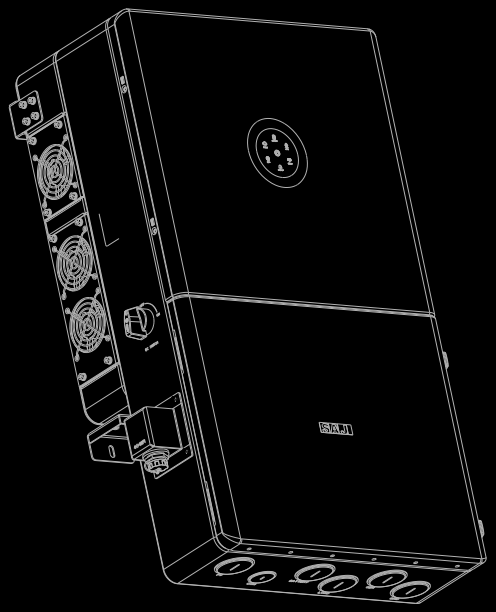


H2 Series

HYBRID INVERTER
USER MANUAL

H2-(5K-7.6K)-LS3-US

H2-(9.6K-11.4K)-LS4-US

Preface

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

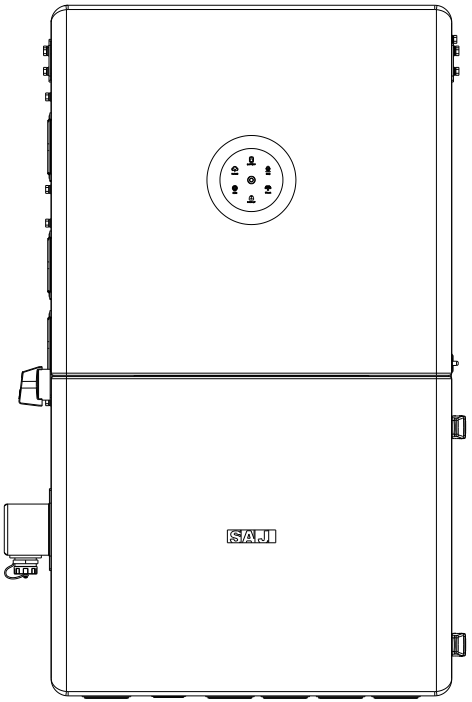
This manual provides information about installation, operation, maintenance, troubleshooting and safety. Please follow the instructions of this manual so that we can ensure delivery of our professional guidance and whole-hearted service.

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**


SAJ

1.

SAFETY PRECAUTIONS

DANGER
• Before installing, using, or maintaining this equipment, read the safety precautions thoroughly, and comply with them during operations. • Failure to follow any of the instructions and warnings in this document may result in electrical shock, serious injury, or death, and may damage the equipment, potentially rendering it inoperable. SAJ shall not be held responsible for any personal injuries or property damage caused by improper use.

1.1. About this document

1.1.1. Overview

This user manual describes instructions and detailed procedures for installing, operating, maintaining, and troubleshooting the following SAJ inverters:

H2-5K-LS3-US H2-7.6K-LS3-US

H2-9.6K-LS4-US H2-11.4K-LS4-US

Please read this manual carefully before installations and operations. Always keep this manual available in case of emergency and maintenance purposes.

1.1.2. Target audience

This manual is intended for qualified personnel who need to install, operate, maintain, and troubleshoot inverters and related system components. Qualified personnel should have the necessary training, knowledge, and experience in:

- Installing electrical equipment.
- Applying all applicable installation tools.
- Analyzing and reducing hazards involved in electrical work.
- Installing and configuring batteries.
- Selecting and using Personal Protective Equipment (PPE).

Battery service must only be performed or supervised by qualified personnel with knowledge of batteries and their required precautions.

1.2. Safety

⚠ CAUTION
• Only qualified and trained electricians who have read and fully understood the safety regulations in this manual may install, maintain, or repair the equipment. • Access to the equipment requires the use of a tool, lock, and key, or other security measures.

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.
	**ETL mark** The ETL Mark is proof of product compliance to North American safety standards.
	**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 your safety, read all safety instructions before beginning any work, and ensure all procedures comply with local and national regulations.

DANGER

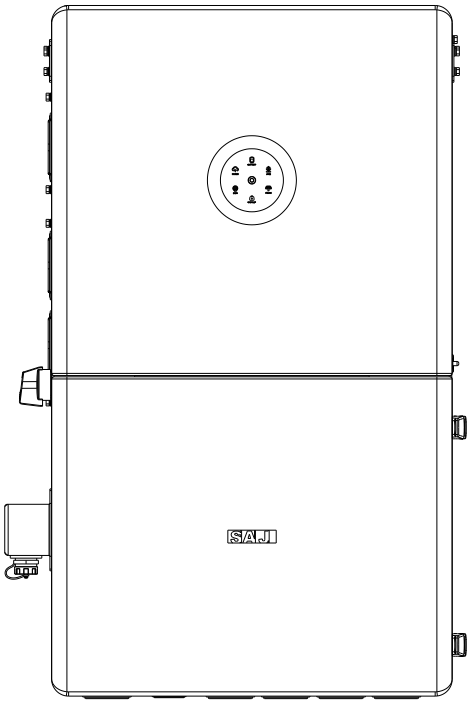
- Risk of fatal personnel injuries due to electrical shock and high voltage.
- Do not touch the surface of the inverter while the housing is wet, otherwise, it might cause electrical shock.
- Do not touch the operating component of the inverter; it might result in burning or death.
- Do not stay close to the inverter while there are severe weather conditions including storms, lightning, etc.
- Before opening the housing, the inverter must be disconnected from the grid and PV array; wait for at least five minutes to let the energy storage capacitors completely discharge after disconnecting from power source.

WARNING

- Do not touch non-insulated parts or cables.
- Do not short-circuit the positive (+) and negative (-) terminals.
- Disconnect the PV array from the inverter by using an external disconnecting device. If no external disconnection device is available, wait until no more DC power is applied to the inverter.
- Any unauthorized actions including modification of product functionality may cause lethal hazard to the operator, third parties, the units or their property. SAJ shall not be held responsible for the loss and these warranty claims.

NOTICE

- Make sure the AC input voltage and current are compatible with the rated voltage and current of the inverter; otherwise, components might be damaged, or the device cannot work properly.
- Moving or reinstalling the inverter to another location might void the warranty without prior written permission from SAJ.



2.

PRODUCT INFORMATION

2.1. General introduction

The H2 series is a transformer-less, low-voltage hybrid solar inverter and serves as a core component in energy storage systems. The H2 inverters provide the following features:

- The inverter integrates maximum power point tracking (MPPT), battery charging/discharging circuit and full-bridge inverting circuit.
- The inverter converts solar power to grid-compliant AC power for home loads and sells extra power to the grid. The solar power can also be stored into the battery for later use during grid failures or peak electricity price periods.
- When power outage occurs, the inverter seamlessly switches critical loads to battery power without supply interruption.
- The inverter offers three operating modes to suit different user needs and environments:
  - **Self-consumption Mode**: The basic working mode. Power generated by PV will be first supplied to the load, and then to the battery before exporting the remaining power to the grid.
  - **Time-of-use Mode:** This mode sets the charging and discharging periods of batteries according to the electricity price difference between peak and valley periods of the local grid.
  - **Back-up Mode**: Battery will be fully charged and will not be discharged until there is a mains error.

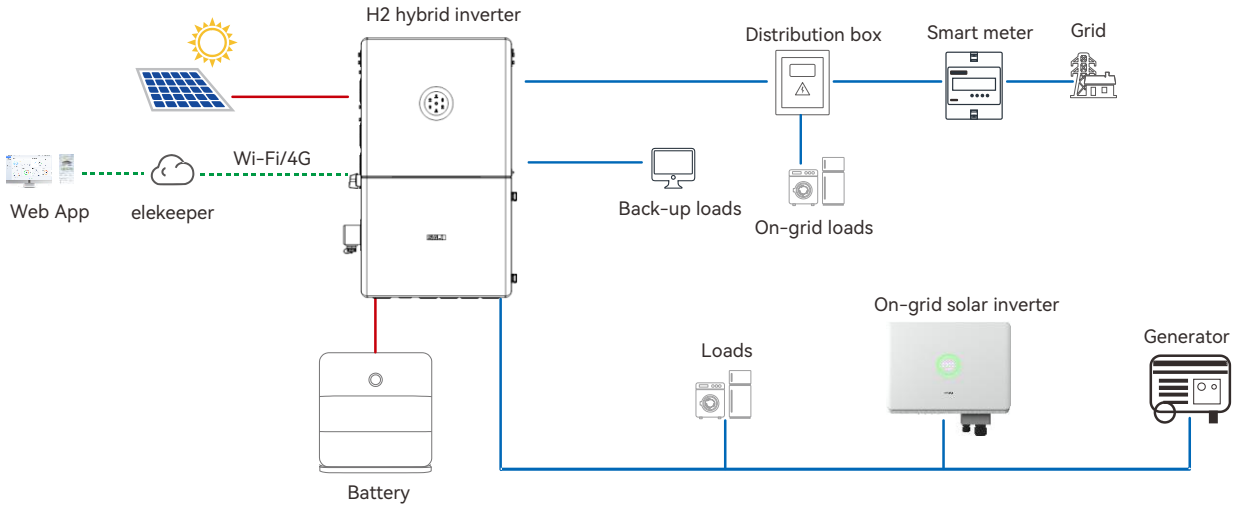


Figure 2.1. Application topology

2.2. Model description

2.2.1. Product models

The H2 series low-voltage single-phase inverter is available in the following models:

- H2-5K-LS3-US
- H2-7.6K-LS3-US
- H2-9.6K-LS4-US
- H2-11.4K-LS4-US

2.2.2. Model description

H2 - *x*K - LS3 - US

H2 - *x*K - LS4 - US

H2: Inverter series.

***x*K**: Rated power of the inverter. For example, 5K indicates the rated power of the inverter is 5 kW.

LS3: Low voltage, single-phase inverter with 3 MPPT.

LS4: Low voltage, single-phase inverter with 4 MPPT.

US: This model is applicable to the United States.

2.3. Dimension

Dimension (H x W x D): 810 x 470 x 247 mm (31.89 x 18.50 x 9.72 inches)

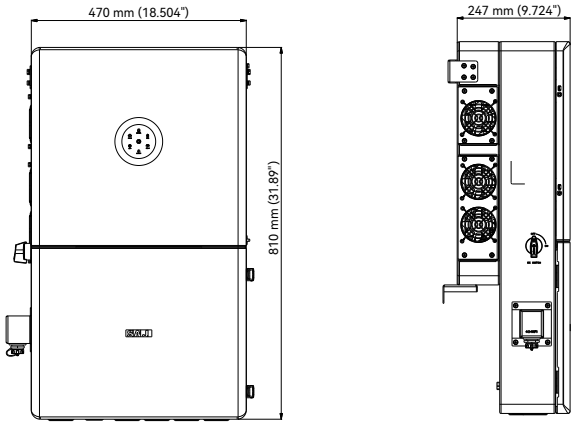


Figure 2.2. Inverter dimension

2.4. Bottom view

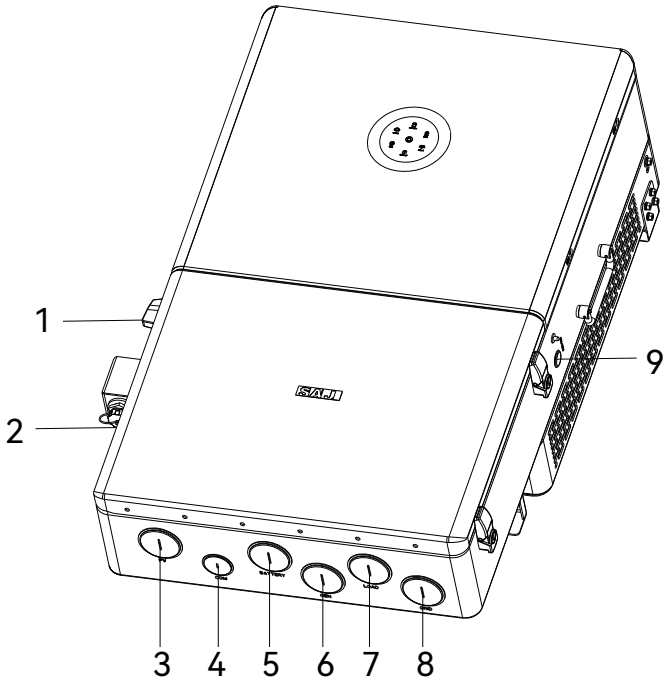


Figure 2.3. Bottom view of the inverter

Callout	Silkscreen	Description
1	DC Switch	DC switch which controls the PV connection.
2	4G/WIFI	For connecting to a 4G or Wi-Fi communication module.
3	PV	For connecting to PV cables.
4	COM	For connecting to communication cables.
5	BATTERY	For connecting to battery cables.
6	GEN	For connecting to generator cables.
7	LOAD	For connecting to load cables.
8	GRID	For connecting to grid cables.
9	ON/OFF	Start button. Press this button to start or shut down the inverter.

Table 2.1. Description of bottom-view silkscreen

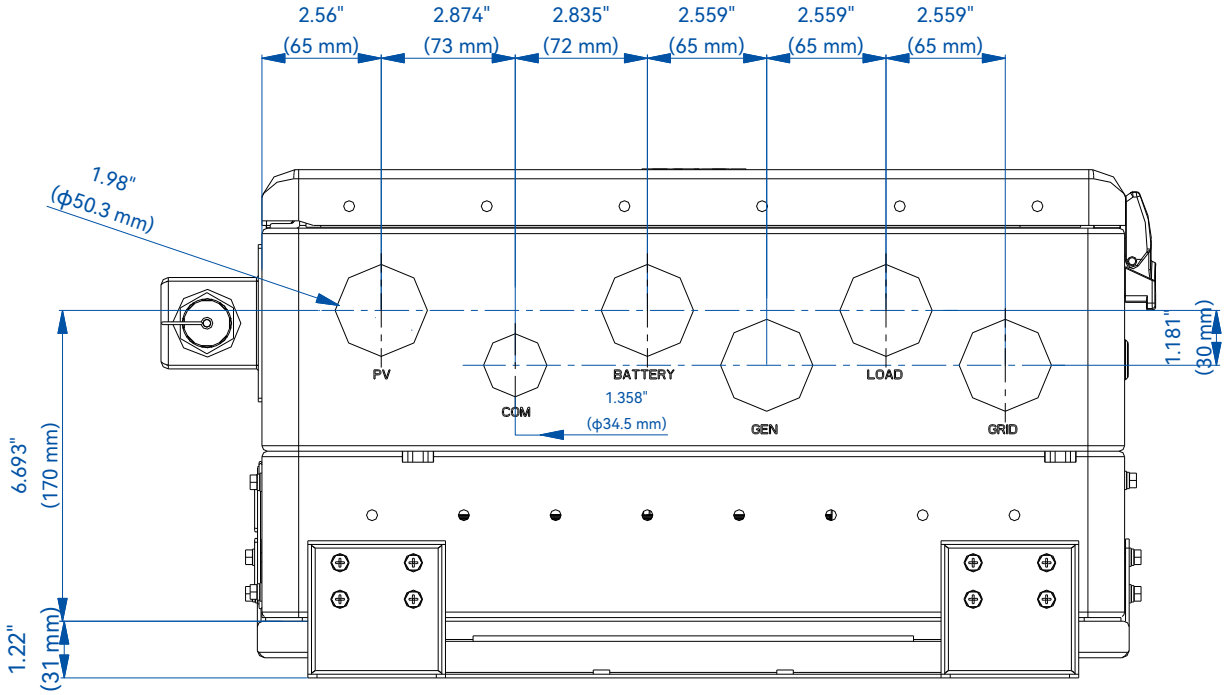


Figure 2.4. Dimension of knockout holes

Knockout hole	Dimension	Knockout hole	Dimension
PV	ϕ50.3 mm (ϕ1.98")	COM	ϕ34.5mm (ϕ1.358")
BATTERY	ϕ50.3 mm (ϕ1.98")	GEN	ϕ50.3 mm (ϕ1.98")
LOAD	ϕ50.3 mm (ϕ1.98")	GRID	ϕ50.3 mm (ϕ1.98")

Table 2.2. Dimension of knockout holes

2.5. Electrical terminals

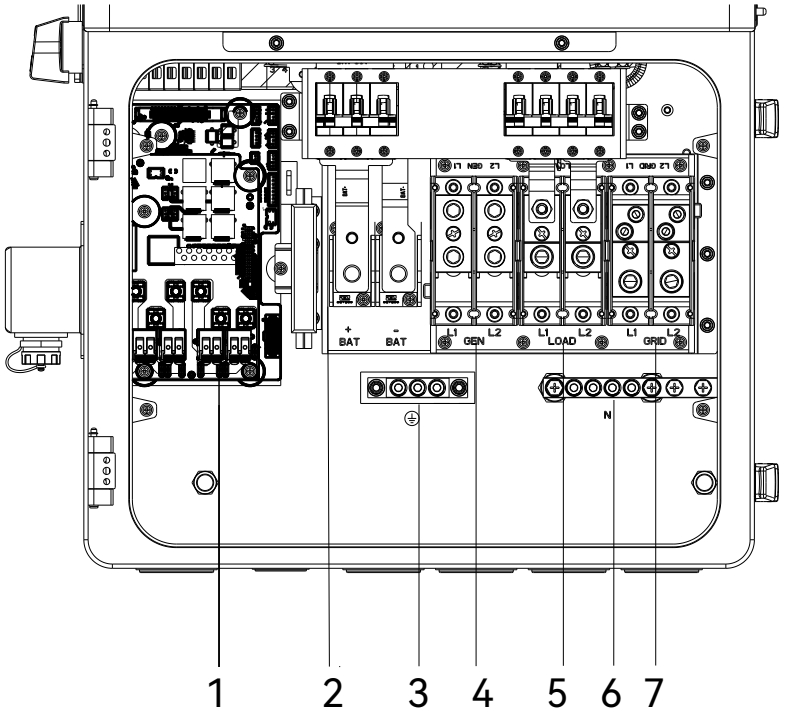


Figure 2.5. Electrical terminals in the junction box

Callout	Silkscreen	Description
1	PV1 / PV2 / PV3 / PV4	Photovoltaic DC input terminals.
2	BAT+ / BAT-	Battery positive and negative terminals.
3	⏚	Protective earth terminals.
4	GEN	Generator connection terminals L1 and L2.
5	LOAD	Load connection terminals L1 and L2.
6	N	Neutral terminals for GEN, LOAD, GRID.
7	GRID	Grid connection terminals L1 and L2.

