B2S Series

HIGH-VOLTAGE BATTERY USER MANUAL

B2-X-HVa-S

Preface

Thank you for choosing SAJ products. We are pleased to provide you first-class products and exceptional service.

This manual provides information about installation, operation, maintenance, troubleshooting and safety. Please follow the instructions of this manual so that we can ensure delivery of our professional guidance and whole-hearted service.

Customer-orientation is our forever commitment. We hope this document proves to be of great assistance in your journey for a cleaner and greener world.

We make constant improvements on the products and their documentation. This manual is subject to change without notice; these changes will be incorporated in new editions of the publication. To access the latest documentation, visit the SAJ website at https://www.saj-electric.com/.

Guangzhou Sanjing Electric Co., Ltd.

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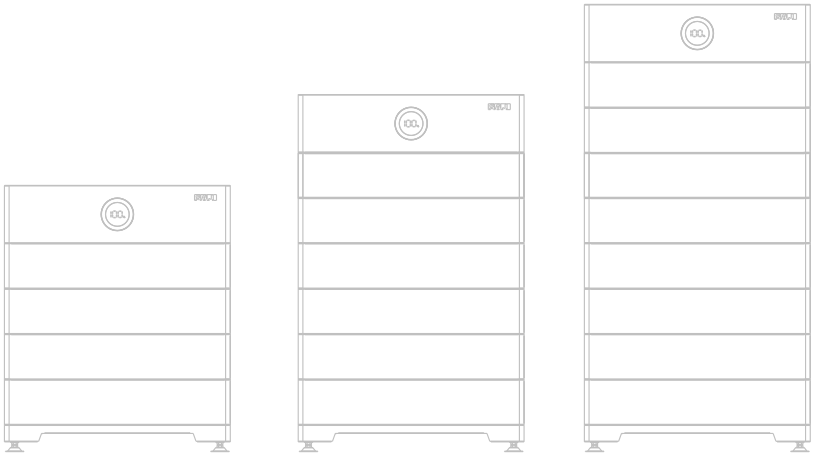


1.

SAFETY PRECAUTIONS

1.1. About This Document

1.1.1. Overview

This user manual describes instructions and detailed procedures for installing, operating, maintaining, and troubleshooting of the battery. Please read this manual carefully before installation and operation. Always keep this manual available in case of emergency and maintenance purpose.

1.1.2. Target Audience

This document is applicable to:

- Installers
- Users

1.2. Safety

1.2.1. Safety Levels

DANGER
DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING
WARNING indicates a hazardous situation which, if not avoided, will result in serious or moderate injury.

CAUTION
CAUTION indicates a hazardous situation which, if not avoided, will result in minor or moderate injury.

NOTICE
NOTICE indicates a situation which, if not avoided, will result in potential damage.

1.2.2. Symbol Explanation

Symbol	Description
	**DANGER: Electric Shock Hazard** This device is connected directly to the public grid. Failure to follow the warnings in this manual could result in severe electric shock.

	**DANGER: Hot Surface** The components inside the inverter battery will release a lot of heat during operation. Do not touch metal plate housing during operating.
	**WARNING: No Open Flames** Maintain a safe distance from all flammable and explosive materials.
	**CAUTION: Wait For 5 Minutes** Risk of electric shock from energy stored in capacitor. Do not remove cover until 5 minutes after disconnecting all sources of supply.
	**NOTICE: Keep Away from Children** Install the product out of reach of children.
	**NOTICE: Consult Manual Before Servicing** Check the user manual before servicing. If an error has occurred, refer to the troubleshooting chapter to remedy the error.
	**NOTICE: Dispose of Device Properly** This device shall not be disposed of in residential waste.
	**NOTICE: Dispose of Battery Properly** This battery module shall not be disposed of in residential waste.
	**CE Mark** Equipment with the CE mark fulfills the requirements of the Low Voltage Directive and Electro Magnetic Compatibility.
	**RoHS Compliant Mark** Equipment with the RoHS mark does not exceed the allowable amounts of the restricted substances defined in Restriction of Hazardous Substances in Electrical and Electronic Equipment.
	**RCM Compliant Mark** Equipment with the RCM mark is in compliance with AS/NZS 4417.1 & 2 and the EESS.
	**Recyclable**

1.2.3. Safety Instructions

For safety reasons, carefully read all safety instructions prior to performing any work. Please observe all applicable rules and regulations in the country or region where you install the battery.

DANGER

- Do not use the battery or the battery control unit if it is defective, broken or damaged.
- Keep the power off prior to any operations.
- Make sure that the battery is grounded prior to use.
- Do not pull out any cables or open the battery enclosure when the battery is powered on.
- Do not subject the battery to any strong force.
- Do not expose the battery to temperatures more than 50°C.
- Do not place the battery near a heat source, such as direct sunlight, a fireplace.
- Keep inflammable and explosive dangerous items or flames away from the battery.
- Do not soak the battery in water or expose it to moisture or liquids.
- Do not use the battery in areas where the ammonia content of the air exceeds 20 ppm.

WARNING

- Only qualified personnel with a thorough understanding of local safety regulations and battery standards may install, maintain, remove, or dispose of this product.
- SAJ Electric shall not be held liable for any loss or warranty claims resulting from unauthorized product modifications that could lead to fatal injury, harm to third parties, or impaired equipment performance.
- To ensure personal and property safety, never short-circuit the positive (+) and negative (-) terminals.

CAUTION

- Use only with compatible inverters.
- Do not mix batteries of different models or specifications in a single Energy Storage System.

NOTICE

- When expanding system capacity in the future, it is recommended to add a new battery cluster with the same configuration and connect it in parallel with the existing setup.
- Do not mix batteries with different SOC. For optimal performance and safety, use batteries from the same production batch to minimize the risk of operational abnormalities.

1.3. Emergency

Despite its careful and professional protection design against any hazards, damage of the battery may still be possible. The causes, potential hazards, and handling measures of damaged batteries are as follows.

- **Risk of Battery Leakage and Hazardous Gas Release**

  Causes: Battery rupture may occur due to mechanical damage or excessive internal pressure, resulting in the leakage of electrolyte and the release of hazardous gas.

  Hazards: The battery electrolyte is corrosive and flammable. Toxic gases released during battery rupture can cause irritation to the skin and eyes, as well as discomfort upon inhalation.

  Response Measures:
  General Handling Procedures for a Damaged Battery:
  · Do not open the damaged battery.
  · Avoid causing further damage (e.g., shock, impact, crushing, or trampling).
  · Keep the damaged battery away from water sources, unless water is necessary to prevent an energy storage system fire.
  · Do not expose the damaged battery to direct sunlight to prevent internal overheating.

  Emergency Procedures for Electrolyte Leakage or Gas Release:
  · Eye contact: Rinse eyes with a large amount of running water and seek medical advice.
  · Contact with skin: Wash the contacted area with soap thoroughly and seek medical advice.
  · Inhalation: If you feel discomfort, dizziness, or vomiting, seek medical advice immediately.
  · Fire response: If a fire occurs within the battery pack area, extinguish it using an FM-200 or Carbon Dioxide (CO_2) fire extinguisher. Always wear a gas mask to avoid inhaling toxic gases and harmful combustion products.
  · If the fire is not caused by battery and has not yet spread to the battery, use an ABC-type fire extinguisher.

- **Risk of Fire and Explosion**

  Causes: Batteries present a risk of fire or explosion if subjected to damage, misuse, or improper handling.

  Hazards: Such incidents can result in rapid fire spread, the release of toxic fumes, and potential projectile hazards from battery rupture.

  Response Measures:
  · If a fire has just occurred, try to disconnect the battery circuit breaker, and cut off the power supply first, but only if you can do so without endangering yourself.

· If the battery is already on fire, do not attempt to extinguish the fire. Evacuate the crowd immediately.

· If a fire occurs within the battery pack area, extinguish it using an FM-200 or Carbon Dioxide (CO_2) fire extinguisher. Always wear a gas mask to avoid inhaling toxic gases and harmful combustion products.

· If the fire is not caused by battery and has not yet spread to the battery, use an ABC-type fire extinguisher.

2.

PRODUCT INFORMATION

2.1. General Introduction

- The battery is applied to the residential photovoltaic energy storage system which stores electricity for future use.
- The battery is a high voltage battery system and employs modular design for easy installation and wiring.
- The battery is built internally with a battery management system (BMS), which is used to ensure efficiency of the battery and protect the battery from operating outside its specified limitations.
- The battery can only be used as a set with SAJ's H2 high voltage series hybrid inverter, otherwise it cannot operate normally.

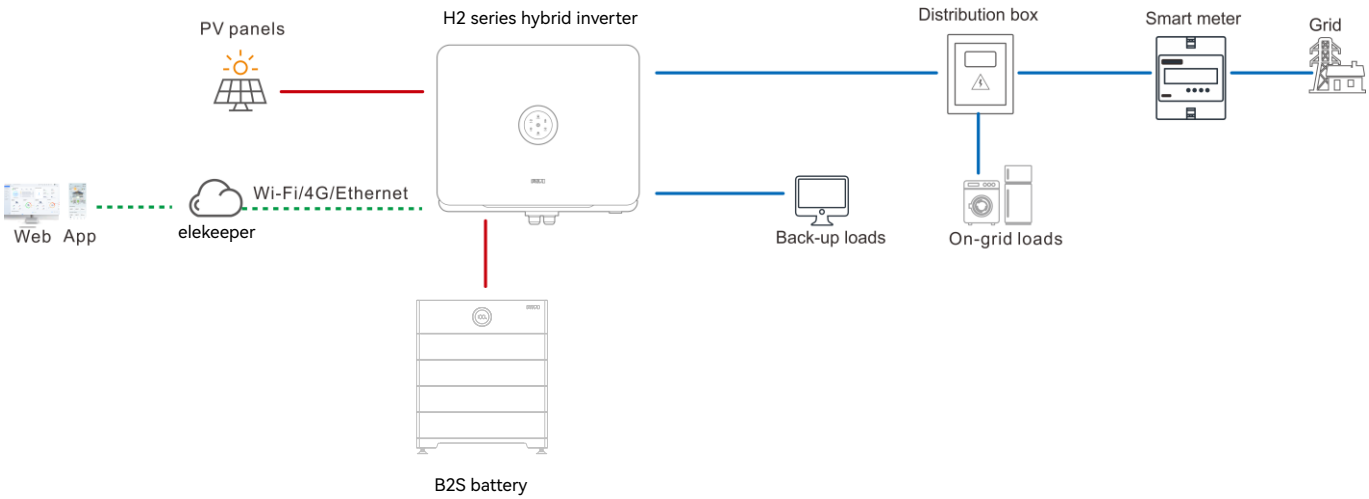


Figure 2.1. Application scenario

2.2. Model Description

2.2.1. Product Models

The B2-X-HVa-S series includes the following models:

• B2-12.8-HV1-S	• B2-12.8-HV2-S	• B2-12.8-HV3-S	• B2-12.8-HV4-S	• B2-12.8-HV6-S
• B2-19.2-HV1-S	• B2-19.2-HV2-S	• B2-19.2-HV3-S	• B2-19.2-HV4-S	• B2-19.2-HV6-S
• B2-25.6-HV1-S	• B2-25.6-HV2-S	• B2-25.6-HV3-S	• B2-25.6-HV4-S	• B2-25.6-HV6-S
• B2-32.0-HV1-S	• B2-32.0-HV2-S	• B2-32.0-HV3-S	• B2-32.0-HV4-S	• B2-32.0-HV6-S
• B2-38.4-HV1-S	• B2-38.4-HV2-S	• B2-38.4-HV3-S	• B2-38.4-HV4-S	• B2-38.4-HV6-S
• B2-44.8-HV1-S	• B2-44.8-HV2-S	• B2-44.8-HV3-S	• B2-44.8-HV4-S	• B2-44.8-HV6-S
• B2-51.2-HV1-S	• B2-51.2-HV2-S	• B2-51.2-HV3-S	• B2-51.2-HV4-S	• B2-51.2-HV6-S

2.2.2. Model Description

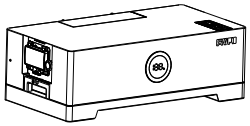
B2 - *X* - HV*a* - S

B2:	Battery model series.
***X*:**	The nominal energy of the battery system in kWh. *X* equals 12.8, 19.2, 25.6, 32, 38.4, 44.8 or 51.2, corresponding to the nominal energy of 2, 3, 4, 5, 6, 7, or 8 battery modules. For example, *X* = 12.8 indicates that the nominal energy of a battery system comprising two battery modules is 12.8 kWh.
HV:	High-voltage battery.
***a*:**	The battery cell brand. *a* equals 1, 2, 3, 4 or 6. Different numbers represent different battery cell brands.
S:	Senior version.

