







**C&I ENERGY STORAGE SYSTEM** 





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V1.1



## Preface



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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 CHS2 Energy Storage Systems (ESS):

- CHS2-29.9K-T4-X
- CHS2-50K-T6-X

#### 1.2. Safety Instructions

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 in this manual can perform installation and maintenance. Operators must be aware of the high-voltage device.



# PREPARATION

#### 2.1. Safety Instructions

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

- Possible danger to life due to electrical shock and high voltage.
- Do not touch the operating component of the inverter; it might result in burning or death.

- Keep the power off prior to any operations.
- Do not use the battery or the battery control unit if it is defective, broken, or damaged.
- Do not expose the battery to temperature higher than 50°C.
- Do not apply any strong force to the battery.
- Do not place the battery near a heat source, such as direct sunlight or a fireplace.
- Keep inflammable and explosive dangerous items or flames away from the battery.
- Do not soak the battery in water or expose it to moisture or liquids.
- Do not use the battery in vehicles.
- Do not use the battery in spaces where the ammonia level exceeds 20 ppm.
- with national and local standards and regulations.

#### 5 DANGER

To prevent risk of electric shock during installation and maintenance, make sure all AC and DC terminals are plugged out.

Do not touch the surface of the equipment while the housing is wet. Otherwise, it can cause electrical shock.

Do not stay close to the equipment 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.



The installation, service, recycling and disposal of the inverters must be performed by qualified personnel only in compliance

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.

Be sure that the PV generator and inverter are well grounded to protect the properties and persons.

For personal and property safety, do not short-circuit the positive (+) and negative (-) electrode terminals.



#### During installation of the battery system, the circuit breaker must be disconnected from the battery pack wiring.

#### 2.2. Explanations of Symbols

Symbol	Description
$\bigwedge$	Danger of electrical voltage This device is directly connected to public grid. All operations to the battery shall only be carried out by qualified personnel.
	<b>Danger to life due to high electrical voltage</b> There might be residual currents in inverter because of large capacitors. Wait at least 5 minutes before you remove the front lid.
	<b>No open flames</b> Do not place or install near flammable or explosive materials.
<b>S</b>	<b>Danger of hot surface</b> The components inside the inverter will release a lot of heat during operation. Do not touch the metal plate housing during operating.
	<b>Attention</b> Keep the product out of reach of children.
	<b>An error has occurred</b> See the Troubleshooting section to remedy the error.
	This device shall NOT be disposed of in residential waste.



## 2.3. Battery Handling

Operate and use the battery properly according to the user manual. Any attempt to modify the battery without the permission from SAJ will void the limit warranty for the battery.

- The battery must be installed at a suitable location with sufficient ventilation.
- Do not use the battery if it is defective, damaged or broken.
- Only use the battery with the compatible inverter.
- Do not use the battery with other types of battery.
- Make sure the battery is grounded prior to use.
- Only use the battery as intended and designed.

#### 2.4. Potential Hazard and Preventions

The damaged battery can have the following types of potential hazard:

To prevent the chemical hazard:

- 1) Do not open the damaged battery.
- 2) Do not move the damaged battery to avoid further damage.
- 3) Keep the damaged battery away from water.

This battery module shall NOT be disposed of in residential waste.

Equipment with the CE mark fulfills the requirements of the Low Voltage Directive and Electro

Do not pull out any cables or open the battery enclosure when the battery is powered on.

• Chemical hazard: Battery rupture may result in battery electrolyte leakage which is corrosive and flammable.

4) Do not expose the damaged battery to the sunlight to prevent battery internal heating.

• Electrical hazard: Battery explosion can result in fire and explosion accidents.

To prevent battery explosion:

1) Avoid short circuit of the battery.

Short circuit will generate high heat inside the battery, resulting in partial electrolyte gasification, which will stretch the battery shell. The temperature reaching ignition point of internal material will lead to explosive combustion.

- 2) Avoid battery overcharge.
- 3) Battery overcharge may precipitate lithium metal. If the shell is broken, it will come into direct contact with the air and causes combustion. The electrolyte will be ignited at the same time, resulting in strong flame and rapid expansion of gas and explosion.

#### 2.5. Emergency Situation

#### Battery electrolyte contact

Despite of the protection design against any hazard, the damage of the battery may still be possible. If a small amount of battery electrolyte is released due to a serious damage of the outer casing, take the following actions immediately and seek medical advice:

1) Eye contact: Rinse eyes with a large amount of clean water thoroughly.

2) Skin contact: Wash the contacted skin with a large amount of clean water thoroughly.

3) Breathing difficulty due to inhalation: Move to fresh air immediately.

|--|

If a small fire started shortly near the battery pack, try to disconnect the battery circuit breaker and cut off the power supply first, but only if you can do so without endangering yourself.

- report the fire.

Applicable fire distinguishers for small-scale fire hazard:

1) Carbon dioxide (CO<sub>2</sub>) fire extinguisher

2) Dry chemical fire distinguisher

#### Battery fire or explosion

• If the battery is on fire, evacuate the crowd to an open area and report the fire immediately.

Wear a gas mask to avoid inhaling toxic gases and harmful substances when evacuating.

• Do not use water to distinguish the burning battery. It can result in severe electrical shock.

#### 

If the battery is on fire, evacuate the crowd to an open area immediately before any attempt to extinguish the fire and

Wear a gas mask to avoid inhaling toxic gases and harmful substances when evacuating or attempting to extinguish the fire.

#### DANGER

# PRODUCT INFORMATION

Figure 3.1. System overview

Note: The CH2 inverter has not been tested to Section 5 of AS/NZS 4777.2:2020. Multiple inverter combinations should not be used or external devices should be used in accordance with the requirements of AS/NZS 4777.1.

#### 3.1. Product Application Scope

This product is a high-performance Commercial & Industrial (C&I) Energy Storage System (ESS) equipped with advanced battery technology, ideal for large residential, small-scale industrial, and commercial applications. Designed to efficiently store energy for later use, the ESS features an integrated Battery Management System (BMS). This BMS optimizes battery performance while safeguarding against operation beyond its safe parameters, ensuring stability and durability.

One CHS2 ESS can be deployed with two CB2 energy storage systems at maximum for system expansion.







#### 3.2. Specification of Product Model



#### ① CHS2 represents the product name.

② xK indicates the rated energy of the storage system in kW. For example, 50 means 50 kW. The value of x includes 29.9 and 50.

③ T means three phases. x indicates three phases with x number of MPPT. The value of x includes 4 and 6.

④ X indicates the battery rated voltage, rated capacity, and usable energy. The value of X includes 204.8V/280AH/51.5KWH,

256.0V/280AH/64.4KWH, 307.2V/280AH/77.3KWH, 358.4V/280AH/90.2KWH, 204.8V/280AH/103KWH, 256.0V/280AH/128.8KWH,

307.2V/280AH/154.6KWH, 358.4V/280AH/180.4KWH, 204.8V/280AH/154.5KWH, 256.0V/280AH/193.2KWH,

307.2V/280AH/231.9KWH, 358.4V/280AH/270.6KWH, 204.8V/280AH/206KWH, 256.0V/280AH/257.6KWH,

307.2V/280AH/309.2KWH, and 358.4V/280AH/360.8KWH.

#### 3.3. Dimension



Figure 3.2. Dimensions of the ESS



Figure 3.3. Electrical interfaces of battery modules

Callout	Silkscreen	Function	
A	A	The communication input port.	
В	В	The communication output port.	
С	С	The fan control output port.	
D	D	The fan power input port.	
E	E	The fan power output port.	
F	/	The positive port of battery connection.	
G	/	The negative port of battery connection.	

G

Table 3.1. Terminal descriptions of battery modules

#### 11





Figure 3.4. Electrical interfaces of the battery control unit

Callout	Silkscreen	
A	A, B, C, D, E, F, G	The ports for cable conr expansion CB2 systems.
В	/	The AC circuit breaker.
С	P+	The positive port for DC
D	P-	The negative port for DO
E	Start	The Start button.
F	/	The main switch.
G	FAN	The fan for system cooli
Н	BAT-	The negative port for DO
I	BAT+	The positive port for DC
J	AC220V	The 220 V AC power sup
К	COM_PCS	The communication por
L	COM_PAR	The communication por
М	COM_BMU	The communication por

Table 3.2. Terminal descriptions of the battery control unit

#### Function

nections to/from the CH2 inverter and the

input and output from/to the inverter.

OC input and output from/to the inverter.

ing.

C input and output from/to the first battery module.

