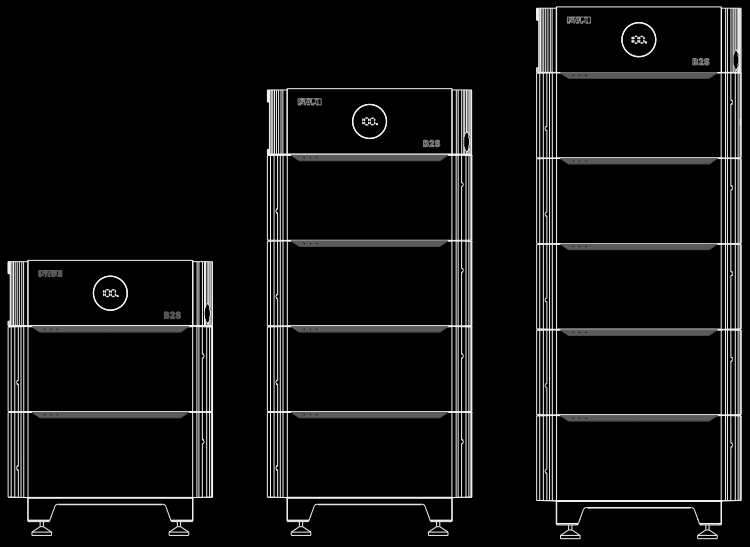


B2S Series

HIGH-VOLTAGE BATTERY USER MANUAL

B2-(5.0-25.0)-HV1-S

B2-(5.0-25.0)-HV5-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.

TABLE OF **CONTENTS**

1.

SAFETY PRECAUTIONS

1.1. About This Document

1.1.1. Overview

This *User Manual* provides introductions and instructions of installing, operating, maintaining, and troubleshooting of the B2S series battery, as listed in section 2.2 "Models".

Read the user manual carefully before any installation, operation and maintenance and follow the instructions during installation and operation. Keep this manual all time available in case of emergency.

1.1.2. Target audience

This document is applicable to:

- Installers
- Users

1.2. Safety

CAUTION:
ONLY qualified and trained electricians who have read and fully understood all safety regulations contained in this manual can install, maintain, and repair the equipment. Access to the equipment is by the use of a tool, lock and key, or other means of security.

1.2.1. Safety Levels

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, can result in death or serious injury or moderate injury.

CAUTION
Indicates a hazardous condition which, if not avoided, can result in minor or moderate injury.

NOTICE
Indicates a situation that can result in potential damage, if not avoided.

1.2.2. Symbol Explanation

Symbol	Description
	**Danger:** Electrical shock hazard This device is directly connected to public grid, thus all work to the battery shall only be carried out by qualified personnel.
	**WARNING:** No open flames Do not place or install near flammable or explosive materials.
	**Danger:** Hot surface The components inside the battery will release a lot of heat during operation. Do not touch metal plate housing during operating.
	**Attention:** Install the product out of reach of children.
	**Attention:** Check the user manual before service. If an error has occurred, refer to the troubleshooting section to remedy the error.
	**Attention:** This device shall NOT be disposed of in residential waste.
	**Attention:** This battery module shall NOT be disposed of in residential waste.
	**CAUTION:** Risk of electric shock from energy stored in capacitor. Do not remove cover until 5 minutes after disconnecting all sources of supply
	**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, be sure to read all the safety instructions carefully prior to any works, and please observe the appropriate rules and regulations of the country or region where you installed all-in-one energy storage system.

DANGER

- Please keep the power off prior to any operations.
- Do not use the battery or the battery control unit if it is defective, broken or damaged.
- Do not expose the battery to temperatures in excess of 50℃.
- Do not subject the battery to any strong force.
- 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 vehicles.
- Do not use the battery in areas where the ammonia content of the air exceeds 20 ppm.

WARNING

- Only qualified personnel who has full knowledge of local safety regulations and local standards on battery can install, maintain, retrieve, and process this product.
- SAJ electric shall not be liable for any loss or warranty claims arising from any unauthorized change of product which may cause fatal injury to the operator, third party or equipment performance.
- For personal and property safety, do not short-circuit the positive (+) and negative (-) electrode terminals.

CAUTION

- Do not modify or change any components in the battery.
- Risk of damage due to improper modification
- Use professional tools when operating the products.

NOTICE
• During installation of the battery, circuit breaker must be disconnected from the battery pack wiring.

1.3. Safe Handling

- Operate and use the battery properly according to the user manual. Any attempts to modify battery without the permission from SAJ will void the limit warranty for the battery.
- The battery must be installed at a suitable location with sufficient ventilation.
- Do not use the battery if it is defective, damaged, or broken.
- Only use the battery with a compatible inverter.
- Use batteries of the same type in an ESS. Do not mix the battery with other types of battery.
- Do not mix old and new battery modules, because doing so will not only cause capacity mismatch, but also affect battery performance and service life.
- If the user wants to expand the capacity later, it is recommended to add a cluster of batteries with the same configuration and use them in parallel with the original batteries.
- Do not mix batteries with different SOC states, and better to use batteries from the same production batch together, because this can reduce the risk of abnormalities.
- 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.
- Only use the battery as intended and designed.

1.4. Emergency

Despite of its careful and professional protection design against any hazards, damage of the battery may still possible. If a small amount of battery electrolyte is released due to a serious damage of the outer casing; or if the battery explodes due to not being treated timely after a fire breaks out nearby, and leaks out poisonous gases such as carbon monoxide, carbon dioxide and etc., the following actions are recommended:

- 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.
- Use a FM-200 or Carbon Dioxide (CO2) fire extinguishers to extinguish the fire if there is a fire in the

area where the battery pack is installed. Wear a gas mask and avoid inhaling toxic gases and harmful substances produced by the fire.

- Use an ABC fire extinguisher, if the fire is not caused by battery and not spread to it yet.

⚠ WARNING
• 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 on fire, do not attempt to extinguish the fire but evacuate the crowd immediately.

Potential danger of damaged battery:

- **Chemical Hazard:**

  Despite of its careful and professional protection design against any hazard results, rupture of battery may still occur due to mechanical damage, internal pressure etc., and may result in a leakage of battery electrolyte. The electrolyte is corrosive and flammable. When there is fire, the toxic gases produced will cause skin and eyes irritation, and discomfort after inhalation. Therefore:

  - Do not open damaged batteries.
  - Do not damage the battery again (shock, fall, trample, etc.).
  - Keep damaged batteries away from water (except to prevent an energy storage system from catching fire).
  - Do not expose the damaged battery to the sun to prevent internal heating of the battery.

- **Electrical hazard:**

  The reason of fire and explosion accidents in lithium batteries is battery explosion. Here are the main factors of battery explosion:

  - Short-circuit of battery. Short circuit will generate high heat inside battery, resulting in partial electrolyte gasification, which will stretch the battery shell. The temperature reaching ignition point of internal material will lead to explosive combustion.
  - Overcharge of battery. Overcharge of battery may precipitate lithium metal. If the shell is broken, it will come into direct contact with the air, resulting in combustion. The electrolyte will be ignited at the same time, resulting in strong flame, rapid expansion of gas and explosion.

2.

PRODUCT INFORMATION

2.1. General Introduction

The B2S series battery is applied to the residential photovoltaic energy storage system which stores the electricity for household future use.

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.

B2S battery is a high voltage battery system. The battery employs modular design for easy installation and wiring.

The battery B2S can only be used as a set with SAJ's H2 high voltage series storage inverter, otherwise it cannot be used normally.

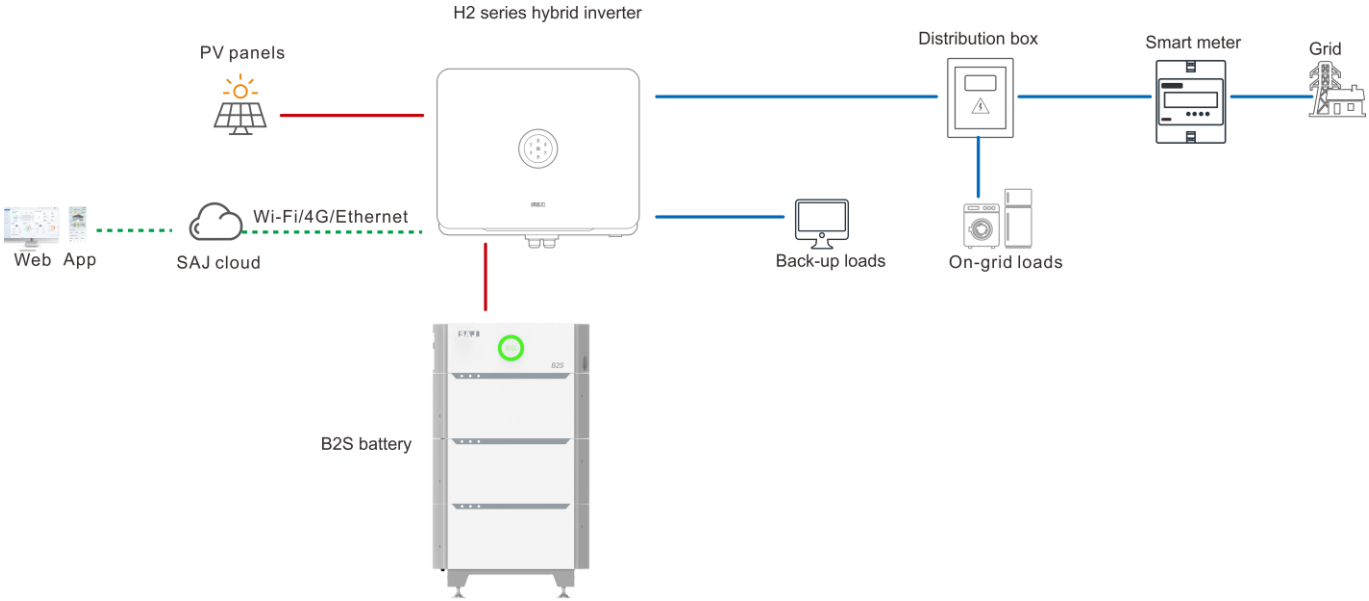


Figure 2.1. Application scenario

2.2. Models

2.2.1. Product Models

The B2S series includes the following SAJ products:

B2-5.0-HV1-S	B2-10.0-HV1-S	B2-15.0-HV1-S	B2-20.0-HV1-S	B2-25.0-HV1-S
B2-5.0-HV5-S	B2-10.0-HV5-S	B2-15.0-HV5-S	B2-20.0-HV5-S	B2-25.0-HV5-S

2.2.2. Model Description

B2 - *x.x* - HV*y* - S

B2: Batter model series

x.x: Rated energy x kWh of the battery. For example, 5.0 indicates the rated energy of this battery is 5.0 kW/h.

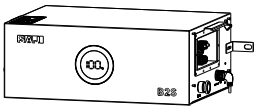
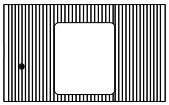
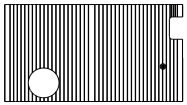
HV*y*: HV indicates that it is a high-voltage battery; ***y*** is 1 or 5, which indicates different battery cells.

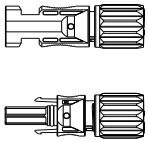
S: Senior version

2.3. Package Contents

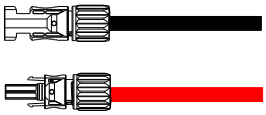
Place the connectors separately after unpacking to avoid confusion for connection of cables.