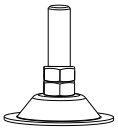
2.3. Package Contents

NOTICE
Place the connectors separately after unpacking to avoid confusion for connection of cables.

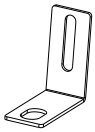
2.3.1. Battery Control Unit Package



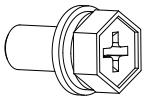
Battery control unit & Base *1



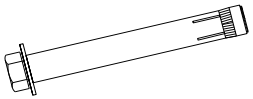
Base foot *4



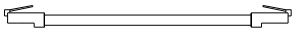
Locking bracket *2



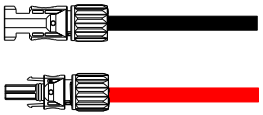
M5*12 screw *2



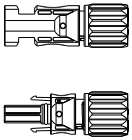
M10*80 screw *2



Communication cable *1



Positive battery cable *1
Negative battery cable *1

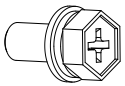


Positive battery connector *1
Negative battery connector *1

Documents

2.3.2. Battery Module Unit Package

Battery module *1



M5*12 screw *2

2.4. Dimension

2.4.1. Battery Control Unit

Dimension (H*W*D): 185*725*380 mm

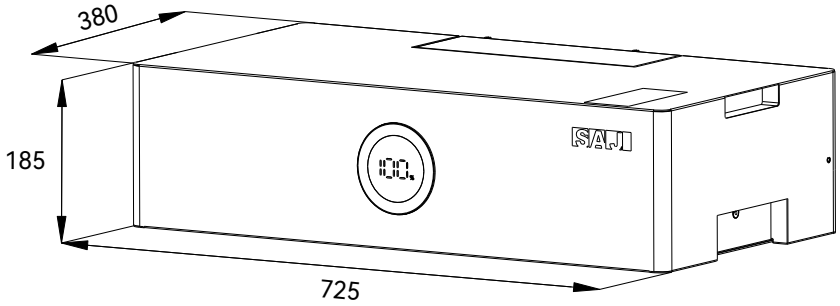


Figure 2.2. Battery control unit dimension

2.4.2. Battery Module

Dimension (H*W*D): 145*725*380 mm

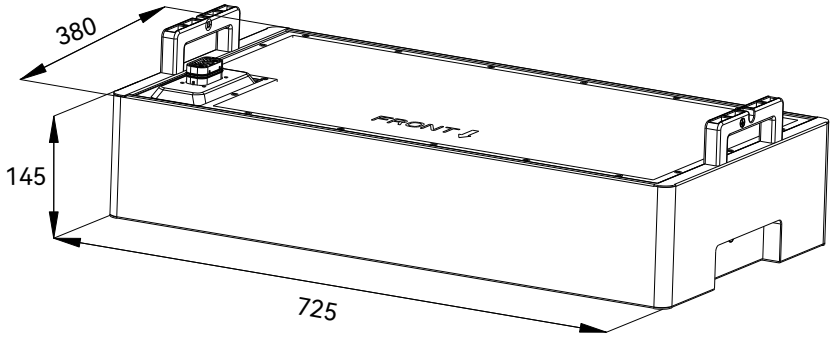


Figure 2.3. Battery module dimension

2.4.3. Battery Base

Dimension (H*W*D): 135*725*380 mm.
The height **X** can be adjusted from 85 mm to 115 mm.

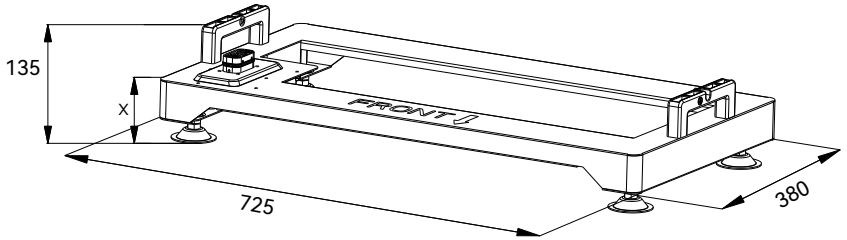


Figure 2.4. Battery base dimension

2.4.4. Battery System

Dimension (H*W*D): 1460*725*380 mm
Note: This is based on a standard configuration which includes:

- 1 Battery Control Unit
- 8 Battery Modules
- 1 Battery Base (Maximum Height: 115 mm)

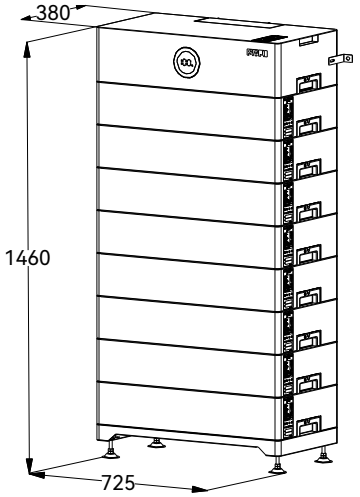


Figure 2.5. Battery system dimension

2.5. Ports, Switches, and LED on the Battery Control Unit

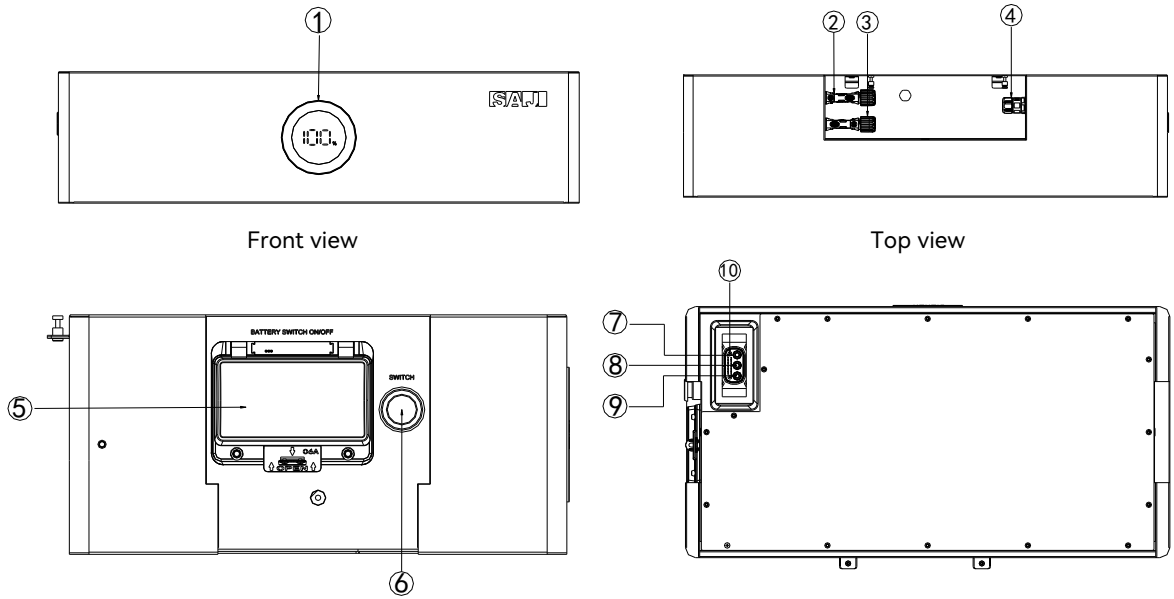


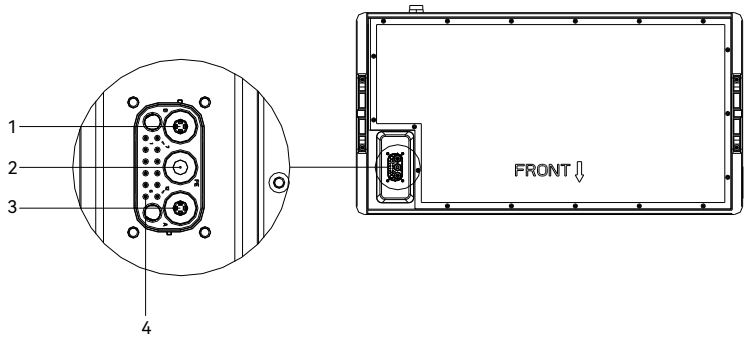
Figure 2.6. Ports, switches, and LED on the battery control unit

Callout	Silkscreen	Description
1		LED panel, which provides battery system status.
2	BAT +	Positive battery port for connecting the battery control unit to inverter.
3	BAT -	Negative battery port for connecting the battery control unit to inverter.
4	CAN	Communication port for connecting the battery control unit to inverter.
5	BATTERY SWITCH ON/OFF	Circuit breaker to protect the battery from overcurrent and short-circuit conditions.
6	SWITCH	Main control switch to power the battery module on/off.
7	A	Positive power port of the blind-mate connector.
8	PE	Protective earth (PE) port of the blind-mate connector.
9	B	Negative power port of the blind-mate connector.
10	1-12	12 communication ports of the blind-mate connector.

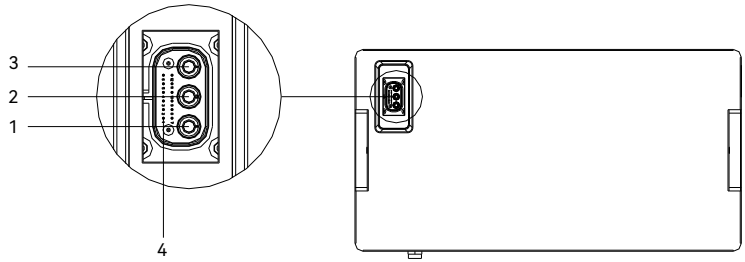
Table 2.1. Ports, switches, and LED on the battery control unit

2.6. Ports on the Battery Module

The battery features the blind-mate connector that connects the one battery module to another, ensuring quick grounding connection, electrical connection and communication between batteries. The following figure shows the ports of the blind-mate connector.



Top view



Bottom view

Figure 2.7. Ports on the battery module

Callout	Silkscreen	Description
1	B	Negative power port of the blind-mate connector.
2	PE	Protective earth (PE) port of the blind-mate connector.
3	A	Positive power port of the blind-mate connector.
4	1-12	12 communication ports of the blind-mate connector.