C input and output from/to the last battery module. pply.

t connecting to the BMS\_1 port of the inverter.

t connecting to the expanded battery system.

t connecting to the battery module.



#### Figure 3.5. Electrical interfaces of the inverter

Callout	Silkscreen	Function
A	1	The DC switches.
В	PV1-PV12	The PV input.
С	BAT1-BAT3	The battery connection ports.
D	4G/WIFI	The 4G/Wi-Fi communication port.
E	GEN	The external generator connection ports.
F	BACK-UP	The AC output connection ports for backup
		loads.
G	GRID	The grid connection port.
Н	СТ	The CT connection port.
I	DRY/DRED/RCR	The connection ports for dry contact, DRED
		and RCR devices.

 J
 RSD

 K
 DRY/SHUT DOWN

 L
 GEN

 M
 BMS/LAN/EMS/METER/PAR

 N
 120Ω

 O
 Image: Comparison of the second se

Table 3.3. Terminal descriptions of the inverter

#### 3.5. Datasheet

#### 3.5.1. System

Model	CHS2-29.9K-T4- 204.8V/280Ah/5 1.5kWh	CHS2-29.9K- 256.0V/280Al .4kWh	
DC Input	I		
Max. PV Array Power [Wp]@STC	59998		
Max. DC Voltage [V]	1000		
MPPT Voltage Range [V]	180-850		
Rated DC Voltage [V]	600		
Start Voltage [V]	200		
Max. DC Input Current [A]	4*45		
Max. DC Short Circuit Current [A]	4*56.5		
Number of Strings per MPPT	2		
Battery Parameters			
Battery Type	LiFePO4		
Rated Energy [kWh]	57.3	71.6	
Battery Voltage Range [V]	179.2-230.4	224-288	
Max. Charging/Discharging Current [A]	140		
Max. DC Short Circuit Current [A]	250		
Usable Energy [kWh]	51.5	64.4	

	The RSD connection port.
	The connection ports for dry contact and
	emergency shut down devices.
	The connection port for external generator.
ELLEL	The connection ports for the listed systems.
	The DIP switches for the 120 $\Omega$ terminal
	resistors.
	The grounding cable connection port.

T4- 1/64	CHS2-29.9K-T4- 307.2V/280Ah/77 .3kWh	CHS2-29.9K-T4- 358.4V/280Ah/90 .2kWh	CHS2-50K-T6- 204.8V/280Ah/ 51.5kWh
			100000
			100000
			6*45
			6*56.5
	85.9	100.3	57.3
	268.8-345.6	313.6-403.2	179.2-230.4
			I
	77.3	90.2	51.5

Model	CHS2-29.9K-T4- 204.8V/280Ah/5 1.5kWh	CHS2-29.9K-T4- 256.0V/280Ah/64 .4kWh	CHS2-29.9K-T4- 307.2V/280Ah/77 .3kWh	CHS2-29.9K-T4- 358.4V/280Ah/90 .2kWh	CHS2-50K-T6- 204.8V/280Ah/ 51.5kWh
AC Output [On-grid]					
Rated AC Power [W]	29999				50000
Rated Apparent Power [VA]	29999				50000
Max. Apparent Power [VA]	29999				55000
Rated Output Current [A]@230Vac	43.3				72.5
Max. AC Output Current to Utility Grid [A]	43.3				79.8
Current Inrush[A]	192				
Max. AC Fault Current[A]	182.6				
Max. AC Over Current Protection[A]	86.6				145
Rated AC Voltage [V]	3+N+PE,400				
Rated Input/Output Voltage/Range(V)	230/400V 0.85Un-1.	1Un			
Rated Output Frequency/Range [Hz]	50: 45-55; 60: 55-65				
Power Factor [cos φ]	0i - 1 - 0c				
Total Harmonic Distortion [THDi]	<3%				
AC Input [On-grid]					
Rated AC Voltage [V]	3+N+PE, 400				
Rated Input Frequency [Hz]	50, 60				
Max. Input Current [A]	150				
AC Input [Generator]					
Max. Input Power [W]	29999				50000
Max. Input Current [A]@230V	43.3				72.5
Rated Input Voltage [v]	3+N+PE,400				
Rated Input Frequency/Range [Hz]	50: 45-55; 60: 55-65				
AC Output [Back-up]					
Max. Apparent Power [VA]	29999				55000
Peak Output Apparent Power [VA]	29999				75000,5s
Rated AC Voltage [V]	3+N+PE,400				
Rated Output Frequency/Range [Hz]	50: 45-55; 60: 55-65				
Output THDv (@ Linear Load)	<3%				
Efficiency					
Max. Efficiency	≥98.0%				
Euro Efficiency	97.3%				
Max. Battery to AC Efficiency	96.0%				

Model	CHS2-29.9K-T4- 204.8V/280Ah/5 1.5kWh	CHS2-29.9K- 256.0V/280Ah .4kWh	
Protection		<u> </u>	
PV String Current Monitoring	Integrated		
PV Insulation Resistance Detection	Integrated		
Residual Current Monitoring	Integrated		
PV Reverse Polarity Protection	Integrated		
Anti-islanding Protection	AFD		
AC Overcurrent Protection	Integrated		
AC Short Circuit Protection	Integrated		
AC Overvoltage Protection	Integrated		
DC switch	Integrated		
DC Surge Protection	Ш		
AC Surge Protection	Ш		
AFCI	Integrated		
RSD	Optional		
General Parameters			
Communication	Wi-Fi/Ethernet/CAN	/RS485	
Topology	Non-isolated		
Over Voltage Category	OVC II (DC), OVC III (	(AC)	
Operating Temperature Range	-30°C to +50°C (45°C to 50°C with dera		
Cooling Method	Air Conditioner		
Ambient Humidity	0-100% Non-condensing		
Altitude [m]	2000		
Ingress Protection	IP55		
Dimensions [H*W*D] [mm]	1980*988*1065		
Weight [kg]	1050	1150 12	
Warranty [Year]	10	L	
Standard	VDE4105, IEC61727/ NBR16149/NBR1615	/62116, VDE0126 50, IEC62109-1/-2	

[4- /64	CHS2-29.9K-T4- 307.2V/280Ah/77 .3kWh	CHS2-29.9K-T4- 358.4V/280Ah/90 .2kWh	CHS2-50K-T6- 204.8V/280Ah/ 51.5kWh
ing)			
			1050
0	1250		1050

Model	CHS2-50K-T6-25 6.0V/280Ah/64.4k Wh	CHS2-50K-T6-30 7.2V/280Ah/77.3k Wh	CHS2-50K-T6 -358.4V/280A h/90.2kWh	CHS2-50K-T6 -358.4V/280A h/180.4kWh	CHS2-50K-T6 -358.4V/280A h/270.6kWh
DC Input	<u> </u>			<u> </u>	
Max. PV Array Power [Wp]@STC	100000				
Max. DC Voltage [V]	1000				
MPPT Voltage Range [V]	180-850				
Rated DC Voltage [V]	600				
Start Voltage [V]	200				
Max. DC Input Current [A]	4*45				6*45
Max. DC Short Circuit Current [A]	4*56.5				6*56.5
Number of Strings per MPPT	2				
Battery Parameters	1				
Battery Type	LiFePO4				
Rated Energy [kWh]	71.6	85.9	100.3	200.6	300.9
Battery Voltage Range [V]	224-288	268.8-345.6	313.6-403.2	313.6-403.2	313.6-403.2
Max. Charging/Discharging Current [A]	140			<b>1</b>	
Max. DC Short Circuit Current [A]	250				
Usable Energy [kWh]	64.4	77.3	90.2	180.4	270.6
AC Output [On-grid]				1	
Rated AC Power [W]	50000				
Rated Apparent Power [VA]	50000	50000			
Max. Apparent Power [VA]	55000	55000			
Rated Output Current [A]@230Vac	72.5				
Max. AC Output Current to Utility Grid [A]	79.8				
Current Inrush[A]	192				
Max. AC Fault Current[A]	182.6				
Max. AC Over Current Protection[A]	145				
Rated AC Voltage [V]	3+N+PE,400				
Rated Input/Output Voltage/Range(V)	230/400V 0.85Un-1.1Un				
Rated Output Frequency/Range [Hz]	50: 45-55; 60: 55-65				
Power Factor [cos φ]	0i - 1 - 0c				
Total Harmonic Distortion [THDi]	<3%				
AC Input [On-grid]					
Rated AC Voltage [V]	3+N+PE,400				
Rated Input Frequency [Hz]	50, 60				