2.3.1. Battery Control Unit Package

			
Battery control unit*1	Left-side cover (left)*1	Right-side cover *1	Grounding cable *1
			
Communication cable *1	Power cable (1.45m) *1	Power cable (150 mm) *1	Positive battery cable (1.5m) *1 Negative battery cable (1.5m) *1 (Europe only)

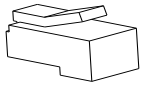


Positive PV connector *1
Negative PV connector *1
(Australia only)



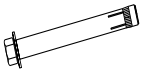
Positive battery cable (1.5m) *1
Negative battery cable (1.5m) *1
(Australia only)

Waterproof cover *1



RJ45 plug *2

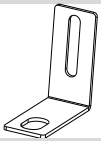
Communication cable (1.5m) *1



M10*80 screw *2

M5*12 screw *2

M4*10 screw *1



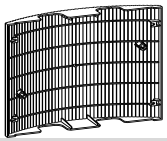
Locking bracket *2

Documents

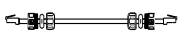
The documents contain a warranty card, a quick guide, and a user manual.

2.3.2. Battery Module Package

Battery module *1



Side cover *2



Communication cable *1

Power cable *1

Grounding cable *1

M4*25 screw *4

M4*10 screw *3

2.3.3. Base for Ground Mounting (Optional)

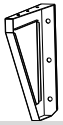

Base *1


Base foot *4


M4*10 screw *2

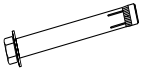
2.3.4. Bracket for Wall Mounting (Optional)


Top plate *1


Left foot *1


Right foot *1


M6*12 screw *6

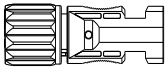

M10*80 expansion bolt *6


M4*10 screw *1

2.3.5. Accessory Package for Multi-cluster Battery Connection (Optional)


Power cable (4000 mm) *1
(Europe only)


Power cable (4000 mm) *1
(Australia only)


PV connector*1
(Australia only)

2.4. Dimension

2.4.1. Battery Control Unit

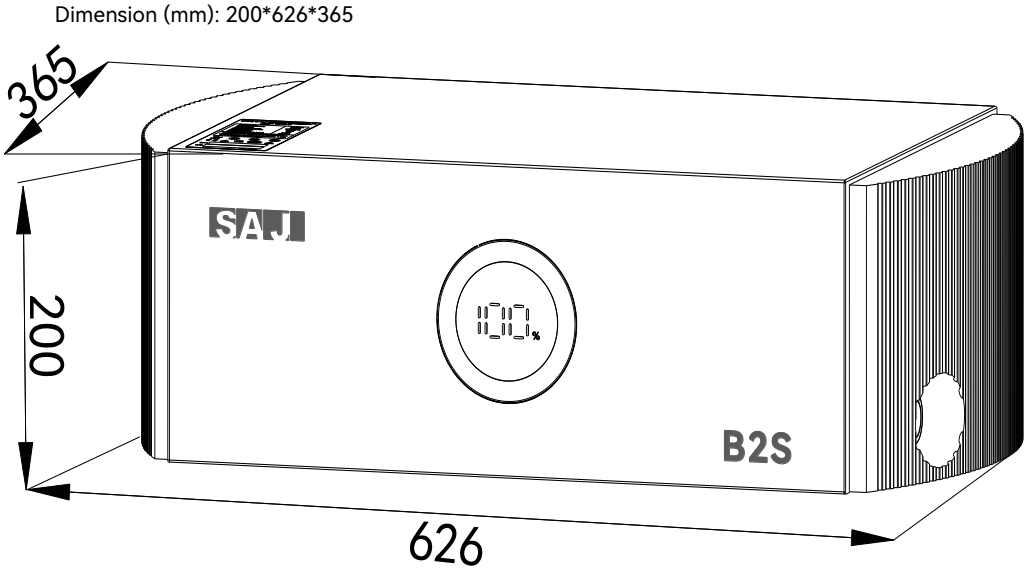


Figure 2.2. Battery control unit dimension

2.4.2. Battery Module

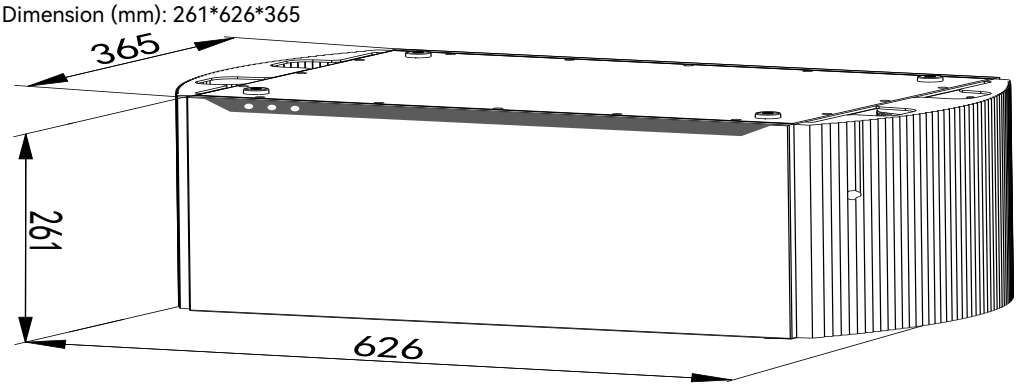


Figure 2.3. Battery module dimension

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

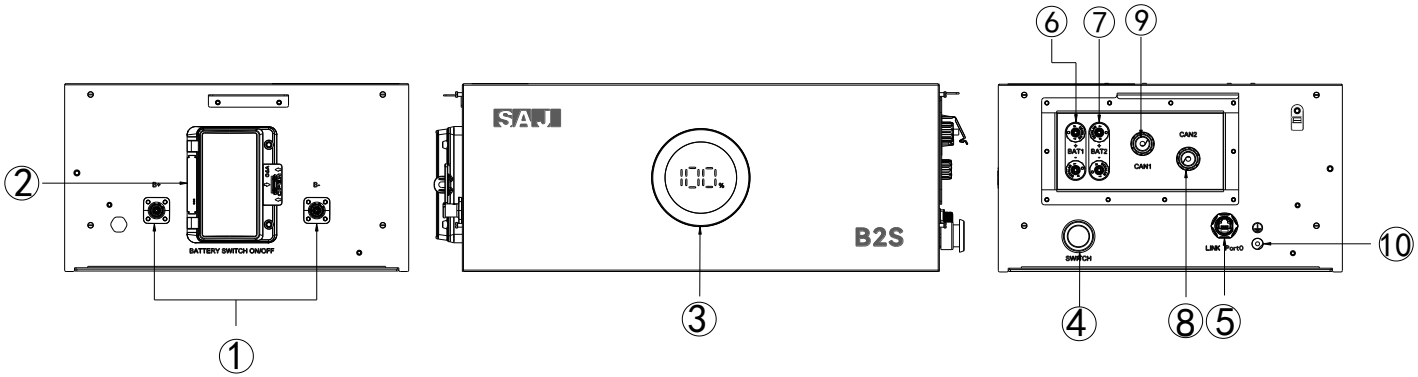


Figure 2.4. Ports, switches, and LED on the battery control unit

Callout	Silkscreen	Description
1	B+ and B-	For connection to the battery module
2	BATTERY SWITCH ON/OFF	Circuit breaker
3	/	LED panel
4	SWITCH	Switch
5	LINK Port0	Communication port (to the battery module)
6	BAT1 (+, -)	Positive and negative battery ports; for power connection
7	BAT2 (+, -)	Positive and negative battery ports; for power connection
8	CAN2	Communication port 2
9	CAN1	Communication port 1
10	/	Grounding point

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

2.6. Ports on the Battery Module

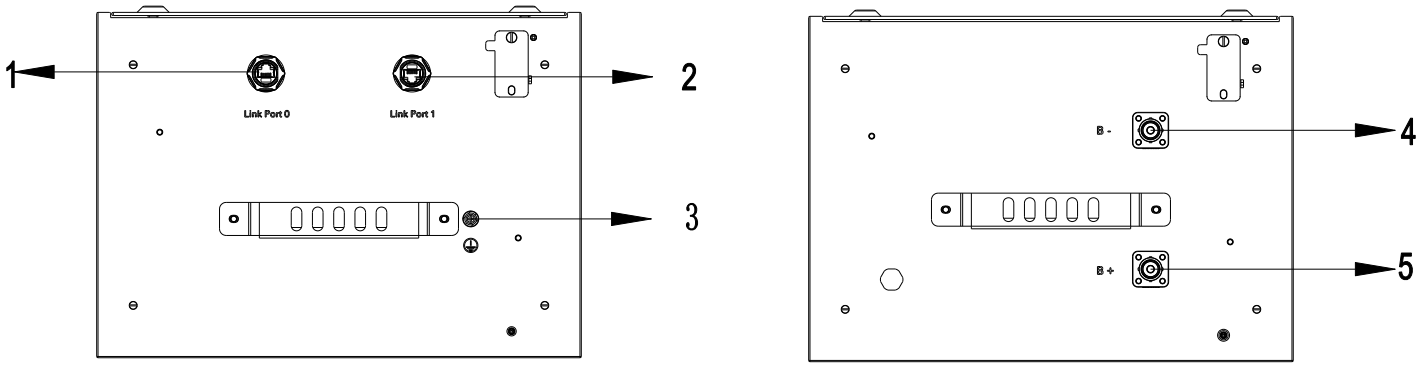


Figure 2.5. Ports on the battery module

Callout	Silkscreen	Description
1	LINK Port0	Link port 0, for battery communication connection
2	LINK Port1	Link port 1, for battery communication connection
3	/	Grounding point
4	B-	B − port, for battery negative power connection
5	B+	B +port, for battery positive power connection

