

HS3 Series

THREE-PHASE ALL-IN-ONE ENERGY STORAGE SYSTEM USER MANUAL

HS3-(5K-13K)-T2-(W, G)-(B, P)X

Preface

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

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

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

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

Guangzhou Sanjing Electric Co., Ltd

TABLE OF CONTENTS

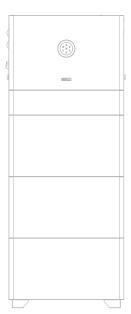
1. SAFETY PRECA	LUTIONS	
1.1.	About this document	
1.1.1.	Overview	
1.1.2.	Target audience	
1.2.	Safety	
1.2.1.	Safety Levels	
1.2.2.	Symbol Explanation	4
1.2.3.	Safety Instructions	!
1.3.	Safe Handling	
1.3.1.	Inverter	
1.3.2.	Battery	
1.4.	Emergency	-
2. Product Informa	ation	10
2.1.	General Introduction	11
2.2.	Models	11
2.2.1.	Product Models	1
2.2.2.	Model Description	12
2.3.	Dimension	13
2.3.1.	HS3 Inverter	13
2.3.2.	BU3 Battery Pack	14
2.3.3.	BC3 Battery Combiner Box	10
2.3.4.	CU2 Charger	1
2.4.	Ports, switches, and LED on the HS3 Inverter	17



2.5.	LED Indicators on the HS3 Inverter	18
2.6.	Datasheet	20
2.6.1.	System	20
2.6.2.	Battery Pack	24
2.6.3.	Battery Combiner Box	24
2.6.4.	Charger	25
3. Transportation	and Storage	28
3.1.	Transportation	29
3.2.	Storage	29
4. Installation		
4.1.	Precautions	
4.2.	Determining the Installation Site	
4.2.1.	Installation Environment Requirements	
4.2.2.	Installation Location Requirements	
4.3.	Preparing Installation Tools	36
4.4.	Unpacking	
4.4.1.	Checking the Outer Packing	
4.4.2.	Checking the Package Contents	
4.5.	Installation	41
4.5.1.	Type A Battery Pack: Ground mounting Manner	41
4.5.2.	Type B Battery Pack: Ground mounting Manner	52
4.5.3.	Type B Battery Pack: Wall Mounting Manner	64
4.5.4.	Installation of Multiple Battery Stacks (Optional)	77
5. Electrical Conne	ection	81
5.1.	Safety Instructions	82
5.2.	Assembling the AC-side Connection	83
5.2.1.	Opening the AC-side Cover	83
5.2.2.	Connecting the Grounding Cable	84
5.2.3.	(Optional) Installing the SIM Card	85
5.24	(Optional) Assembling the LAN Electrical Connection	84



	5.2.5.	Assembling the EMS Electrical Connection	87
	5.2.6.	Installing a Circuit Breaker	88
	5.2.7.	Installing an RCD (optional)	88
	5.2.8.	Connecting the Smart Meter	88
	5.2.9.	Connecting the Grid and Backup Loads	88
	5.2.10.	Assembling the Communication Connection	92
	5.2.11.	Closing the AC-side Cover	97
	5.3.	Assembling the DC-side Connection	98
	5.3.1.	Opening the DC-side Cover	98
	5.3.2.	Connecting the PV Cables	99
	5.3.3.	(Optional) Connecting the Battery Cables between Multiple Stacks	102
	5.3.4.	Closing the DC-side Cover	105
	5.4.	Earth Fault Alarm	105
	5.5.	System Connection	106
	5.6.	System Connection Diagram	108
6.	Startup and Shu	ıtdown	111
	6.1.	Startup	112
	6.2.	Shutdown	112
7.	Commissioning		113
	7.1.	About the Elekeeper App	114
	7.2.	Downloading the App	114
	7.3.	Using the App	114
8.	Troubleshooting	J	115
9.	Appendix		123
	9.1.	Recycling and Disposal	124
	9.2.	Warranty	124
	9.3.	Contacting Support	124
	9.4.	Trademark	124







SAFETY PRECAUTIONS





1.1. About this document

1.1.1. Overview

This *User Manual* provides introductions and instructions of installing, operating, maintaining, and troubleshooting of the SAJ system HS3-(5K-12K)-T2-(W, G)-(B, P)X. It is a three-phase all-in-one energy storage system which includes the SAJ products listed in section 2.2.1 "Product models".

Read the user manual carefully before any installation, operation and maintenance and follow the instructions during installation and operation. Keep this manual all time available in case of emergency.

1.1.2. Target audience

This document is applicable to:

- Installers
- Users

1.2. Safety

CAUTION:

ONLY qualified and trained electricians who have read and fully understood all safety regulations contained in this manual can install, maintain, and repair the equipment. Access to the equipment is by the use of a tool, lock and key, or other means of security.

1.2.1. Safety levels



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



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



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



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



1.2.2. Symbol explanation

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



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

1.2.3. Safety instructions

For safety, be sure to read all the safety instructions carefully prior to any works, and please observe the appropriate rules and regulations of the country or region where you installed all-in-one energy storage system.



- · There is possibility of fatal personnel injuries due to electrical shock and high voltage.
- Do not touch the surface of the equipment while the housing is wet, otherwise, it might cause electrical shock.
- · Do not touch the operating component of the device; it might result in burning or death.
- To prevent risk of electric shock during installation and maintenance, please make sure that all AC and DC terminals are plugged out.
- Do not stay close to the equipment while there are severe weather conditions including storm, 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.
- Please 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 subject the battery to any strong force.
- Do not place the battery near a heat source, such as direct sunlight, a fireplace.
- Do not expose the battery to temperatures in excess of 50°C.
- 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 areas where the ammonia content of the air exceeds 20 ppm.





WARNING

- 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.
- · Do not touch non-insulated parts or cables.
- For personal and property safety, do not short-circuit the positive (+) and negative (-) electrode terminals.
- Disconnect the PV array from the inverter by using an external disconnection device. If no
 external disconnection device is available, 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.
- The SAJ inverter must only be operated with the 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.



- Only qualified personnel who has full knowledge of local safety regulations and local standards on battery can install, maintain, retrieve, and process this product.
- Only use the battery as intended and designed. Do not change any components in the battery.
- · Risk of damage due to improper modification
- Use professional tools when operating the products.
- The inverter will become hot during operations. Do not touch the heat sink or peripheral surface during or shortly after operation.



NOTICE

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

1.3. Safe handling

1.3.1. Inverter

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



- When the inverter is working, do not plug in or out the cables.
- Make sure that the AC input voltage and current are compatible with the rated voltage and current of
 the inverter; otherwise, components might be damaged, or the device cannot work properly.

1.3.2. Battery

- Operate and use the battery properly according to the user manual. Any attempts to modify 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 a compatible inverter.
- Use batteries of the same type in an ESS. Do not mix the battery with other types of battery.
- Make sure that the battery is grounded prior to use.
- Do NOT pull out any cables or open the battery enclosure when the battery is powered on.
- Only use the battery as intended and designed. Do not change any components in the battery.
- It is recommended not to mix old and new battery modules, because doing so will not only cause capacity mismatch, but also affect battery performance and service life.
- It is recommended not to mix batteries with different SOC states, and better to use batteries from the same production batch together, because this can reduce the risk of abnormalities.
- If the user wants to expand the capacity later, it is recommended to add a cluster of batteries with the same configuration and use them in parallel with the original batteries.

1.4. Emergency

Despite of its careful and professional protection design against any hazards, damage of the battery may still possible. If a small amount of battery electrolyte is released due to a serious damage of the outer casing; or if the battery explodes due to not being treated timely after a fire breaks out nearby, and leaks out poisonous gases such as carbon monoxide, carbon dioxide and etc., the following actions are recommended:

- Eye contact: Rinse eyes with a large amount of running water and seek medical advice.
- Contact with skin: Wash the contacted area with soap thoroughly and seek medical advice.
- Inhalation: If you feel discomfort, dizziness, or vomiting, seek medical advice immediately.
- Use a FM-200 or Carbon Dioxide (CO2) fire extinguishers to extinguish the fire if there is a fire in the



area where the battery pack is installed. Wear a gas mask and avoid inhaling toxic gases and harmful substances produced by the fire.

Use an ABC fire extinguisher, if the fire is not caused by battery and not spread to it yet.



WARNING

- If a fire has just occurred, try to disconnect the battery circuit breaker, and cut off the power supply first, but only if you can do so without endangering yourself.
- If the battery is on fire, do not attempt to extinguish the fire but evacuate the crowd immediately.

Potential danger of damaged battery:

Chemical Hazard:

Despite of its careful and professional protection design against any hazard results, rupture of battery may still occur due to mechanical damage, internal pressure etc., and may result in a leakage of battery electrolyte. The electrolyte is corrosive and flammable. When there is fire, the toxic gases produced will cause skin and eyes irritation, and discomfort after inhalation. Therefore:

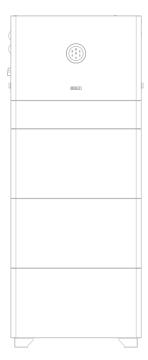
- Do not open damaged batteries.
- Do not damage the battery again (shock, fall, trample, etc.).
- Keep damaged batteries away from water (except to prevent an energy storage system from catching fire).
- Do not expose the damaged battery to the sun to prevent internal heating of the battery.

Electrical hazard:

The reason of fire and explosion accidents in lithium batteries is battery explosion. Here are the main factors of battery explosion:

- Short-circuit of battery. Short circuit will generate high heat inside 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.
- Overcharge of battery. Overcharge of battery may precipitate lithium metal. If the shell is broken, it will come into direct contact with the air, resulting in combustion. The electrolyte will be ignited at the same time, resulting in strong flame, rapid expansion of gas and explosion.









PRODUCT INFORMATION





2.1. General introduction

The SAJ system HS3-(5K-12K)-T2-(W, G)-(B, P) \mathcal{X} contains at least one HS3 inverter and one BU3 battery pack. It is a single-phase all-in-one energy storage system which is applied to the residential photovoltaic energy storage system which stores the electricity for household future use.

The HS3 inverter is built internally with a battery management system (BMS), which is used to ensure efficiency of the battery and protect the battery from operating outside its specified limitations. Working with an optional BC3 battery junction box, up to 8 battery packs can be used for storage expansion. Working with an optional CU2 charger, it provides power to the EV charger.

Note: *X is the* quantity of the battery modules, ranging from 1 to 8.

2.2. Models

2.2.1. Product models

The following tables list the device models of the HS3-(5K-12K)-T2-(W, G)-(B, P)X system with an optional battery junction box or a charger.

Inverter

Model type	Basic model	Professional model	
Communication			
With a built-in AIO3 module	● HS3-5K-T2-W-B	● HS3-5K-T2-W-P	
	● HS3-6K-T2-W-B	● HS3-6K-T2-W-P	
	● HS3-8K-T2-W-B	● HS3-8K-T2-W-P	
	● HS3-10K-T2-W-B	● HS3-10K-T2-W-P	
	● HS3-10K-T2-W-B-BE*	● HS3-10K-T2-W-P-BE*	
	● HS3-12K-T2-W-B	● HS3-12K-T2-W-P	
	● HS3-12K-T2-W-B-IE*	● HS3-12K-T2-W-P -IE*	
With a built-in 4G module	● HS3-5K-T2-G-B	● HS3-5K-T2-G-P	
	● HS3-6K-T2-G-B	● HS3-6K-T2-G-P	
	● HS3-8K-T2-G-B	● HS3-8K-T2-G-P	
	● HS3-10K-T2-G-B	● HS3-10K-T2-G-P	
	● HS3-10K-T2-G-B-BE*	● HS3-10K-T2-G-P-BE*	
	● HS3-12K-T2-G-B	● HS3-12K-T2-G-P	
	● HS3-12K-T2-G-B-IE*	● HS3-12K-T2-G-P-IE*	



- * BE indicates that this model is available in Belgium only.
- * IE indicates that this model is available in Ireland only.

Battery

Equipment	Basic model	Professional model		
Battery	● BU3-5.0-TV1	● BU3-5.0-TV1-PRO		
	● BU3-5.0-TV2	● BU3-5.0-TV2-PRO		
Battery with a base	● BU3-5.0-TV1-BASE	BU3-5.0-TV1-PRO-BASE		
	BU3-5.0-TV2-BASE	BU3-5.0-TV2-PRO-BASE		

• Battery combiner box: BC3-TV

Charger: CU2-11K-T-I

2.2.2. Model description

HS3: Inverter model series

xK: Rated power. For example, 6K indicates the rated power of the inverter is 6 kW.

T2: Three phases with 2 MPPT

W: This model uses a built-in AIO3 module

G: This model uses a built-in 4G module

B: Basic model

P: Professional model

X: Quantity of the battery modules, ranging from 1 to 8.

IE: This model is applicable to Ireland ONLY.

BE: This model is applicable to Belgium ONLY.



BU3 - **5.0** - **TVx** - **PRO** - **BASE**

BU3: Battery model series

5.0: The rated energy of the battery is 5.0 kWh.

TVx: TV indicates a pack-level optimizer. x indicates the battery cell manufacturer.