Table 2.3. Description of electrical terminals

2.6. LED indicators

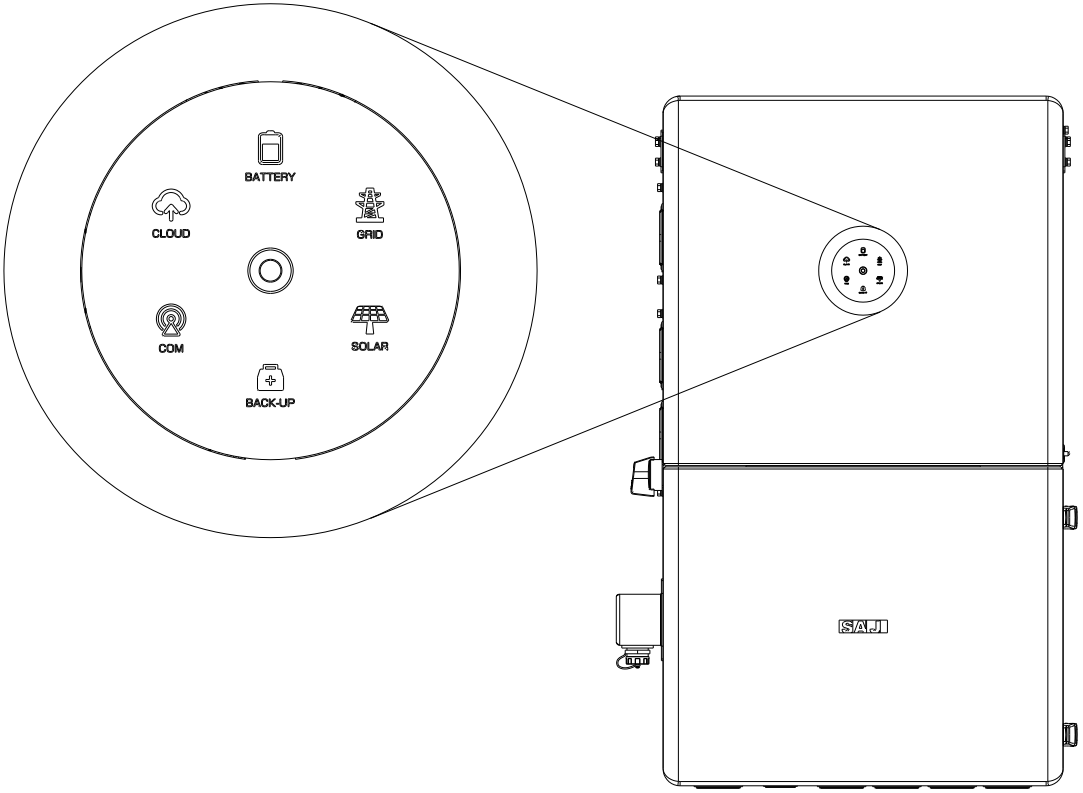


Figure 2.6. LED indicators

LED indicator	Status	Description
○	Off	The inverter is powered off.
○	Breathing 6s	The inverter is in initialization or standby state.
○	Solid on	The inverter is working properly.
○	Breathing 6s	The inverter is upgrading.
○	Solid on	The inverter is not working properly.

System	Solid on	The battery is importing electricity from the grid.
	On 1s, off 1s	The battery is exporting electricity to the grid.
	On 1s, off 3s	No electricity is imported from or exported to the grid.
	Off	The inverter is disconnected from the grid.
Battery	Solid on	The battery is in discharging status.
	On 1s, off 1s	The battery is in charging status.
	Off	The battery is disconnected or inactive.
Grid	Solid on	The grid is connected and is working properly.
	On 1s, off 1s	The inverter is trying to connect to the grid.
	On 1s, off 3s	The grid is not working properly.
	Off	No grid is detected.
PV	Solid on	The PV array is working properly.
	On 1s, off 1s	The PV array is not working properly.
	Off	The PV array is not working.
Backup	Solid on	The AC-side load is working properly.
	On 1s, off 1s	The AC-side load is overloaded.
	Off	The AC-side load is disconnected or off.
Communication	Solid on	In good communication with both the meter and BMS.
	On 1s, off 1s	In good communication with the meter but lost communication with the BMS.
	On 1s, off 3s	In good communication with the BMS but lost communication with the meter.
	Off	Lost communication with the meter and the BMS.
Cloud	Solid on	The inverter is connected to the cloud.
	On 1s, off 1s	The inverter is trying to connect to the cloud.
	Off	The inverter is disconnected from the cloud.

Table 2.2. Description of the LED indicator status

3.

TRANSPORTATION AND STORAGE

3.1. Transportation

⚠ WARNING

- Do not drill holes into the product or its housing for any transportation-related purpose. Such modifications can damage the structural integrity and functionality of the device.
- Do not stack more than four cartons of inverters in a single pile.
- Ensure that transport vehicles are not overloaded and that weight is distributed evenly.
- Maintain stable driving conditions throughout transportation — avoid sudden acceleration, deceleration, or severe shaking.
- The weight of the inverter adheres to local regulations regarding manual handling requirements. Assign sufficient personnel for moving operations to avoid injury.
- Wear suitable protective gloves when manually handling equipment.
- When lifting the inverter, grip it firmly at the designated handles and support the base. Keep the unit level to avoid dropping.
- Use professional lifting and handling equipment operated by trained personnel with relevant skills and experience.

⚠ NOTICE

- The transportation service provider must be certified for handling and transporting inverters.
- All transportation equipment must be adequately prepared and inspected by authorized professional organizations to verify compliance and suitability.
- Inverters must be placed in their original packaging or specially designed transport packaging.
- Packaging materials should possess sufficient strength and cushioning properties to prevent damage from impact or compression during transportation.
- Securely fasten inverters within the packaging to prevent movement during transportation. For larger or heavier units, use additional restraints or fixing devices as necessary.
- Observe all safety symbols displayed on the packaging prior to and during transportation.

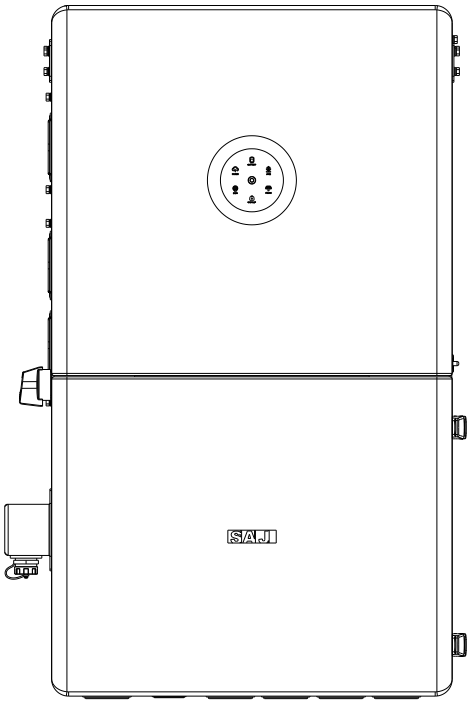
3.2. Storage

⚠ WARNING

- Do not unpack the inverter if it is not used immediately.
- Do not store the inverter in areas exposed to direct sunlight, rain, strong electric fields, or high humidity. Such conditions can cause overheating, electrical failure, or corrosion.
- Do not store inverters near chemically corrosive substances or in locations prone to pests or rodents. These can cause irreversible damage to housing and internal components.
- Do not stack more than four cartons of inverters in a single pile. Improper stacking may result in personal injury or device damage.
- Do not place heavy objects on top of the inverters. Crushing may deform the housing or damage internal components.
- Do not tilt or invert the packaging. Maintain the upright orientation as indicated on the carton to prevent internal displacement or component stress.

⚠ NOTICE

- The storage temperature must remain between -30℃ to +65℃ (-22℉ to +149℉), with relative humidity between 5% and 95% (non-condensing).
- Store inverters in a clean, dry, and well-ventilated area to avoid moisture buildup and overheating.
- Retain the original packaging with desiccants when storing inverters. Repackage properly if necessary.
- Regularly inspect stored inverters every three months. Check for environmental damage, pest intrusion, or packaging degradation.
- Promptly replace any packaging materials that have been damaged by insects or rodents.
- If an inverter has been stored for two years or longer, it must undergo inspection and functional testing by qualified personnel before being commissioned.


SAJ

4.

INSTALLATION

4.1. Precautions

For safety, read all safety instructions carefully before performing any work and comply with all applicable rules and regulations in the country or region where the product is installed.

DANGER
• Risk of fatal electric shock or fire. • Keep the inverter away from flammable and explosive materials.

NOTICE
• Installation in unsuitable or non-compliant environments may reduce the inverter's service life. • Avoid installing the inverter in direct, intense sunlight. • Ensure the installation site is well-ventilated.

4.2. Installation diagram

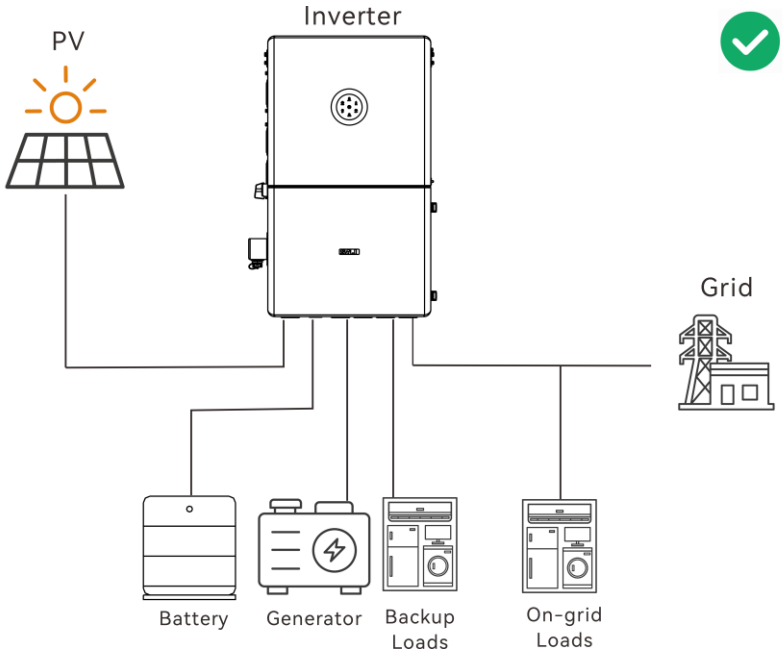
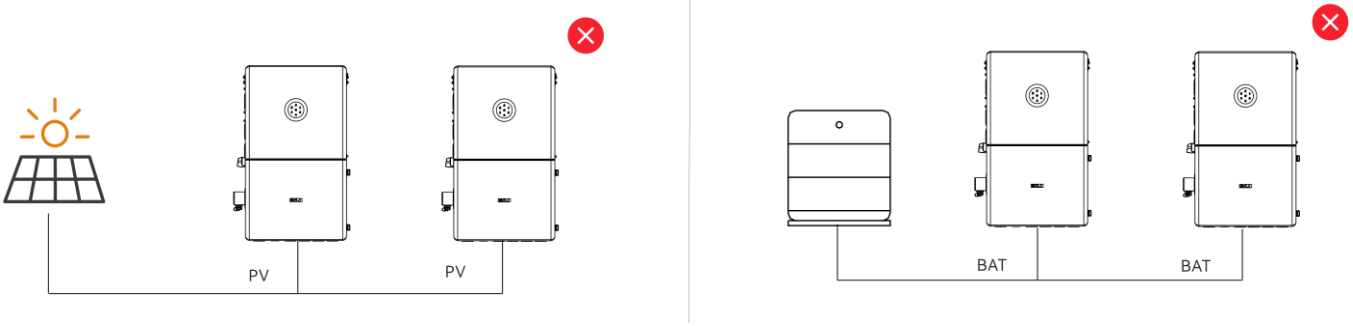


Figure 4.1. Applicable scenario

The following installation practices must be avoided. Any resulting damage will not be covered under warranty.

- Do not connect a single PV string to multiple inverters.
- Do not connect a single battery stack to multiple inverters.



- Do not connect the back-up side to any AC generator.
- Do not connect the back-up side to the grid.

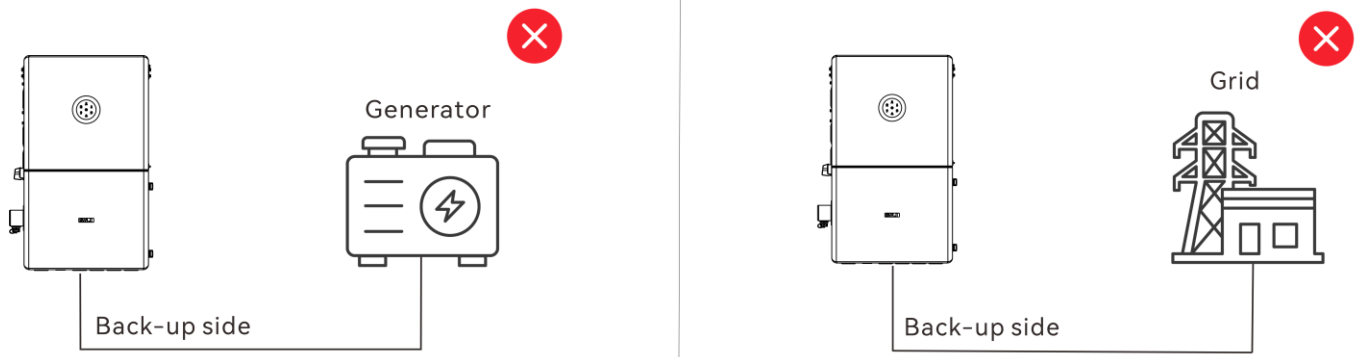


Figure 4.2. Non-applicable scenarios

4.3. Choose installation site

Read the following sections to carefully select a suitable installation site.

Note: safety regulations may differ across countries and regions. Always comply with all applicable local safety requirements.

4.3.1. Installation environment requirements

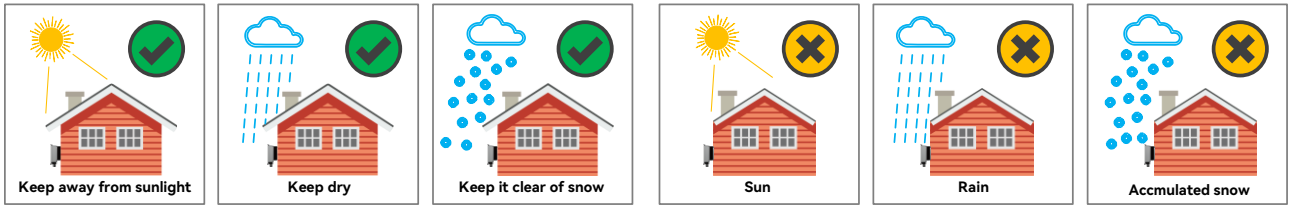


Figure 4.3. Installation location

- 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 heat sources.
- 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.

4.3.2. Installation position requirements

- The device employs natural convection cooling, and it can be installed indoors or outdoors.
  - Indoor requirement
    The battery connected to the device cannot be installed in the habitable rooms.
  - Outdoor requirement
    Elevate the unit appropriately from the ground to avoid immersion in water.
    The exact height should be determined based on the conditions of the installation site.
- Install the device vertically. The maximum allowable backward-tilted angle is 15 degrees.
- Do not install it forward-tilted, horizontally or upside down.

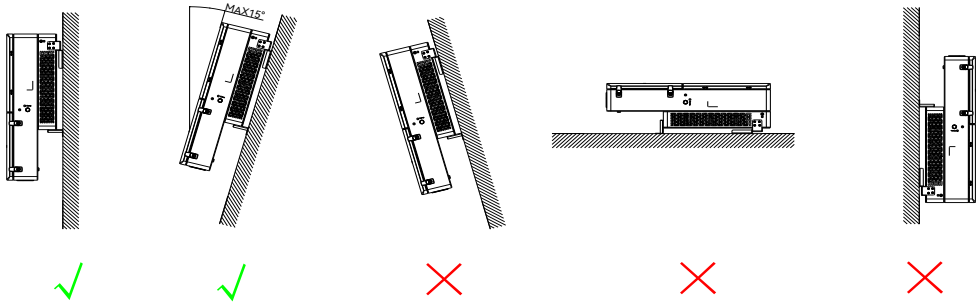


Figure 4.4. Installation position

- Select a solid and flat wall capable of supporting the total weight of the inverter and all associated accessories to ensure secure mounting.
- Maintain sufficient clearance around the inverter to allow for adequate airflow. This is especially important when installing multiple inverters in the same location.

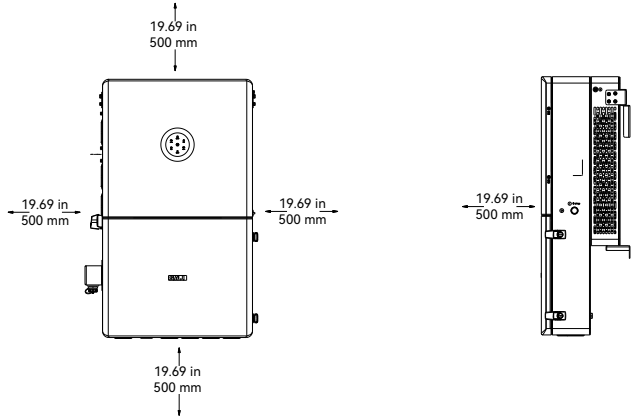


Figure 4.5. Installation clearance

4.4. Prepare installation tools

The installation tools below are for your reference. Tools include but are not limited to the following recommended ones. You may use other auxiliary tools based on site requirements.