Table 2.2. Ports on the battery module

2.7. LED Indicators on the Battery Control Unit

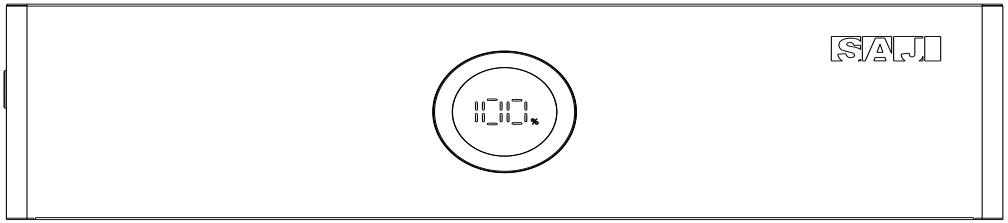


Figure 2.8. LED indicators on the battery control unit

LED indicator	Status	Description
	Solid on	The battery is working properly.
	Breathing 6s	The battery is in initialization or standby state.
	Solid on	An error occurs.
	Breathing 6s	The battery is upgrading.
	OFF	The battery is powered off.
	*Integer* (example, 50)	Battery average SOC (for example, 50%)

Table 2.3. LED indicator description

2.8. Datasheet

- In the model “B2-***X***-HVa-S”, ***X*** represents the nominal energy of the battery system in kWh.

  X equals 12.8 / 19.2 / 25.6 / 32 / 38.4 / 44.8 / 51.2 kWh, corresponding to the nominal energy of 2 / 3 / 4 / 5 / 6 / 7 / 8 battery modules.

- In the model “B2-X-HV***a***-S”, ***a*** represents the battery cell brand.

  a equals 1 / 2 / 3 / 4 / 6, corresponding to different battery cell brands.

  When ***a*** = 1 / 4 / 6, the nominal capacity of each battery module is 100 Ah.

  When ***a*** = 2 / 3, the nominal capacity of each battery module is 102 Ah.

Battery System	**B2-X-HVa-S** (***X*** may be 12.8, 19.2, 25.6, 32.0, 38.4, 44.8 or 51.2 and ***a*** may be 1, 2, 3, 4 or 6)						
Model	B2-12.8-HVa-S	B2-19.2-HVa-S	B2-25.6-HVa-S	B2-32.0-HVa-S	B2-38.4-HVa-S	B2-44.8-HVa-S	B2-51.2-HVa-S
Number of Battery Modules	2	3	4	5	6	7	8
Battery Type	LiFePO4						
Cell Capacity [Ah]	a =1,4,6: 100 Ah a=2,3: 102 Ah						
Cycle Life [1]	6000						
Total Energy Capacity [kWh]	12.8	19.2	25.6	32.0	38.4	44.8	51.2
Usable Energy Capacity [kWh] [2]	12.8	19.2	25.6	32.0	38.4	44.8	51.2
Rated Power [W]	6400	9600	12800	16000	19200	22400	25600
Nominal Voltage [V]	128	192	256	320	384	448	512
Operating Voltage [V]	112–144	168–216	224–288	280–360	336–432	392–504	448–576
Rated / Max. Charging and Discharging Current [A]	50						
Depth of Discharge	100%						
Recommended Charging Method (Charge at constant current 50 A until reaches max. voltage)	144 V	216 V	288 V	360 V	432 V	504 V	576 V
Recommended Discharging Method (Discharge at constant current 50 A until reaches min. voltage)	112 V	168 V	224 V	280 V	336 V	392 V	448 V

General Data							
Dimension (H*W*D) [mm] (Battery Control Unit + Battery Module + Base Max. Height)	590*725*380	735*725*380	880*725*380	1025*725*380	1170*725*380	1315*725*380	1460*725*380
Weight [Kg] (Battery Control Unit + Battery Module + Base)	132.4	188.4	244.4	300.4	356.4	412.4	468.4
Operating Temperature [℃]	Charging Temperature: 0 – 50 Discharging Temperature: -10 – 50						
Operating Relative Humidity	0% – 95% RH (non-condensing)						
Cooling	Natural convection						
Max. Operating Altitude [m]	2000						
Ingress Protection Rating	IP65						
Protective Class	I						
Battery Designation	a = 1: IFpP52/161/120/[(1P20S)NS]/M/-10+50/80 a = 2: IFpP51/161/120/[(1P20S)NS]/M/-10+50/80 a = 3: IFpP51/161/119/[(1P20S)NS]/M/-10+50/80 a = 4: IFpP51/161/120/[(1P20S)NS]/M/-10+50/80 a = 6: IFpP51/161/119/[(1P20S)NS]/M/-10+50/80 (N = 2,3,4,5,6,7,8 battery modules)						
Warranty [Year]	Refer to the warranty documentation						
Installation Method	Floor standing						
Compatible Inverters	SAJ H2 series 2–6 battery modules used for single-phase inverter 3–8 battery modules used for three-phase inverter						
Standard	IEC62040-1, IEC 62619(Cell & System), EN 62477-1, EN 61000-6-1/2/3/4, UN38.3						
Battery Control Unit	**BC2-HV-S**						
Dimension (H*W*D) [mm]	185*725*380						
Weight [kg]	15.3						
Max. Fault Current [A]	100						
Communication	CAN						

Battery Module	**BU2-6.4-HVa-S** (***a*** may be 1,2,3,4 or 6)
Dimension (H*W*D) [mm]	145*725*380
Weight [kg]	56
Cell Capacity [Ah]	a=1,4,6: 100 Ah a=2,3: 102 Ah
Total Energy Capacity [kWh]	6.4
Usable Energy Capacity [kWh]	6.4
Rated Power [W]	3200
Nominal Voltage [V]	64
Operating Voltage [V]	56 – 72
Rated / Max. Charging and Discharging Current [A]	50
Depth of Discharge	100%
Recommended Charging Method (Charge at constant current 50 A until reaching max. voltage)	72 V
Recommended Discharging Method (Discharge at constant current 50 A until reaching min. voltage)	56 V
Battery Base	
Dimension (H*W*D) [mm]	135*725*380
Weight [kg]	5.1

Note:

[1] Data is provided by the battery cell manufacturer and based on the test conditions: 25 ± 2 ℃, 0.5 C charge/discharge rate, and a state of health (SOH) of 70 %.

[2] Test conditions: 25 ℃, 0.2 C average charge/discharge rate, 100 % depth of discharge, beginning of life.

3.

TRANSPORTATION AND STORAGE

3.1. Transportation

⚠ WARNING
• The product has passed UN38.3 test and meets the transportation requirements for dangerous goods (including lithium batteries). • The transportation service provider must be qualified to transport dangerous goods. • Prior to shipping, inspect the battery packaging to ensure it is intact. Do not transport any unit that shows signs of abnormal odor, leakage, smoke, or burn marks. • Do not stack more than four cartons in a single stack. • Always handle batteries with care during loading and unloading. Improper handling can cause short circuits, leakage or cracks, and may lead to fire or explosion.

ⓘ NOTICE
• After installing the battery on site, keep the original packaging containing the lithium battery identification. When the battery needs to be returned to the factory for repair, use the original packaging to transport it.

3.2. Storage

⚠ WARNING
• Store it in a dry and ventilated environment and keep it away from heat sources. • For daily use or short-term storage, keep the battery at temperatures between -10℃ and 50℃, with relative humidity from 0% to 95%. • For long-term storage (3–6 months), store the battery at temperatures between -20℃ and 25℃, and keep relative humidity below 85%. • Avoid rapid temperature changes to stop moisture from forming inside the device. Condensation can cause short circuits, corrosion, or failure. • Each stack holds a maximum of five battery control unit cartons or four battery module cartons.

ⓘ NOTICE
• When shipped from the factory, the battery is charged to approximately 40% of its capacity. • To check operation, turn on the circuit breaker and press the main switch. A solid green LED indicates normal operation. A solid red LED or no light indicates a malfunction. • The battery should be installed within 6 months and used only with compatible inverters. • The State of Charge (SOC) decreases overtime during storage. If the remaining battery voltage falls below the required startup voltage, the battery may become damaged. • This battery must not be discarded with household waste. At the end of its service life, it does not need to be returned to the dealer or SAJ, but must be delivered to a designated waste lithium-ion battery recycling facility in your local area.

4.

INSTALLATION

4.1. Precautions

For safety, read all the safety instructions carefully prior to any work and observe the appropriate rules and regulations of the country or region where you installed the equipment.

DANGER

Risk of fatal electric shock

Battery terminals and cables may be energized at lethal voltages, even when the inverter is off.

- Disconnect all AC and DC power sources before installation.
- Verify no voltage is present using a voltmeter.
- Never handle terminals or tools with wet hands or while standing on a wet surface.
- Use Personal Protective Equipment (PPE), such as goggles and gloves.
- Always wear safety goggles to protect your eyes from accidental electrolyte splashes or metal debris.
- Insulated gloves must be worn when handling batteries and electrical connections.
- Use anti-static workwear and insulated safety shoes.
- Remove all rings, watches, and other metal objects before installation.

WARNING

The battery module must not be installed in a parallel connection under any circumstances.

CAUTION

Risk of personal injury due to handling

Unproper handling method may cause personal injury.

- Always use proper lifting techniques and suitable equipment when moving heavy items.
- Avoid lifting overly heavy battery packs alone. Seek assistance or use mechanical aids to prevent injury and ensure safe handling.

NOTICE

Select a well-ventilated location with lower ambient temperatures to improve efficiency and extend the equipment service life.

4.2. Determining the Installation Site

Before installation, carefully select the site according to the guidelines in the following sections.
Note: safety standards differ across countries and regions. Installation must adhere to all applicable local regulations.

4.2.1. Installation Environment Requirements

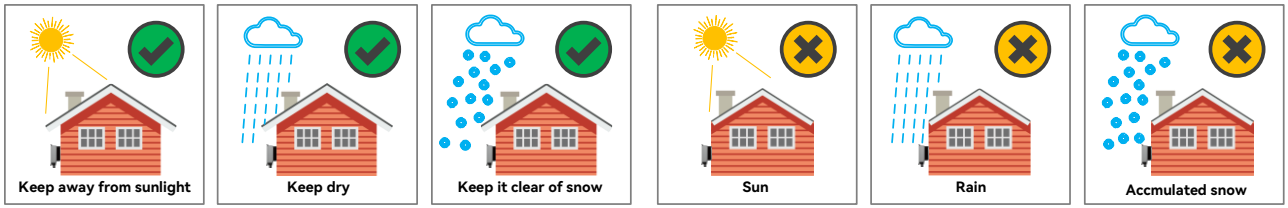


Figure 4.1. Installation location

- Do not expose the device to direct solar irradiation as this could cause power derating due to overheating.
- The installation environment must be free of inflammable or explosive materials.
- The device must be installed in a place away from any heat source.
- Do not install the device at a place where the temperature changes extremely.
- Keep the device away from children.
- Do not install the device in the bedroom, toilet, or bathroom.
- When installing the device at the garage, keep it away from the driveway.
- Keep the device from water sources such as taps, sewer pipes and sprinklers to prevent water seepage.
- It is recommended that the device be installed in an area where its status can be easily checked and maintained in case of failure or emergency.

4.2.2. Installation Location Requirements

- The device employs natural convection cooling, and it can be installed indoors or outdoors.
    - Indoor requirement: The battery CANNOT be installed in the habitable rooms.
    - Outdoor requirement: The height of the device from the ground should be considered to prevent the device from soaking in water. The specific height is determined by the site environment.
- Install the device vertically. Do not install it forward-tilted, horizontally or upside down.

