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V1.1

H2 Series

HYBRID SOLAR INVERTER

USER MANUAL

H2-(5K, 7.6K)-S3-US

H2-(8.6K-12K)-S4-US

Preface

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

This manual includes information for installation, operation, maintenance, trouble shooting and safety. Please follow the instructions of this manual so that we can ensure delivery of our professional guidance and wholehearted 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.

This manual is subject to change without notice due to product upgrade. Please check for the latest version at www.saj-electric.com.

Guangzhou Sanjing Electric Co., Ltd.

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1.

SAFETY PRECAUTIONS

■ Before installing, using, and maintaining this equipment, read the safety information and precautions thoroughly, and comply with them during operations.

■ Failure to follow any of the instructions or warnings in this document can result in electrical shock, serious injury, or death, or can damage the equipment, potentially rendering it inoperable. SAJ shall take no responsibility for any personal injuries or property damage caused by improper use.

1.1 Scope of Application

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

H2-5K-S3-US; H2-7.6K-S3-US; H2-8.6K-S4-US; H2-10K-S4-US; H2-12K-S4-US

Please read this manual carefully before installations and operations. Keep this manual in a readily accessible place for future reference.

1.2 Target Group

This manual is intended for any qualified personnel to install, operate, maintain, and troubleshoot the H2-5K/7.6K/8.6K/10K/12K inverter and related system components. The qualified personnel have training, knowledge, and experience in:

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

Servicing of batteries must only be performed or supervised by qualified personnel with knowledge of batteries and their required precautions. Keep unqualified personnel away from batteries.

No responsibility is assumed by SAJ Electric for any consequences arising out of the use of this material.

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

CAUTION

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

NOTICE

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

1.4 Safety Instructions

DANGER

· There is possibility of fatal personnel injuries due to electrical shock and high voltage.
· Do not touch the operating component of the inverter; it might result in burning or death.
· To prevent risk of electric shock during installation and maintenance, please make sure that all AC and DC terminals are disconnected prior to work.
· Do not touch the surface of the inverter while the housing is wet, otherwise, it might cause electrical shock.
· Do not stay close to the inverter while there are severe weather conditions including storm, lightning, etc.
· Before opening the housing, the SAJ inverter must be disconnected from the grid and PV generator; you must wait for at least five minutes to let the energy storage capacitors completely discharge after disconnecting from power source.

WARNING

Danger to life due to fire or explosion
· In the event of fault, do not conduct any direct action on the inverter.
· Disconnect PV array from inverter via an external disconnection device. If there is no external disconnection device present, wait until no more DC power is applied to the inverter.
· Disconnect the AC circuit breaker, or keep it disconnect if it is tripped, and secure it against reconnection.
· Do not touch non-insulated parts or cables.
· Do not touch non-insulated parts or cables.
·The installation, service, recycling and disposal of the inverters must be performed by qualified personnel only in compliance with national and local standards and regulations.
·Any unauthorized actions including modification of product functionality of any form may cause lethal hazard to the operator, third parties, the units or their property. SAJ is not responsible for the loss and these warranty claims.
·The SAJ inverter must only be operated with PV generator. Do not connect any other source of energy to the SAJ inverter.
·Be sure that the PV generator and inverter are well grounded in order to protect properties and persons.

CAUTION

·The inverter will become hot during operation. Please do not touch the heat sink or peripheral surface during or shortly after operation.
·Risk of damage due to improper modifications.

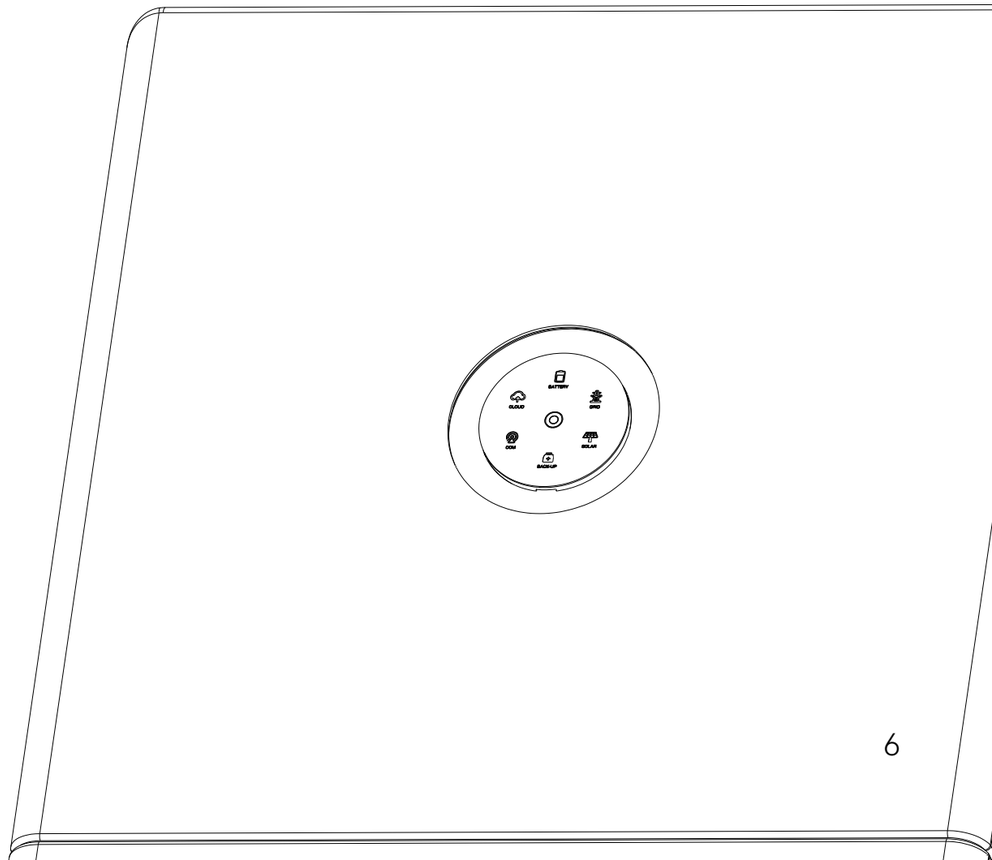
NOTICE

·Moving or reinstall the inverter to another location might void the warranty without prior written permission from SAJ.

1.5 Explanations of Symbols

To ensure the safety of people and equipment, follow the safety symbols on the equipment.

Symbol	Description
	**Dangerous electrical voltage** This device is directly connected to public grid, thus all work to the inverter shall only be carried out by qualified personnel.
	**Danger to life due to high electrical voltage!** There might be residual currents in inverter because of large capacitors. Wait for 5 minutes before you remove the front lid.
	**Notice, danger!** This is directly connected with electricity generators and public grid.
	**Danger of hot surface** The components inside the inverter will release a lot of heat during operation. Do not touch metal plate housing during operating.
	**An error has occurred.** Please go to Chapter 9 “Troubleshooting” to remedy the error.
	**This device SHALL NOT be disposed of in residential waste.** Please go to Chapter 8 “Recycling and Disposal” for proper treatments.
	**CSA Mark** The CSA mark means the inverter has been tested and compliant with the relevant standards in the US and Canada.



2.

PRODUCT INFORMATION

2.1 Product Overview

H2 series high voltage split-phase inverter is a transformer-less hybrid solar inverter, which is a key component of a complete energy storage system.

The inverter contains solar maximum power point tracking circuit, battery charging/discharging circuit and full bridge inverting circuit. It can convert solar power to grid-compliant AC power to supply home loads and sell back to the grid. The solar power can also be stored into the battery for later use when grid is down or during peak electricity price period.

When power outage occurs, the inverter transfers the critical loads to battery power immediately and seamlessly without supply interruption to the critical loads.

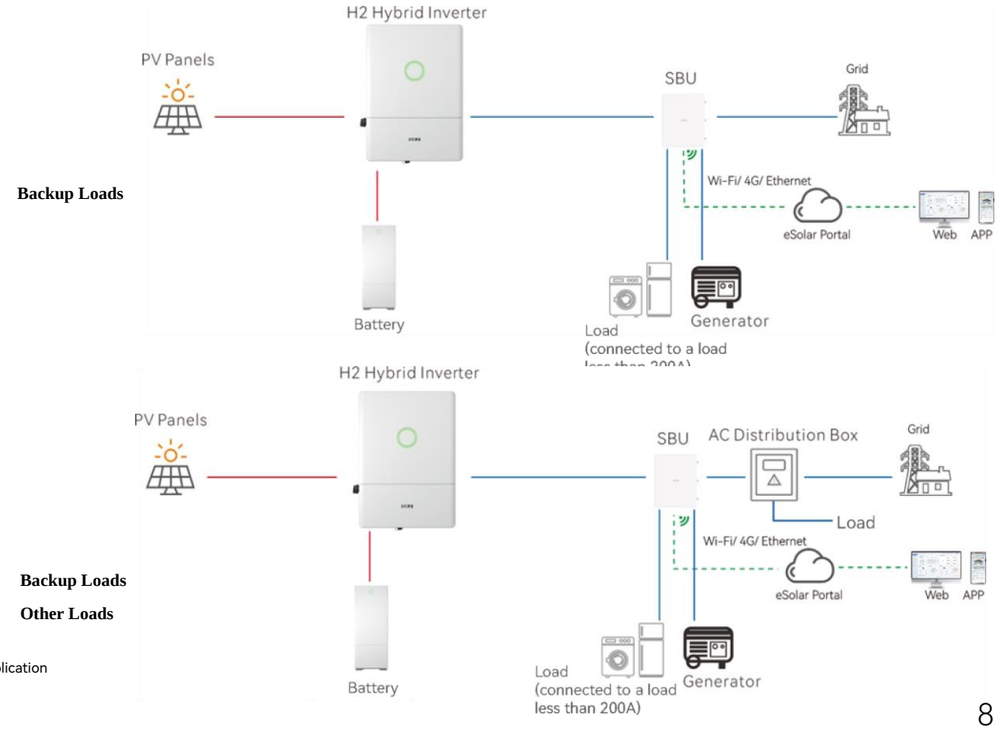


Figure 2.1 Inverter application

2.2 Product Model

H2 - XK - S4 - US
① ② ③ ④

① H2 represents for product name.

② XK represents rated energy XkW of Inverter, for example, 5K means 5kW.

③ S4 means single phase with 4MPPT.

④ Products exclusively available in North America.