Figure 4.6. Suggested installation tools

4.5. Unpacking

4.5.1. Check the outer packing

Although all SAJ products undergo rigorous testing and inspection prior to shipment, damage may occasionally occur during transportation. Upon receipt, perform the following checks:

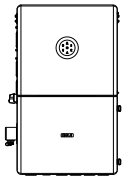
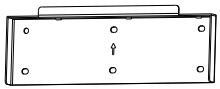
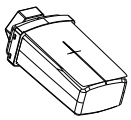
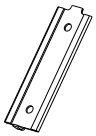
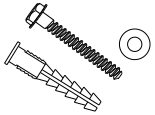
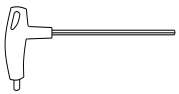
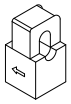
- Check the outer packaging for any damage, such as holes and cracks.
- Check equipment model matches your order.

If any serious damage is found or the model is not what you requested, do not unpack the product.

Please contact your dealer immediately.

4.5.2. Check 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.
2. Place the connectors separately after unpacking to avoid confusion for cable connection.

			
H2 Inverter	Mounting plate	Communication module	Flathead tool
			
Key x4	Allen wrench	M6*50 screw x8 Expansion tube x8	Hex wrench
			
Current transformer x2	Printed documents		

4.6. Install the inverter

Before you start

Make sure that the wall is solid and flat enough to bear the weight of the inverter and accessories.

Procedure

Step 1. Use a positioning jig to mark eight holes on the wall according to the following figure. Then, drill eight holes on the wall.

Alternatively, you can place the mounting plate onto the wall and mark upper six holes and place the inverter onto the wall to mark the bottom two holes.

Notes:

- Reserve enough distance at the inverter bottom for installing the metal cable conduits.
- The upper six holes are reserved for installing the upper mounting plate while the bottom two holes are for the bottom locking brackets of the inverter.

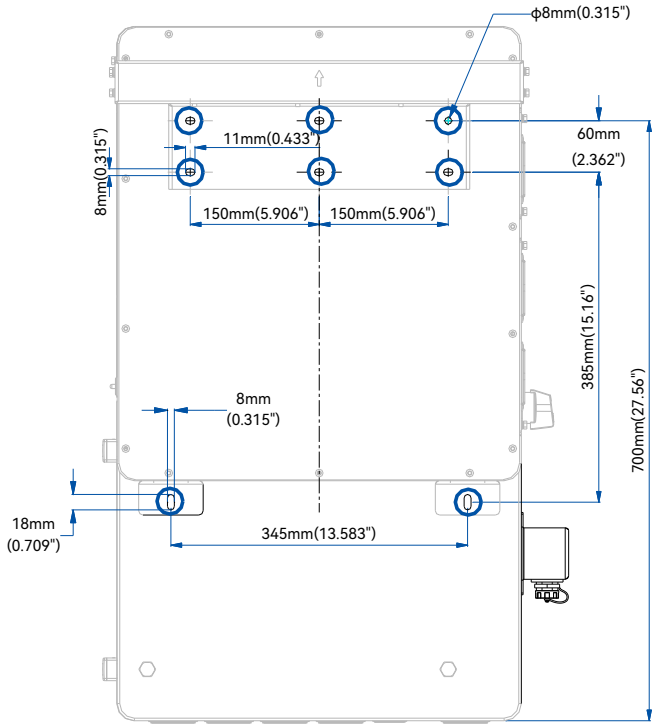


Figure 4.7. Eight holes for installing the mounting bracket

Step 2. Use six M6*50 screws to secure the mounting plate to the wall.

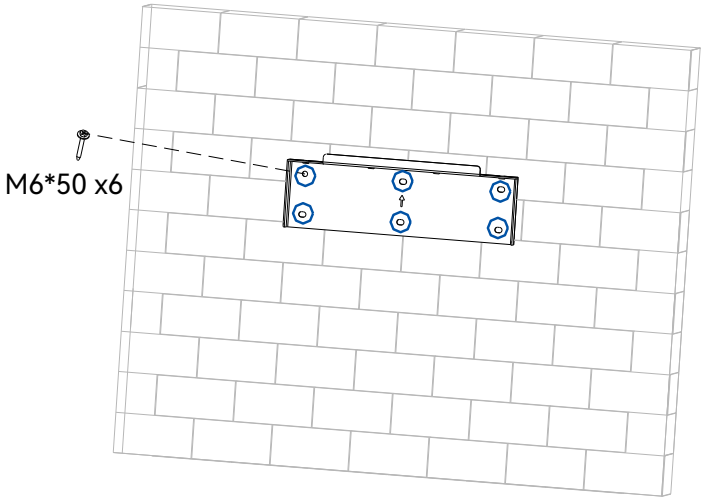


Figure 4.8. Insert expansion tubes into the holes

Step 3. Mount the inverter onto the mounting plate.
Insert two M6*50 screws on each bottom side of the inverter to secure it to the wall.

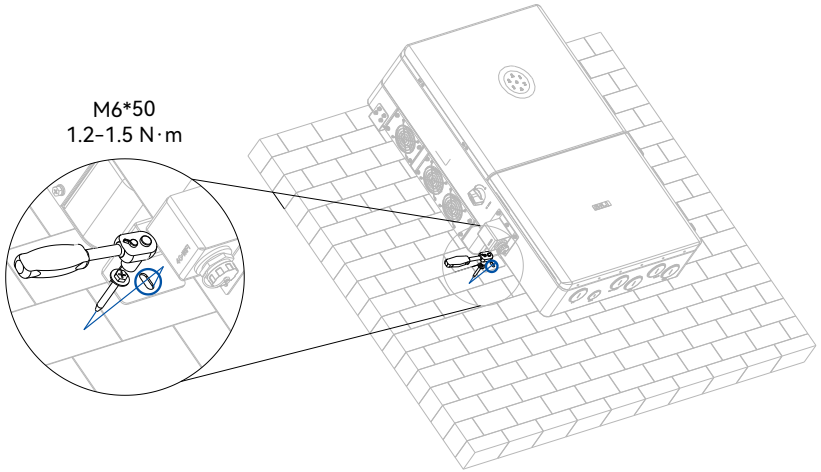


Figure 4.9. Secure the bottom locking brackets

Step 4. If required, install metal conduits to the knockout holes at the bottom of the inverter.

4.7. Install the battery

⚠ CAUTION
• Do not connect the positive port (BAT+) to the negative port (BAT-) of the battery. This will short-circuit the battery and cause serious damage.

ⓘ NOTICE
• The H2 series inverter is only compatible with the batteries listed below. Using any other untested battery might cause damage to the inverter and thus void the inverter warranty. • To comply with regulations, install a battery isolator ≥70A near the inverter. This is not required when using the SAJ B2 battery model (B2-5.0-LV1 or B2-5.0-LV2), as it incorporates a built-in DC isolator within its low-voltage box unit.

The H2 series inverter is compatible with the following SAJ batteries. For details on installing the battery, refer to the corresponding battery *User Manual*.

Brand	Compatible battery models
SAJ	B2-5.0-LV1, B2-5.0-LV2, B3-5.0-LV

5.

ELECTRICAL CONNECTION

5.1. Safety instructions

DANGER
Dangerous to life due to potential fire or electricity shock. • Do not install the inverter near any inflammable or explosive items. • Ensure that the equipment is powered off before performing any wiring operations. • When powered on, the equipment should be in conformity with national rules and regulations. • Operations must be operated by qualified technicians in accordance with local and national power grid standards and regulations. • Technicians must be aware that the inverter is a bi-power supply equipment. Before connecting, technicians must wear necessary protective equipment, including insulation gloves, insulation shoes, and a safety helmet.

5.2. System connection and recommended cable list

For safety operation and regulation compliance, circuit breakers should be installed between devices. Prepare appropriate circuit breakers and cables based on different connection scenarios. Check the recommended size in the following tables. You may choose other sizes based on real needs.

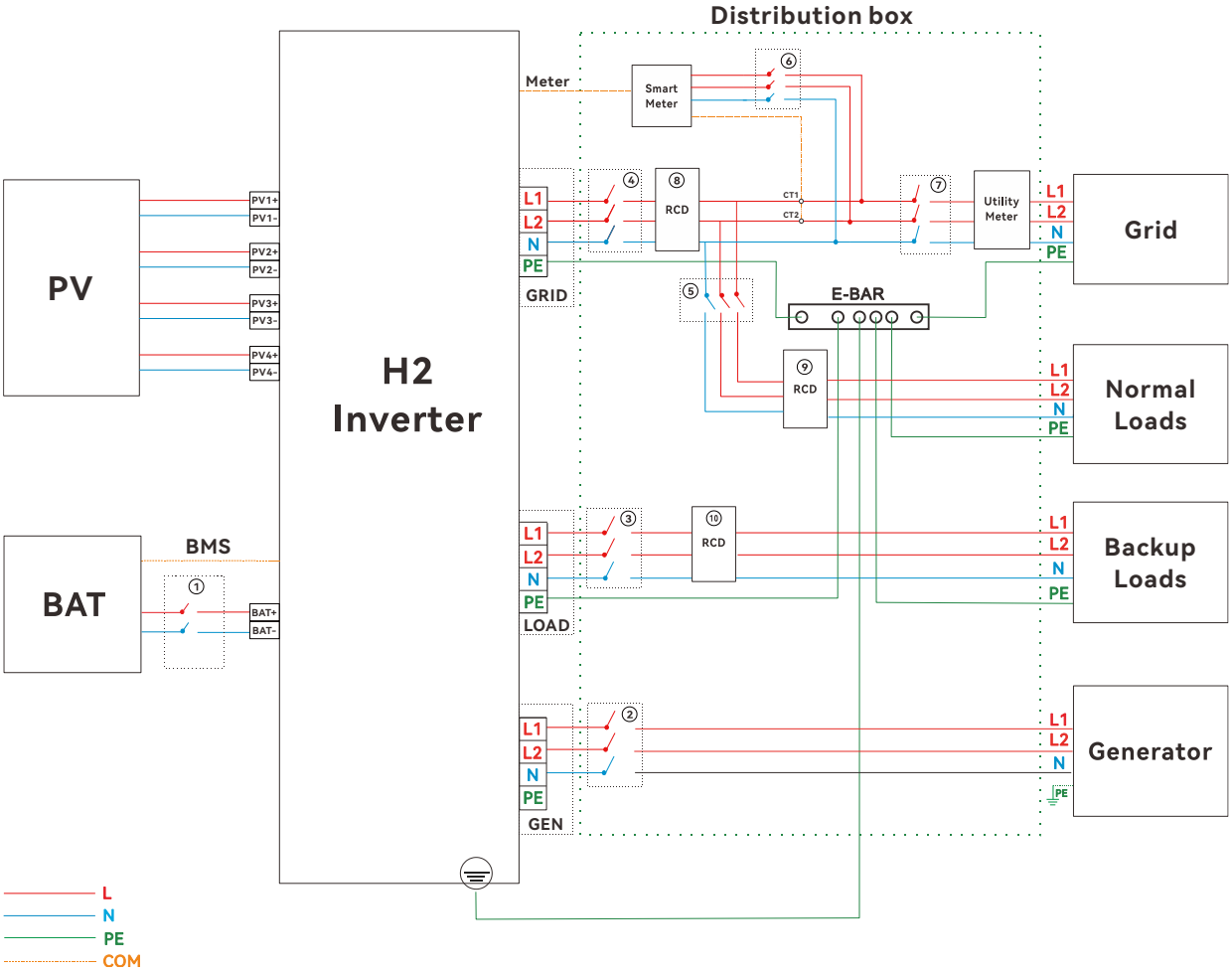


Figure 5.1. System connection diagram

NOTICE

- An independent two-pole circuit breaker must be installed on the AC side of the inverter to ensure safe disconnection from the grid.
- Do not connect multiple inverters to one circuit breaker.
- If the inverter is installed far away from the grid connection point, select a larger cable size to ensure that the voltage drops from the grid connection point to the inverter is within 2% of the grid voltage.

Model	① DC breaker for battery	② AC breaker for generator	③ AC breaker for backup loads	④ AC breaker for grid	⑤⑥ AC breaker for normal loads/ smart meter	⑦ AC breaker for utility meter	⑧ RCD for grid	⑨⑩ RCD For normal and backup loads
H2-5K-LS3-US	200 A/60 V	32 A/240 V	Integrated 200A breaker. No additional AC breaker is required.	200 A/240 V	Depends on loads and meter	Main breaker	300 mA RCD	30 mA RCD
H2-7.6K-LS3-US	200 A/60 V	40 A/240 V		200 A/240 V				
H2-9.6K-LS4-US	300 A/60 V	50 A/240 V		200 A/240 V				
H2-12K-LS4-US	300 A/60 V	63 A/240 V		200 A/240 V				

Table 5.1. Recommended specifications for circuit breakers and RCD

Cable (90℃, Copper)	Recommended cross-sectional area				Stripping Length
	H2-5K-LS3-US	H2-7.6K-LS3-US	H2-9.6K-LS4-US	H2-12K-LS4-US	
Ground	6 mm^2 / 10 AWG	8 mm^2 / 8 AWG	10 mm^2 / 6 AWG	10 mm^2 / 6 AWG	15 mm / 0.59 inch
PV	6 mm^2 / 10 AWG	6 mm^2 / 10 AWG	6 mm^2 / 10 AWG	6 mm^2 / 10 AWG	20 mm / 0.79 inch
Battery	70 mm^2 / 2/0 AWG	70 mm^2 / 2/0 AWG	95mm^2 / 4/0 AWG	95mm^2 / 4/0 AWG	20 mm / 0.79 inch
GEN	6 mm^2 / 10 AWG	8 mm^2 / 8 AWG	10 mm^2 / 6 AWG	10 mm^2 / 6 AWG	10 mm / 0.39 inch
LOAD	6 mm^2 / 10 AWG	8 mm^2 / 8 AWG	10 mm^2 / 6 AWG	10 mm^2 / 6 AWG	20 mm / 0.79 inch
GRID	6 mm^2 / 10 AWG	8 mm^2 / 8 AWG	10 mm^2 / 6 AWG	10 mm^2 / 6 AWG	20 mm / 0.79 inch

Table 5.2. Recommended specification and stripping length for cables

5.3. Connect the grounding cable

NOTICE
The inverter cannot be used with functionally earthed PV Arrays.

About this task

- The grounding cable must be connected before other electrical connections.
- The cable needs to be prepared by the user.
- Choose appropriate cable according to the recommended cable list below or in ***Section 5.2***. You may use other sizes based on real needs.

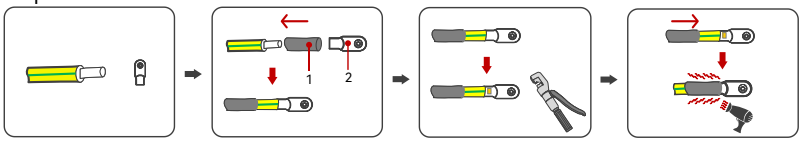
Procedure

Step 1. Choose the appropriate cables according to the following table.

Cable (90℃, Copper)	Recommended cross-sectional area				Stripping Length	Recommended torque
	H2-5K-LS3-US	H2-7.6K-LS3-US	H2-9.6K-LS4-US	H2-12K-LS4-US		
Ground	6 mm^2 / 10 AWG	8 mm^2 / 8 AWG	10 mm^2 / 6 AWG	10 mm^2 / 6 AWG	15 mm / 0.59 inch	2 N·m / 17.70 LB-IN

Table 5.3. Recommended specification for grounding cables

Step 2. Assemble the cable and OT/DT terminal.



1	Heat shrink tube	2	OT/DT terminal

Figure 5.2. Preparing the grounding cable

Step 3. Remove the screw on the ground terminal and secure the cable.

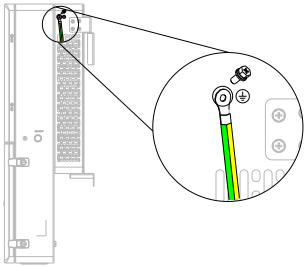


Figure 5.3. Connecting the grounding cable

5.4. Open the junction box of the inverter

Procedure

Step 1. Use the provided key to open the two locks on the right side of the inverter. Then, lift the cover leftwards.

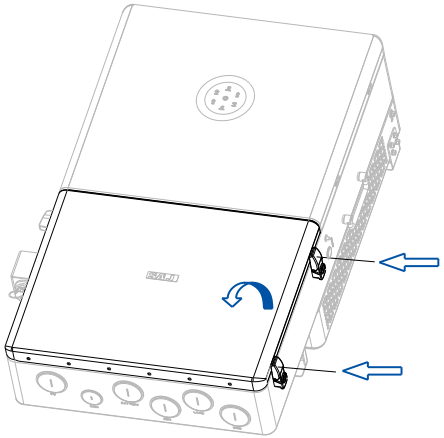


Figure 5.4. Opening the junction box

Step 2. Loosen the four screws to unlock the internal plate. Lift the plate outwards.

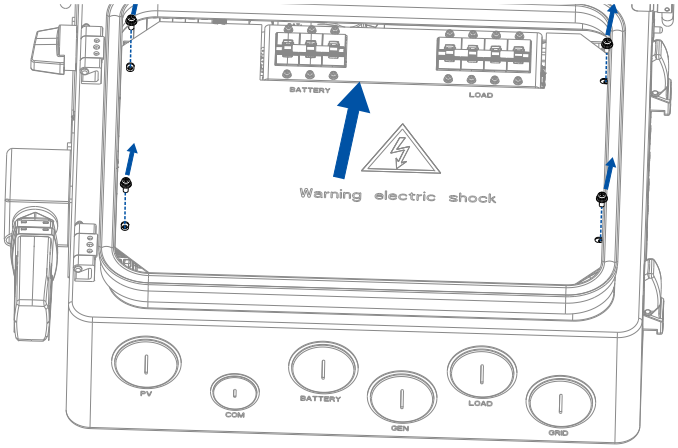


Figure 5.5. Removing the internal plate

5.5. Assemble the AC-side electrical connection

⚠ WARNING

Risk of personal injury due to electric shock!

