

SAJ



GUANGZHOU SANJING ELECTRIC CO.,LTD

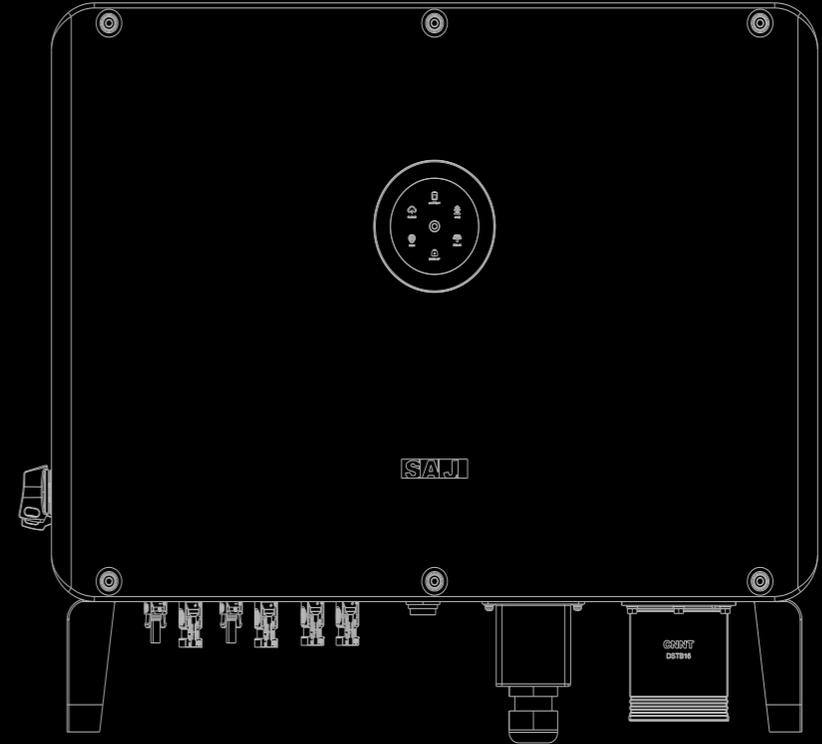


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V0.2

SAJ



H2 Series

HYBRID SOLAR INVERTER

USER MANUAL

H2-(10K-30K)-(T2, T3)-AU

Preface

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

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

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

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

Guangzhou Sanjing Electric Co., Ltd.



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1.

SAFETY PRECAUTIONS



1.1. Application Scope

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

H2-10K-T3-AU	H2-12K-T3-AU	H2-15K-T2-AU	H2-15K-T3-AU
H2-20K-T2-AU	H2-20K-T3-AU	H2-25K-T3-AU	H2-30K-T3-AU

Please read the user manual carefully before any installation, operation and maintenance and follow the instruction during installation and operation. Please keep this manual all time available in case of emergency.

Only qualified electricians who have read and fully understood all safety regulations contained in this manual can install, maintain, and repair the inverter. Operators must be aware that it is a high-voltage device.

1.2. Safety

CAUTION:

ONLY qualified and trained electricians who have read and fully understood all safety regulations contained in this manual can install, maintain, and repair the equipment.

1.2.1. Safety Levels

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

 WARNING
Indicates a hazardous situation which, if not avoided, can result in death or serious injury or moderate injury.

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

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

1.2.2. Symbol Explanation

Symbol	Description
	Danger: Electrical shock hazard This device is directly connected to public grid, thus all work to the battery shall only be carried out by qualified personnel.
	WARNING: No open flames Do not place or install near flammable or explosive materials.
	Danger: Hot surface The components inside the battery will release a lot of heat during operation. Do not touch metal plate housing during operating.
	Attention: Install the product out of reach of children.
	Attention: Check the user manual before service. If an error has occurred, refer to the troubleshooting chapter to remedy the error.
	Attention: This device shall NOT be disposed of in residential waste.
	Attention: This battery module shall NOT be disposed of in residential waste.
	CAUTION: Risk of electric shock from energy stored in capacitor. Do not remove cover until 5 minutes after disconnecting all sources of supply
	CE Mark Equipment with the CE mark fulfills the requirements of the Low Voltage Directive and Electro Magnetic Compatibility.
	RoHS compliant mark Equipment with the RoHS mark does not exceed the allowable amounts of the restricted substances defined in Restriction of Hazardous Substances in Electrical and Electronic Equipment.

	RCM compliant mark Equipment with the RCM mark is in compliance with AS/NZS 4417.1 & 2 and the EESS.
	Recyclable

1.2.3. Safety Instructions

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

DANGER
<ul style="list-style-type: none"> • There is possibility of dying due to electrical shock and high voltage. • Do not touch the surface of the equipment while the housing is wet, otherwise, it might cause electrical shock. • Do not touch the operating component of the device; 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 plugged out. • Do not stay close to the equipment 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 discharged after disconnecting from power source. • Please keep the power off prior to any operations.

WARNING
<ul style="list-style-type: none"> • Only qualified personnel who has full knowledge of local safety regulations and local standards on battery can install, maintain, retrieve, and process this product. • SAJ electric shall not be liable for any loss or warranty claims arising from any unauthorized change of product which may cause fatal injury to the operator, third party or equipment performance. • For personal and property safety, do not short-circuit the positive (+) and negative (-) electrode terminals.

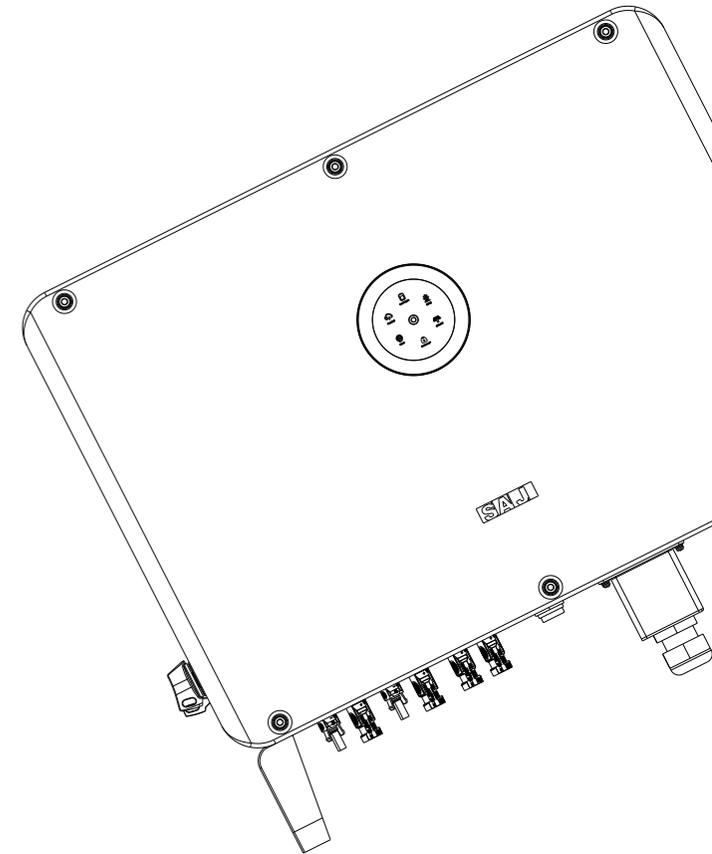
CAUTION
<ul style="list-style-type: none"> • The inverter will become hot during operation. Please do not touch the heat sink or peripheral surface during or shortly after operation. • Risk of damage due to improper modifications.

! NOTICE

- Public utility only.
- The inverter is designed to feed AC power directly to the public utility power grid; do not connect AC output of the inverter to any private AC equipment.

1.3. Safe Handling

- Only qualified electricians who have read and fully understood all safety regulations in this manual can install, maintain, and repair the inverter.
- When the inverter is working, do not touch the internal components or cables to avoid electric shock.
- When the inverter is working, do not plug in or out the cables.
- Make sure that 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.



2.

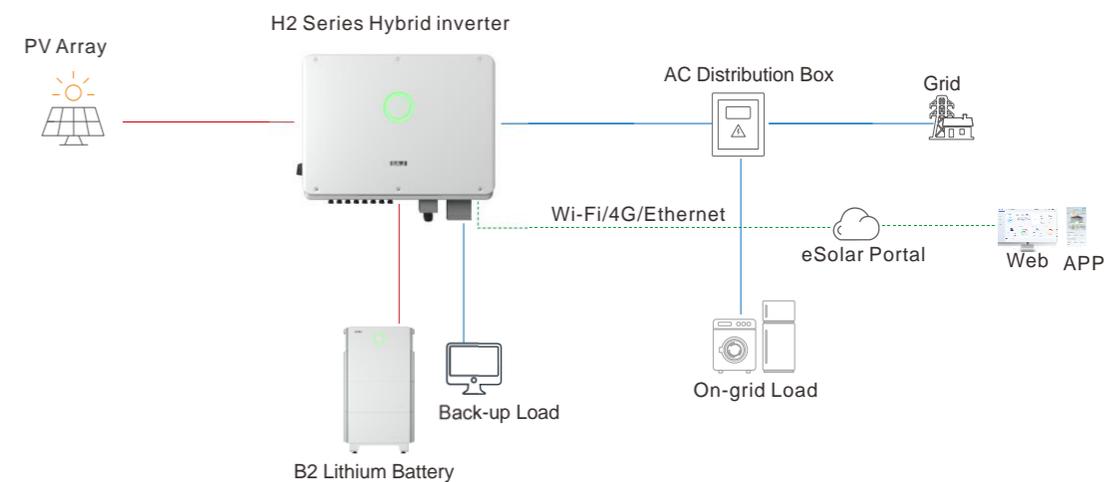
PRODUCT OVERVIEW



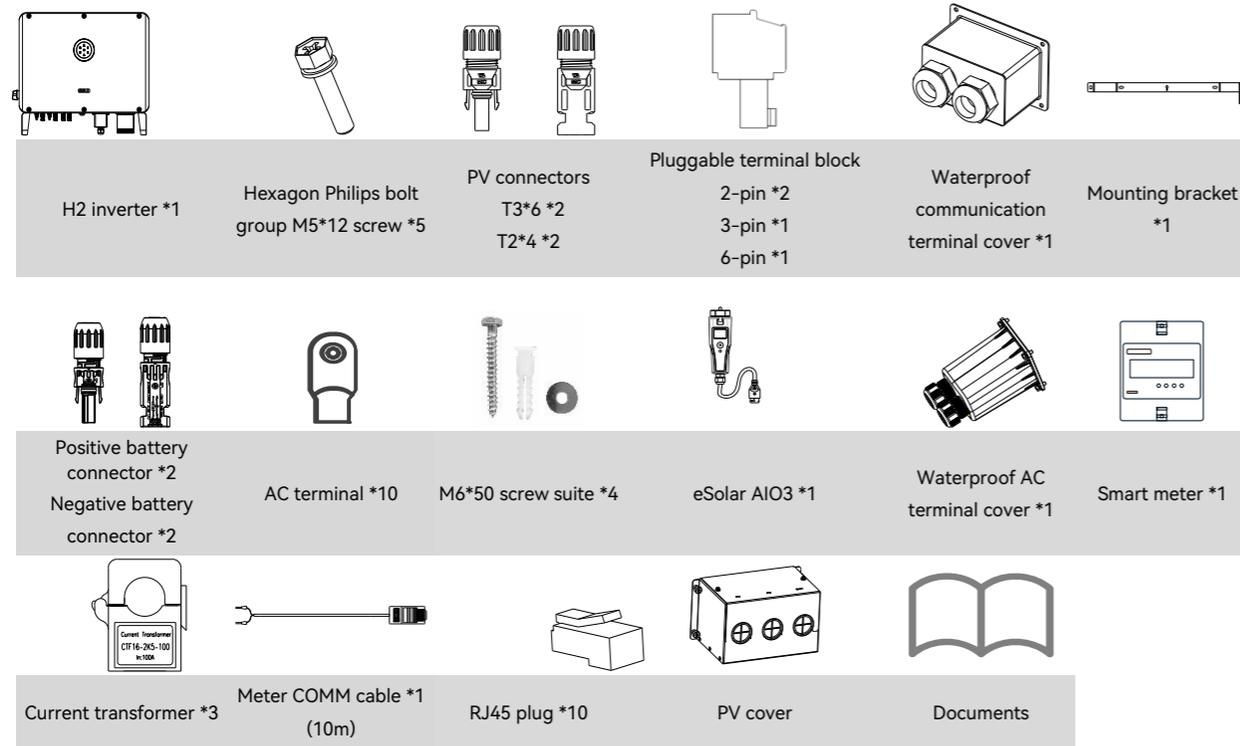
2.1. General Introduction

The H2 series inverter is a hybrid photovoltaic inverter which is applicable to both on-grid and off-grid solar systems. The energy generated by the photovoltaic (PV) system will be fed to loads first, the surplus energy will charge the battery for later use, and if there is still excess more energy, it will be exported to the grid.