2.3 Dimensions

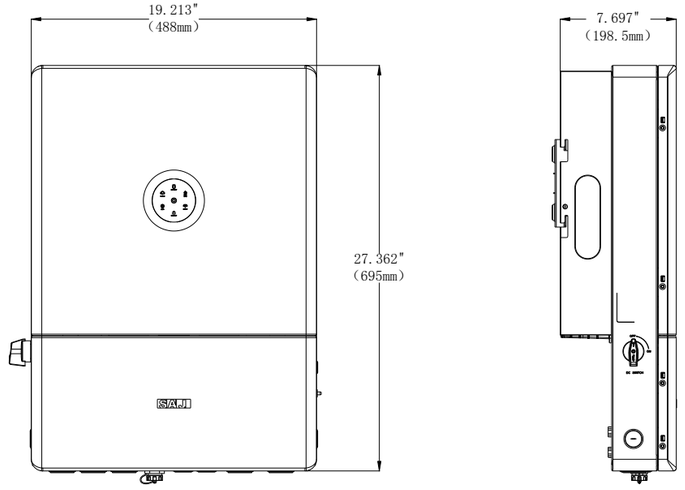


Figure 2.1 Dimensions of H2 series inverter

2.4 Human-computer Interface

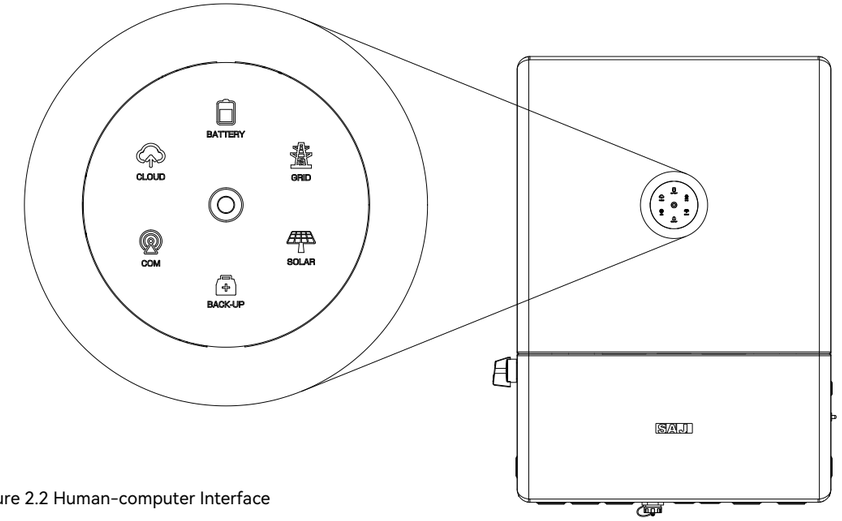
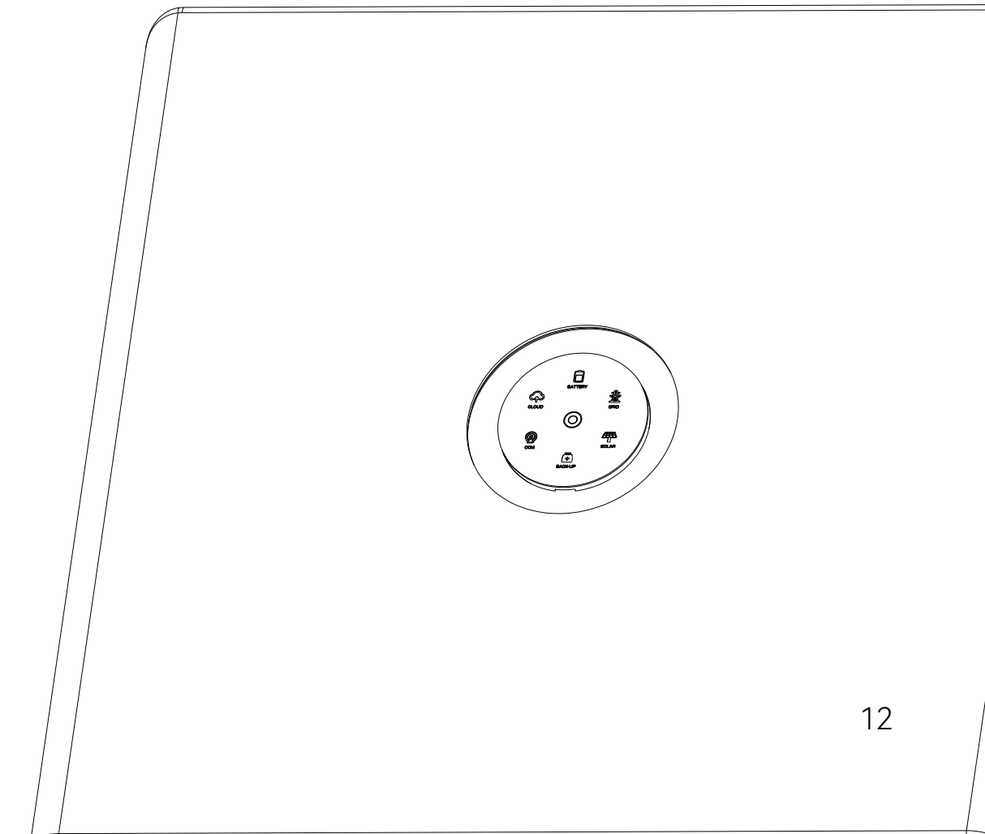


Figure 2.2 Human-computer Interface

LED indicator	Status	Description
	LED off	Inverter power off
	Breathing	Inverter is at initial state or standby state
	Solid	Inverter running properly
	Breathing	Inverter is upgrading
	Solid	Inverter is faulty

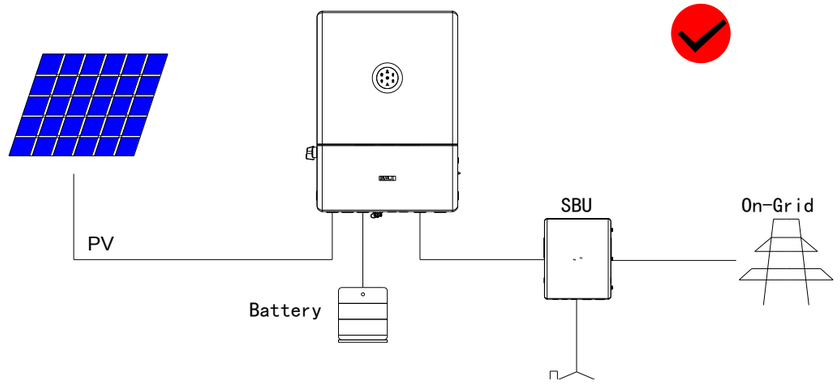
LED indicator	Status	Description
System	Solid	Importing electricity from grid
	On 1s, off 1s	Exporting electricity to grid
	On 1s, off 3s	Not importing and exporting at all
	Off	Off-grid
Battery	Solid	Battery is discharging
	On 1s, off 1s	Battery is charging
	On 1s, off 3s	SOC low
	Off	Battery is disconnected or inactive
Grid	Solid	Connected to grid
	On 1s, off 1s	Counting down to grid connection
	On 1s, off 3s	Grid is faulty
	Off	No grid
PV	Solid	PV array is running properly
	On 1s, off 1s	PV array is faulty
	Off	PV array is not operating
Backup	Solid	AC side load is running properly
	On 1s, off 1s	AC side load overload
	Off	AC side is turned off
Communication	Solid	Both BMS and meter communication are good
	On 1s, off 1s	Meter communication is good, BMS communication is lost
	On 1s, off 3s	Meter communication is lost, BMS communication is good
	Off	Both meter and BMS communication are lost
Cloud	Solid	Connected
	On 1s, off 1s	Connecting
	Off	Disconnected



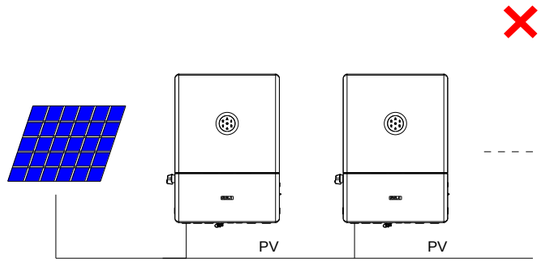
3.

INSTALLATION

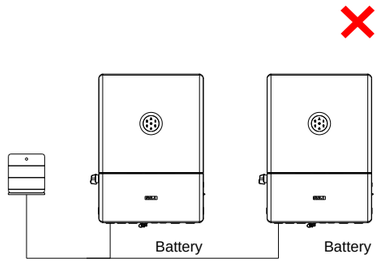
3.1 Installation Diagram



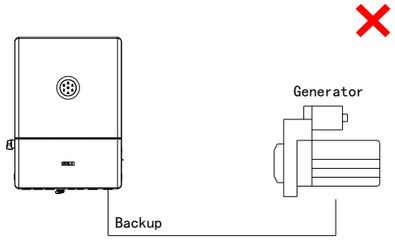
The following installation examples should be avoided. Any damage caused will not be covered by the warranty policy.



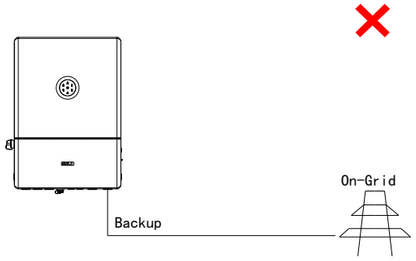
Single PV string can not be connected to multiple inverters.



Single battery bank can not be connected to multiple inverters.



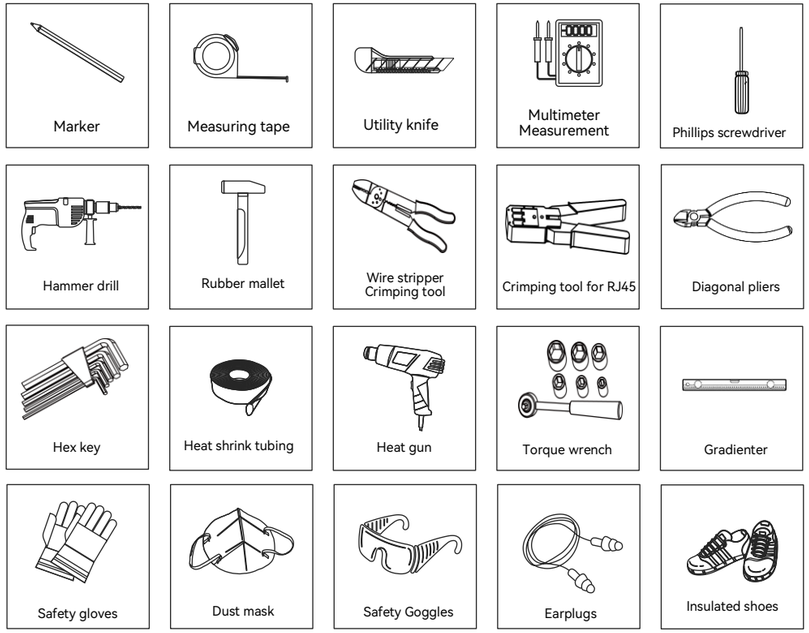
Back-up side can not be connected to any AC generator.



Back-up side can not be connected to grid.

3.2 Installation Tools

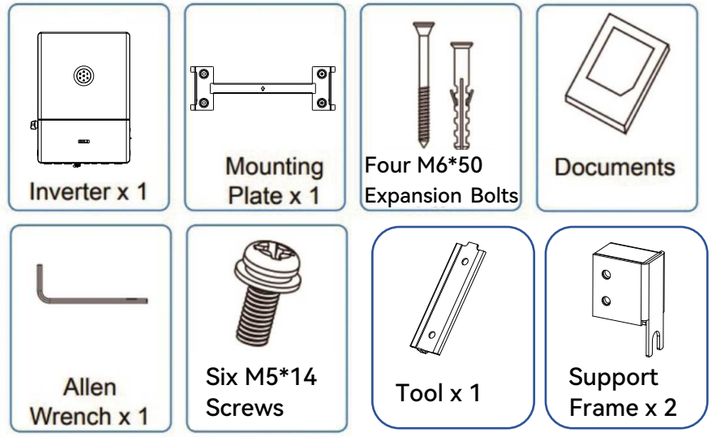
Installation tools include but are not limited to the following recommended ones. Please use other auxiliary tools on site if necessary.



3.3 Pre-installation Check

■Visual Check

Although SAJ's inverters have passed stringent test and are checked before they leave the factory, the inverters may still suffer damages during transportation. Please check the package for any obvious signs of damage, and if such evidence is present, do not open the package and contact your dealer as soon as possible.



■Check the Assembly Parts

Please refer to the Packing List inside the accessory bag.

3.4 Mounting Orientation and Clearance

The inverter uses natural convection cooling, it can be installed indoor or outdoor.

(1) Do not expose the inverter to direct sunlight as this could cause power derating due to overheating.

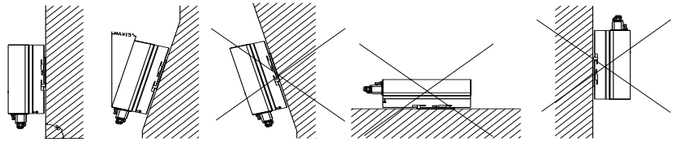


Figure 3.1

Mounting orientation

(2) Mount vertically with tilting angle no greater than 15°. Never install the inverter horizontally or upside down.

(3) Install the inverter at eye level for easy inspection of the LED indicators and possible maintenance activities.

The minimum clearance requirement for multiple inverter installation is shown as below.

3.5 Installing the Inverter

Please reserve enough clearance around the inverter to ensure a good air circulation at the installation area.

Because poor air ventilation will affect the working performance of internal electronic components and shorten the service life of the system.