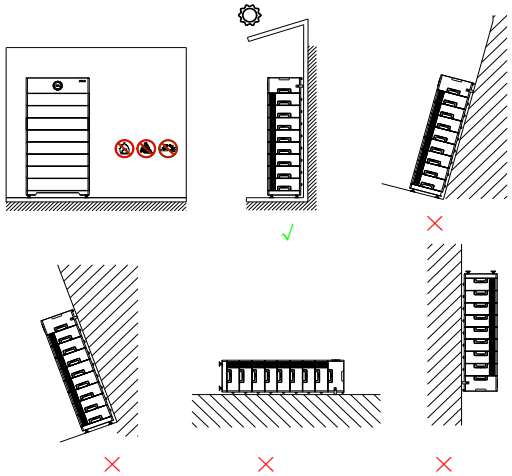


Figure 4.2. Installation limitations

- Choose a solid and smooth wall to ensure that the device can be installed securely on the wall. Make sure that the wall can bear the weight of the device and accessories.
- Reserve enough clearance around the device to ensure a good air circulation at the installation area, especially when multiple devices need to be installed in the same area.

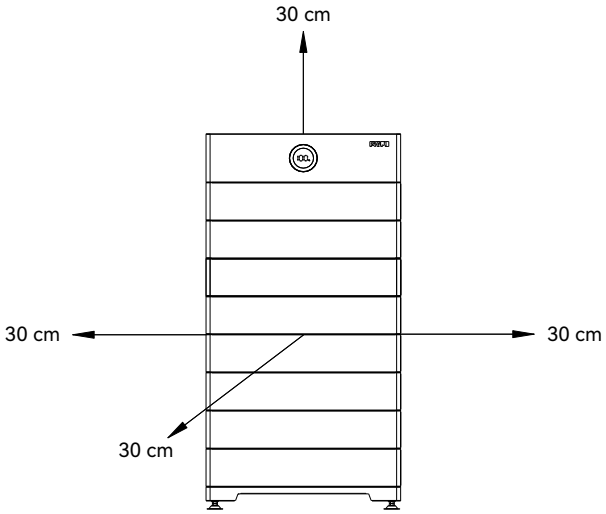


Figure 4.3. Installation clearance

4.3. Preparing Installation Tools

The tools illustrations are for your reference. Installation tools include but are not limited to the following recommended ones. Use other auxiliary tools based on site requirements.

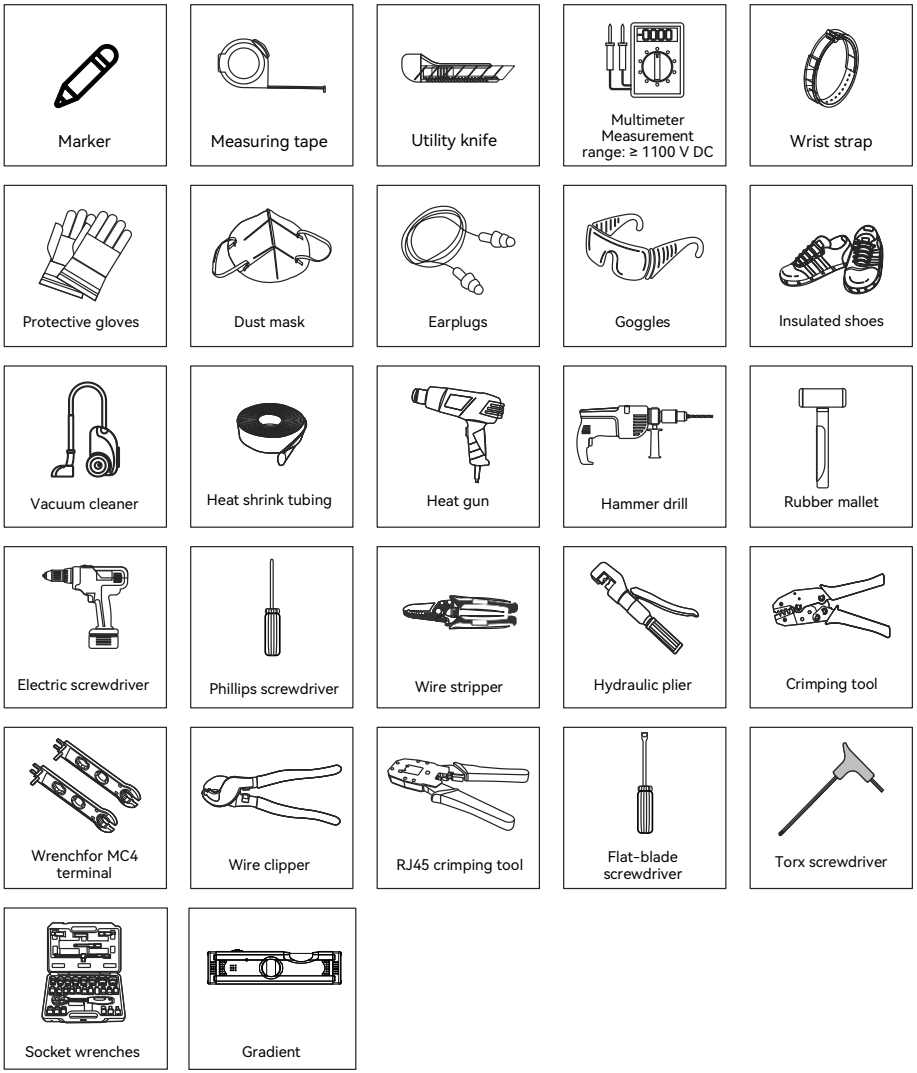


Figure 4.4. Suggested installation tools

4.4. Unpacking

4.4.1. Checking the Outer Packing

Although SAJ's products have been thoroughly tested and checked before delivery, there is possibility that the products may suffer damage during transportation.

1. Check the outer packing package for anya damage, such as holes and cracks.
2. Check the equipment model.

If any serious damage is found or the model is not what you requested, do not unpack the product, and contact your dealer as soon as possible.

4.4.2. Checking the Package Contents

1. Verify that the shipment contains everything that you expected to receive. Contact after sales to see if there are missing or damaged components. For detailed contents, refer to **Section 2.3**.
2. Place the connectors separately after unpacking to avoid confusion for connection of cables.

4.5. Installation

4.5.1. Ground mounting

Before you start

Make sure that the ground should be flat and have no inclination.

Procedure

Step 1. Loosen the screws on both sides of the battery control unit to separate the battery control unit and the base.

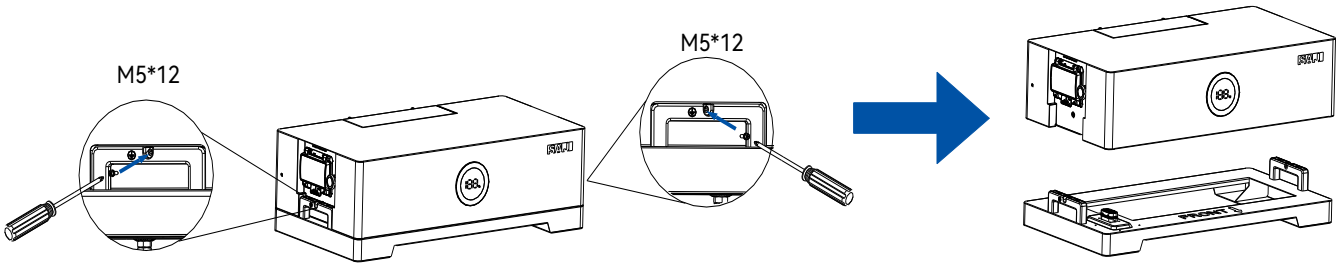


Figure 4.5. Separating the battery control unit and the base

Step 2. Assemble the base. Adjust the height of the base feet and use the gradient to make sure that the base is placed on the ground horizontally.

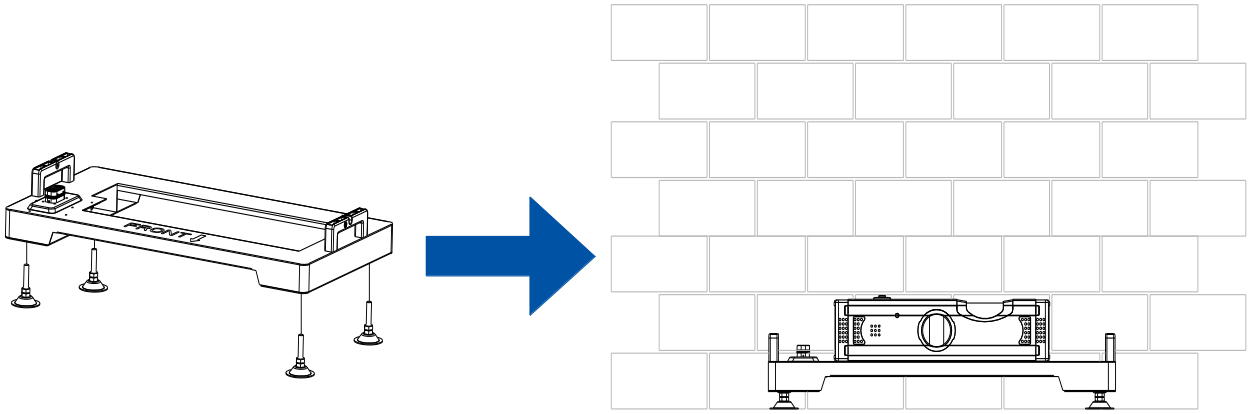


Figure 4.6. Adjusting the battery base horizontally

Step 3. Place the base on the ground. Make sure the distance between the base and the wall is 30–50 mm. Place the battery module onto the base and secure it with screws.

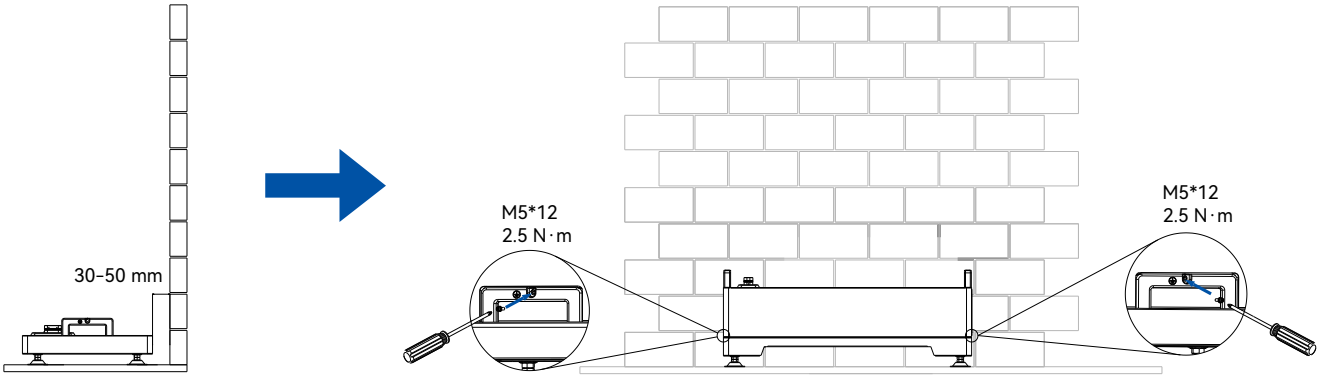


Figure 4.7. Securing the battery to the base

Step 4. Remove the dust cap from the top of the battery module.