Table 2.2. Ports on the battery module

2.7. LED Indicators on the Battery Control Unit

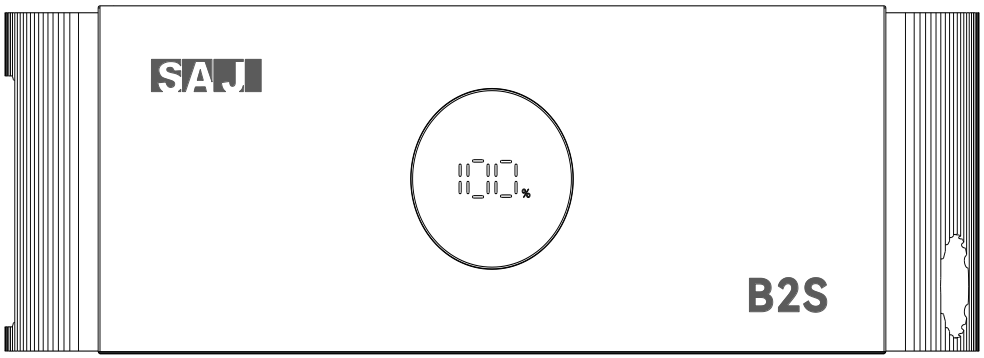


Figure 2.6. LED indicators on the battery control unit

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

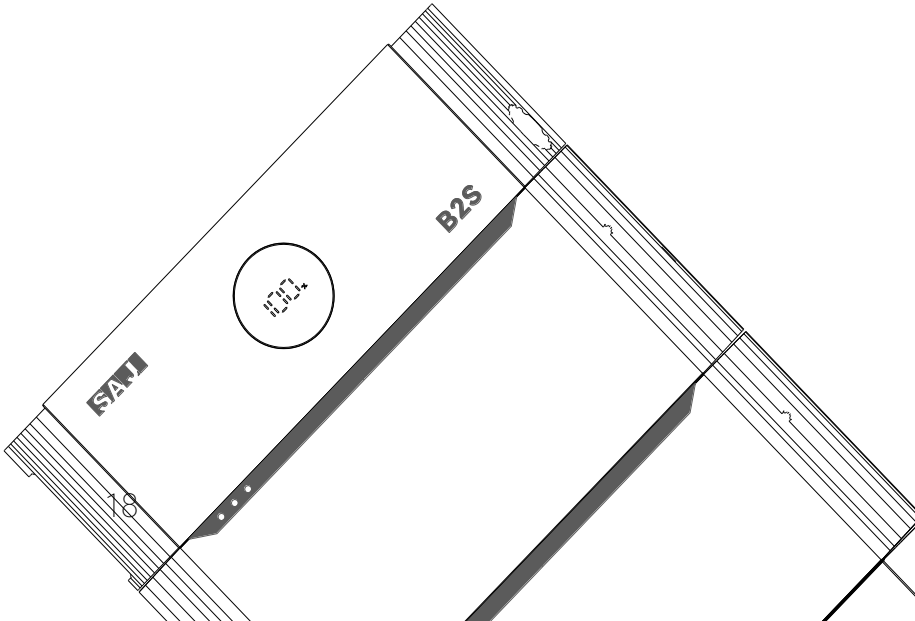
2.8. Datasheet

2.8.1. B2-5.0-HV1-S

Battery Module	**BU2-5.0-HV1-S (1P32S 102.4V 50Ah)**				
Number of Battery Modules	**1**	**2**	**3**	**4**	**5**
Rated Energy [kWh]	5.0	10.0	15.0	20.0	25.0
Usable Energy [kWh]	4.5	9.0	13.5	18.0	22.5
Rated Power (W)	5000	10000	15000	20000	25000
Dimension (H*W*D) [mm]	261*626*365	522*626*365	783*626*365	1044*626*365	1305*626*365
Weight [kg]	50.5	101	151.5	202	252.5
Nominal Voltage [V]	102.4	204.8	307.2	409.6	512
Operating Voltage [V]	89.6—115.2	179.2—230.4	268.8—345.6	358.4—460.8	448—576.0
Max. Charge Current [A]	50				
Max. Discharge Current [A]	50				
Control Module	**BC2-HV-S**				
Max. Fault Current [A]	100				
Dimension (H*W*D) [mm]	200*626*365				
Weight [kg]	11				
General Data					
Battery Type	Lithium battery				
Ingress Protection	IP65				
Dimension (H*W*D) [mm] (Battery control unit + Battery module)	461*626*365	722*626*365	983*626*365	1244*626*365	1505*626*365
Weight [kg] (Battery control unit + Battery unit)	61.5	112	162.5	213	263.5
Mounting	● Wall-mounted ● Ground-Mounted				
Operating Temperature Range	-10℃ to +50℃				
Ambient Humidity	0–95% non-condensing				
Cooling Method	Natural convection				
Communication	CAN				
Warranty [Year]	Refer to the warranty policy				
Applicable Standard	IEC62619 (Cell&Pack)/EN62477-1/EN61000-6-1/2/3/4/UN38.3				

2.8.2. B2-5.0-HV5-S

Battery Module	**BU2-5.0-HV5-S (1P32S 102.4V 50Ah)**				
Number of Battery Modules	**1**	**2**	**3**	**4**	**5**
Rated Energy [kWh]	5.0	10.0	15.0	20.0	25.0
Usable Energy [kWh]	4.5	9.0	13.5	18.0	22.5
Rated Power (W)	5000	10000	15000	20000	25000
Dimension (H*W*D) [mm]	261*626*365	522*626*365	783*626*365	1044*626*365	1305*626*365
Weight [kg]	52.5	105	157.5	210	262.5
Nominal Voltage [V]	102.4	204.8	307.2	409.6	512
Operating Voltage [V]	89.6—115.2	179.2—230.4	268.8—345.6	358.4—460.8	448—576.0
Max. Charge Current [A]	50				
Max. Discharge Current [A]	50				
Control Module	**BC2-HV-S**				
Max. Fault Current [A]	100				
Dimension (H*W*D)[mm]	200*626*365				
Weight [kg]	11				
General Data					
Battery Type	Lithium battery				
Ingress Protection	IP65				
Dimension (H*W*D) [mm] (Battery Control Unit + Battery Unit)	461*626*365	722*626*365	983*626*365	1244*626*365	1505*626*365
Weight [kg] (Battery Control Unit + Battery Unit)	63.5	116	168.5	221	273.5
Mounting	• Wall-mounted • Ground-Mounted				
Operating Temperature Range	-10℃ to +50℃				
Ambient Humidity	0–95% non-condensing				
Cooling Method	Natural convection				
Communication	CAN				
Warranty [Year]	Refer to the warranty policy.				
Applicable Standard	IEC62619 (Cell&Pack)/EN62477-1/EN61000-6-1/2/3/4/UN38.3				


B2S
SAJ

3.

TRANSPORTATION AND STORAGE

3.1. Transportation

DANGER

Load or unload batteries with caution. Otherwise, the batteries may be short-circuited or damaged (such as leakage and crack), catch fire, or explode.

- Batteries have passed the test of UN38.3. This product meets the transportation requirements for dangerous goods for lithium batteries.
- The transportation service provider must be qualified to transport dangerous goods.
- Before transportation, check that the battery package is intact and that there is no abnormal odor, leakage, smoke, or sign of burning. Otherwise, the batteries must not be transported.
- Keep less than 4 cartons of inverter in one stack and keep less than 4 cartons of battery in one stack.
- After the installation of the battery on site, the original packaging (contains the lithium battery identification) should be kept. When the battery needs to be returned to the factory for repair, use the original packing for battery transportation.

3.2. Storage

- Store it in a dry and ventilated environment and keep it away from heat sources.
- Keep the battery in an environment with storage temperature as -10 ° C to +50 ° C, humidity 0% to 95% RH.
- For long-term storage (>3 months), put the battery in an environment with a temperature of -25 ° C to 25 ° C and a humidity of < 85% RH.
- One stack supports up to five battery control unit cartons or four battery module cartons.
- The battery should be installed within 6 months since delivered from the factory and used with compatible inverters.

NOTICE

- The battery remains 50% power when it is sent from the factory.
- The longer the battery is stored, the lower the SOC. When the battery remaining voltage fails to reach the startup voltage requirement, the battery may be damaged.
- Close the battery breaker switch and press the main switch. If the LED light is in solid green, it is running normally. If the LED light is in solid red or off, the battery is not working properly.

- The battery cannot be disposed of as household refuse. When the service life of the battery reaches to the limit, it is not required to return it to the dealer or SAJ, but it must be recycled to the special waste lithium battery recycling station in the area

4.

INSTALLATION

4.1. Precautions

For safety, be sure to read all the safety instructions carefully prior to any works and observe the appropriate rules and regulations of the country or region where you installed the energy storage system.

DANGER

- Dangerous to life due to potential fire or electricity shock.
- Do not install the inverter near any inflammable or explosive items.

NOTICE

- This equipment meets the pollution degree.
- Inappropriate or the harmonized installation environment may jeopardize the life span of the inverter.
- Installation directly exposed under intensive sunlight is not recommended.
- The installation site must be well ventilated.

4.2. Determining the Installation Site

Read the following sections to cautiously determine the installation site.

The safety regulations vary in different countries and regions. Follow local safety regulations.

4.2.1. Installation Environment Requirements

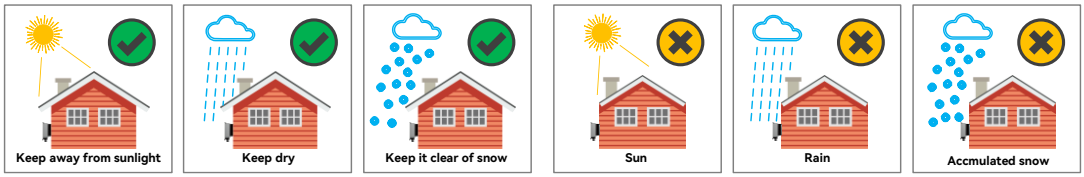


Figure 4.1. Installation location

- 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 at daily working or living arears, including but not limited to the following areas: bedroom, lounge, living room, study, toilet, bathroom, theater, and attic.
- 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 indoor or outdoor.
  - 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.

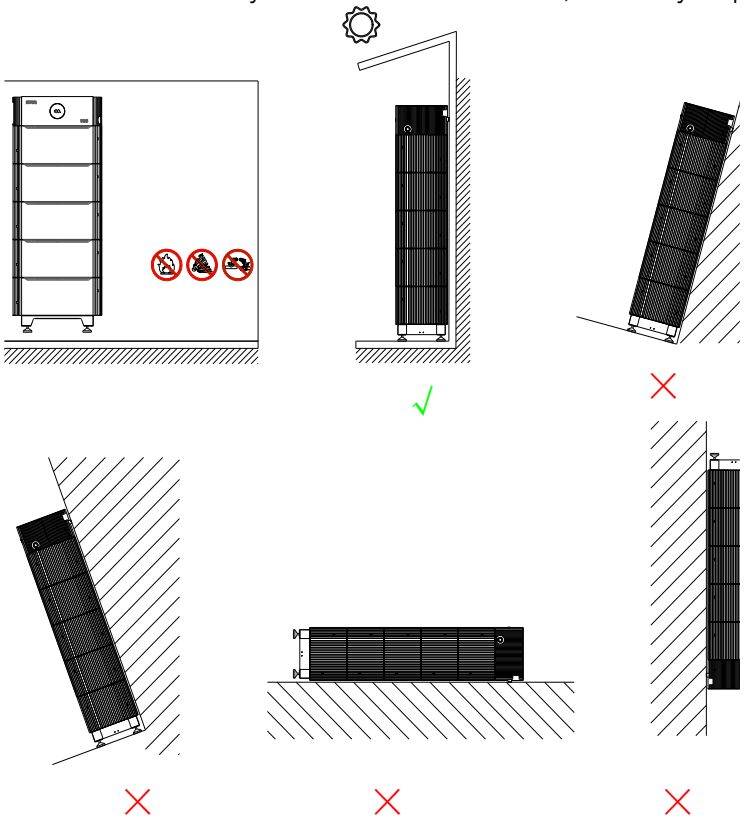


Figure 4.2. Installation limitations

- 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.

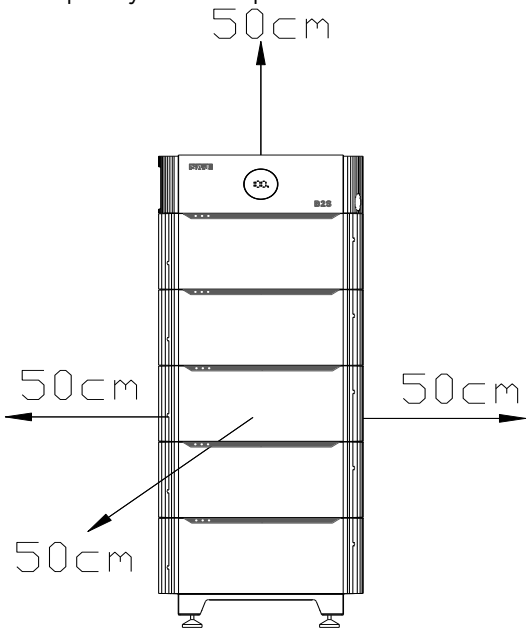


Figure 4.3. Installation clearance

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.