The H2 inverter can significantly improve the self-consumption rate of solar energy and lower the dependency on grid.

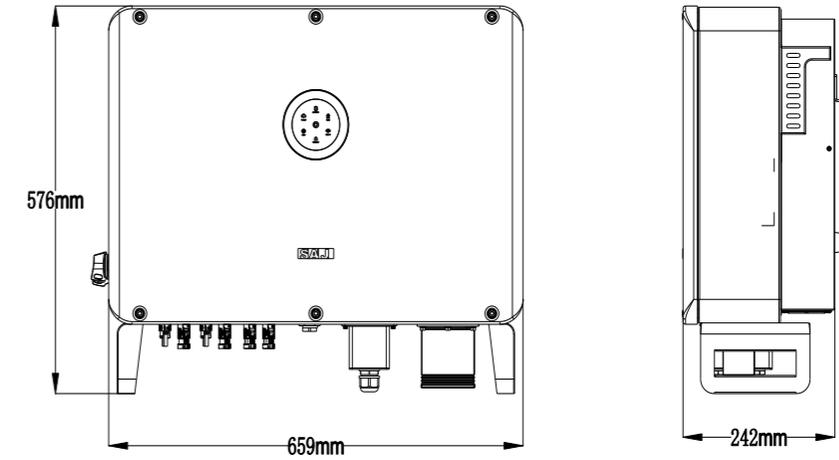


2.2. Unpacking



The documents include the user manual, quick installation guide, warranty card and packaging list.

2.3. Dimension



2.4. Datasheet

H2-(10K-20K)-(T2, T3)-AU

Model	H2-10K-T3-AU	H2-12K-T3-AU	H2-15K-T2-AU	H2-15K-T3-AU	H2-20K-T2-AU
DC Input					
Max. PV Array Power [Wp]@STC	20000	24000	30000	30000	30000
Max. DC Voltage [V]	1000				
MPPT Voltage Range [V]	180 - 900				
Rated DC Voltage [V]	600				
Start Voltage [V]	180				
Over voltage Category (OVC)	II				
Max. DC Input Current [A]	40/40/40	40/40/40	40/40	40/40/40	40/40
Max. DC Short Circuit Current [A]	50/50/50	50/50/50	50/50	50/50/50	50/50
No. of MPPT	3	3	2	3	2
Number of String per MPP Tracker	2/2/2	2/2/2	2/2	2/2/2	2/2
Battery Port Connection					
Battery Type	LiFePO4				
Battery Voltage Range [V]	180 - 800				
Max. Charging/Discharging Current [A]	2*50				
AC Output [On-grid]					
Rated AC Power [W]	9999	12000	15000	15000	20000
Rated Apparent Power [VA]	9999	12000	15000	15000	20000
Max. Apparent Power [VA]	9999	13200	16500	16500	22000
Rated Output Current [A]@230Vac	14.5	17.4	21.8	21.8	29.0
Max. AC Output Current to Utility Grid [A]	14.5	19.2	24.0	24.0	31.9
Current Inrush [A]	120				
Max. AC fault Current [A]	64				
Max. AC over Current Protection [A]	95.5				
Rated AC Voltage/Range [V]	3+N+PE, 220/380, 230/400, 240/415; 180 - 280/312 - 485				
Rated Output Frequency/Range [Hz]	<ul style="list-style-type: none"> ● 50 Hz: 45 - 55 ● 60 Hz: 55 - 65 				
Power Factor [cos φ]	0.8 leading - 0.8 lagging				

Model	H2-10K-T3-AU	H2-12K-T3-AU	H2-15K-T2-AU	H2-15K-T3-AU	H2-20K-T2-AU
Total Harmonic Distortion [THDi]	<3%				
Over voltage Category (OVC)	III				
AC Input [On-grid]					
Rated AC Voltage/Range [V]	3+N+PE, 220/380, 230/400, 240/415; 180 - 280/312 - 485				
Rated Input Frequency [Hz]	50, 60				
Max. Input Current [A]@230Vac	28.3	28.3	28.3	28.3	37.7
Power Factor [cos φ]	0.8 leading - 0.8 lagging				
AC Output [Back-up]					
Max. Output Power [VA]	10000	12000	15000	15000	20000
Max. Output Current [A]	14.5	17.4	21.8	21.8	29.0
Peak Output Apparent Power [VA]	15000, 3s	18000, 3s	22500, 3s	22500, 3s	30000, 3s
Rated AC Voltage/Range [V]	3+N+PE, 220/380, 230/400, 240/415; 180 - 280/312 - 485				
Rated Output Frequency/Range [Hz]	<ul style="list-style-type: none"> ● 50 Hz: 45-55 ● 60 Hz: 55-65 				
Output THDv (@ Linear Load)	<3%				
Power Factor [cos φ]	0.8 leading - 0.8 lagging				
Efficiency					
Max. Efficiency	98.0%				
Euro Efficiency	97.6%				
Protection					
Battery Input Reverse Polarity Protection	Integrated				
Over Load Protection	Integrated				
AC Short Circuit Current Protection	Integrated				
DC Surge Protection	Type II				
AC Surge Protection	Type II				
Anti-islanding Protection	AFD				
AFCI Protection	Integrated				
Interface					
PV Connection	MC4: PV-ADSP4-S2-UR/6 and PV-ADBP4-S2-UR/6				
AC Connection	Terminal block				
Battery Connection	Quick connector				
Display	LED and App				
Communication	Wi-Fi, Ethernet, or 4G (optional)				
General Parameters					
Topology	Non-isolated				
Operating Temperature Range	-40°C to +60°C (45°C and above with derating)				
Cooling Method	Intelligent fan cooling				

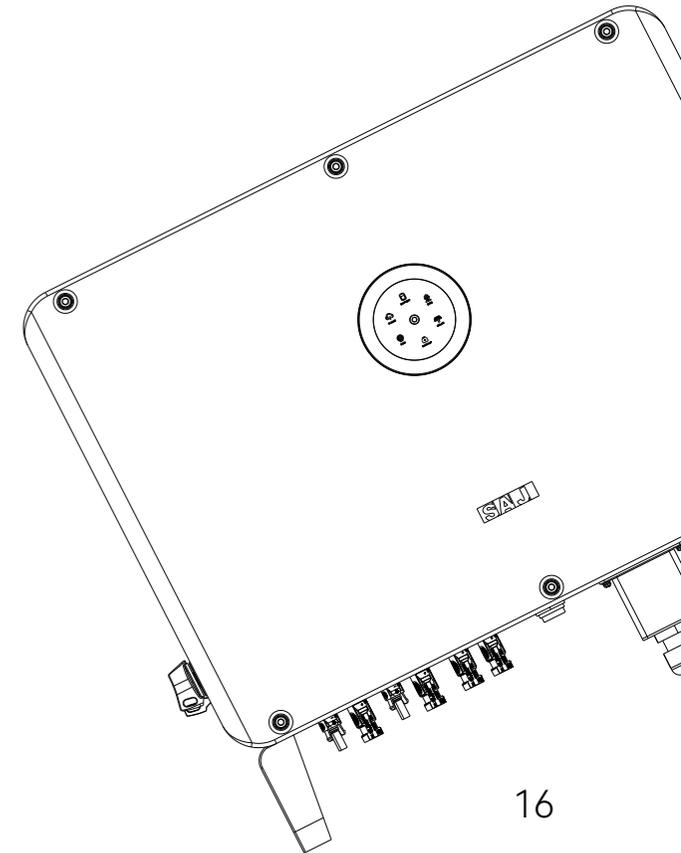
Model	H2-10K-T3-AU	H2-12K-T3-AU	H2-15K-T2-AU	H2-15K-T3-AU	H2-20K-T2-AU
Ambient Humidity	0 - 100%, non-condensing				
Altitude	4000m (>3000m Power Derating)				
Noise [dBA]	<50				
Ingress Protection	IP65				
Dimensions [H*W*D] [mm]	576*659*242				
Weight [kg]	50				
Warranty [Year]	Refer to the warranty policy				
Standard	EN 62109-1/2, EN 61000-6-2/4, EN 50438, EN 50549, C10/11, IEC 62116, IEC 61727, RD 1699, RD 413, UNE 206006, UNE 206007, NTS, CEI 0-16, CEI 0-021, AS 4777.2, NBR 16149, NBR 16150 VDE-AR-N 4105, VDE 0126-1-1				

H2-(20K-30K)-T3-AU

Model	H2-20K-T3-AU		H2-25K-T3-AU		H2-30K-T3-AU	
DC Input						
Max. PV Array Power [Wp]@STC	40000		45000		45000	
Max. DC Voltage [V]	1000					
MPPT Voltage Range [V]	180 - 900					
Rated DC Voltage [V]	600					
Start Voltage [V]	180					
Over voltage Category (OVC)	II					
Max. DC Input Current [A]	40/40/40					
Max. DC Short Circuit Current [A]	50/50/50					
No. of MPPT	3					
Number of String per MPP Tracker	2/2/2					
Battery Parameters						
Battery Type	LiFePO4					
Battery Voltage Range [V]	180 - 800					
Max. Charging/Discharging Current [A]	2*50					
AC Output [On-grid]						
Rated AC Power [W]	20000		25000		29999	
Rated Apparent Power [VA]	20000		25000		29999	
Max. Apparent Power [VA]	22000		27500		29999	
Rated Output Current [A]@230Vac	29.0		36.3		43.4	

Model	H2-20K-T3-AU		H2-25K-T3-AU		H2-30K-T3-AU	
Max. AC Output Current to Utility Grid [A]	31.9		39.9		43.4	
Current Inrush [A]	120		180			
Max. AC fault Current [A]	64		95			
Max. AC over Current Protection [A]	95.5		140			
Rated AC Voltage/Range [V]	3+N+PE, 220/380, 230/400, 240/415; 180 - 280/312 - 485					
Rated Output Frequency/Range [Hz]	<ul style="list-style-type: none"> ● 50 Hz: 45 - 55 ● 60 Hz: 55 - 65 					
Power Factor [cos φ]	0.8 leading - 0.8 lagging					
Total Harmonic Distortion [THDi]	<3%					
Over voltage Category (OVC)	III					
AC Input [On-grid]						
Rated AC Voltage/Range [V]	3+N+PE, 220/380, 230/400, 240/415; 180 - 280/312 - 485					
Rated Input Frequency [Hz]	50, 60					
Power Factor [cos φ]	0.8 leading - 0.8 lagging					
Max. Input Current [A]@230Vac	37.7		47.2		56.5	
AC Output [Back-up]						
Max. Output Power [VA]	20000		25000		30000	
Max. Output Current [A]	29.0		36.3		43.4	
Peak Output Apparent Power [VA]	30000, 3s		37500, 3s		45000, 3s	
Rated AC Voltage/Range [V]	3+N+PE, 220/380, 230/400, 240/415; 180 - 280/312 - 485					
Rated Output Frequency/Range [Hz]	<ul style="list-style-type: none"> ● 50 Hz: 45 - 55 ● 60 Hz: 55 - 65 					
Output THDv (@ Linear Load)	<3%					
Power Factor [cos φ]	0.8 leading - 0.8 lagging					
Efficiency						
Max. Efficiency	98.0%					
Euro Efficiency	97.6%					
Protection						
Battery Input Reverse Polarity Protection	Integrated					
Over Load Protection	Integrated					
AC Short Circuit Current Protection	Integrated					
DC Surge Protection	Type II					
AC Surge Protection	Type II					
Anti-islanding Protection	AFD					
AFCI Protection	Integrated					
Interface						
PV Connection	MC4: PV-ADSP4-S2-UR/6 and PV-ADBP4-S2-UR/6					

Model	H2-20K-T3-AU	H2-25K-T3-AU	H2-30K-T3-AU
AC Connection	Terminal block		
Battery Connection	Quick connector		
Display	LED+App		
Communication	Wi-Fi/Ethernet/4G (Optional)		
General Parameters			
Topology	Non-isolated		
Operating Temperature Range	-40°C to +60°C (45°C and above with derating)		
Cooling Method	Intelligent fan cooling		
Ambient Humidity (non-condensing)	0 - 100%		
Altitude	4000m (>3000m Power Derating)		
Noise [dBA]	<50		
Ingress Protection	IP65		
Dimensions [H*W*D] [mm]	576*659*242		
Weight [kg]	50		
Warranty [Year]	Refer to the warranty policy		
Standard	EN 62109-1/2, EN 61000-6-2/4, EN 50438, EN 50549, C10/11, IEC 62116, IEC 61727, RD 1699, RD 413, UNE 206006, UNE 206007, NTS, CEI 0-16, CEI 0-021, AS 4777.2, NBR 16149, NBR 16150 VDE-AR-N 4105, VDE 0126-1-1		



3.