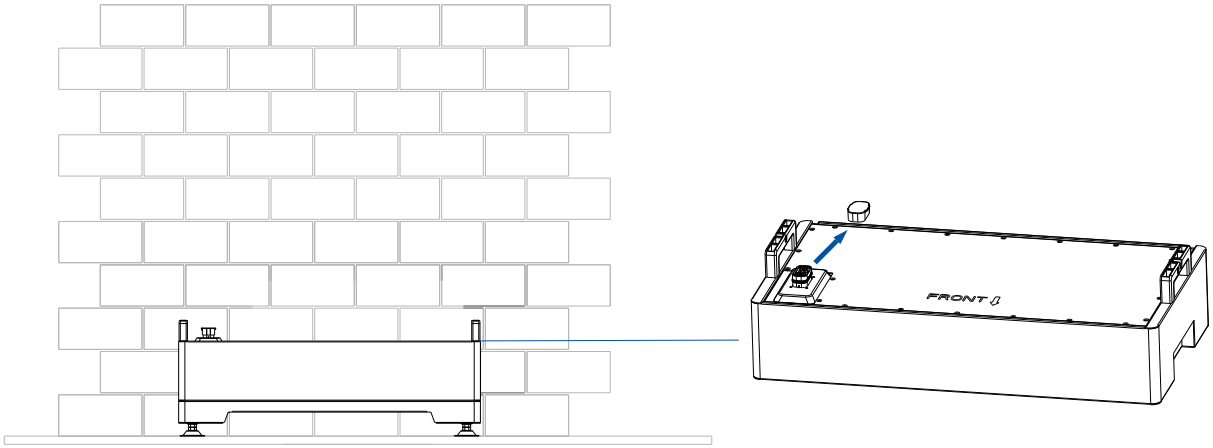


Figure 4.8. Removing the dust cap

Step 5. ① Place the second battery module onto the first battery module.

② On each side of the battery, tighten the screws.

③ Remove the dust cap from the top of the second battery module.

④ Repeat the same operations until all required battery modules are installed.

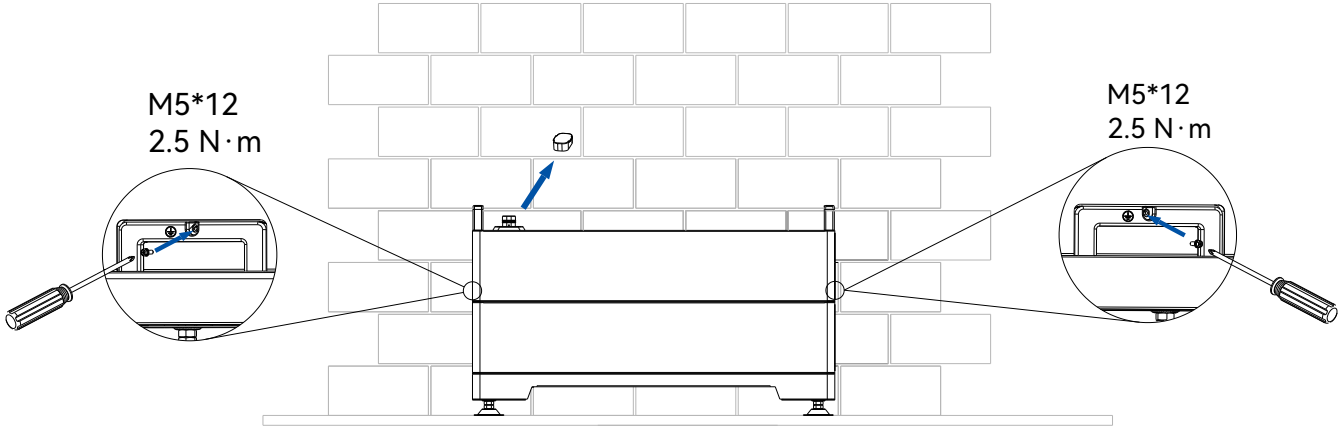


Figure 4.9. Securing the batteries

Step 6. ① Place the battery control unit onto the top of the battery pack.

② Use two M5*12 screws to install the locking brackets on each side of the battery control unit.

③ Mark the installation hole of the locking brackets on the wall.

④ Remove the battery control unit.

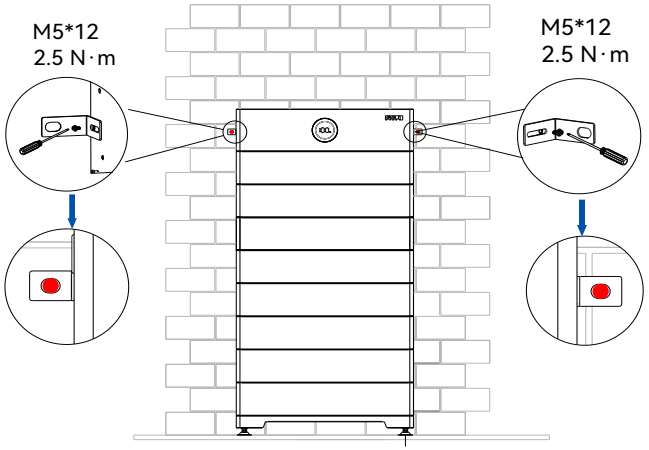


Figure 4.10. Locating the installation holes of the battery control unit

Step 7. ① Put the dust cap back to the top of the battery module.

② Drill two holes (13 mm in diameter, 65 mm in depth) at the position marked in Step 6.

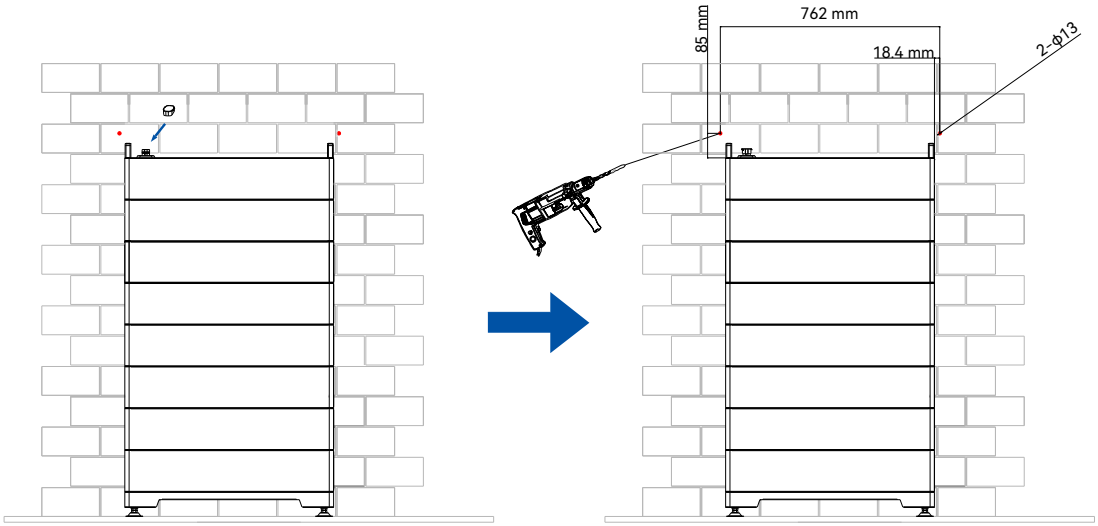


Figure 4.11. Drilling holes in the wall

Step 8. ① Remove the dust cap from the top of the battery module.
② Place the battery control unit to the top of the battery pack.
③ To secure the battery control unit to the wall, use a rubber hammer to drive the M10*80 screws into the drilled holes and then use the wrench to tighten the screws.

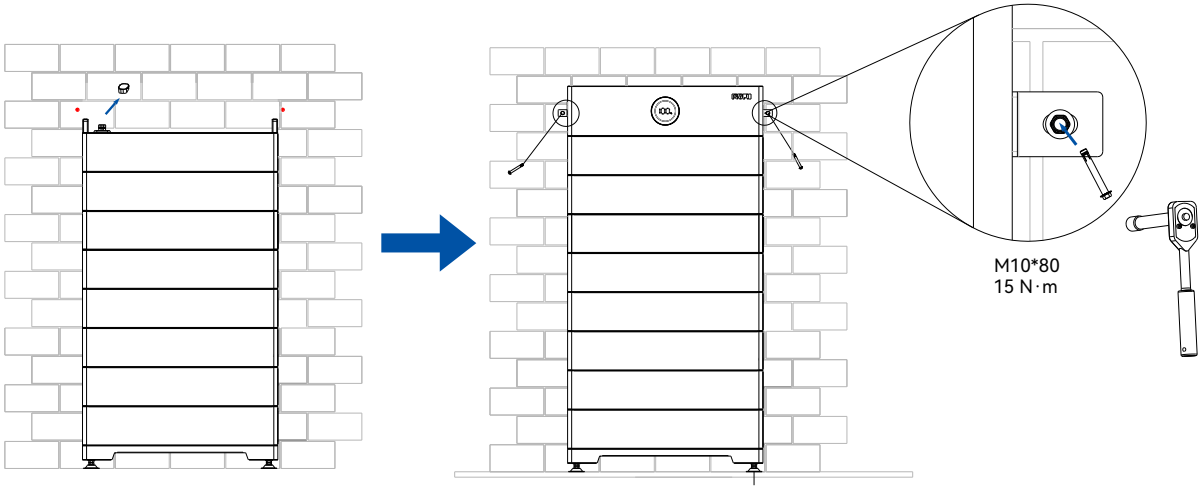


Figure 4.12. Installing the battery control unit

Step 9. After completing all installation procedures, tick the box (☑) for the battery cell brand and nominal energy on the system label.

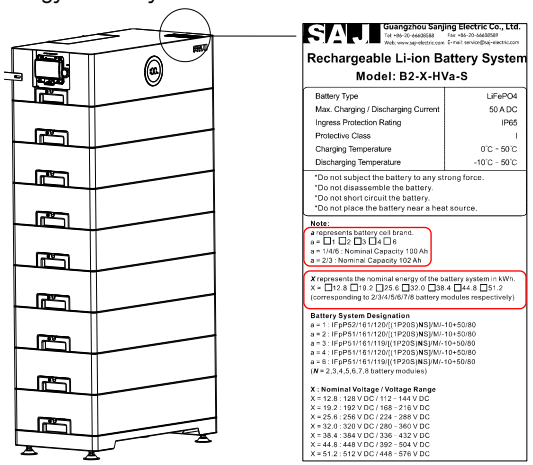


Figure 4.13. Tick the box on battery system label

5.

ELECTRICAL CONNECTION

5.1. Safety Instructions

DANGER

Dangerous to life due to potential fire or electric shock

- Electrical connection must only be performed by professional technicians.
- Before connecting, necessary protective equipment must be used by technicians including insulating gloves, insulating shoes, and safety helmet.
- Before connecting, ensure the battery system is powered off.
- When it is powered on, the equipment should be in conformity with national rules and regulations.
- Any improper operation during cable connection can cause device damage or personal injury.
- Under a short-circuit condition, this battery system can deliver a peak current of 960 A within 3.11 ms. Never intentionally create or cause a short circuit across the battery terminals.

WARNING

Risk of electric shock and burn

Improper wiring or connection can cause overheating, arcing, or fire.

- Ensure all connections are clean, tight, and torque to the manufacturer's specification.
- Use only cables of the correct gauge and type as specified.
- Observe correct polarity (+/-). Reverse polarity can permanently damage equipment.

