

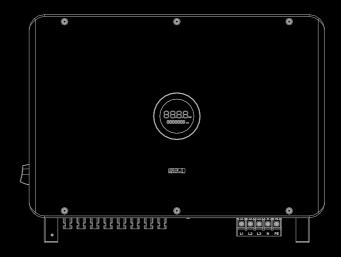


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V1.1





# R6 Series

## ROOFTOP SOLAR INVERTER USER MANUAL

R6-(15K-50K)-(T2,T3,T4)-32, R6-(25K-30K)-(T2,T3)-32-B R6-(5K-30K)-(T2,T3,T4)-32-LV

#### Preface

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

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 ir your journey for a cleaner and greener world.

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

Guangzhou Sanjing Electric Co., Ltd



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# SAFETY PRECAUTIONS



#### 1.1. Scope of Application

This User Manual describes instructions and detailed procedures for installing, operating, maintaining, and troubleshooting of the following SAJ on-grid inverters:

T2 models				
R6-15K-T2-32	R6-17K-T2-32	R6-20K-T2-32	R6-22K-T2-32	R6-25K-T2-32
K0-15K-12-52	R0-17N-12-32	R0-20R-12-32	R0-22N-12-32	R6-25K-T2-32-B
R6-5K-T2-32-LV	R6-6K-T2-32-LV	R6-8K-T2-32-LV	R6-10K-T2-32-LV	R6-15K-T2-32-LV
T3 models				
R6-25K-T3-32	R6-30K-T3-32	R6-33K-T3-32	R6-36K-T3-32	
R6-25K-T3-32-B	R6-30K-T3-32-B	K0-33K-13-3Z	R0-30K-13-32	
R6-20K-T3-32-LV				
T4 models				
R6-36K-T4-32	R6-40K-T4-32	R6-50K-T4-32		
R6-25K-T4-32-LV	R6-30K-T4-32-LV			

#### 1.2. Safety Instructions





<u></u> CAUTION
$\cdot \text{ CAUTION indicates a hazardous condition which, if not avoided, can result in minor or moderate injury.} \\$

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

#### 1.3. Target Group

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 of the high-voltage of the equipment.

### **PREPARATION**



#### 2.1. Safety Instructions



- · Possible danger to life due to electrical shock and high voltage.
- · Do not touch non-insulated parts or cables.
- · Disconnect the inverter from voltage sources and make sure it cannot be reconnected before working on the device.
- Do not disconnect the DC connector under load.
- · Do not touch the live parts and cables inside the inverter during operation, 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.
- · 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, lighting, 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.



- · 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.



- · The solar inverter enclosure will become hot during operation. Please do not touch the heat sink or enclosure during operation.
- Risk of damage due to improper modifications.

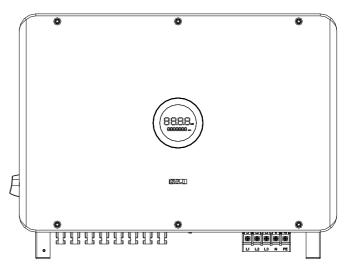




- · Public utility only.
- $\cdot$  The solar inverter is designed to feed AC power directly to the public utility power grid; do not connect AC output of the inverter to any private AC equipment.

#### 2.2. Explanations of Symbols

Symbol	Description
<u> </u>	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.
(5) 5min	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.
<b>S</b> SS	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 See Chapter Troubleshooting to remedy the error.
	This device shall not be disposed of in residential waste See Chapter Recycling and Disposal for proper disposal.
CE	CE Mark  Equipment with the CE mark fulfills the basic requirements of the Guideline Governing Low-Voltage and Electro-magnetic Compatibility.



# 3.

# PRODUCT INFORMATION



#### 3.1. Application Scope of Products

R6 products are grid-tied three phase inverters without transformer and the inverters are important components of grid-tied solar power systems.

The product converts the DC generated by solar panels into AC which is in accordance with the requirements of public grid and send the AC into the grid, Figure 3.1 shows the structural diagram of the typical application system.

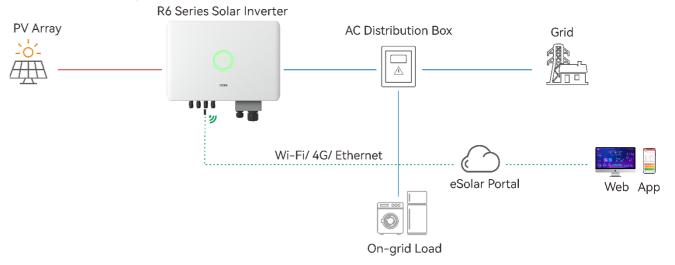
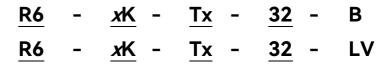


Figure 3.1. R6 series application

#### 3.2. Specification of Product Model



R6: The product name.

xK: Rated power. For example, 15K indicates the rated power of the inverter is 15 kW.

Tx: Three-phase model with x MPPTs.

32: The maximum DC input current per MPPT is 32 A.

B: This model is ONLY applicable to Belgium.

LV: Low voltage. The LV series inverters are at the nominal AC voltage of 127/220 V.

#### SAJ

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#### 3.3. Dimensions

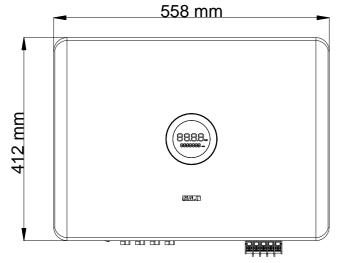


Figure 3.2. Dimensions of R6-(15K-25K)-T2-32, R6-25K-T2-32-B and R6-(5K-15K)-T2-32-LV

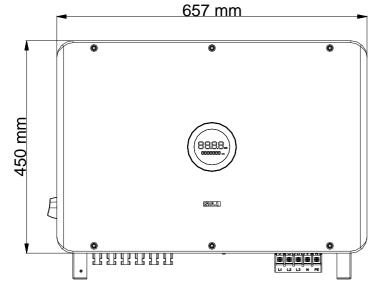


Figure 3.3. Dimensions of R6-(25K-36K)-T3-32, R6-(25K,30K)-T3-32-B, and R6-20K-T3-32-LV

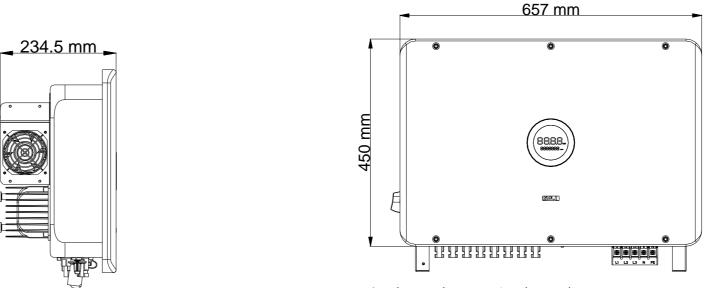
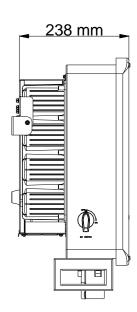


Figure 3.4. Dimensions of R6-(36K-50K)-T4-32 and R6-(25K,30K)-T4-32-LV



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238 mm



#### 3.4. Datasheet

#### 3.4.1. R6-(15K-25K)-T2-32, R6-25K-(T2,T3)-32-B

Model	R6-15K-T2-32	R6-17K-T2-32	R6-20K-T2-32	R6-22K-T2-32	R6-25K-T2-32-B	R6-25K-T2-32	R6-25K-T3-32-B			
DC Input				,		'				
Max. PV Array Power [Wp]@STC	22500	25500	30000	33000	37500	37500	37500			
Max. Input Voltage [V]	1100									
MPPT Voltage Range [V]	180-1000	80-1000								
Nominal Input Voltage [V]	600									
Start-up Voltage [V]	200									
Max. Input Current [A]	32									
Max. Short-Circuit Current [A]	38.4									
No. of MPPT	2						3			
No. of Strings per MPPT	2									
AC Output [On-grid]										
Rated AC Output Power [W]	15000	17000	20000	22000	25000	25000	25000			
Max. AC Output Powe [VA]	16500	18700	22000	24200	25000	27500	25000			
Max. AC Output Current [A]	25.0	28.3	33.3	36.7	37.9	41.7	37.9			
Nominal AC Voltage [V]	220/380									
Nominal AC Grid Frequency/ Range	50/60									
[Hz]	50/60									
Total Distortion Harmonic [THDi]	< 3%									
Power Factor	0.8 leading-0.8 la	igging								
Feed-in Phases/AC Connection	3/3									
Phases	3/3									
Efficiency										
Max. Efficiency	98.8%									
Euro Efficiency	98.5%									
Protection	,									
DCI Monitoring	Integrated									
GFCI Monitoring	Integrated									
Grid Monitoring	Integrated									
AC Grounding Detection	Integrated									
AC Short-Circuit Protection	Integrated									
DC Insulation Resistance Detection	Integrated									
DC Surge Protection	Type II									
AC Surge Protection	Type III <sup>①</sup>									