INSTALLATION INSTRUCTIONS



DANGER

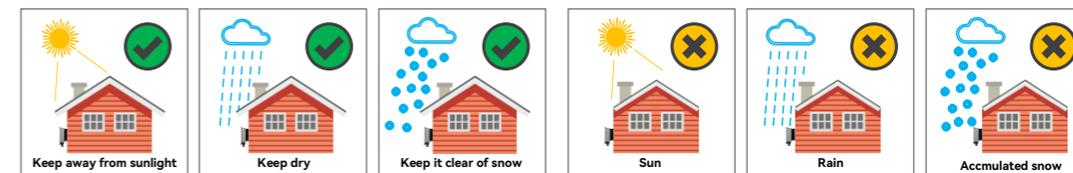
- Dangerous to life due to potential fire or electricity shock.
- Do not install the inverter near any inflammable or explosive items.

NOTICE

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

3.1 Determining the Installation Position

3.1.1. Installation Environment Requirements



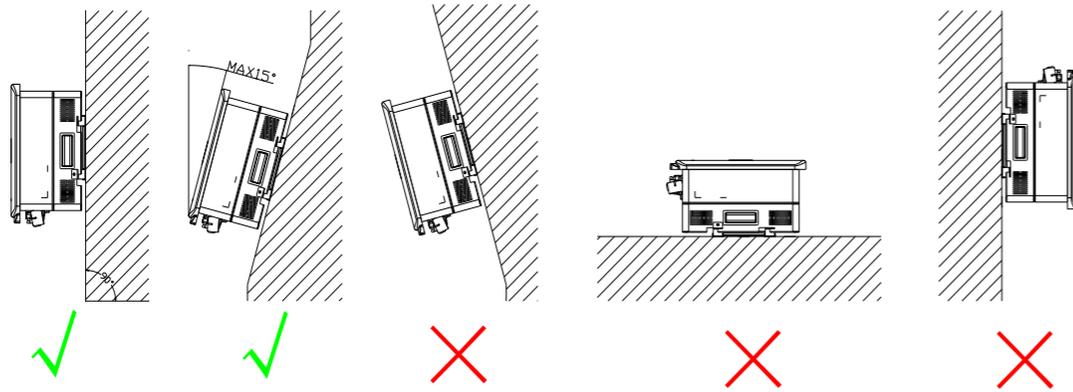
- Do not expose the device to direct solar irradiation as this could cause power derating due to overheating.
- The installation environment must be free of inflammable or explosive materials.
- The device must be installed in a place away from any heat source.
- Do not install the device at a place where the temperature changes extremely.
- Keep the device away from children.
- Do not install the device at daily working or living areas, including but not limited to the following areas: bedroom, lounge, living room, study, toilet, bathroom, theater, and attic.
- When installing the device at the garage, keep it away from the driveway.
- Keep the device from water sources such as taps, sewer pipes and sprinklers to prevent water seepage.
- The product is to be installed in a high traffic area where the fault is likely to be seen.

NOTE: When installing outdoors, the height of the device from the ground should be considered to prevent the device from soaking in water. The specific height is determined by the site environment.

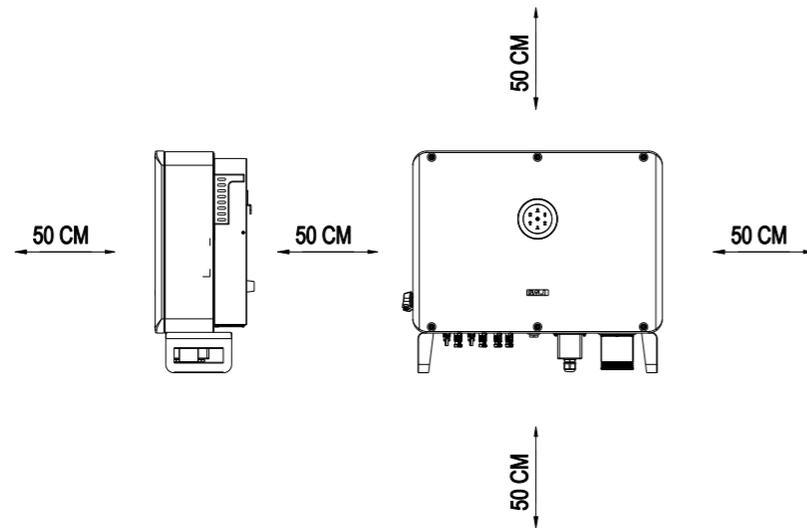
3.1.2. Installation Location Requirements

- The device employs Intelligent fan cooling, and it can be installed indoor or outdoor.

- Install the device vertically. Do not install it forward-tilted, horizontally or upside down.



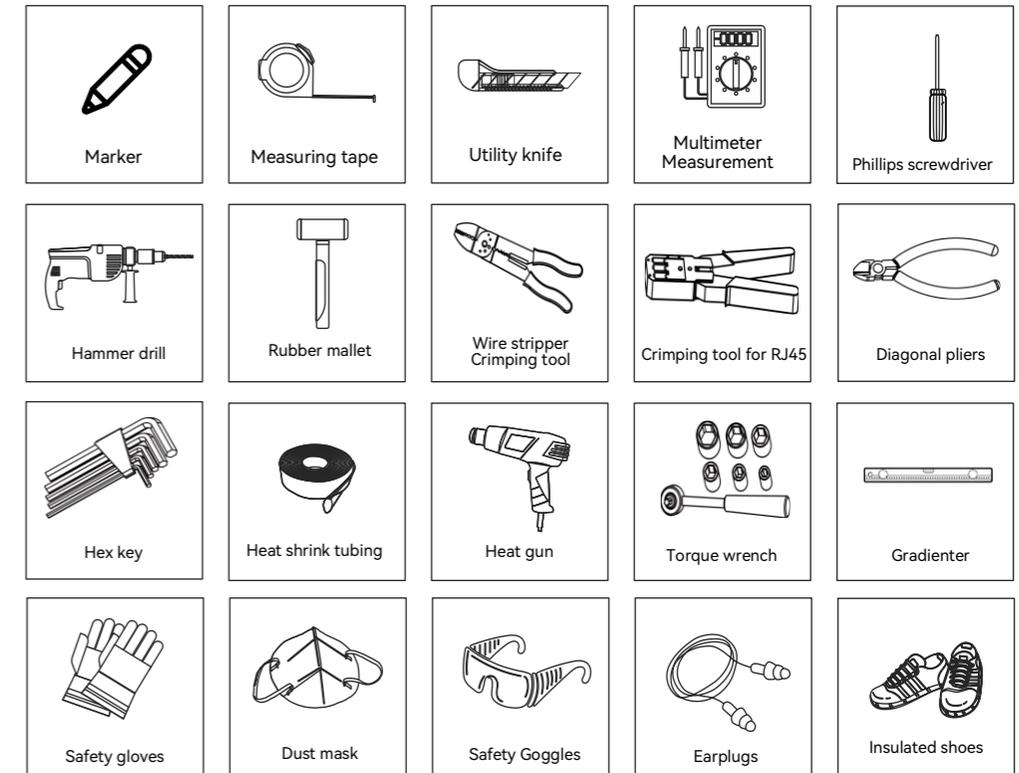
- Choose a solid and smooth wall to ensure that the inverter can be installed securely on the wall. Make sure that the wall can bear the weight of the inverter and accessories.
- Reserve enough clearance around the inverter to ensure a good air circulation at the installation area, especially when multiple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



3.2. Mounting Procedure

3.2.1. Installation Tools

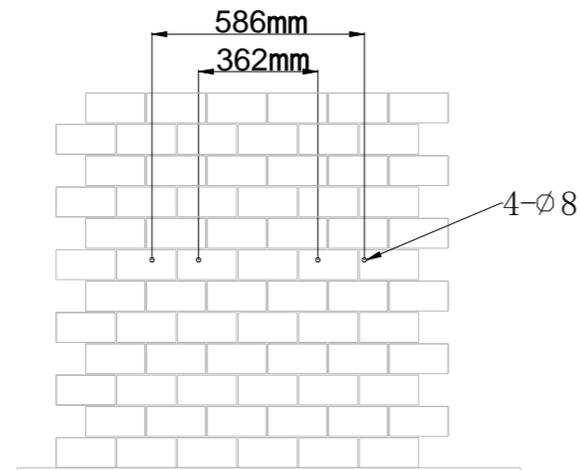
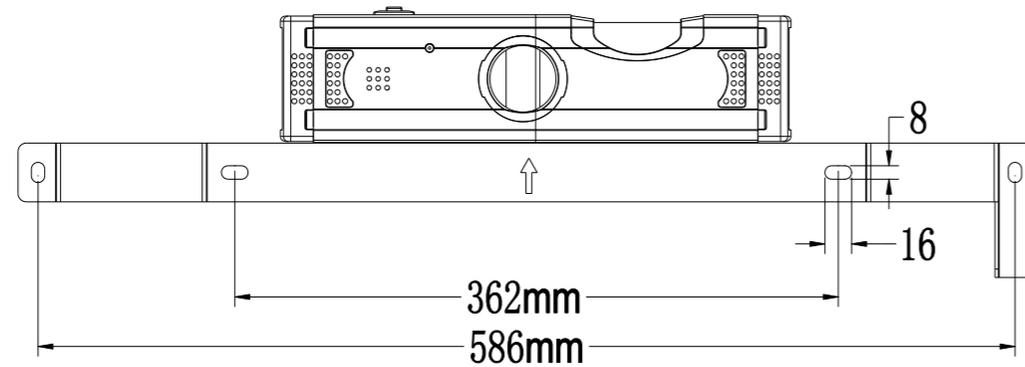
Installation tools include but are not limited to the following recommended ones. Please use other auxiliary tools on site if necessary.



3.2.2. Mounting Procedures

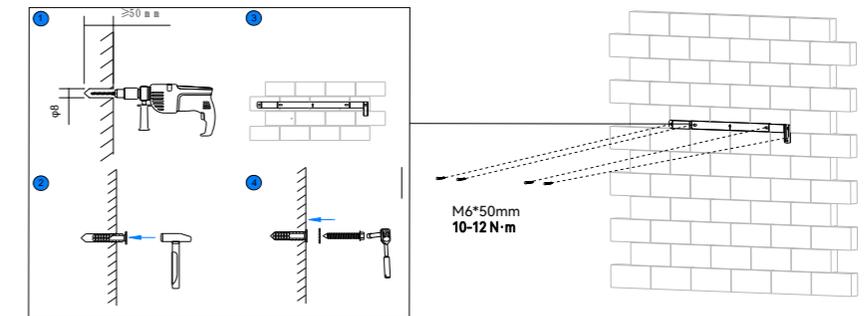
1. Place the mounting bracket horizontally onto the wall by using a gradienter and mark the four holes on the wall.

Note: If required, reserve enough distance at the inverter bottom for installing the metal cable conduits.



2. Install the mounting bracket to the wall.

- ① Drill four holes in the mark positions on the wall.
- ② Use a rubber mallet to insert the plastic expansion bolts into the holes.
- ③ Align the holes in the mounting bracket to the drilled holes in the wall.
- ④ Install the screws.



3. Carefully mount the inverter into the mounting bracket. Tighten the screws to secure the inverter.

4.

ELECTRICAL CONNECTION



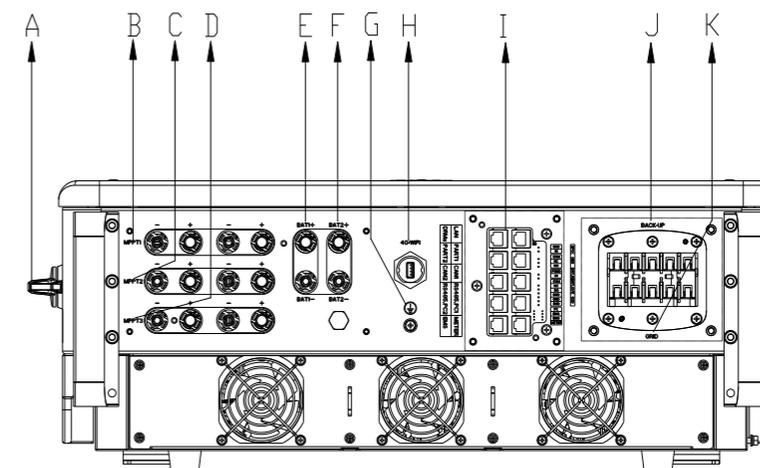
4.1. Safety Instructions

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

 DANGER
<ul style="list-style-type: none"> • Dangerous to life due to potential fire or electricity shock. • Do not install the inverter near any inflammable or explosive items. • Dangerous to life due to potential fire or electricity shock. • When it is powered on, the equipment should in conformity with national rules and regulations. • The direct connection between the inverter and high voltage power systems must be operated by qualified technicians in accordance with local and national power grid standards and regulations. • The PV arrays will produce lethal high voltage when exposed to sunlight.