PRO: Professional model

BASE: With a base

2.3. Dimension

2.3.1. HS3 inverter

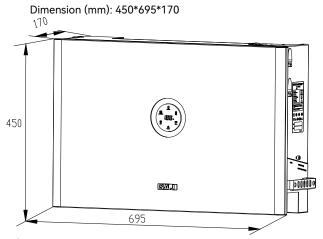


Figure 2.1. HS3 inverter dimension



2.3.2. BU3 battery pack

■ Type A battery pack

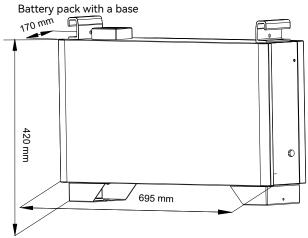


Figure 2.2. Dimension of the type A BU3 battery pack with a base

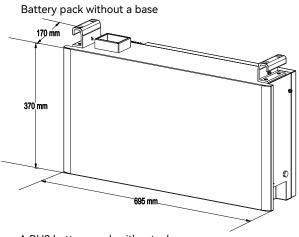


Figure 2.3. Dimension of the type A BU3 battery pack without a base



■ Type B battery pack

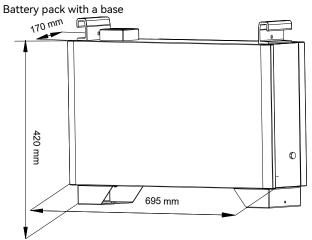
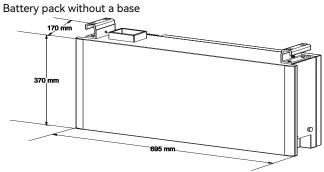


Figure 2.4. Dimension of the type B BU3 battery pack with a base



Dimension of the type B BU3 battery pack without a base



2.3.3. BC3 battery combiner box

Dimension (mm): 150*695*170

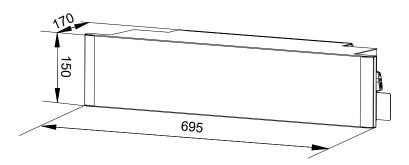


Figure 2.5. BC3 battery combiner box dimension

2.3.4. CU2 charger

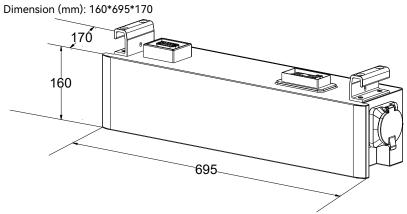


Figure 2.6. CU2 charger dimension



2.4. Ports, switches, and LED on the HS3 inverter

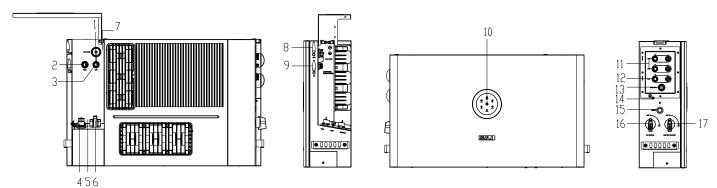


Figure 2.7. Ports, switches, and LED on the HS3 inverter

Callout	Silkscreen	Description		
1	SIM CARD	SIM card slot		
		Only available when a 4G module is embedded in the inverter.		
2	EMS	EMS port		
		Used in the paralleling scenario.		
3	LAN	LAN port		
		Only available when an AIO3 module is embedded in the inverter. It		
		is used by the AIO3 module for communication.		
4	BACK-UP	Backup load port		
5	СОММ	Communication port		
6	GRID	Grid port		
7	1	Grounding port		
8	WIFI	Wi-Fi antenna		
9	4G	4G antenna.		
		Only available when a 4G module is embedded in the inverter.		
10	1	LED panel		
11	PV1 (+, -), PV2 (+, -)	PV input ports		
12	BAT (+, -)	BAT+ and BAT- ports		
		Used for parallelling connection		



13	BMS CAN	Battery communication port
14	1	Grounding port
15	START	Start button
16	DC SWITCH	Switch for controlling the DC input
17	BATTERY SWITCH	Switch for controlling battery power input and output

Table 2.1. Description of the HS3 ports, switches, and LED

2.5. LED indicators on the HS3 inverter

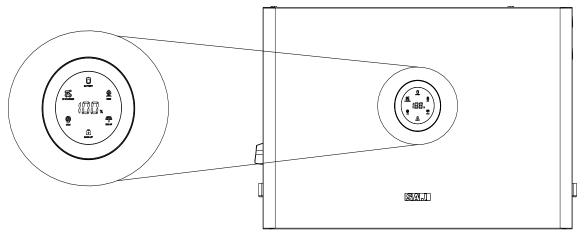


Figure 2.8. HS3 inverter LED

LED indicator	Status	Description	
0	Off	The inverter is powered off.	
0	Breathing 6s	The inverter is in initialization or standby state.	
0	Solid on The inverter is working properly.		
0	Breathing 3s	The inverter is upgrading.	
0	Solid on	The inverter is not working properly.	
	Integer (example, 50)	Battery average SOC (for example, 50%)	
		The battery communication is lost.	



	Solid on	The battery is working properly.
BATTERY	On 1s, off 1s	The battery is not working properly.
	Off	The battery is disconnected or inactive.
-A-	Solid on	The grid is connected and working properly.
登	On 1s, off 1s	The grid is not working properly.
GRID	Off	No grid is detected.
/ ///	Solid on	The PV array is working properly.
	On 1s, off 1s	The PV array is not working properly.
SOLAR	Off	The PV array is not working.
	Solid on	The AC-side load is working properly.
+	On 1s, off 1s	The AC-side load is overloaded.
BACK-UP	Off	The AC-side load is disconnected or off.
	Solid on	In good communication with the meter, BMS, and cloud.
(Q)	On 1s, off 1s	Lost communication with the meter, BMS, or cloud.
COM	Off	Lost communication with all the meter, the BMS, and cloud.
	Solid on	The EV charger is in standby mode and working properly.
Ä	On 1s, off 1s	The EV charger is charging.
EV CHARGER	On 1s, off 3s	The EV charger is not working properly.
EV CHARGER	Off	The EV charger is disconnected.

Table 2.2. LED description



2.6. Datasheet

2.6.1. System

Notes:

W=Wi-Fi

B=Basic model

P=Professional model

IE=Ireland (This model is applicable to Ireland ONLY.)

BE= Belgium (This model is applicable to Belgium ONLY.)					
Model Parameter	HS3-5K-T2-(W, G)-(B, P) <i>X</i>	HS3-6K-T2-(W, G)-(B, P) <i>X</i>	HS3-8K-T2-(W, G)-(B, P) <i>X</i>	HS3-10K-T2-(W, G)- (B, P) X, HS3-10K-T2- (W, G)-(B, P) X-BE	HS3-12K-T2-(W, G)- (B, P) <i>X</i> , HS3-12K-T2- (W, G)-(B, P) <i>X</i> -IE
DC Input					
Max. PV Array Power [Wp]@STC	Basic: 7500Professional: 10000	Basic: 9000Professional: 12000	Basic: 12000Professional: 12000	Basic: 15000Professional: 15000	Basic: 15000Professional: 15000
Max. Input Voltage [V]	1000				
Start Voltage / Min. Input Voltage[V]	180				
Rated Input Voltage [V]	600				
MPPT Voltage Range [V]	180 – 900				
Max. Input Current [A]	Basic: 16/16 Professional: 20/20				
Max. Short Circuit Current [A]	Basic: 20/20 Professional: 25/25				
MPPT Quantity	2				
Battery Port Connection					
Battery Type	LiFePO4				
Battery Voltage Range [V]	380-500				
Max. Charging Current [A]	30				
Max. Discharging Current [A]	15.8	18.4	25	30	30
Scalability	Quantity of batteries connecting to one inverter: 1 to 8 Note: A maximum of 3 batteries can be installed in one stack.				



Model Parameter	HS3-5K-T2-(W, G)-(B, P) <i>X</i>	HS3-6K-T2-(W, G)-(B, P) <i>X</i>	HS3-8K-T2-(W, G)-(B, P) <i>X</i>	HS3-10K-T2-(W, G)- (B, P) <i>X</i> , HS3-10K-T2- (W, G)-(B, P) <i>X</i> -BE	HS3-12K-T2-(W, G)- (B, P) <i>X</i> , HS3-12K-T2- (W, G)-(B, P) <i>X</i> -IE
AC Output [On-grid]	AC Output [On-grid]				
Rated AC Power [W]	5000	6000	8000	10000	• 12000 • 11000 (IE model)
Max. Apparent Power [VA]	5500	6600	8800	• 11000 • 10000 (BE model)	• 12000 • 11000 (IE model)
Rated Output Current [A] @230 V AC	7.2	8.7	11.6	14.5	• 17.4 • 15.9 (IE model)
Max. Continuous Current [A]	8.0	9.6	12.8	• 15.9 • 14.5 (BE model)	• 17.4 • 15.9 (IE model)
Current Inrush [A]	52	52			
Max. AC Fault Current [A]	45				
Max. AC Over-Current Protection [A]	20.8	25	33.3	41.8	41.8
Connection Manner	3+N+PE				
Rated AC Voltage / Range [V AC]	220/380, 230/400, 240/415 180-280/312-485				
Rated Output Frequency and Range [Hz]	 50 Hz: 45 - 55 60 Hz: 55 - 65 				
Power Factor [cos φ]	0.8 leading to 0.8 lagging				
Total Harmonic Distortion [THDi]	<3%				
AC Input [On-grid]					
Connection Manner	3+N+PE				
Rated AC Voltage / Range [V AC]	230/400				
Rated Input Frequency [Hz]	50, 60				
Max. Input Current [A]	29.0				
Max. Input Current (Inrush) [A]	52				
Max. Inverter Backfeed Current to the Array [A]	0				
AC Output [Back-up]					



Model Parameter	HS3-5K-T2-(W, G)-(B, P) <i>X</i>	HS3-6K-T2-(W, G)-(B, P) <i>X</i>	HS3-8K-T2-(W, G)-(B, P) <i>X</i>	HS3-10K-T2-(W, G)- (B, P) <i>X</i> , HS3-10K-T2- (W, G)-(B, P) <i>X</i> -BE	HS3-12K-T2-(W, G)- (B, P) <i>X</i> , HS3-12K-T2- (W, G)-(B, P) <i>X</i> -IE
Max. Apparent Power [VA]	5500	6600	8800	1100010000 (BE model)	• 12000 • 11000 (IE model)
Max. Continuous Current [A]	8.0	9.6	12.8	15.914.5 (BE model)	• 17.4 • 15.9 (IE model)
Peak Output Apparent Power [VA]	10000, 60s	12000, 60s	16000, 60s	16500, 60s	16500, 60s
Connection Manner	3+N+PE				
Rated AC Voltage / Range [V AC]	220, 230, 240 180–280				
Rated Output Frequency/Range [Hz]	 50 Hz: 45 - 55 60 Hz: 55 - 65 				
Output THDv (@ Linear Load)	<3%				
Efficiency					
Max. Efficiency	98.0%				
Euro Efficiency	97.6%				
Protection					
Battery Input Reverse Polarity Protection	Integrated				
Overload Protection	Integrated				
AC Short Circuit Current Protection	Integrated				
DC Surge Protection	Integrated				
AC Surge Protection	Integrated				
Anti-islanding Protection	Integrated (AFD)				
AFCI Protection	Integrated				
RSD Protection	Optional, compatible with an external protection equipment				
Connection and Communication					
PV Connection	D4; MC4 (optional)				
AC Connection	Plug-in connector				



Model Parameter	HS3-5K-T2-(W, G)-(B, P) <i>X</i>	HS3-6K-T2-(W, G)-(B, P) <i>X</i>	HS3-8K-T2-(W, G)-(B, P) <i>X</i>	HS3-10K-T2-(W, G)- (B, P) <i>X</i> , HS3-10K-T2- (W, G)-(B, P) <i>X</i> -BE	HS3-12K-T2-(W, G)- (B, P) <i>X</i> , HS3-12K-T2- (W, G)-(B, P) <i>X</i> -IE
Battery Connection	Quick connector				
Display	LED + App				
Communication	 Bluetooth (Bluetooth low energy, BLE) Wi-Fi and Ethernet (W models using the AlO3 module) 4G (4G models using the 4G module) 				
Communication Port	LANCANRS485Dry contact				
General Parameters	General Parameters				
Topology	Transformer-less				
Operating Temperature Range	 ■ Basic: Charging: 0°C to 50°C Discharging: -10°C to +50°C ■ Professional: -30°C to 50°C >45 °C derating 				
Storage Temperature Range	-10°C to 40°C				
Cooling Method	Natural convection				
Ambient Humidity	5–95% non-condensing				
Max. Operating Altitude [m]	3000				
Noise [dBA]	<35				
Overvoltage	II (DC), III (AC)				
Protective Class	1				
Ingress Protection	IP65				
Dimensions [H*W*D] [mm]	450*695*170				
Weight [kg]	34				
Warranty [Year]	Refer to the warranty policy.				



2.6.2. Battery pack

Model	BU3-5.0-(TV1, TV2),	BU3-5.0-(TV1, TV2)-PRO,		
Parameter	BU3-5.0-(TV1, TV2)-BASE	BU3-5.0-(TV1, TV2)-PRO-BASE		
Rated Capacity [Ah]	100			
Rated Energy [kWh]	5.0			
Usable Energy [kWh]	4.5			
Dimension (H*W*D) [mm]	With the base: 420*695*170Without the base: 370*695*170			
Weight [kg]	With the base: 53Without the base: 52			
Nominal Voltage [V]	450			
Operating Voltage [V]	380 - 500			
Max. Charging Current [A]	7.9			
Max. Discharging Current [A]	7.9			
Battery Designation	IFpP170/695/370/(1P16S)M/-10+50/90			
Ingress Protection	IP65			
Mounting	 Ground-mounting Wall-mounting			
Operating Temperature Range	Charging: 0°C to 50°CDischarging: -10°C to +50°C	-30°C to 50°C		
Storage Temperature Range	-10°C to 40°C			
Ambient Humidity	5 – 95% non-condensing			
Altitude	<3000 m			
Cooling Method	Natural convection			
Communication	CAN			
Warranty [Year]	Refer to the warranty policy.			

2.6.3. Battery combiner box

Model Parameter	BC3-TV
Communication Port	CAN
Dimension [mm] (H*W*D)	150*695*170
Weight [kg]	5.3



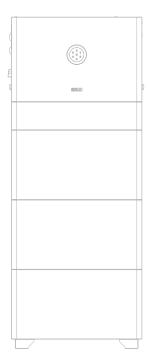
2.6.4. Charger

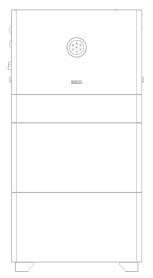
Model	CU2-11K-T-I		
Parameter			
Input			
Power supply	3+N+PE		
Rated Voltage [V AC]	230/400, ± 20%		
Rated Current [A]	16		
Frequency [Hz]	50/60		
Output			
Output Voltage [V AC]	400, ± 20%		
Max. Current [A]	16		
Output Power [kW]	11		
Power Consumption (standby) [W]	5		
Efficiency			
Euro Efficiency	≥99%		
Power Metering			
Precision	2%		
User Interface			
Charging Outlet	Type 2		
Housing Material	Chassis: SGCC (T=1.2 mm)		
	Cover: SGCC (T=2 mm)		
Start Mode	Plug and Play (PnP) + App		
Communication			
Communication	Wi-Fi 2.4G only		
Max. RF Output Power	<20 dBm (-10 dBW)		
Safety			
Ingress Protection	IP54		
Electrical Protection	Over-current protectionResidual current protection		



Certification	 Surge protection Over/Under voltage protection Over/Under frequency protection Over temperature protection EN IEC 61851-1: 2019 IEC 62955: 2018 EN IEC 61851-21-2: 2021 EN 61000-6-1: 2019 EN 61000-6-3: 2021 EN 300 328 V2.2.2:2019 EN 301 489-1 V2.2.3:2019 EN 301 489-3 V2.1.1:2019 EN 301 489-17 V3.2.0:2017 	
Warranty	Refer to the warranty policy.	
Environment		
Working Temperature	-30°C to +50°C	
Storage Temperature	-40°C to +60°C	
Ambient Humidity	5 – 95% non-condensing	
Max. Operating Altitude [m]	2000	
Cooling Method	Natural convection	
Package		
Product Dimension [mm] (H*W*D)	160*695*170	
Weight [kg]	9	









3.