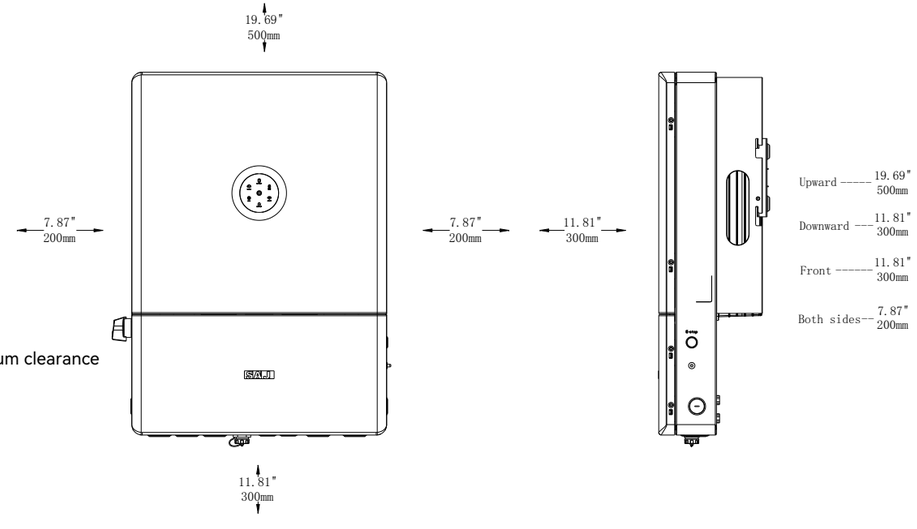


Figure 3.2 Minimum clearance

Wall Mounting

Step 1: Determine the installation position and drill holes on the wall.

Note: Reserve enough distance at the inverter bottom for installing the metal cable conduits.

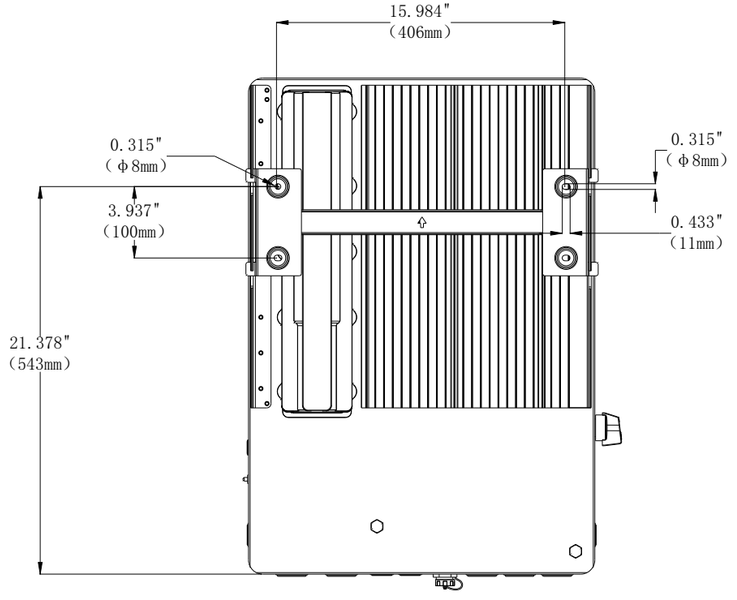


Figure 3.3 Dimensions of mounting bracket

Step 2: Use the four M6x50 expansion tubes in the holes using a rubber mallet. And use four M6x50 expansion bolts to fix the mounting plate to the wall.

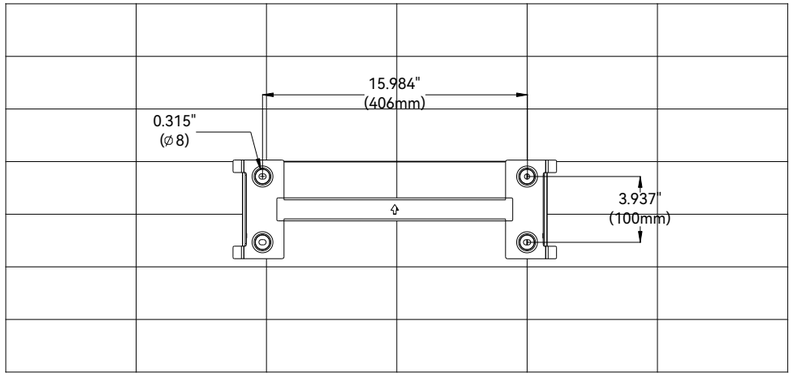


Figure 3.4

Mounting the bracket

Step 3: Mount the inverter to the plate. Install three M5*14 screws on each side of the inverter.

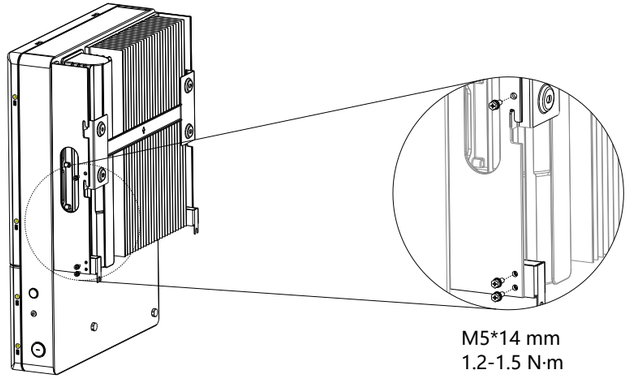


Figure 3.5 Tighten the screws

3.6 Installing the SBU

Install the SBU between the grid and the inverter. Connect cables to the grid and loads. For details, refer to the SBU user manual.

3.7 Installing the Battery

Install the battery. For details, refer to the battery user manual.

Warning: On one battery, do NOT connect its positive port (BAT+) to its negative port (BAT-). This will short-circuit this battery, causing serious battery damage.

Note: For regulation compliance, you can install a battery isolator ≥70A near the inverter, except that you are using the SAJ B2 battery model which has a built-in DC isolator in its high-voltage box unit: B2-7.3-HV5, B2-14.6-HV5, or B2-21.9-HV5.

4.

ELECTRICAL CONNECTION

4.1 Safety Instruction

Electrical connection must only be carried out by professional technicians. 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. · The wiring and connection of the inverter should be carried out by qualified technicians in accordance with local and national electrical standards and regulations.

WARNING
·When the photovoltaic array is exposed to light, it supplies a DC voltage to the inverter.

NOTICE
·Electrical connection should in conformity with proper stipulations, such as stipulations for cross-sectional area of conductors, fuses and ground protection. ·The overvoltage category on DC input port is II, on AC output port is IV. ·The high-voltage inverter is set to a single-phase 240V grid, do not connect to a 120V load.

4.2 Earth Fault Alarm

This inverter complies with IEC 62109-2 clause 13.9 for earth fault alarm monitoring. If an earth Fault Alarm occurs, the second LED indicator will be lit up until the error being solved and inverter functioning properly.

Note: The inverter cannot be used with functionally earthed PV Arrays.

4.3 Cable Holes

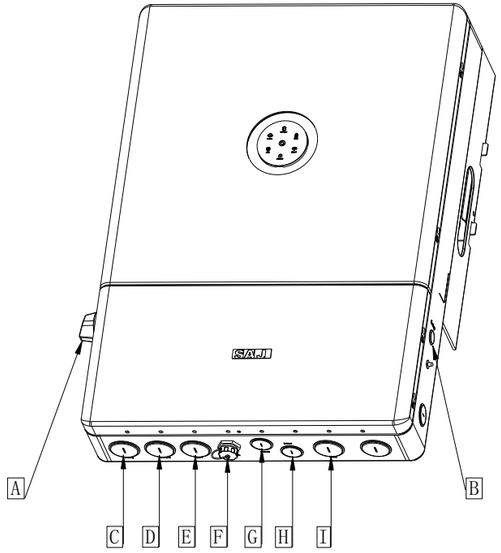


Figure 4.1 Cable holes on the inverter

Callout	Description
A	DC Switch
B	E-stop
C	PV1-2
D	PV3-4
E	BAT
F	4G/WI-FI
G	COM2
H	COM1
I	GRID

4.4 Electrical Terminals

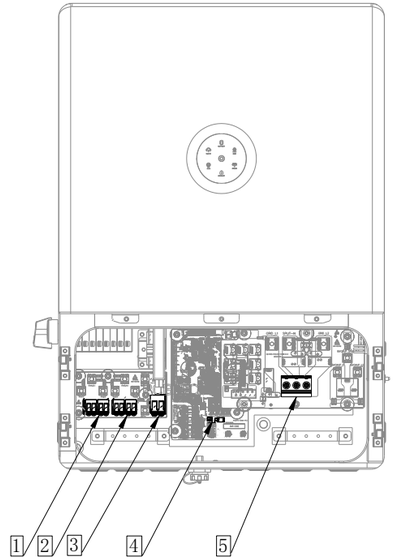


Figure 4.2 Electrical terminal of the inverter

Callout	Description
1	PV1-2
2	PV3-4
3	BAT
4	4G/WI-FI
	COM2
	COM1
5	GRID

4.5. Knockout Holes Dimension and Location

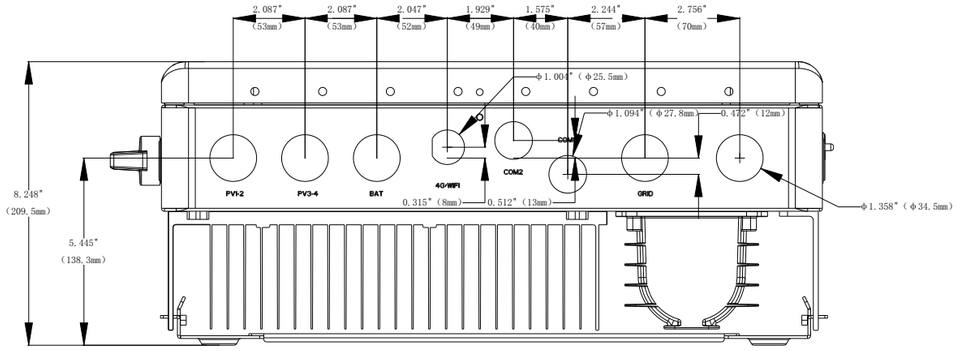


Figure 4.3 Dimension and Location

Note: Description of knockout holes dimension.

PV1-2	34.5mm (1.358")	COM1&COM2	27.8mm (1.094")
PV3-4	34.5mm (1.358")	4G/WI-FI	25.5mm (1.004")
BAT	34.5mm (1.358")	GRID	34.5mm (1.358")

4.6 Opening the Wiring Compartment of the Inverter

1. Use the Allen Wrench to press down four locks on both sides of the inverter. Then, remove the cover.
2. Use a flathead screwdriver to remove the cable hole fillers. (Inserting into the hole and anti-clock rotation)

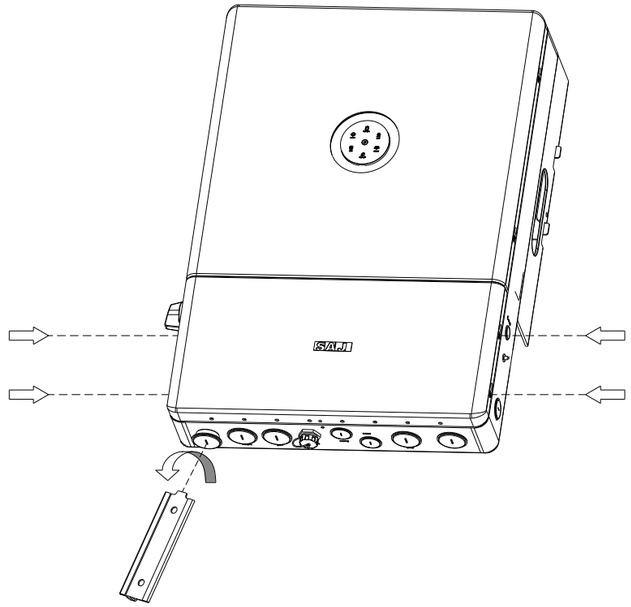


Figure 4.4 Opening the Wiring Compartment

4.7 Assembling the SBU Power Connection

Step 1: Insert the 12 V power cables through cable hole D at the bottom of the SBU. For the cable hole location, see section 3.4 “Cable Holes” in the SBU user manual.

Step 2: Loosen screws in the high-voltage terminal on the inverter. Connect the 12 V power cables from the SBU to the inverter, as shown below. Then, tighten the screws.