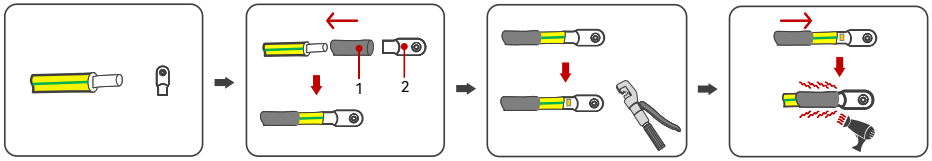
5.2. Grounding Connection

About this task

- Here takes a cluster of eight batteries as an example.
- The grounding cable must be connected before other electrical connections. You can connect the grounding cable to the grounding point on either AC-side or DC-side. Here takes the grounding point on the AC-side as an example.
- The cable and the OT/DT terminals need to be prepared by the user. It is recommended that a 6 mm^2 conductor cross-sectional area of cable be used.

Procedure

Step 1. Assemble the cable and OT/DT terminal.



1	Heat shrink tube	2	OT/DT terminal

Figure 5.1. Preparing the grounding cable

Step 2. Remove the cover on top of the battery control unit.

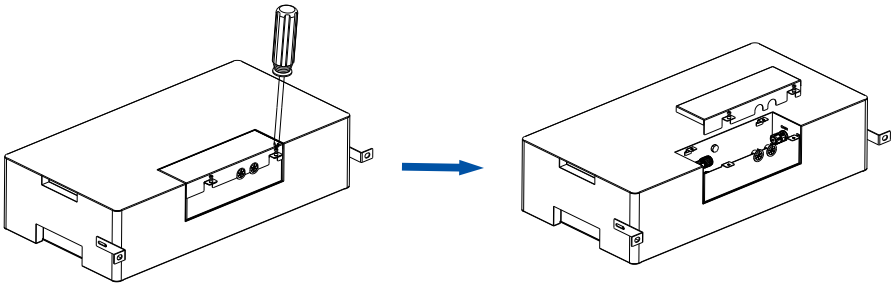


Figure 5.2. Removing the cover

Step 3. Remove the M5*14 screw from the grounding port on the battery control unit. Connect and secure the grounding cable.

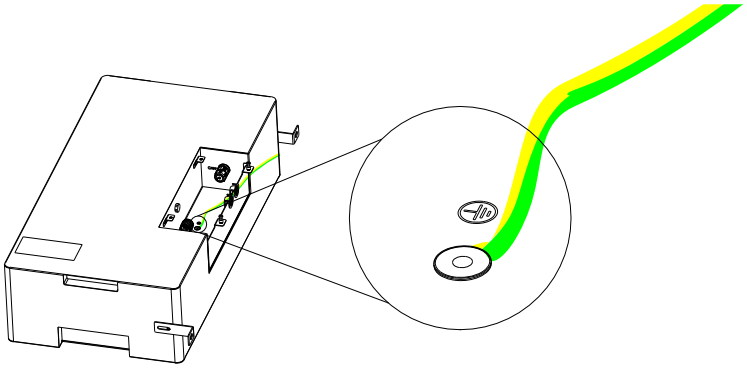


Figure 5.3. Connecting the grounding cable

The battery system features the blind-mate connector that connects one battery module to another, ensuring quick grounding connection between batteries. Therefore, there is no need to connect the grounding cable to the battery modules.

The grounding connection is achieved through **PE** port of the blind-mate connector.

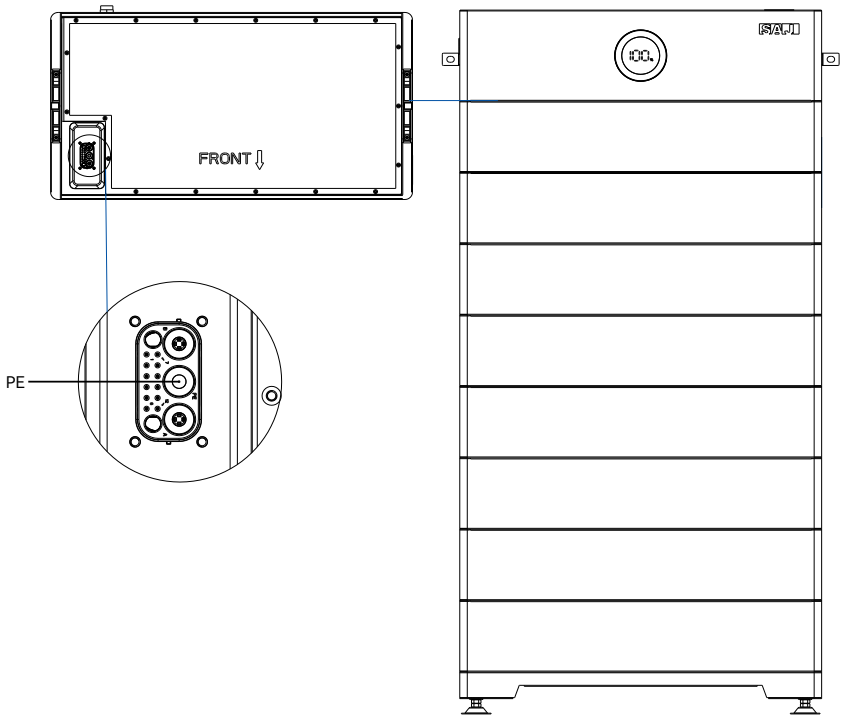


Figure 5.4. Grounding point of the blind-mate connector

5.3. Communication Connection Between Batteries

DANGER
Before connection, ensure the battery system is powered off.

About this task

The battery system features the blind-mate connector that connects one battery module to another, ensuring quick communication connection between batteries. Therefore, there is no need to connect the communication cable to the battery modules.

The communication connection is achieved through communication ports **1 to 12** of the blind-mate connector.

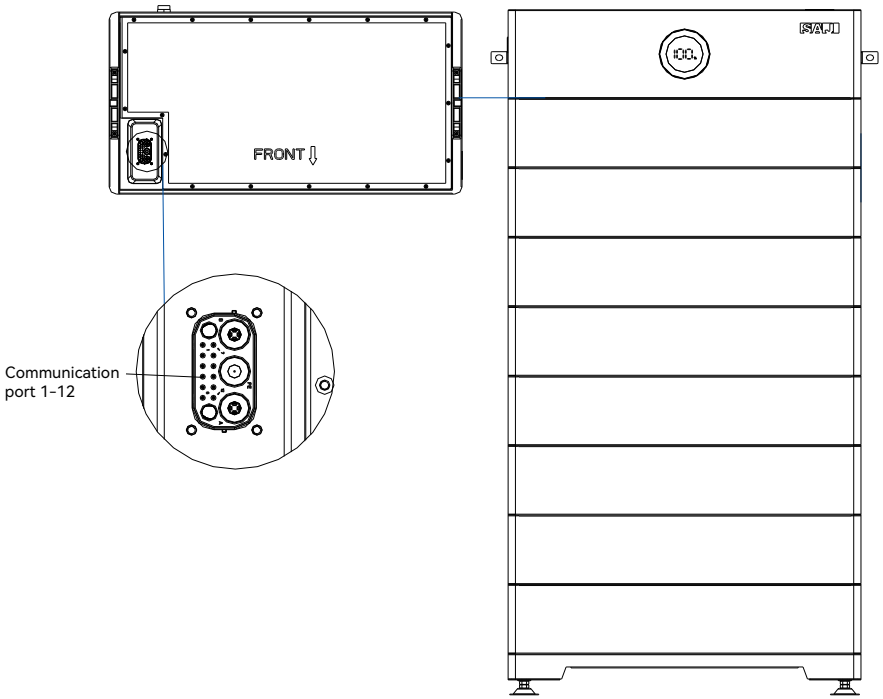


Figure 5.5. Communication ports of the blind-mate connector

5.4. Power Connection among Batteries

DANGER
Before connection, ensure the battery system is powered off.

About this task

The battery system features the blind-mate connector that connects one battery module to another, ensuring quick power connection between batteries. Therefore, there is no need to connect the communication cable to the battery modules.

The power connection is achieved through positive port **A** and negative port **B** of the blind-mate connector.

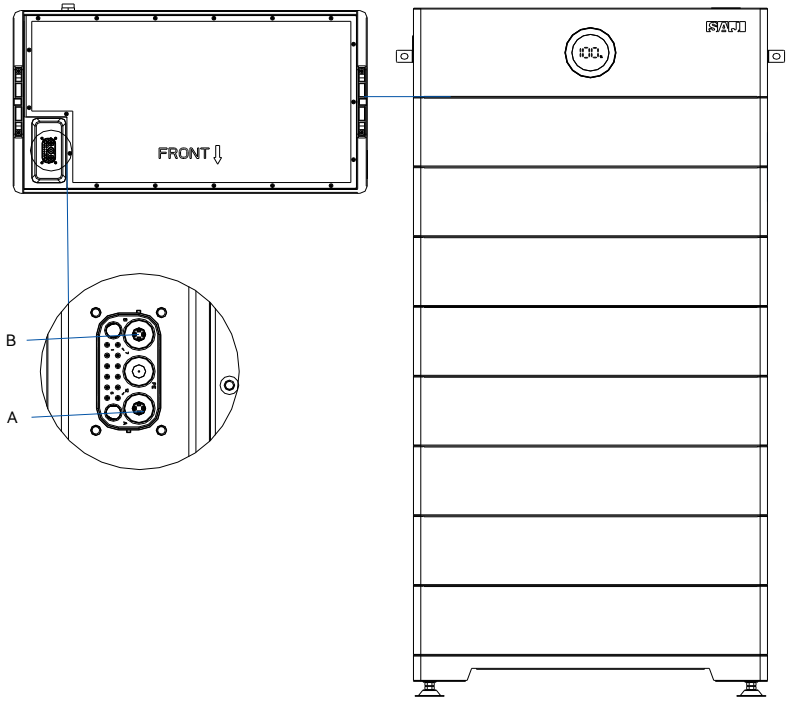


Figure 5.6. Connecting battery power cables

5.5. Connecting the Battery to the Inverter

Before you start

Make sure the vertical height between the inverter and the battery control unit is less than 0.7 m. Use the 2 m communication cable (standard network cable), and 2 m positive battery cable, and negative battery cable provided in the battery control unit package.

Procedure

Step 1. Assemble the battery power cables

① Take out the positive and negative battery cables and connectors from the package.

② Loosen the seal and the lock nut on the connectors.

③ Pass the cables through the lock nut, the seal, and the connector body.

④ Tighten the seal and the lock nut on the connectors.

Take the positive battery cable as an example:

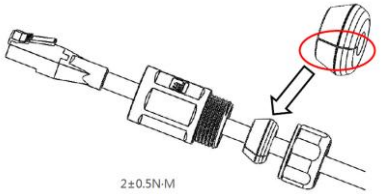
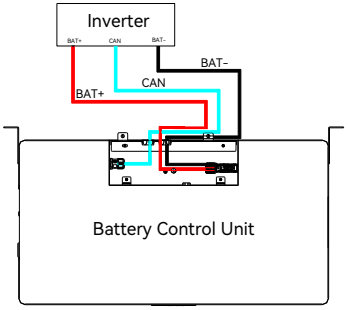


Figure 5.7. Assembling the battery power cables

Step 2. Connect the communication and power cables between the inverter and battery control unit.