TRANSPORTATION AND STORAGE





3.1. Transportation



Load or unload batteries with caution. Otherwise, the batteries may be short-circuited or damaged (such as leakage and crack), catch fire, or explode.

- Batteries have passed the test of UN38.3. This product meets the transportation requirements for dangerous goods for lithium batteries.
- The transportation service provider must be qualified to transport dangerous goods.
- Before transportation, check that the battery package is intact and that there is no abnormal odor, leakage, smoke, or sign of burning. Otherwise, the batteries must not be transported.
- Keep less than 4 cartons of inverter in one stack and keep less than 4 cartons of battery in one stack.
- After the installation of the battery on site, the original packaging (contains the lithium battery identification) should be kept. When the battery needs to be returned to the factory for repair, use the original packing for battery transportation.

3.2. Storage

Store it in a dry and ventilated environment and keep it away from heat sources.

Inverter-specific:

 Keep the inverter in an environment with storage temperature as -40 ° C to +60 ° C, humidity 5% to 95% RH.

Battery-specific:

- Keep the battery in an environment with storage temperature as -10 ° C to +40 ° C, humidity 5% to 95% RH.
- For long-term storage (>3 months), put the battery in an environment with a temperature of -25°C to 25°C and a humidity of < 85% RH.
- The battery should be installed within 6 months since delivered from the factory and used with compatible inverters.



- The battery remains 50% power when it is sent from the factory.
- The longer the battery is stored, the lower the SOC. When the battery remaining voltage fails to reach the startup voltage requirement, the battery may be damaged.



- Close the battery breaker switch and press the main switch. If the LED light is in solid green, it is running normally. If the LED light is in solid red or off, the battery is not working properly.
- The battery cannot be disposed of as household refuse. When the service life of the battery reaches
 to the limit, it is not required to return it to the dealer or SAJ, but it must be recycled to the special
 waste lithium battery recycling station in the area.









INSTALLATION





4.1. Precautions

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



DANGER

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



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

4.2. Determine the installation site

Read the following sections to cautiously determine the installation site.

The safety regulations vary in different countries and regions. Follow local safety regulations.

4.2.1. Installation environment requirements













Figure 4.1. Installation location

- Do not expose the device to direct solar irradiation as this could cause power derating due to overheating.
- The installation environment must be free of inflammable or explosive materials.
- The device must be installed in a place away from any heat source.
- Do not install the device at a place where the temperature changes extremely.
- Keep the device away from children.
- Do not install the device at daily working or living 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, keep it away from the driveway.



- Keep the device from water sources such as taps, sewer pipes and sprinklers to prevent water seepage.
- The product is to be installed in a high traffic area where the fault is likely to be seen.

4.2.2. Installation location requirements

- The device employs natural convection cooling, and it can be installed indoor or outdoor.
 - Indoor requirement: The battery CANNOT be installed in the habitable rooms.
 - Outdoor requirement: 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.
- Install the device vertically. Do not install it forward-tilted, horizontally or upside down.

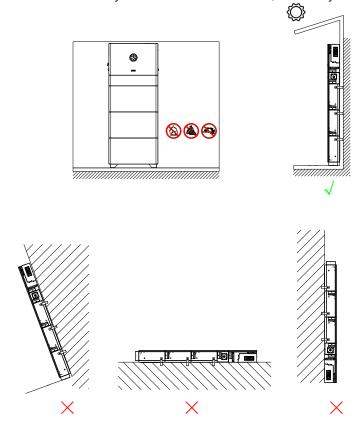


Figure 4.2. Installation limitations



In some restricted conditions, the allowable backward-tilted angle must not be greater than 3 degrees, and the allowable side-tilted angle must not be greater than 2 degrees.

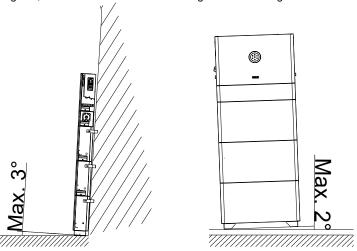


Figure 4.3. Installation angle

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

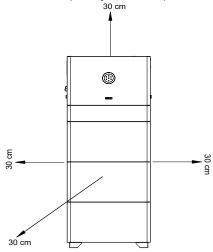


Figure 4.4. Installation clearance



4.3. Preparing installation tools

The tools illustrations are for your reference. Installation tools include but are not limited to the following recommended ones. Use other auxiliary tools based on site requirements.



Figure 4.5. Suggested installation tools



4.4. Unpacking

4.4.1. Check the outer packing

Although SAJ's products have thoroughly tested and checked before delivery, there is possibility that the products may suffer damages during transportation.

- 1. Check the outer packing package for any damage, such as holes and cracks.
- 2. Check the equipment model.

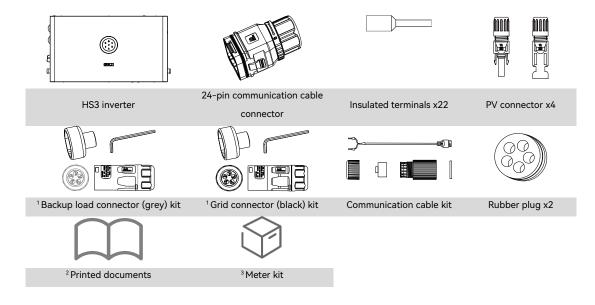
If any serious damage is found or the model is not what you requested, do not unpack the product, and contact your dealer as soon as possible.

4.4.2. Check the package contents

- Verify that the shipment contains everything that you expected to receive. Contact after sales if there
 are missing or damaged components.
- 2. Place the accessories separately after unpacking to avoid confusion for connection of cables.

Contents in your shipment are order-dependent. Not all packages listed below may be in your shipment.

■ Inverter package





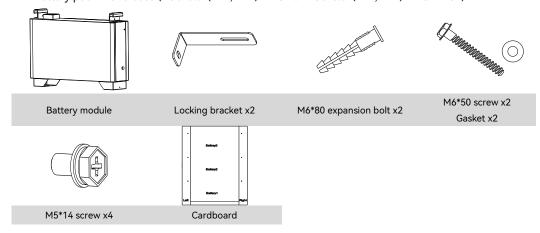
- ¹ The waterproof cover is only available in some configurations.
- ² The printed documents include a warranty card, a *Quick Guide*, and a *Configuration Instructions*.
- ³ The meter kit contains the following items:



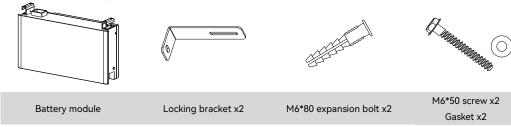
■ Package of type A BU3 battery pack

Type A battery has two holes on the left and right sides.

Battery pack with a base (BU3-5.0-(TV1, TV2)-BASE or BU3-5.0-(TV1, TV2)-PRO-BASE)



• (Optional) Battery without a base (BU3-5.0-(TV1, TV2) or BU3-5.0-(TV1, TV2)-PRO)





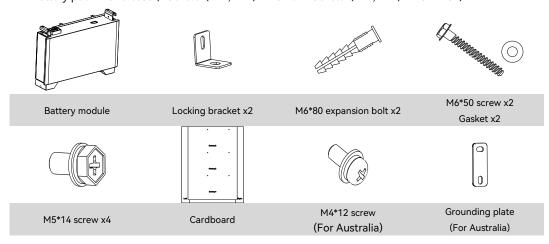


M5*14 screw x4

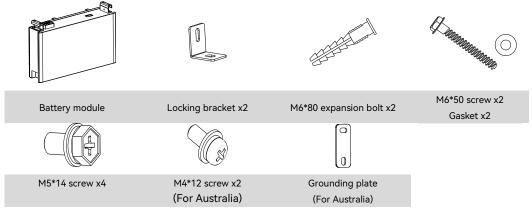
Package of type B BU3 battery pack

Type B battery pack has two mounting ears on the rear cover.

Battery pack with a base (BU3-5.0-(TV1, TV2)-BASE or BU3-5.0-(TV1, TV2)-PRO-BASE)



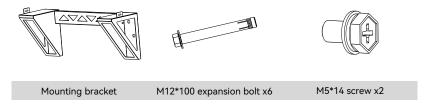
• (Optional) Battery without a base (BU3-5.0-(TV1, TV2) or BU3-5.0-(TV1, TV2)-PRO)





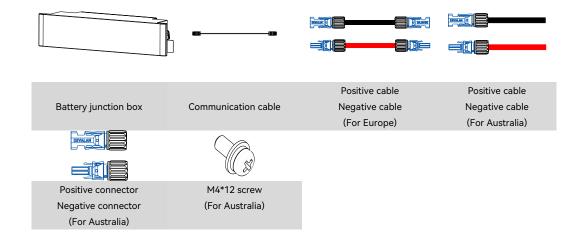
■ Wall-mounting bracket

This is an optional package, depending on your system configuration.



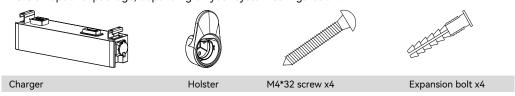
BC3 Battery Junction Box Package

This is an optional package, depending on your system configuration.



■ CU2 Charger Package

This is an optional package, depending on your system configuration.







4.5. Installation

Depending on your order, you will receive either type A or type B battery pack.

Depending on the battery pack type and mounting manner, choose the following installation procedure:

Type B: With two mounting ears on the rear cover

- Section 4.5.1 "Type A battery pack: ground mounting manner" on Page 41
- Section 4.5.2 "Type B battery pack: ground mounting manner" on Page 52
- Section 4.5.3 "Type B battery pack: wall mounting manner" on Page 64

4.5.1. Type A battery pack: ground mounting manner

Before you start

Make sure that the ground should be flat and no inclination.

Type A: With two holes on left and right sides

Procedure

Step 1. Install the base battery (BU3-5.0-(TV1, TV2)-BASE or BU3-5.0-(TV1, TV2)-PRO-BASE).

a. Get the cardboard from the base battery package. Place the cardboard on to the wall. Drill six holes (8 mm in diameter and 55 mm in depth) on the marked positions on the cardboard. Install the provided expansion bolts into the drilled holes.



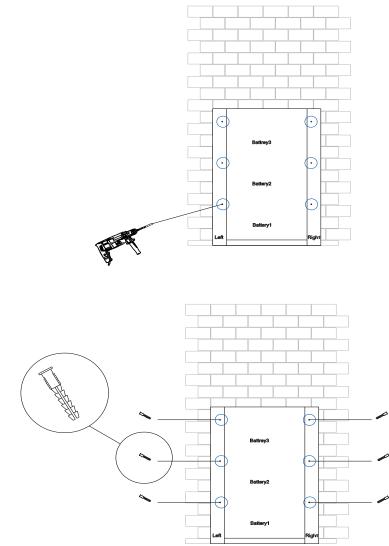


Figure 4.6. Marking and drilling holes on the wall



- b. Use two M5*14 screws to install two locking brackets on the left and right sides of the battery pack. On the desired installation site, place the base battery on the floor. Make sure that:
 - The left and right battery bases are aligned with the vertical black lines on the cardboard.
 - The battery pack is placed horizontally. (It is recommended that a gradienter be used.)
 - The space between the battery back and the wall surface is 50–65 mm.

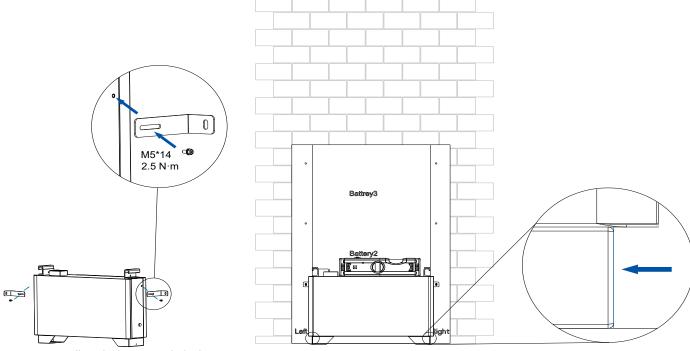


Figure 4.7. Installing the battery with the base



c. On the left and right upper sides of the battery pack, align the locking brackets to the drill holes and install M6*50 screws to secure the locking brackets to the wall.

Note: If the battery is installed outdoors, it is suggested to remove the cardboard which is not waterproof.

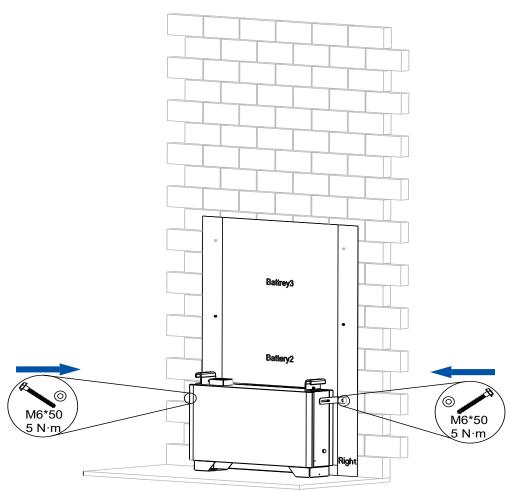


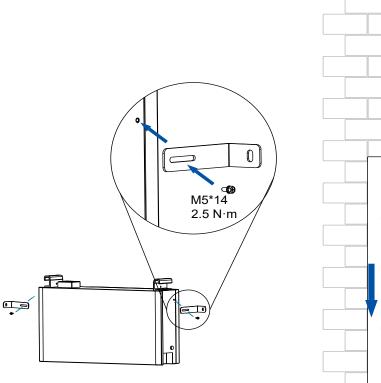
Figure 4.8. Securing the battery to the wall

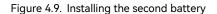


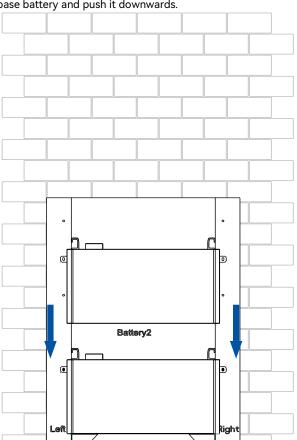
Step 2. (Optional) Install other batteries (BU3-5.0-(TV1, TV2) or BU3-5.0-(TV1, TV2)-PRO).