Cable (color)	Red	Black
From (the SBU)	Position 1	Position 4
To (the inverter)	Position 9	Position 10

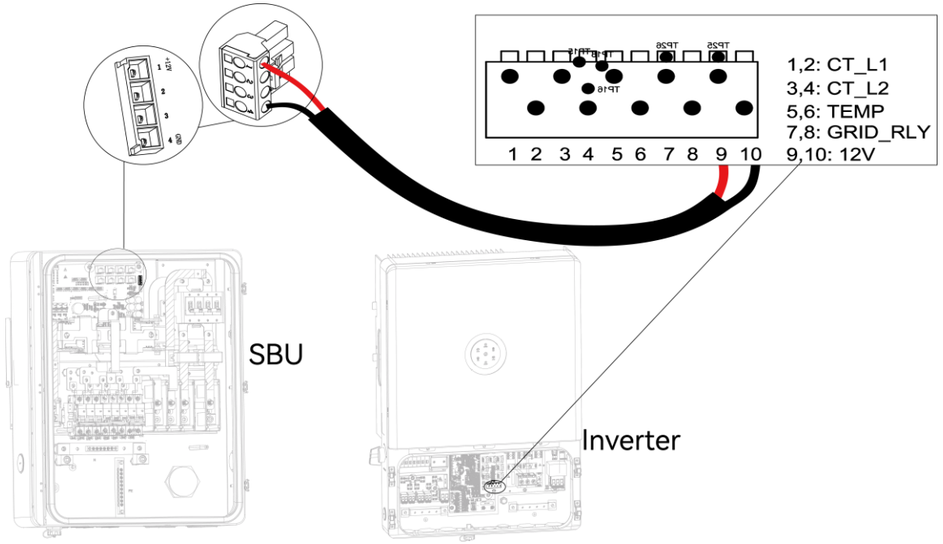
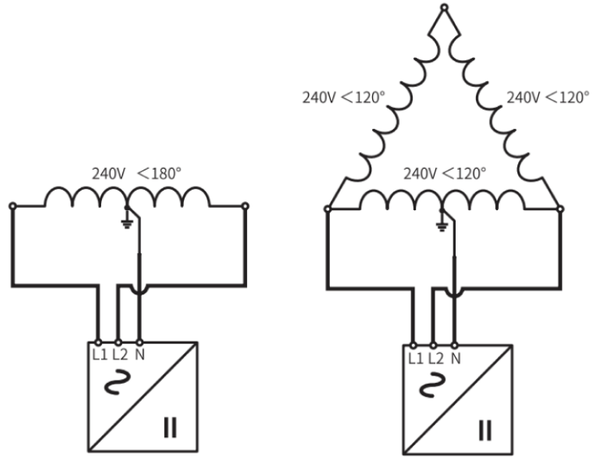


Figure 4.5 Power connection

4.8 Assembling the AC-side Electrical Connection



240V/120V split-phase AC grid　　240V/120V delta AC grid

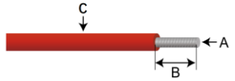
Install the SBU between the grid and inverter for safety operation and regulation compliance.

Inverter Model	AC Breaker	Cable Size
H2-5K-S3-US	30A	10AWG
H2-7.6K-S3-US	40A	8AWG
H2-8.6K-S4-US	45A	8AWG
H2-10K-S4-US	55A	8AWG
H2-12K-S4-US	70A	6AWG

Table 4.1 Recommended cables

In case where the inverter is too far from the grid connection point, please use larger cable size to ensure the voltage drop from grid connection point to inverter is within 2% of the grid voltage.

Step 1: Strip the insulation (18-mm/0.71-inch length) on the cable ends.



Grade	Description	Value
A	Conductor core section	6AWG
B	Conductor core length	18mm（0.71in.）
C	Outside Diameter	Max7.4mm（0.29in.）

If needed, you can put a terminal on the cable end, as shown below.

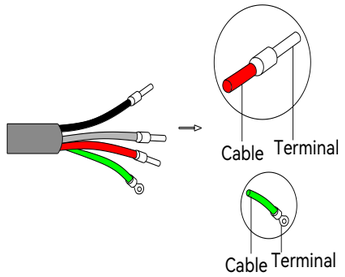


Figure 4.6 AC-side electrical connection

Step 2: Open the wiring compartment. Insert the grid cable through the conduit and connect to the corresponding terminals L1, L2, N, and PE. Use a standard torque (2N.m) to tighten the screws.

Cable (color)	L1 (black)	L2 (red)	N (white)	PE (green)
From (the SBU)	L1 terminal	L2 terminal	N terminal	PE terminal
To (the inverter)	L1 terminal	L2 terminal	N terminal	PE terminal

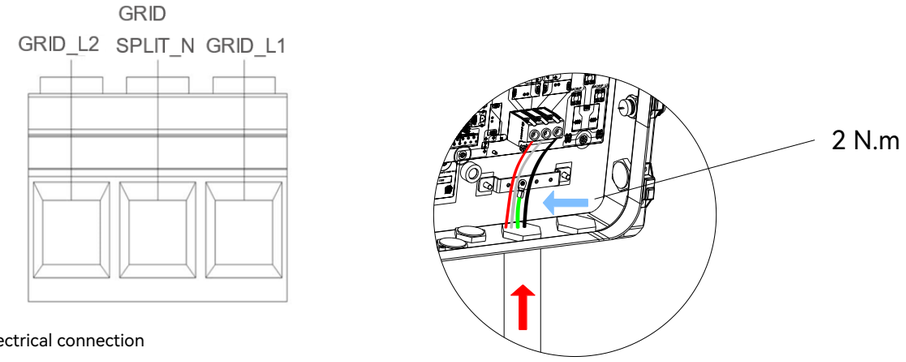


Figure 4.6 AC-side electrical connection

4.9 Connecting the Battery to the Inverter

Approved compatible battery list.

Brand	Model
SAJ	B2-7.3/14.6/21.9-HV5

Note: 1. The H2 series inverter is only compatible with the batteries listed above, any other unapproved battery connections will lead the inverter warranty to be voided.

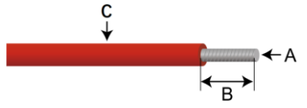
2. Some utility company or electrical regulation may require a battery isolator to be installed near the inverter, Please choose a battery isolator≥70A for regulation compliance.

3. 1* The B2 battery has a built-in DC isolator at the side of its high-voltage box unit.

4. For multiple batteries connection, please refer to the user manual of B2 battery.

Warning: Do NOT connect the positive port to the negative port on one battery. This will short-circuit this battery, causing serious battery damage.

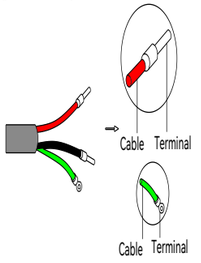
Step 1: Stripe off the insulation (0.71-inch length) of the battery cable.



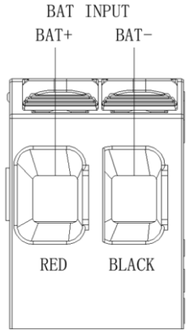
Grade	Description	Value
A	Conductor core section	6AWG
B	Conductor core length	18mm（0.71in.）
C	Outside Diameter	Max7.4mm（0.29in.）

Table4.4 Recommended Specifications of DC Cables

If needed, you can put a terminal on the cable end, as shown below.



Step 2: Insert the cables through the conduit and connect it to the battery terminals in the wiring compartment.



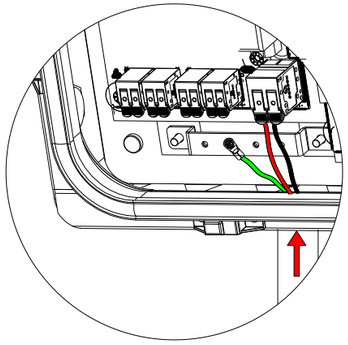


Figure 4.7 Battery connection

4.10 Assembling the Communication Connection

Step1: Insert the prepared communication cables through the conduit and connect to the corresponding communication ports.

a. Connect the CAN port on the BMS to the BMS/CAN port on the inverter.

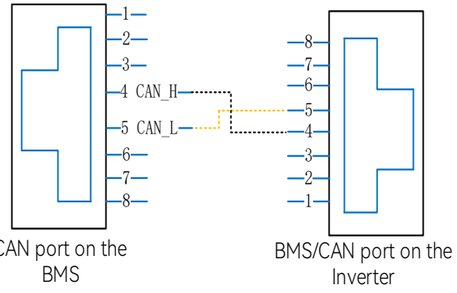


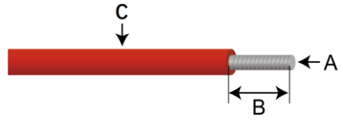
Figure 4.8 Communication connection

b. Connect the H2-CAN port on the SBU to the GATEWAY_CAN port on the inverter.

Step2: Toggle the DIP Switch SW2 down.

4.11 Assembling the PV-side Electrical Connection

Step 1: Strip the insulation (18-mm/0.71-inch length) of the PV cable ends. User cable ferrules if the cable is of multi-strand type.



Grade	Description	Value
A	Conductor core section	12AWG
B	Conductor core length	18mm（0.71in.）
C	Outside Diameter	Max5.6mm（0.22in.）

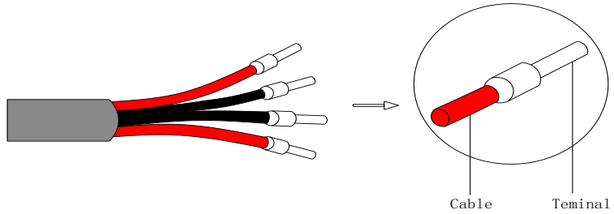
Table 4.2 Recommended Cables

PV conductors are made up of the positive conductor and the negative conductor.

NOTICE

1.The connector separately after unpacking to avoid confusion for connection of cables.
2.Connect the positive connector to the positive side of the solar panels and connect the negative connector to the negative side of the solar side. Be sure to connect them in right position.
3·Before insert the connector into DC input terminal of the inverter, please make sure that the DC switch of the inverter is OFF.

If needed, you can put a terminal on the cable end, as shown below.



Step 2: Ensure the DC switch on the left side of the inverter is OFF.

Step 3: Insert the PV cables through the conduits and connect them to the PV terminals in the wiring compartment.

For PV1-2, refer to the left two figures; for PV3-4, refer to the right two figures.

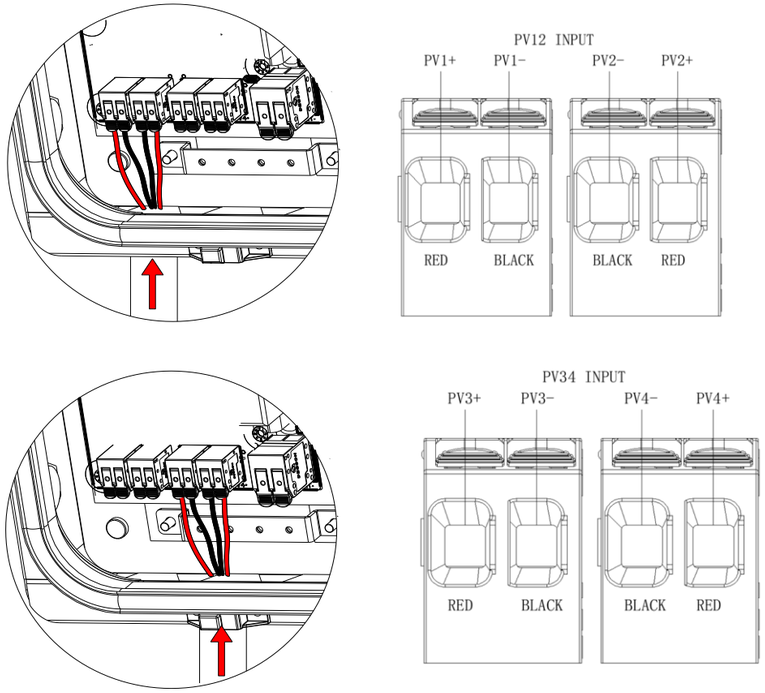


Figure 4.9 PV-side electrical connection

Step 4: Close the cover of the wiring compartment.

