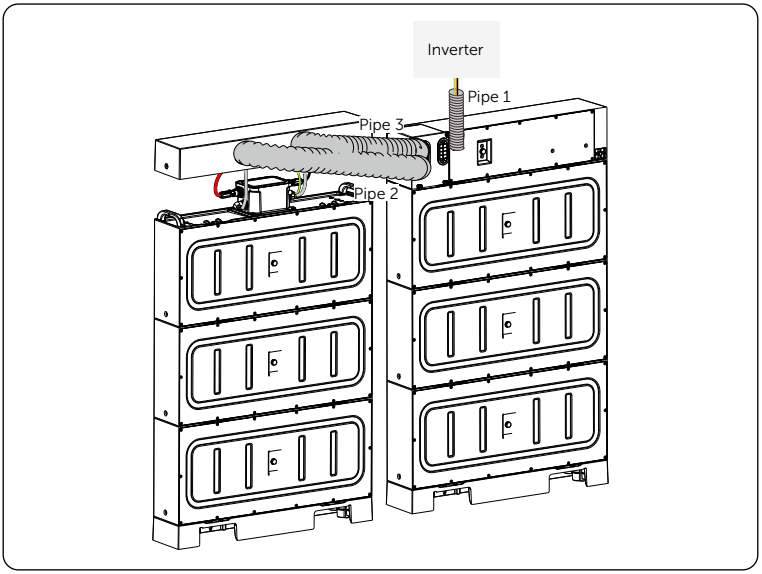


Figure 7-39 Inserting pipes into the cover

7.5 Installation of Cover

After finishing wiring, push the cover to the Series Box, and tighten M5x14 screws on both sides to secure the cover (torque: 2.2-2.5 N·m).

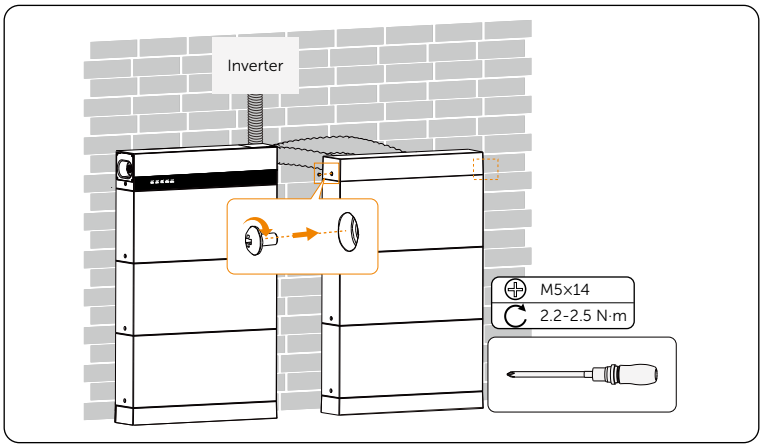


Figure 7-40 Tightening M5 screws

NOTICE!

- Please make sure that the corners and edges of the cover and battery pack are aligned before tightening screws.
- The above steps for installing the cover also apply to the mode of wall mounting.

8 System Commissioning

8.1 Checking before Power-on

a. Check the device installed correctly and securely;

b. Make sure that all the BAT BUTTON and BAT SWITCH are OFF;

c. All cables are connected correctly and securely;

d. All unconnected port are covered;

8.2 Powering on the System

The BMS is provided with two kinds of switches, unlockable or lockable version. Users may purchase it based on their location.

8.2.1 Unlockable Switch

The unlockable switch (shown below) allows a user to rotate between two states, such as "ON" or "OFF". The switch by default is "OFF". The switch is shown below in both its "ON" and "OFF" states.