Model	CHS2-50K-T6-25 6.0V/280Ah/64.4k Wh	CHS2-50 7.2V/280/ W	
Max. Input Current [A]	150		
AC Input [Generator]	1		
Max. Input Power [W]	50000		
Max. Input Current [A]@230V	72.5		
Rated Input Voltage [v]	3+N+PE,400		
Rated Input Frequency/Range [Hz]	50: 45-55; 60: 55-65		
AC Output [Back-up]			
Max. Apparent Power [VA]	55000		
Peak Output Apparent Power [VA]	75000,5s		
Rated AC Voltage [V]	3+N+PE,400		
Rated Output Frequency/Range [Hz]	50: 45-55; 60: 55-65		
Output THDv (@ Linear Load)	<3%		
Efficiency	1		
Max. Efficiency	≥98.0%		
Euro Efficiency	97.3%		
Max. Battery to AC Efficiency	96.0%		
Protection			
PV String Current Monitoring	Integrated		
PV Insulation Resistance Detection	Integrated		
Residual Current Monitoring	Integrated		
PV Reverse Polarity Protection	Integrated		
Anti-islanding Protection	AFD		
AC Overcurrent Protection	Integrated		
AC Short Circuit Protection	Integrated		
AC Overvoltage Protection	Integrated		
DC switch	Integrated		
DC Surge Protection	II		
AC Surge Protection	11		
AFCI	Integrated		
RSD	Optional		
General Parameters			
Communication	Wi-Fi/Ethernet/CAN/	RS485	
Тороlоду	Non-isolated		
Over Voltage Category	OVC II (DC), OVC III (A	AC)	
	1		

K-T6-30 Ah/77.3k h	CHS2-50K-T6 -358.4V/280A h/90.2kWh	CHS2-50K-T6 -358.4V/280A h/180.4kWh	CHS2-50K-T6 -358.4V/280A h/270.6kWh
		•	•

Model	CHS2-50K-T6-25 6.0V/280Ah/64.4k Wh	CHS2-50K-T6-30 7.2V/280Ah/77.3 Wh	CHS2-50K-T -358.4V/280 h/90.2kWh	6 CHS2-50K-T6 A -358.4V/280A h/180.4kWh	CHS2-50K-T6 -358.4V/280A h/270.6kWh
Operating Temperature Range	-30°C to +50°C (45°C	to 50°C with derating	1		
Cooling Method	Air Conditioner				
Ambient Humidity	0-100% Non-condensing				
Altitude [m]	2000				
Ingress Protection	IP55				
Dimensions [H*W*D] [mm]	1980*988*1065				
Weight [kg]	1150	1250 13	50	2610	3870
Warranty [Year]	10				
Standard	VDE4105, IEC61727/ UNE217002, NBR167 EN61000-6-4	62116, VDE0126, AS4 49/NBR16150, IEC62	777.2, CEI 0 21, E 109-1/-2, EN610	N50549-1, G98, G99 00-6-1, EN61000-6-	₹, C10-11, -2, EN61000-6-3,





# INSTALLATION INSTRUCTIONS

## 4.1. Unpacking

#### 4.1.1. Check the Outer Package

Although SAJ products are thoroughly tested and checked before delivery, the products may suffer damages during transportation. 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.

#### 4.1.2. Scope of Delivery

Contact after-sales if there are missing or damaged components.

CHS2 ESS x1	Positioning cardboard x1	2-pin plug >
		The second se
	PV positive terminal x2	M8*16 screw
M4*10 flathead screw x4	PV negative terminal x2	M6*12 screw
0		
Terminal (SQNBS22-5) x10	Removal tool x1	RJ45 plug x
Sj		$\square$
Key1 x2	Key2 x2	Document

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



## 4.2. Installation Method and Position

#### 4.2.1. Installation Position and Space Requirement

This device is equipped with an air conditioner for cooling and provides the ingress protection of IP 55 (Battery) and IP66 (Inverter). The device can be installed either indoors or outdoors.

Poor air ventilation will affect the working performance of internal electronic components and shorten the service life of the system. Reserve enough clearance around the product to ensure a good air circulation at the installation area.



Figure 4.1. Installation space requirement of a single machine



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Figure 4.2. Installation space requirement of multiple machines

4.2.2. Mounting Method





Figure 4.3. Mounting positions





• The equipment employs air conditioner cooling, and it can be installed indoor or outdoor.

• Mount vertically. Never install the device tilted forwards, sideways, horizontally or upside down.

• The ground should be flat without inclination. The load-bearing capacity of the ground should reach 1.5

#### Installation Environment Requirements

- The installation environment must be free of inflammable or explosive materials.
- Install the device away from heat sources.
- Do not install the device at a place where the temperature changes extremely.
- Keep the device away from children.
- Do not install the device 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 the drive-way.
- Keep the device from water sources such as taps, sewer pipes and sprinklers to prevent water seepage. Note: When installed 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.

#### 4.3. Mounting Procedure

4.3.1. Installation Tools

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







Dust mask





Vacuum cleaner





Electric screwdriver Tool bit: M4

N. C. C. C. . A COLOR



Wire clipper

Wrenchfor MC4 terminal

e patr Removal tool Gradienter







#### 4.3.2. Transportation Equipment

The installers need to prepare proper equipment for transporting and lifting the product components. For example, a forklift or a crane.

Forklift



Figure 4.5. Transporting with a forklift

Use the following forklift to move or lift the cabinet:

- The load capacity must be greater than two tons.
- The length of the fork blades must be greater than 1.2 meters. Use fork extensions if needed.
- The fork blades can slide under the bottom of the cabinet without damaging the cabinet.

Follow specific guidelines below to move or lift the cabinet:

- Adjust the distance between the fork blades to ensure load stability.
- The fork blades must extend longer than the depth of the cabinet to avoid falling.

Crane

Use a crane to move or lift the cabinet. A force greater than two tons is required to move this device. The height between the sling and the top surface must be greater than or equal to 1.5 meters.



4.3.3. Installation Personnel

• The forklift and crane operators must have va





he forklift and crane operators must have valid operation license or certification and follow the operation safety rules.

#### 4.3.4. Mount the Cabinet

Select one of the following options to secure the cabinet:

- Secure with the screw bolts.
- Secure with the mounting brackets.

#### To secure the cabinet with the screw bolts:

Step 1. Place the positioning cardboard on the floor where the machine is to be located. Mark six drilling



Figure 4.7. Marking the drilling positions

Step 2. Use an electrical drill to drill six holes on the floor at the depth of 80-90 mm. Put an expansion tube in each hole. (M12\*80)



Figure 4.8. Drilling the holes

Step 3. Move and place the cabinet to the installation location with a forklift or crane. Align the holes at the cabinet bottom with the drilled holes.



Figure 4.9. Placing the cabinet

Step 4. Use a wrench to secure the bottom of the cabinet to the floor with screws. (M12\*80)



Figure 4.10. Securing the cabinet

#### To secure the cabinet with the mounting brackets:

Step 1. Move and place the cabinet to the installation location with a forklift or crane.



Figure 4.11. Placing the cabinet

Step 2. Place the four mounting brackets at the four corners of the cabinet and mark the drilling holes.



Figure 4.12. Marking the drilling positions

Step 3. Remove the mounting brackets, and use an electrical drill to drill four holes on the floor at the depth of 80-90 mm. Put an expansion tube in each hole. (M12\*80)



Figure 4.13. Drilling the holes

to the floor. (M12\*80 screws: 47 N·m) (M8\*25 screws: 13 N·m)



Figure 4.14. Securing the cabinet

Step 4. Place the four mounting brackets back to the four corners and use a wrench to secure the brackets

# ELECTRICAL CONNECTION



#### 5.1. Connect the Grounding Cable

Electrical connection must only be operated by professional technicians. Before connection, the technicians must wear necessary protective equipment, including insulating gloves, insulating shoes and safety helmet.

Connect the grounding cable before other electrical 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 mm<sup>2</sup>.

Step 1. Assemble the cables with the RNBS38-8 OT/DT terminals as follows:



Figure 5.1. Preparing the grounding cable

1. Heat shrink tubing 2. OT/DT terminal

Step 2. Remove the screw of the grounding terminal, insert the screw through the OT/DT terminal, and tighten the cable with the screw.



Figure 5.2. Connecting the grounding cable

#### 



## 5.2. Organize the Cables and Remove the Covers

#### Procedure

Step 1. Remove the metal plate at the bottom right corner of the cabinet for wiring convenience.