4.12 Performing subsequent operations

1. Open the DC switch on the PV side.
2. Open the battery switch.
3. Ensure the SBU is connected properly. Open the breaker on the grid side.
4. Perform system commissioning on the eSAJ Home APP. For details, see the configuration instructions.

4.13 CAN Communication DIP Switch Description

SW2-1 is SBU CAN communication 120Ω impedance matching.

SW2-2 road is CAN communication 120Ω impedance matching of lithium battery.

SW3-2 is energy storage inverter parallel CAN communication 120Ω impedance matching.

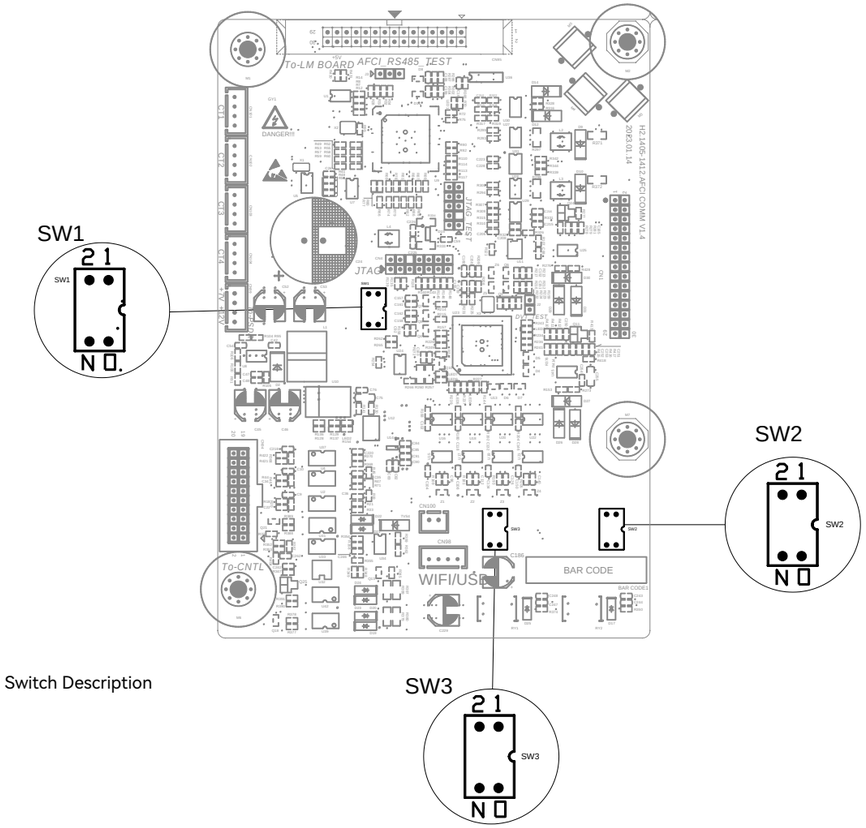


Figure 4.10 DIP Switch Description

4.14 System Connection

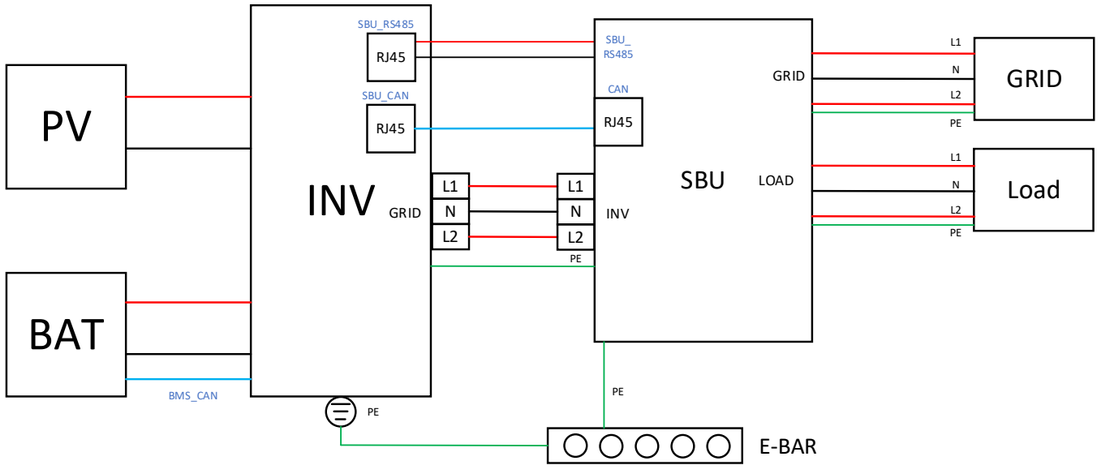


Figure 4.11 Without Generator

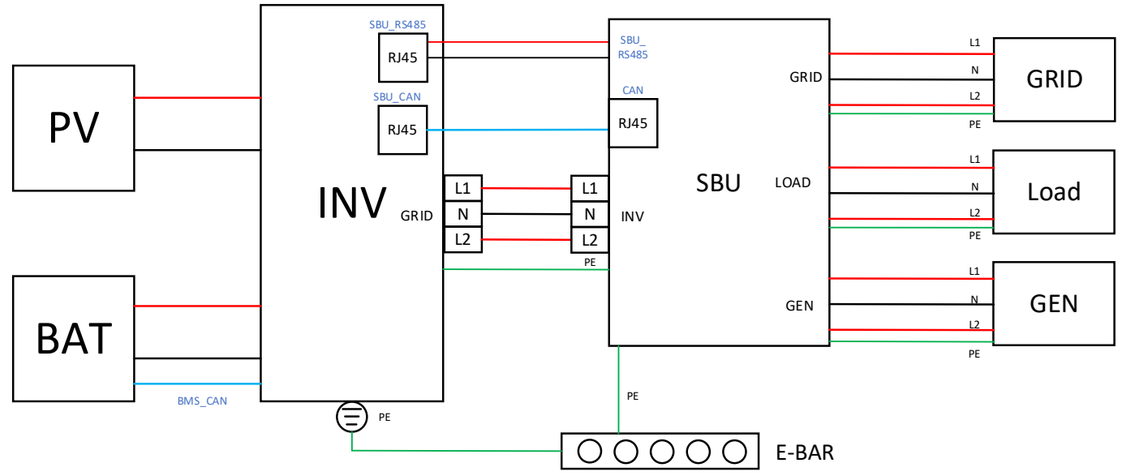


Figure 4.12 With Generator

4.15 RSD Connection

The H2 inverter has built-in RSD protection.

The compatible RSD device includes APsmart RSD-D.

Transmitter model: Transmitter-PLC-1P.

4.16 H2+SBU Connection

The GEN-CT and MAIN-CT terminals for connecting to the CTs are integrated into the SBU. The following illustration is only used to show the cabling.

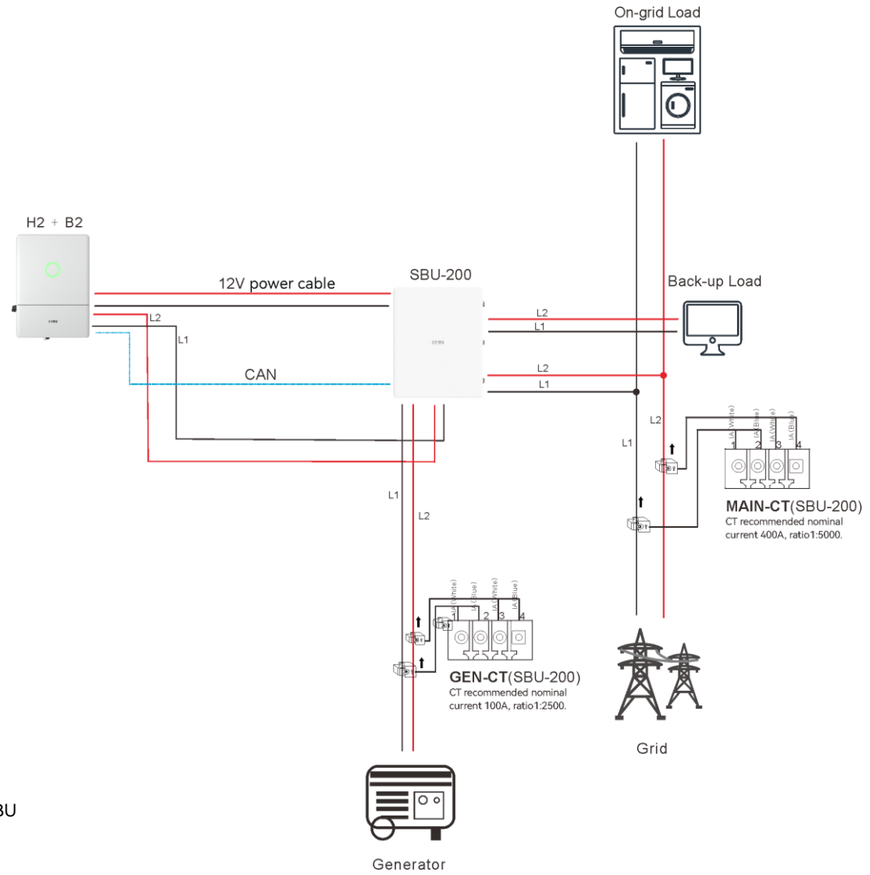
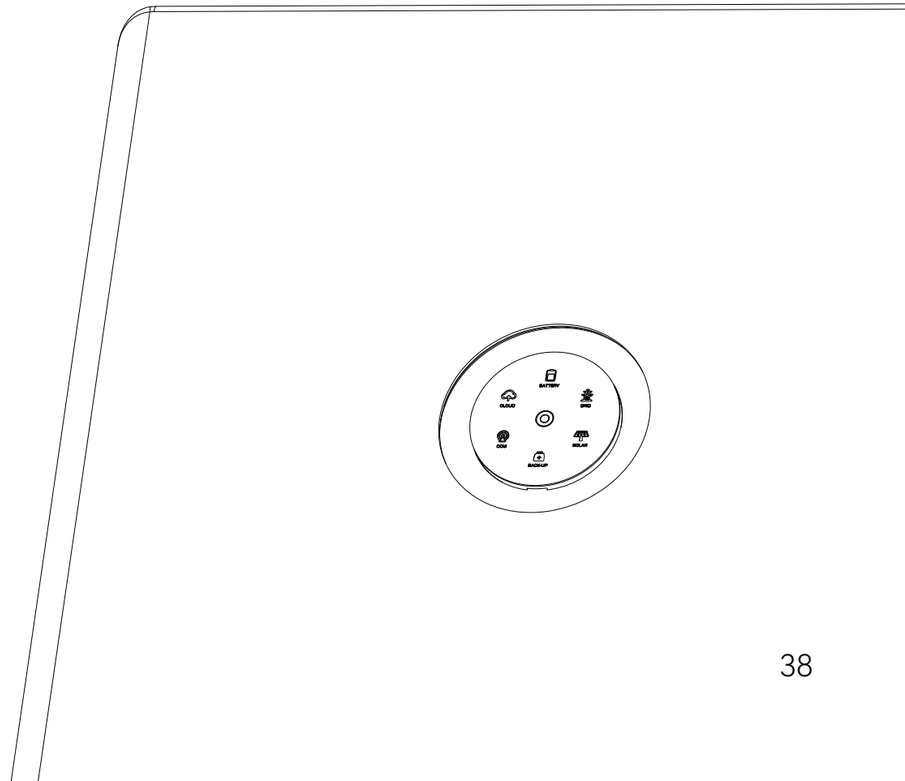


Figure 4.13 H2+SBU



5.

SYSTEM COMMISSIONING

5.1 Startup

The H2 series inverter can be started up by the following procedure:

1. Turn on the external AC switch (grid side)

2. Turn on the DC switch on the inverter

3. Turn on the battery switch

4. Lastly, turn on the PV isolator

5.2 eSAJ APP Connection

5.2.1 Installer APP Installation

1. The APP supports Bluetooth and 4G or Bluetooth and Wi-Fi to communicate with the device. it is an APP for nearby and remote monitoring.