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

4.2. Port

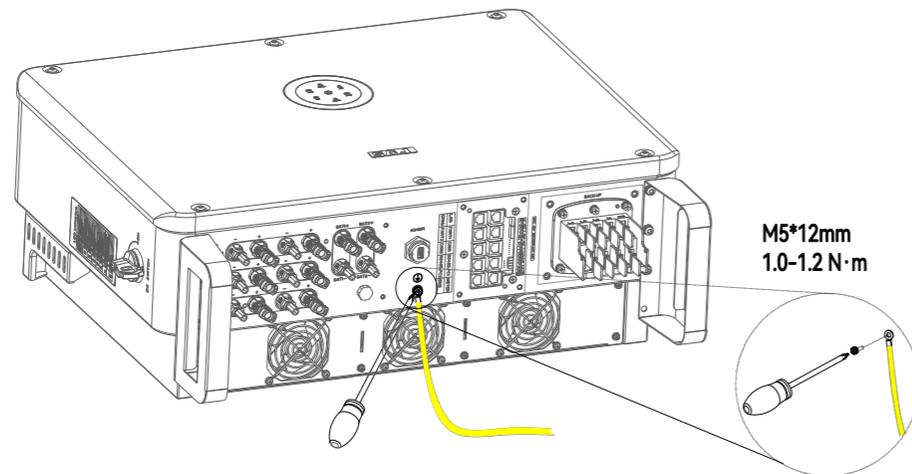


Callout	Name	Description
A	DC SWITCH	Direct current (DC) switch. You can turn it to OFF or ON position.
B	MPPT1	PV input
C	MPPT2	PV input
D	MPPT3	PV input
E	BAT1+, BAT1-	Battery input
F	BAT2+, BAT2-	Battery input
G		Grounding
H	4G/WIFI	4G, Wi-Fi, and Ethernet
I	LAN, CAN, PART1, PART2, EMS, RS485, METER, DRMs	Communication port
J	BACK-UP	For connecting to backup loads
K	GRID	For connecting to the grid

4.3. Connecting the Grounding Cable

About this task

This inverter complies with IEC 62109-2 clause 13.9 for earth fault alarm monitoring. After system startup and commissioning, if a grounding error occurs, the ring light on the inverter LED panel will be lit up in red and an error code <44> can be viewed on the Elekeeper App.



4.4. Assembling the AC-side Electrical Connection

4.4.1. Installing a Circuit Breaker

For safety operation and regulation compliance, install air circuit breaker between the grid and the inverter.

Inverter type	Recommended breaker specification
H2-(10K-20K)-(T2, T3)-AU	50 A
H2-(25K-30K)-T3-AU	63 A
Note: Do not connect multiple inverters to one AC circuit breaker.	

By installing a circuit breaker, the inverter can be disconnected from the grid quickly and safely when the integrated leakage current detector of the inverter detects that the leakage current exceeds the limitation.

4.4.2. Installing an RCD (optional)

An external residential current device (RCD) is not required since the inverter is integrated with a residential current monitoring unit (RCMU). However, if the external RCD must be installed according to the local regulations, either type A or B RCD can be installed with the action current 300 mA.

4.4.3. Connecting the Grid and Backup Loads

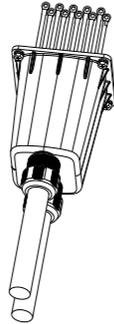
Prerequisite

Select cables according to the below specification. You can amplify appropriate diameter selection of the alternating current (AC) cable for the long grid-connection distance.

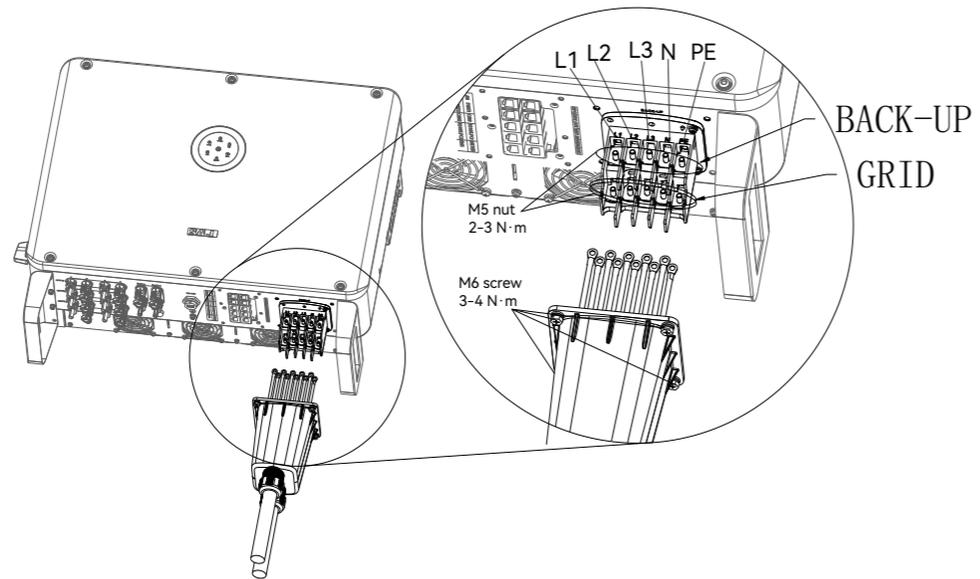
Type	Cable cross-sectional area (mm ²)	
	Range	Recommend
H2-(10K-30K)-(T2, T3)-AU	10 - 16	16
Additional grounding cable cross-sectional area (mm ²): 8		

Procedure

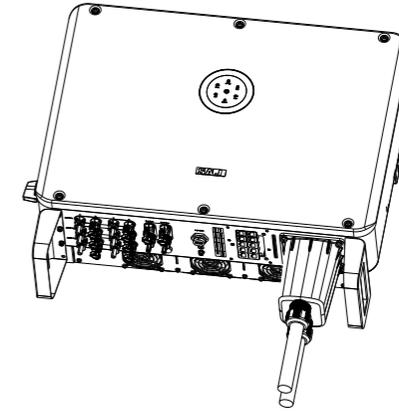
1. Open the waterproof cover, loosen the nut from the cable gland on the waterproof cover, insert the AC cable through the AC waterproof hole.

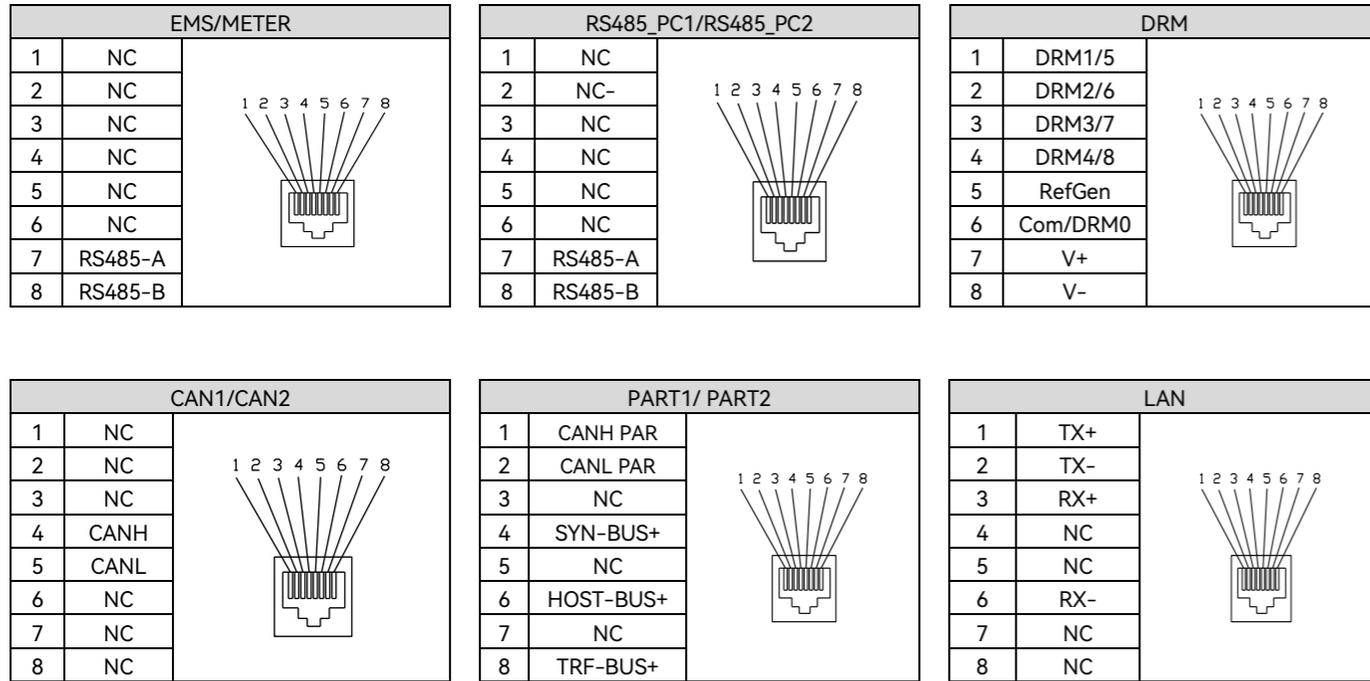


2. Connect the cables to the conductors L1, L2, L3, N, and PE. Secure the waterproof cover to the inverter.

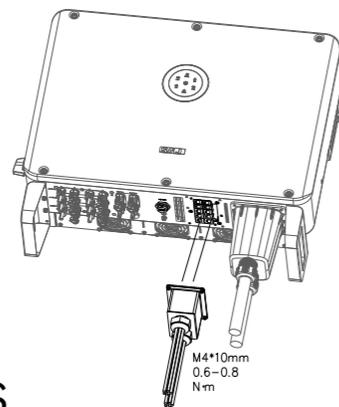


3. Tighten the nut back to the cable gland.

**4.5. Assembling the Communication Connection**



Thread the communication cable through the waterproof cable gland and connect to the corresponding port. Tighten screws to secure the waterproof cover to the inverter. (M4*10mm screw; 0.6-0.8 N·m)



4.6. Connecting the BMS

Before you start

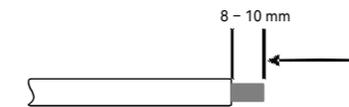
- SAJ battery has the detection mechanism to report the insulation fault alarm. After system startup and commissioning, if a battery insulation error occurs, an error code <112> will be reported on the Elekeeper App.
- Make sure that the battery management system (BMS) (including the battery control unit and battery packs) has been installed.
- Make sure that the BMS is powered off.
- Prepare the cables according to the below specifications:

Cable Cross-sectional area (mm ²)	
Range	Recommended value
8 - 10	8

- The positive cable is connected to the positive port BAT+ of the battery control unit, and the negative cable is connected to the negative port BAT- of the battery control unit.
- When connecting the BMS to the inverter, use a DC isolator that complies with AS4777.2 and CEC standards.

Procedure

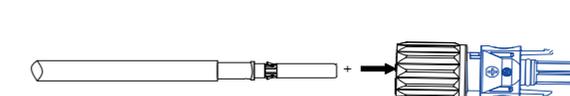
- Get the waterproof cover from the accessory bag and cut holes in the rubber plug. Insert the positive and negative cables through the hole.
- On both cables, use a 3-mm wide-bladed screwdriver to strip the insulation layer around 8 to 10 mm length from one cable end.



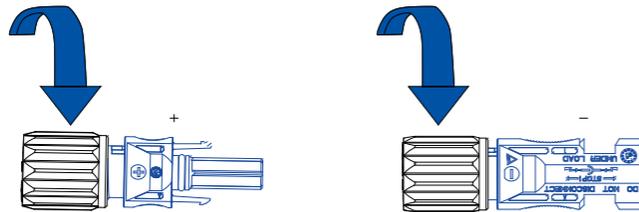
- Insert the cable ends to the corresponding sleeves. Use a crimping plier to assembly the cable ends.



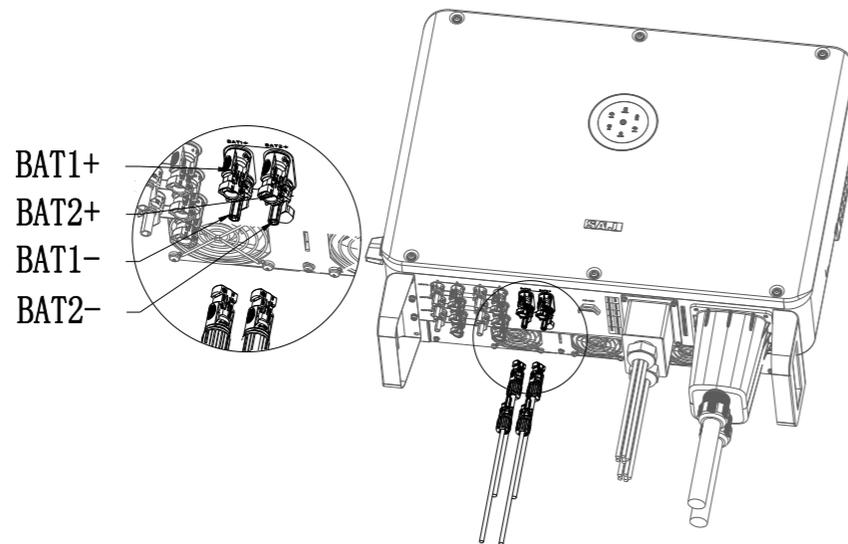
- Insert the assembled cable ends into the blue positive and negative battery connectors. Then, gently pull the cables backwards to ensure that they are firmly connected.