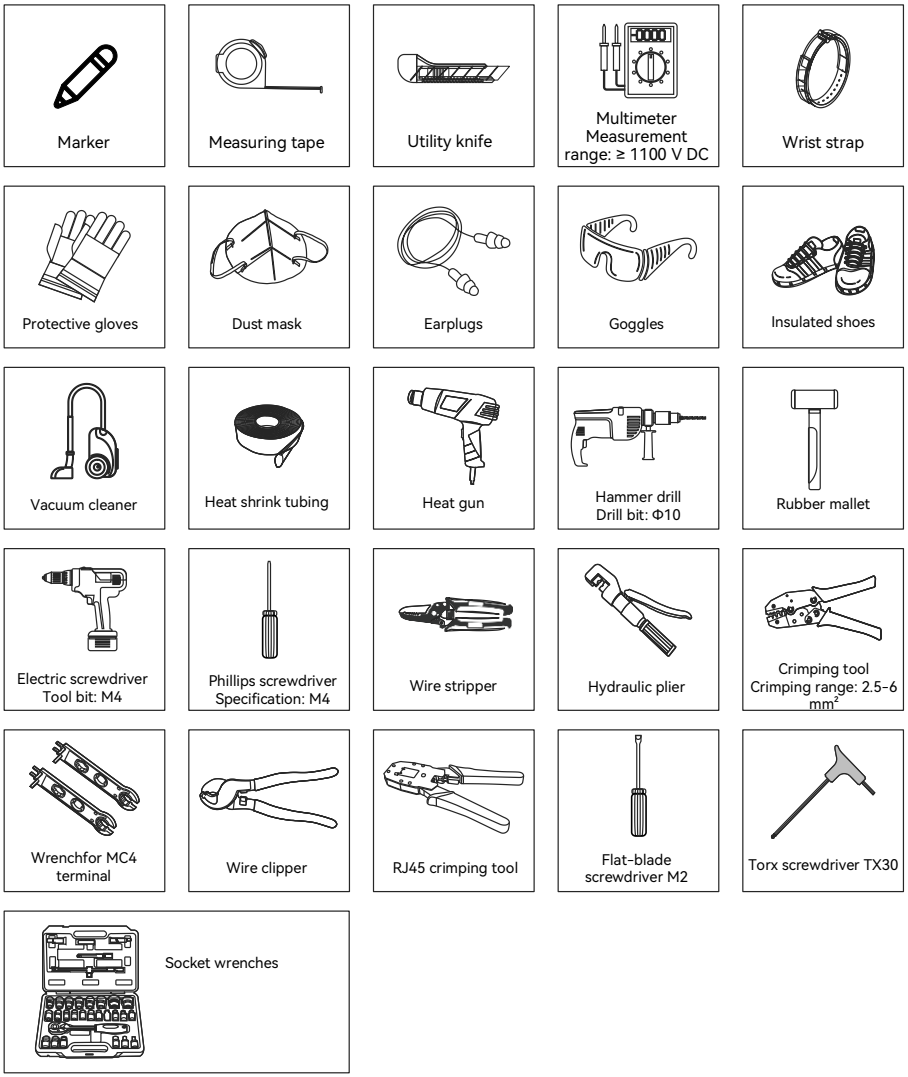


Figure 4.4. Suggested installation tools

4.4. Unpacking

4.4.1. Checking the Outer Packing

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

1. Check the outer packing package for any 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 if there are missing or damaged components.

   For detailed contents, refer to section 2.3 "Package Contents".
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 no inclination.

Procedure

Step 1. 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.

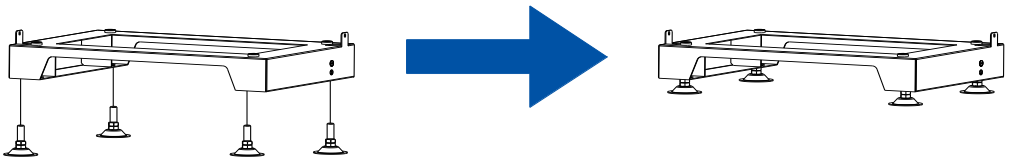


Figure 4.5. Marking and drilling holes on the wall

Step 2. Place the base on the ground. Make sure the distance between the base and the wall is 28-34mm. Place the battery module onto the base and secure it with screws (M4*10).

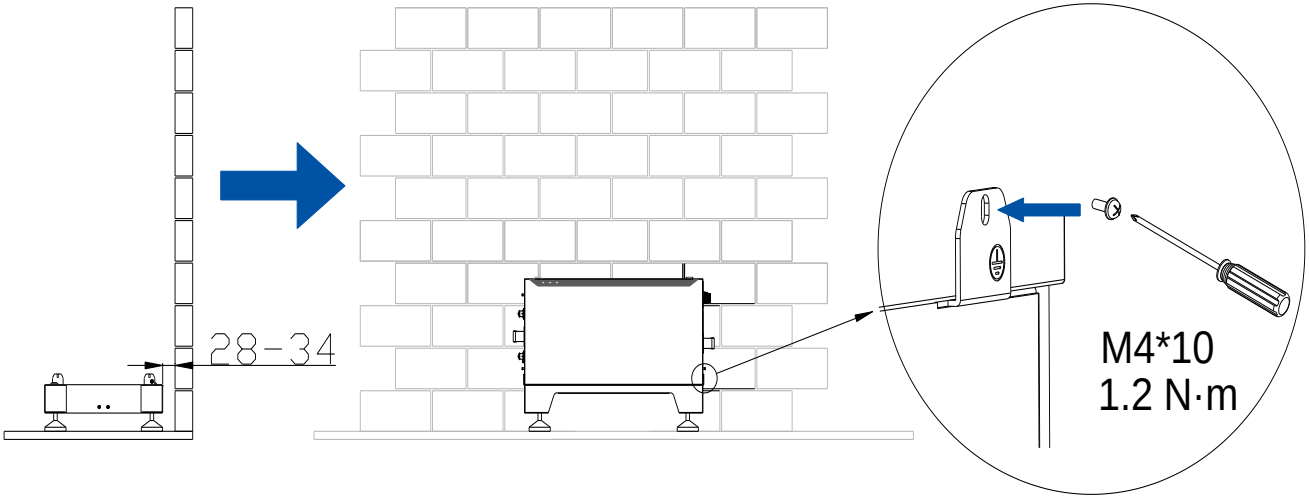


Figure 4.6. Securing the battery to the wall

Step 3. Place the second battery module onto the first battery module. On each side of the battery, rotate the locking bracket clockwise and secure it. Repeat the same operations until all required battery modules are installed.

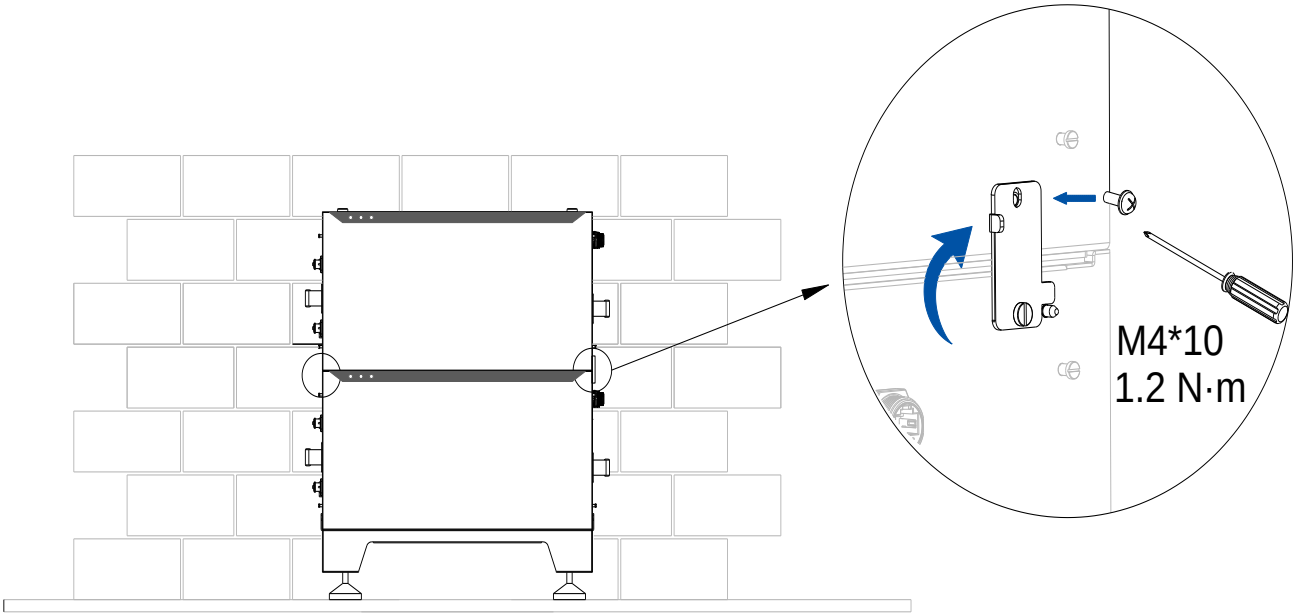


Figure 4.7. Securing the batteries

Step 4. Place the battery control unit onto the top of the battery pack. Install the locking brackets on each side of the battery control unit and mark the U-shaped hole of the locking brackets on the wall. Then, remove the battery control unit.

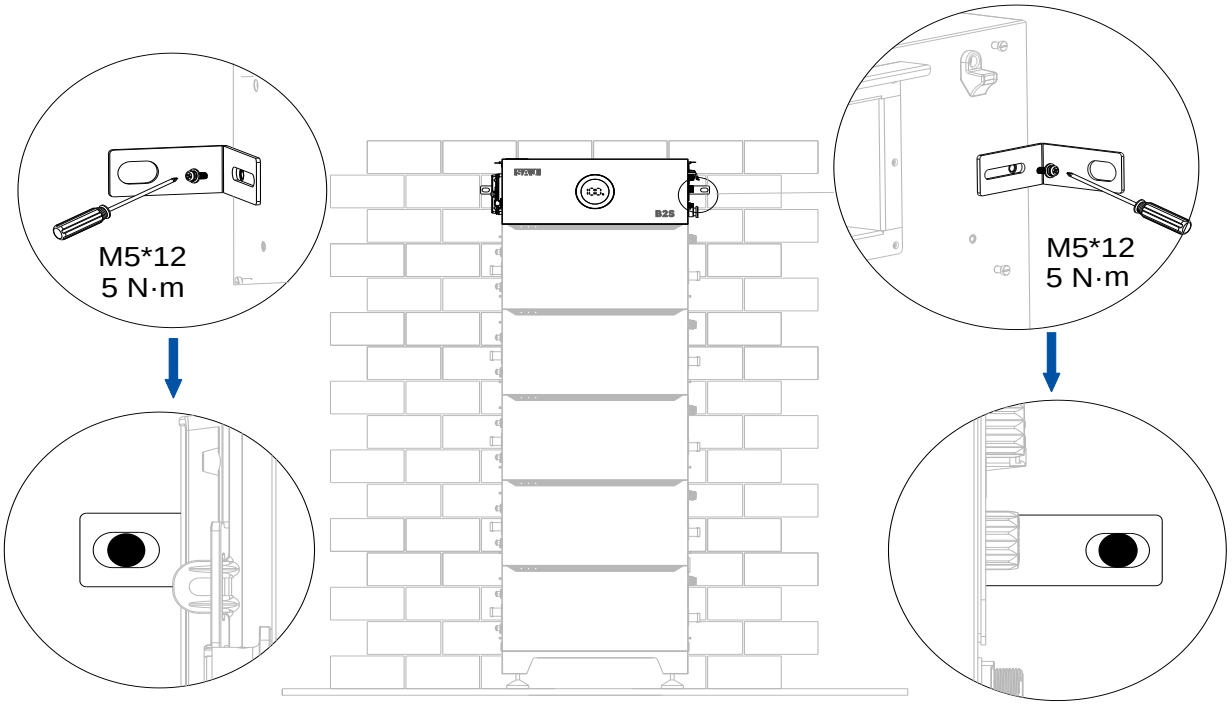


Figure 4.8. Locating the installation holes of the battery control unit

Step 5. Drill holes (13mm in diameter, 65mm in depth) at the positions marked in step 4.