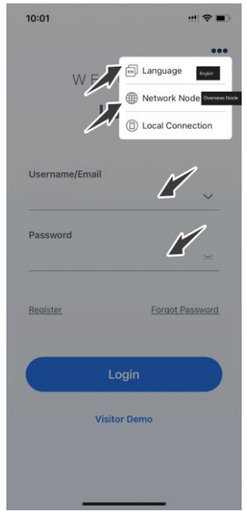
2. Search for “eSAJ Home” in the App store and download this App.

5.2.2 First Login

There are two ways to log in to the APP. The operation of APP local connection and account login initialization setting is the same.

Account Login:

Step 1: Open the APP and click on the three-dot icon on the top right corner. Set the language to “English” and network node to “Overseas Node”.

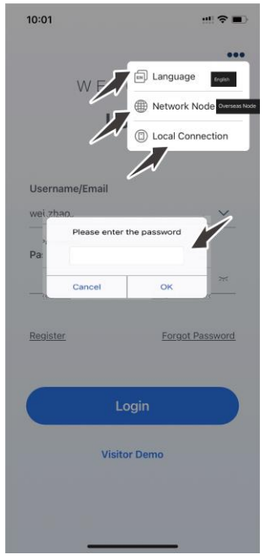


step 2: Log in APP, if you do not have an account, please register first. Go to the “Tool” interface and select “Remote Configuration”. Click on “Bluetooth” and activate the Bluetooth function on your phone, then click on “Next”.

Step 3: Choose your inverter according to your inverter SN. Click on the inverter to enter inverter setting.

Local connection:

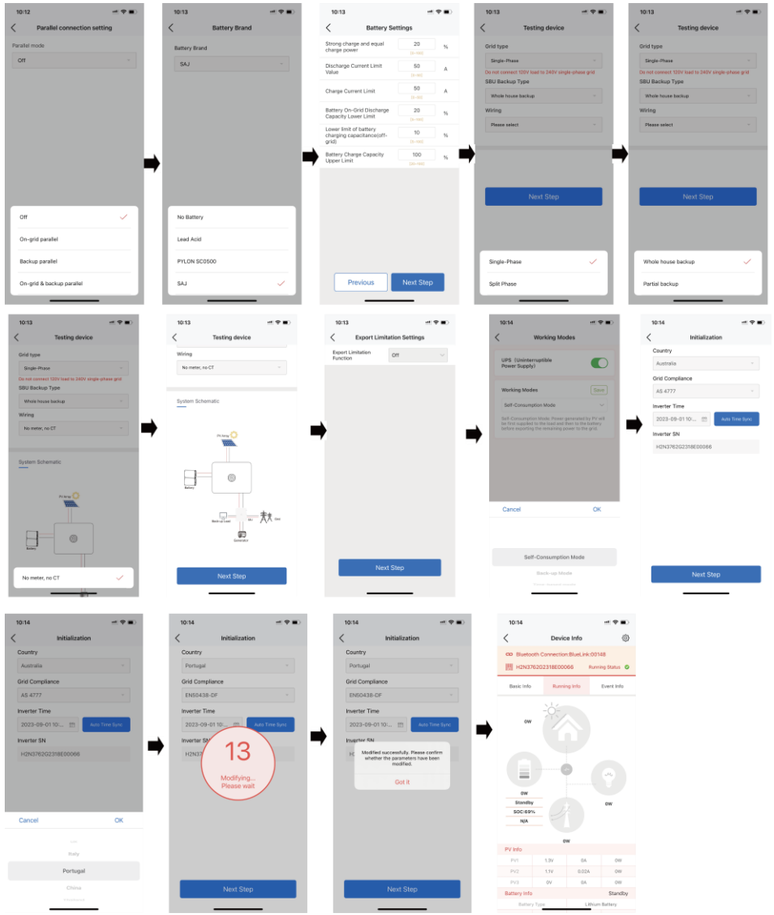
Step 1: Open the APP and click on the three-dot icon on the top right corner. Set the language to “English” and network node to “Overseas Node”. Enter the password “123456.”



Step 2: Click on “Bluetooth” and activate the Bluetooth function on your phone, then click on “Next”.

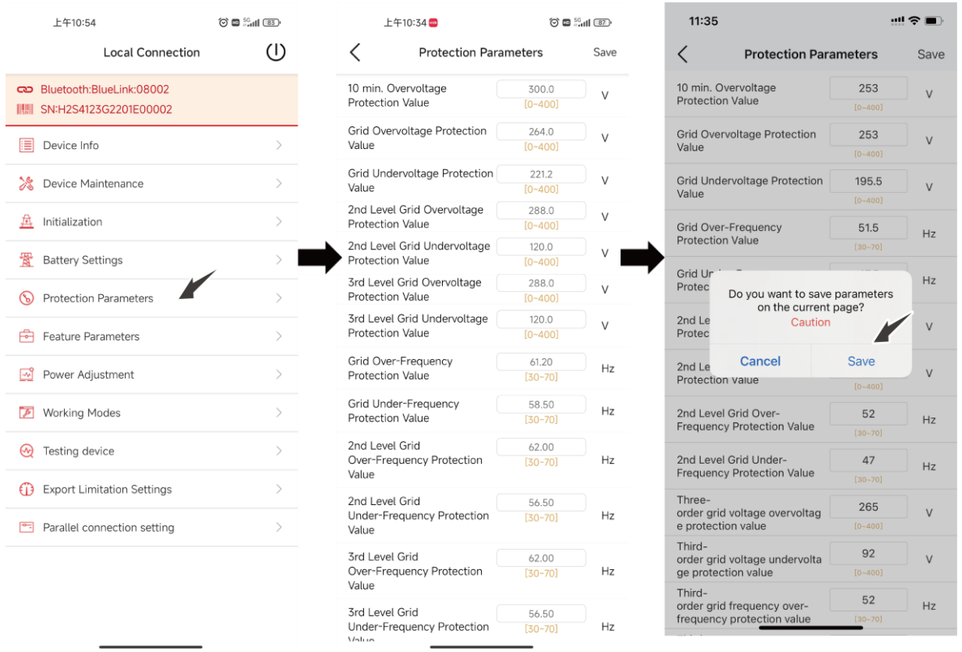
Step 3: Choose your inverter according to your inverter SN. Click on the inverter to enter inverter setting.

Step 4: (local connection and account login) Follow the instructions on the screen.



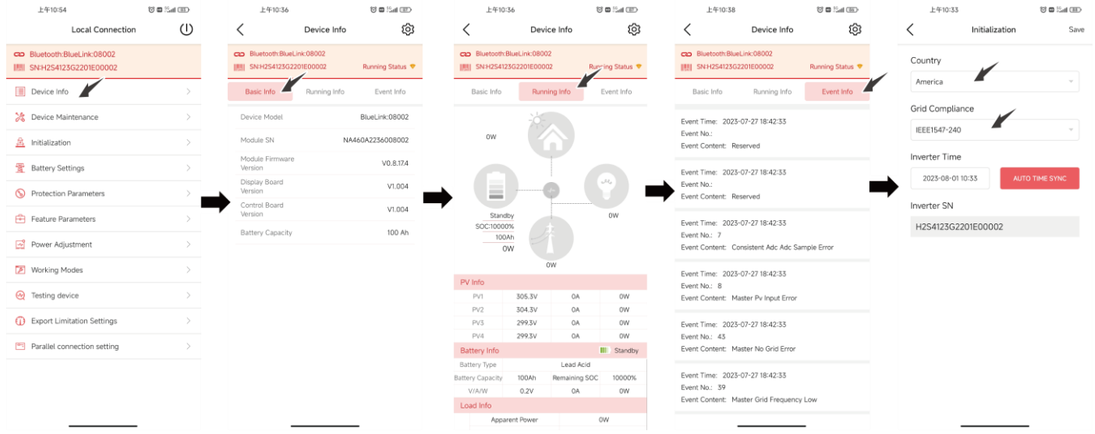
5.3 Protection Parameter Setting

Corresponding modification of protection parameters will take effect only after saving.



5.4 Inverter Setting Review

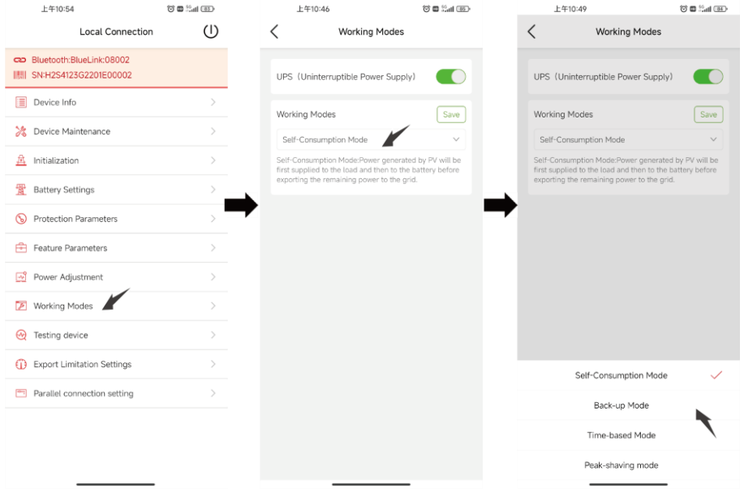
After commissioning, the device info including device basic info, running info and event info can be viewed. Country and grid code can be viewed from initial setting.



5.5 Remote Monitoring

Connect the internet Via the 4G/Wi-Fi module and upload the inverter data onto the server and customers could monitor running information of the inverter remotely via the eSolar Web Portal or their mobile customer terminals.

5.6 Selecting Working Modes



Self-consumption 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.

Back-up Mode: Back-up Mode: Ensure that the battery SOC does not fall below the set value. If the battery SOC is lower than the set value, the PV will charge the battery preferentially. If the grid charging function is enabled, the power grid will also charge the battery according to the set power. After the set value is met, power generated by PV will be first supplied to the load and then to the battery. The battery will only discharge if its SOC exceeds 2% of the set value.

Time-based Mode: Set the charging and discharging of batteries according to the electricity price difference between peak and valley periods of the local grid.

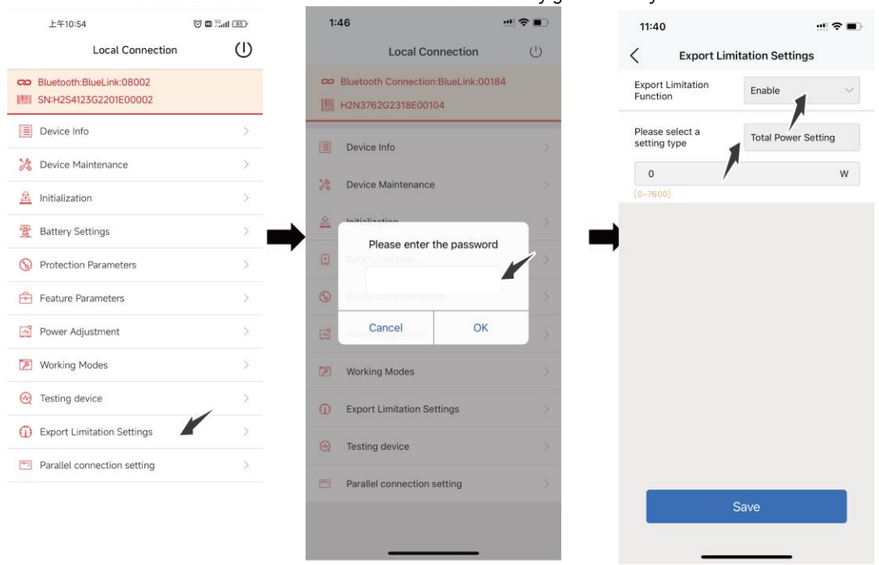
Peak-shaving Mode: Limit grid output power to set values. If the load power exceeds the permissible value it will be supplemented by photovoltaic energy and batteries. If it still cannot meet the load demand; the grid will increase the power to reach it.

5.7 Export Limit Setting

There are two methods to control the export limit, the two methods are alternative to each other.

Method 1: Export limitation setting is to control the export electricity to the grid.

Method 2: Generation limit is to control the electricity generated by the inverter.