Before connecting the AC cables, ensure all the following requirements are met:

- An independent AC breaker must be installed on the output side of the inverter to ensure safe disconnection from the grid.
- Before connection, ensure that the AC breakers are in the OFF position.
- Multiple inverters cannot share one circuit breaker.
- Do not connect the load between the inverter and the circuit breaker.
- Before connection, ensure that the AC-side equipment is powered off.
- Ensure the rated power of the load does not exceed the rated output power of the inverter.
- Before connecting, use a multimeter to verify that the AC voltage measures 0 Vdc.
- Improper wiring of AC conductors will result in risks of electrical failure or equipment damage. Ensure that all connections are made correctly in accordance with the instructions in this document and in accordance with local wiring codes and regulations before applying power to the unit.

! NOTICE

- If the inverter is installed far away from the grid connection point, select a larger cable size to ensure that the voltage drops from the grid connection point to the inverter is within 2% of the grid voltage.

About this task

For safety and regulation compliance, AC breakers must be installed on the output side of the inverter. Choose appropriate AC breaker according to the recommended cable list in ***Section 5.2***. You may use other sizes based on real needs.

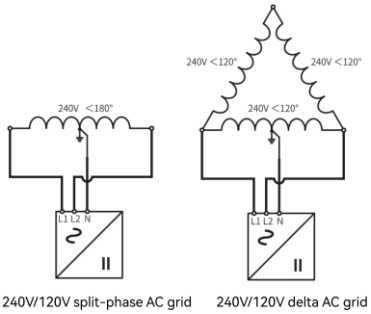


Figure 5.6. AC grid

Procedure

Step 1. Choose the appropriate cables according to the following table.

Cable (90℃, Copper)	Recommended cross-sectional area				Stripping Length	Recommended torque
	H2-5K-LS3-US	H2-7.6K-LS3-US	H2-9.6K-LS4-US	H2-12K-LS4-US		
GEN	6 mm² / 10 AWG	8 mm² / 8 AWG	10 mm² / 6 AWG	10 mm² / 6 AWG	10 mm/0.39 inch	2 N·m / 17.70 LB-IN
LOAD	6 mm² / 10 AWG	8 mm² / 8 AWG	10 mm² / 6 AWG	10 mm² / 6 AWG	20 mm/0.79 inch	
GRID	6 mm² / 10 AWG	8 mm² / 8 AWG	10 mm² / 6 AWG	10 mm² / 6 AWG	20 mm/0.79 inch	

Table 5.4. Recommended specification for GEN/LOAD/GRID cables

Step 2. Strip off the insulation on the cable ends.

Figure 5.7. Stripping off the insulation

Step 3. (Optional) If needed, install a terminal on the cable end as below:

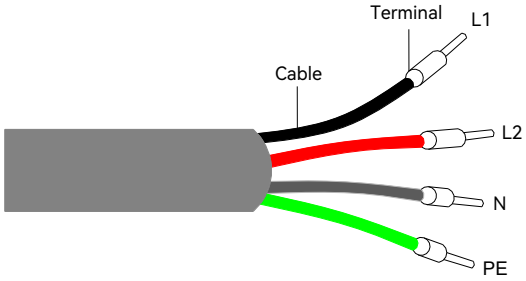


Figure 5.8. Installing terminals at the cable ends

Step 4. Use Insert a flat-head tool into the knockout hole and rotate counterclockwise to remove the filler.

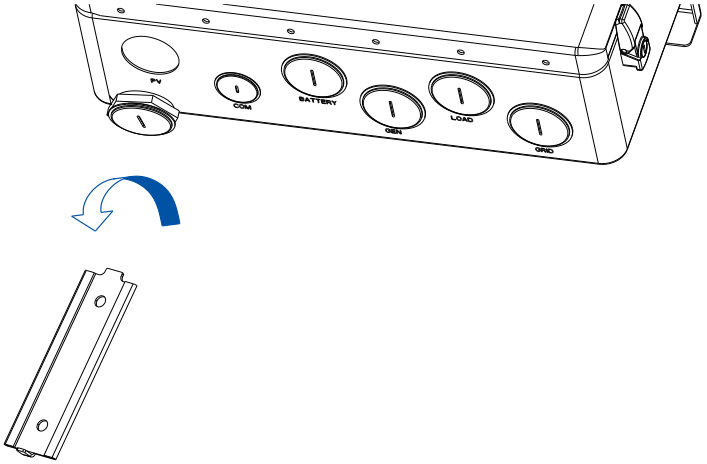


Figure 5.9. Removing the knockout hole fillers

Step 5. According to the silkscreen, insert the **GEN / LOAD / GRID** cables through the corresponding knockout hole. Connect the cables to the corresponding **L1**, **L2**, **N**, and **PE** terminals. Then, use standard torque to tighten the screws on the terminals to secure the cable connection.

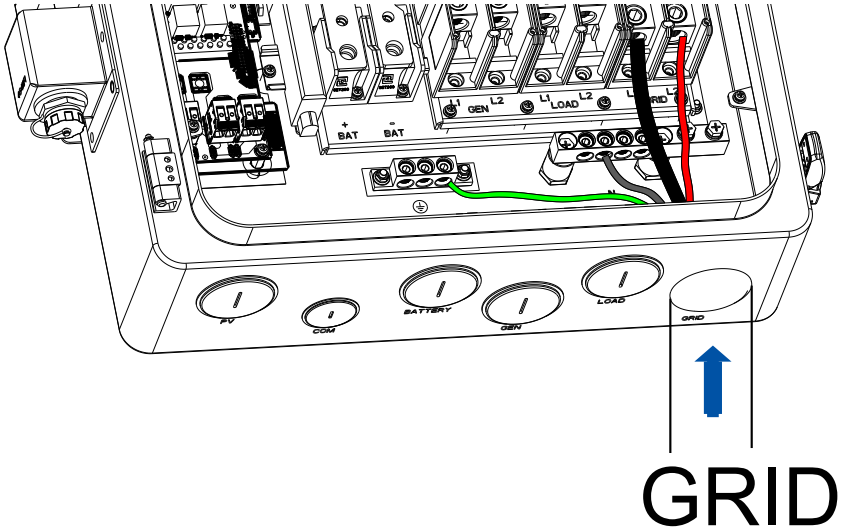


Figure 5.10. Connecting the grid cables

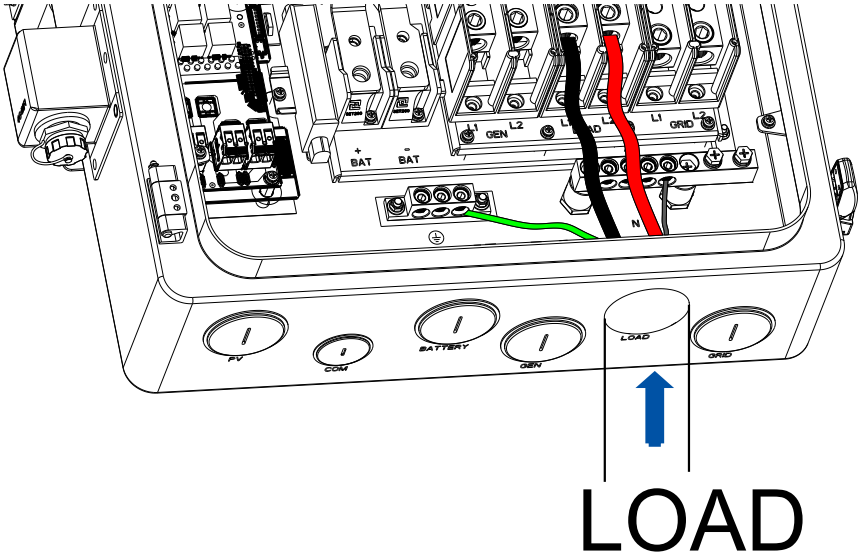


Figure 5.11. Connecting the load cables

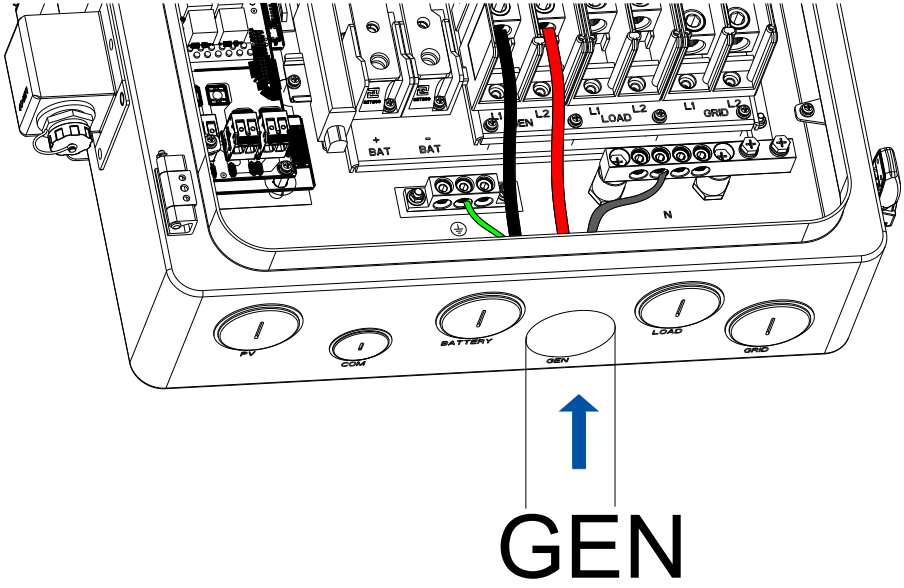


Figure 5.12. Connecting the generator cables

5.6. Connect the battery to the inverter

⚠ WARNING
Before connecting the battery cables, ensure all the following requirements are met: • A DC breaker must be installed between the inverter and the battery. Choose appropriate DC breaker according to the recommended cable list in ***Section 5.2***. You may use other sizes based on real needs. • Ensure that the DC breaker is in the OFF position. • Before connection, use a multimeter to verify that the battery voltage measures 0 Vdc. • Do not turn on the battery switch until all cables are properly connected.

About this task

The H2 series inverter is compatible with the following SAJ batteries.

Brand	Compatible battery models
SAJ	B2-5.0-LV1, B2-5.0-LV2, B3-5.0-LV

Note:

- For battery details, refer to the user manual of the corresponding battery model.
- The H2 series inverter is only compatible with the batteries listed above. Using any other untested battery might cause damage to the inverter and thus void the inverter warranty.
- Some utility companies or electrical regulations may require a battery isolator to be installed near the inverter. Choose a ≥70A battery isolator for regulation compliance.

Procedure

Step 1. Choose the appropriate cables according to the following table.

Cable (90℃, Copper)	Recommended cross-sectional area				Stripping Length	Recommended torque
	H2-5K-LS3-US	H2-7.6K-LS3-US	H2-9.6K-LS4-US	H2-12K-LS4-US		
BAT+ and BAT-	70 mm^2 / 2/0 AWG	70 mm^2 / 2/0 AWG	95mm^2 / 4/0 AWG	95mm^2 / 4/0 AWG	20 mm / 0.79 inch	9 N·m / 80 LB-IN

Step 2. Strip off the insulation on the cable ends.

Figure 5.13. Stripping off the insulation

Step 3. Install an M10 bronze terminal on the cable end.

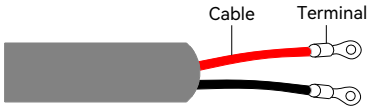


Figure 5.14. Crimping terminals on the cable ends

Step 4. Insert the cables through the **BATTERY** knockout hole and connect them to the battery terminals **BAT+** and **BAT-** in the junction box.

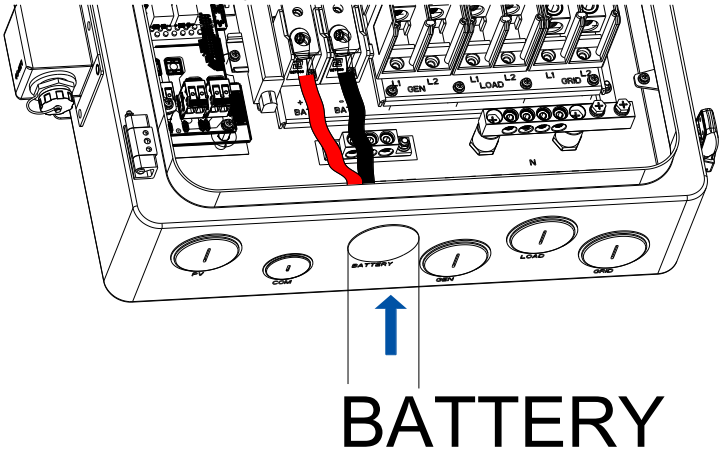


Figure 5.15. Connecting the battery cables

5.7. Assemble the PV-side electrical connection

Procedure

Step 1. Choose the appropriate PV cables according to the following table.

Cable (90℃, Copper)	Recommended cross-sectional area	Stripping length	Recommended torque
PV+ and PV-	6 mm² / 10 AWG	20 mm / 0.79 inch	2 N·m / 17.70 LB-IN

Step 2. Strip off the insulation of the cable ends. User cable ferrules if the cable is of multi-strand type.

Figure 5.16. Stripping off the insulation

Step 3. (Optional) If needed, install a terminal on the cable end.

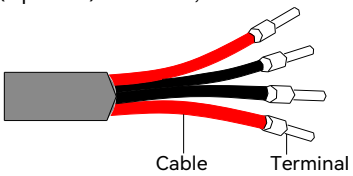


Figure 5.17. Crimping terminals on the cable ends

Step 4. Ensure that the DC switch on the left side of the inverter is in OFF position.

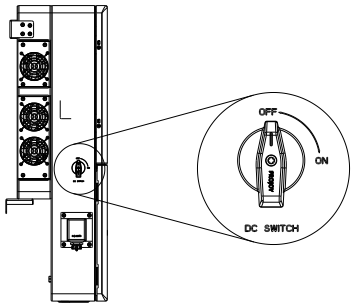


Figure 5.18. DC switch in OFF position

NOTICE
Connect the positive and negative connectors to their respective terminals on the solar panels. Ensure the connections are correct to prevent damage.

Step 5. Insert the PV cables through the PV knockout hole and connect them to the PV terminals in the junction box.

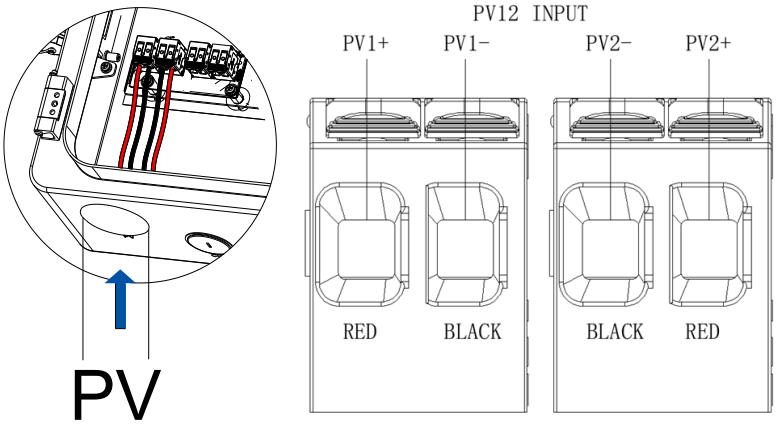


Figure 5.19. Connecting the cables to PV1 and PV2

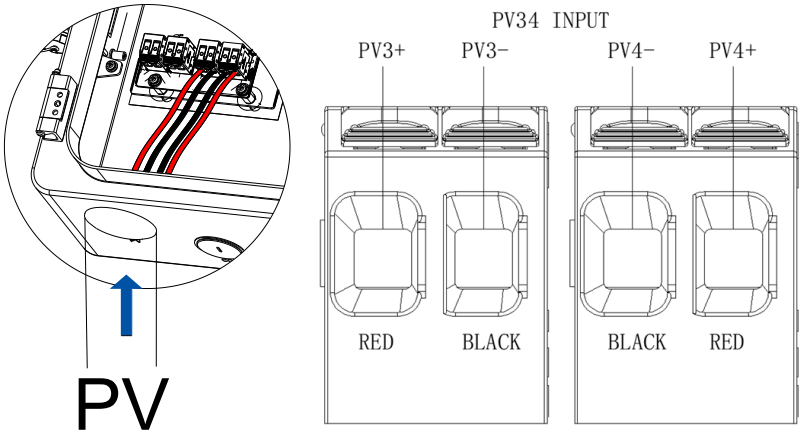


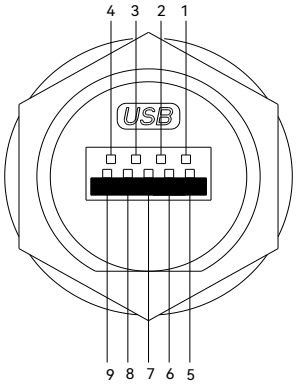
Figure 5.20. Connecting the cables to PV3 and PV4

5.8. Assemble the communication connection

5.8.1. Install the communication module

About this task

An RS232 USB communication port is provided at the bottom of the junction box. This port is used to connect the communication module, such as a Wi-Fi or AIO3 module.



Pin	Description
1	GND: Ground wire
2	485A: 485 communication pin A
3	485B: 485 communication pin B
4	CANL: Low speed CAN signal
5	+5V: Power supply
6	232RX: Receive data
7	232TX: Transmit data
8	CANH: High speed CAN signal
9	NULL: Null

Table 5.5. Pin definitions

Procedure

Step 1. On the left side of the inverter, remove the cover from the 4G/WIFI port.

Step 2. Insert the communication module into the 4G/WIFI port. Rotate the nut to secure the module.