Model	R6-15K-T2-32	R6-17K-T2-32	R6-20K-T2-32	R6-22K-T2-32	R6-25K-T2-32-B	R6-25K-T2-32	R6-25K-T3-32-B		
Anti-islanding Protection	AFD	1					1		
AFCI Protection	Integrated								
Interface									
AC Connection	Terminal block	minal block							
DC Connection	D4, MC4 (optiona	1)							
Display	LED + App (Blueto	ooth)							
	• RS232 (USB)								
Communication Port	• RS485 (RJ45)								
	• DRM (RJ45)								
	Wi-Fi (standar	d)							
Communication Mode	• Ethernet/4G (d	optional)							
General Data									
Topology	Transformer-less								
Nighttime Power Consumption [W]	<0.6								
Temperature	40°C								
Cooling Method	Intelligent fan coo	oling							
Ambient Humidity	0%-100% non-co	ndensing							
Max. Operating Altitude [m]	4000 m (>3000 m	power derating)							
Noise [dBA]	< 50								
Ingress Protection	IP65								
Mounting	Rear panel								
Dimensions [H x W x D] [mm]	412 * 558 * 234.5								
Weight [kg]	22.5						37.65		
Warranty [Year]	Refer to the warra	anty policy							
Certifications	IEC/EN62109-1/2, EN61000-6-1/2/3/4, IEC61683, IEC60068-2, IEC62116, IEC61727, PEA/MEA, VDE0126-1-1/A1, CEI 0-2 VDE-AR-N 4105, AS/NZS4777.2, CQC NB/T 32004, G98/G99, NBR 16149, NBR 16150, C10/11, RD1669, UNE206006, UNE206007, EN50438								

①: For products sold in Pakistan, the AC surge protection is of type II.



#### 3.4.2. R6-(25K-36K)-T3-32, R6-(36K-50K)-T4-32, R6-30K-T3-32-B

Model	R6-25K-T3-32	R6-30K-T3-32-B	R6-30K-T3-32	R6-33K-T3-32	R6-36K-T3-32	R6-36K-T4-32	R6-40K-T4-32	R6-50K-T4-32	
DC Input									
Max. PV Array Power [Wp]@STC	37500	45000	45000	49500	54000	54000	60000	75000	
Max. Input Voltage [V]	1100								
MPPT Voltage Range [V]	180-1000								
Nominal Input Voltage [V]	600	0							
Start-up Voltage [V]	200								
Max. Input Current [A]	32								
Max. Short-Circuit Current [A]	38.4								
No. of MPPT	3					4			
No. of Strings per MPPT	2								
AC Output [On-grid]									
Rated AC Output Power [W]	25000	30000	30000	33000	36000	36000	40000	50000	
Max. AC Output Powe [VA]	27500	30000	33000	36300	39600	39600	44000	50000	
Max. AC Output Current [A]	41.7	45.5	50	55	60	60	66.7	75.8	
Nominal AC Voltage [V]	220/380		•	•	•		•		
Nominal AC Grid Frequency/	50/60								
Range [Hz]	50/60								
Total Distortion Harmonic [THDi]	< 3%								
Power Factor	0.8 leading-0.8	3 lagging							
Feed-in Phases/AC Connection	3/3								
Phases	3/3								
Efficiency	T								
Max. Efficiency	98.8%								
Euro Efficiency	98.5%								
Protection									
DCI Monitoring	Integrated								
GFCI Monitoring	Integrated								
Grid Monitoring	Integrated								
AC Grounding Detection	Integrated								
AC Short-Circuit Protection	Integrated								
DC Insulation Resistance	Integrated								
Detection	_								
DC Surge Protection	Type II								
AC Surge Protection	Type III <sup>①</sup>								
Anti-islanding Protection	AFD								
AFCI Protection	Integrated								

Model	R6-25K-T3-32	R6-30K-T3-32-B	R6-30K-T3-32	R6-33K-T3-32	R6-36K-T3-32	R6-36K-T4-32	R6-40K-T4-32	R6-50K-T4-32
Interface	<u> </u>			'	'	'	<u>'</u>	
AC Connection	Terminal block	;						
DC Connection	D4, MC4 (optio	onal)						
Display	LED+App (Blue	etooth)						
	<ul> <li>RS232 (USE</li> </ul>	3)						
Communication Port	<ul> <li>RS485 (RJ4</li> </ul>	5)						
	<ul> <li>DRM (RJ45)</li> </ul>	)						
	Wi-Fi (standard)	dard)						
Communication Mode	Ethernet/40	G (optional)						
General Data								
Topology	Transformer-le	ess						
Nighttime Power Consumption	-0.4							
[W]	<0.6							
Temperature	40°C							
Cooling Method	Intelligent fan	cooling						
Ambient Humidity	0%-100% non-	-condensing						
Max. Operating Altitude [m]	4000 (>3000 m	n power derating)						
Noise [dBA]	< 50							
Ingress Protection	IP65							
Mounting	Rear panel							
Dimensions [H x W x D] [mm]	450 * 657 * 238	8						
Weight [kg]	37.65							38.35
Warranty [Year]	Refer to the wa	arranty policy						
Certifications		1/2, EN61000-6-1 05, AS/NZS4777.2,						

①: For products sold in Pakistan, the AC surge protection is of type II.



#### 3.4.3. R6-(5K-15K)-T2-32-LV

Model	R6-5K-T2-32-LV	R6-6K-T2-32-LV	R6-8K-T2-32-LV	R6-10K-T2-32-LV	R6-15K-T2-32-LV					
Input (DC)				•						
Max. PV Array Power [Wp]@STC	7500	9000	12000	15000	22500					
Max. Input Voltage [V]	1100									
MPP Voltage Range [V]	180-1000	180-1000								
Nominal Input Voltage [V]	370									
Start-up Voltage [V]	200									
Max. Input Current [A]	32									
Max. Short-Circuit Current [A]	38.4									
Number of MPP Trackers	2									
Number of Strings per MPP Tracker	2									
Output (AC)										
Rated AC Output Power [W]	5000	6000	8000	10000	15000					
Max. Apparent Power [VA] *1	5500	6600	8800	11000	15000					
Max. AC Output Current [A]	14.4	17.3	23.1	28.9	39.4					
Nominal AC Voltage [V]	127/220									
Nominal AC Grid Frequency/ Range [Hz]	50/60									
Total Distortion Harmonic [THDi]	< 3%									
Power Factor	0.8 leading-0.8 laggi	ng								
Feed-in Phases/AC Connection Phases	3/3									
Efficiency										
Max. Efficiency	98.8%									
Euro Efficiency	98.5%									
Protection										
DCI Monitoring	Integrated									
GFCI Monitoring	Integrated									
Grid Monitoring	Integrated									
AC Grounding Detection	Integrated									
AC Short-Circuit Protection	Integrated									
DC Insulation Resistance Detection	Integrated									
DC Surge Protection	Type II									
AC Surge Protection	Type III <sup>①</sup>									
Anti-islanding Protection	AFD									
AFCI Protection	Integrated									

Model	R6-5K-T2-32-LV	R6-6K-T2-32-LV	R6-8K-T2-32-LV	R6-10K-T2-32-LV	R6-15K-T2-32-LV			
Interface	<b>-</b>	1	1					
AC Connection	Terminal block							
DC Connection	D4/MC4 (optional)							
Display	LED+App (Bluetooth)							
Communication Port	• RS232 (USB)							
	<ul><li>RS485 (RJ45)</li><li>DRM (RJ45)</li></ul>							
Communication Mode	<ul><li>Wi-Fi (standard)</li><li>Ethernet/4G (option</li></ul>	<ul><li>Wi-Fi (standard)</li><li>Ethernet/4G (optional)</li></ul>						
General Data								
Topology	Transformerless							
Nighttime Power Consumption [W]	<0.6							
Temperature	40°C							
Cooling Method	Intelligent fan cooling							
Ambient Humidity	0%-100% non-conder	nsing						
Max. Operating Altitude [m]	4000 (>3000m power	derating)						
Noise [dBA]	<50							
Ingress Protection	IP65							
Mounting	Rear panel							
Dimensions [H*W*D] [mm]	412 * 558 * 234.5							
Weight [kg]	22.5							
Warranty [Year]	Refer to the warranty	policy						
Certifications	IEC/EN62109-1/2, EN VDE0126-1-1/A1, CEI NBR 16150, C10/11, R	0-21, VDE-AR-N 41	05, AS/NZS4777.2, 0	CQC NB/T 32004, G9				

①: For products sold in Pakistan, the AC surge protection is of type II.