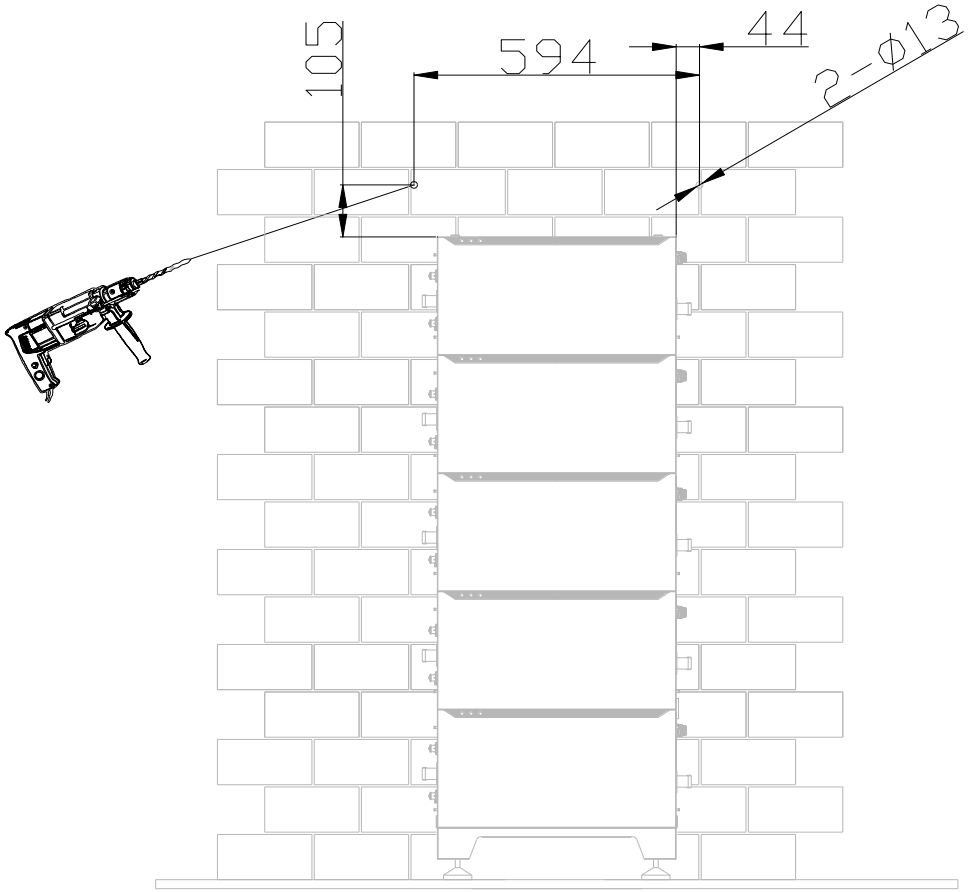


Figure 4.9. Drilling holes on the wall

Step 6. Place the battery control unit back to the top of the battery pack. 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.

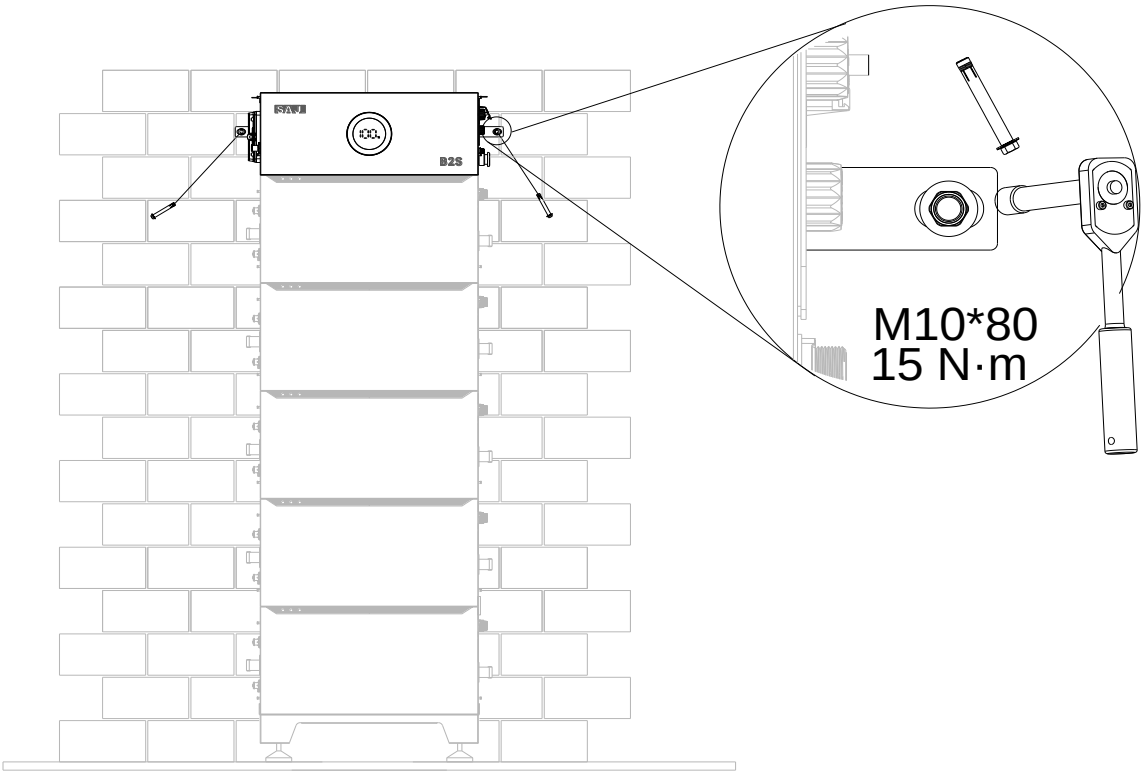


Figure 4.10. Installing the battery control unit

4.5.2. Wall mounting

Before you start

Make sure that the wall can bear the weight of the device and accessories.

Procedure

Step 1. Assemble the bracket.

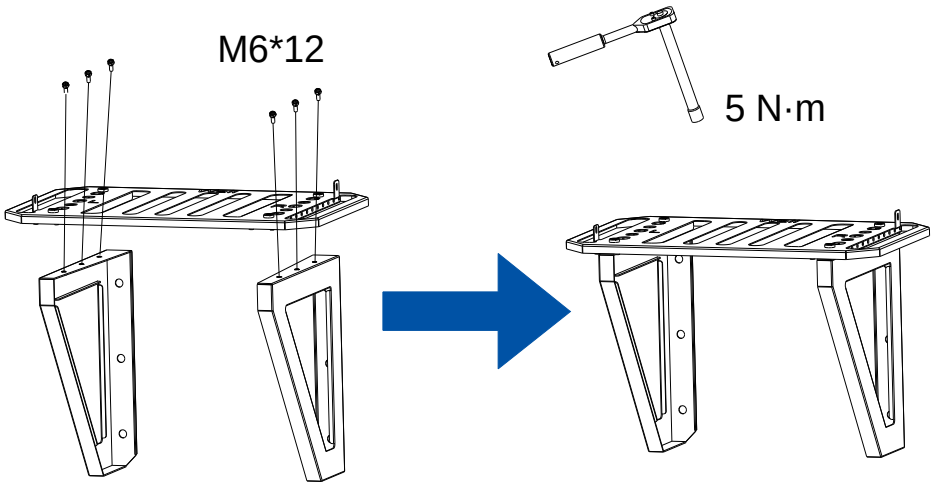


Figure 4.11. Assembling the bracket

Step 2. Place the Mark the proper positions of locking bracket and drill holes on those positions (13mm in diameter, 65mm in depth) by using the locking bracket as a template, and then use a rubber hammer to drive the screw fixing seat into the holes to fix the bracket.

Note: It is recommended to leave no gap between the bracket and ground.

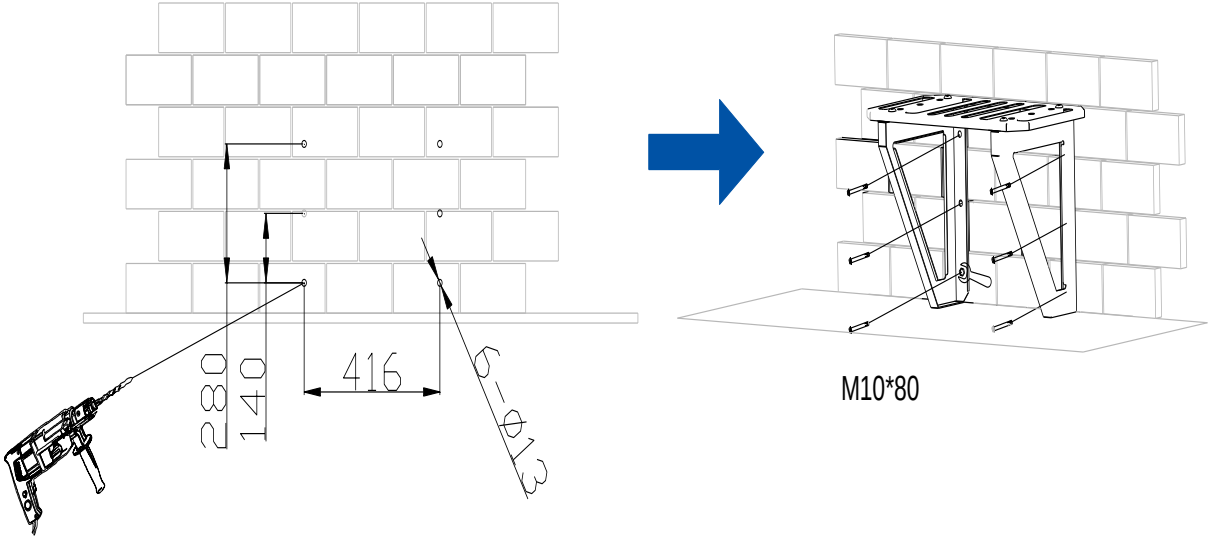


Figure 4.12. Drilling holes on the wall and installing the bracket

Step 3. Place the battery module on the bracket and tighten the screws to secure it to the wall. Place the second battery module onto the first battery module. On each side of the battery, rotate the locking bracket clockwise and secure it. Repeat the same operations until all required battery modules are installed.

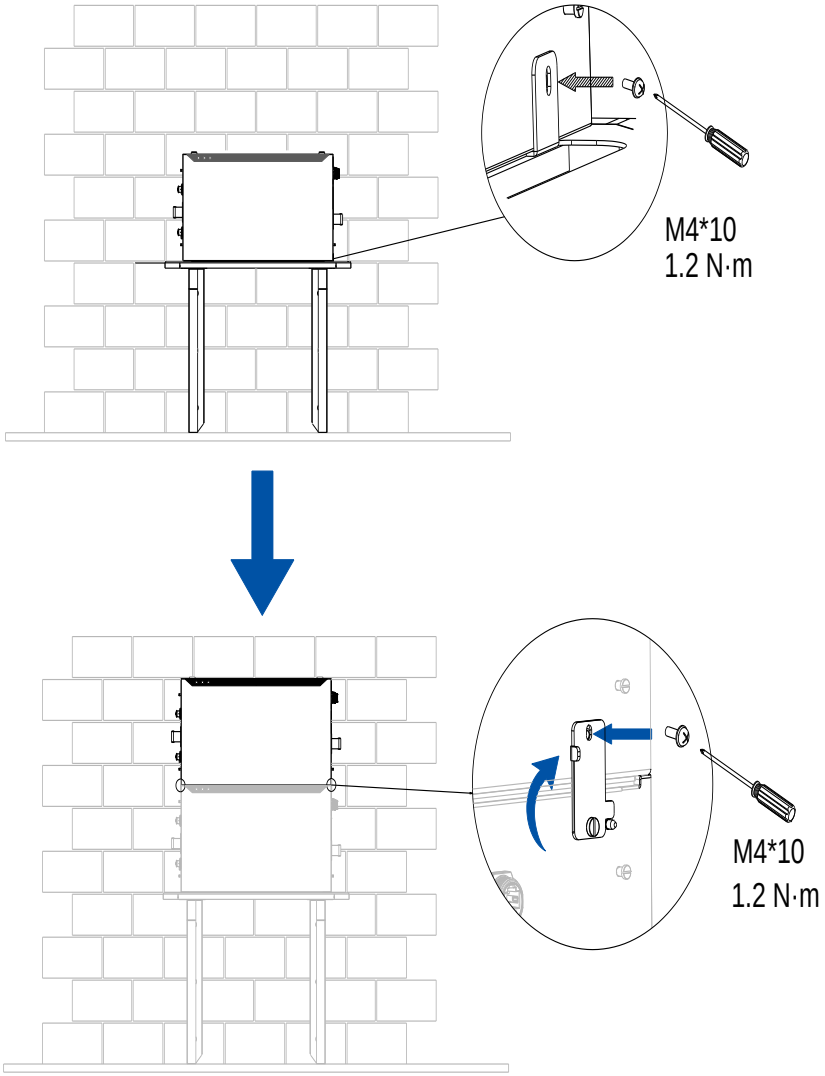


Figure 4.13. Installing the battery modules

Step 4. Place the battery control unit onto the top of the battery pack. Install the locking brackets on each side of the battery control unit and mark the U-shaped hole of the locking brackets on the wall. Then, remove the battery control unit.