5. Tighten the nuts on the positive and negative cable connectors.



6. Connect the cables to the BAT+ and BAT- ports on the inverter.



4.7. Assembling the PV-side Electrical Connection

About this task

- The inverter cannot be used with functionally earthed PV arrays.
- A positive connector and a negative connector are provided in the accessory bag.

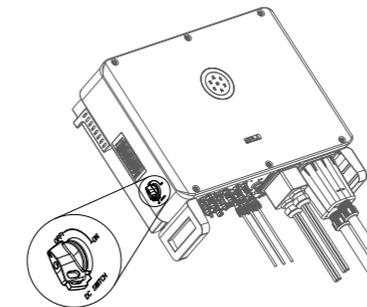


Before you start

- Make sure that the PV array is properly insulated to the ground before it is connected to the inverter. Otherwise, after the PV array is connected, an error code <31> will be reported on the App after system startup and commissioning.
- Select cables according to the below specification.

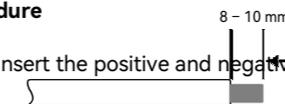
Conductor cross-sectional area of cables (mm ²)		Conductor material
Scope	Recommended value	Outdoor copper wire cable, complying with 1000 V DC.
4.0 - 6.0	4.0	

- Connect one end of the positive cable to the positive side of the solar panels and connect one end of the negative cable to the negative side of the solar panels.
- Make sure that the DC switch on the inverter is in OFF position to avoid short circuit caused by maloperations. For further safety considerations, use a reliable tool (such as a lock with a key) to lock the switch, so that others cannot unlock it easily.

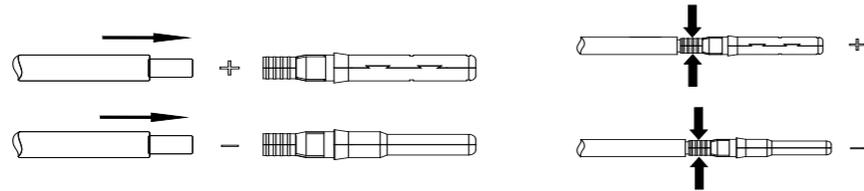


Procedure

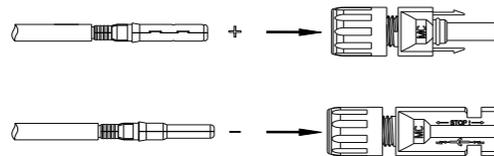
1. Insert the positive and negative cables through the hole in the waterproof cover.



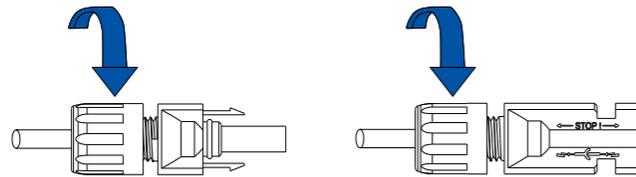
- Use a 3-mm wide-bladed screwdriver to strip the insulation layer around 8 to 10 mm length from one end of each cable.



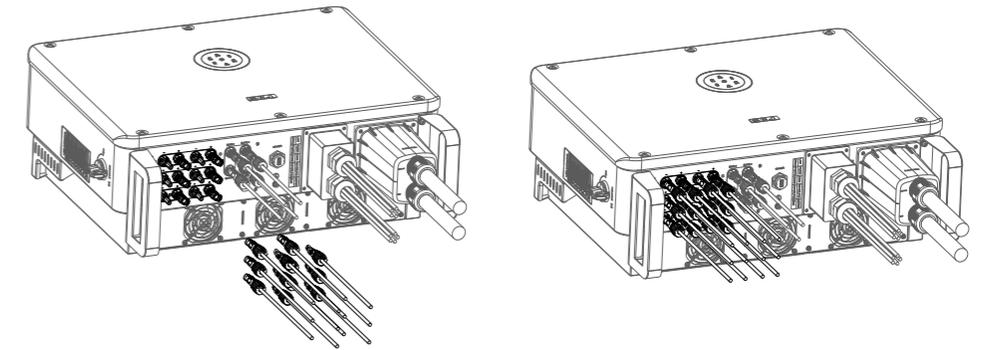
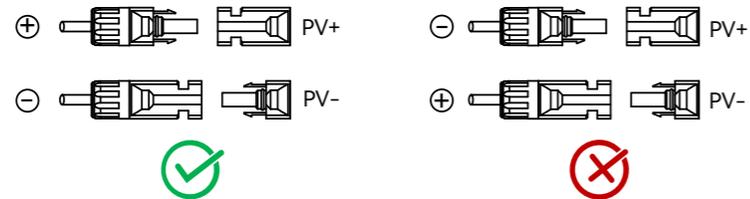
- Insert the cables ends to the sleeves. Use a crimping plier to assembly the cable ends.
- Insert the assembled cables ends into the positive and negative connectors. Gently pull the cables backwards to ensure firm connection.



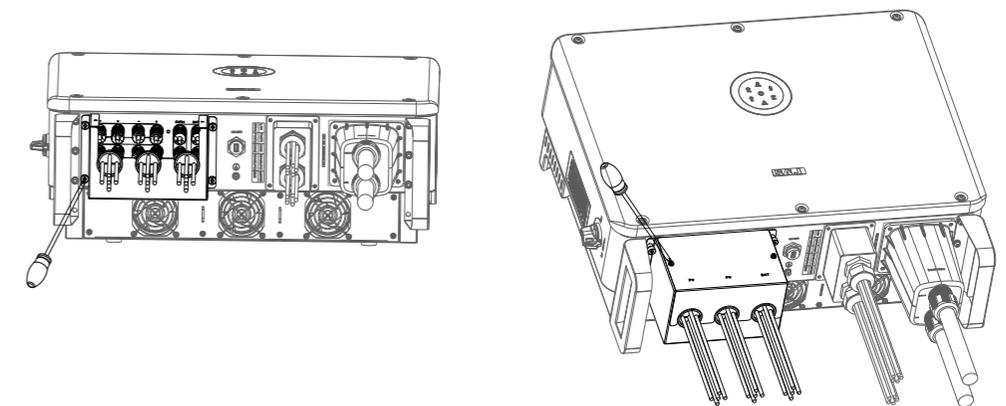
- Tighten the lock screws on the positive and negative cable connectors.



- Connect the positive and negative cables connectors into the positive and negative PV ports on the inverter. After you hear a “click” sound, the cables are firmly connected.

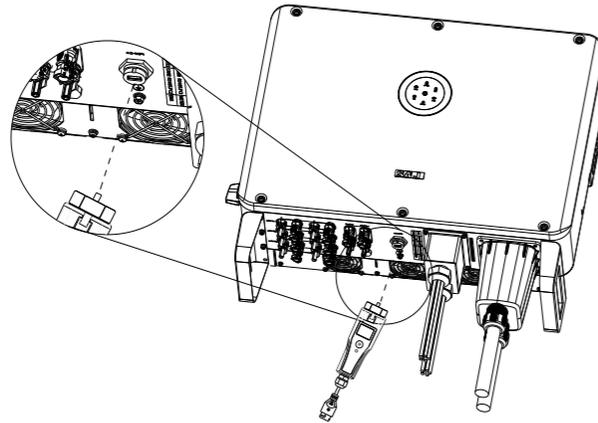


- Install the waterproof cover for PV and battery ports. Tighten the screws.



4.8. Installing the Communication Module

Plug in the communication module to 4G/WIFI port and secure the module by rotating the nut.



Either an eSolar 4G module, eSolar Wi-Fi module, or eSolar AIO3 module can be connected to the 4G/WIFI port. For operation details, refer to the documentation shipped in the module package or go to <https://www.saj-electric.com/> for downloads.

4.9. Connect the Smart Meter

Connect the smart meter as shown in section 4.11 “System Application Diagram”.

A meter has been shipped with the inverter. By using this meter, many functions can be implemented, such as the export limitation function.

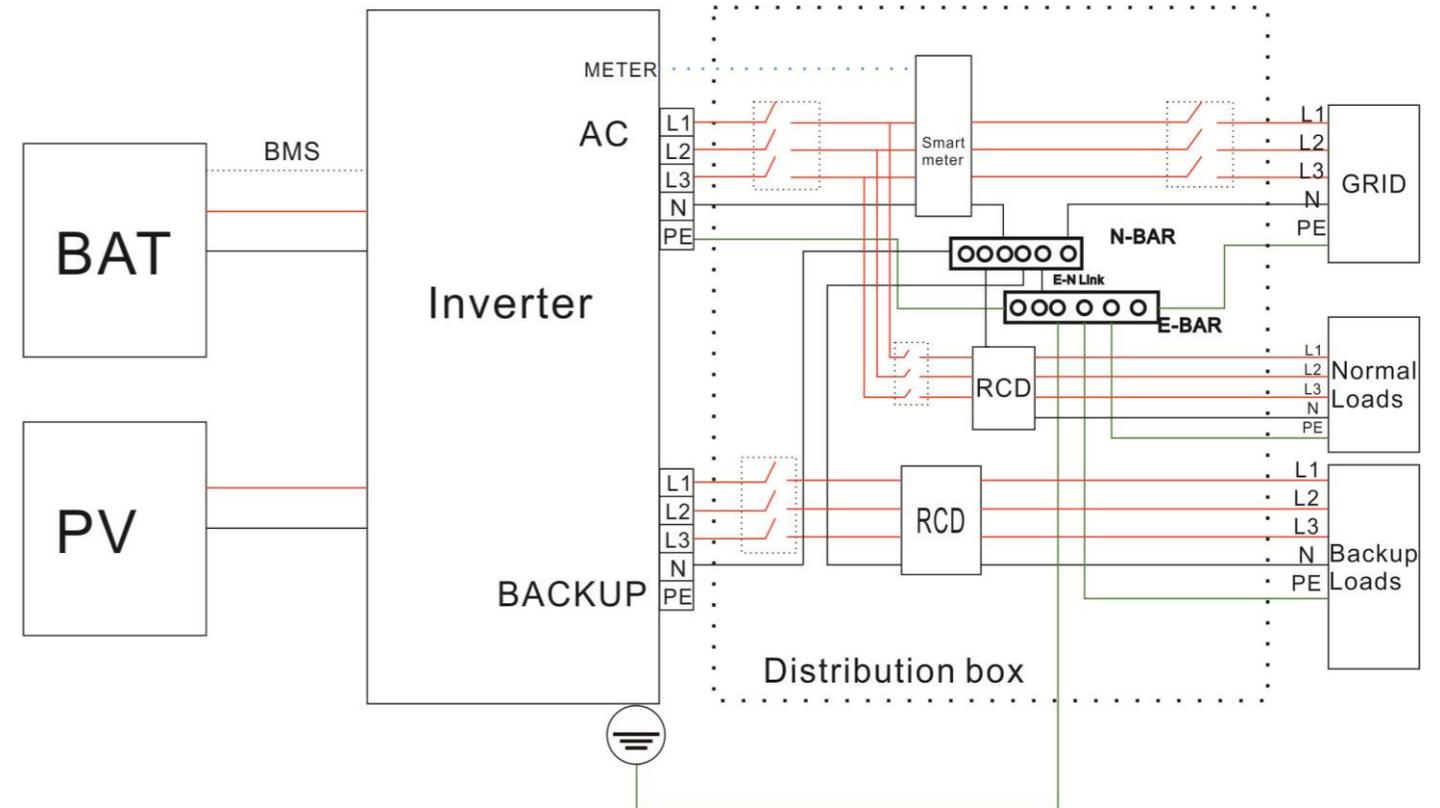
The meter specifications are as follows:

Manufacturer	Zhejiang Chint Instrument & Meter Co., Ltd.
Model	DTSU666
Application	3-phase
Nominal voltage	230 V
Max. current	100 A per line conductor
Class of accuracy	1
Communication type	RS485

4.10. System connection

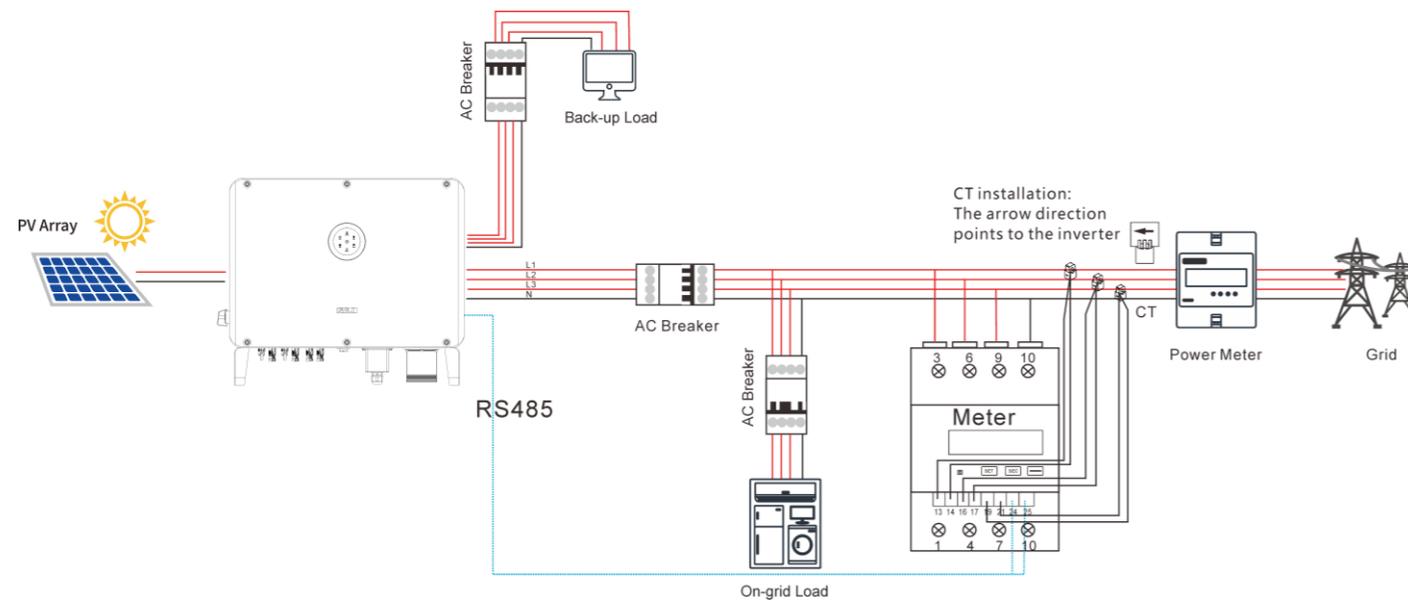
The system connection in Australia and New Zealand is as below.