5.8 Shutdown

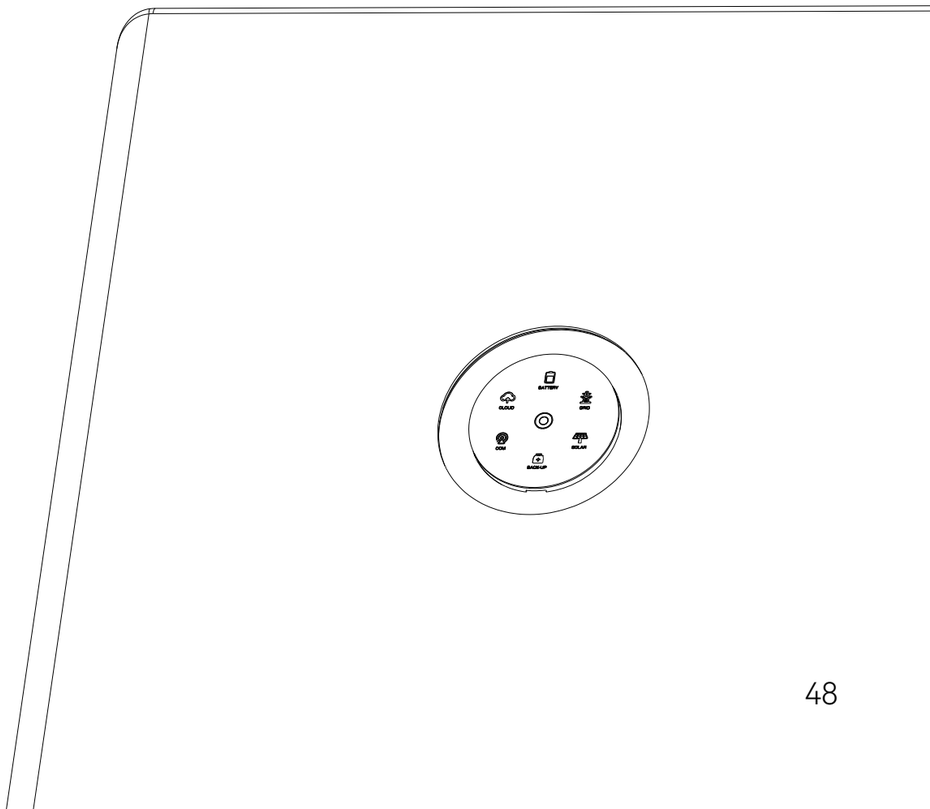
The H2 inverter can be shut down by the following procedure:

1. Press the "E-stop" button (Note: PV cannot be turned off directly to prevent arc pulling).

2. Turn off the external AC switch (grid side).

3. Turn off the DC switch on the inverter.

4. Turn off the battery switch.



6.

TROUBLESHOOTING

Error Description	Explanation	Solution
Bus Voltage High (energy store)	The input voltage of PV string is over the max. DC input voltage of the inverter. Due to improper PV panels arrangement.	1. Check the panels quantities in each PV strings and calculate the open circuit voltage in each string to make sure its lower than the Max input DC voltage of inverter. 2. After above checking restart inverter to see whether this problem is solved. If not, contact local agent or SAJ service center.
Bus Voltage Low (energy store)	DC bus voltage is under the limitation	1. Switch off the breakers from PV panels and Battery, first and switch off the AC breaker (Grid side) for 5mins, then restart the hybrid inverter. *2. If this error occurred frequently, contact local agent or SAJ* service line.
PV Voltage High Error (energy store)	The input voltage of PV string is over the max. DC input voltage of the inverter. Due to improper PV panels arrangement.	1. Check the panels quantities in each PV strings and calculate the open circuit voltage in each string to make sure its lower than the Max input DC voltage of inverter. 2. After above checking and this error occurred frequently, contact local agent or SAJ service line.
Slaver Sample Error	Slaver cFault_SampleCircuitOffset	1. Switch off the breakers from PV panels and Battery first and switch off the AC breaker (Grid side) for 5mins, then restart the hybrid inverter. 2. If this error occurred frequently, contact local agent or SAJ service line.
Master Sample Error	Master cFault_SampleCircuitOffset	2. Switch off the breakers from PV panels and Battery first and switch off the AC breaker (Grid side) for 5mins, then restart the hybrid inverter. 2. If this error occurred frequently, contact local agent or SAJ service line.
PV Input Error	PV Input Error	1. Check the inverter's PV input wire 2. After above checking and this error occurred frequently, contact local agent or SAJ service line
Freq config Error	Freq config Error	1. Confirm the frequency of the power grid and check whether the rated frequency of the safety configuration is proper. 2. After the above problems are troubleshot, the machine still

Error Description	Explanation	Solution
		reports this fault. Contact the installer or the manufacturer's service center.
Bus Voltage High (Hw)	The input voltage of PV string is over the max.DC input voltage of the inverter. Due to improper PV panels arrangement.	1. Check the panels quantities in each PV strings and calculate the open circuit voltage in each string to make sure its lower than the Max input DC voltage of inverter. 2. After above checking restart inverter to see whether this problem is solved. If not, contact local agent or SAJ service line.
PV Over Current (Hw)	Input current over limitation	1. Check the panel configuration & arrangement in PV strings, confirm the PV current in each string within the max DC Input current of inverter. 2. Switch off the breakers from PV panels and Battery first and switch off the AC breaker (Grid side) for 5mins, then restart the hybrid inverter. 3. After above checking and this error occurred frequently, contact local agent or SAJ service line.
Consistency Error	The inverter is under disturbing	1. Switch off the AC breaker first and cut off the DC switch for 5mins, then restart the inverter. 2. If this error occurred frequently, contact local agent or SAJ service line.
Inverse Curr. High Err (HW)	The reverse current exceeds the allowable range	1. Switch off the AC breaker (Grid side) first and switch off the breakers from PV panels and Battery, then check the AC cable in right polarity & firm connection. 2. After above checking restart inverter to see whether this problem is solved. If not, contact local agent or SAJ service line.
BAT Cur Error (Hw)	The current charging or discharging battery is over limitation	1. Checking whether real-time load (back up) exceeds the Rate output power of inverter or not. 2. Switch off the breakers from PV panels and Battery first and switch off the AC breaker (Grid side) for 5mins, then restart the hybrid inverter. 3. After above checking and this error occurred frequently, contact local agent or SAJ service line.

Error Description	Explanation	Solution
BLC Curr Error	The BLC current is over limitation	1. Switch off the breakers from PV panels and Battery first and switch off the AC breaker (Grid side) for 5mins, then restart the hybrid inverter. 2. After above checking and this error occurred frequently, contact local agent or SAJ service line.
Ground Detecting Error	Earth fault on a phase line occurred	1. Check the Phase-Ground voltage to confirm whether there exist Ground fault problem in AC side. 2. After above checking and this error occurred frequently, contact local agent or SAJ service line
AFCI Device check Error	AFCI Device check Error	1. Switch off the breakers from PV panels and Battery first and switch off the AC breaker (Grid side) for 5mins, then restart the hybrid inverter. 2. If this error occurred frequently, contact local agent or SAJ service line.
AFCI Error	PV Input produce electric arc	1. Switch off the AC breaker first and cut off the DC switch for 5mins, then restart the inverter. 2. If this error occurred frequently, contact local agent or SAJ service line.
PV Over Current (Sw)	Input current over limitation	1. Check the panel configuration & arrangement in PV strings, confirm the PV current in each string within the max DC Input current of inverter. 2. Switch off the breakers from PV panels and Battery first and switch off the AC breaker (Grid side) for 5mins, then restart the hybrid inverter. 3. After above checking and this error occurred frequently, contact local agent or SAJ service line.
Battery Voltage Error	Battery voltage out of permissible range	1. Confirm the Battery voltage is not over or under the inverter setting range. 2. Check the Battery is on. 3. Check the float voltage is proper in charging setup. 4. After above checking and this error occurred frequently, contact

Error Description	Explanation	Solution
		local agent or SAJ service line.
BAT Curr Error (Sw)	The current charging or discharging battery is over limitation	1. Checking whether real-time load (back up) exceeds the Rate output power of inverter or not. 2. Switch off the breakers from PV panels and Battery first and switch off the AC breaker (Grid side) for 5mins, then restart the hybrid inverter. 3. After above checking and this error occurred frequently, contact local agent or SAJ service line.
Generator Overload Error	The Generator power is over the inverter rated output power and duration out of permit-table range	1. Checking whether real-time load (back up) exceeds the Rate output power of inverter or not. 2. checking whether Max Gen power is OK 3. Regarding inductive load such as the Air-conditioner/ Fridge/ Fans etc, choose the peak shift operation to avoid the the starting power gathering at same time. 4. If this error occurred frequently, contact local agent or SAJ service line.
Inverse Curr.High Err (SW)	Inverse current exceeds the permit-table range	1. Switch off the AC breaker (Grid side) first and switch off the breakers from PV panels and Battery, then check the AC cable in right polarity & firm connection. 2. After above checking restart inverter to see whether this problem is solved. If not, contact local agent or SAJ service line.
Battery Open Circuit Warning	Low battery voltage, possibly battery not connected or open circuit.	1. Check the battery configuration and measure the battery input terminals to confirm the Battery voltage not under the inverter setting range. 2. Check the Battery is "Power-on" setup. 3. After above checking and this error occurred frequently, contact local agent or SAJ service line

Error Description	Explanation	Solution
BMS Voltage Low Warning	the battery is low	1. Check the specification of Battery to confirm whether is applied for Hybrid device. 2. Check the "Charging voltage" setup inside inverter. 3. Switch off the breakers from PV panels and Battery first and switch off the AC breaker (Grid side) for 5mins, then restart the hybrid inverter. 4. After above checking and this error occurred frequently, contact local agent or SAJ service line.
Lost Com. （slaver）	Data communication lost between slaver and display board	1. Switch off the breakers from PV panels and Battery first and switch off the AC breaker (Grid side) for 5mins, then restart the hybrid inverter. 2. If this error occurred frequently, contact local agent or SAJ service line.
Lost Com. （master）	Data communication lost between master and display board	1. Switch off the breakers from PV panels and Battery first and switch off the AC breaker (Grid side) for 5mins, then restart the hybrid inverter. 2. If this error occurred frequently, contact local agent or SAJ service line.
Master Relay Error	Relay units unstable operation	1. Switch off the breakers from PV panels and Battery first and switch off the AC breaker (Grid side) for 5mins, then restart the hybrid inverter. 2. If this error occurred frequently, contact local agent or SAJ service line.
Master Relay Error	Relay units unstable operation	1. Check the AC cable in right polarity & firm connection; 2. Check the voltage between Phase/Neutral and ground cable in normal value; 3. Switch off the breakers from PV panels and Battery first and switch off the AC breaker (Grid side) for 5mins, then restart the hybrid inverter. 4. If this error occurred frequently, contact local agent or SAJ service line.

Error Description	Explanation	Solution
Inverter Temperature High Error	Temperature inside inverter over the limitation	1. Check the cooling channel of base not get stuck and in good ventilation condition; 2. Inverter should be installed in the absence of direct sunlight; 3. If this error occurred frequently, contact local agent or SAJ service line.
Inverter Temperature Low Error (energy store)	Temperature inside inverter lower the limitation	1. Switch off the AC breaker (Grid side) first and switch off the breakers from PV panels and Battery for 5mins, then restart the hybrid inverter. 2. If this error occurred frequently, contact local agent or SAJ service line.
Spi Com Lost	Data communication lost between control master and slaver CPU	1. Switch off the breakers from PV panels and Battery first and switch off the AC breaker (Grid side) for 5mins, then restart the hybrid inverter. 2. If this error occurred frequently, contact local agent or SAJ service line.
GFCI Device Error	The function of internal Ground fault circuit device failed	1. Switch off the breakers from PV panels and Battery first and switch off the AC breaker (Grid side) for 5mins, then restart the hybrid inverter. 2. If this error occurred frequently, contact local agent or SAJ service line.
Grid Voltage High	Grid voltage over the limitation of present "Grid compliance" setted	1. Check the grid voltage in display screen or measure in AC breakers, confirm whether it's in proper gird voltage range; 2. Check the AC cable in right polarity & firm connection; 3. Check the grid compliance setted inside inverter, and choose the wider voltage accepted “Grid compliance” 4. After above checking item and this error occurred frequently, contact local agent or SAJ service line.