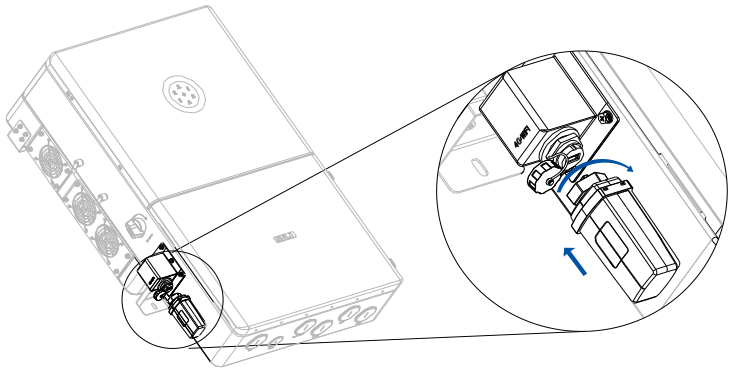


Figure 5.21. Connecting the communication module

5.8.2. Connect the communication cable

5.8.2.1. BMS connection

Procedure

Step 1. Connect one end of the network cable to the communication port on the BMS.

Step 2. Insert the other end of the network cable through the **BATTERY** knockout hole of the inverter and connect it to the **BMS_CAN** port.

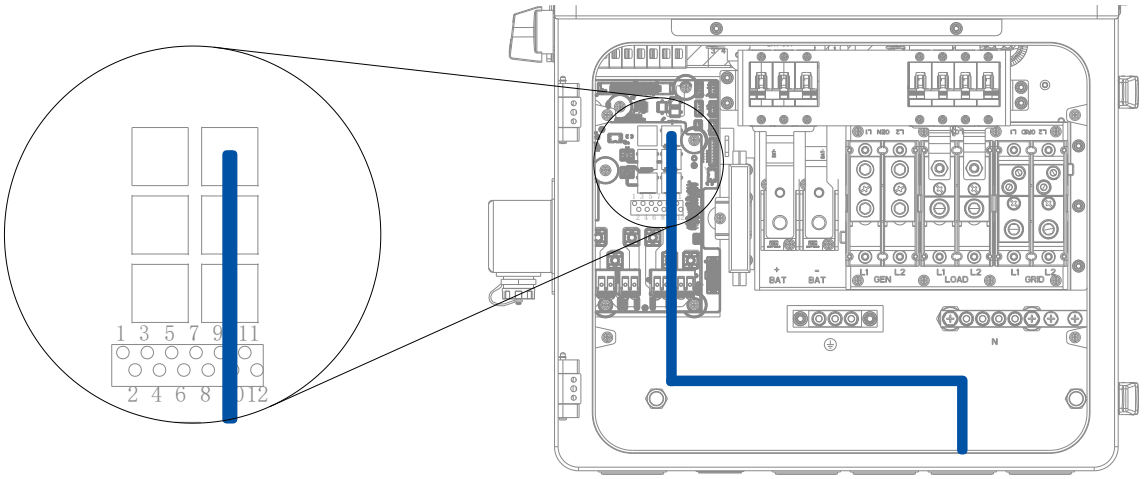


Figure 5.22. Connect the cable to the BMS_CAN port

BMS_CAN	
1	NC
2	NC
3	NC
4	CANH
5	CANL
6	NC
7	NC
8	NC

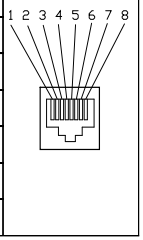


Figure 5.23. Pin definition of the BMS_CAN port

5.8.2.2. CT connection

Procedure

Connect the CT wires to pin **1**, **2**, **3**, and **4** on the CN89 terminal in the junction box of the inverter.

From the CT		To the CN89 terminal pins in the inverter
CT GRID-L1	Blue wire	1
	White wire	2
CT GRID-L2	Red wire	3
	Black wire	4

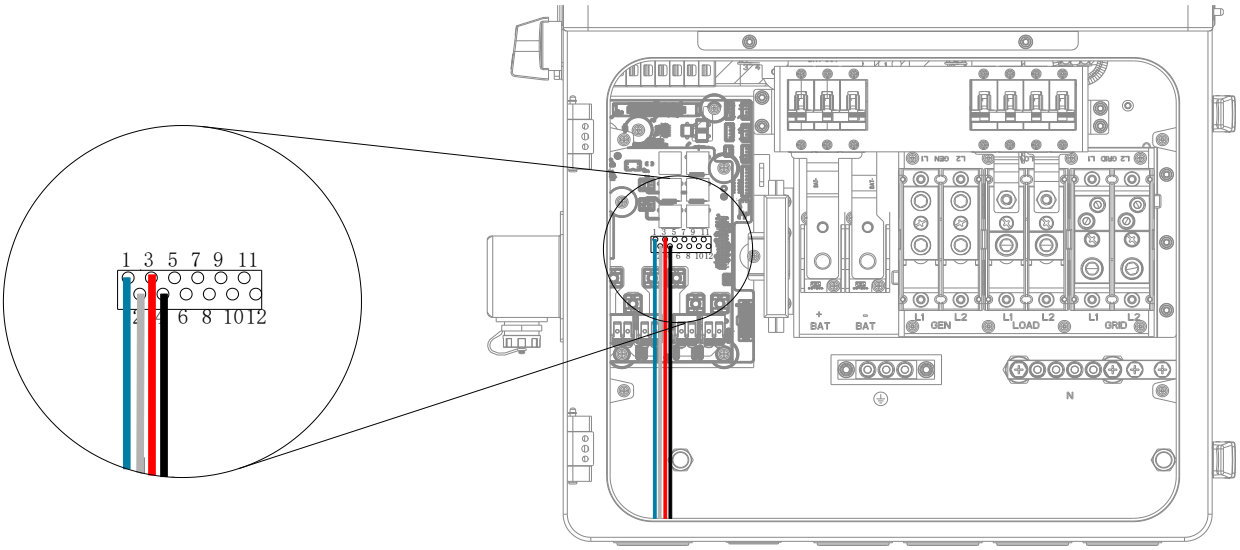


Figure 5.24. CT connection

5.8.2.3. External rapid shutdown switch connection

About this task

According to local safety regulations, an external rapid shutdown switch is required in case of emergency. After the switch is turned off, the system stops working immediately.

Procedure

Connect the wires of the external rapid shutdown switch to pins **11** and **12** on the CN89 terminal in the junction box of the inverter.

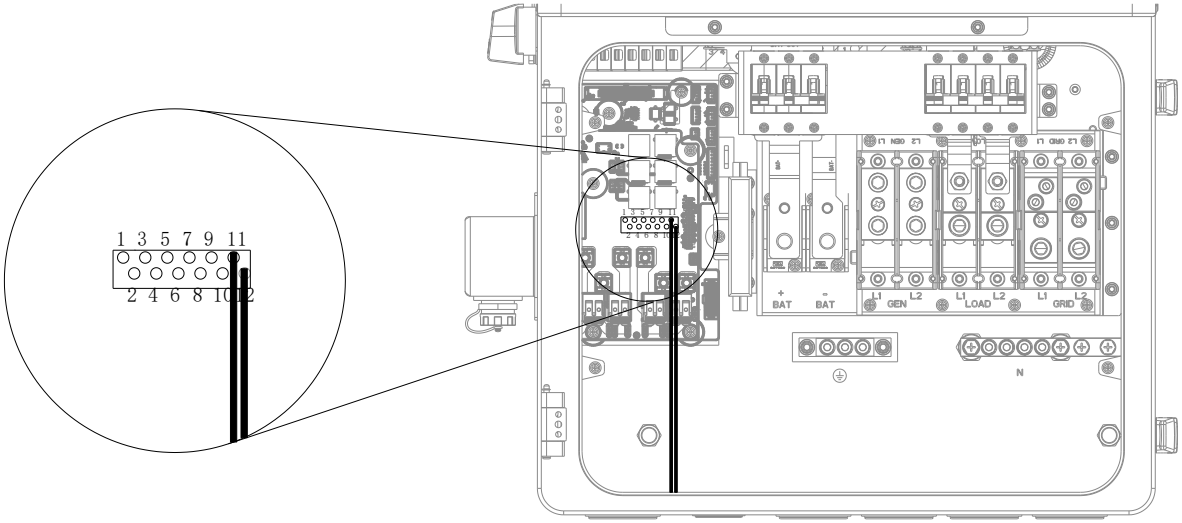


Figure 5.25. External rapid shutdown switch connection

5.9. Close the junction box of the inverter

Procedure

Step 1. Align the holes on the internal plate with the holes in the junction box. Push the plate downwards. Tighten four screws to lock the plate.

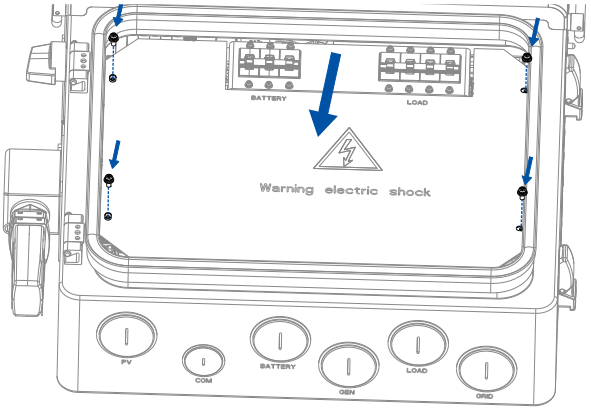


Figure 5.26. Installing the internal plate

Step 2. Close the cover. Lock the cover back on the right side of the inverter. Keep the key to a safe place.

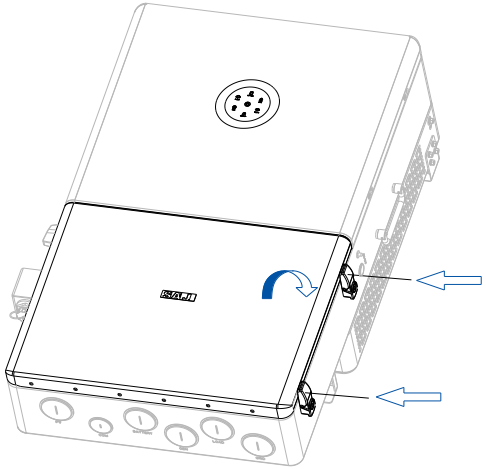
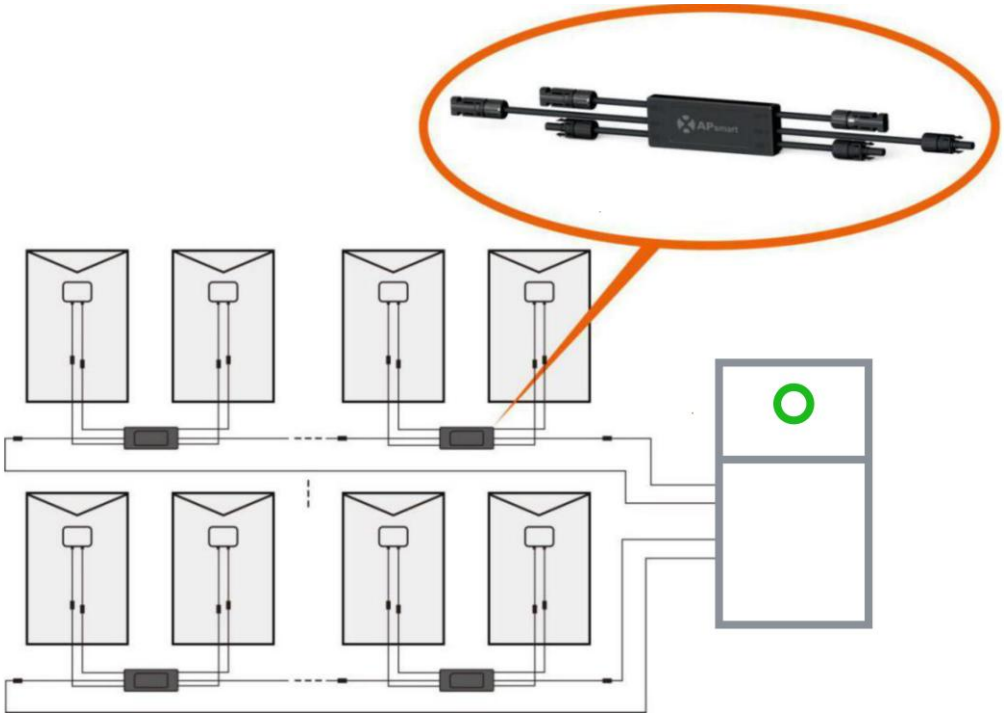


Figure 5.27. Closing the cover of the junction box

5.10. Install an RSD (optional)

The SAJ inverter provides RSD protection with a built-in transmitter (Transmitter-PLC-1P). To enable RSD protection, use an APsmart RSD-D model to connect to PV panels. For more details about the cable connections, refer to the RSD-D manual.



5.11. Connect the smart meter

To ensure full functionality (e.g., export limitation), use an SAJ-recommended smart meter. Please contact SAJ to purchase. For connection guidance, refer to ***Section 5.12*** *System topology diagram*.

5.12.System topology diagram

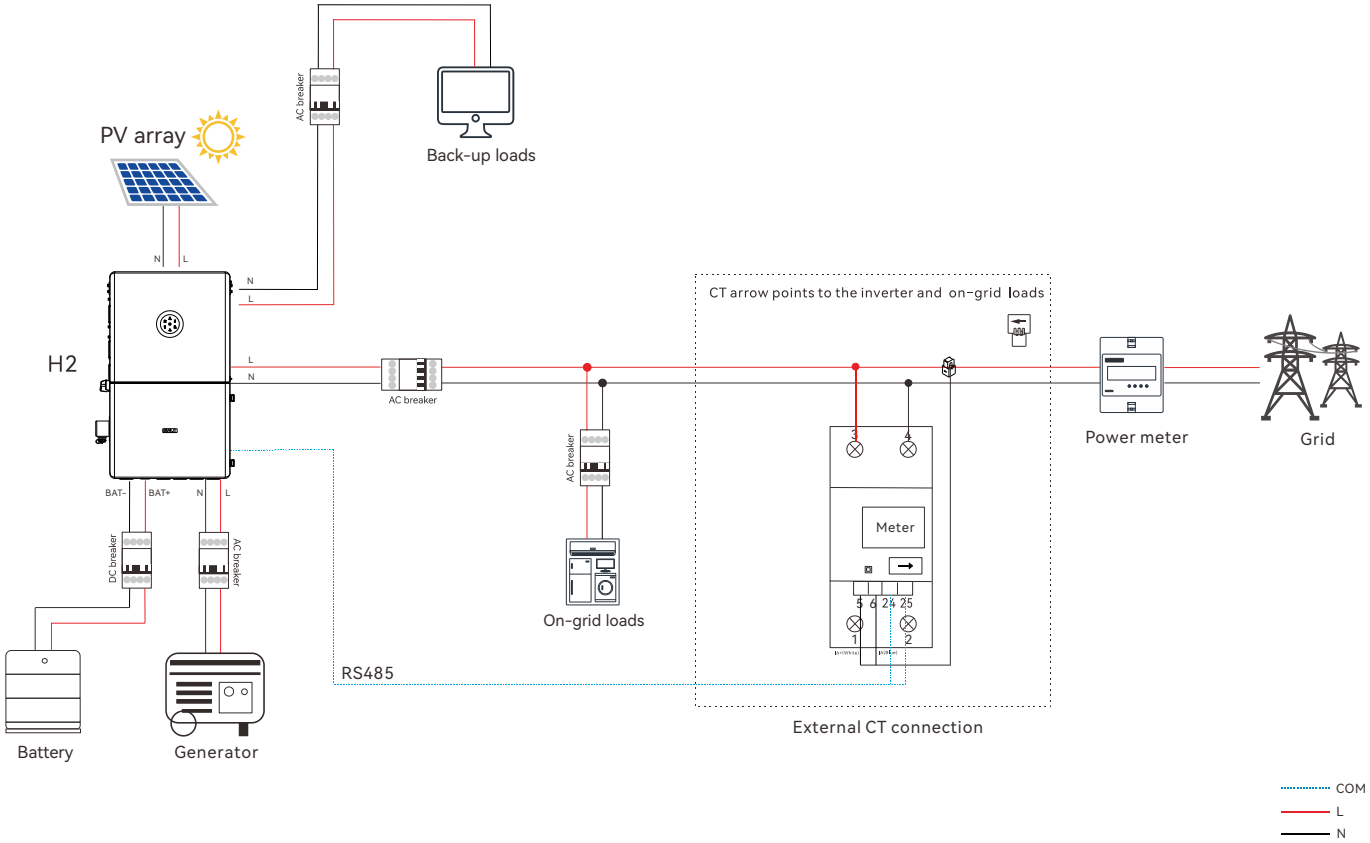


Figure 5.28. Single-phase connection

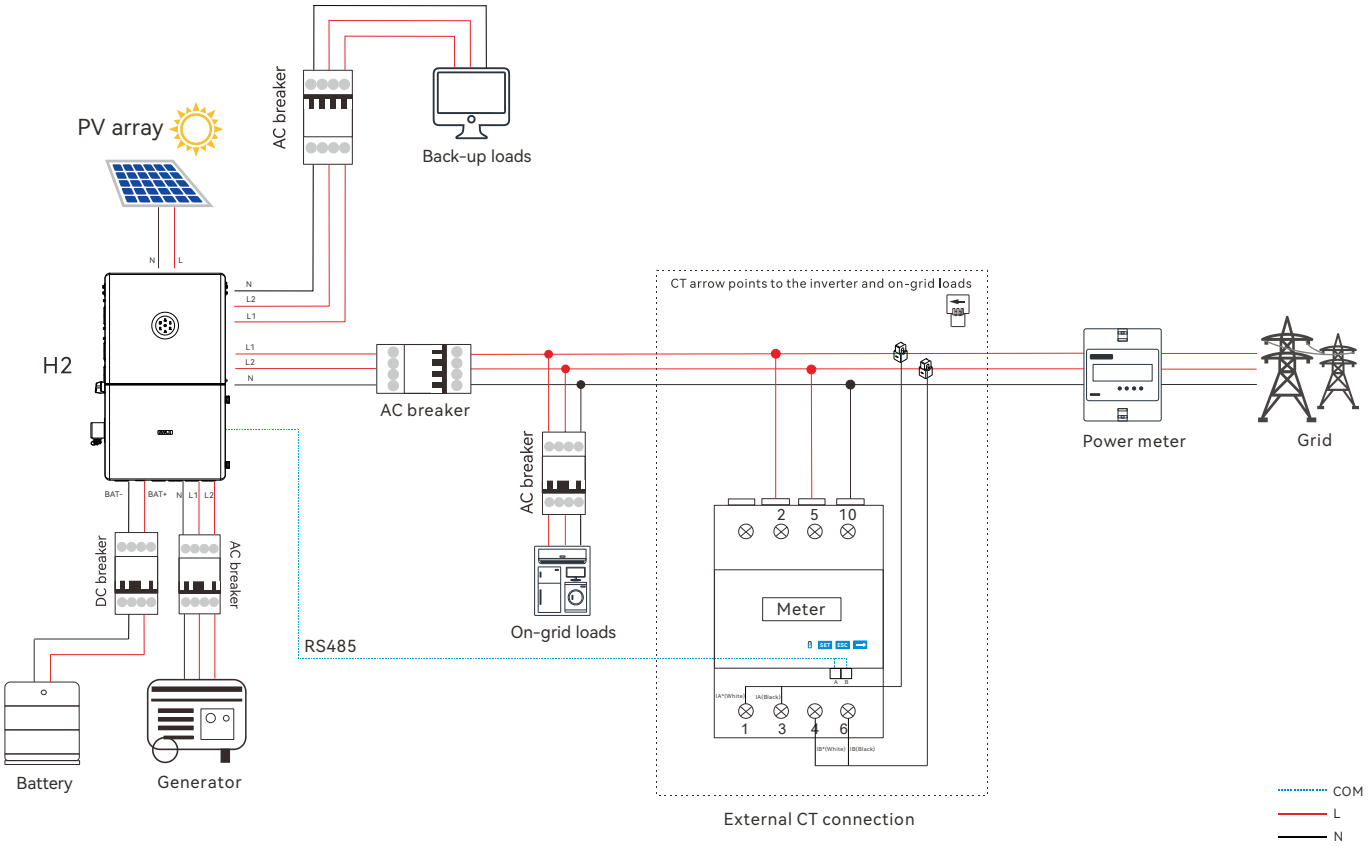


Figure 5.29. Split-phase connection

6.