- For safety, the neutral (N) cables of the grid and backup-load sides must be connected together.
- The PE terminal of the BACK-UP port is not connected.
- The E-BAR and the N-BAR must be short-circuited.



4.11. System Application Diagram

CT wire	Corresponding port in the meter
IA (white)	13
IA (blue)	14
IB (white)	16
IB (blue)	17
IC (white)	19
IC (blue)	21



4.12. AFCI

The inverter is equipped with arc-fault circuit interrupter (AFCI). With AFCI protection, when there is an arc signal on the DC side due to aging of the cable or loose contact, inverter can quickly detect and cut off the power to prevent fire, making the PV system run more safely.

5.1. Starting the Inverter

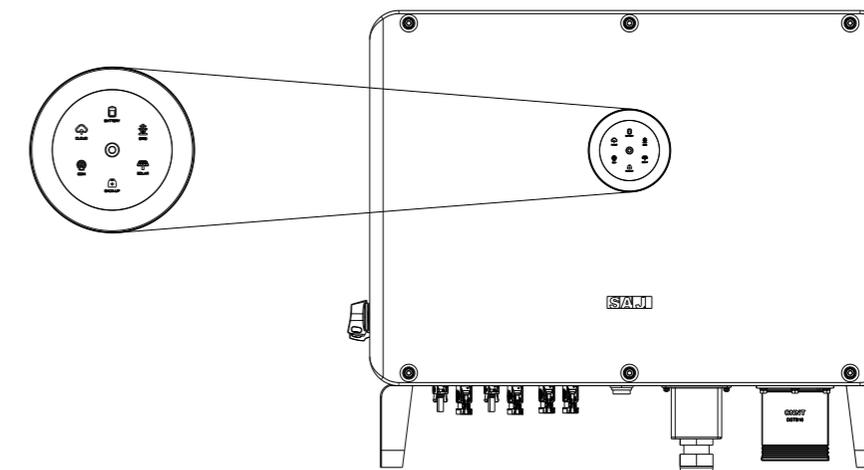
Prerequisite

- The circuit breaker on the AC side is connected properly.
- The DC circuit breaker is connected properly (if applicable).

Procedure

1. Unlock the DC switch and turn it on.
2. Turn on the battery switch (if applicable).
3. Turn on the circuit breaker on the grid side.
4. Configure the initialization settings on the Elekeeper App. For details, refer to Chapter 6 “Commissioning”.
5. Check the LED indicator status on the inverter panel to ensure that the inverter is running properly.

5.1.1. Introduction to the LED Indicators



5.

STARTUP AND SHUTDOWN



LED indicator	Status	Description
	Off	The inverter is powered off.
	Breathing	The inverter is in initialization or standby state.
	Solid on	The inverter is working properly.
	Breathing	The inverter is upgrading
	Solid on	The inverter is not working properly
 System	Solid on	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 on	Connected to grid
	On 1s, off 1s	Counting down to grid connection
	On 1s, off 3s	Grid is not working properly
	Off	No grid
 PV	Solid on	PV array is running properly
	On 1s, off 1s	PV array is not working properly
	Off	PV array is not operating
 Backup	Solid on	AC side load is running properly
	On 1s, off 1s	AC side load overload
	Off	AC side is turned off
	Solid on	Both BMS and meter communication are good

LED indicator	Status	Description
 Communication	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 on	Connected
	On 1s, off 1s	Connecting
	Off	Disconnected

5.2. Shutting Down the Inverter

Automatic shutdown

The inverter will be automatically shut down when all the following conditions are met:

- The solar light intensity is insufficient during sunrise and sunset or when the output voltage of the photovoltaic system is lower than the minimum input power threshold of the inverter.
- The battery is neither importing nor exporting the electricity from or to the inverter.
- The grid is neither importing nor exporting the electricity from or to the inverter.

Manual shutdown

To manually shut down the inverter, perform as follows:

1. **PV side:** Turn off the DC switch on the inverter.
2. **Battery side:** Turn off the battery switch.
3. **AC side:** Turn off the circuit breaker on the AC side.

Note: If multiple inverters are connected, turn off the their own circuit breakers before turning off the main circuit breaker.

6.

COMMISSIONING



6.1. Installing the App

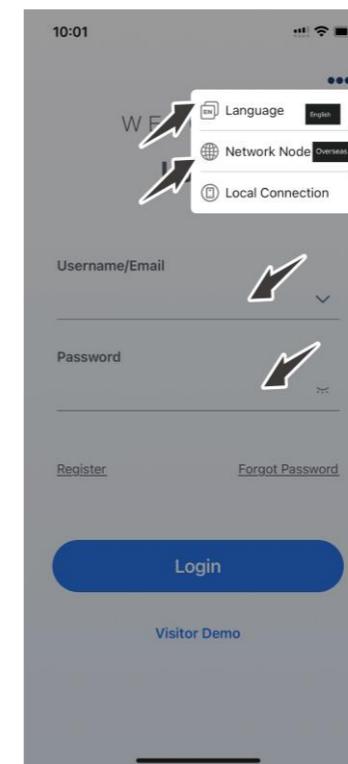
The Elekeeper (used to be called eSAJ Home) App can be used for both nearby and remote monitoring. It supports Bluetooth/4G or Bluetooth/Wi-Fi to communicate with the device.

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

6.2. Logging In to the App and Performing the Initialization Settings

Procedure

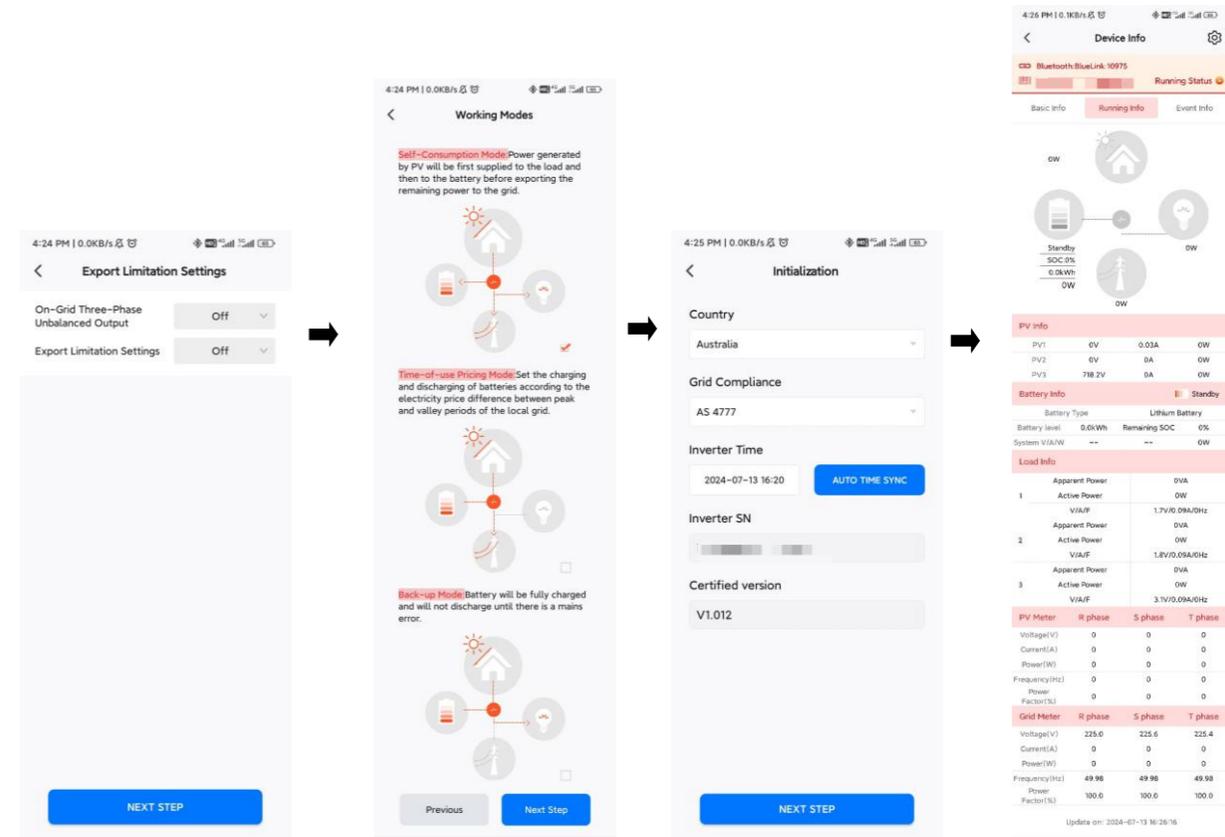
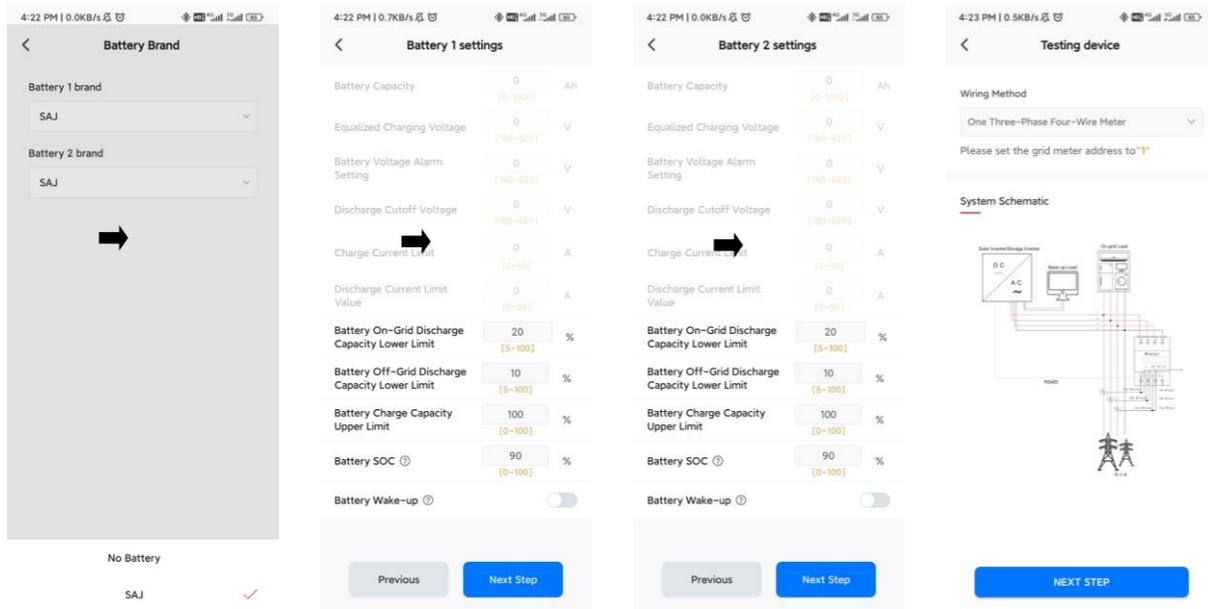
1. Open the App and tap on the three-dot icon  on the top right corner.
2. Set the **Language** to **English** and **Network Node** to **Overseas Node**.