Figure 5.3. Removing the metal plate

Step 2. Pass the AC, PV, and communication cables through the cable outlet holes.



Figure 5.4. Organizing the cables





Figure 5.5. Cutting the cable sleeves

Step 4. Remove the decorative panels of the inverter.

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Figure 5.6. Removing the decorative panel

Step 3. Use a knife to cut the end of the cable sleeves at the cable outlet holes.





Step 5. Remove the AC cover, the middle beam, and the baffles under the inverter.

Figure 5.7. Removing the AC cover, middle beam, and baffle

## 5.3. Connect the AC Cables

Prepare the GRID cables according to the following specifications:

Model	Conductor cross-sectional area of cables (mm <sup>2</sup> )		Conductor material
	Range	Recommended value	
CHS2-(29.9K-50K)-(T4, T6)-X	35-70	50	Copper
Grounding cable cross sectional ar	rea (mm²): 25		

Table 5.1. Recommended specifications of GRID cables

Note: If the grid-connection distance is large, select an AC cable with larger diameter for the actual condition. Prepare the GEN and BACK-UP cables according to the following specifications:

Prepare the GRID cables according to the following specifications:

Model	Conductor cross-sectional area of cables (mm <sup>2</sup> )		Conductor material
	Range	Recommended value	<u>_</u>
CHS2-(29.9K-50K)-(T4, T6)-X	16-25 25		Copper
Grounding cable cross sectional area (mm²): 25			

Table 5.2. Recommended specifications of GEN and BACK-UP cables

#### Procedure

Step 1. Pass the AC cables through the GEN, BACK-UP, and GRID water-proof nuts of the AC cover box.



Figure 5.8. Threading the cables



#### Figure 5.9. Inserting the cables

#### 5.3.1. 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 on the inverter LED panel will be lit up in red and an error code <44> can be viewed on the Elekeeper (used to be called eSAJ Home) App.

#### 5.3.2. External AC Circuit Breaker

Install an external circuit breaker to ensure that the inverter can be disconnected from the grid safely. Prepare the circuit breaker according to the following recommended rated current (A) specification:

Model
CHS2-(29.9K-50K)-(T4, T6)-X
Notice: Do not connect multiple inver

Table 5.3. Recommended circuit breaker specification

#### 5.3.3. Residual Current Device

The inverter is integrated with a RCMU that can detect the real time external current leakage. When the detected current exceeds the limitation, the inverter will be disconnected from the grid quickly.

An external residual current device can be connected with the inverter to protect the system from tripping when it is required by regional or local regulations. Either type A or type B RCD is compatible with the inverter. The action current of external residual current device should be 300 mA.

## 5.4. Connect the PV-side Cables

Make sure the PV array is well insulated to the ground before connecting it 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. The inverter cannot be used with functionally earthed PV arrays.

Conductor cross-sectional area of cables (mm <sup>2</sup> )		Conductor material	
Range	Recommended value		
4.0-6.0	4.0	Outdoor copper wire cable, complying with 1000 V DC	

Table 5.4. Recommended specifications of DC cable

consistent as much as possible.

	Recommended circuit breaker specification
	200 A
rter	rs to one AC circuit breaker.

#### WARNING

Note: When the inverters are used in parallel, it is necessary to ensure that the PV power of all inverters is

· Danger to life due to electric shock from touching the live components or DC cables.	
$\cdot$ When the photovoltaic array is exposed to light, it supplies DC voltage to the PCE. Touching live DC cables can	result in
death or lethal injures.	
· DO NOT touch the non-insulated parts or cables.	
· Disconnect the inverter from voltage sources.	
· DO NOT disconnect the DC connectors under load.	
· Wear suitable personal protective equipment for all operations.	

- Place the connector separately after unpacking to avoid confusion about cable connections.
- 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 the correct way.

#### Procedure

Step 1. Remove the upper cover of the PV cover.



Figure 5.10. Removing the PV cover







cable.



Figure 5.12. Striping the insulation







Figure 5.13. Assembling the cable ends

Step 5. Insert the positive and negative cables into the positive and negative connectors. Gently pull the cables backward to ensure firm connection.



Figure 5.14. Assembling the cables



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

Step 4. Insert the cable ends to the sleeves. Use a crimping plier to assembly the cable ends.





Step 6. Tighten the lock screws on the positive and negative cable connectors with the D4 assembly tool.

until you hear a "click" sound.



Figure 5.15. Tightening the connectors

Step 7. Make sure the two DC switches are at the OFF position.



۲ Q 

Figure 5.17. Inserting PV connectors

Figure 5.16. DC switch OFF



Step 8.Insert the positive and negative cable connectors into the positive and negative PV ports on the inverter



Figure 5.18. Installing the PV cover

#### 5.5. Communication Connection

#### 5.5.1. Communication Interfaces Overview

The inverter provides the communication interfaces and ports that allow the inverter to communicate with external equipment and systems like the generator, the energy management system (EMS), and so on. The following figure shows the communication ports of the inverter:





Figure 5.19. Communication interfaces overview

#### 5.5.2. Connect the Communication Cables and Plugs





Figure 5.20. 3-pin plug

orange button to secure the cable.



Figure 5.21. Assembling wires for plugs

Step 3. Connect the communication plugs for the corresponding functions according to the port descriptions in sections 5.5.1 Communication Interfaces Overview to 5.5.9 DIP Switch Connection.

Step 1. Prepare the wires for the 2-pin, 3-pin, and 6-pin plugs depending on which communication functions

Step 2. Peel off the insulation skin of the wire by proper length. Insert the wire into the plug and press the

#### 5.5.3. Meter Connection for Export Limit Setting

The METER.485 port can connect with meter CHINT's DTSU666 to provide RS485 communication.

Note: The electric meter needs to be CHINT's DTSU666 electric meter.



Figure 5.22. System diagram – one meter



Figure 5.23. Meter connection

When two meters are used, set the address of the inverter-side meter to 2. Do NOT change the default address 1 of the grid-side meter. The CT arrow direction points to the CHS2 inverter.



Figure 5.24. Meter connection - two meters

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Meter DTSU666				
11	Button	Description		
	SET	Confirmation or cursor shift (when input digits)		
	ESC	Exit		
	<b>→</b>	Add		

Table 5.5. Meter DTSU666 description





a. Power on the meter and enter Measure display, and then press SET twice to enter the password 701.

- b. Press the  $\rightarrow$  button to adjust the value of the first digit. One increment per pressing.
- c. Press SET once to shift to the second digit and adjust the value in the same way. Set the default password to 701.
- d. When the password is entered correctly, press SET twice to enter the port interface and press the → button three times to enter the address page. Then, press SET once to start the meter address setting.
- e. Press the  $\rightarrow$  button to adjust the value of the address. One increment per pressing.
- f. After the address is set successfully, press ESC twice to exit Measure display for the meter to start working.

#### 5.5.4. Dry Contact Connection



Figure 5.25. Output dry contact connection 5.5.5. Generator Connection





Figure 5.26. Generator connection



#### The DRY.DO1 and DRY.DO2 ports are reserved as an output dry contact for future use.

The GEN port can connect with the generator to control the start and stop of the generator.

When the inverters are deployed in parallel, the generator needs connect to the DO4 interface of the EMS  $% \left( {{{\rm{MS}}} \right)$ 

#### 5.5.6. DRM Connection





Figure 5.27. RCD connection

#### 5.5.7. 12V Power Output Connection

The RSD\_1 port can supply power to the fast shutdown module of the photovoltaic system at the rated voltage of 12 V. The two ports control the fast shutdown and startup of the PV system by turning on or off the power supply to the fast shutdown module.

![](_page_29_Figure_7.jpeg)

![](_page_29_Figure_8.jpeg)

+ V<sub>1N</sub>

- GND

Figure 5.28. PV connection

parallel deployment of the inverters. power supply wire to the EMS is limited to 6 meters.

RSD 1

+ -

0 0

0 0

+ -RSD\_2

![](_page_29_Figure_11.jpeg)

Figure 5.29. EMS connection in parallel

#### 5.5.8. Emergency Stop Dry Contact Connection

The SHUT DOWN + and - ports can connect with an external switch to stop the inverter immediately in emergent situations. DRY\_DI1: Reserved for input dry contact connection.

![](_page_29_Figure_15.jpeg)

Figure 5.30. Emergency stop dry contact connection

The RSD\_1 and RSD\_2 ports can supply power to the external energy management system (EMS) in the

At least two inverters must provide the power supply to the EMS in parallel deployment. The length of the

![](_page_29_Figure_22.jpeg)

#### 5.5.9. DIP Switch Connection

The SW1/2/3 dual inline package (DIP) switches are provided to control the activation of 120  $\Omega$  terminal resistors to ensure the communication stability of the corresponding communication functions.