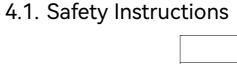
#### 3.4.4. R6-20K-T3-32-LV, R6-(25K,30K)-T4-32-LV

Model	R6-20K-T3-32-LV	R6-25K-T4-32-LV	R6-30K-T4-32-LV
Input (DC)	·	•	
Max. PV Array Power [Wp]@STC	30000	37500	45000
Max. Input Voltage [V]	1100		
MPP Voltage Range [V]	180-1000		
Nominal Input Voltage [V]	370		
Startup Voltage [V]	200		
Max. Input Current [A]	32		
Max. Short-Circuit Current [A]	38.4		
Number of MPP Trackers	3	4	
Number of Strings per MPP Tracker	2		
Output (AC)			
Rated AC Output Power [W]	20000	25000	30000
Max. Apparent Power [VA] *1	22000	27500	30000
Max. AC Output Current [A]	57.7	72.2	78.7
Nominal AC Voltage [V]	127/220	127/220	
Nominal ACGrid Frequency/Range [Hz]	50/60		
Total Distortion Harmonic [THD]	<3%		
Power Factor	0.8 leading-0.8 laggi	0.8 leading-0.8 lagging	
Feed-in Phase/AC Connection Phases	3/3		
Efficiency			
Max. Efficiency	98.8%		
Euro Efficiency	98.5%		
Protection	•		
DCI Monitoring	Integrated		
GFCI Monitoring	Integrated		
Grid Monitoring	Integrated		
AC Grounding Detection	Integrated		
AC Short-Circuit Protection	Integrated	Integrated	
DC Insulation Resistance Detection	Integrated		
DC Surge Protection	Type II	Type II	
AC Surge Protection	Type III <sup>①</sup>	Type III <sup>®</sup>	
Anti-islanding Protection	AFD		
AFCI Protection	Integrated		

Model	R6-20K-T3-32-LV	R6-25K-T4-32-LV	R6-30K-T4-32-LV	
Interface	,			
AC Connection	Terminal block			
DC Connection	D4/MC4 (optional)			
Display	LED+App (Bluetooth)			
Communication Port	• RS232 (USB)			
	• RS485 (RJ45)			
	<ul> <li>DRM (RJ45)</li> </ul>			
Communication Mode	Wi-Fi (standard)			
	Ethernet/4G (option)	nal)		
General Data				
Topology	Transformerless	Transformerless		
Nighttime Power Consumption [W]	<0.6			
Temperature	40°C	40°C		
Cooling Method	Intelligent fan cooling	Intelligent fan cooling		
Ambient Humidity	0%-100% non-conden	0%–100% non-condensing		
Max. Operating Altitude [m]	4000 (>3000m power	4000 (>3000m power derating)		
Noise [dBA]	<50	<50		
Ingress Protection	IP65	IP65		
Mounting	Rear panel	Rear panel		
Dimensions [H*W*D] [mm]	450 * 657 * 238	450 * 657 * 238		
Weight [kg]	37.65	37.65		
Warranty [Year]	Refer to the warranty	Refer to the warranty policy		
Certifications	IEC62116, IEC61727, F VDE-AR-N 4105, AS/N	IEC/EN62109-1/2, EN61000-6-1/2/3/4, IEC61683, IEC60068-2, IEC62116, IEC61727, PEA/MEA, VDE0126-1-1/A1, CEI 0-21, VDE-AR-N 4105, AS/NZS4777.2, CQC NB/T 32004, G98/G99, NBR 16149, NBR 16150, C10/11, RD1669, UNE206006, UNE206007, EN50438		

①: For products sold in Pakistan, the AC surge protection is of type II.

# INSTRUCTIONS FOR INSTALLATION





#### **DANGER**

- Danger to life due to potential fire or electricity shock.
- Do not install the inverter near any inflammable or explosive items.
- This inverter will be directly connected with HIGH VOLTAGE power generation device; the installation must be performed by qualified personnel only in compliance with national and local standards and regulations.



#### NOTICE

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

#### 4.2. Pre-installation Check

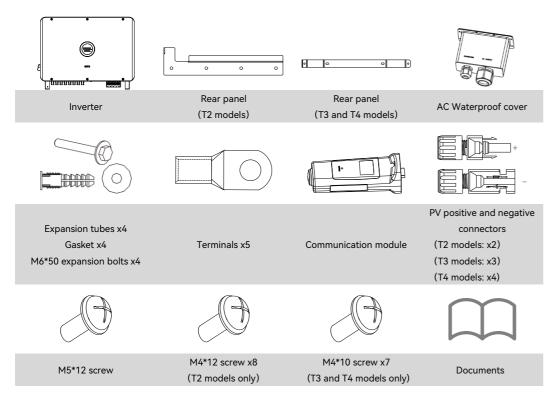
#### 4.2.1. Check the Package

Although SAJ's inverters have thoroughly tested and checked before delivery, it is uncertain that the inverters may 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.



#### 4.2.2. Scope of Delivery

Contact after sales if there are missing or damaged components.



#### 4.3. Installation Method and Position

#### 4.3.1. Installation Position and Clearance

- The installation environment must be free of inflammable or explosive materials.
- Install the device away from heat source.
- Do not install the device at a place where the temperature changes extremely.
- Keep the device away from children.
- Do not install the device at daily working or living arears, including but not limited to the following areas: bedroom, lounge, living room, study, toilet, bathroom, theater, and attic.
- When installing the device at the garage, please keep it away from 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.



To make sure the installation spot is suitably ventilated, if multiple SAJ on-grid solar inverters are installed at the same area, the safety clearance should be followed for proper ventilation condition.

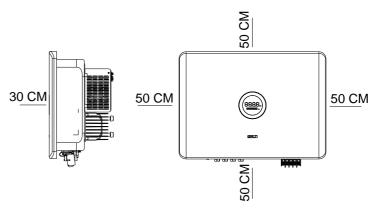


Figure 4.1.Installation clearance



#### 4.4. Mounting Method

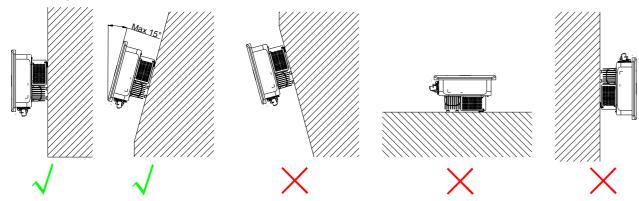


Figure 4.2. Mounting method

- ① The equipment employs natural convection cooling, and it can be installed indoor or outdoor.
- ② Mount vertically or tilted backwards by max.15°. Never install the inverter tilted forwards, sideways, horizontally or upside down.
- ③ Install the inverter at eye level for convenience when checking the LCD display and possible maintenance activities.
- 4 When mounting the inverter, please consider the solidity of wall for inverter, including accessories, make sure the wall has enough strength to hold the screws and bear the weight of products. Please ensure the mounting bracket mounted tightly.

#### 4.5. Mounting Procedure

#### 4.5.1. Installation Tools

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





































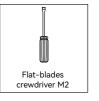
















Socket wrench open end: 10mm (forM6 bolts) 13mm (forM8bolts) 16mm (forM10bolts)

Figure 4.3. Recommended tools



#### 4.5.2. Mount the Inverter

#### Procedure

Select one of the following options to mount the inverter:

- Mount the inverter on the wall.
- Mount the inverter on an external frame. With this option, the installer needs to prepare the frame and make sure that the frame can hold the weight of the inverter.

#### To mount the inverter on the wall:

Step 1. Mark the drilling positions on the wall with the rear panel. Install the inverter at the eye level for maintenance convenience.