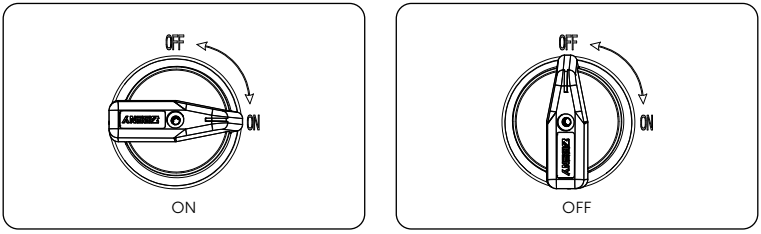


Figure 8-1 State of switch

Step 1: Switch the BAT SWITCH to the "ON" position.

Step 2: Press and hold the BAT BUTTON for about 1 to 2 seconds to activate the system, at this point, the status light flashes a yellow light every 0.1 seconds until finishing self test, of which the period lasts about 3 to 4 seconds. Then the status light flashes green light every 0.5 seconds after finishing self test. During the whole period, all the SOC power indicators were off. It indicates that the self test has been successfully done. If fails, you can check the light information about fault and warning. After successful communication to the inverter, the status light turns solid green light, and SOC power indicators come on solid green light based on the actual remaining capacity.

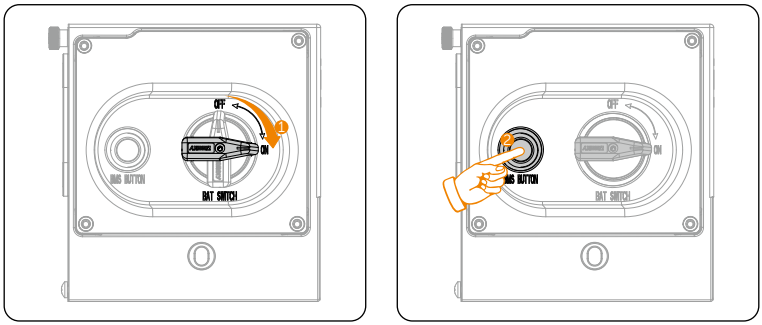


Figure 8-2 Power on

NOTICE!

- A system problem may be encountered while pressing the button frequently. The user may need to wait at least 10 seconds and then try again.

8.2.2 Lockable Switch

The lockable switch (shown below) allows a user to rotate among three states, such as "ON", "OFF" or "OFF+LOCK". The switch by default is "OFF". The switch is shown below in its "ON", "OFF" and "OFF+LOCK" states.

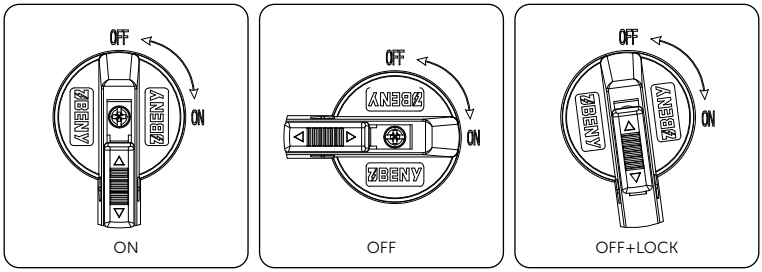


Figure 8-3 State of switch

Step 1: Switch the BAT SWITCH to the "ON" position.

Step 2: Press and hold the BAT BUTTON for about 1 to 2 seconds to activate the system, at this point, the status light flashes a yellow light every 0.1 seconds until finishing self test, of which the period lasts about 3 to 4 seconds. Then the status light flashes green light every 0.5 seconds after finishing self test. During the whole period, all the SOC power indicators were off. It indicates that the self test has been successfully done. If fails, you can check the light information about fault and warning. After successful communication to the inverter, the status light turns solid green light, and SOC power indicators come on solid green light based on the actual remaining capacity.

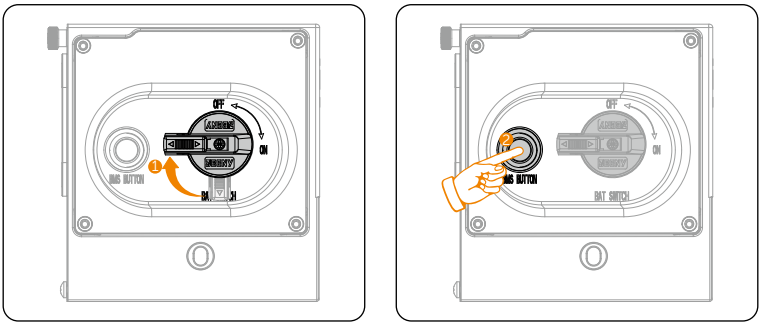


Figure 8-4 Power on

NOTICE!