![](_page_30_Figure_3.jpeg)

#### Figure 5.31. DIP switches

Switch	Function
BMS3, BMS2, BMS1	Provide the 120 $\boldsymbol{\Omega}$ terminal resistors for the CAN communication between
	battery management systems (BMS). Turn the switch on as needed.
RS485.PAR	Provide the 120 $\Omega$ terminal resistors for RS485 PAR1 communication. Turn
	the switch on as needed.
Parallel	Provide the 120 $\boldsymbol{\Omega}$ terminal resistors when multiple inverters are deployed
	in parallel. Turn the switches to the ON position on the two inverters that
	are physically farthest apart.
EMS	Provide the 120 $\boldsymbol{\Omega}$ terminal resistors for RS485 communication with the
	EMS. Turn the switch on as needed.
METER.485	Provide the 120 $\boldsymbol{\Omega}$ terminal resistors for RS485 communication with the
	external meters. Turn the switch on as needed.
ADD	Reserved for future use.

Table 5.6. DIP switch functions

#### 5.5.10. RJ45 Ports Connection

![](_page_30_Figure_8.jpeg)

	RS485_P/	AR1/RS4
1	NC	
2	NC	1
3	NC	
4	NC	
5	NC	
6	NC	
7	RS485-A	
8	RS485-B	

BMS_1/ BMS_2/ BMS_3				
1	Shut down—BMS			
2	GND_S			
3	NC			
4	CANH			
5	CANL			
6	NC			
7	NC			
8	NC			

	Parell	e1/ Par
1	SYN B	
2	SYN A	1
3	SYN B	
4	SYN B	
5	SYN A	
6	SYN A	
7	CANL	
8	CANH	

#### Table 5.7. RJ45 pin definitions

Confirm that the DC switches are OFF during installation to avoid short circuit.

Step 1. Prepare the RJ45 cables using the original RJ45 plugs in the delivery package. Connect the cables for the corresponding functions as needed.

![](_page_30_Picture_15.jpeg)

![](_page_30_Figure_18.jpeg)

	М	ETER
1	RS485-1B	
2	RS485-1A	12345678
3	NC	
4	RS485-2B	
5	RS485-2A	
6	NC	
7	RS485-3A	
8	RS485-3B	

![](_page_30_Figure_20.jpeg)

LAN				
1	TX_D1+			
2	TX_D1-	12345678		
3	RX_D2+	\\\\///		
4	BI_D3+			
5	BI_D3-			
6	RX_D2-			
7	BI_D4+			
8	BI_D4-			

#### 

Step 2. Install the crossbeam suspended in the middle of the inverter and the baffle under the inverter back to their original positions.

Step 2. Install back the decorative panels on the front of the inverter.

Step 3. Secure all parts of the grid and backup connector tightly.

Figure 5.32. Securing cables and connectors

#### 5.6. Install the Communication Module

Step 1. Plug in the communication module to the 4G/WIFI port and rotate the module to secure it.

![](_page_31_Figure_7.jpeg)

Figure 5.33. Installing the communication module

Figure 5.34. Installing the decorative cover

![](_page_31_Figure_13.jpeg)

## 5.7. System Connection

#### The following figure shows the system connection applicable in Australia and New Zealand.

- 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.

![](_page_32_Figure_6.jpeg)

The following figure shows the system connection for the grid system without special requirements. **Note**: The backup PE line and earthing bar must be grounded properly. Otherwise, the backup function may be inactive during blackout.

![](_page_32_Figure_8.jpeg)

## 5.8. System Connection Diagrams

#### 5.8.1. Backup Single Deployment

The following diagram shows the system connections of a single machine where both the backup and the on-grid loads are enabled.

![](_page_33_Figure_4.jpeg)

![](_page_33_Figure_5.jpeg)

5.8.2. Back-up Parallel Deployment

RSD\_1 + -• • • • RSD\_2

5.8.3.On-grid Parallel Deployment

![](_page_34_Figure_2.jpeg)

## 5.9. AFCI

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

![](_page_35_Picture_0.jpeg)

# COMMISSIONING

#### 6.1. Start Up and Shut Down the Inverter

6.1.1. Start Up

Step 1. Turn the two DC switches to the **ON** position on the inverter to enable the PV side connection.

![](_page_35_Picture_6.jpeg)

Step 2. Turn on the external AC circuit breaker to enable the connection to the grid. Step 3. Rotate the Main switch on the battery control unit to the **ON** position.

![](_page_35_Picture_8.jpeg)

Step 4. Press and hold the START switch on the battery control unit for 3 seconds until the LED light flashes in green. It indicates that the battery system is started up.

![](_page_35_Picture_12.jpeg)

Note: If the main switch suddenly trips while the machine is running, reset the main switch and rotate the

main switch to the ON position again.

Step 5. Close the cabinet doors and keep the keys at a safe place.

#### 6.1.2. Shut Down

Step 1: Turn off the external AC circuit breaker to disconnect from the grid.

Step 2: Rotate the Main switch on the battery control unit to the OFF position to shut down the battery system.

Step 3: Turn off the two DC switches on the inverter to disconnect from the PV.

Note: After closing the cabinet door, lock the door handle with the two locks.

## 6.2. LED Indicators Introduction

![](_page_36_Figure_10.jpeg)

Figure 6.1. LED indicators

LED indicator	Status	
0	Off	The inverter is pov
0	Breathing	The inverter is at th
0	Solid on	The inverter is runn
0	Breathing	The inverter is upgr
0	Solid on	The inverter is faul
System	Solid on	The inverter is imp
	On 1s, off 1s	The inverter is exp
	On 1s, off 3s	No importing or ex
	Off	Off-grid.
_	Solid on	The battery is disch
	On 1s, off 1s	The battery is charg
Batterv	On 1s, off 3s	Low SOC.
	Off	The battery is disco
_	Solid on	The inverter is con
費	On 1s, off 1s	Counting down to g
Grid	On 1s, off 3s	The grid is faulty.
	Off	No grid.
	Solid on	The PV array is run
Solar	On 1s, off 1s	The PV array is faul
	Off	The PV array is not

Description
wered off.
ne initial state or standby state.
ning properly.
rading.
lty.
porting electricity from the grid.
porting electricity to the grid.
xporting.
harging.
ging.
onnected or inactive.
nected to the grid.
grid connection.
ning properly.
lty.
working.

LED indicator	Status	Description
	Solid on	The AC side load is running properly.
Ŧ	On 1s, off 1s	The AC side consumption is overloaded.
Backup	Off	The AC side is turned off.
R	Solid on	The communication with both the BMS and the meter is working.
	On 1s, off 1s	The meter communication is working, but the BMS communication is lost.
Communication	On 1s, off 3s	The BMS communication is working, but the meter communication is lost.
communication	Off	Lost communication with both the BMS and the meter.
	Solid on	The power input of the generator is connected.
	On 1s, off 1s	The power output of the generator is connected.
GEN	Off	Disconnected from the generator.

Note: One breathing interval is 6 seconds.

Table 6.1 LED indicators description

## 6.3 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.

#### 6.4 Logging in to the App and Performing the Initialization Settings

1. Log in to the App by using one of the following manners:

Account Login

a. Open the App and tap the three-dot icon **m** on the top right corner. Set the **Language** to English and Network Node to European Node or International Node. Then, use your account to log in to the App.

#### If you do not have an account, register first.

![](_page_37_Picture_12.jpeg)

- 3. Complete the inverter settings by following the instructions on the screen.

Example:

b. Go to the Service interface and select Remote Configuration. Tap Bluetooth and enable the Bluetooth function on your mobile phone. Then, tap Next.