Notes:

- To locate the BAT+, BAT- terminals and CAN port of the battery, refer to **Section 2.5**.
- Do not intertwine the communication cable and power cables.



Battery control unit	Inverter
BAT+	BAT+
BAT-	BAT-
CAN	CAN

Figure 5.8. Battery-inverter connection (rear view)

Note: For the communication cable, use an open-ended wrench to secure the RJ45 connector to the CAN port on the inverter. Tighten the seal and the lock nut to the connector body.

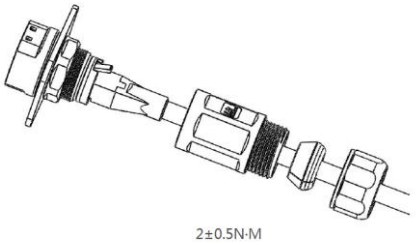


Figure 5.9. Securing the RJ45 connector to the CAN port of inverter

Step 3. After communication and power cables are connected properly, install the cover back to the battery control unit.

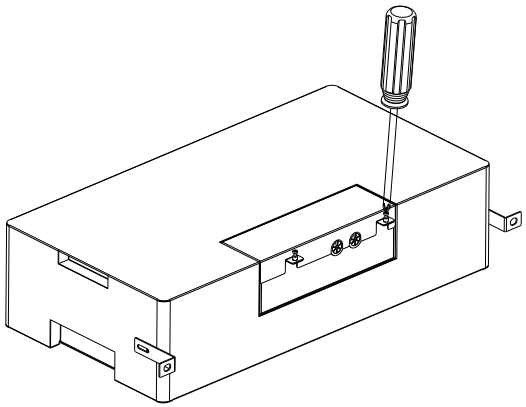


Figure 5.10. Closing the battery control unit cover

6.

STARTUP AND SHUTDOWN

6.1. Startup

⚠ WARNING
Risk of electric shock, fire, explosion and irreversible equipment damage Improper installation or wiring can cause short circuits, overheating, fire or explosion. • Before starting up the system, ensure all installation operations are performed in accordance with the procedures in the manual. • Ensure all connections are clean, tight, and torque to the manufacturer's specification. • Double-check positive (+) and negative (-) terminals to ensure correct connections. Reverse polarity can permanently damage equipment. • Ensure proper grounding connection.

Step 1. Turn on the circuit breaker on the left side of battery control unit.

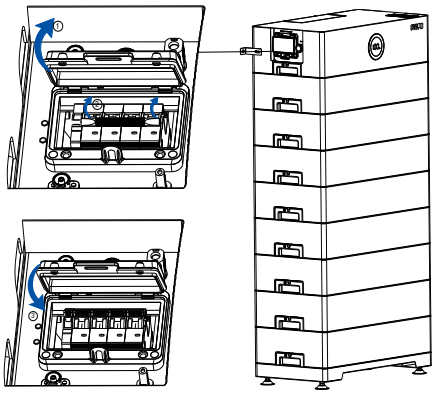


Figure 6.1. Turn on the circuit breaker

Step 2. Press and hold the main switch for two to three seconds, until the LED indicator on the battery control unit is on.

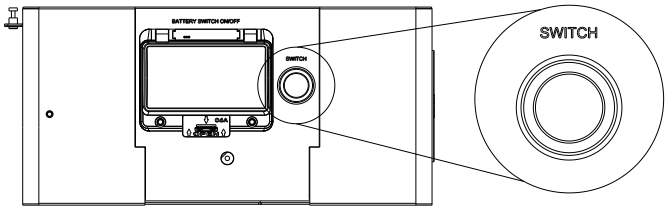


Figure 6.2. Press the switch

6.2. Shutdown

⚠ WARNING
Risk of electric shock Before conducting any replacement, maintenance or repair work, wait for at least 15 minutes after the system is shutdown.

Step 1. Press and hold the main switch for five seconds until the LED indicator on the battery control unit is off.

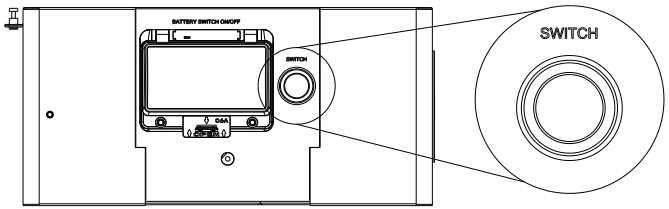


Figure 6.3. Press the switch

Step 2. Turn off the circuit breaker.

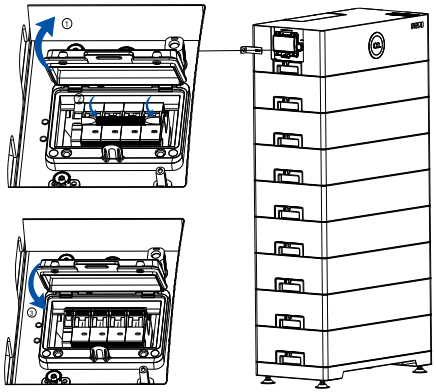
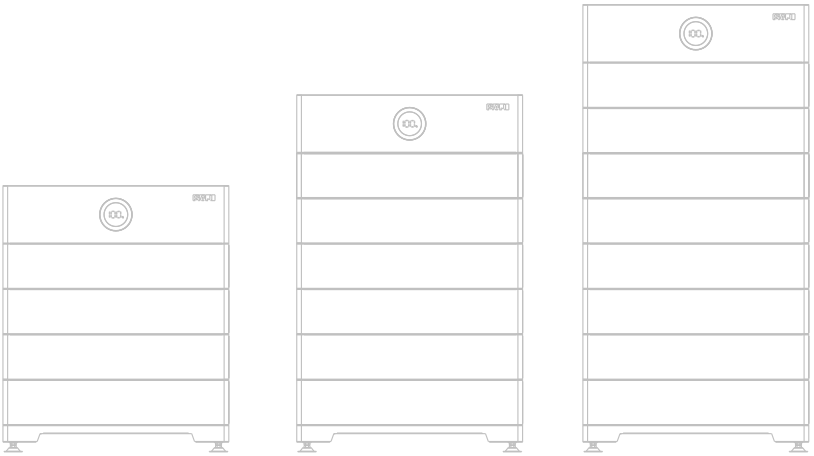


Figure 6.4. Turn off the circuit breaker



7.

COMMISSIONING

7.1. About the elekeeper App

The elekeeper App can be used for both nearby and remote monitoring. Depending on the communication module used, it supports Bluetooth/4G or Bluetooth/Wi-Fi to communicate with your energy storage system (ESS).

7.2. Downloading the App

On your mobile phone, search for “elekeeper” in the App store and download the App.
Alternatively, scan the below QR code to download the App.

Android

iOS

7.3. Using the App

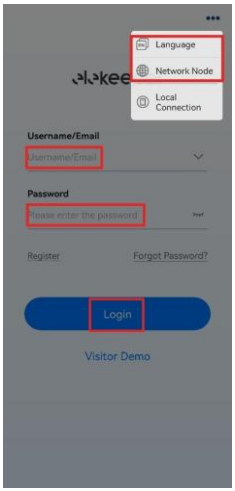
Step 1. Log in to the APP.

- If you have an account, log in to the App directly:

a. Tap the three-dot icon ••• on the top right corner.

b. Choose the Language and Network Node based on your needs.

c. Log in to the App by using the Username / Email and Password.



- To apply for a new account, perform as follows:

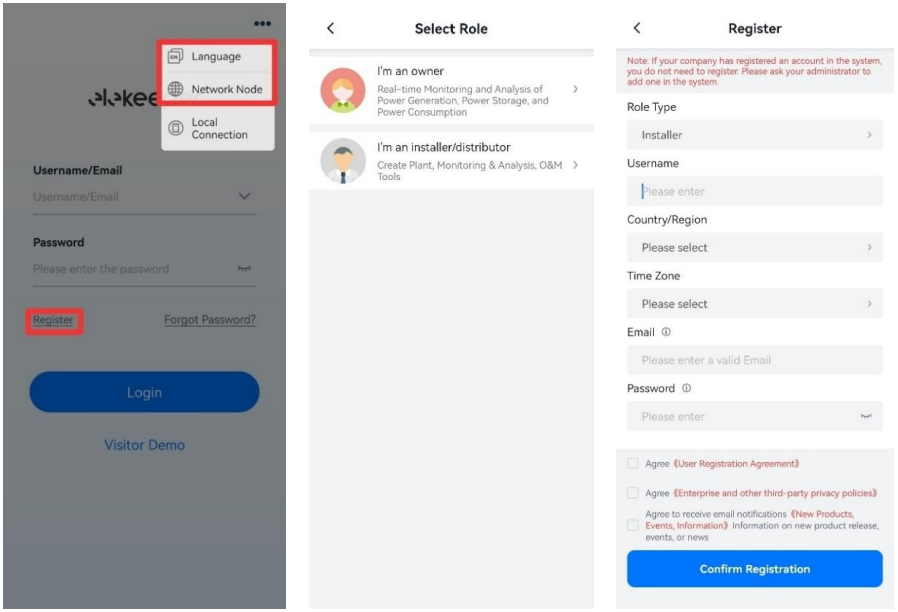
a. Tap the three-dot icon ••• on the top right corner. Choose the language and network node based on your needs.

b. Tap Register. Choose whether you are an owner, installer or distributor.

c. Follow the instructions on the screen to complete the registration.

d. Log in to the App by using the new account and the password.

Example (for installer):

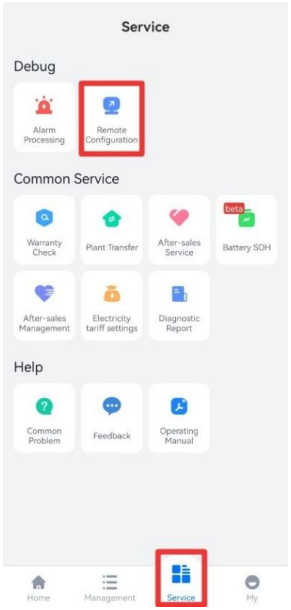


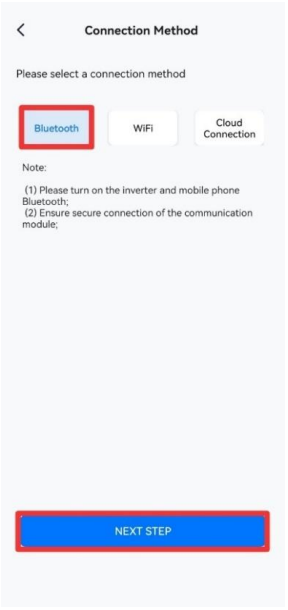
Step 2. Select your device.

a. On the Service interface, select Remote Configuration.

b. Tap Bluetooth and then NEXT STEP.

c. Tap your inverter according to the inverter serial number (SN).





Step 3. Battery settings

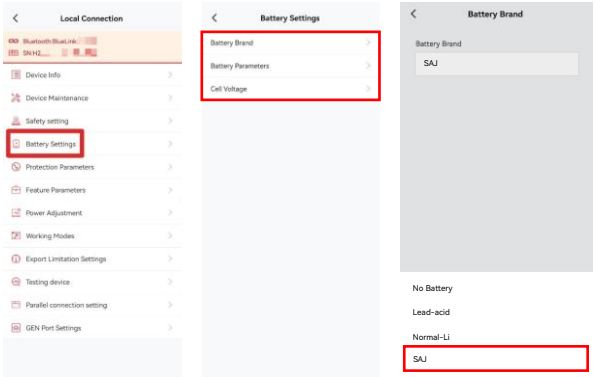
① On **Local Connection** page**,** tap **Battery Settings** > **Battery Brand**, and select **SAJ** battery brand.