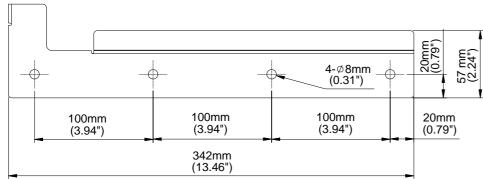


Figure 4.4. Marking drilling positions: T2 models

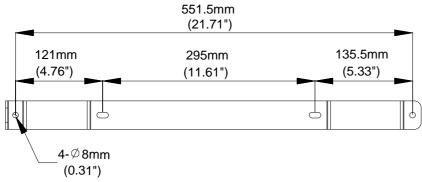


Figure 4.5. Marking drilling positions: T3 and T4 models

Step 2. Drill four holes in the wall and place an expansion tubes in each hole using a rubber mallet.

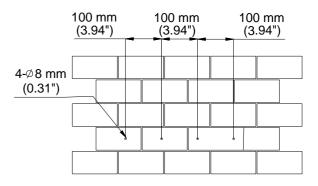


Figure 4.6. Drilling holes: T2 models

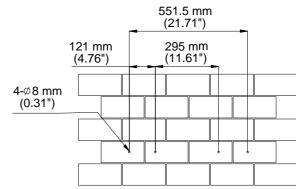


Figure 4.7. Drilling holes: T3 and T4 models

Step 3. Secure the rear panel to the wall with four screws. (M6\*50 screw; 1.5-1.8 N·m)

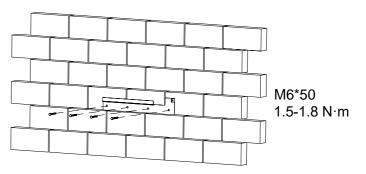


Figure 4.8. Securing the rear panel: T2 models



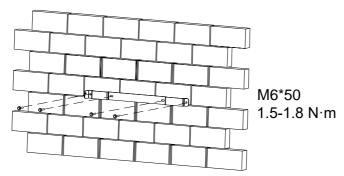


Figure 4.9. Securing the rear panel: T3 and T4 models

Step 4. Carefully mount the inverter to the rear panel. Make sure that the rear part of the equipment is closely mounted to the rear panel.

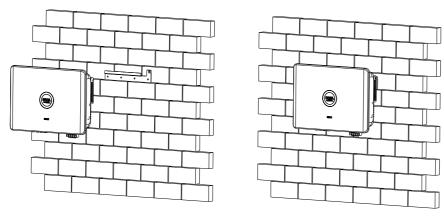


Figure 4.10. Mounting the inverter: T2 models

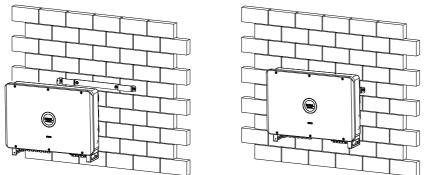
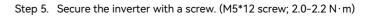


Figure 4.11. Mounting the inverter: T3 and T4 models



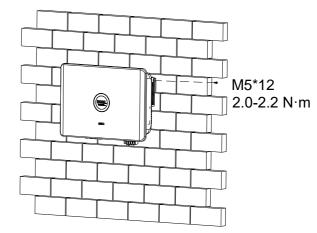


Figure 4.12. Securing the inverter: T2 models

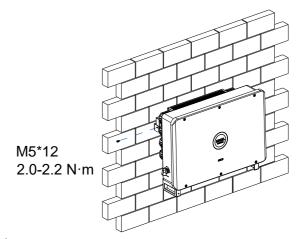


Figure 4.13. Securing the inverter: T3 and T4 models



#### To mount the inverter on the frame:

Step 1. Mark the drilling positions on the frame with the rear panel. Install the inverter at the eye level for maintenance convenience.

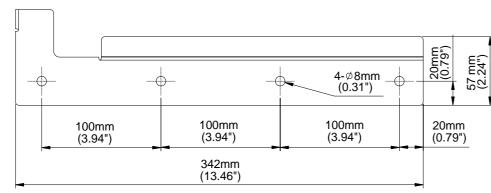


Figure 4.14. Marking drilling positions: T2 models

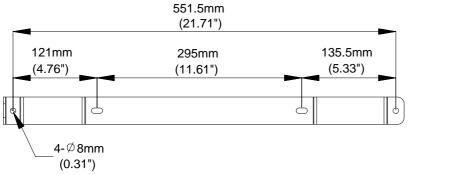


Figure 4.15. Marking drilling positions: T3 and T4 models

Step 2. Drill four holes on the frame according to the markings.

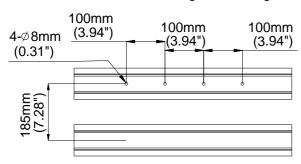


Figure 4.16. Drilling holes: T2 models

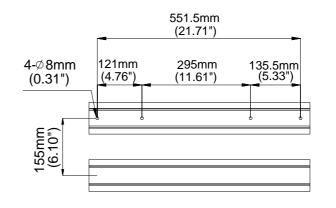


Figure 4.17. Drilling holes: T3 and T4 models

Step 3. Secure the rear panel to the frame with four screws. (M6\*50 screw; 1.5-1.8 N·m)

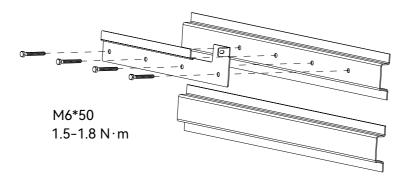


Figure 4.18. Securing the rear panel: T2 models

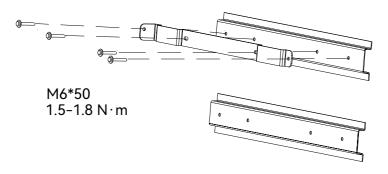


Figure 4.19. Securing the rear panel: T3 and T4 models



Step 4. Carefully mount the inverter to the rear panel. Make sure that the rear part of the equipment is closely mounted to the rear panel.

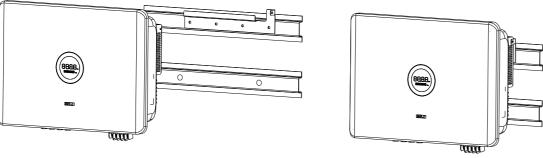


Figure 4.20. Mounting the inverter: T2 models

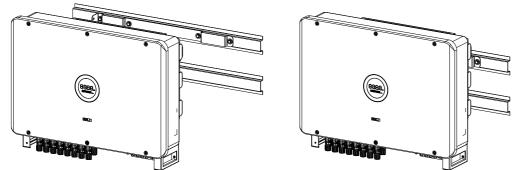


Figure 4.21. Mounting the inverter: T3 and T4 models

Step 5. Secure the inverter with a screw. (M5\*12 screw; 2.0-2.2 N·m)

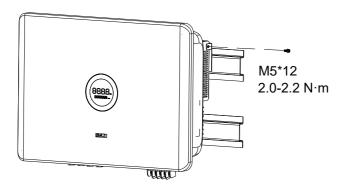


Figure 4.22. Securing the inverter: T2 models

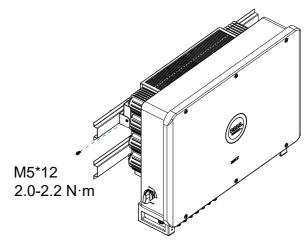


Figure 4.23. Securing the inverter: T3 and T4 models

# **ELECTRICAL** CONNECTION



#### 5.1. Safety Instructions

Electrical connection must only be operated 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

- Dangerous to life due to potential fire or electricity shock.
- The PV panel string will produce lethal high voltage when exposed to sunlight.
- Disconnect DC and AC circuit breakers before starting electrical connections.
- Ensure all the cables have no voltage before conducting cable connection.



#### **WARNING**

- Any improper operations during cable connection can cause device damage or personal injury.
- All cables must be undamaged, firmly attached, properly insulated, and adequately dimensioned.



- When power-on, the equipment should be 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.

#### 5.2. 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 ring light will be lit up in red and error code <31> will be displayed on LED panel 1 until the error being solved and inverter functioning properly.