Note: In one stack, up to three batteries are supported.

a. Use two M5*14 screws to install two locking brackets on the left and right sides of the battery pack. Place this battery onto the base battery and push it downwards.









b. On the left and right upper sides of the battery pack, align the locking brackets to the drilled holes and install the gaskets and M6*50 screws to secure the battery pack to the wall.
 On the left and right bottom sides of the battery pack: Install two M5*14 screws to secure two batteries.

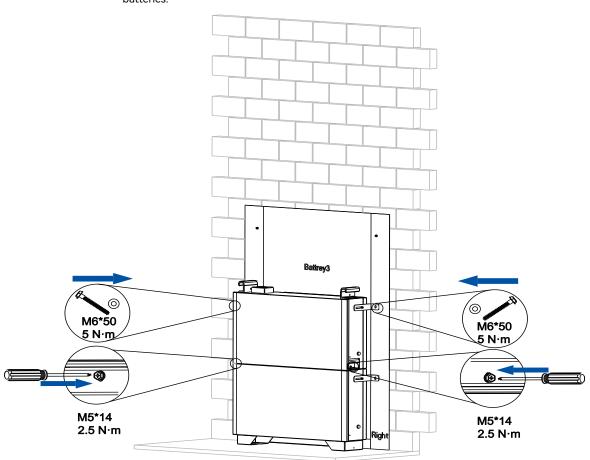


Figure 4.10. Securing the batteries



a. (Optional) If needed, repeat steps a and b to install the third battery.

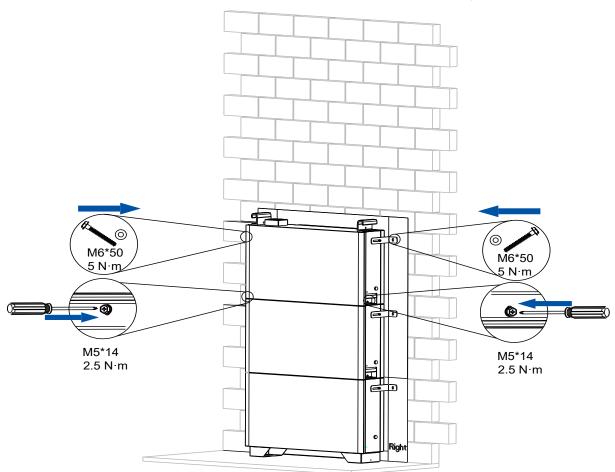
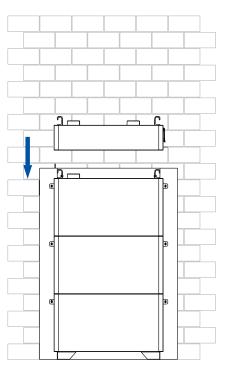


Figure 4.11. Installing the third battery

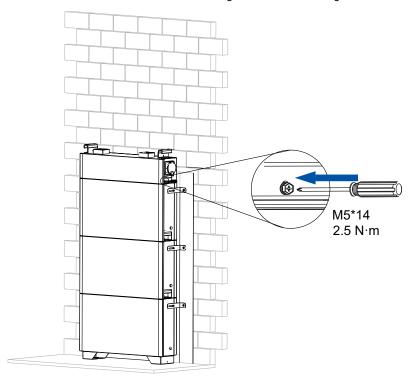


Step 3. (Optional) Install the charger (CU2-7.4K-S-I).

- a. Get the holster from the charger package. Install the holster onto the right side of the charger.
- b. Place the charger onto the battery. Push it downwards.
- c. Install M5*14 screws on both lower sides of the charger to secure the charger to the battery.









d. Install the holster on the wall by using three M4*32 screws.

Note: The holster is used to secure the charger cable. You can connect the cable after all installation is completed. It is recommended that you purchase the cable from SAJ.

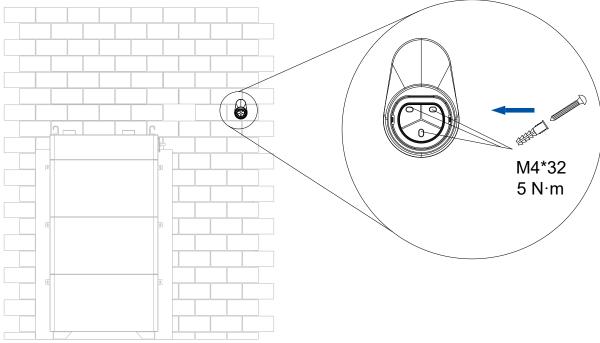


Figure 4.13. Installing the charger cable holster



e. (Optional) Connect the charger cable.

Notes:

- It is recommended that you connect the cable after all device installation is completed.
- It is recommended that you purchase the cable from SAJ.
- For a long cable, you can wrap the cable on the holster.

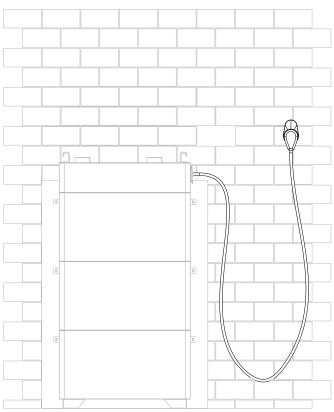
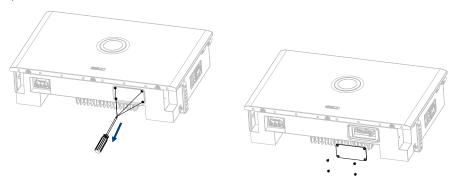


Figure 4.14. Connecting the charger cable



Step 4. Install the inverter (HS3-xk-T2-W-B, HS3-xK-T2-W-P, HS3-xk-T2-G-B, or HS3-xK-T2-G-P).

a. (Optional) If you have installed a charger, loosen the screws on the inverter, and remove the port cover, as shown below:



b. Place the inverter onto the battery or charger (if available) and push it downwards. Install screws on both lower sides of the inverter to secure the inverter to the beneath device (battery or charger; here takes a charger as an example).

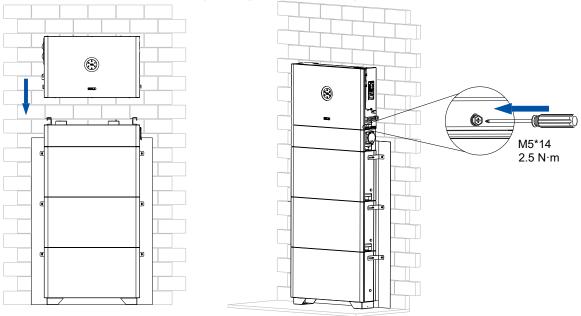


Figure 4.15. Installing the inverter



Installation completion view

Single stack: supporting 1 to 3 batteries

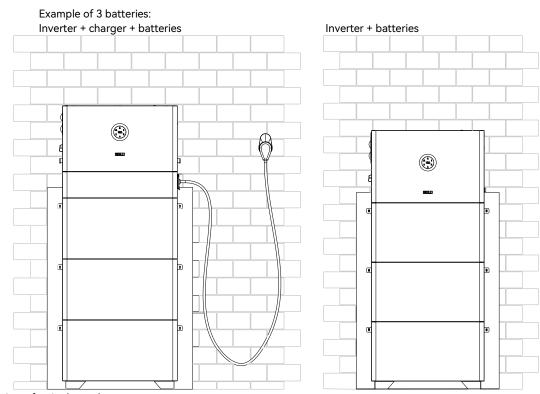


Figure 4.16. Completion view of a single stack

4.5.2. Type B battery pack: ground mounting manner

Before you start

Make sure that the ground should be flat and no inclination.

Procedure

- Step 1. Install the base battery (BU3-5.0-(TV1, TV2)-BASE or BU3-5.0-(TV1, TV2)-PRO-BASE).
 - a. Get the cardboard from the base battery package. Place the cardboard on to the wall. Drill six holes (8mm in diameter and 55mm in depth) on the marked positions on the cardboard. Install the provided expansion bolts into the drilled holes.



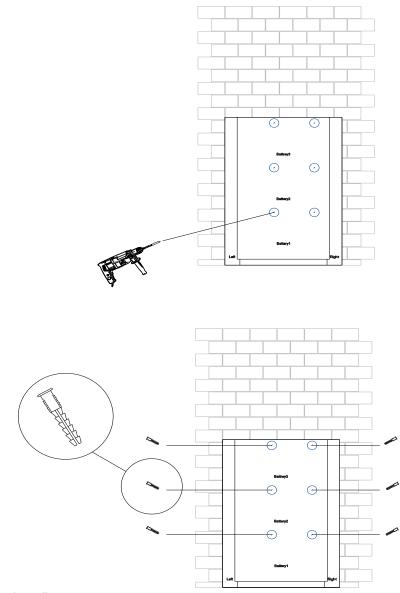


Figure 4.17. Marking and drilling holes on the wall



- b. Use two M5*14 screws to install two locking brackets to the mounting ears on the top of the battery pack. On the desired installation site, place the base battery on the floor. Make sure that:
 - The left and right battery bases are aligned with the vertical black lines on the cardboard.
 - The battery pack is placed horizontally. (It is recommended that a gradienter be used.)
 - The space between the battery back and the wall surface is 50–65 mm.

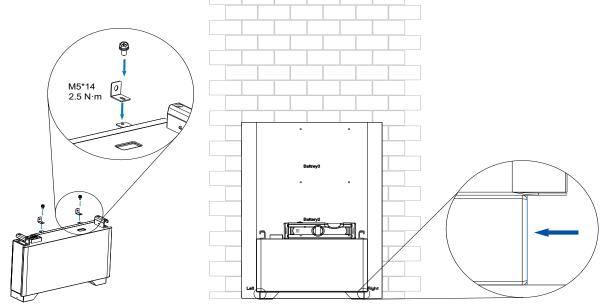


Figure 4.18. Installing the battery with the base



c. On the top of the battery pack, align the locking brackets to the drilled holes and install M6*50 screws to secure the locking brackets to the wall.

Note: If the battery is installed outdoors, it is suggested to remove the cardboard which is not waterproof.

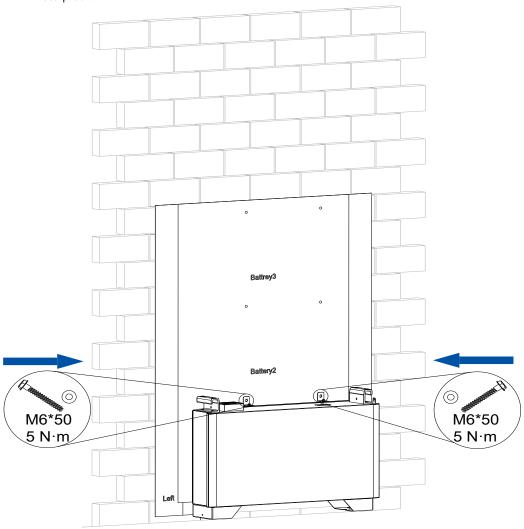


Figure 4.19. Securing the battery to the wall



Step 2. (Optional) Install other batteries (BU3-5.0-(TV1, TV2) or BU3-5.0-(TV1, TV2)-PRO).

Note: In one stack, up to three batteries are supported.

a. Use two M5*14 screws to install two locking brackets to the mounting ears on the top of the battery pack. Place this battery onto the base battery and push it downwards.

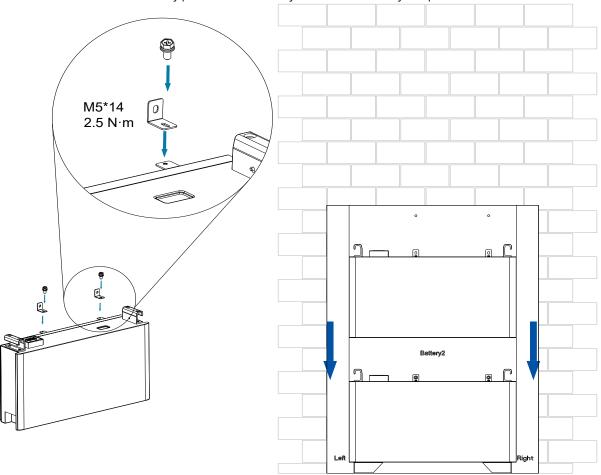


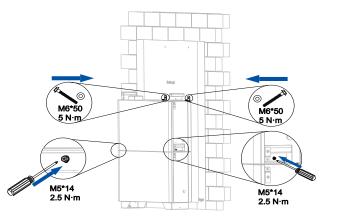
Figure 4.20. Installing the second battery



b. On the top of the battery pack, align the locking brackets to the drilled holes and install the gaskets and M6*50 screws to secure the battery pack to the wall.

On the left and right bottom sides of the battery pack, install M5*14 screws to secure two batteries.

Australia only: As shown in the right figure, install the metal grounding plate and secure it by installing two M4*12 screws.



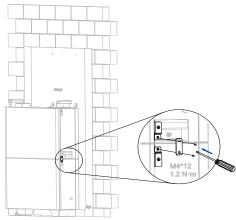


Figure 4.21. Securing the batteries



c. (Optional) If needed, repeat steps a and b to install the third battery.

Australia only: Install the metal grounding plate and secure it by installing two M4*12 screws.

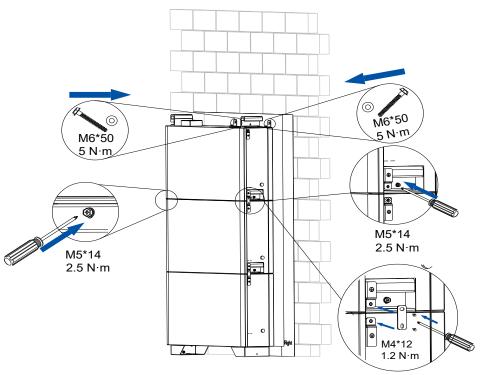


Figure 4.22. Installing the third battery



Step 3. (Optional) Install the charger (CU2-7.4K-S-I).