2. Choose your inverter according to your inverter SN. Tap the inverter to enter inverter settings.

下午4:23   0.7K/s 爲 🗇 🔹	(11) (11) (11) (11) (11) (11)	4:51 PM   0.2KB/s 及 〇	The line in the test	4:53 PM   6.1KB/s 反 ⑦	🔁 hi.º 🖬	4:53 PM   0.4KB/s 겼 영	<b>1</b> 21
< Parallel connection sett	ing	< Battery	Brand	< Battery 1 set	tings	< Battery 1 set	tings
Parallel Mode		Battery 1 brand		Battery Capacity	28.0 Ah	Battery Capacity	
Off	~	CB2	.*	Equalized Charging Voltage	403.2 V [160-820]	Equalized Charging Voltage	
				Battery Voltage Alarm Setting	336.0 V	Battery Voltage Alarm Setting	
				Discharge Cutoff Voltage	336.0 V	Discharge Cutoff Voltage	
				Charge Current Limit	140.0 A	Charge Current Limit	
				Discharge Current Limit Value	140.0 A	Note	
	-	•	-	Battery On-Grid Discharge Capacity Lower Limit	20 %	Are you sure to submit	the settings?
				Battery Off-Grid Discharge Capacity Lower Limit	10 %	Battery Off-Grid Discharge Capacity Lower Limit	10
				Battery Charge Capacity Upper Limit	100 %	Battery Charge Capacity Upper Limit	100
				Battery SOC ③	60 % [20-100]	Battery SOC ⑦	60 (20-100)
off	~						
Storage on-gird parallel	2	NEXT CB2	STEP	Previous	Next Step	Previous	Next Step

**Note**: When the inverters are used in parallel, you need to select **Storage on-grid parallel**. For more instructions on parallel App operation, please refer to the user manual provided with the EMS product.

![](_page_38_Picture_3.jpeg)

#### 6.5 Protection Parameters Setting

The corresponding modification of protection parameters will take effect only after saving.

4:3	8 PM   0.0KB/s & 🕤 🔤 🖧	e lu	4:55 PM   0.5KB/s 及 回	🚸 🖾 "ant S	al 🐵	4:55 PM   0.	0KB/s Æ ☺	令 🖾 "art 5	ial (832)
	Local Connection	Û	< Protection Par	ameters	Save	<	Protection Para	meters	Save
8	Bluetooth:BlueLink:01163		10 min. Overvoltage Protection Value	258.0 [240-300]	v	10 min. Ove Protection 1	rvoltage Value	258.0 [240-300]	v
	Device Info	>	Grid Overvoltage Protection Value	265.0	v	Grid Overvo Value	altage Protection	265.0 (240-300)	v
%	Device Maintenance	>	Grid Undervoltage Protection Value	180.0	v	Grid Underv Protection	voltage Value	180.0 [100-220]	v
盘	Initialization	>	2nd Level Grid Overvoltage Protection Value	275.0	v	2nd Level G Protection 1	rid Overvoltage Value		v
	Battery Settings	>	2nd Level Grid Undervoltage Protection Value	70.0	v	2nd Level G Protection	rid Undervoltage Value	70.0 [40+220]	v
8	Protection Parameters	>	Grid Over-Frequency Protection Value	52.00 [50-70]	Hz	G	Note		
3	Power Adjustment	>	Grid Under-Frequency Protection Value	47.00 [45-70]	Hz	G Are Pr	you sure to submi	t the settings?	-
Z	Working Modes	5	2nd Level Grid Over-Frequency Protection	55.00 [50-70]	Hz	2r Over-Frequ	ANCEL	OK [50-70]	Hz
<b>@</b>	Communication Settings	>	2nd Level Grid Under-Frequency	45.00 [45-70]	Hz	2nd Level G Under-Fred	ind Juency	45.00 [45-70]	Hz
3	Testing device	>	Overvoltage Disconnection Time	1000 [0-1200000]	ms	Overvoltag	e Disconnection	1000 {0-1200000}	m
	V-Watt/V-Var	>	Undervoltage Disconnection Time	10000	ms	Undervolta	ge Disconnection	10000	m
-	Parallel connection setting	>	2nd Level Overvoltage Disconnection Time	0	ms	2nd Level C Disconnecti	vervoltage ion Time	0	me
<u>þ</u> a	Diesel generator setting	>	2nd Level Undervoltage Disconnection Time	1000	ms	2nd Level U Disconnecti	ndervoltage ion Time	1000	m

#### 6.6 Inverter Setting Review

After commissioning, the users can check the device info including device basic info, running info and event info on the **Device Info** page.

e ta buillo ovgiz \$ 0	we see the Up	4:29 PM   0.0	KB/S KA G		all sall (20)	4-29 PM   0.0K	BIS & G	MB 241 1241 082
< Device	Info 🔞	<	Devic	e Info	0	<	Device Info	6
Bluetooth:BlueLink:01163		CD Bluetoot	h:BlueLink:011	63		CD Bluetooth:	BlueLink:01163	
SN: SN:	Running Status 🖤	Sh.		Runni	ng Status 🔻	IN SN		Running Status
Basic Info Running	g Info Event Info	Basic Info	Runni	ng Info	Event Info	Basic Info	Running Info	Event Info
Device Model	CH52-50K-T6-X					Event Time: 20	24-04-17 12:41:41	
Module SN	M5380G2338001163	ow				Event No.: 26 Event Content:	Parallel machine CA	AN Com Error
Module Firmware Version	v3.005					Event Time: 20	24-04-17 12:41:41	
Display Board Version	V1.270		)e			Event No.: 24 Event Content:	Master No Grid Erro	r .
Control Board Version	V5.200	Stand	у		ow	Front Youry 24		
Battery Capacity	280 Ah	SOC:67.80 2804	th S			Event No.: 24	24-04-17 12-41-40	
Battery Pack1	•	191	~	w		Event Content:	Master No Grid Erro	K .
Battery Cluster	0	PV Info				Event Time: 20 Event No.: 55	24-04-17 12:36:04	
barreny crosseer		PV1	65.0V	0A	ow	Event Content:	BMS Lost.Conn	
BMS 1 SN	CBB82A0J2341E00005	PV2	66.2V	0A	ow			
BMS Software Merricon	V0.16	PV3	64.5V	0A	ow	Event Time: 20	24-04-17 12:36:04	
		PV4	65.3V	0A	ow	Event No.: 95		
BMS Hardware Version1	V1.02	PV5	63.9V	0A	ow	Event Content:	Battery Open Circu	et .
BAT1 SN	N/A	PV6	65.3V	0A	ow	Event Time: 20	24-04-17 12:36:04	
BAT1 Software Version	V0.08	Battery Info			Standby	Event No.: 24	24 04 17 12 30 04	
DATI Manhatana Magricon	1/1/22	Battery	Туре	Lithium	Battery	Event Content:	Master No Grid Erro	N.
Service and the service of the servi	V1.02	Battery Capacity	280Ah	Remaining SOC	67.80%			
BAT2 SN	CBU22A0J2341E00005	V/A/W	367.4V	-0.01A	-6W	Event Time: 20	24-04-17 12:35:58	

#### The country and grid code can be viewed on the Initialization page. For example:

![](_page_39_Picture_8.jpeg)

73

ization	<	AS 4777
	V-Watt	
	V1	207.0V
	V2	220.0V
*	V3	253.0V
_	V4	260.0V
AUTO TIME SYNC	%P1	100.0%
	%P2	100.0%
	%P3	100.0%
	%P4	20.0%
	V-Var	
ок	V1	207.0V
AustraliaA	V2	220.0V
AustraliaB	V3	240.0V
AustraliaC	N/A	258.01/
lewZealand		256.07
	%VAR1	44.0%

The power quality response modes and the grid connection settings can be viewed on the **Protection Parameters** page. For example:

#### 6.8 Working Modes

6.8.1 Selecting Working Modes

Self-consumption Mode:	When	the sola
supplied to load first, the s	urplu	s energy
to the grid. When the solar	is ins	sufficient
Back-up Mode: Reserved	Backı	up SOC s
SOC value, battery can only	y be o	charged,
charging; when SOC is larg	er th	an SOC s
Time-of-use Mode: Batter	y cha	irging pe
battery can only be charge	ed, wh	nile in dis
period, battery will behave	as Se	elf-use n
4:38 PM   0.0KB/s 点 🗑 📾 🤐	all 🚳	
Local Connection	$(\mathbb{I})$	
CD Bluetooth:BlueLink:01163		
Device Info	>	
🎇 Device Maintenance	>	
A Initialization	>	
Battery Settings	>	
S Protection Parameters	>	
Power Adjustment	>	
🔀 Working Modes	>	
Communication Settings	>	
Export/Generation Limitation Settings	>	
Generating device	>	
V-Watt/V-Var	>	
Parallel connection setting	>	
Diesel generator setting	>	