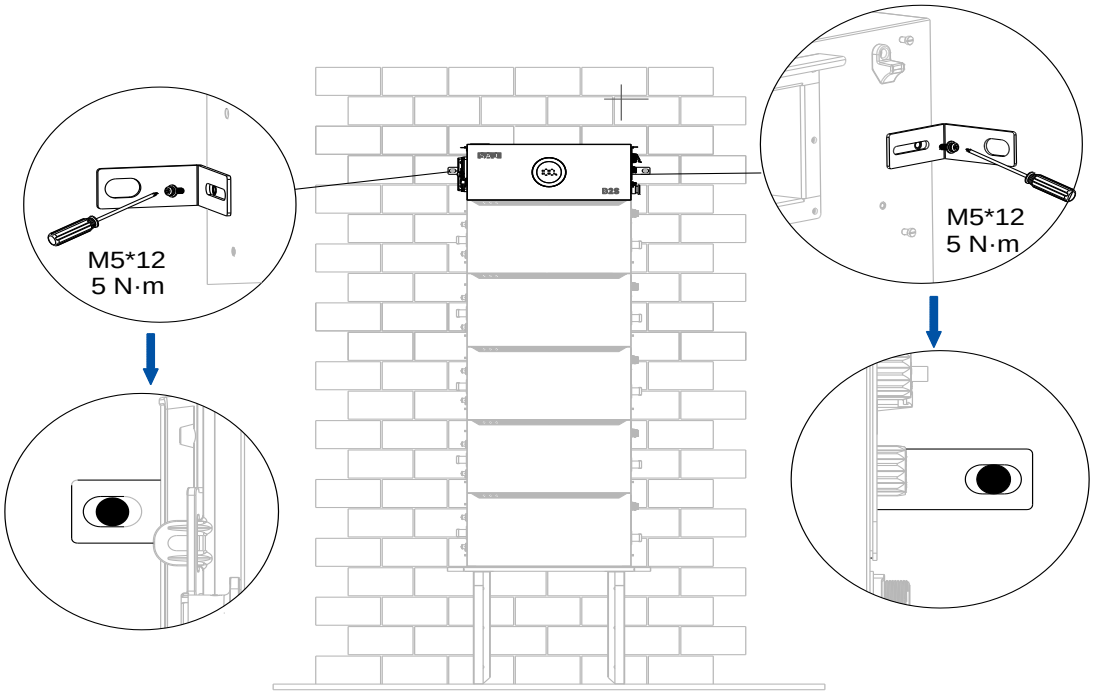


Figure 4.14. Locating the installation holes of the battery control unit

Step 5. Drill holes (13mm in diameter, 65mm in depth) at the positions marked in step 4.

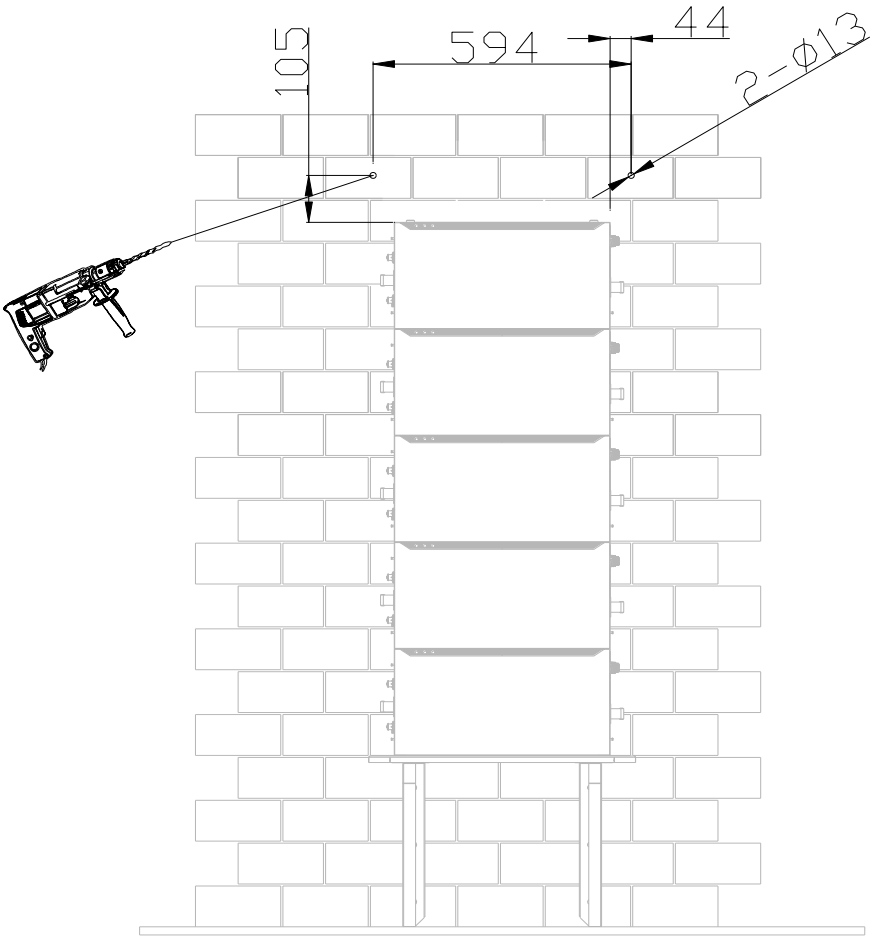


Figure 4.15. Drilling holes on the wall

Step 6. Place the battery control unit back to the top of the battery pack. 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.

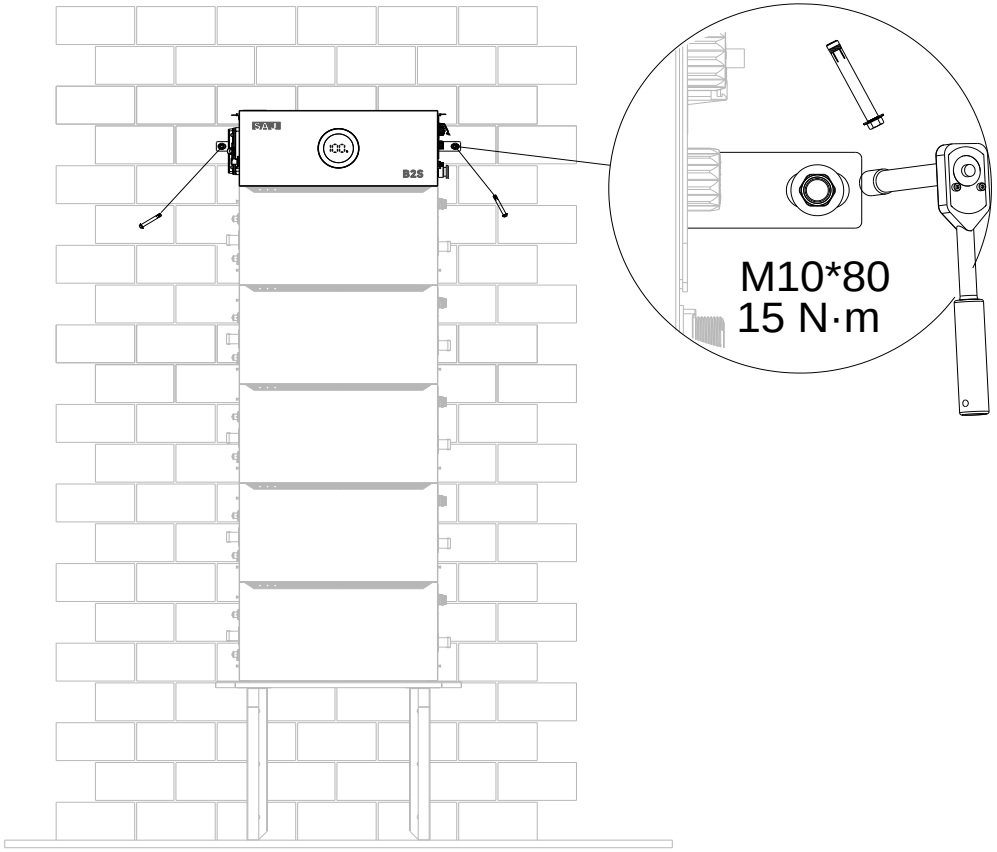
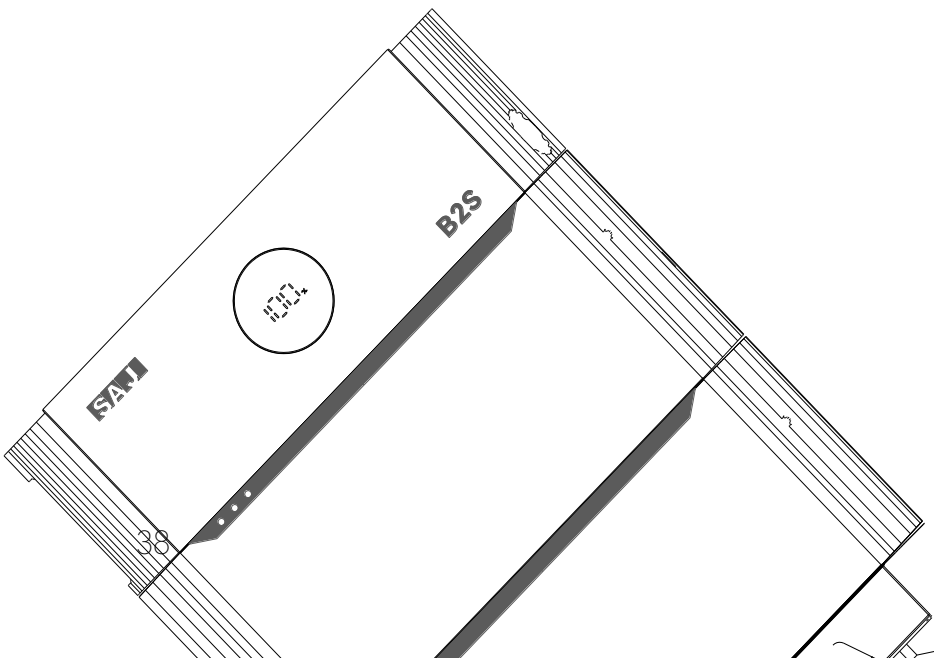


Figure 4.16. Installing the battery control unit


B2S

5.

ELECTRICAL CONNECTION

5.1. Safety Instructions

Electrical connection must only be operated on by professional technicians. Operators must be aware that the inverter is a bi-power supply equipment. Before connection, necessary protective equipment must be employed by technicians including insulating gloves, insulating shoes, and safety helmet.

DANGER
• Dangerous to life due to potential fire or electricity shock. • When it is powered on, the equipment should in conformity with national rules and regulations. • The direct connection between the inverter and high voltage power systems must be operated by qualified technicians in accordance with local and national power grid standards and regulations. • The PV arrays will produce lethal high voltage when exposed to sunlight.

NOTICE
Any improper operation during cable connection can cause device damage or personal injury

5.2. Connecting the Grounding Cable

About this task

Here takes a cluster of five batteries as an example.

This additional grounding cable must be connected before other electrical connection. 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.