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



#### 5.3. Specification of Electrical Interfaces

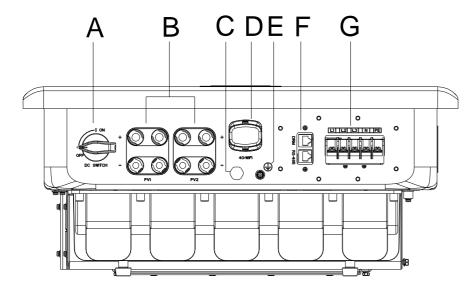


Figure 5.1. Electrical terminals: T2 models

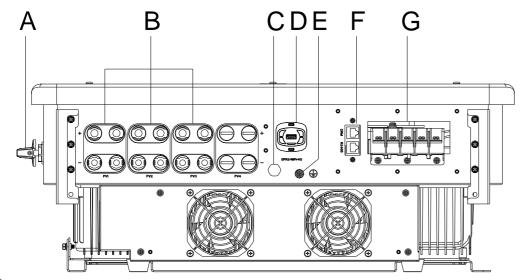


Figure 5.2. Electrical terminals: T3 models

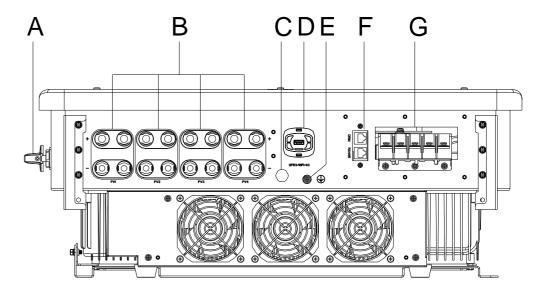


Figure 5.3. Electrical terminals: T4 models

Callout	Description
Α	DC Switch
В	DC Input
С	Decompression Valve
D	RS232 Communication
E	Ground Connection
F	RS485 Communication + DRM
G	Terminals Block

Table 5.1. Port description

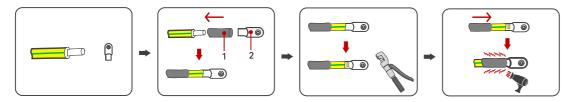
#### 5.4. Grounding Cable Connection



- The ground connection cannot replace the AC cable PE terminal connection.
- Connect the grounding cable before AC cable, DC cable, and communication cable connections.

The users need to prepare the cables and OT/DT terminals themselves. The recommended conductor cross-sectional area of the grounding cable is 6-16mm<sup>2</sup>.

Step 1. Assemble the cables with the OT/DT terminals as follows:



- 1. Heat shrink tubing 2. OT/DT terminal
- Step 2. Remove the screw of the grounding terminal, and secure the OT/DT terminal of the grounding cable with the screw. (T2 series: M5\*12 screw; 2.0-2.2 N·m) (T3/T4 series: M4\*10 screw; 1.1-1.2 N·m)

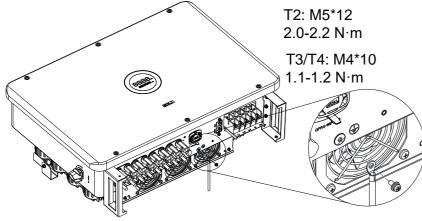


Figure 5.4. Connecting the grounding cable

#### 5.5. AC-side Electrical Connection

#### 5.5.1 External AC Circuit Breaker and Residual Current Device

Install a 4-pole circuit breaker to ensure the inverter can disconnect from grid safely. The inverter is integrated with a RCMU; however, an external RCD is needed to protect the system from tripping, either type A or type B RCD is compatible with the inverter.

The integrated leakage current detected of inverter can detect the real time external current leakage. When integrated leakage detected exceeds the limitation the inverter will be disconnected from grid quickly, if an external leakage current device is connected, the action current should be 300 mA.

Model	Rated current of AC circuit breaker (A)
R6-(15K-25K)-T2-32, R6-25K-T2-32-B	/0
R6-(5K-15K)-T2-32-LV	40
R6-(25K-36K)-T3-32, R6-(25K,30K)-T3-32-B	10
R6-20K-T3-32-LV	60
R6-(36K-50K)-T4-32	100
R6-(25K-30K)-T4-32-LV	100
Note: Do not connect multiple inverters to one AC circuit breaker.	

Table 5.2. Recommended AC circuit breaker specification

#### 5.5.2 Connection Procedure

Model	Cross-sectional area of cables (mm²)	
Model	Range	Recommended value
R6-(15K-25K)-T2-32, R6-25K-T2-32-B	10.0-16.0	16.0
R6-(5K-15K)-T2-32-LV	10.0-16.0	10.0
R6-(25K-36K)-T3-32, R6-(25K,30K)-T3-32-B		
R6-20K-T3-32-LV	1/0.250	25.0
R6-(36K-50K)-T4-32	16.0-35.0	25.0
R6-(25K,30K)-T4-32-LV		

Table 5.3. Recommended AC cable specification

**Note:** If the grid-connection distance is too large, select an AC cable with larger diameter for the actual condition.

#### Procedure

Step 1. Strip off the insulation on the cable ends by 14 mm (0.55 inch).

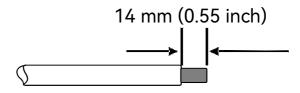


Figure 5.5. Stripping the cable insulation skin

40



Step 2. Crimp the M5 terminals on the cable ends.

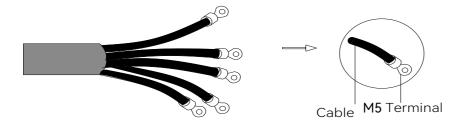


Figure 5.6. Crimping the terminals

Step 3. Loosen the nut from the cable gland on the waterproof cover and insert the AC cables and the communication cable through the waterproof cover.

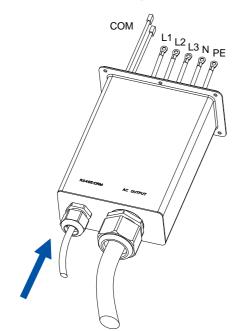


Figure 5.7.Inserting cables through the waterproof cover

Step 4. Insert the communication cables to the communication port. Secure the cables on the AC terminals L1, L2, L3, N, and PE. (M6 screw; 2.5–3 N·m). Secure the waterproof cover to the inverter. (M4\*10 screw; 1.1–1.2 N·m). Tighten the nut back to the cable gland.

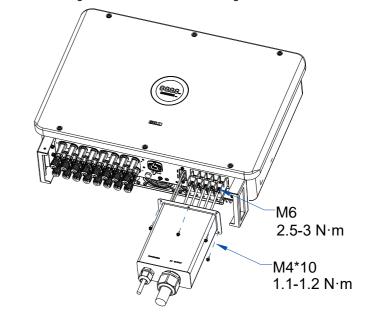
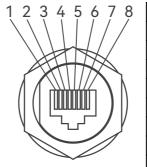


Figure 5.8. Securing the cable

#### 5.6. Communication Connection

R6 inverter is standardly equipped with an RS485 interface and an RS232 interface.

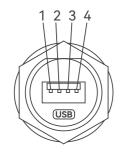
#### RS485 port



Pin Number	Description
1	NC
2	NC
3	NC
4	NC
5	NC
6	NC
7	RS485-A: Transmission RS485-A differential signal
8	RS485-B: Transmission RS485-B differential signal

Table 5.4. RS485 pin definition

#### RS232 port



Pin Number	Description	Function
1	+7 V	Power supply
2	RS-232 TX	Send data
3	RS-232 RX	Receive data
4	GND	Ground wire

Table 5.5. RS232 Pin definition

#### 5.7. DC-side Connection



#### / WARNING

• Make sure the PV array is well insulated to ground before connecting it to the inverter.



#### WARNING

- Danger to life due to electric shock when live components or DC cables are touched.
- The PV panel string will produce lethal high voltage when exposed to sunlight.
- DO NOT touch non-insulated parts or cables. Touching live DC cables results in death or lethal injures.
- Disconnect the inverter from voltage sources.
- DO NOT disconnect DC connectors under load.
- Wear suitable personal protective equipment for all work.



#### NOTICE

- Place the connector separately after unpacking to avoid confusion for connection of cables.
- 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.
- . Before insert the connector into DC input terminal of the inverter, make sure that the DC switch of the inverter is OFF.
- Use the original terminals for installation.

Conductor cross-sectional area of cables (mm²)		Outside diameter of the cables (mm)
Range	Recommended value	4.2-5.3
4.0-6.0	4.0	4.2-5.3

Table 5.6. Recommended specifications of DC cable

Step 1. Loosen the lock screws on positive and negative connector.

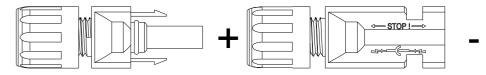
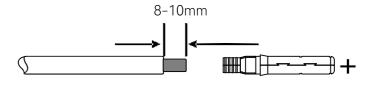


Figure 5.9.Loosening PV connectors

Step 2. Strip off the insulation of the positive and negative cables by 8-10 mm (0.31-0.39 inch).