- a. Get the holster from the charger package. Install the holster onto the right side of the charger.
- b. Place the charger onto the battery. Push it downwards.
- c. On the left and right bottom sides, install M5*14 screws to secure the charger to the battery.

Australia only: As shown in the right figure, install the metal grounding plate and secure it by installing two M4*12 screws.

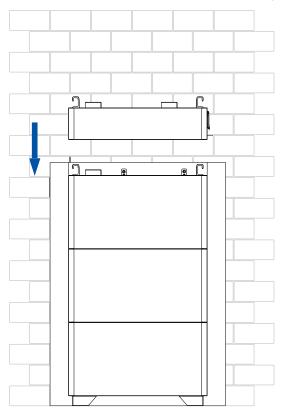
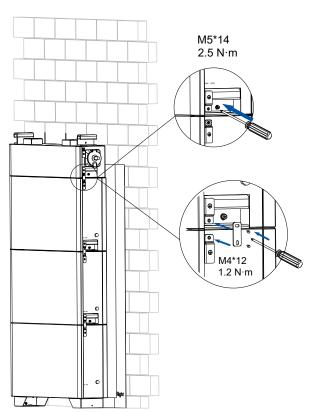


Figure 4.23. Installing the charger





d. Install the holster on the wall by using three M4*32 screws.

Note: The holster is used to the charger cable. You can connect the cable after all installation is completed. It is recommended that you purchase the cable from SAJ.

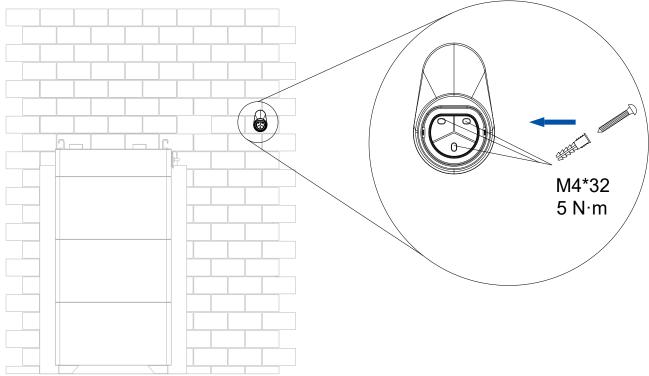


Figure 4.24. Installing the charger cable holster



f. (Optional) Connect the charger cable.

Notes:

- It is recommended that you connect the cable after all device installation is completed.
- It is recommended that you purchase the cable from SAJ.
- For a long cable, you can wrap the cable on the holster.

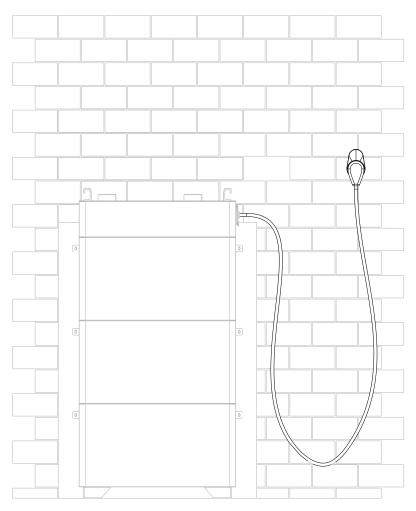
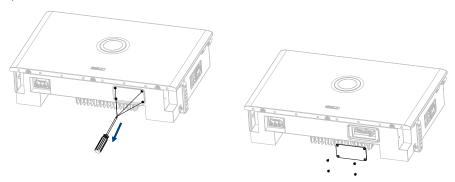


Figure 4.25. Connecting the charger cable



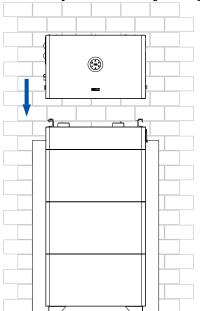
Step 4. Install the inverter (HS3-xk-T2-W-B, HS3-xK-T2-W-P, HS3-xk-T2-G-B, or HS3-xK-T2-G-P).

c. (Optional) If you have installed a charger, loosen the screws on the inverter, and remove the port cover, as shown below:



d. Place the inverter onto the battery or charger (if available) and push it downwards. On the left and right bottom sides of the inverter, install M5*14 screws to secure the inverter to the beneath device.

Australia only: Install the metal grounding plate and secure it by installing two M4*12 screws.



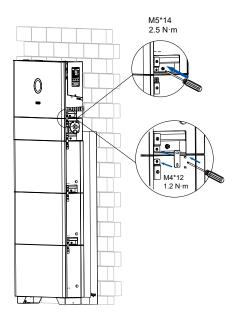


Figure 4.26. Installing the inverter



Installation completion view

Single stack: supporting 1 to 3 batteries

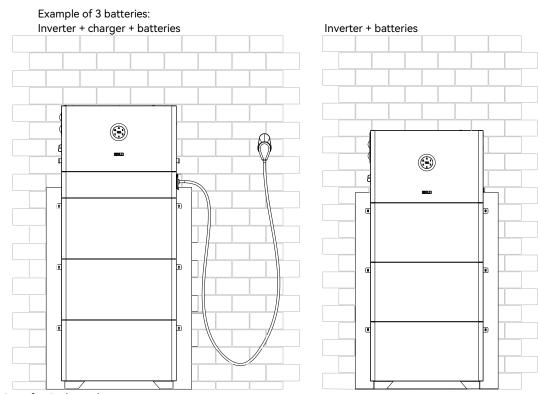


Figure 4.27. Completion view of a single stack



4.5.3. Type B battery pack: wall mounting manner

Before you start

Make sure that the wall can bear the weight of the inverter and accessories.

Procedure

- Step 1. Install the wall-mounting bracket.
 - a. Place the mounting bracket onto the wall. Mark six holes. Remove the bracket.

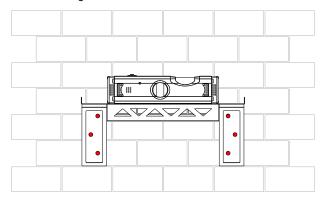


Figure 4.28. Marking the hole positions

b. Drill six holes according to the marked positions on the wall.

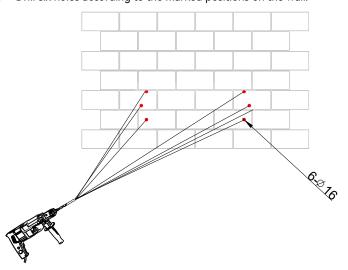


Figure 4.29. Drilling holes



c. Install the mounting bracket on to the wall.

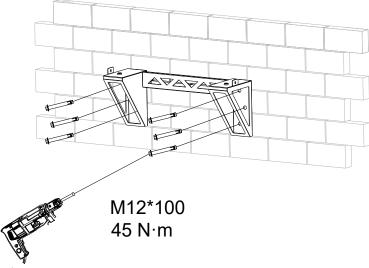


Figure 4.30. Installing the mounting bracket

Step 1. Install the base battery (BU3-5.0-(TV1, TV2)-BASE or BU3-5.0-(TV1, TV2)-PRO-BASE).

 Get the cardboard from the base battery package. Place the cardboard onto the wall and align the vertical lines on the cardboard with the bracket edges.

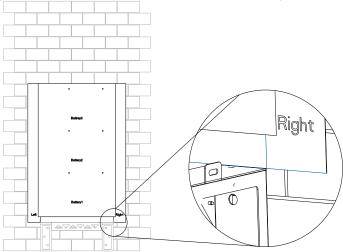


Figure 4.31. Aligning the cardboard with the bracket



b. Drill six holes (8mm in diameter and 55mm in depth) on the marked positions on the cardboard. Install the provided expansion bolts into the drilled holes.

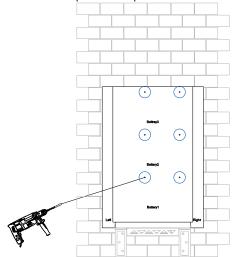


Figure 4.32. Drilling holes

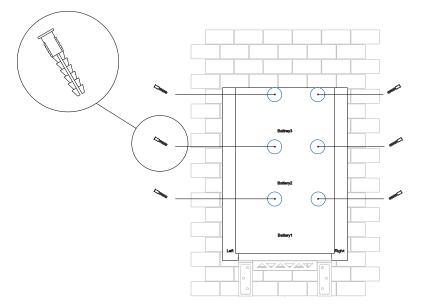


Figure 4.33. Installing expansion bolts



- c. Use two M5*14 screws to install two locking brackets to the mounting ears on the top of the battery pack. Place the base battery onto the floor. Make sure that:
 - The battery feet are aligned with the vertical black line on the cardboard.
 - The battery pack is placed horizontally. (It is recommended that a gradienter be used.)
 - The space between the battery back and the wall surface is 50–65 mm.

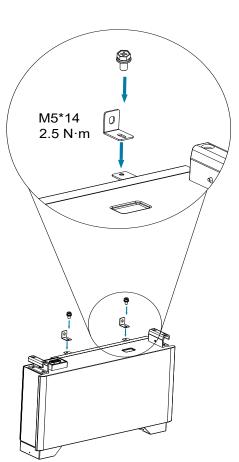
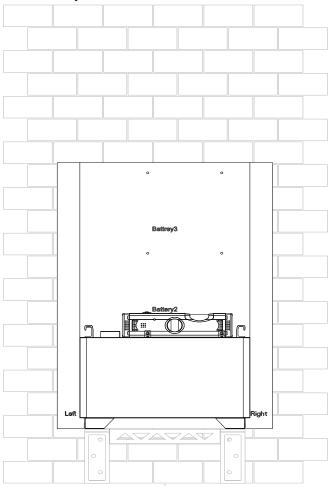


Figure 4.34. Installing the battery with the base





d. On the top of the battery pack, align the locking brackets to the drilled holes and install M6*50 screws to secure the locking brackets to the wall. Secure battery to the bracket by tightening two M6*14 screws.

Note: If the battery is installed outdoors, it is suggested to remove the cardboard which is not waterproof.

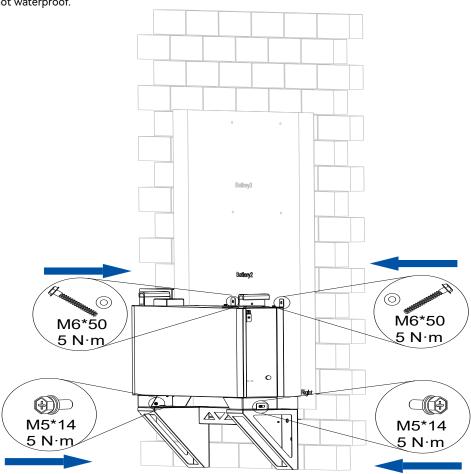


Figure 4.35. Securing the battery to the wall



Step 2. Install other batteries (BU3-5.0-(TV1, TV2) or BU3-5.0-(TV1, TV2)-PRO).

Note: In one stack, up to three batteries are supported.

a. Use two M5*14 screws to install two locking brackets to the mounting ears on the top of the battery pack. Place this battery onto the base battery. Push it downwards.

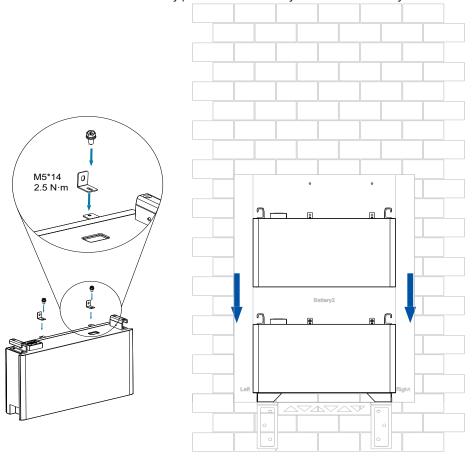


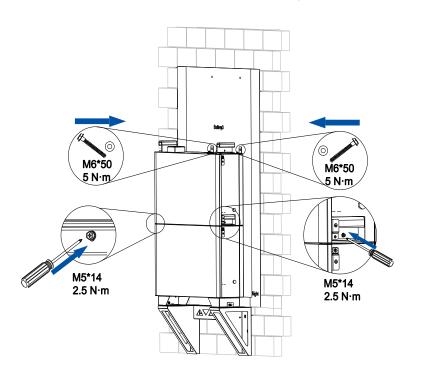
Figure 4.36. Installing the second battery without



b. On the top of the battery pack, align the locking brackets to the drilled holes and install the gaskets and M6*50 screws to secure the battery pack to the wall.

On the left and right bottom sides of the battery pack, install M5*14 screws to secure two batteries.

Australia only: As shown in the right figure, install the metal grounding plate and secure it by installing two M4*12 screws.



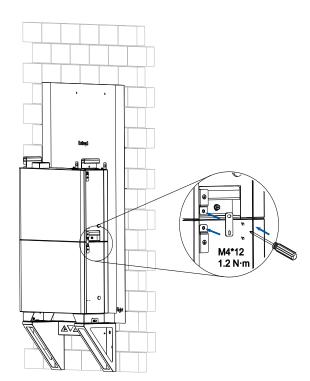


Figure 4.37. Securing the batteries



c. (Optional) If needed, repeat steps a and b to install the third battery.

Australia only: Install the metal grounding plate and secure it by installing two M4*12 screws.

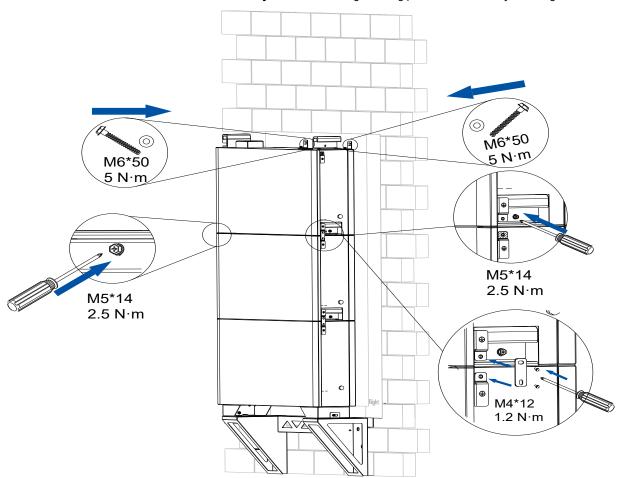


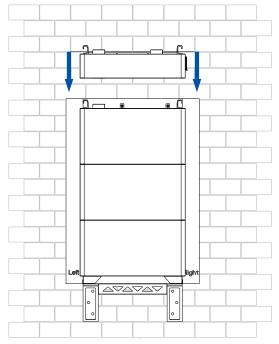
Figure 4.38. Installing the third battery



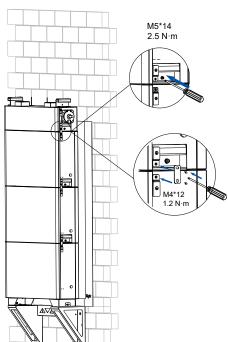
Step 3. (Optional) Install the charger (CU2-7.4K-S-I).