STARTUP AND SHUTDOWN

6.1. Startup

Step 1. Open the junction box. Turn on the following breakers by pushing their handles upwards:

a. Load breaker (optional, only when loads are connected)
b. Battery breaker

Step 2. Turn on the breaker on the grid side.

Step 3. Turn on DC switch on the left side of the inverter to establish the connection to the PV array.

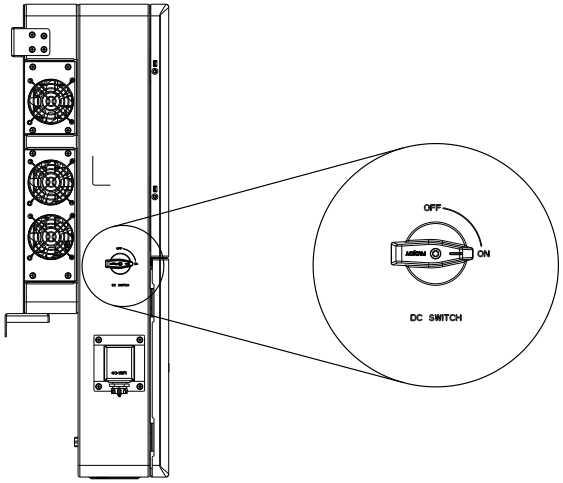


Figure 6.1. DC switch on the left side of the inverter

Step 4. Turn on the battery switch on the battery. For details, refer to the battery user manual.

Step 5. Press the ON/OFF button on the right side of the inverter.

Step 6. Check the LED indicator status on the inverter panel to verify that the inverter is operating properly. For details, refer to section 2.6 “LED indicators”.

6.2. Shutdown

Step 1. To disable the AC side, press the ON/OFF button on the right side of the inverter so that the button bounces back.

Step 2. To disable the connection to PV array, turn off DC SWITCH.

Step 3. To disable the connection to battery and loads, turn off the battery switch and load switch.

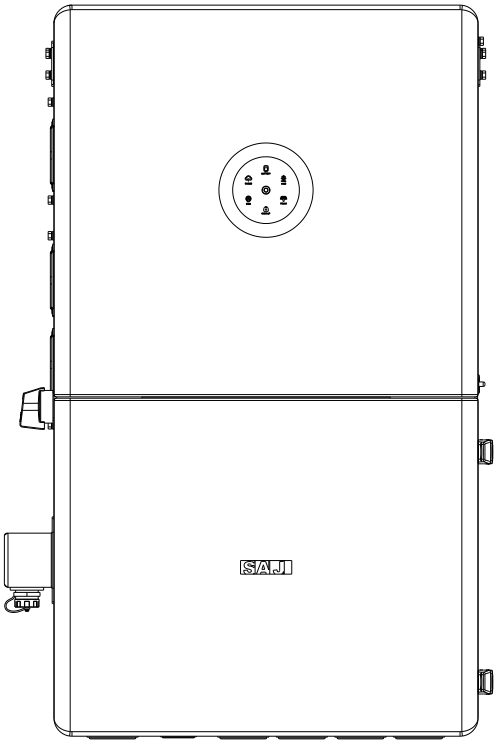
Step 4. Turn off the breaker on the grid side.

6.3. Emergency shutdown

If there is an emergency, press the ON/OFF button on the right side of the inverter to shut down the system immediately. When the button is bounced, the system shuts down.

6.4. Restart after emergency shutdown

After the emergency is subsided, press the ON/OFF button to restart the system.


SAJ

7.

COMMISSIONING

7.1. Download the 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).

On your mobile phone, search for “elekeeper” in the App store and download the App.

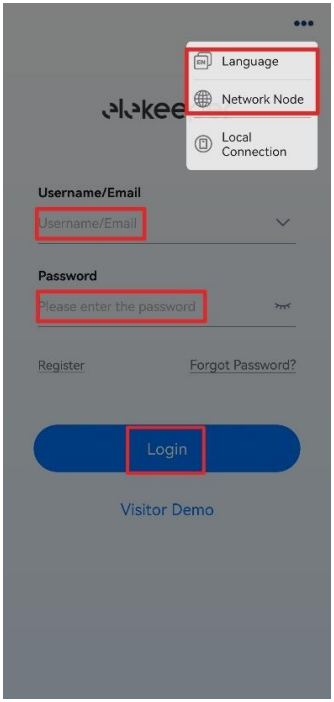
7.2. Log in to the App

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

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

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

b. Log in to the App by using the account and the password.



To apply for a new account, perform as follows:

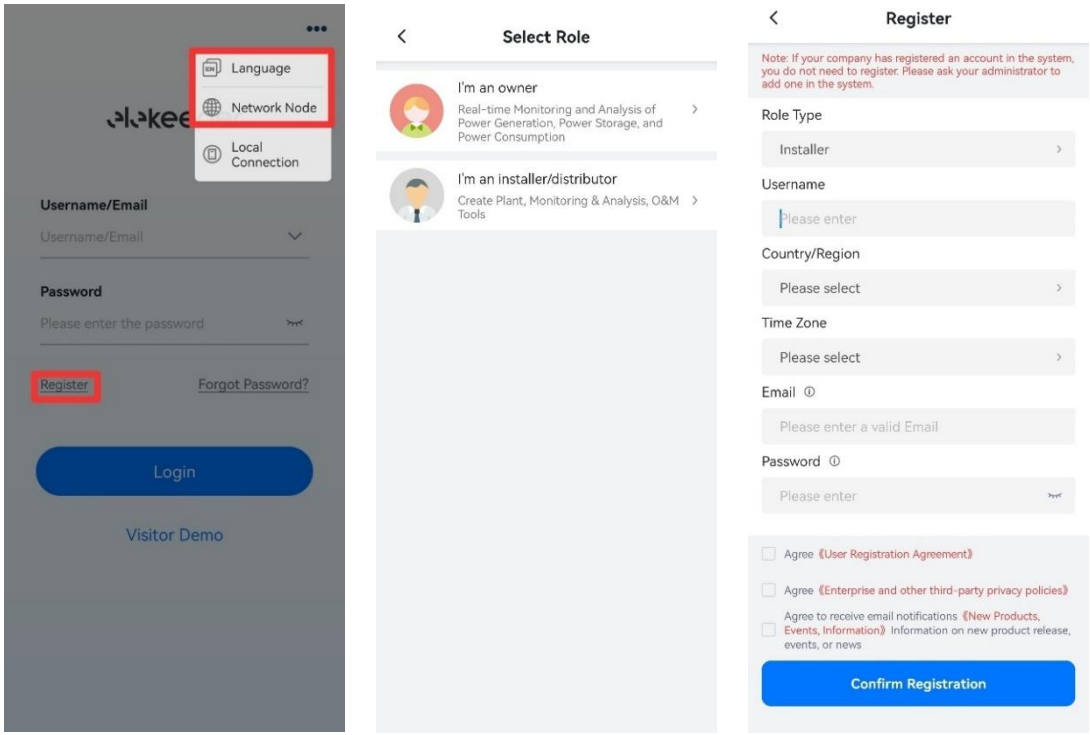
a. Tap the three-dot icon ••• on the top right corner. Choose the language and network node based on your needs.

b. Tap **Register.** Choose whether you are an owner or an 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):



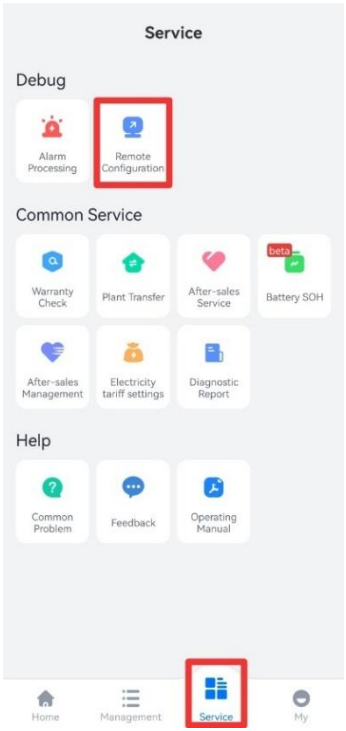
7.3. Perform the initialization settings

Prerequisite

The Bluetooth function on your mobile phone is enabled.

Procedure

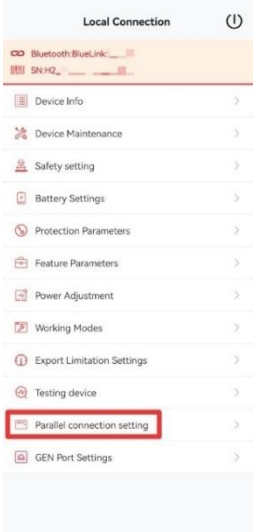
1. On the **Service** interface, select **Remote Configuration**. Tap **Bluetooth** and then **NEXT STEP**. Tap your inverter according to the inverter serial number (SN).

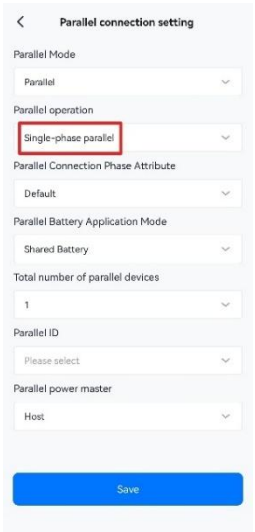


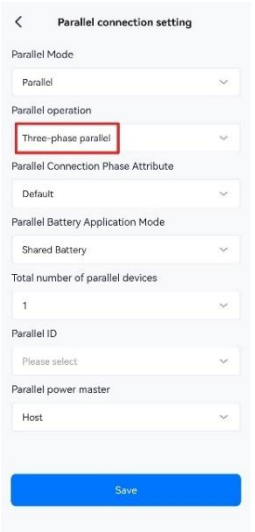
2. Complete the initialization settings by following the instructions on the screen.

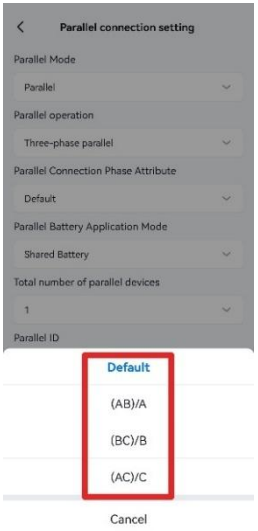
   a. Parallel connection settings

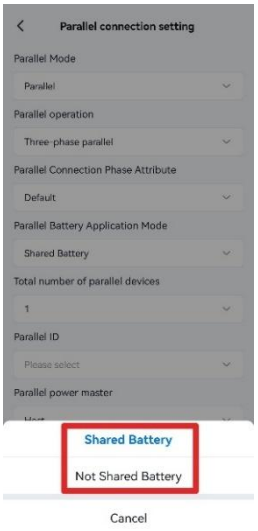
   Choose the corresponding **Parallel operation, Parallel Connection Phase Attribute, Parallel Battery Application Mode, Total number of parallel devices,** and **Parallel power master.**