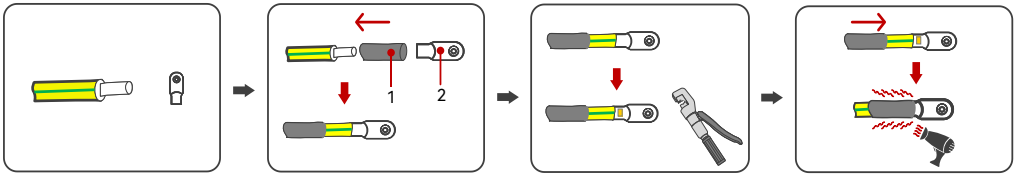


Figure 5.1. Preparing the grounding cable

1	Heat shrink tube	2	OT/DT terminal

Step 2. Connect the grounding cable on the battery control unit and the battery modules.

a. Remove the M4*10 screw from the grounding port on the battery control unit. Connect and secure the grounding cable.

b. Use M4*10 screws to connect and secure the grounding cables on the battery modules.

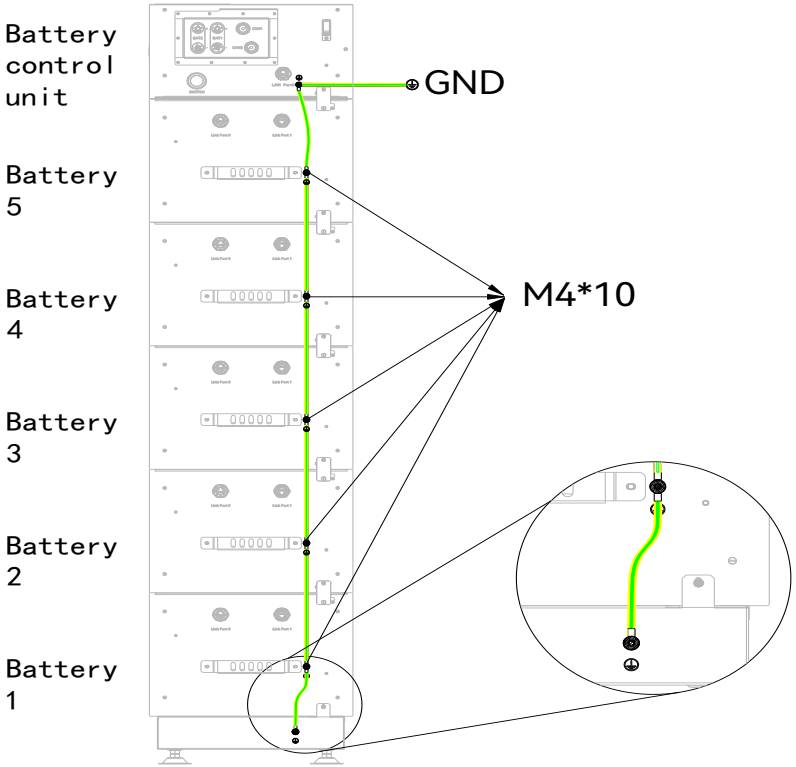


Figure 5.2. Connecting the additional grounding cable

5.3. Connecting Communication Cables among Batteries

About this task

Here takes a cluster of five batteries as an example. The battery number might vary, depending on your actual system.

The communication cables are provided in the accessory bags of both the battery control unit and the battery module.

Procedure

Step 1. Connect LINK Port0 on the battery control unit to Link Port 1 on battery 5.

Step 2. Connect Link Port 0 on Battery 5 to Link Port 1 of Battery 4. Repeat the same operations on Batteries 3, 2, and 1 until all five batteries are connected.

Step 3. Insert RJ45 plugs to Link Port 0 of Battery 1 and the CAN2 port of the battery control unit. Then, use the waterproof covers to secure the plugs.

Note: If the RJ45 plug is not installed, a communication error will occur.

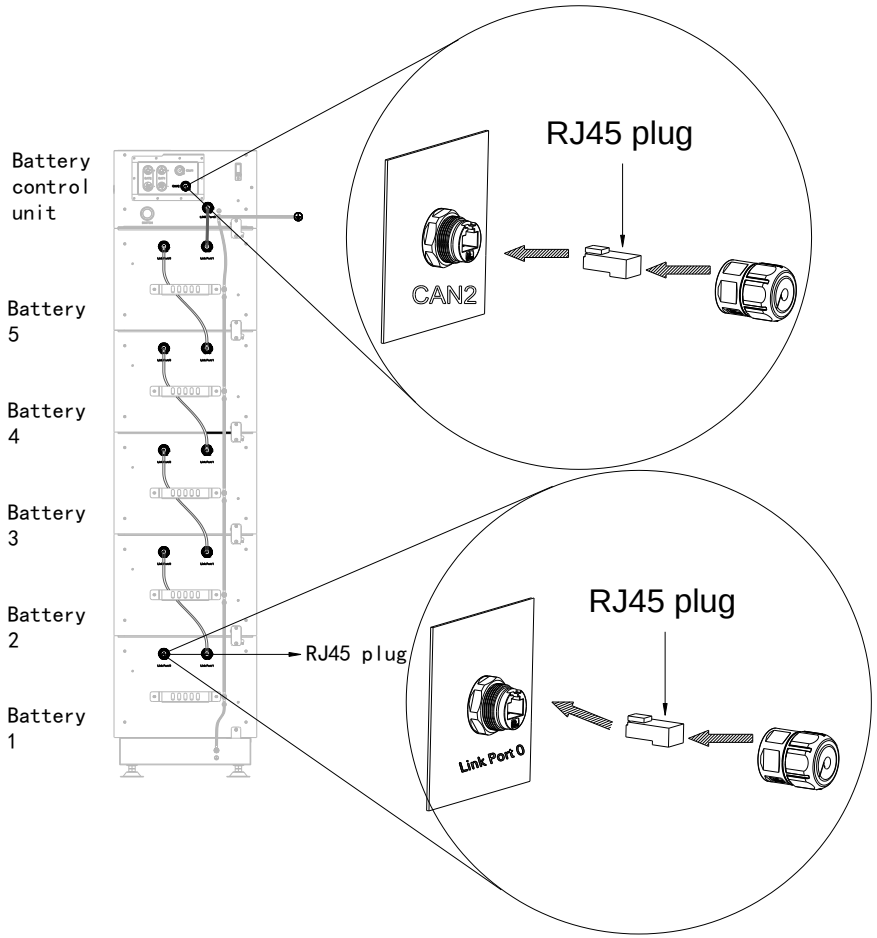


Figure 5.3. Connecting the battery communication cables

5.4. Connecting Power Cables among Batteries

WARNING
• Power off the battery system before connecting the power cable to avoid high voltage danger • The electrical connection of high voltage battery systems must be operated by qualified technicians in accordance with local and national power grid standards and regulations.

About this task

Here takes a cluster of five batteries as an example. The battery number might vary, depending on your actual system.

The power cables are provided in the accessory bags of both the battery control unit and the battery module.

Procedure

Step 1: Connect the power cable from the B- port of the battery control unit to the B- port on Battery 5.

Step 2: Connect the power cable from the B+ port of Battery 5 to the B- port of Battery 4. Repeat the same operations on Battery 3, 2, and 1 until all five batteries are connected.

Step 3: Connect the B+ port on the battery control unit to the B+ port of Battery 1.

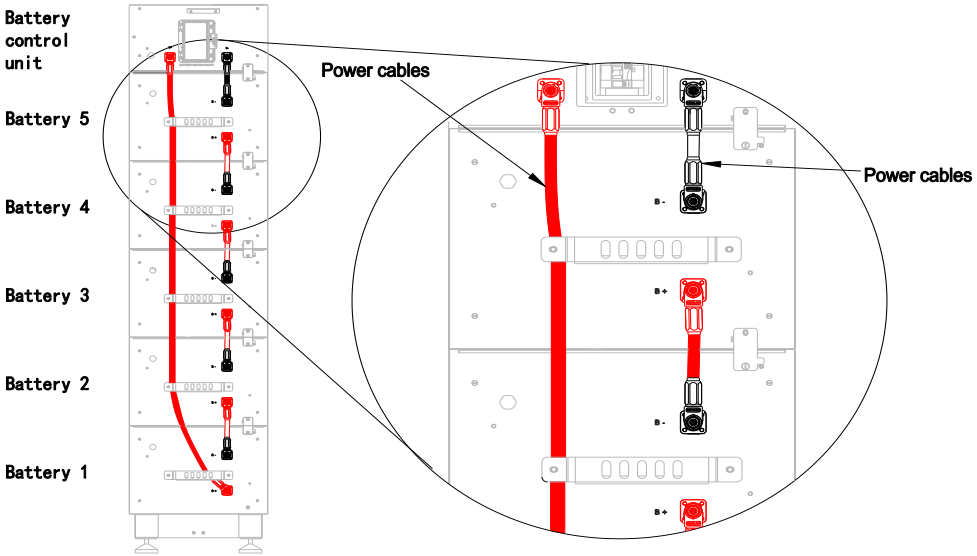


Figure 5.4. Connecting battery power cables

5.5. Connecting the Battery to the Inverter

Use the 1.5m communication cable (standard network cable) provided in the battery control unit package.

5.5.1. Single-Cluster Battery Connection

Before you start

Make sure that the vertical height between the inverter and the battery control unit is less than 0.7m.

Procedure

Step 1: Pass the communication cable through the lock nut, the seal, and the connector body, as shown below:

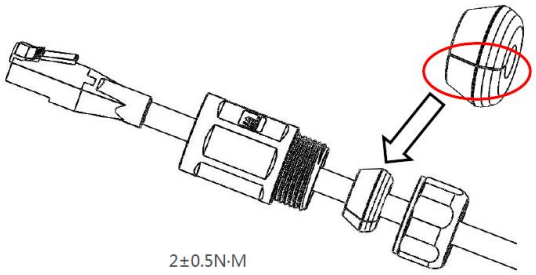


Figure 5.5. Assembling the cables

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

From the battery control unit	To the inverter
BAT1+	BAT+
BAT1-	BAT-
CAN1	CAN

Note: Do not intertwine the communication cable and power cables.

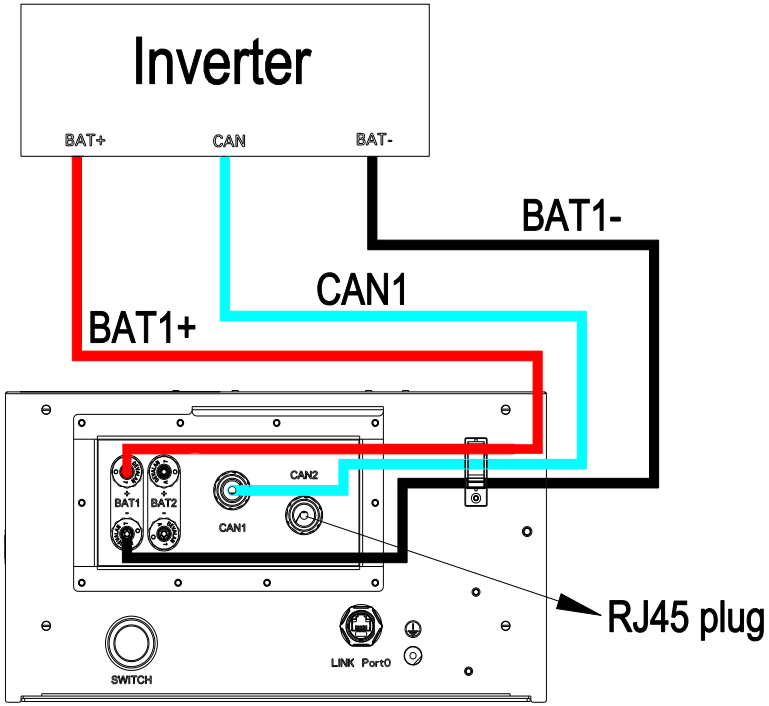


Figure 5.6. Single-cluster connection

Step 3: For the communication cable, use an open-ended wrench to secure the RJ45 connector to the CAN1 port on the inverter. Tighten the seal and the sealing nut to the connector body.