- a. Get the holster from the charger package. Install the holster onto the right side of the charger.
- b. Place the charger onto the battery. Push it downwards.
- c. On the left and right bottom sides of the battery pack, install M5*14 screws to secure the charger to the battery.

Australia only: Install the metal grounding plate and secure it by installing two M4*12 screws









e. Install the holster on the wall by using three M4*32 screws.

Note: The holster is used to secure the charger cable. It is recommended that you purchase the cable from SAJ and connect the cable after all devices are installed.

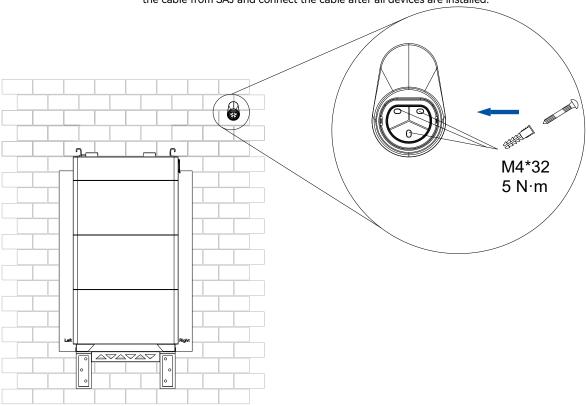


Figure 4.40. Installing the charger cable holster



(Optional) Connect the charger cable. f.

Notes:

- It is recommended that you connect the cable after all device installation is completed. It is recommended that you purchase the cable from SAJ. For a long cable, you can wrap the cable on the holster.

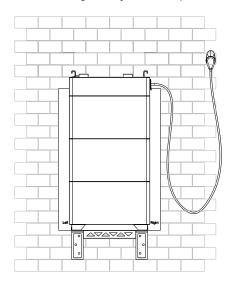


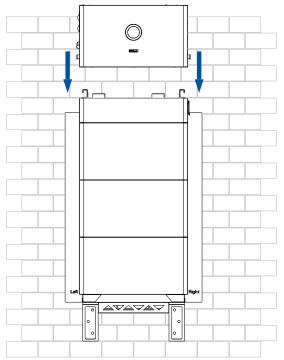
Figure 4.41. Connecting the charger cable



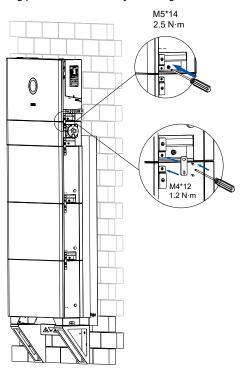
Step 4. Install the inverter (HS3-xk-T2-W-B, HS3-xK-T2-W-P, HS3-xk-T2-G-B, or HS3-xK-T2-G-P).

- a. Place the inverter onto the battery or charger (if available) and push it downwards.
- b. On the left and right bottom sides of the battery pack, install M5*14 screws to secure the inverter to the beneath device (battery or charger; here takes a charger as an example).

Australia only: Install the metal grounding plate and secure it by installing two M4*12 screws.









Installation completion view

Single stack: supporting 1 to 3 batteries

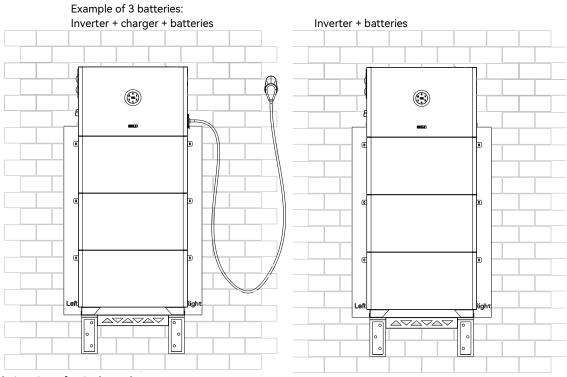


Figure 4.43. Completion view of a single stack



4.5.4. Installation of multiple battery stacks (optional)

About this task

An inverter can support up to eight batteries; however, for safety reason, up to three batteries can be installed vertically in one stack. The extra batteries must be installed in other stack(s) and the extra battery stack must be installed with a battery combiner box (BC3-TV). The distance between each battery stack is 0.5 meter.

The procedures in the ground-mounting manner and the wall-mounting manner are the same.

Procedure

Step 1. Place the junction box onto the battery. Push it downwards.

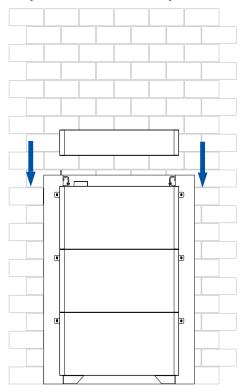


Figure 4.44. Installing a battery junction box



Step 2. Depending on the battery type, perform as follows:

• Type A battery pack: Install screws on both lower sides of the junction box to secure the junction box to the beneath battery.

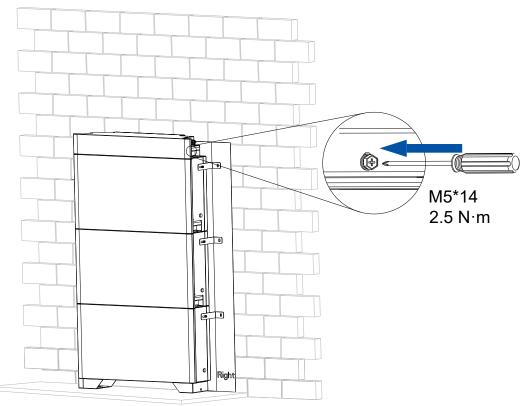
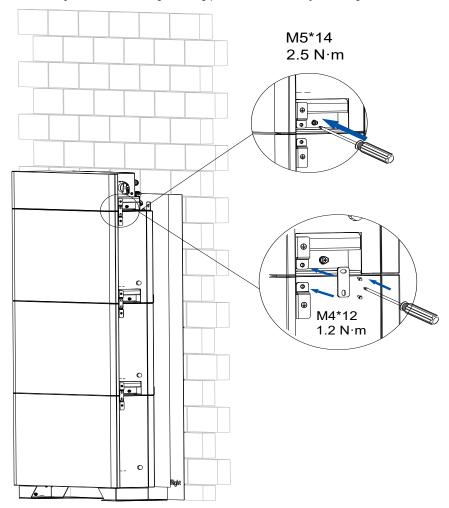


Figure 4.45. Installing a battery junction box



 Type B battery pack: Type B battery pack: Install screws on both lower sides of the junction box to secure the junction box to the beneath battery.

Australia only: Install the metal grounding plate and secure it by installing two M4*12 screws





Installation completion view

Multiple battery stacks: supporting 4 to 8 batteries

Take eight batteries as an example. Quantities of the batteries in different stacks are 2, 3, and 3, as shown below. The distance between each stack is 0.5 meter.

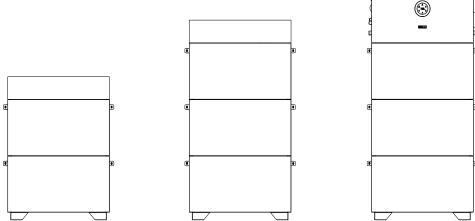


Figure 4.46. Completion view of three battery stacks

ELECTRICAL CONNECTION





5.1. Safety instructions

Electrical connection must only be operated on by professional technicians. Operators must be aware 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.



A DANGER

- · Dangerous to life due to potential fire or electricity shock.
- Do not install the inverter near any inflammable or explosive items.
- Dangerous to life due to potential fire or electricity shock.
- · When it is powered on, the equipment should in conformity with national rules and regulations.
- The direct connection between the inverter and high voltage power systems must be operated by qualified technicians in accordance with local and national power grid standards and regulations.
- · The PV arrays will produce lethal high voltage when exposed to sunlight.



NOTICE

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



5.2. Assemble the AC-side connection

5.2.1. Open the AC-side cover

Loosen the screw that locks the cover. Then, lift the cover upwards.

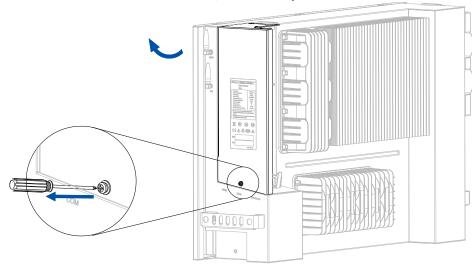


Figure 5.1. Opening the AC-side cover

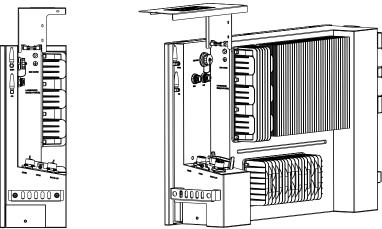


Figure 5.2. After the AC-side cover is opened



5.2.2. Connect the grounding cable

About this task

This additional grounding cable must be connected before other electrical connection. You can connect the grounding cable to the grounding point on either AC-side or DC side. Here takes the grounding point on the AC-side as an example.

The cable needs to be prepared by the user. It is recommended that a 6-mm² conductor cross-sectional area of cable be used.

Procedure

Step 1. Assemble the cable and OT/DT terminal.

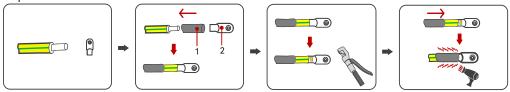


Figure 5.3. Preparing the grounding cable

010	510				
1	Heat shrink tube	2	OT/DT terminal		

Step 2. Remove the M4*10 screw from the grounding port. Connect and secure the grounding cable, as shown below:

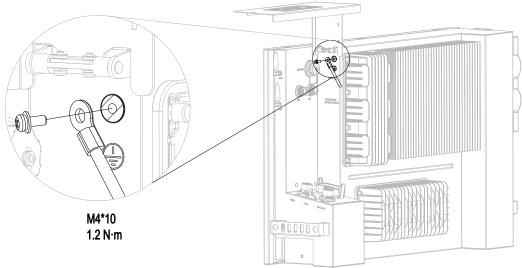


Figure 5.4. Connecting the additional grounding cable



5.2.3. Install the SIM card (optional)

Only the 4G model provides the SIM card slot.

Loosen the cover of the SIM card slot. Then, insert the SIM card to the slot.

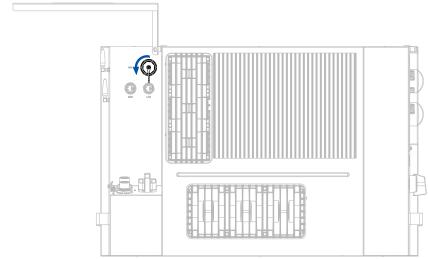


Figure 5.5. Loosening the cover on the SIM card slot

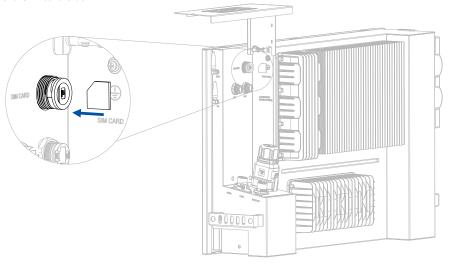


Figure 5.6. Inserting the SIM card



5.2.4. Assemble the LAN electrical connection (optional)

About this task

Only the W (Wi-Fi) model provides the LAN port.

If you choose to use Wi-Fi connection manner or has an EMS connected in the ESS, no need to connect the LAN cable. If you choose to use Ethernet connection manner, perform as follows:

Procedure

- Step 1. Remove the RJ45 cable fastener from the LAN port.
- Step 2. Use a standard RJ45 cable. Insert the cable through the cable fastener as shown below. Assembly the cable fastener.

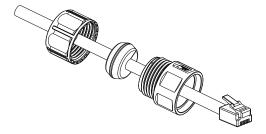
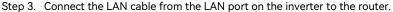


Figure 5.7. Preparing the LAN cable



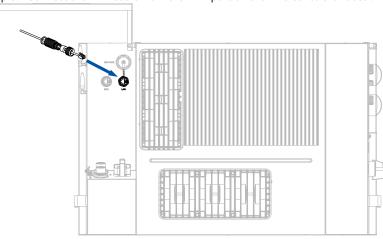


Figure 5.8. Connecting the LAN cable



5.2.5. Assemble the EMS electrical connection

To connect an EMS to the inverter, perform as follows:

- Step 1. Remove the RJ45 cable fastener from the EMS port.
- Step 2. Use a standard RJ45 cable. Insert the cable through the cable fastener as shown below. Assembly the cable fastener.

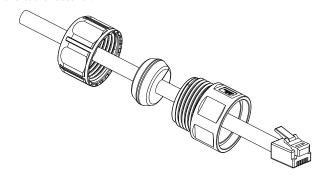
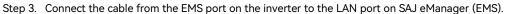


Figure 5.9. Preparing the EMS cable



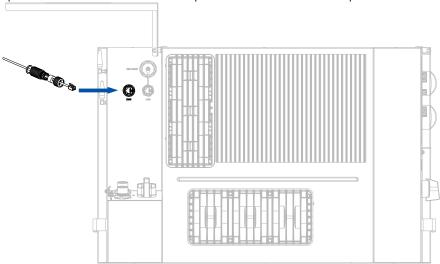


Figure 5.10. Connecting the EMS cable



5.2.6. Install a circuit breaker

For safety operation and regulation compliance, install a 63 A or higher air circuit breaker between the grid and the inverter.

By installing a circuit breaker, the inverter can be disconnected from the grid quickly and safely when the leakage current detector embedded in the inverter detects that the leakage current exceeds the limitation. **Notice**: In parallelling scenario, do NOT connect multiple inverters to one AC circuit breaker.

5.2.7. Install an RCD (optional)

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

5.2.8. Connect the smart meter

To buy a smart meter, contact SAJ for more details.

By using a SAJ-recommended smart meter, many functions can be implemented, such as the export limitation function.

Connect the smart meter as shown in section 5.6 "System connection diagram".