Protection Para	ameters	Save	
10 min. Overvoltage	258.0	V	
Protection Value	[240-300]	v	
Grid Overvoltage Protection	265.0	V	
Value	[240-300]	V	
Grid Undervoltage	180.0	V	
Protection Value	[100-220]	•	
2nd Level Grid Overvoltage	275.0	v	
Protection Value	[240-300]	v	
2nd Level Grid Undervoltage	70.0	V	
Protection Value	[40-220]	v	
Grid Over-Frequency	52.00	Hz	
Protection Value	[50-70]		
Grid Under-Frequency	47.00	LL-	
Protection Value	[45-70]		
2nd Level Grid	55.00		
Over-Frequency Protection Value	[50-70]	Hz	
2nd Level Grid	45.00		
Under-Frequency Protection Value	[45-70]	Hz	
Overvoltage Disconnection	1000	1	
Time	[0-1200000]	ms	
Undervoltage Disconnection	10000	1	
Time	[0~1200000]	ms	
2nd Level Overvoltage	0		
Disconnection Time	[0-1200000]	ms	
2nd Level Undervoltage	1000	1	
Disconnection Time		ms	

#### 6.7 Remote Monitoring

Connect the internet via the eSolar AIO3 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 mobilepone. For details, refer to the user manual of the communication module.

lar is sufficient, electricity generated by photovoltaic system will be y will be stored in battery, then the excess electricity will be exported nt, the battery will release electricity to supply load.

setting value can be adjusted, when battery SOC is less than reserved I, until SOC reaches reserved value, the battery will be stopped setting value, battery will behave as Self-use mode.

period and discharging period can be set, during charging period, ischarging period, battery can only be discharged, the rest of the

![](_page_40_Picture_13.jpeg)

6.9 Export Limit Setting

4:38 PM   0.0KB/s /2 🕤 🔤 4:41   5:41	d 🖘	4:33 PM   0.0KB/s	🐨 IIa <sup>21</sup> IIa <sup>26</sup>	4:36 PM   0.1KB/s 点 ⑦	🐵 hati hati 💷	4:34 PM   0.0KB/s 及 <sup>(</sup>	🖬 🕍 hài 💷
Local Connection	Û	< Export Limitation	Settings	< Export Limitation	Settings	< Export Limitation	Settings
CD Bluetooth:BlueLink:01163		On-Grid Three-Phase Unbalanced Output	Off $\lor$	On-Grid Three-Phase Unbalanced Output	Enable 🗸	On-Grid Three-Phase Unbalanced Output	Enable $\vee$
Device Info	>	Export Limitation Settings	Off v	Export Limitation Settings	Off ∨	Export Limitation Settings	Enable $\vee$
🎘 Device Maintenance	>					Please select the type	Total Power
🚊 Initialization	>					0	w
Battery Settings	>					[0 - 50000]	
S Protection Parameters	>						
Power Adjustment	>						
1 Working Modes	>						
Communication Settings	>						
Export/Generation Limitation Settings	>						
Testing device	>						
V-Watt/V-Var	5						
Parallel connection setting	>						
Diesel generator setting	Σ			Enable			
		SAVE		Off	~	SAVE	

On the Local Connection page, tap Export/Generation Limitation Setting to set the parameters. Contact SAJ technical support for the password.

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

- Method 1: Export limitation setting is to control the electricity exported to the grid.
- Method 2: On-Grid Three-Phase Unbalanced Output is to control the electricity generated by the inverter.

## 6.10 Self-test (For Italy Only)

Italian Standard CEI0-21 requires a self-test function for all inverter that connected to utility grid. During the self-testing time, inverter will check the reaction time for over frequency, under frequency, overvoltage and undervoltage. This self-test is to ensure the inverter can disconnect from grid when required. If the self-test fails, the inverter will not feed into the grid. Prerequisite

- network.
- Initialization on the Local Connection page.

	Local Connection	Ċ
3	Bluetooth Connection:BlueLink:09876	
55		
	Device Info	>
*	Device Maintenance	>
<u>#</u>	Initialization	>
3	Protection Parameters	>
Ē	Feature Parameters	X
2	Power Adjustment	>
P	Communication Settings	>
0	Export Limitation Settings	>
	AFCI settings	>

• Ensure that the communication module (Wi-Fi/Bluetooth/Ethernet) of the inverter is connected to the

• Ensure that Country is set to Italy and Grid Compliance is selected properly. To check the settings, choose

<	Initialization	Save
Country		
Italy		Ψ.
Grid Compliance		
CEI0_16		Ŧ
Inverter Time		
2024-10-08 17:5	53:45 Auto	Time Sync
Inverter SN		
PROVIDE AND	P. 011	

- 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.

![](_page_42_Picture_3.jpeg)

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.

<	Self-Test		<	Test Report	
Ovp(59.S2) test		$\odot$	💽 Self-	Test Report	
Ovp10(59.S1) tes	t		Ovp(59.S2)	results Test Time: 20	24.10.09 10 44 51
Uvp(27.S1) test			VE 200 V	Ve: 129.2 V	Vo: 2277 V
Uvp2(27.S2) test					
Ofp(81>.S1) test					
Ofp2(81>.S2) tes	t				
Ufp(81<.S1) test					
Ufp2(81<.S2) tes					
All test					
You can check and dow	Test complete evidence the force region at the log-right	tő čai tier			
	Start Test			Download Test Rep	ort

## 6.11 Configuring the Reactive Power Control (For Australia Only)

6.11.1 Setting the Fixed Power Factor Mode and Fixed Reactive Power Mode

Step 1. Log in to the App and connect to the inverter through Bluetooth connection. Step 2. Select Power Adjustment. Step 3. Select Inductive Adjustment (Var) or Capacitive Var according to your local grid regulation. The power ranges from -60% Pn to 60% Pn.

Example of fixed power factor mode:

4:38 PM   0.0KB/s 亿 @ 40 atil 10 atil	d (53)	4:39 PM   0.0KB/s 尽 1	3
Local Connection	$(\mathbb{D})$	< Powe	r Adjustr
Bluetooth:BlueLink:01163		Reactive Power Compensation Mode	
Device Info	>	Maximum purchased power of the grid	
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>	>	Maximum selling pov of the grid	ver
<u>A</u> Initialization	>		
Battery Settings	>		
S Protection Parameters	>		
Power Adjustment	>		
D Working Modes	>		
Communication Settings	>		
Export/Generation Limitation Settings	>		
Testing device	>	Cancel	
V-Watt/V-Var	>	Capacitiv	e Adjustr
Parallel connection setting	>	Inductive	Adjustn
Diesel generator setting	>	Capacitive Por	wer Fac
		Voltage-R	anctive F

		4:39 PM	10.0KB/s 2 0	Sall Sal	CaD.
ent	Save	<	Power Ac	ljustment	Save
off. ~		Reactive Compen	Power sation Mode	Capacitive Power Factor Adjustment	
	%	Reactive	Power sation Value	1.0	
	%	Maximun power of	n purchased the grid	110 [0-110]	%
		Maximum of the gr	n selling power id	110	%
	OK				
	ОК				
errt (Ver) ert (Ver)	ОК				
ent (Ver) ent (Var) or Adjustm	ОK				
ent (Ver) ent (Var) or Adjustmen	OK ent				

PM   0.0KB/s 尽 む	<b>10</b> 15al 35a	
Power Ac	ljustment	Save
ctive Power pensation Mode	Capacitive Adjustment (Var)	
ctive Power opensation Value	0	vi
mum purchased er of the grid	110	,
mum selling power ne grid	110	*

![](_page_43_Figure_2.jpeg)

#### 6.11.2 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. e.g.: AS4777 series setting as shown below.

![](_page_43_Figure_5.jpeg)

Stop 1 Since AS/7

Step 1. Since AS4777 grid compliance has been set during production, select the corresponding grid compliance according to state regulation during installation. You can choose a state regulation compliance with your local grid via Elekeeper.
Step 2. Log in to Elekeeper App.
Step 3. Tap V-Watt/V-Var to enter DNSPs settings, and choose a suitable state regulation from the drop-down list.