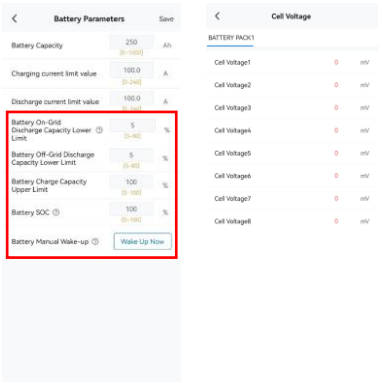
② On **Battery Settings** page, tap **Battery Parameters.** Configure battery discharge capacity lower limit, battery charge capacity upper limit, and battery SOC based on real needs.

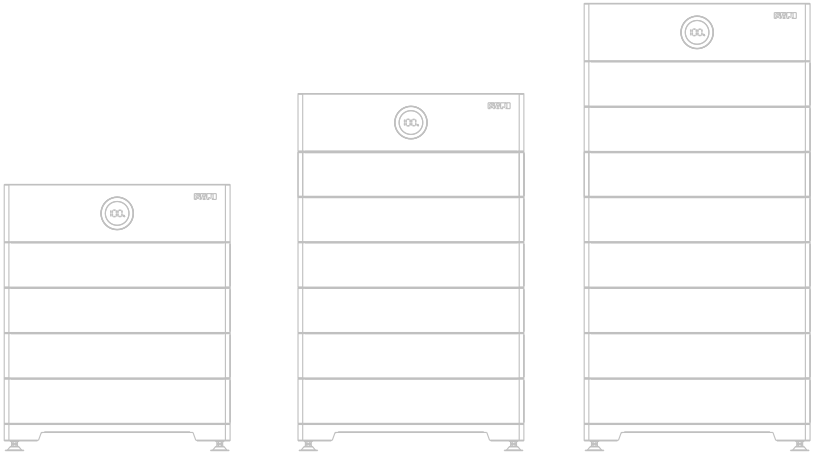
③ (optional) Tap **Wake Up Now** to wake up the battery manually when the battery enters a protective hibernation state due to over-discharge.

④ On **Battery Settings** page, tap **Cell Voltage** and configure each battery cell voltage.

Note: The detailed operations on the App might vary, depending on the version you are using.







8.

SYSTEM MAINTENANCE

8.1. Routine Maintenance

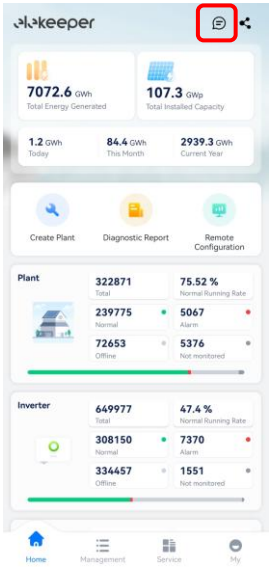
To ensure that the energy storage system can operate properly for a long term, routine maintenance is recommended.

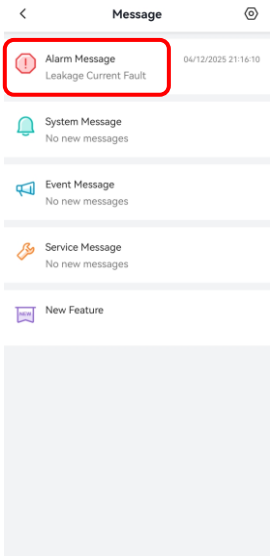
To purchase the routine maintenance service, contact the installer, distributor, or SAJ after-sales.

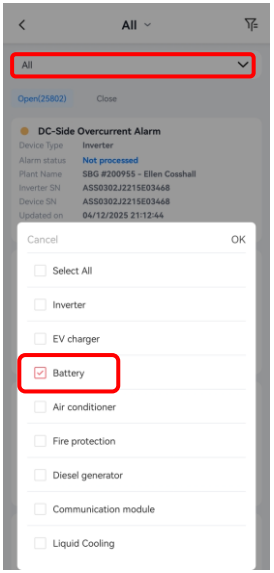
Check item	Check method	Maintenance interval
System cleanliness	Check periodically whether the heat sinks are blocked or dirty.	Once every 6 to 12 months
Cleanness of air intake and exhaust vents	Check periodically whether there is dust or foreign objects at the air intake and exhaust vents. Detailed operations are as follows: Power off the system and remove dust and foreign objects. If necessary, remove the baffle plates from the air intake and exhaust vents for cleaning	Once every 6 to 12 months (or once every 3 to 6 months based on the actual dust conditions in the environment)
Fan	Check whether the fan generates abnormal noise during operation Detailed operations are as follows: Remove foreign objects from the fan. If the abnormal noise persists, replace the fan.	Once every 6 to 12 months
System running status	1. Check whether the inverter is damaged or deformed. 2. Check whether the inverter generates abnormal sound during operation. 3. Check whether all inverter parameters are correctly set during operation.	Once every 6 months
Electrical connection	1. Check whether cables are disconnected or loose. 2. Check whether cables are damaged, especially whether the cable sheath that contacts a metal surface is damaged.	6 months after the first commissioning and once every 6 to 12 months after that
Grounding reliability	Check whether the PE cable is securely connected.	6 months after the first commissioning and once every 6 to 12 months after that
Sealing	Check whether all terminals and ports are properly sealed.	Once a year

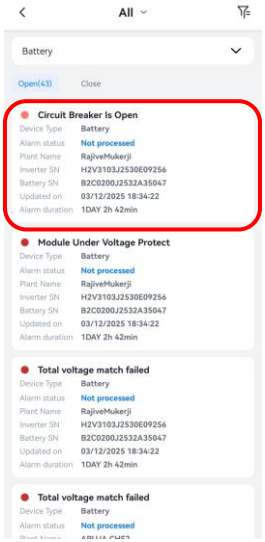
8.2. Troubleshooting

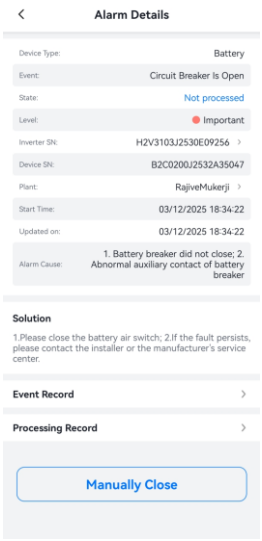
On the elekeeper App, users may monitor the battery system and check the alarm message through **Home** > **Message** > **Alarm Message** > **All** > **Battery** > **Alarm Details**.











For any errors reported below, try the suggested solutions or contact the after-sales for service support.

Error code	Error message	Possible cause	Solution
97	BMS internal communication error	1. Communication error between battery control unit and battery module 2. Did not install RJ45 plug, therefore battery control unit counted the number of battery modules connected mistakenly	1. Check if communication cable is connected properly 2. Check if RJ45 plug is installed
98	Battery module sequence error	1. Cable connection is wrong 2. Did not install RJ45 plug 3. Communication cable connection is wrong	1. Connect the cable correctly 2. Check if the RJ45 plug is installed 3. Check if the communication cable is working
99	Discharge overcurrent protection	Discharging current exceeds the set limit	Wait until the error is clear or restart
100	Charge overcurrent protection	Charging current exceeds the set limit	Wait until the error is clear or restart
101	Total voltage low protection	Total voltage is lower than the set limit	Force charging the battery
102	Total voltage high protection	Total voltage is higher than the set limit	Wait until the error is clear or restart
103	Single battery module voltage low protection	Single battery module voltage is lower than the set limit	Force charging the battery
104	Single battery module voltage high protection	Single battery module voltage is higher than the set limit	Wait until the error is clear or restart
105	BMS hardware error	1. Single battery module voltage sensor error 2. Temperature sensor error 3. Current sensor error	1. Check if battery temperature and voltage sensor cable is in poor contact 2. Check if current sensor cable is in poor contact 3. Replace BMS
106	Charging temperature low protection	The battery temperature is lower than the minimum battery protection temperature.	Wait until battery temperature increases and the error is clear

Error code	Error message	Possible cause	Solution
107	Charging temperature high protection	The battery temperature is higher than the maximum battery protection temperature.	Wait until battery temperature decreases and the error is clear
108	Discharging temperature low protection	The battery temperature is lower than the minimum battery protection temperature, causing relay disconnection and then charging termination.	Wait until battery temperature increases and the error is clear
109	Discharging temperature high protection	The battery temperature is higher than the maximum battery protection temperature.	Wait until battery temperature decreases and the error is clear
110	Relay error	1. Cathode or anode relay is adhesive 2. Cathode or anode relay is unable to close	Replace relay
111	Pre-charge error	1. Pre-charge relay damaged 2. Pre-charge resistor open circuit 3. BMS damaged	1. Replace pre-charge relay 2. Replace pre-charge resistor 3. Replace BMS
112	Insulation error	Battery module has electricity leakage	Contact battery supplier
113	BMS supplier incompatibility	BMS of battery module and battery control unit are incompatible	Check if the model of battery module and battery control unit are compatible
114	Battery cell supplier impartibility	Supplier of battery module and battery cell are incompatible	Check if the model of battery module is correct
115	Battery cell incompatibility	Battery cells are incompatible	Check if the model of battery module is correct
116	Battery pack models or grades are inconsistent	Battery pack models or grades are inconsistent	Check if the model or grade of battery modules are consistent
117	Circuit breaker is open	1. Circuit breaker is open 2. Circuit breaker auxiliary contact error	Replace circuit breaker

Error code	Error message	Possible cause	Solution
118	Temperature difference is too wide	1. Temperature sensor error 2. Battery life span	Check if temperature sensor cable is in poor contact
119	Voltage difference is too wide (Class II)	1. Sensor cable is loose 2. Battery life span	1. Check if voltage sensor cable is in poor contact 2. Replace BMS
120	Voltage difference is too wide (Class I)	1. Sensor cable is loose	1. Check if voltage sensor cable is in poor contact 2. Replace BMS
121	BMS over temperature protect	1. Ambient temperature is high 2. Overload	1. Check if ambient temperature is high 2. Check if overloaded
122	Short circuit protect	P+ and P- short circuit	Check if the cable connected correctly
123	Total Voltage match failed	Connection is wrong	Contact technical support to locate the fault
124	The system is locked	System is faulty	Contact technical support to locate the fault
125	FUSE error protection	Fuse is damaged	Contact technical support to locate the fault
126	Voltage on charging port is high protection	Inverter output voltage is high	Contact technical support to locate the fault

9.

APPENDIX

9.1. Recycling and Disposal

This device should not be disposed of as a residential waste.

The device that has reached the end of its operation life is not required to be returned to your dealer; instead, it must be disposed of by an approved collection and recycling facility in your area.

9.2. Warranty

Check the product warranty conditions and terms on the SAJ website: https://au.saj-electric.com/en-au/services-support-warranty

9.3. Contacting support

Online technical support

Go to https://www.saj-electric.com/services-support-technical to check FAQs or send your message or product enquiry.

Call for assistance

For SAJ support telephone numbers, see https://www.saj-electric.com/locations for your region support details.

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9.4. Trademark

SAJ is the trademark of Sanjing.

SAJ

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