5.2.9. Connect the grid and backup loads

About this task

By default, the grid or backup load connector contains a one-hole rubber plug inside for connecting a three-wire cable. The following takes a three-wire cable as an example.

However, if you choose to use three separated cables for grid or backup load connection, to ensure sealing safety, remove the one-hole rubber plug in the connector, use the three-hole rubber plug provided in the accessory bag instead.

Before you start

Select cables according to the below specification.

Recommended cable specification:



Conductor cross-sectional area	Conductor material	
Scope	Recommended value	
4-6 mm² or 12-10 AWG	6 mm² or 10 AWG	Copper

Note the required cable diameter of different rubber plugs.

Rubber plug	Hole diameter
One-hole plug (in the connector)	14-17.5 mm
Five-hole plug (in the accessory bag)	4.0−5.5 mm

Table 5.1 Recommended AC cable specification

Procedure

Step 1. Strip the insulation off (13-mm length) the cables.

Step 2. Thread the cables through the cable glands of the connectors and secure the cables with a spanner.

Notes:

- The black connector is for grid connection and the grey connector is for backup load connection.
- Depending on the configurations, the waterproof gland nut (callout 4 in the following illustration) may not be provided.



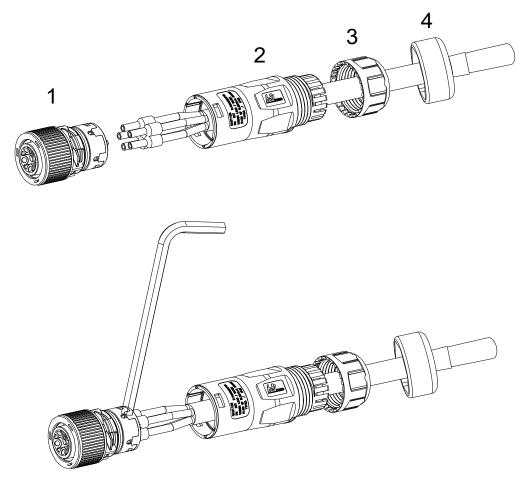


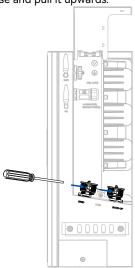
Figure 5.11. Preparing the cable



Step 3. Remove the dustproof covers from the GRID and BACK-UP ports.

Use a flathead screwdriver to press down the tab in the cover.

Rotate the cover anti-clockwise and pull it upwards.



Step 4. Connect the grid cable to the GRID and BACKUP ports on the inverter.

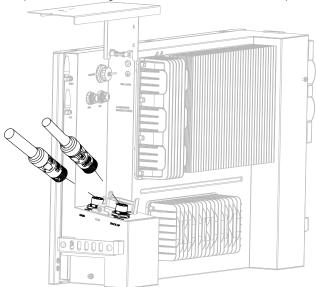


Figure 5.12. Connecting the grid cable



5.2.10. Assemble the communication connection

- Step 1. Disassemble the communication cable connector.
 - ① Press the tabs on two sides of the connector by one hand and press the front ends of the terminal by another hand. Pull the connection terminal block outwards.
 - ② Rotate the nut anti-clockwise and remove it from the connector body.
 - 3 Remove the rubber plugs out of the seals.

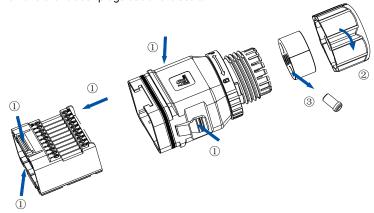


Figure 5.13. Disassembling the 24-pin communication cable connector

Step 2. Prepare cables.

 Meter communication: Use the provided communication cable kit. It contains a communication cable with an RJ45 port and two assembled terminals and cable fastener parts.



- Other terminal connection: Per you needs, prepare cables. Strip the insulation around 7.5 mm on cable ends and if needed, use provided insulated crimp terminals on the cable ends.
 Suggested cable specifications:
 - DO: 0.5-0.75 mm²
 - Others: 0.2-0.5 mm²



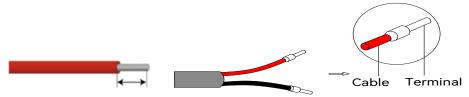
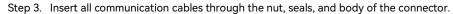


Figure 5.14. Installing the insulated crimp terminals on the cable ends



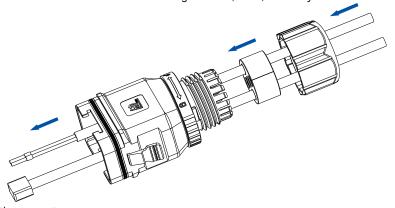


Figure 5.15. Inserting the cables through the connector

Step 4. Locate the ports and terminals on the connection terminal block according to their silkscreens.

Connect all communication cables to the communication cable connector.

Name	Number	Pin definition	Description
PORT (RJ45 port)	/	1: CAN-H	For parallelling connection
		(with a 120 Ω resistor)	scenario
		2: CAN-L	
		3: GND_W	
		4: SYN	
		5: GND_W	
		6: HOST	
		7: GND_W	
		8: TRF	
DRMs (RJ45 port)	/	1: DRM1/5	For RCR
		2: DRM2/6	For RCR
		3: DRM3/7	For RCR



		4: DRM4/8	For RCR
		5: REF D/0	/
		6: COM D/0	/
		7: NC	/
		8: NC	/
Terminals	4	DO1+	Dry output 1
	5	DO1-	Dry output 1
	6	DO2+	Dry output 2
	7	DO2-	Dry output 2
	11	RS485-A	For external RS485
		(with a 120 Ω resistor)	communication
	12	RS485-B	
	13	MET-A	For meter communication
		(with a 120 Ω resistor)	
	14	MET-B	
	15	DI1+	Dry input 1
	16	DI1-	Dry input 1
	17	DI2+	Dry input 2
	18	DI2-	Dry input 2
	19	CAN_H	For external CAN
		(with a 120 Ω resistor)	communication
	20	CAN_L	

Table 5.1. Ports and terminals on the connection terminal block

- Step 5. Connect and secure the cables to the connection terminal block. Then, assemble the communication cable connector.
 - a. Connect cables to corresponding terminals and RJ45 ports based on your needs.
 - b. Use a screwdriver to secure the cables connected to the terminals.
 - **Note:** If any terminal that has been equipped with a 120 Ω resistor, such as METER-A, needs to be connected by a cable with the length longer than 20 meters, switch the resistor to ON status.
 - c. Insert the connection terminal block back to the connector body until you hear a click sound.
 - d. Insert the seals and nut back to the connector body.
 - e. Rotate the nut clockwise until it is secured to the connector body.



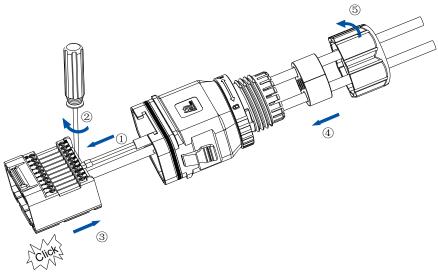


Figure 5.16. Assembling the connector



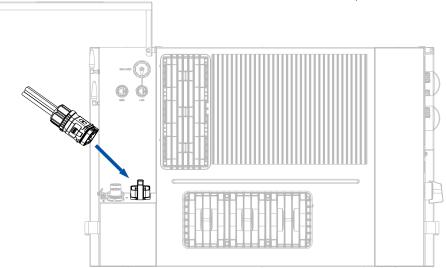


Figure 5.17. Connecting the connector to the inverter



Step 7. Connect the other end of the cables to external devices, such as the meter.

Note: For meter connection, use the communication cable (A) provided in the meter kit package. Connect the RJ45 connector on one end to the RJ45 port of the meter communication cable (B) that you have just connected to MET_A and MET_B on the communication terminal connector. Connect the two crimped cable ends on the other end to ports 24 and 25 on the meter. For detailed meter connection, refer to section 5.6 "System connection diagram".

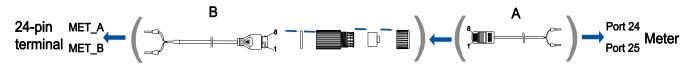


Figure 5.18. Assembling the meter connection

Callout	Description	RJ45 pin definition
Α	Communication cable with an RJ45 connector	• Pin 1: A1
		• Pin 2: B1
		Pins 3 to 8: NC
В	Communication cable kit	Pin 1: For MET-A
		Pin 2: For MET-B
		Pins 3 to 8: NC

Table 5.2. Cables and parts used in the meter connection



5.2.11. Close the AC-side cover

Push the cover downwards. Use a screwdriver to tighten the screw to lock the cover securely.

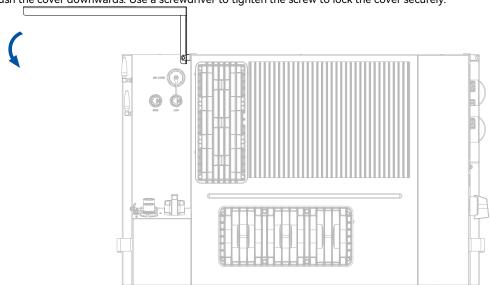


Figure 5.19. Closing the AC-side cover

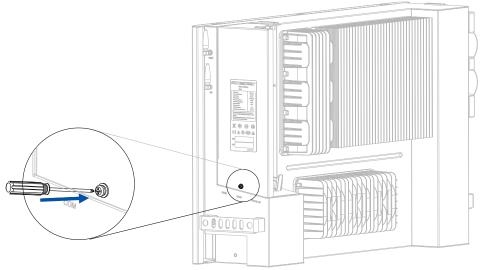


Figure 5.20. Securing the screw



5.3. Assemble the DC-side connection

5.3.1. Open the DC-side cover

Loosen the screw that locks the cover. Then, lift the cover upwards.

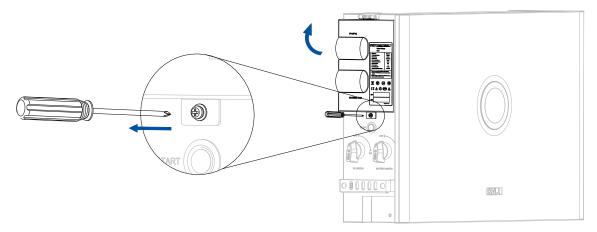


Figure 5.21. Opening the DC-side cover

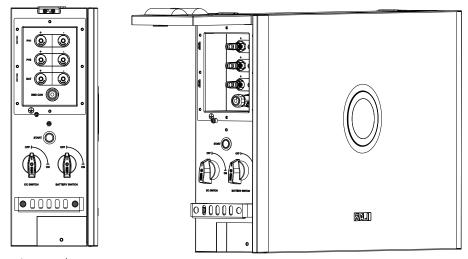


Figure 5.22. After the DC-side cover is opened



5.3.2. Connect the PV cables

About this task

Read the safety instructions first before operations.



- · Dangerous 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. Touching live DC cables results in death or lethal injures.
- · DO NOT touch non-insulated parts or cables.



- · Disconnect the inverter from voltage sources.
- · DO NOT disconnect DC connectors under load.
- · Wear suitable personal protective equipment for all work.
- The inverter cannot be used with functionally earthed PV arrays.

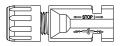
Before you start

- Verify that the PV array is properly insulated to ground before it is connected to the inverter.
- Select cables according to the below specification.

Conductor cross-section	nal area of cables (mm²)	Conductor material
Scope	Recommended value	Outdoor copper wire cable, complying with
5.0 - 6.0	6.0	600 V DC

Table 5.3. Recommended specifications of DC cable

- Verify that one end of the positive cable and one end of the negative cable are properly connected to the positive and negative sides of the solar panels.
- Use the positive and negative PV connectors provided in the accessory bag.



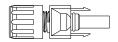


Figure 5.23. Positive and negative PV connectors



 Verify that the DC switch on the inverter is in OFF position to avoid short circuit caused by maloperations.

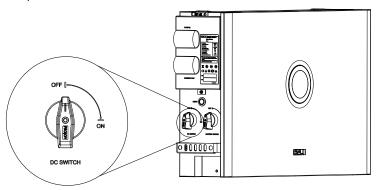


Figure 5.24. DC switch in OFF position

(For Australia) To comply with local regulations and for further safety consideration, use a reliable tool (such as a lock with a key) to lock the switch, so that others cannot unlock it easily.

Procedure

Step 1. Use a 3-mm wide-bladed screwdriver to strip the insulation layer around 8 to 10 mm length from one end of each cable.

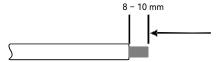


Figure 5.25. Stripping the insulation

Step 2. Insert the cable ends to the sleeves. Use a crimping plier to assembly the cable ends.



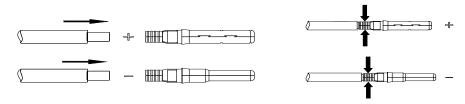


Figure 5.26. Assembling the cable ends

Step 3. Insert the assembled cable ends into the blue positive and negative connectors. Gently pull the cables backwards to ensure firm connection.

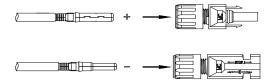


Figure 5.27. Assembling the positive and negative cables

Step 4. Tighten the lock screws on the positive and negative cable connectors.

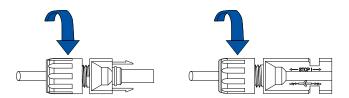
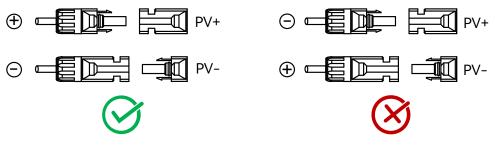


Figure 5.28. Securing the positive and negative cables

Step 5. Insert the positive and negative cable connectors into the positive and negative PV ports on the inverter until you hear a "click" sound to ensure firm connection.





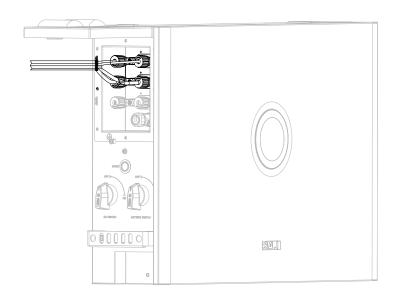


Figure 5.29. Connecting the PV cables

5.3.3. Connecting the battery cables between multiple stacks (optional)

About this task

This task is only applicable to the scenario in which four to eight batteries are connected to one inverter. On top of the first stack, an inverter is installed; while in the top of other stacks, a battery combiner box has been installed on top of the stack. For details, refer to 4.5.4 "Installation of multiple battery stacks (optional)".