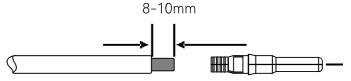


Figure 5.10. Striping off the insulation skin of cables

Step 3. Insert the cable ends to the sleeves. Use a crimping plier to assembly the cable ends.

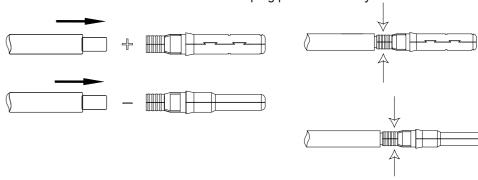


Figure 5.11. Inserting cables to lock screws



Step 4. Insert the assembled cable ends into the blue positive and negative PV connectors. Gently pull the cables backwards to ensure firm connection.

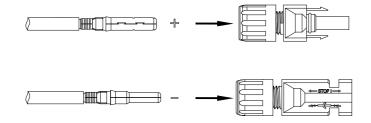


Figure 5.12. Inserting crimped cables to connectors

Step 5. Tighten the lock screws on the positive and negative cable connectors.

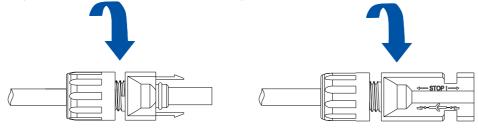


Figure 5.13. Securing the connectors

Step 6. Make sure the DC switch is at the OFF position.

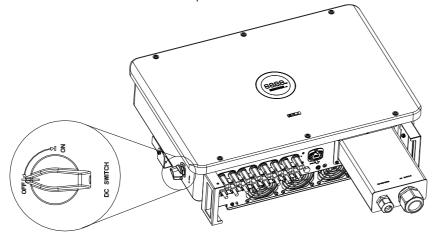


Figure 5.19 DC switch at OFF

Step 7. Connect the positive and negative connectors into the positive and negative DC input terminals of the inverter. A "click" sound should be heard when the contact cable assembly is seated correctly.

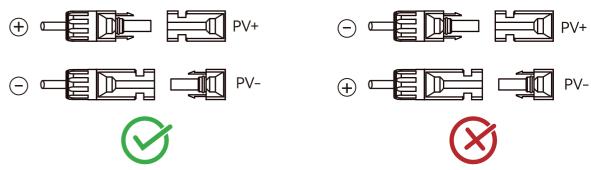


Figure 5.14. Plugging in PV connectors

#### 5.8. Communication Module Connection

Remove the dust-proof cover from the 4G/WiFi or GPRS/WiFi/4G port and insert the communication module.

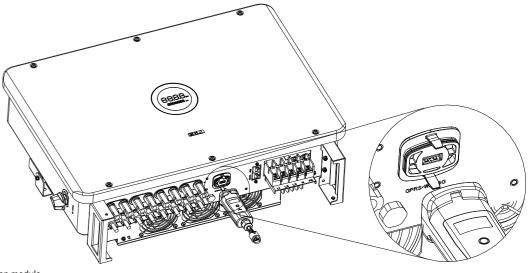


Figure 5.15. Connecting the communication module



#### 5.9. Starting up and Shutting down

#### 5.9.1. Start up the Inverter

- Step 1. Make sure that the photovoltaic panels and AC power grid are connected to the inverter following the installation instructions from previous chapters.
- Step 2. Use a multimeter to check whether the AC side and DC side voltage meet the inverter start voltage.
- Step 3. Turn ON the DC switch (if applicable). The LED indicators will be lit up.
- Step 4. Select the count grid code through the App. Contact the local grid operator about which region to select if needed.

The inverter will be in self-testing mode. When the inverter meets all the grid connecting standards, the inverter will connect to the grid and generate power automatically.

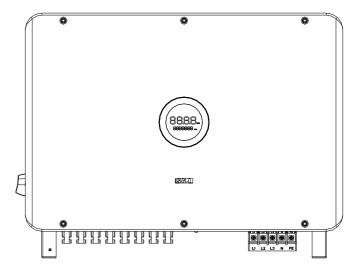
#### 5.9.2. Shut down the Inverter

When the solar light intensity is not strong enough or the output voltage of the photovoltaic system is less than the minimum input power of the inverter, the inverter will shut down automatically.

To shut down the inverter manually, disconnect the AC side circuit breaker first. When multiple inverters are connected, disconnect the minor circuit breaker first, and then disconnect the main circuit breaker. Disconnect the DC switch after the inverter reports the grid connection lost alarm.

#### 5.10. 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, R6 series can quickly detect it and cut off the power to prevent fire and ensure the PV system safety.



## COMMISSIONING

### 6.1. Introduction of LED Panel

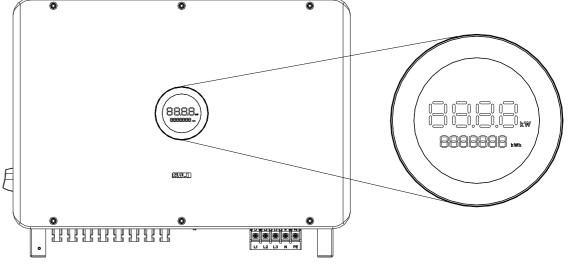


Figure 6.1. LED panel

Display	Status		Description	
		Solid Green	The inverter is in normal on-grid state.	
	O	Breathing Mode	The inverter is in the initialization or waiting state.	
Ring Light		Solid Red	An error occurs.	
	U		Breathing Mode	The software is upgrading.
	0	OFF	Powered off.	
LED Panel 1	88.88 <sub>kw</sub> /6036		Current power (kW) / Error code	
LED Panel 2			Total yield (kWh)	

Table 6.1. LED indicators





#### 6.2. About the Elekeeper App

The Elekeeper (used to be called eSAJ Home) App can be used for both nearby and remote monitoring. It communicates with different devices through Bluetooth or Ethernet connection.

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

#### 6.3. Install the App

On your mobile phone, search for Elekeeper in the App store to download and install the App. Alternatively, scan the following QR code to download the App:

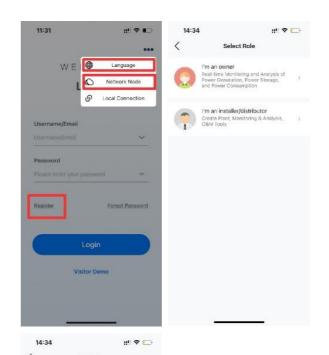


#### 6.4. Log in to the App



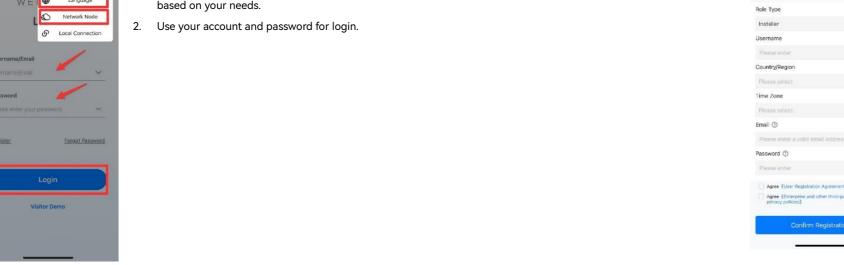
Have an account? — Log in to the App.

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



No account? — Apply for a new account for login.