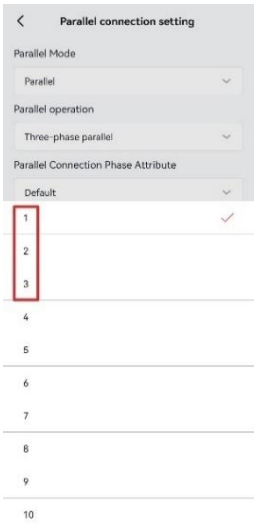


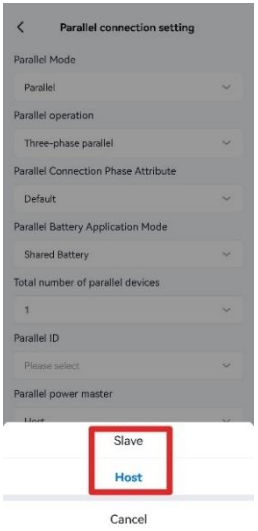




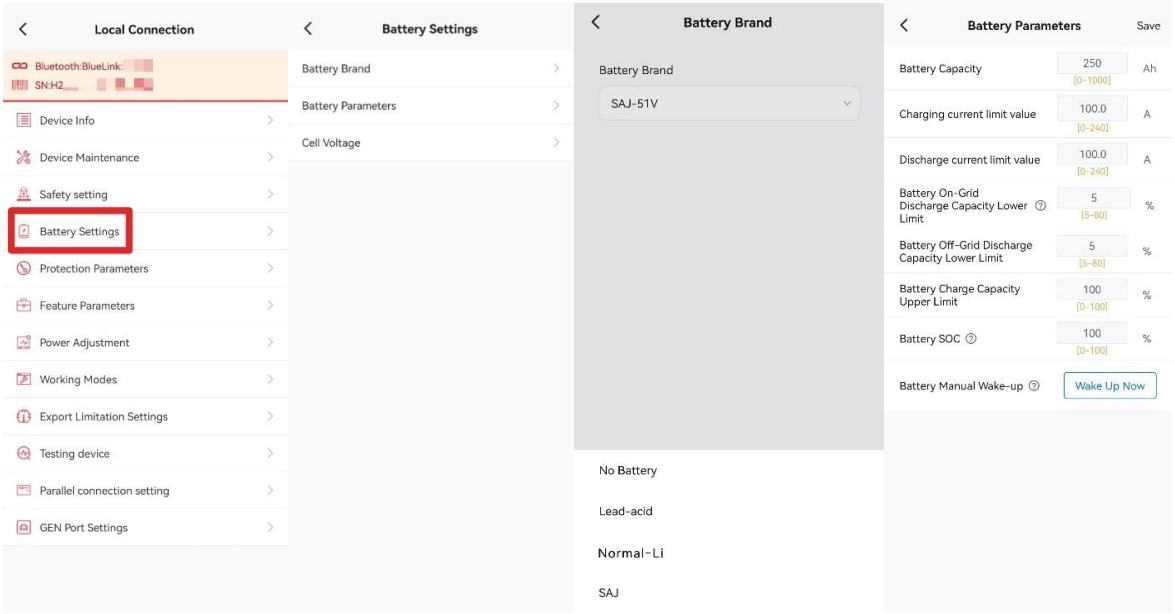




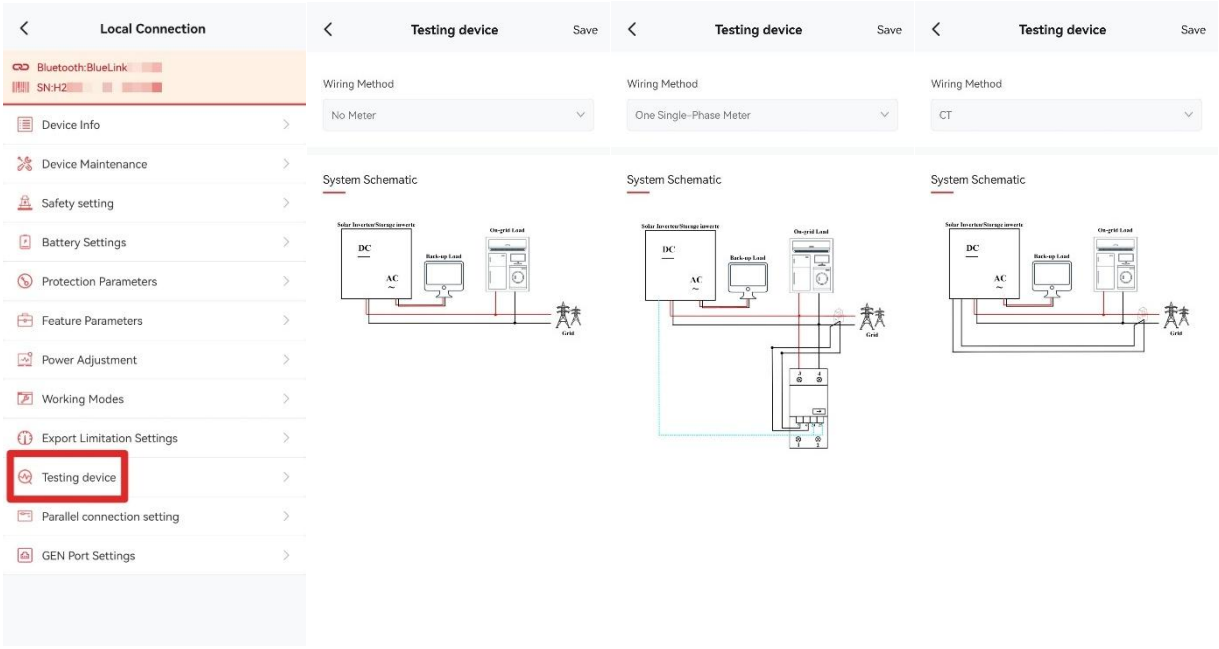




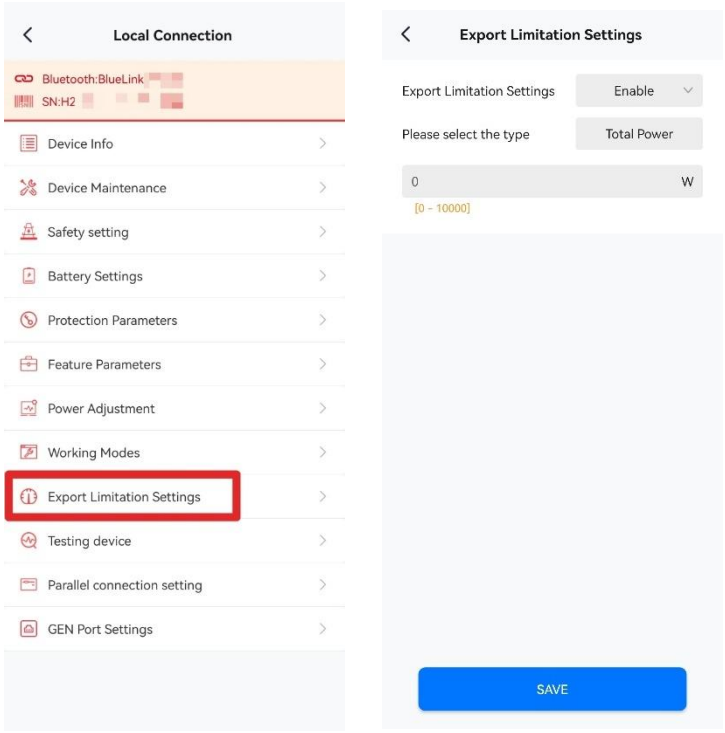
b. Battery brand and settings



c. Meter and system schematic

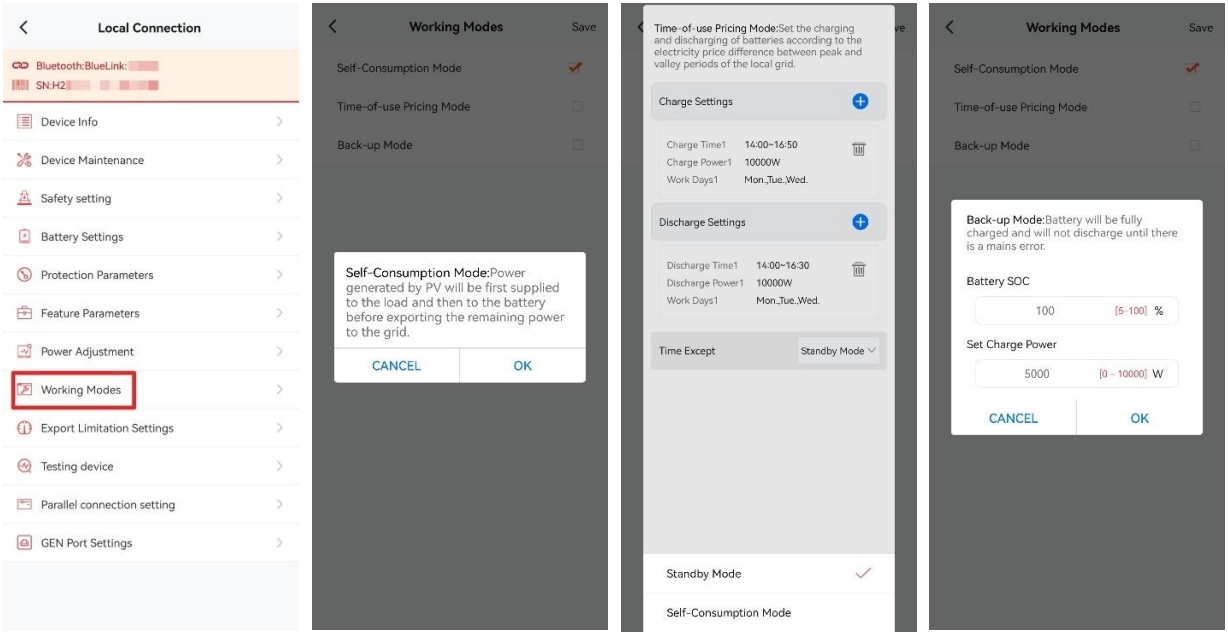


d. Export limitation settings



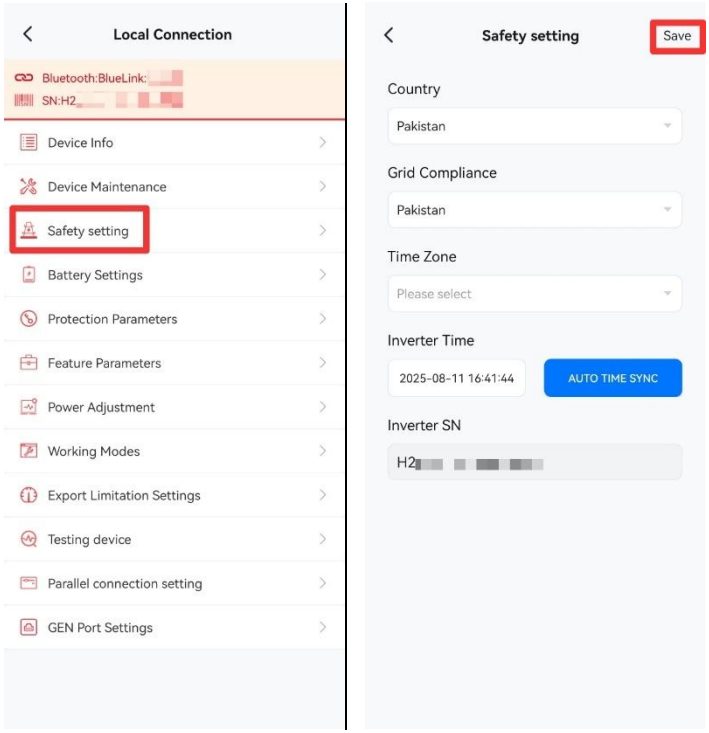
e. Working modes

Choose the working mode: **Self-Consumption Mode, Time-of-use Pricing Mode,** or **Back-up Mode.**



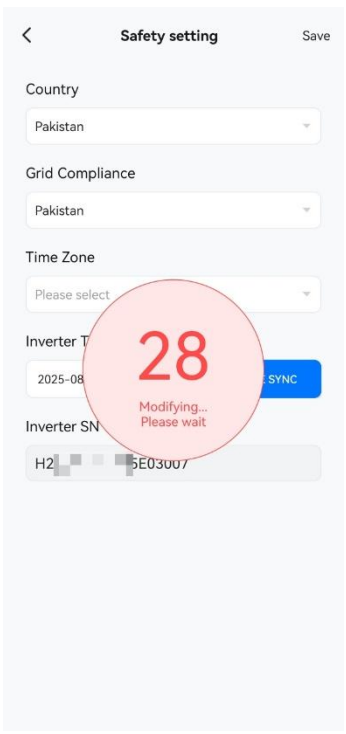
f. Country and grid compliance

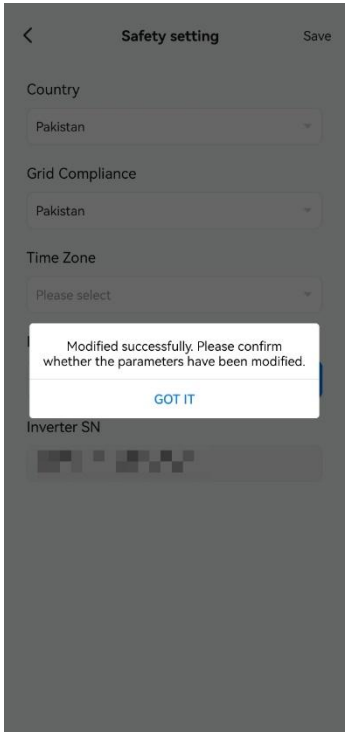
Tap **Safety Setting**. Select the **Country** and **Grid Compliance**.

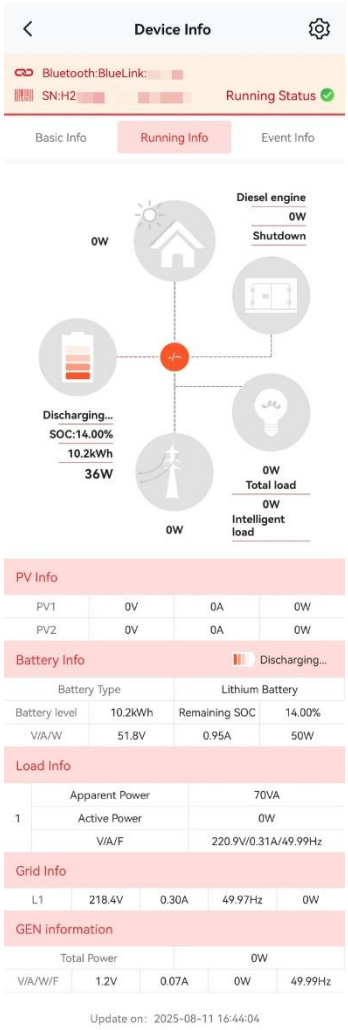


g. Initialization completion

Tap **Save** and wait 30 seconds for the parameters to be modified.







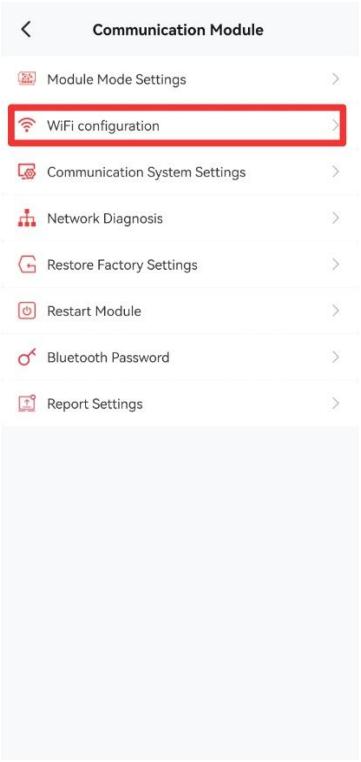
7.4. Configure the communication module

About this task

To remotely monitor the energy storage system and view the device statistics (for example, when you are away from home), connect the communication module installed on the inverter to the network.

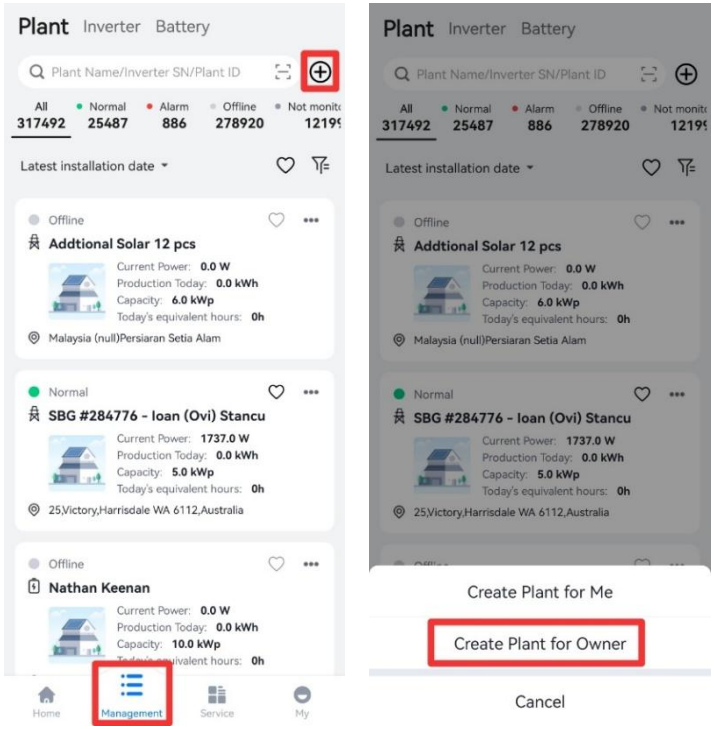
Procedure

1. On the **Device List** page, select your communication module according to its SN.
2. Tap the setting icon on the upper right corner.
3. Select **WiFi Configuration** and set the communication module to connect to your home network.

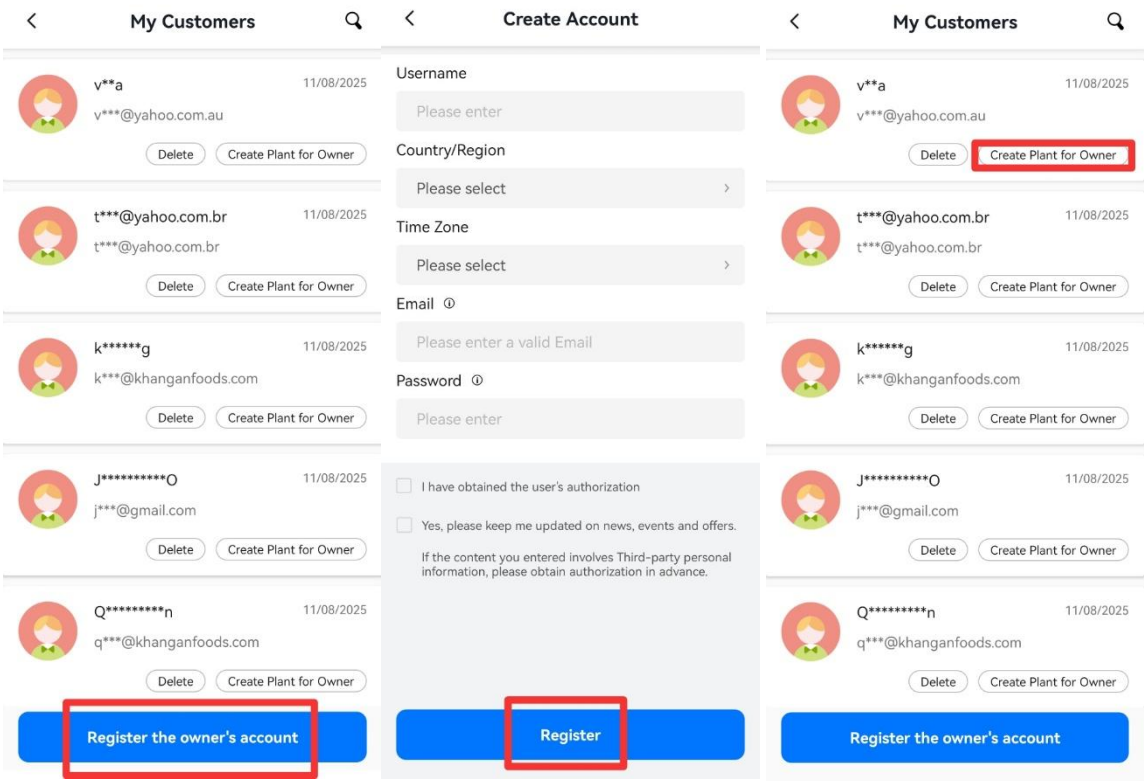


7.5. Create a plant

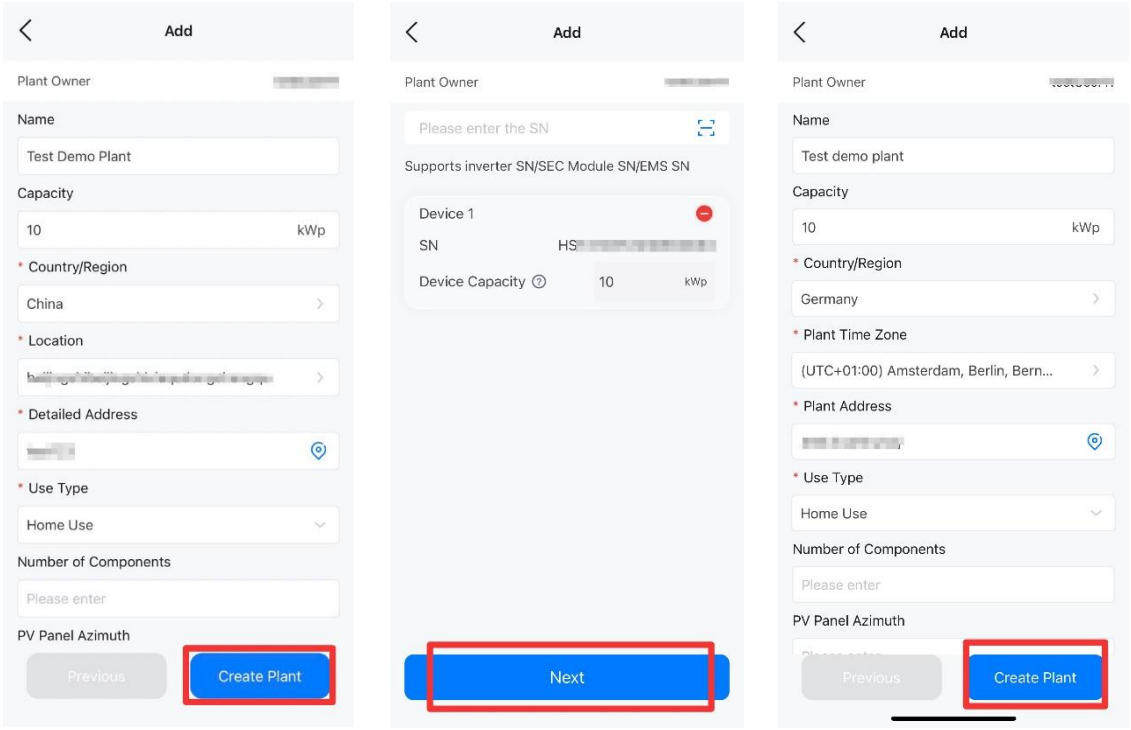
1. On the **Management** page, tap the ⊕ icon on the top right corner. Select **Create Plant for Owner**.