3. If you do not have an account, register first.
 - a. Tap **Register**. Choose whether you are an owner or an installer or distributor.
 - b. Follow the instructions on the screen to complete the registration.
4. Use the account and password to log in to the App.
5. Go to the **Tool** interface and select **Remote Configuration**. Tap on **Bluetooth** and enable the Bluetooth function on your mobile phone. Then, tap on **Next**.
6. Choose your inverter according to your inverter SN. Tap on the inverter to enter inverter settings.
7. Complete the inverter settings by following the instructions on the screen. Example:

For **Grid Compliance**, select the value according to your setpoint (region of installation):

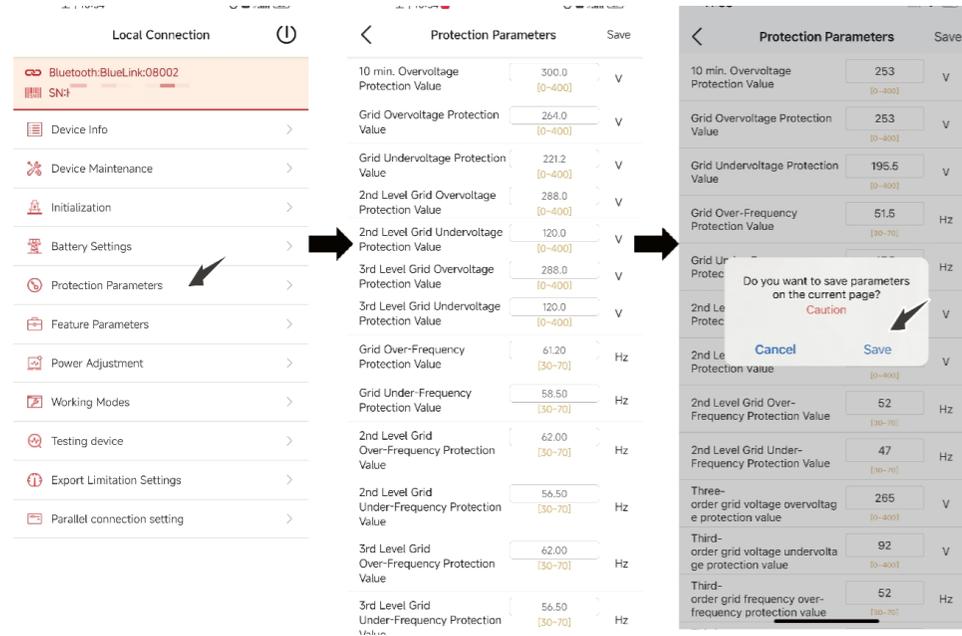
- **AS4777_AustraliaA**: For large interconnected power system. For example, all Australian networks other than those specified below.
- **AS4777_AustraliaB**: For small interconnected power systems. For example, Western Power.
- **AS4777_AustraliaC**: For isolated or remote power systems. For example, Horizon Power and TasNetworks.



6.3. Setting the Protection Parameters

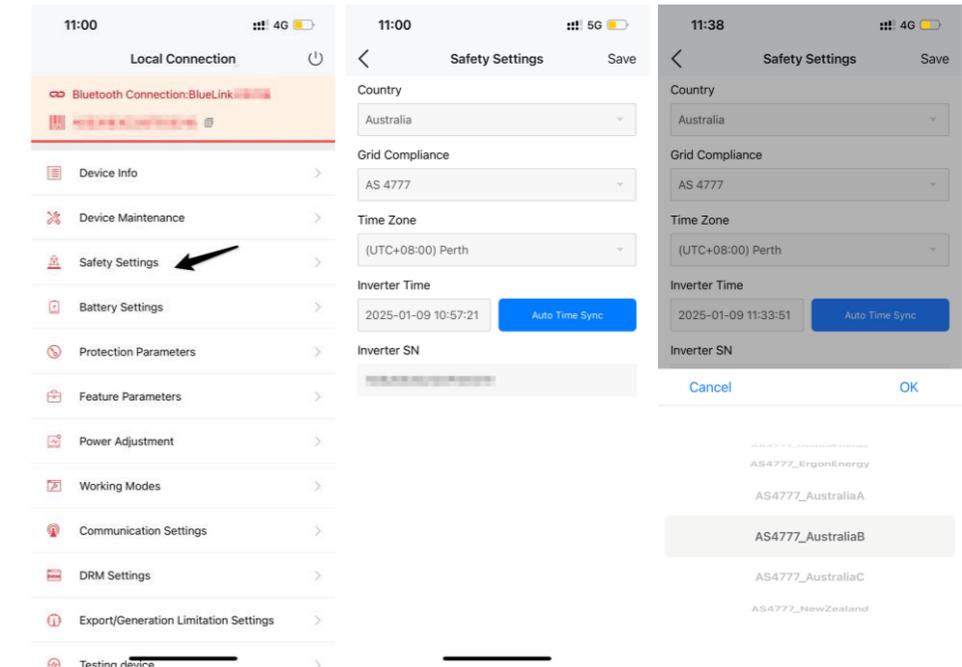
The following parameters are set based on local safety rules and regulations.

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



6.4. Viewing the Country and Grid Compliance

You can view or change the country and grid compliance after initialization. Example:



For **Grid Compliance**, select the value according to your setpoint (region of installation):

- **AS4777_AustraliaA**: For large interconnected power system. For example, all Australian networks other than those specified below.
- **AS4777_AustraliaB**: For small interconnected power systems. For example, Western Power.
- **AS4777_AustraliaC**: For isolated or remote power systems. For example, Horizon Power and TasNetworks.

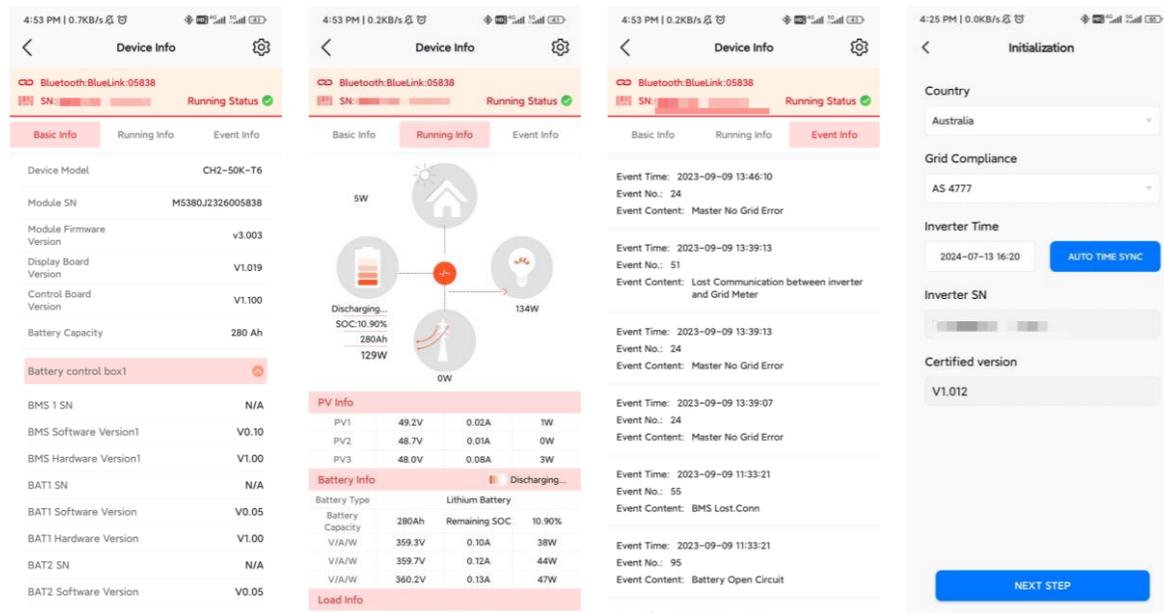
6.5. Viewing the Inverter Settings

After the above configurations, view the device information.

- Device info: **Basic Info**, **Running Info**, and **Event Info**

On **Basic Info**: You can view the inverter firmware version, including **Display Board Version (ARM)** and **Control Board Version**.

- Initialization: **Country** and **Grid Compliance**.



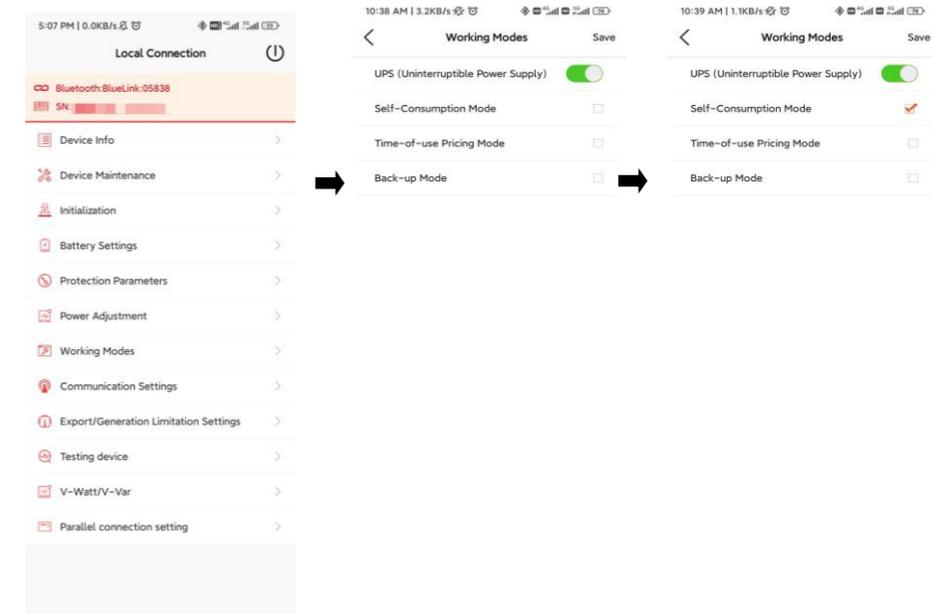
6.6. Configuring the Remote Monitoring

Connect the inverter to the Internet by using the 4G/Wi-Fi/eSolar AIO3 module and upload the inverter data onto the server. Users can monitor the inverter operating information remotely from the eSolar Web portal or the Elekeeper App in their mobile phones.

For details, refer to the user manual of the communication module.

6.7. Selecting the Working Mode

Select one of the working modes based on your needs:



Self-consumption Mode: When the solar is sufficient, electricity generated by photovoltaic system will be supplied to load first, the surplus energy will be stored in battery, then the excess electricity will be exported to the grid. When the solar is insufficient, the battery will release electricity to supply load.

Back-up Mode: Reserved Backup SOC setting value can be adjusted, when battery SOC is less than reserved SOC value, battery can only be charged, until SOC reaches reserved value, the battery will be stopped charging; when SOC is larger than SOC setting value, battery will behave as Self-use mode.

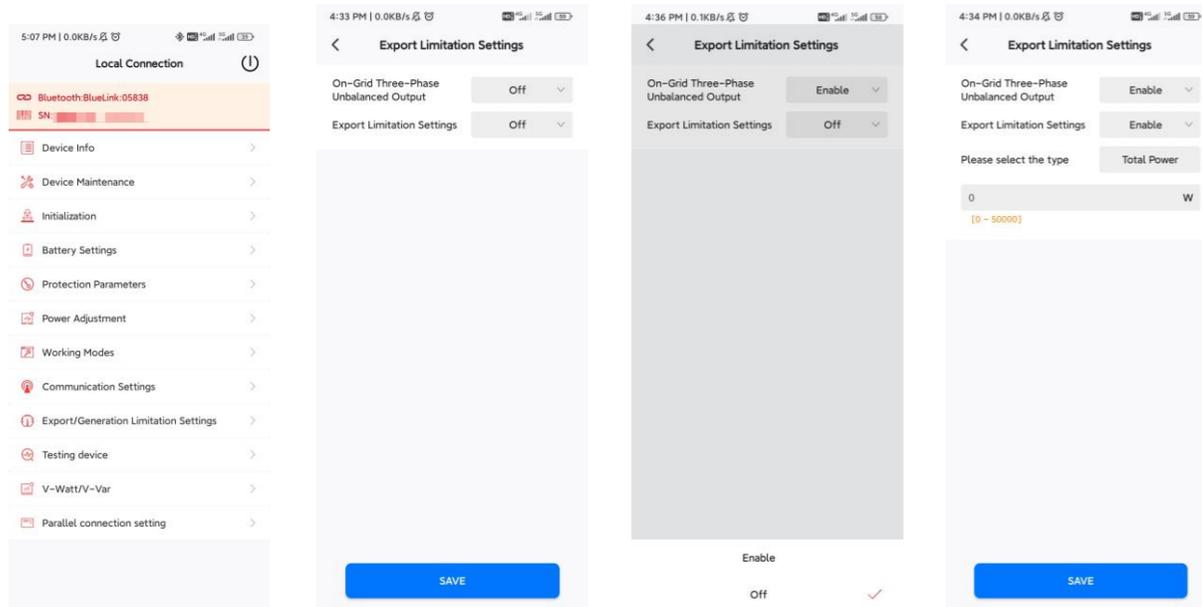
Time-of-use Mode: Battery charging period and discharging period can be set, during charging period, battery can only be charged, while in discharging period, battery can only be discharged, the rest of the period, battery will behave as Self-use mode.