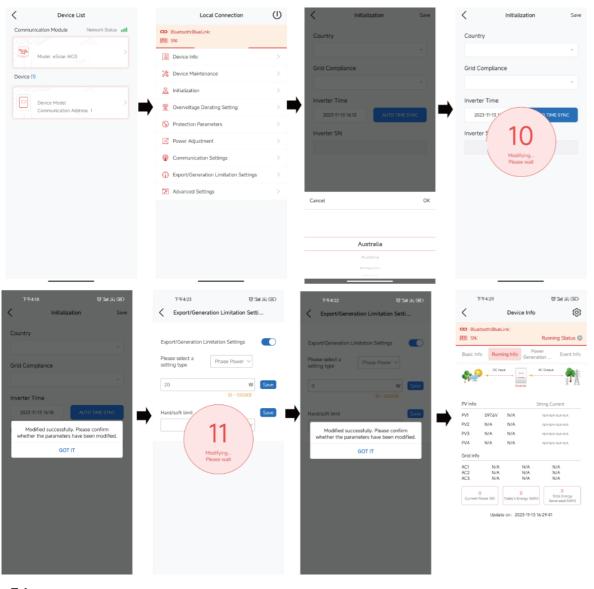
- a. Tap the three-dot icon on the top right corner. Choose the language and network node based on your needs.
- b. Tap **Register.** Choose whether you are an owner, an installer, or a distributor.
  - Note: For commissioning convenience, it is suggested that the owner account be applied by the installer.
- c. Set your username, country/region, time zone, email, and password. Select the registration agreements and confirm the registration.
- d. Use the applied account and the password for





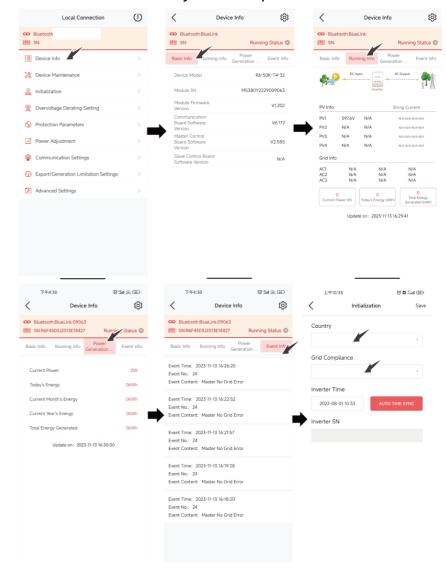
#### 6.5. Complete the Initialization Settings





#### 6.6. View the Inverter Settings

After commissioning, the **device Info** including device **Basic Info**, **Running Info**, **Power Generation**, and **Event Info** can be viewed. **Country** and **Grid Compliance** can be viewed from **initialization** setting.





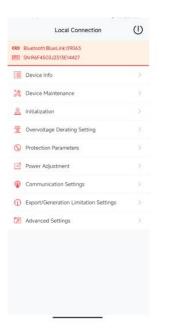
#### 6.7. Remote Monitoring

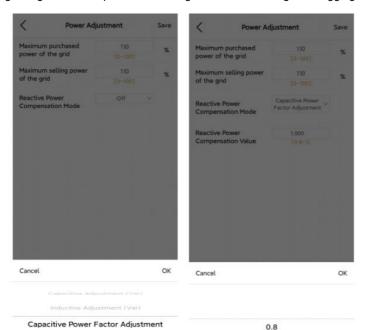
Connect the internet via the eSolar/4G/Wi-Fi module and upload the inverter data onto the server and customers could monitor running information of the inverter remotely via the eSolar Web Portal or their mobile customer terminals.

#### 6.8. Set Reactive Power Control (For Australia)

#### 6.8.1. Set up Fixed Power Factor Mode and Fixed Reactive Power Mode

- 1. Select Power Adjustment.
- 2. Select **Capacitive Power Factor Adjustment** or **Inductive Power Factor Adjustment** according to your local grid regulation. The power factor range is from 0.8 leading ~ 0.8 lagging.







#### 6.8.2. Set up V-Watt and Volt-Var Mode

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. e.g.: AS4777 series setting as below Fig 6.2&6.3.

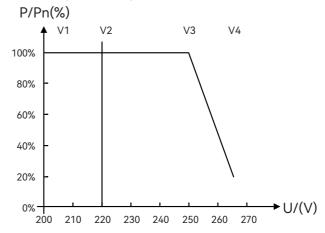


Figure 6.2 Curve for a Volt-Watt response mode (AS4777 Series)

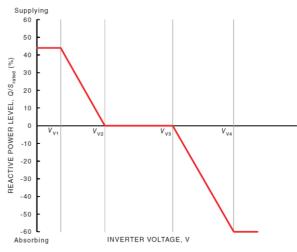


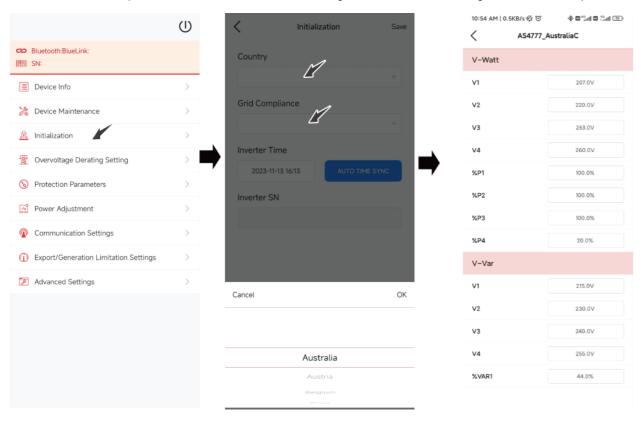
Figure 6.3 Curve for a Volt-Var control mode (AS4777 Series)



#### Setting procedure:

1.AS4777 grid compliance has been set during production, please select corresponding grid compliance according to state regulation during installation. You can choose a state regulation compliance with your local grid on the Elekeeper App.

- 2. Log in to Elekeeper. Refer to chapter 6.2.2 Nearby monitoring.
- 3. Tap V-Watt and V-Var to enter DNSPs settings, choose a suitable state regulation from the drop-down list.



#### 6.9. Export Limit Setting

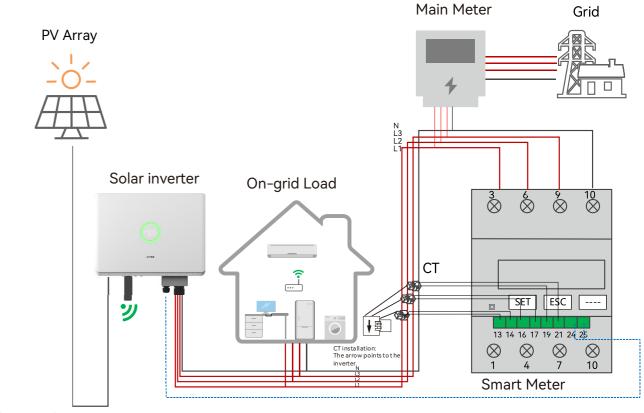
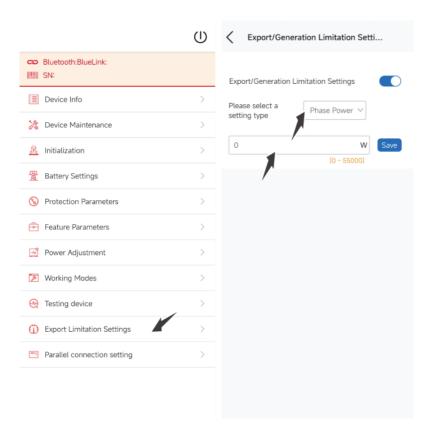


Figure 6.4 Export limit wiring schematic

- 1. Tap Export Limitation Settings.
- 2. In **Please select a setting type**, select the required setting type from the drop-down list.
- 3. Enter the corresponding value.
- 4. Tap **Save**.





#### 6.10. Self-test (For Italy)

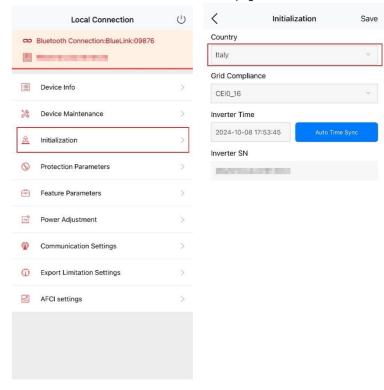
#### About this task

Italian Standard CEI0-21 requires a self-test function for all inverters connected to the utility grid. The self-test ensures that the inverter can be disconnected from the grid when required.

During the self-test, the inverter will check the reaction time for over-frequency, under-frequency, over-voltage, and under-voltage. If the self-test failed, the inverter stops providing the electricity to the grid.

#### Prerequisite

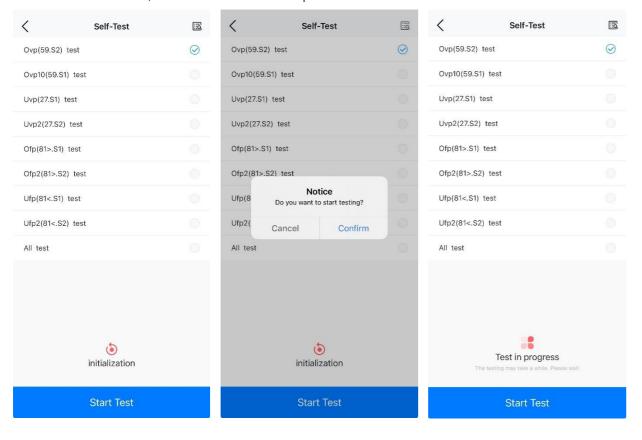
- Ensure that the communication module (Wi-Fi/Bluetooth/Ethernet) of the inverter is connected to the network.
- Ensure that **Country** is set to **Italy** and **Grid Compliance** is selected properly. To check the settings, choose **Initialization** on the **Local Connection** page.