2. Apply for an account for the end user.



3. Configure the plant details.



7.6. View the fixed power factor mode and fixed reactive power mode

Once **Country and Grid Compliance** are selected during initialization, the parameters relating to the reactive power control settings are set automatically. In typical household scenarios, these default values generally require no adjustment.

If adjustment is necessary, before any modifications, contact SAJ for consultation and ensure that you have the necessary electrical knowledge and are fully aware of the impact of such modifications.

To view the settings, perform as follows:

Depending on your inverter manufacturing date, view the parameter values as follows:

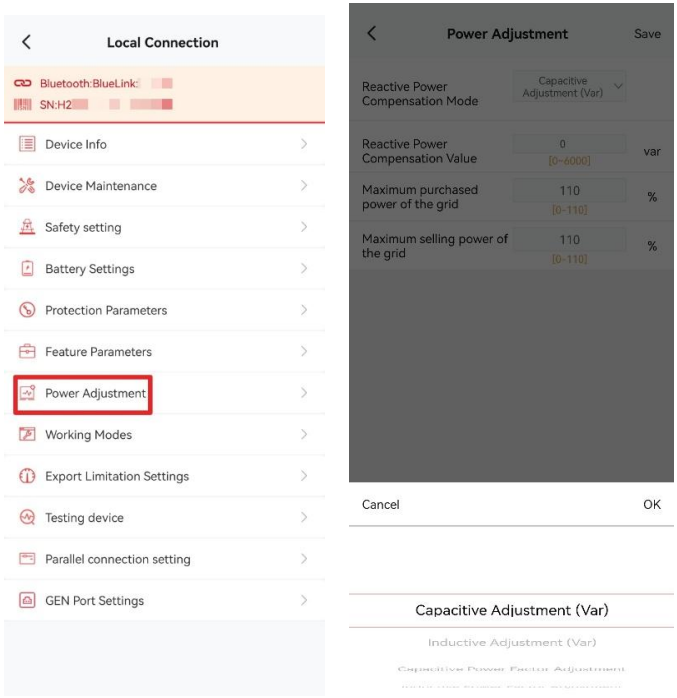
- For **Reactive Power Compensation Mode**:
  - Fixed power factor mode:

    Capacitive Power Factor Adjustment or **Inductive Power Factor Adjustment**.

    The power factor range is from 0.8 leading to 0.8 lagging.
  - Fixed reactive power mode:

    Inductive Adjustment (Var) or **Capacitive Adjustment (Var).**

    The power ranges from -60% Pn to 60% Pn.



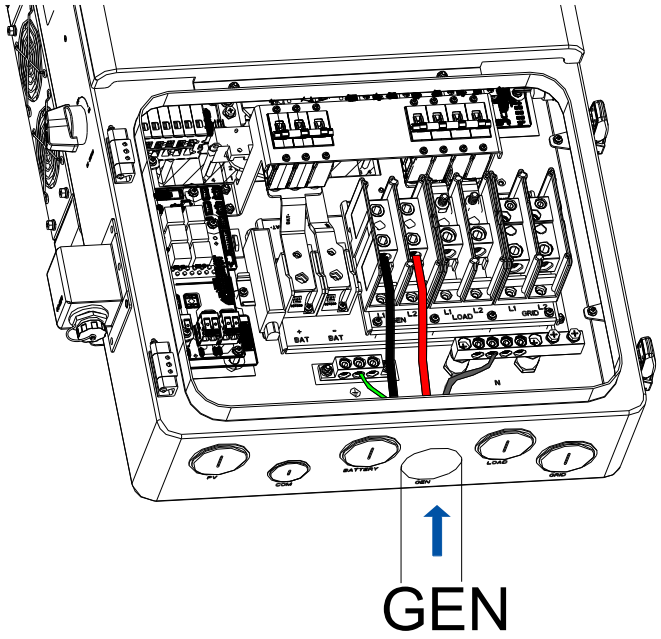
7.7. Smart Load Setting

The smart load function transforms the generator input terminal into a controllable output terminal for non-essential loads.

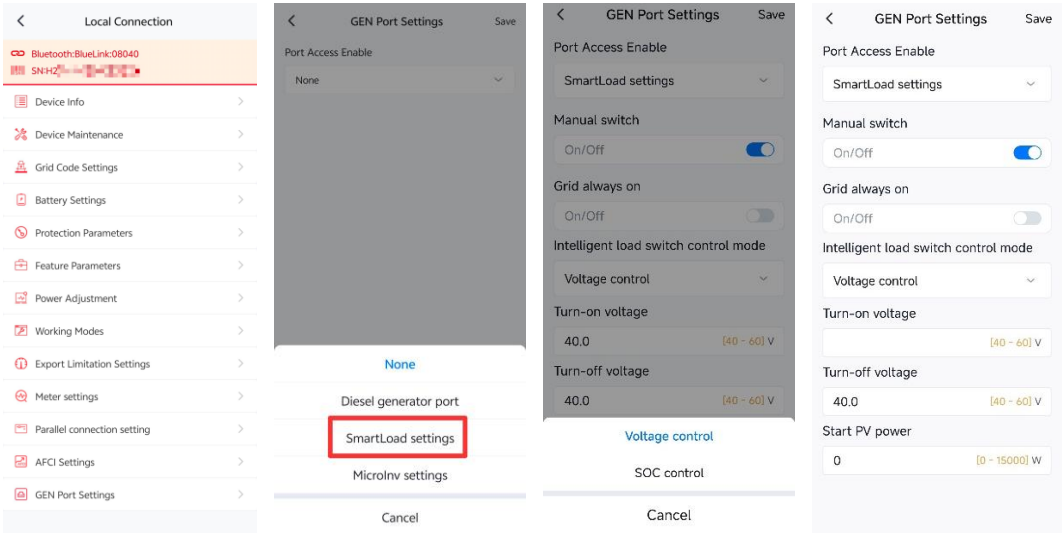
When enabled, the inverter will supply power to the smart load only if the battery SOC or voltage exceeds user-defined values. Conversely, if the battery SOC or voltage drops below the set minimum, the inverter will automatically disconnect the smart load, ensuring energy is reserved for priority loads.

When the battery connected to the inverter is a lead-acid battery, the smart load switch control method can be voltage control or SOC control. When the connected battery is a LiFePO4 battery, only SOC control is available.

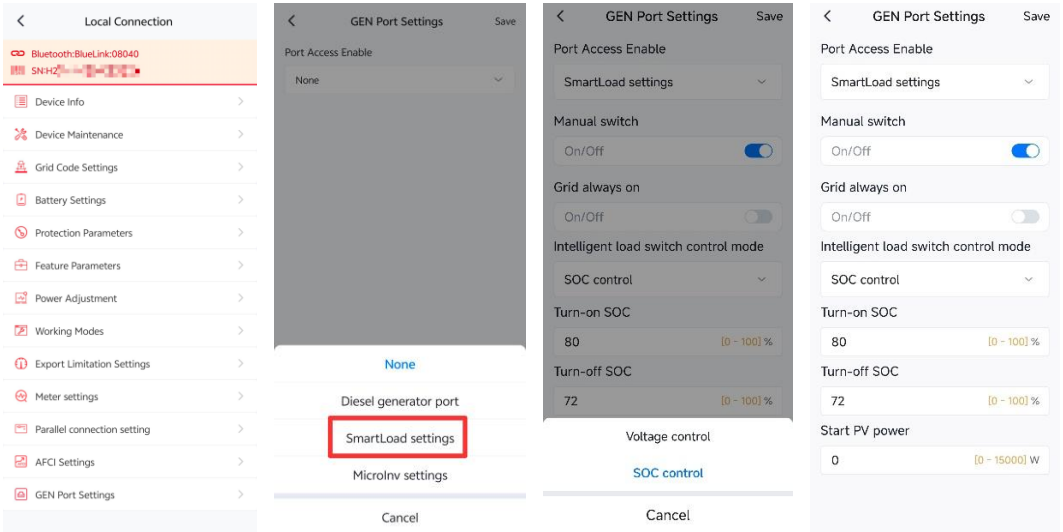
NOTICE
• The turn-on voltage must be greater than the turn-off voltage. • The turn-on SOC must be greater than the turn-off SOC.



- Voltage control



- SOC control



8.

TROUBLESHOOTING

NOTICE

- For any errors reported below, contact the installer or SAJ technical support.
- The operations and maintenance must be performed by authorized technicians.

Error message	Description
Master Bus Voltage High	The DC input voltage exceeds the allowed input limit of the inverter.
Master HW Bus Voltage High	The DC input voltage exceeds the allowed input limit of the inverter.
Master Bus Voltage Low	The bus voltage of the inverter is too low.
Master PV Voltage High	The DC input voltage of the inverter is too high.
Slaver Adc Sample Error	The inverter sampling circuit is faulty.
Master Adc Sample Error	The inverter sampling circuit is faulty.
Consistent Adc Adc Sample Error	The inverter sampling circuit is faulty.
Master Pv Input Error	PV reverse connection or sensor abnormality.
Frequency Config Error	The center frequency of the safety configuration does not match the real frequency of the power grid.
Master HW PV Current High	1. The positive and negative poles of the string are reversely connected. 2. Internal damage to the inverter.
Master SW PV Current High	1. The positive and negative poles of the string are reversely connected. 2. Internal damage to the inverter.
Master HW Inv Current High	1. The positive and negative poles of the string are reversely connected. 2. Internal damage to the inverter.
Master SW Inv Current High	The grid-side output current exceeds the inverter limit.
Master HW BAT Current High	The grid-side output current exceeds the inverter limit.
Master SW BAT Current High	The battery charging and discharging current exceeds the inverter limit.
Master HW BLC Current High	The battery charging and discharging current exceeds the inverter limit.
Master SW BLC Current High	The operating current of the balancing bridge exceeds the inverter limit.
Master Grid NE Voltage Error	Live line grounding occurs on the grid side
Master Arc Device Error	Arc equipment failure.

Error message	Description
Master Arc Error	DC arcing caused by DC short circuit or poor terminal contact.
Arc Permanent Err	Permanent arc error
Master Battery Voltage Error	1. Bad battery connection. 2. Lithium battery is turned off.
Gen Output OverLoad	The load connected to the generator output is greater than the maximum output power.
Battery Open Circuit	Inverter cannot detect battery voltage.
Master Battery Discharge Voltage Low	Low voltage detected during battery discharge and overload.
Lost Communication between M<->H	Internal communication of the inverter is lost.
Lost Communication between M<->S	Internal communication of the inverter is lost.
Lost Communication between S<->H	Internal communication of the inverter is lost.
Master Grid Rly Errot	1. A live wire grounding occurs on the power grid side. 2. The grid voltage is too low. 3. The inverter relay circuit is faulty.
Master Inv Rly Errot	1. A live wire grounding occurs on the power grid side. 2. The grid voltage is too low. 3. The inverter relay circuit is faulty.
Master Temperature High Error	Inverter temperature is too high.
Master Temperature Low Error	Inverter temperature is too low.
GFCI Device Error	Inverter leakage current detection equipment fails.
Grid Voltage High	The grid voltage is higher than the inverter safety regulations allow.
Grid Voltage 10Min High	The grid voltage is higher than the inverter safety regulations allow.
Grid Voltage Low	The grid voltage is lower than the allowable range of the inverter safety regulations.
EpsPort Voltgae Error	Before leaving the grid, detect abnormal voltage at the off-grid port.
Master Grid Frequency High	The grid frequency is higher than the upper limit specified by the local power grid.

Error message	Description
Master Grid Frequency Low	The grid frequency is lower than the lower limit specified by the local power grid.
Output OverLoad	The load connected to the back-up end is greater than the maximum output power of the inverter.
Output Volt DCV High	The DC component of the AC output exceeds the limit range.
Output Current Dci High	The DC component of the AC output exceeds the limit range.
Master No Grid Error	The inverter cannot detect the grid voltage.
Master BMS com Lost	BMS does not start normally.
Gen Rly Errot	1. Diesel engine sampling circuit abnormality. 2. Diesel engine relay failure.
GFCI Error	A ground leakage current fault was detected in the power station system.
ISO Error	The insulation resistance between the string and the ground is less than the set value.
Bus Voltage Imbalance	Bus voltage imbalance.
Lost Communication between H<->M	Internal communication of the inverter is lost.
Lost Communication between H<->S	Internal communication of the inverter is lost.
HMI EEPROM Error	memory failure.
Lost Communication between Master and Meter	Abnormal communication between inverter and meter.
Lost Communication between inverter and SEC	Communication abnormality between inverter and load monitoring module.
HMI RTC Error	RTC failure
BMS Device Error	Battery abnormality
BMS Lost.Conn	BMS does not start normally.
CT Device Err	CT equipment failure
AFCI Lost Com.Err	AFCI board communication interrupted.
Master FAN Error	Master FAN Error
Master Bat Midbus Error	Battery voltage is too high or too low

9.

PRODUCT SPECIFICATIONS

Model	H2-5K-LS3-US	H2-7.6K-LS3-US	H2-9.6K-LS4-US	H2-11.4K-LS4-US
PV String Input				
Max. PV array power [Wp]@STC	7500	11400	14400	17100
Max. DC voltage[V]	600			
MPPT voltage range[V]	90–510			
Nominal DC voltage[V]	380			
Start voltage [V]	100			
Min. input voltage [V]	80			
Max. input current[A]	16/16/16		16/16/16/16	
Max. short current [A]	19.2/19.2/19.2		19.2/19.2/19.2/19.2	
Quantity of strings per MPPT	1/1/1		1/1/1/1	
Quantity of MPPT	3		4	
DC switch	Integrated			
Battery Port Connection				
Battery type	Lead-acid batter / Lithium battery			
Voltage range [V]	40–60			
Start voltage [V]	42			
Max. charging/discharging current [A]	152		228	
AC Output [On-grid]				
Rated AC power [W]@208 V AC	4330	6580	8320	9880
Rated AC power [W]@240 V AC	5000	7600	9600	11400
Rated AC current [A]@208/240 V AC	20.8	31.7	40	47.5
Rated AC voltage and range	L1/L2/N/PE, 120 V AC (split-phase), 208 V AC (2/3 phase) L1/L2/PE: 240 V AC ● 120 V: 106–132 V ● 240 V: 211–264 V ● 208 V: 183–229 V			
Rated output frequency and range [Hz]	● 50 Hz: 47–53 ● 60 Hz: 57–63			
Power factor [cosϕ]	0.8 leading–0.8 lagging			

Model	H2-5K-LS3-US	H2-7.6K-LS3-US	H2-9.6K-LS4-US	H2-11.4K-LS4-US
Total harmonic distortion [THDi]	< 3%			
AC Output [Back-up Mode]				
Rated AC power [W]@208 V AC	4330	6580	8320	9880
Rated apparent power [VA]@240 V AC	5000	7600	9600	11400
Rated AC current [A]@208/240 V AC	20.8	31.7	40	47.5
Peak output power [VA, 1 min]	6000	8360	10560	12540
Peak output power [VA, 10s]	7500	11400	14400	17100
Rated output voltage [V]	120 / 208 / 240			
Rated output frequency and range [Hz]	• 50 Hz: 45–55 • 60 Hz: 55–65			
Output THDV (@liner load)	< 3%			
Switching time	< 10 ms			
AC Input [GEN]				
Maximum continuous input power @240V	5000	7600	9600	11400
Rated voltage [V]	120 / 208 / 240			
Rated current [A]	20.8	31.7	40	47.5
Efficiency				
Maximum efficiency	97.20%			
CEC efficiency	96.50%			
AC-Bat maximum efficiency	94.20%			
Protection & Features				
Overvoltage protection	Integrated			
ISO monitoring	Integrated			
DC component monitoring	Integrated			
Monitoring of ground fault current	Integrated			
Grid monitoring	Integrated			
AC output short circuit protection	Integrated			
AC grounding detection	Integrated			
DC surge protection	Type II			

Model	H2-5K-LS3-US	H2-7.6K-LS3-US	H2-9.6K-LS4-US	H2-11.4K-LS4-US
AC surge protection	Type II			
Island protection monitoring	Integrated			
AFCI	Integrated			
RSD	Integrated			
Interface				
Display	LED/App (via Bluetooth)			
Communication port	RS485/Wi-Fi/CAN			
Communication	Wi-Fi/4G (optional)			
Load Monitor	24 hours			
General Data				
Topology type	Transformer-less (DC-AC)			
Standby power consumption [W]	< 35			
Operating temperature range	-40℃ to +60℃ (-40℉ to 140℉) [Load shedding operation above 45℃]			
Cooling method	Air fan cooling			
Relative humidity	0%-100% RH, no condensation			
Altitude	< 2000 m			
Noise [dBA]	< 50			
Ingress protection	NEMA 4X			
Mounting	Wall mounting			
Dimension [H x W x D]	810*470*247 mm (31.89*18.504*9.724 inch)			
Weight	48 kg (105.82 lb)			
Warranty [year]	10 years			
Applicable standard	UL 1741 and 1741SB; IEEE1547 and 1547.1; UL1699B, UL1998; CSA STD. C22.2 No.107.1, FCC, Part15, Class B, Rule21, HE CO 14H			

10.

APPENDIX

10.1 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.

10.2 Warranty

Check the product warranty conditions and terms on the SAJ website: https://www.saj-electric.com/

10.3 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 20 6660 8589

E-mail: service@saj-electric.com

Sales

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

Fax: 020-66608589

E-mail: info@saj-electric.com

10.4 Trademark

SAJ is the trademark of SanJing.

GUANGZHOU SANJING ELECTRIC CO., LTD

Tel: 86-20-66608588 **Fax**: 86-20-66608589 **Web:** www.saj-electric.com
Add: SAJ Innovation Park, No.9, Lizhishan Road, Science City, Guangzhou High-tech Zone, Guangdong, P.R.China

V1.0