- A system problem may be encountered while pressing the button frequently. The user may need to wait at least 10 seconds and then try again.

9 Troubleshooting and Maintenance

9.1 Power off the System

9.1.1 Unlockable Switch

Step 1: Please check that the inverter has been shut down.

Step 2: Press and hold the BAT BUTTON for more than 1 second. At the point, the status light comes on solid green light, and the SOC power indicators flash green in turn.

Step 3: Switch the BAT SWITCH to the "OFF" position.

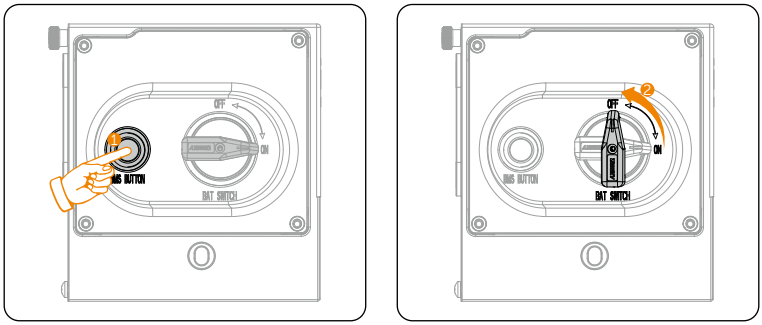


Figure 9-1 Power off

WARNING!

- After the battery 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.

9.1.2 Lockable Switch

Step 1: Please check that the inverter has been shut down.

Step 2: Press and hold the BAT BUTTON for more than 1 second. At the point, the status light comes on solid green light, and the SOC power indicators flash green in turn.

Step 3: Rotate the SWITCH to "OFF" position;

Step 4: Go counter the SWITCH anticlockwise by 7 to 13 degrees

Step 5: Push the lock upward;

Step 6: Secure the SWITCH with a lock.

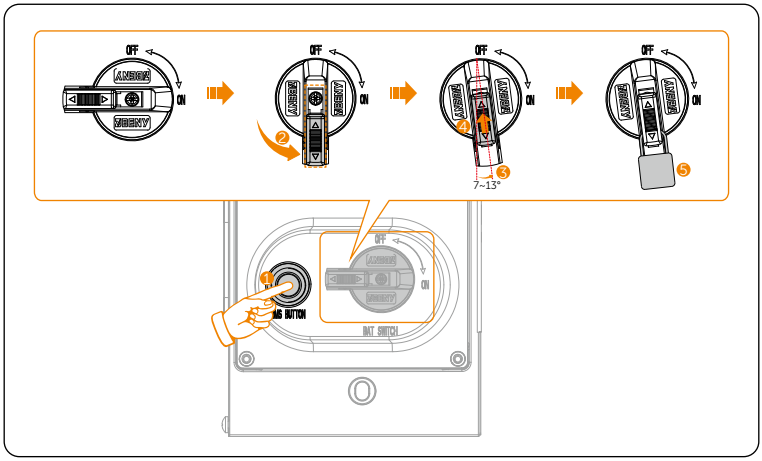


Figure 9-2 Power off

WARNING!

- After the battery 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!

- Please prepare a lock in advance.

9.2 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.