Figure 6.3 Curve for a Volt-Watt response mode (AS4777 Series)

![](_page_43_Figure_11.jpeg)

4:38 PM   0.0KB/s 🔏 🎯 🛛 🖼 🖏	at 💿	4:58 PM   0.2KB/s 炙 〇	🖼 🖓 an 🖓 an 🕮	4:44 PM   0	.OKB/s 🔏 🕤 🛛 🖬 🖓 ett 🕮
Local Connection	Û	< Initialization	ί.	<	AS4777_AustraliaC
				Inverter SN	4: CSV6503J2341E00013
CD Bluetooth:BlueLink:01163		Country		V-Watt	
Device Info	>	Australia	×	V1	207.0V
Dence into		Grid Compliance		V2	220.0V
Zevice Maintenance	2	AS 4777		V3	253.0V
A Initialization	>			V4	260.0V
Battery Settings	>	Inverter Time		%P1	100.0%
S Protection Parameters	>	2024-04-17 13:24	UTO TIME SYNC	%P2	100.0%
Power Adjustment	s	Inverter SN		%P3	100.0%
		Concernant of the		%P4	20.0%
Working Modes	>			V-Var	
Communication Settings	>			VI	215.0V
Export/Generation Limitation Settings	>			V2	230.0V
🥘 Testing device	×	Cancel	ОК	V3	240.0V
V-Watt/V-Var	>	AS4777_Austra	liaa	V4	255.0V
Parallel connection setting	>	AS4777_Austra	liaB	%VAR1	44.0%
		AS4777_Austra	aliaC	%VAR2	0.0%
Diesel generator setting	2	AS4777_NewZe	aland	%VAR3	0.0%
				%VAR4	-60.0%

Note: With regard to the Power rate limit mode, SAJ sets the product WGra 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.

![](_page_44_Figure_6.jpeg)

![](_page_45_Picture_0.jpeg)

# **TRANSPORTATION & STORAGE**

![](_page_45_Picture_2.jpeg)

#### 7.1. Transportation

Lithium batteries can be dangerous if not transported properly. This product has passed the test of UN38.3 and meets the transportation requirements as dangerous goods with lithium batteries. After the installation of the battery on site, the original packaging including the lithium battery identification should be kept. When the battery needs to be returned to the factory for repair, pack the battery with the original packaging to reduce unnecessary inconveniences. Take care of the product during transportation and storage. Do not stack the products.

7.2. Storage

The battery should be installed within 6 months since it is delivered from the factory and used with compatible inverters. Before installation, store the battery according to the following instructions: 1) Store it in a dry and ventilated environment. Keep it at least 600 mm away from heat sources; 2) For storage period less than 3 months, keep it in an environment with storage temperature from -20°C to +40°C with humidity lower than 85% RH; 3) For long-term storage longer than 3 months but shorter than 6 months, put it in an environment with storage temperature from -20°C to +25°C with humidity lower than 85% RH.

than 50% SOC everyone six months.

The battery remains 50% power when it is sent from the factory.

battery recycling station in the area.

4) For long term storage without installation, contact SAJ technical support to charge the battery to no less

![](_page_45_Picture_12.jpeg)

#### NOTICE

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

![](_page_46_Picture_0.jpeg)

# TROUBLESHOOTING

![](_page_46_Picture_2.jpeg)

## 8.1. Troubleshooting

Contact your supplier for troubleshooting and remedy.

Code	Fault
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	Off Grid Output Voltage Low
17	Off Grid Output Short Circuit
18	Master Grid Frequency High
19	Master Grid Frequency Low
20	BAT Input Mode Error
21	Phase1 DCV High
22	Phase2 DCV High
23	Phase3 DCV High
24	Master No Grid Error
25	DC Reverse Connect Error
26	Parallel machine CAN Com 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
35	Master Grid Phase Lost

36	Master PV Voltage High
37	Master Islanding Error
38	Master HW Bus Voltage High
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
59	Lost Communication between inverter and PV Meter
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
85	Authority expires

86	DRM0 Error
87	Master Arc Error
88	Master SW PV Curren
89	Battery Voltage High
90	Battery Current High
91	Battery Charge Voltag
92	Battery Over Load
93	Battery Soft Connect
94	Output OverLoad
95	Battery Open Circuit E
96	Battery Discharge Vol
97	BMS Internal Commun
98	Battery Module Seque
99	Discharge Overcurren
100	Charge Overcurrent P
101	Module Under Voltage
102	Module Over Voltage
103	Single Cell Under Volt
104	Single Cell Over Volta
105	BMS hardware error
106	Charging temperature
107	Charging temperature
108	Discharging temperat
109	Discharging temperat
110	BMS relay error
111	Pre-charge error
112	BMS Insulation error
113	BMS supplier incompa
114	Battery cell supplier ir
115	Battery cell incompati
116	The battery pack mod
117	Circuit breaker is oper
118	Temperature differen
119	Voltage difference is t
120	Voltage difference is t
121	BMS over temperature
122	Short circuit protect
123	Total voltage match fa
124	The system is locked
125	FUSE error protection
126	Voltage on charging p

High
e High
TimeOut
rror
age Low
ication Error
nce Error
Protection
otection
Protection
Protection
age Protection
ge Protection
low protection
high protection
ure low protection
ure high protection
tibility
npartibility
pility
el does not match
e is too wide
oo wide (Class II)
po wide (Class I)
e protect
iled
ort is high protection

129	CO sensor triggered
130	Stroke switch triggered
131	Temperature sensor triggered
132	Smoke sensor triggered
133	Water sensor triggered
134	Aerosol triggered
135	Emergency stop
136	T/H sensor communication lost
137	Air conditioning communication lost
138	Temperature inside cabinet too high
139	Temperature inside cabinet too low
140	Humidity too high
141	Humidity too low
142	Coil anti-freeze
143	Defrost probe error
144	Fuse error
145	Condensing temperature probe error
146	Temperature probe inside cabinet error
147	Outlet air temperature probe error
148	Humidity probe error
149	Internal fan error
150	Compressor error
151	High voltage alarm
152	Low voltage alarm
153	High voltage alarm lock alarm
154	Phase sequence alarm
155	CO sensor communication lost
156	Temperature of T/H sensor is too high
162	Gen Start or Stop fail
163	Lost Communication Gen Meter
165	The wood originating port is overloaded

![](_page_48_Figure_2.jpeg)

# 

# ROUTINE MAINTENANCE

![](_page_49_Picture_2.jpeg)

## 9.1. Suggested Maintenance Operations

Product parts	Operation	Standard	Interval	Power OFF
Cabinet	Visual inspection:	No obvious coating peeling or scratches.	Quarterly	No
	• Rust	No obvious paint fading or rusting.		
	Door locks	Door lock is not damaged.		
	Air vents	No dust accumulation in the vent.		
		No insects, rats, snakes and other animals.		
Air Conditioner	Visual inspection:	No obvious damage.	Quarterly	No
	Outer appearance	No obvious paint fading or rusting.		
	• Rust	No screw loose and falling off.		
	• Fan	The fan rotates normally without abnormal noises.		
	• Filter	The surface of the filter is clean and not blocked.		
EMS	Viewing the indicator status.	The indicator is steady green.	Quarterly	No
Distributor Box	Visual inspection:	No obvious coating peeling, scratches.	Quarterly	No
	Check the appearance	No obvious paint fading or rusting.		
	• Rust	The cabinet is clean and free of unexpected objects.		
	<ul> <li>Anything unusual in the</li> </ul>			
	cabinet			
Labels	Visual inspection.	Clearly visible and free from defacement.	Quarterly	No
Air Conditioner	Clean the external fan filter.	The filter surface is clean and free of clogging.	Every 6 months	No
External Fan				
Battery Package	Charge the battery	If the system is not in use for a long period of time, charge	Every 6 months	Yes
		the battery to no less than 50% SOC.		
Battery Package	Visual inspection:	No obvious damage.	Yearly	Yes
	Check the appearance	No obvious paint fading or rusting.		
	• Rust	The screws are not loosen or falling off.		
	Screws	The fan rotates normally without abnormal noises.		
	• Fan	The surface of the front panel vents is clean and not		
	Front panel vents	clogged.		
Grounding and	Ground wire	The grounding resistance must not be greater than $4\Omega$ .	Yearly	Yes
Equipotential	<ul> <li>Internal equipotential</li> </ul>	Equipotential connections inside the cabinet are correct.		
Junction Point				
Security Function	Emergency button	Check that the emergency stop button is working.	Yearly	Yes

# **APPENDIX**

#### 10.1. 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.

#### 10.2. Warranty

Visit the SAJ website for warranty conditions and terms: https://www.saj-electric.com/.

#### 10.3. Contacting Support

Guangzhou Sanjing Electric Co., Ltd.

Postcode: 510663 Website: https://www.saj-electric.com/

**Technical Support & Service** 

Tel: +86 20 6660 8588 Fax: +86 206660 8589

E-mail: service@saj-electric.com

International Sales

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

Fax: 020-66608589

E-mail: info@saj-electric.com

China Sales

Tel: 020-66600058/66608588 Fax: 020-66608589

#### 10.4. Trademark

SAJ is the trademark of Sanjing.

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