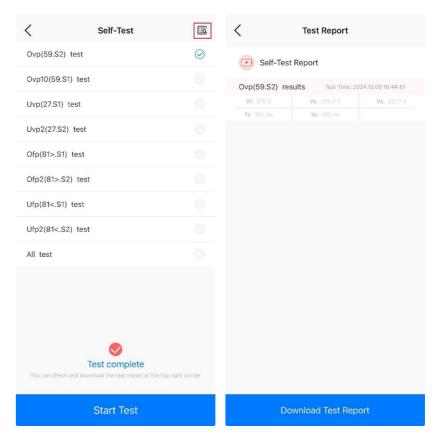
#### Procedure

- 1. On the **Local Connection** page, choose **Self-Test**. Set the self-test parameters if needed.
- 2. Choose the self-test items as required and tap **Start Test**. It takes around 5 minutes to complete each item, and around 40 minutes to complete all the items.



3. After the self-test is completed, tap the search icon on the top right corner to check the test report.

Download the test report if the self-test fails and contact SAJ or your inverter supplier.



## **TROUBLESHOOTING**

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

Error Code	Error Message
1	Master Relay Error
2	Master EEPROM Error
3	Master Temperature High Error
4	Master Temperature Low Error
5	Lost Communication M<->S
6	GFCI Device Error
7	DCI Device Error
8	Current Sensor Error
9	Master Phase1 Voltage High
10	Master Phase1 Voltage Low
11	Master Phase2 Voltage High
12	Master Phase2 Voltage Low
13	Master Phase3 Voltage High
14	Master Phase3 Voltage Low
15	Grid Voltage 10Min High
16	OffGrid Output Voltage Low
17	OffGrid Output Short Circuit
18	Master Grid Frequency High
19	Master Grid Frequency Low
21	Phase1 DCV High
22	Phase2 DCV High
23	Phase3 DCV High
24	Master No Grid Error
27	GFCI Error
28	Phase1 DCI Error
29	Phase2 DCI Error
30	Phase3 DCI Error
31	ISO Error
32	Bus Voltage Balance Error
33	Master Bus Voltage High
34	Master Bus Voltage Low
36	Master PV Voltage High
38	Master HW Bus Voltage High



Error Code	Error Message
39	Master HW PV Current High
40	Master Self -Test Failed
41	Master HW Inv Current High
42	Master AC SPD Error
43	Master DC SPD Error
44	Master Grid NE Voltage Error
45	Master Fan1 Error
46	Master Fan2 Error
47	Master Fan3 Error
48	Master Fan4 Error
49	Lost Communication between Master and Meter
50	Lost Communication between M<->S
51	Lost Communication between inverter and Grid Meter
52	HMI EEPROM Error
53	HMI RTC Error
54	BMS Device Error
55	BMS Lost.Conn
56	CT Device Err
57	AFCI Lost Err
58	Lost Com. H< ->S Err
61	Slave Phase1 Voltage High
62	Slave Phase1 Voltage Low
63	Slave Phase2 Voltage High
64	Slave Phase2 Voltage Low
65	Slave Phase3 Voltage High
66	Slave Phase3 Voltage Low
67	Slave Frequency High
68	Slave Frequency Low
73	Slave No Grid Error
74	Slave PV Input Mode Error
75	Slave HW PV Curr High
76	Slave PV Voltage High
77	Slave HW Bus Volt High
81	Lost Communication D<->C
83	Master Arc Device Error
84	Master PV Mode Error

Error Code	Error Message
85	Authority expires
86	DRM0 Error
87	Master Arc Error
88	Master SW PV Current High

Table 7.1. Error code

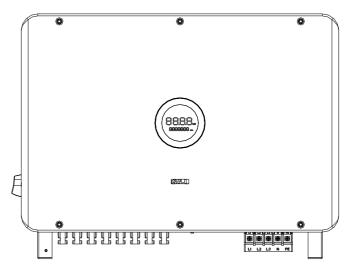
General troubleshooting methods for the inverter are listed below:

Error Message Type	Troubleshooting
Relay Error	If this error occurs frequently, please contact your distributor or call SAJ technical support.
Storer Error	If this error occurs frequently, please contact your distributor or call SAJ technical support.
High Temperature Error	Check whether the radiator is blocked, whether the inverter is in too high or too low temperature.  For further, please contact your distributor or call SAJ technical support.
GFCI Device Error	If this error occurs frequently, please contact your distributor or call SAJ technical support.
DCI Device Error	If this error occurs frequently, please contact your distributor or call SAJ technical support.
GFCI Devices Error	If this error occurs frequently, please contact your distributor or call SAJ technical support.
DCI Devices Error Master	If this error occurs frequently, please contact your distributor or call SAJ technical support.
Current Sensor Error	If this error occurs frequently, please contact your distributor or call SAJ technical support.
AC Voltage Error	Check the voltage of the grid. Check the connection between the inverter and the grid. Check the settings of the on-grid standards of the inverter. If the voltage of the grid is higher than that regulated by local grid. Check with the local grid workers whether they can adjust the voltage at the feed point or change the value of the regulated voltage. If the voltage of the grid is in regulated range as allowed and LCD still shows this error, please contact your distributor or call SAJ technical support.
Frequency Error	Check the setting of country and check the frequency of the local grid. If the above mentioned are normal, please contact your distributor or call SAJ technical support.
Grid Lost Error	Check the connection status between the AC side of the inverter and the grid.



Error Message Type	Troubleshooting
	For further support, please contact your distributor or call SAJ technical support.
GFCI Error	Check the insulation resistance of the positive side and negative side of the solar panel; check whether the inverter is in wet environment; check the grounding of the inverter. If the above mentioned are normal, please contact your distributor or call SAJ technical support.
DCI Error	If this error persists, please contact your distributor or call SAJ technical support.
ISO Error	Check the insulation resistance of the positive side and negative side of the solar panel; check whether the inverter is in wet environment; check whether the grounding of the inverter is loose or not.  If the above mentioned are normal, please contact your distributor or call SAJ technical support.
Overcurrent	Check the connection status between the inverter and the grid and test whether the voltage of the grid is stable or not.  If the above mentioned are normal, please contact your distributor or call SAJ technical support.
Over Bus Voltage	Check the settings of the solar panel. SAJ designer can help you. If the above mentioned are normal, please contact your distributor or call SAJ technical support.
PV Overcurrent	If this error persists, please contact your distributor or call SAJ technical support.
PV Voltage Fault	Check the settings of the solar panel. SAJ designer can help you. If the above mentioned are normal, please contact your distributor or call SAJ technical support.
Lost Communication	Check the connection of communication cables between control board and display board.  If the connection is normal, please contact your distributor or call SAJ technical support.
Null line-to-earth Voltage Fault	Check if connection of the AC output grounding terminal is stable and reliable. If the connection is normal, please contact your distributor or call SAJ technical support.

Table 7.2. Troubleshooting



# ROUTINE MAINTENANCE



#### Inverter Cleaning

Clean the enclosure lid and LED indicator of the inverter with moistened cloth with clear water only. Do not use any cleaning agents as it may damage the components.

#### **Heat Sink Cleaning**

Clean the heat sinks with dry cloth or air blower. Do not clean the heat sink with water or cleaning agents. Make sure there is enough space for ventilation of inverter.

## **APPENDIX**



#### 9.1. Recycling and Disposal

This device should not be disposed as a residential waste.

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

#### 9.2. Warranty

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

#### 9.3. Contacting Support

#### Guangzhou Sanjing Electric Co., Ltd.

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

Postcode: 510663

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

#### **Technical Support & Service**

Tel: +86 20 6660 8588

Fax: +86 20 6660 8589

E-mail: service@saj-electric.com

#### International Sales

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

Fax: 020-66608589

E-mail: info@saj-electric.com

#### China Sales

Tel: 020-66600058/66608588

Fax: 020-66608589

#### 9.4. Trademark

SAJ is the trademark of Sanjing.