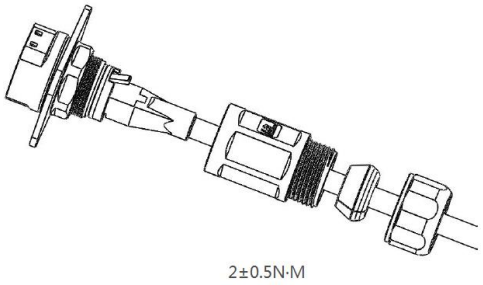


Figure 5.7. Securing the RJ45 connector to the CAN1 port

5.5.2. Multi-cluster Battery Connection

About this task

If two or more clusters of batteries are installed, install the inverter in a location adjacent to the first cluster of batteries. Use the 4m negative power cable (refer to section 2.3.5 “Accessory Package for Multi-cluster Battery Connection (Optional)"), instead of the 1.5m negative power cable provided in the battery control unit package.

Before you start

- Make sure that the vertical height between the inverter and the battery control unit is less than 0.7m.
- Make sure that the power cables are connected on the battery control unit and battery modules.

From		To	
Battery control unit on the **1st** battery cluster	CAN1	Inverter	CAN
	BAT1+		BAT+
	CAN2	Battery control unit on the **2nd** battery cluster	CAN1
	BAT2+		BAT1+
	BAT2-		BAT1-
Battery control unit on the **2nd** battery cluster	CAN2	Battery control unit on the **3rd** battery cluster	CAN1
	BAT2+		BAT1+
	BAT2-		BAT1-
Battery control unit on the **3rd** battery cluster	CAN2	Battery control unit on the **4th** battery cluster	CAN1
	BAT2+		BAT1+
	BAT2-		BAT1-
Battery control unit on the **4th** battery cluster	CAN2	RJ45 plug	
	BAT2+	/	
	BAT2-	Inverter	BAT-

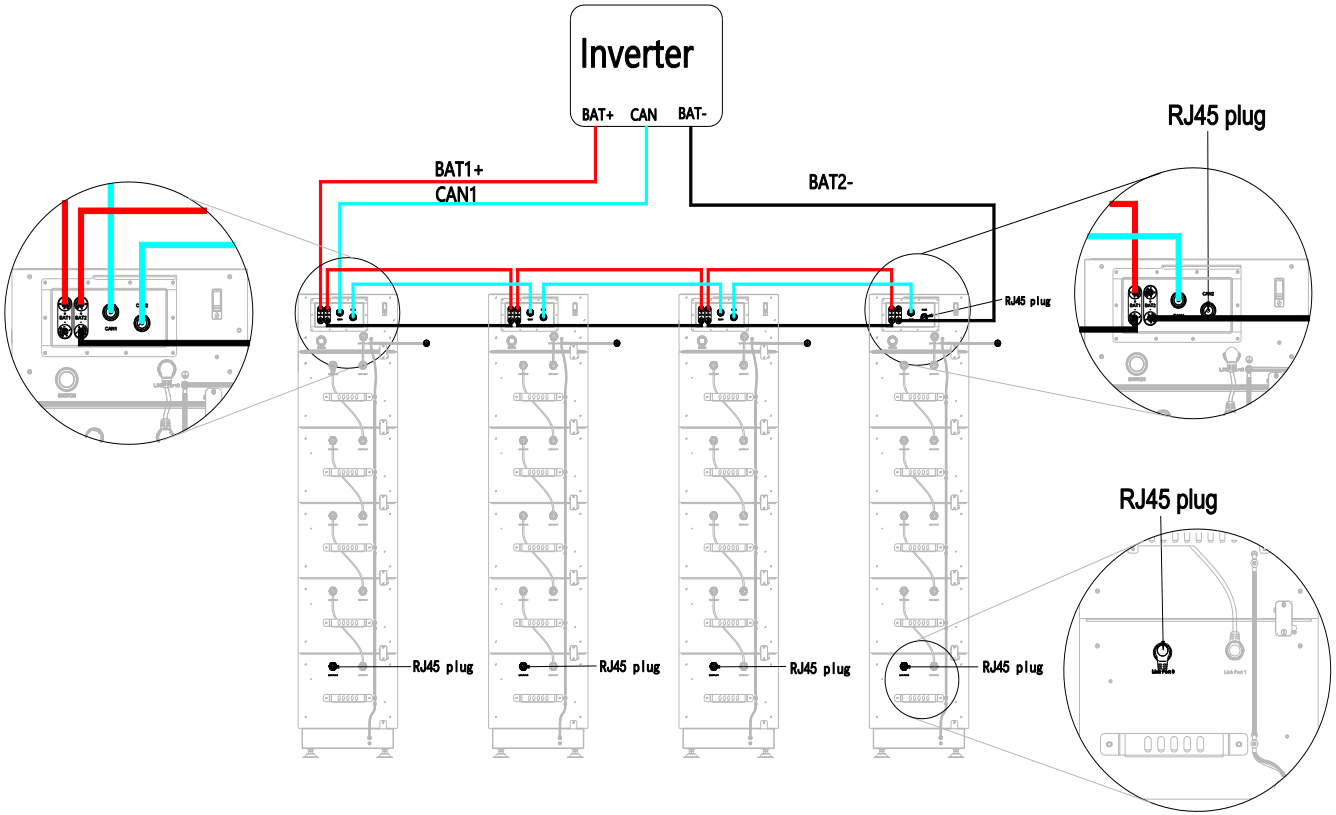


Figure 5.8. Multi-cluster battery connection

5.6. Installing Side Covers

5.6.1. Battery control unit

Push the side covers inwards. Press the cover downwards. Tighten the screws on the cover.

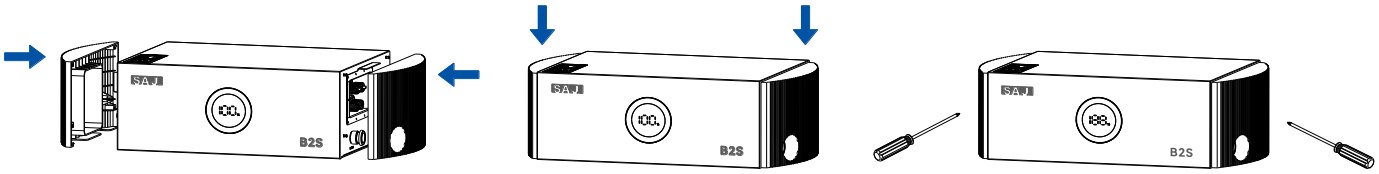


Figure 5.9. Installing the side covers on the battery control unit

5.6.2. Battery module

Push the side covers inwards. Push the side covers forwards. Secure it with screws (M4*25).

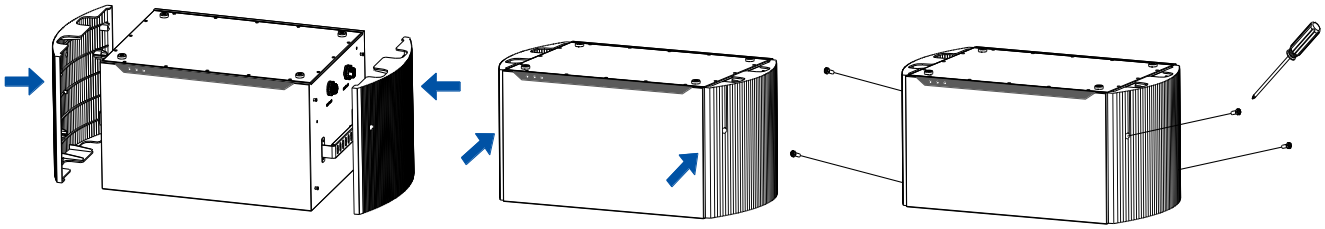


Figure 5.10. Installing the side covers on the battery module

6.

STARTUP AND SHUTDOWN

6.1. Startup

Step 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.

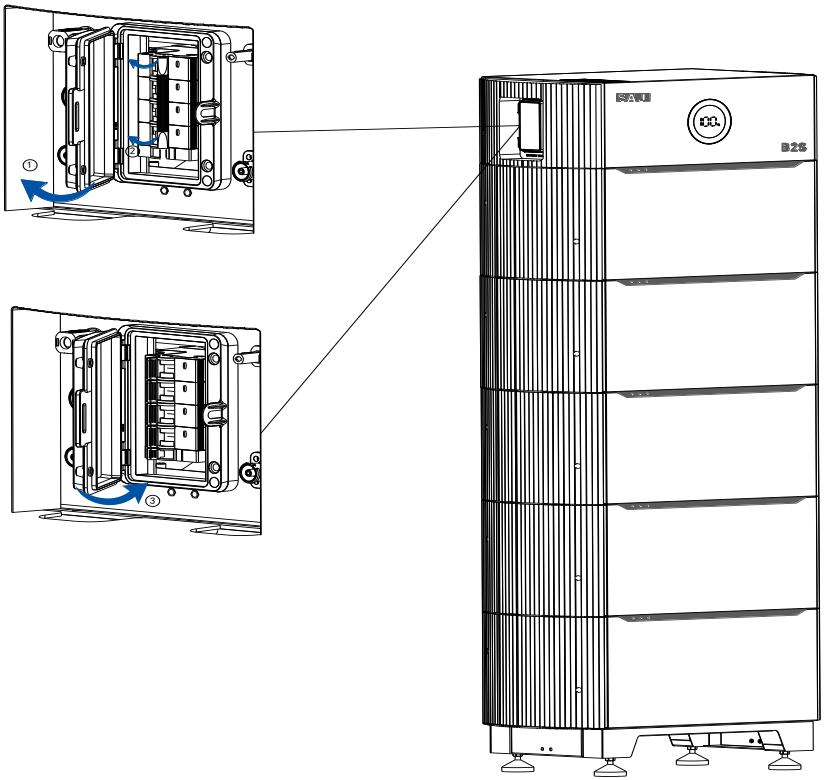


Figure 6.1. Switches on the left side of the inverter

6.2. Shutdown

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

Step 2. 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, you can scan the below QR code to download the App.

Android

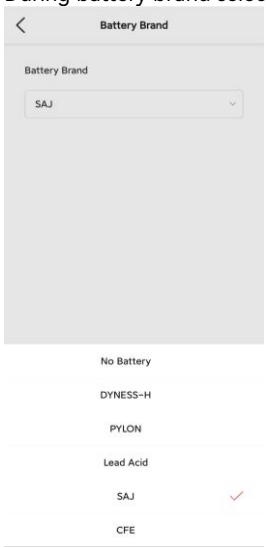
iOS

7.3. Using the App

To perform commissioning operations on the App, refer to the inverter *User Manual* or *SAJ Configuration Guide*.

Notes:

- The detailed operations on the App might vary, depending on the version you are using.
- During battery brand selection, select SAJ battery.



8.

TROUBLESHOOTING

For any errors reported as below, contact the after-sales for service support. The operations and maintenance must be performed by authorized technicians.

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	Wait until battery temperature increased and the error is clear

Error code	Error message	Possible cause	Solution
		temperature.	
107	Charging temperature high protection	The battery temperature is higher than the maximum battery protection temperature.	Wait until battery temperature decreased 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 increased 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 decreased 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 as a residential waste.

An inverter that has reached the end of its operation life is not required to be returned to your dealer; instead, it must be disposed 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://www.saj-electric.com/

9.3. Contacting Support

Guangzhou Sanjing Electric Co., Ltd.

Address: SAJ Innovation Park, No.9, Lizhishan Road, Guangzhou Science City, Guangdong, P.R.China.

Postcode: 510663

Website: https://www.saj-electric.com/

Technical Support & Service

Tel: +86 20 6660 8588

Fax: +86 206660 8589

E-mail: service@saj-electric.com

International Sales

Tel: 86-20-66608618/66608619/66608588/66600086

Fax: 020-66608589

E-mail: info@saj-electric.com

China Sales

Tel: 020-66600058/66608588

Fax: 020-66608589

9.4. Trademark

SAJ is the trademark of Sanjing.

SAJ

GUANGZHOU SANJING ELECTRIC CO.,LTD

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