T-BAT system's BMS 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
BMS_Lost	External fault of BMS	Unable to establish communication with inverter. • Restart the BMS. • Contact the after-sales personnel of our company.
BMS_Internal_Err	Internal fault of BMS	Unable to establish communication among battery packs. • Restart the BMS. • Check whether the wire connections among battery packs are correct. • Contact the after-sales personnel of our company.
BMS_OverVoltage	BMS overvoltage	Overvoltage of a single battery pack. • Contact the after-sales personnel of our company.
BMS_LowerVoltage	BMS undervoltage	Undervoltage of a single battery pack. • Battery pack is forced to charge through inverter. • Contact the after-sales personnel of our company.
BMS_ ChargeOverCurrent	Overcurrent charging of BMS	Overcurrent charging of BMS. • Restart the BMS. • Contact the after-sales personnel of our company.
BMS_ DischargeOverCurrent	Discharge overcurrent of BMS	Discharge overcurrent of BMS. • Restart the BMS. • Contact the after-sales personnel of our company.

Error Code	Fault	Diagnosis and Solution
BMS_TemHigh	High temperature of BMS	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.
BMS_TemLow	Low temperature of BMS	The temperature of the BMS is too low. • Warm up the BMS, and restart it. • Contact the after-sales personnel of our company.
BMS_CellImbalance	Cell imbalance of BMS	Inconsistency of battery pack. • Restart the BMS. • Contact the after-sales personnel of our company.
BMS_Circuit_Fault	Circuit fault	Circuit fault of the BMS. • Restart the BMS. • Contact the after-sales personnel of our company.
BMS_Insulation_Fault	Insulation fault	Insulation fault of the BMS. • Restart the BMS. • Contact the after-sales personnel of our company.
BMS_VoltSensor_Fault	Voltage sensor fault	Voltage sampling fault of the BMS. • Restart the BMS. • Contact the after-sales personnel of our company.
BMS_CurrSensor_Fault	Current sensor fault	Current sampling fault of the BMS. • Restart the BMS. • Contact the after-sales personnel of our company.
BMS_Relay_Fault	Relay fault	Relay contact adhesion fault of the BMS. • Restart the BMS. • Contact the after-sales personnel of our company.
BMS_CR_ Unresponsive	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_536_Fault	Simulated front end failure of the BMS	BMS voltage sampling fault. • Restart the BMS. • Contact the after-sales personnel of our company.

Error Code	Fault	Diagnosis and Solution
BMS_Selfchecking_ Fault	Self-test fault of the BMS	Self-test fault of the BMS. • Restart the BMS. • Contact the after-sales personnel of our company.
BMS_Temdiff_Fault	Temperature different fault	BMS temperature varies greatly. • Restart the BMS. • Contact the after-sales personnel of our company.
BMS_Break	Disconnection fault of the BMS	BMS sampling fault. • Restart the BMS. • Contact the after-sales personnel of our company.
S_Software_Protect	Software protection of battery pack	Software protection of battery pack. • If the battery packs are connected in parallel and one of the completed parallel units stops running, restart the BMS; • Contact the after-sales personnel of our company.
BMS_Hardware_ Protect	Relay failure in parallel operation	Relay failure in parallel operation • Restart the BMS. • Contact the after-sales personnel of our company.
BMS_Precharge_Fault	BMS precharge fault	External short circuit of the BMS. • Check the external connection and restart the BMS. • Contact the after-sales personnel of our company.

9.3 Maintenance

In order to express the optimum device performance, please follow the instructions below when storing the battery. 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%.
- Batteries typically do not require maintenance by the installer or end user. If a battery is reporting an error message, SolaX can view the error message via Cloud online monitoring and then arrange for an on-site technical support engineer to go to the site to resolve the issue, as well as contacting an electrician if required.

10 Decommissioning

10.1 Disassembling the Battery

WARNING!

- When disassembling the battery, strictly follow the steps as below.

Step 1: Press the BAT BUTTON to shut down the system.

Step 2: Switch the BAT SWITCH to "OFF" position.