Error Description	Explanation	Solution
Grid Voltage Low	Grid voltage under the limitation of present "Grid compliance" setted	1. Check the grid voltage in display screen or measure in AC breakers, confirm whether it's in proper gird voltage range; 2. Check the AC cable in right polarity & firm connection; 3. Check the grid compliance setted inside inverter, and choose the wider voltage accepted “Grid compliance” 4. After above checking and this error occurred frequently, contact local agent or SAJ service line.
Grid Voltage 10Min High (energy store)	Average grid voltage in 10mins over the limitation of present "Grid compliance" setted	1. Switch off the breakers from PV panels and Battery first and switch off the AC breaker (Grid side) for 5mins, then restart the hybrid inverter. 2. If this error occurred frequently, contact local agent or SAJ service line.
Abnormal output terminal connection (AC coupling inverter)	Output terminal is wrongly connected to the grid or there is voltage in output terminal.	1. Check if output terminal cables of the inverter are normally connected; 2. If the error still exists, contact local agent or SAJ service hotline 400-159-0088.
cFault_BatRly	Bat Relay units unstable operation	1. Check the Bat cable in right polarity & firm connection; 2. Check the voltage between Bat and inverter cable in normal value; 3. Switch off the breakers from PV panels and Battery first and switch off the AC breaker (Grid side) for 5mins, then restart the hybrid inverter. 4. If this error occurred frequently, contact local agent or SAJ service line.
Grid Frequency High (energy store)	Grid frequency over the limitation of present "Grid compliance" settled	1. Check the grid compliance setted inside inverter and choose the proper “Grid compliance” to meet the local grid circumstance. 2. Switch off the breakers from PV panels and Battery first and switch off the AC breaker (Grid side) for 5mins, then restart the hybrid inverter. 3. After above checking and this error occurred frequently, contact local agent or SAJ service line.

Error Description	Explanation	Solution
Grid Frequency Low (energy store)	Grid frequency under the limitation of present "Grid compliance" settled	1. Check the grid compliance setted inside inverter and choose the proper “Grid compliance” to meet the local grid circumstance. 2. Switch off the breakers from PV panels and Battery first and switch off the AC breaker (Grid side) for 5mins, then restart the hybrid inverter. 3. After above checking and this error occurred frequently, contact local agent or SAJ service line.
Overload Error	The output power is over the inverter rated output power and duration out of permittable range	1. Checking whether real-time load (back up) exceeds the Rate output power of inverter or not. 2. Regarding inductive load such as the Air-conditioner/ Fridge/ Fans etc, choose the peak shift operation to avoid the the starting power gathering at same time. 3. If this error occurred frequently, contact local agent or SAJ service line.
DCV Error in AC Output	Direct Volt component feeding into the grid is over the limitation	1. Switch off the breakers from PV panels and Battery first and switch off the AC breaker (Grid side) for 5mins, then restart the hybrid inverter. 2. If this error occurred frequently, contact local agent or SAJ service line.
Grid Lost Error (energy store)	Inverter cannot detect the grid voltage	1. Check whether grid is off or not, and make sure no open circuit exist in AC side by confirming cable in good connection and AC breakers not tripped. 2. Check the grid voltage by measuring the voltage in AC cable with multi-meter, and restart inverter. 3. If this error occurred frequently, contact local agent or SAJ service line.
BMS communication loss warning (master)	master MCU receive BMS com lost flag	1. Check if the lithium battery is opened; 2. Check communication line between the inverter and lithium battery is stably connected; 3. Check communication parameters setting of the inverter and lithium battery is correct, including address, baud rate, etc.

Error Description	Explanation	Solution
		4. If the error still exists, contact local agent or SAJ service hotline 400-159-0088.
Gen Relay Error	Gen Relay units unstable operation	1. Check the Gen cable in right polarity & firm connection; 2. Check the voltage between Gen and inverter cable in normal value; 3. Switch off the breakers from PV panels and Battery first and switch off the AC breaker (Grid side) for 5mins, then restart the hybrid inverter. 4. If this error occurred frequently, contact local agent or SAJ service line.
GFCI Error	The ground fault current in plant AC side is over the limitation	1. Switch off the breakers from PV panels and Battery first and switch off the AC breaker (Grid side) for 5mins, then confirm the AC cable in right polarity & firm connection, include Live/Neutral/Earth cable. 2. Check whether there exist insulation defects or soaking in AC cable. 3. After above checking restart inverter to see whether this problem is solved. If not, contact local agent or SAJ service line.
DCI Error in AC Output (energy store-Grid)	Direct current component feeding into the grid is over the limitation	1. Switch off the breakers from PV panels and Battery first and switch off the AC breaker (Grid side) for 5mins, then restart the hybrid inverter. 2. If this error occurred frequently, contact local agent or SAJ service line.
Isolation Error (energy store)	Insulation between PV strings and ground is under the limitation	1. Switch off the breakers from PV panels and Battery first and switch off the AC breaker (Grid side) for 5mins, then confirm the AC cable in right polarity & firm connection, include Live/Neutral/Earth cable. 2. Check whether there exist insulation defects or soaking in DC/PV cable. 3. After above checking restart inverter to see whether this problem is solved. If not, contact local agent or SAJ service line.

Error Description	Explanation	Solution
Bus Voltage Balance Error	The difference between middle point measuring value and half value in DC busbar is different	1. Switch off the breakers from PV panels and Battery first and switch off the AC breaker (Grid side) for 5mins, then restart the hybrid inverter. 2. If this error occurred frequently, contact local agent or SAJ service line.
Lost Com. （HDMI）	Data communication lost between master and display board	1. Switch off the breakers from PV panels and Battery first and switch off the AC breaker (Grid side) for 5mins, restart the hybrid inverter. 2. If this error occurred frequently, contact local agent or SAJ service line.
Meter Lost Com	Data communication lost between inverter and electricity meter	1. Check the "Meter" in good operation. 2. Check the comm cable between Inverter and Meter firmly connected. 3. Confirm the communication parameter setup between inverter and Meter is right, include "comm addr" "Baud rate" etc. 4. After above confirmation and this error occurred frequently, contact local agent or SAJ service line.
Memory (EEPROM) Error (energy store)	The EEPROM device (Memory) Error	1. Switch off the breakers from PV panels and Battery first and switch off the AC breaker (Grid side) for 5mins, then restart the hybrid inverter. 2. If this error occurred frequently, contact local agent or SAJ service line.
HMI RTC Err	RTC function failed.	1. Switch off the breakers from PV panels and Battery first and switch off the AC breaker (Grid side) for 5mins, then restart the hybrid inverter. 2. If this error occurred frequently, contact local agent or SAJ service line.
BMS device error (AC coupling inverter)	Error occurred in external lithium battery which is connected to inverter	1. Restart BMS device; 2. Switch off the breakers from PV panels and Battery first and switch off the AC breaker (Grid side) for 5mins, then restart the hybrid inverter.

Error Description	Explanation	Solution
		3. If the error still exists, contact local agent or SAJ service hotline 400-159-0088.
BMS communication loss warning (AC coupling inverter)	Data communication lost between inverter and lithium battery	1. Check if the lithium battery is opened; 2. Check communication line between the inverter and lithium battery is stably connected; 3. Check communication parameters setting of the inverter and lithium battery is correct, including address, baud rate, etc. 4. If the error still exists, contact local agent or SAJ service hotline 400-159-0088.
AC Current Sensor Error	The function of current sensor failed	1. Check the ct sensor wire OK 2. Switch off the breakers from PV panels and Battery first and switch off the AC breaker (Grid side) for 5mins, then restart the hybrid inverter. 3. If this error occurred frequently, contact local agent or SAJ service line.
Lost AFCI Com. （HDMI）	Data communication lost between AFCI and display board	1. Switch off the breakers from PV panels and Battery first and switch off the AC breaker (Grid side) for 5mins, then restart the hybrid inverter. 2. If this error occurred frequently, contact local agent or SAJ service line.
Lost slaver Com. （HDMI）	Data communication lost between slaver and display board	1. Switch off the breakers from PV panels and Battery first and switch off the AC breaker (Grid side) for 5mins, then restart the hybrid inverter. 2. If this error occurred frequently, contact local agent or SAJ service line.

7.

SPECIFICATIONS

MODEL	H2-5K-S3-US	H2-7.6K-S3-US	H2-8.6K-S4-US	H2-10K-S4-US	H2-12K-S4-US
PV String Input Data					
Max. PV Array Power [Wp]@STC	7500	11400	12900	15000	18000
Max. DC Voltage [V]	600				
MPPT Voltage Range [V]	90～550				
Nominal DC Voltage[V]	380				
Start Voltage [V]	100				
Min. DC Voltage [V]	80				
Max. DC Input Current[A]	16/16/16		16/16/16/16		
Max. DC Short Circuit Current[A]	19.2/19.2/19.2		19.2/19.2/19.2/19.2		
Number of MPPT	3		4		
PV Strings per MPPT	1/1/1		1/1/1/1		
PV Switch	Integrated				
Battery Data					
Battery Type	Lithium-ion battery				
Battery Voltage Range[V]	85-450				
Max. Charging/Discharging Current [A]	50				
AC Output Data [On-grid]					
AC Nominal Power[W]@208Vac	4330	6580	7450	8660	10400
AC Nominal Power [W]@240V	5000	7600	8600	10000	12000
Rated AC Current [A]	20.8	31.7	35.8	41.7	50.0
Nominal AC voltage/Range [V]	L1/L2/N/PE, 208V/240V; 183V~229V/211V~264V				
Rated Grid Frequency / Range [Hz]	60, 57Hz~63Hz				
Power Factor [cos φ]	0.8 leading~0.8 lagging				
Total Harmonic Distortion [THDi]	<3% (at nominal power)				
AC Output Data [Back-up Mode]					
AC Nominal Power [W]	5000	7600	8600	10000	12000
Surge AC Power [VA]	7500, 10s	11400, 10s	12900, 10s	15000, 10s	18000, 10s
Rated Output Voltage [V]	120/208V, 120/240V				
Rated Output Frequency [Hz]	60				
Efficiency					
Max. Efficiency	97.6%				
CEC Efficiency	96.8%				
Protection					

MODEL	H2-5K-S3-US	H2-7.6K-S3-US	H2-8.6K-S4-US	H2-10K-S4-US	H2-12K-S4-US
AC Short Circuit Protection	Integrated				
Overload Protection	Integrated				
DC Overvoltage/ Undervoltage Protection	Integrated				
AC Overvoltage/ Undervoltage Protection	Integrated				
AC Over frequency/ Underfrequency High/Low Protection	Integrated				
Over Temperature Protection	Integrated				
Anti-islanding protection	Integrated				
AC Surge Protection	II				
DC Surge Protection	II				
AFCI Protection	Integrated				
Interface					
Human Machine Interface	LED/APP (via Bluetooth)				
BMS Communication	RS485/CAN				
Communication for monitoring	Wi-Fi/Ethernet/4G(Optional)				
General Data					
Topology	Transformer-less				
Consumption at Standby[W]	<10				
Operating Temperature Range	-40°F to 140°F (-40℃ to +60℃), 113°F to 140°F with derating(45℃ to 60℃ with derating)				
Cooing Method	Natural Convection				
Ambient Humidity	0～95% Non-Condensing				
Maximum Elevation	4000m(13123ft), derated over 3000m(9842ft)				
Noise Level@1m[dBA]	<30				
Ingress Protection	NEMA 4X(IP65)				
Mounting	Wall Mounting				
Dimensions[H*W*D]	490*690*198mm (19.3*27.2*7.8inch)				
Weight[kg]	32(71lbs)				
Standard Warranty[year]	Refer to the warranty policy				
Safety/EMC standard	UL 1741, IEEE1547, UL1699B, UL1998, UL9540, CAN/CSA C22.2, No.107.1-1, FCC, Part15, Class B, Rule21, HECO 14H				

Recycling and Disposal

This device should not be disposed as residential waste. An Inverter that has reached the end of its life and is not required to be returned to your dealer, it must be disposed carefully by an approved collection and recycling facility in your area.

Contact SAJ

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