Pin definitions of the BMS CAN port are as follows:

	BMS CAN					
1	NC					
2	NC	12345678				
3	NC					
4	CANH					
5	CANL					
6	NC					
7	NC					
8	NC					

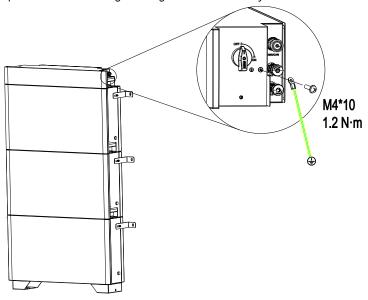


Prerequisite

For the battery stack without an inverter, a battery combiner box (BC3-TV) has been installed on top of the stack.

Procedure

Step 1. Prepare and connect the grounding cable to the battery combiner box.



Step 2. Use the provided positive and negative power cables and the communication cable. Connect the cables from the combiner box to the inverter, as listed below:

Cable	From the combiner box	To the inverter
Positive and negative power cables	BAT+ and BAT- ports	BAT+ and BAT- ports
Communication cable	BMS/CAN port	BMS CAN port

Table 5.4. Cable connection between multiple stacks

Notes:

 The BMS/CAN port on the inverter has been installed with an RJ45 connector plug. In this case, remove this plug and insert it into the BMS/CAN port on the battery combiner box on the left stack.



The provided cables have been assembled with connectors. In some special cases, if you need
to use your own cables, contact SAJ for technical support.

Taking eight batteries connecting to one inverter as an example:

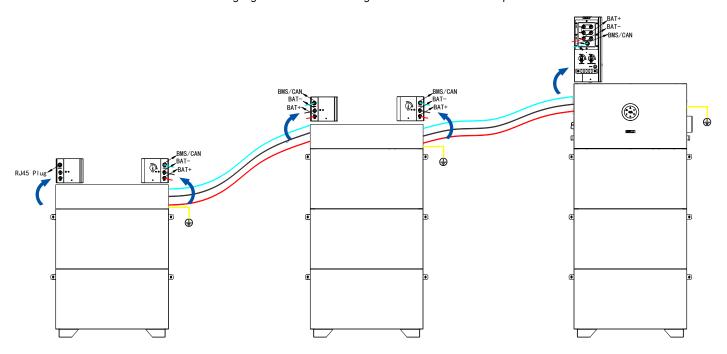


Figure 5.30. Connection of eight batteries in three stacks



5.3.4. Close the DC-side cover

Push the cover downwards. Use a screwdriver to tighten the screw to lock the cover securely.

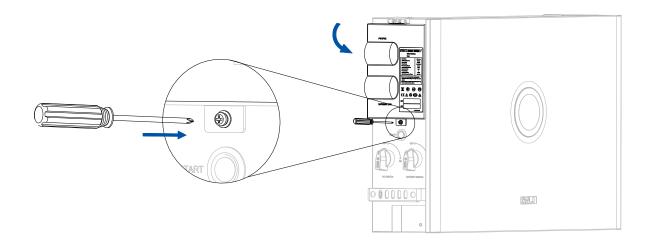


Figure 5.31. Closing the DC-side cover

5.4. 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 <31> can be viewed on the eSAJ Home App.

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



5.5. System connection

For Australia and New Zealand, the system connection is as below:

Notes:

- For safety, the neutral cable of AC and backup side must be connected together.
- DO NOT connect the PE terminal of the BACKUP side.
- The E-BAR and the N-BAR must be short-circuited.

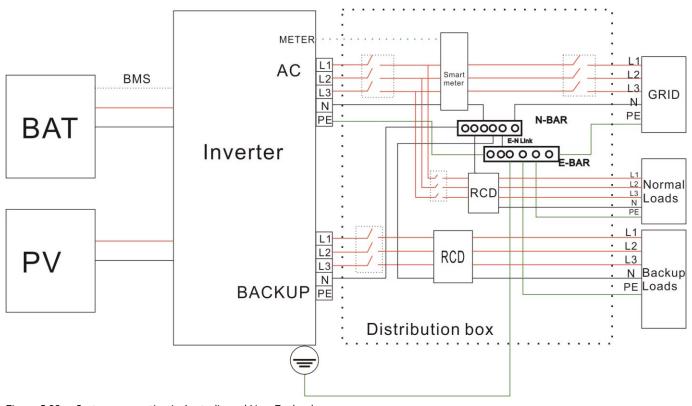


Figure 5.32. System connection in Australia and New Zealand



The system connection for the grid system without special requirements is as below:

Note: The backup PE line and earthing bar must be grounded properly. Otherwise, the backup function may be inactive during blackout.

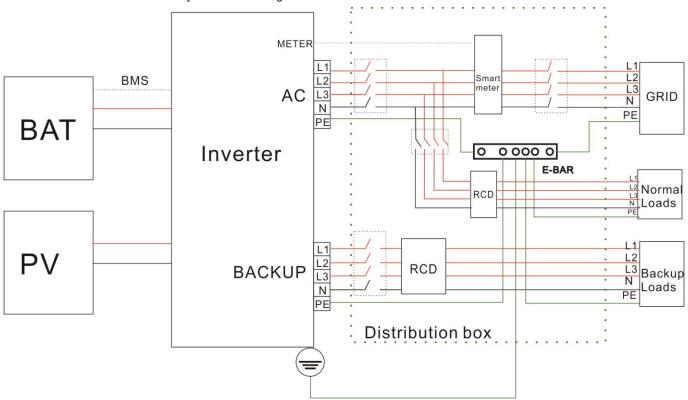


Figure 5.33. System connection in other countries and regions

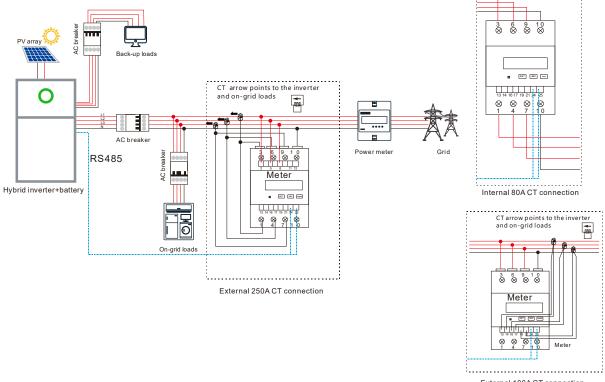


5.6. System connection diagram

If the length of the RS485 cable between the inverter and the meter exceeds 20 meters, connect a 120Ω resistor to ports 24 and 25 on the meter.

One HS3

CT wire	250A meter	100A meter
CT-A	1, 3	13, 14
CT-B	4, 6	16, 17
CT-C	7, 9	19, 21

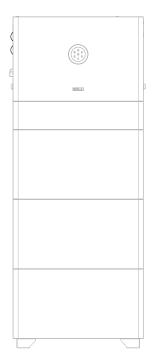


External 100A CT connection



- For other scenarios, refer to Chapter 4 "System Connection: Three-phase hybrid inverter" in the *Configuration Instructions*.
 - Multiple HS3 (parallelling scenario)
 - One HS3 working with a solar inverter (AC coupling scenario)
 - Multiple HS3 working with a solar inverter (AC coupling + parallelling scenario)









STARTUP AND SHUTDOWN



6.1. Startup

- Step 1. (Optional) If there are multiple battery stacks, turn on the battery switch on the right side of the battery combiner box.
- Step 2. On the left side of the inverter, perform as follows:
 - a. Turn on BATTERY SWITCH.
 - Turn on DC SWITCH.
 - c. Press and hold the START button around three seconds until the LED indicator on the front panel is on O.

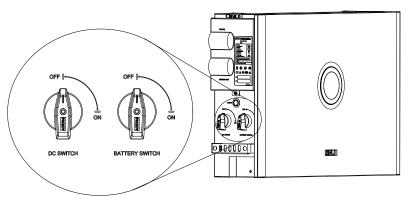


Figure 6.1. Switches on the left side of the inverter

Step 3. Check the LED indicator status on the inverter panel to ensure that the inverter is running properly.

For details, refer to section 2.5 "LED indicators on the HS3 inverter".

6.2. Shutdown

On the left side of the inverter, perform as follows:

- Step 1. Turn off DC SWITCH.
- Step 2. Turn off BATTERY SWITCH.
- Step 3. Press and hold the START button around five seconds. Then, release the button and wait until the LED indicator on the front panel is off.

COMMISSIONING





7.1. About the Elekeeper App

The Elekeeper App can be used for both nearby and remote monitoring.

Depending on the communication module used, it supports Bluetooth/4G or Bluetooth/Wi-Fi to communicate with your energy storage system (ESS).

7.2. Download the App

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

Alternatively, you can scan the below QR code to download the App.





iOS



7.3. Use the App

To perform commissioning operations on the App, refer to the SAJ Configuration Guide.

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

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	Master Lost Communication M<->S
6	Master GFCI Device Error
7	Master DCI Device Error
8	Master 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	Master Voltage 10Min High
16	Master OffGrid Voltage Low
17	Master Output_Shorter
18	Master Grid Frequency High
19	Master Grid Frequency Low
20	BATInputMode Error
21	Master Phase1 DCV Error
22	Master Phase2 DCV Error
23	Master Phase3 DCV Error
24	Master No Grid Error
25	DC ReverseConnect Error
26	Parallel machine CAN Com Error
27	Master GFCI Error
28	Master Phase1 DCI Error
29	Master Phase2 DCI Error
30	Master Phase3 DCI Error



Error code	Error message
31	Master ISO Error
32	Master Bus Voltage Balance Error
33	Master Bus Voltage High
34	Master Bus Voltage Low
35	Master Grid Phase Error
36	Master PV Voltage High Error
37	Master Islanding Error
38	Master HW Bus Voltage High
39	Master HW PV Current High
40	Master SelfTestFailed
41	Master HW Inv Current High
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 DSP and PowerMeter
50	Lost Communication between M<->S
51	Lost Communication between inverter and Grid Meter
52	HMI EEPROM Error
53	HMI RTC Error
55	BMS Lost.Conn Warn
57	AFCI Lost Com.Err
59	Lost Communication between inverter and PV Meter
60	EV_Lost.Conn Warn
69	DCDC_Lost.Conn Warn
70	DCDC_ Device Error
81	Lost Communication D<->C
83	Master Arc Device Error
84	Master PVInput Error
85	Authority expires



Error code	Error message
86	DRM0 Error
87	Master Arc Error
88	Master SW PV Current High
89	Master Battery Voltage High
90	Master Battery Current High
91	Master Battery Charge Voltage High
92	Master Battery OverLoad
93	Master Battery SoftConnet TimeOut
94	Master Output OverLoad
95	Master Battery Open Circuit Error
96	Master Battery Discharge Voltage Low
97	BMS Internal Communication Error
98	Bat Sequence Error
99	Discharge Over Current Protect
100	Charge Over Current Protect
101	Module Under Voltage Protect
102	Module Over Voltage Protect
103	Single Cell Under Voltage Protect
104	Single Cell Over Voltage Protect
105	BMS Hardware Error
106	Charge Cell Under Temperature Protect
107	Charge Cell Over Temperature Protect
108	Discharge Cell Under Temperature Protect
109	Discharge Cell Over Temperature Protect
110	Relay Error
111	Pre-charge Error
112	Insulation Error
113	BMS supplier Incompatibility
114	Battery cell supplier Incompatibility
115	Battery cell Incompatibility
116	Battery pack models or grades are inconsistent



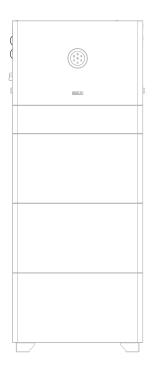
Error code	Error message
117	Circuit Breaker Is Open
118	Temperature Difference Is Too Wide
119	Voltage Difference Is Too Wide
120	Voltage Difference Is Too Wide
121	BMS Over Temperature Protect
122	Short Circuit Protect
123	Total voltage match failed
124	The system is locked
125	FUSE error protection
126	Voltage on charging port is high protection
127	Heating film overtemperature protection
128	Abnormal temperature increases
225	Battery Software Overvoltage Fault
226	Battery Software Undervoltage Fault
227	Battery Discharge Software Overcurrent Fault
228	Battery Charge Software Overcurrent Fault
229	Battery Discharge Overpower Fault
230	Battery Charge Overpower Fault
233	Battery Hardware Overvoltage Fault
234	Battery Hardware Overcurrent Fault
237	Battery Voltage Exceeds BMS Upper Limit Fault
238	Battery Voltage Exceeds BMS Lower Limit Fault
239	Battery Side Precharge Fault
241	Bus Voltage Overvoltage Fault
242	Bus Voltage Undervoltage Fault
243	Bus Discharge Overcurrent Fault
244	Bus Charge Overcurrent Fault
245	Bus Discharge Overpower Fault
246	Bus Charge Overpower Fault
247	Bus Hardware Overvoltage Fault
248	Bus Hardware Overcurrent Fault



Error code	Error message
250	Auxiliary Power Source Fault
251	Hardware Protection Signal Fault
252	Bus Voltage Differential Fault
253	BMS Protection Signal Fault
254	Software Resonant Chamber Overcurrent Fault
255	Soft Start Abnormal Fault
257	Heatsink High Temperature Fault
258	Heatsink Low Temperature Fault
259	PCB High Temperature Fault
260	PCB Low Temperature Fault
261	Fan Fault
262	Heating Film Fault
274	Inverter CAN communication failure
275	Battery pack internal CAN communication fault
276	Memory fault
278	Button failure fault
289	Relay over temperature
290	Over load
291	AC over voltage
292	AC under voltage
293	AC over current
294	AC over frequency
295	AC under frequency
296	DC residual current exception A
297	Emergency Stop
298	Under temperature
299	AC residual current
300	Input terminal over temperature
301	Bluetooth fault
302	DC residual current exception B
303	Relay exceptior



Error code	Error message
304	Grounding error
305	Phase twisted
306	RCD circuit exception
307	RS485 Com time out
308	Electricity exception
311	Meter fault
312	cp exception,cp lower than 2V
318	Connector lock exception
319	Connector current exception
320	DC residual current exception C







APPENDIX





9.1. Recycling and disposal

This device should not be disposed as a residential waste.

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

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/

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

Fax: 020-66608589

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Fax: 020-66608589

9.4. Trademark

SAJ is the trademark of Sanjing.