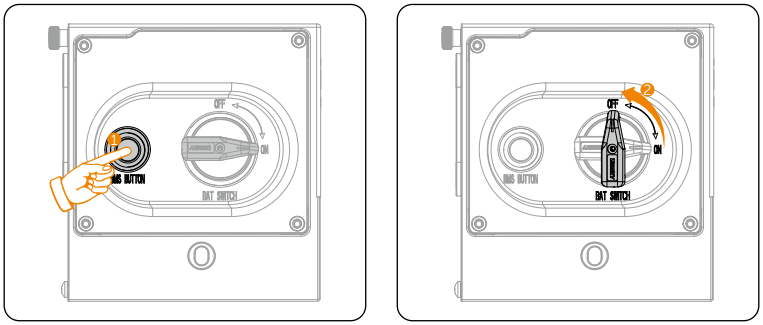


Figure 10-1 Pressing button and rotating switch

Step 3: Press and hold the lock button on the terminals to unplug the short power cable in the case of one tower;

Or press and hold the lock button on the terminals to unplug power cables in the case of two towers.

Step 4: Rotate the ring anti-clockwise to unplug the heater cable after two arrows are aligned in the case of two towers.

Step 5: Use and rotate anti-clockwise a rotation wrench to unplug the communication cable in the case of two towers.

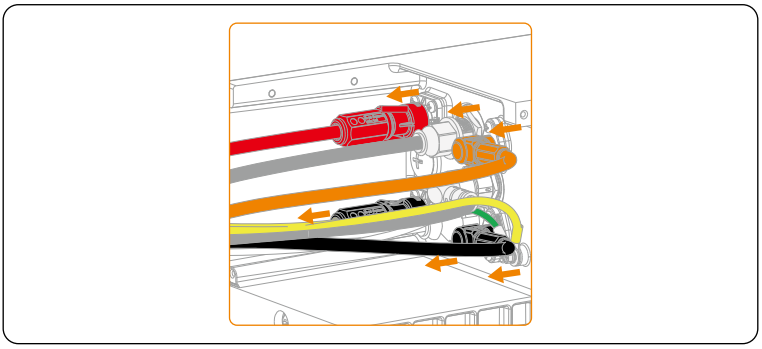


Figure 10-2 Unplugging cables

CAUTION!

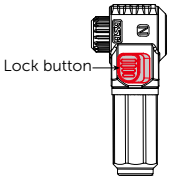


Figure 10-3 Connector

- When unplugging the power cable connecting to the inverter, press and hold the lock button while unplugging the power cable, or it cannot be pulled out.
- Don't violently remove the cable when it is locked. Otherwise, the connector will be damaged.

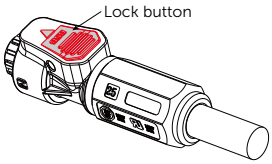


Figure 10-4 Connector (BMS side)

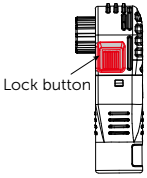


Figure 10-5 Connector (Series box side)

- When unplugging the power cable connecting from the BMS to the series box, press and hold the lock button while unplugging the short power cable, or it cannot be pulled out.
- Don't violently remove the cable when it is locked. Otherwise, the connector will be damaged.

CAUTION!

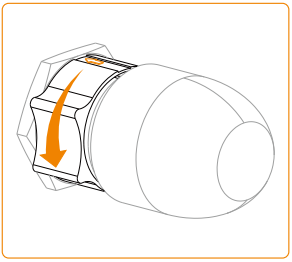


Figure 10-6 Heater cable

- Don't violently unplug the heater cable before the arrow on the rotating ring is aligned with the arrow on the panel.

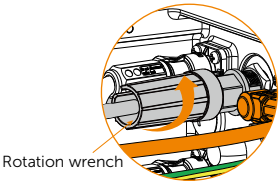


Figure 10-7 Rotating rotation wrench

- Both ends of the communication cable shall be unscrewed by using a rotation wrench.

Step 6: Unscrew the screws to remove the grounding cable.