6.8. Configuring the Export Limit

On the **Local Connection** page, tap **Export/Generation Limitation Setting** and enter the password “201561”. There are two methods to control the export limit, the two methods are alternative to each other.

Method 1: Export Limitation Settings is to control the electricity exported to the grid.

Method 2: On-Grid Three-Phase Unbalanced Output is to control the electricity generated by the inverter.



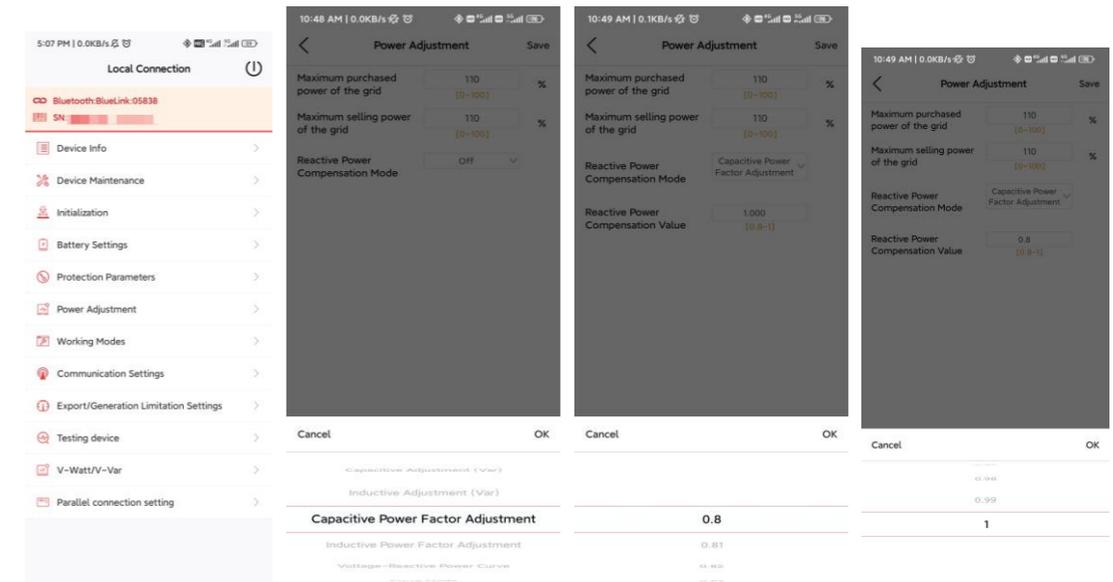
To view the settings, perform as follows:

1. Check the manufacturing date of the inverter according to the SN, such as an SN “1 502 0 G 11 01 CN 00000”, in which “11 01” indicates that the manufacturing date is the first week in 2011.
 2. Depending on your inverter manufacturing date, view the parameter values as follows:
- For the equipment manufactured before August 2023:

Tap **Power Adjustment** and enter the password. (Contact SAJ for the password.)

In **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.

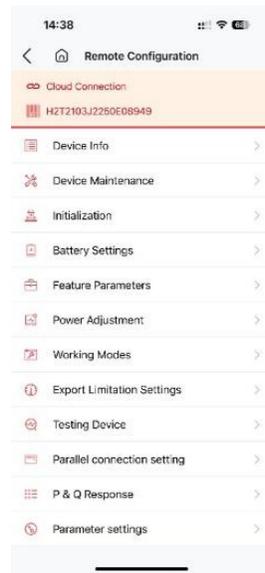


6.9. Configuring the Reactive Power Control

6.9.1 Setting 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, no need to change these default parameter values. If you really need to change them, before any modifications, contact SAJ for consultation and ensure that you have necessary electric knowledge and are fully aware of the impact of such modifications.

- For the equipment manufactured after August 2023: Tap **Parameter settings**.



6.9.2 Setting the V-Watt and Volt-Var Modes

This inverter complies with AS/NZS 4777.2: 2020 for power quality response modes. The inverter satisfies different regions of DNSPs' grid connection rules requirements for volt-watt and volt-var Settings. For example, AS4777 series setting is as shown below.

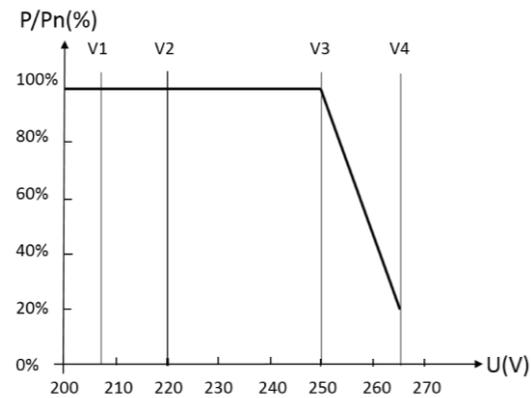


Figure 6.1
Curve for a Volt-Watt response mode (AS4777 Series)

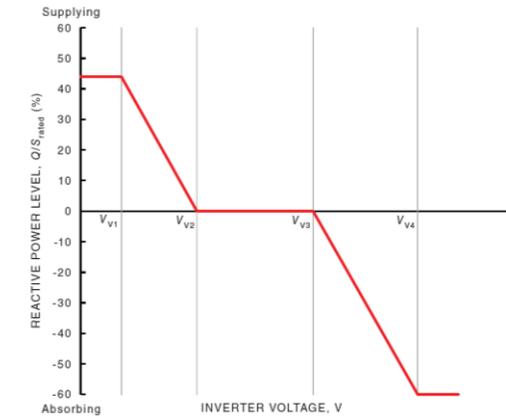
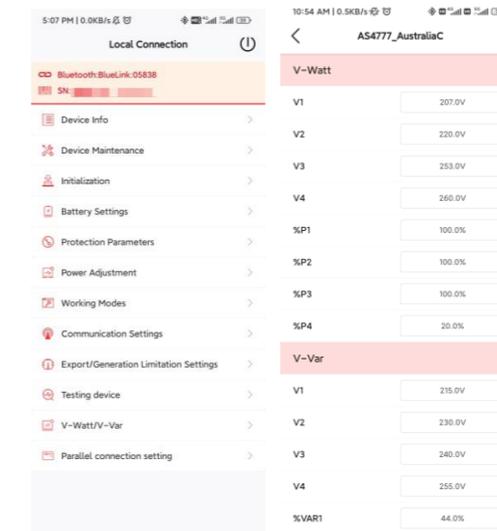


Figure 6.1
Curve for a Volt-Var control mode (AS4777 Series)

1. Select corresponding grid compliance according to state regulation during installation. AS4777 grid compliance has been set during production. You can choose a state regulation compliance with your local grid on Elekeeper.
2. Log in to Elekeeper.
3. Tap **V-Watt/V-Var** to enter the DNSPs settings. Choose the state regulation from the drop-down list.



Notes:

Regarding to the power rate limitation mode, SAJ sets the product WGr to 16.67% Pn by default in the following cases according to the requirements of 3.3.5.2 as 4777.2: 2020.

1. Soft ramp up after connection.
2. Reconnect or soft ramp up/down following a response to frequency disturbance.

7.

MAINTENANCE


 **CAUTION**

- Power off the system before any cleaning, check, or maintenance operations on the equipment; otherwise, electric shocks may occur.
- Follow the instructions in chapter 5.2 "Shutting Down the Inverter" to shut down the system. Wait for 5 minutes until the system is not energized.
- Use dedicated insulated tools (such as insulated gloves) and other protective equipment to avoid electric shocks or short circuits.

7.1. Routine Maintenance

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

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

Check item	Check method	Maintenance interval
System cleanliness	Check periodically whether the heat sinks are blocked or dirty.	Once every 6 to 12 months
Cleanness of air intake and exhaust vents	Check periodically whether there is dust or foreign objects at the air intake and exhaust vents.	Power off the system and remove dust and foreign objects. If necessary, remove the baffle plates from the air intake and exhaust vents for cleaning. Once every 6 to 12 months (or once every 3 to 6 months based on the actual dust conditions in the environment)
Fan	Check whether the fan generates abnormal noise during operation.	Remove foreign objects from the fan. If the abnormal noise persists, replace the fan. Once every 6 to 12 months
System running status	<ol style="list-style-type: none"> 1. Check whether the inverter is damaged or deformed. 2. Check whether the inverter generates abnormal sound during operation. 3. Check whether all inverter 	Once every 6 months

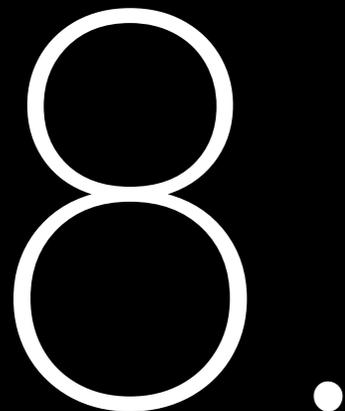
	parameters are correctly set during operation.	
Electrical connection	<ol style="list-style-type: none"> 1. Check whether cables are disconnected or loose. 2. Check whether cables are damaged, especially whether the cable sheath that contacts a metal surface is damaged. 	6 months after the first commissioning and once every 6 to 12 months after that
Grounding reliability	Check whether the PE cable is securely connected.	6 months after the first commissioning and once every 6 to 12 months after that
Sealing	Check whether all terminals and ports are properly sealed.	Once a year

7.2. Error Codes

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

Error code	Error message		
1	Master Relay Error	45	Master Fan1 Error
2	Master EEPROM Error	46	Master Fan2 Error
3	Master Temperature High Error	47	Master Fan3 Error
4	Master Temperature Low Error	48	Master Fan4 Error
5	Lost Communication M<->S	49	Lost Communication between Master and Meter
6	GFCI Device Error	50	Lost Communication between M<->S
7	DCI Device Error	51	Lost Communication between inverter and Grid Meter
8	Current Sensor Error	52	HMI EEPROM Error
9	Master Phase1 Voltage High	53	HMI RTC Error
10	Master Phase1 Voltage Low	54	BMS Device Error
11	Master Phase2 Voltage High	55	BMS Lost. Conn
12	Master Phase2 Voltage Low	56	CT Device Err
13	Master Phase3 Voltage High	57	AFCI Lost Err

14	Master Phase3 Voltage Low	58	Lost Com. H<->S Err
15	Grid Voltage 10Min High	59	Lost Communication between inverter and PV Meter
16	Off Grid Output Voltage Low	61	Slave Phase1 Voltage High
17	Off Grid Output Short Circuit	62	Slave Phase1 Voltage Low
18	Master Grid Frequency High	63	Slave Phase2 Voltage High
19	Master Grid Frequency Low	64	Slave Phase2 Voltage Low
20	BAT Input Mode Error	65	Slave Phase3 Voltage High
21	Phase1 DCV High	66	Slave Phase3 Voltage Low
22	Phase2 DCV High	67	Slave Frequency High
23	Phase3 DCV High	68	Slave Frequency Low
24	Master No Grid Error	73	Slave No Grid Error
25	DC Reverse Connect Error	74	Slave PV Input Mode Error
26	Parallel machine CAN Com Error	75	Slave HW PV Curr High
27	GFCI Error	76	Slave PV Voltage High
28	Phase1 DCI Error	77	Slave HW Bus Volt High
29	Phase2 DCI Error	81	Lost Communication D<->C
30	Phase3 DCI Error	83	Master Arc Device Error
31	ISO Error	84	Master PV Mode Error
32	Bus Voltage Balance Error	85	Authority expires
33	Master Bus Voltage High	86	DRM0 Error
34	Master Bus Voltage Low	87	Master Arc Error
35	Master Grid Phase Lost	88	Master SW PV Current High
36	Master PV Voltage High	89	Battery Voltage High
37	Master Islanding Error	90	Battery Current High
38	Master HW Bus Voltage High	91	Battery Charge Voltage High
39	Master HW PV Current High	92	Battery Over Load
40	Master Self-Test Failed	93	Battery Soft Connect Time Out
41	Master HW Inv Current High	94	Output Over Load
42	Master AC SPD Error	95	Battery Open Circuit Error
43	Master DC SPD Error	96	Battery Discharge Voltage Low
44	Master Grid NE Voltage Error		



APPENDIX



8.1. 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.

8.2. Transportation

Be careful with the product transportation and storage. Keep less than 5 cartons of inverter in one stack.

8.3. Warranty

Check the product warranty conditions and terms on the SAJ website:

<https://www.saj-electric.com/services-support-warranty>

8.4. Contacting Support

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

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

Head Quarter: Guangzhou Sanjing Electric Co., Ltd.

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

Tel: +86 20 6660 8588

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

8.5. Trademark

SAJ is the trademark of Sanjing.