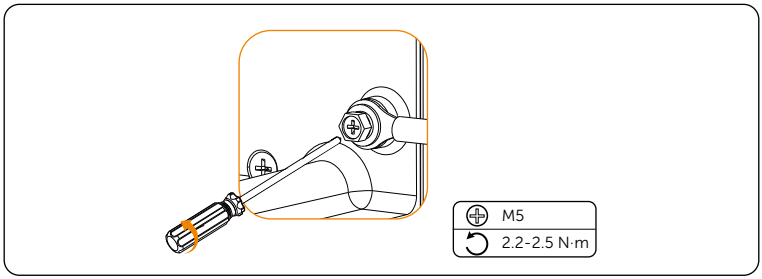


Figure 10-8 Removing grounding cable

NOTICE!

- The above steps for disconnecting cables apply to both the BMS and Series Box.

10.2 Packing

- Load the BMS and battery packs 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.

10.3 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.

11 Technical Data

- Configuration List

Model	BMS	Battery pack	Nominal Energy (kWh)	Operating Voltage (Vdc)
T-BAT HS 5	TBMS-MCS0800E-D × 1	TP-HS50E × 1	5.1	90-116
T-BAT HS 10	TBMS-MCS0800E-D × 1	TP-HS50E × 2	10.2	180-232
T-BAT HS 15	TBMS-MCS0800E-D × 1	TP-HS50E × 3	15.3	270-348
T-BAT HS 20	TBMS-MCS0800E-D × 1	TP-HS50E × 4	20.4	360-464
T-BAT HS 25	TBMS-MCS0800E-D × 1	TP-HS50E × 5	25.6	450-580
T-BAT HS 30	TBMS-MCS0800E-D × 1	TP-HS50E × 6	30.7	540-696

- Performance Parameter

Module	T-BAT HS 5	T-BAT HS 10	T-BAT HS 15	T-BAT HS 20	T-BAT HS 25	T-BAT HS 30
Nominal Voltage (Vdc)	102.4	204.8	307.2	409.6	512	614.4
Operating Voltage (Vdc)	90-116	180-232	270-348	360-464	450-580	540-696
Nominal Capacity (Ah)[1]	50	50	50	50	50	50
Nominal Energy (kWh)[1]	5.1	10.2	15.3	20.4	25.6	30.7
Usable Energy 90% DOD (kWh)[2]	4.6	9.2	13.8	18.4	23.0	27.6
Max. Charge/Discharge Current (A)[3]	50	50	50	50	50	50
Recommend Charge/ Discharge Current (A)[4]	30	30	30	30	30	30
Standard Power (kW)	3	6.1	9.2	12.2	15.3	18.4
Max. Power (kW)	5.1	10.2	15.3	20.4	25.6	30.7
Short-circuit current	3.57 kA (0.333 ms)					
Battery Round-trip Efficiency (0.2C, 25°C)[5]	95%					
Expected Lifetime (25°C)	10 years					
Cycle Life 90% DOD (25°C)	6000 cycles					
Charge Temperature	0°C ~ 53°C (Off heating function)[3]/ -30°C ~ 53°C (In heating function)[3]					
Discharge Temperature	-20°C ~ 53°C (Off heating function)[3]/ -30°C ~ 53°C (In heating function)[3]					
Storage Temperature	30°C ~ 50°C (6 months); -20°C ~ 30°C (12 months)					
Ingress Protection	IP66					
Protection Class	I					

NOTICE!

1. Test conditions: 25°C, 100% depth of discharge (DoD), 0.2C charge & discharge.
2. System usable energy may vary with inverter different setting.
3. Discharge: In case of battery cell's temperature range of -20°C ~ 10°C and 45°C ~ 53°C, the discharge current will be reduced; Charge: In case of battery cell's temperature range of 0°C ~ 25°C and 45°C ~ 53°C, the charge current will be reduced. Product charge or discharge power depends on the actual temperature of the battery cell.
4. The battery can only be discharged and can not be charged when the battery cell's temperature range is between -20°C and 0°C.
5. Test conditions: 25°C, 100% depth of discharge (DoD), 0.2C charge & discharge.

- Fuse Parameter

Item	Information
Component Type	DC Fuse
Fuse Type	EV / HEV
Rated Voltage (Vdc & Vac)	750
Rated Current (A)	80

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