



Installation Manual

Energy Storage System (ESS)

SMILE-S6

SMILE-S5

SMILE-S3.6

SMILE-B5 series

V01

IMPRINT

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Copyright Statement

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Version Information

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V01	25.12.2021	New

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1. Information on this Document

1.1 Content and Structure of this Document

This document is valid for product of SMILE-S6, SMILE-S5, SMILE-S3.6, SMILE-B5 series which has integrated hybrid inverter with 1~6 battery packs -- SMILE-BAT-5P. This document describes the installation, commissioning, configuration, operation, troubleshooting and decommissioning of the product. The SMILE-S5 will be used in this manual as the example.

Comply with the provisions of all documents shipped with the product, and keep them properly to ensure that they are available at any time.

The illustrations in this document are abbreviated versions, which may deviate from the actual product

1.2 Target Group

This document is intended for qualified persons and end users. Only qualified persons are allowed to perform the operations marked with a warning symbol in this document. Tasks that do not require any specific qualifications will not be marked and can be performed by the end user. Qualified persons must have

- knowledge of working principle of inverters
- knowledge of how to deal with the dangers and risks associated with installing and using electrical devices, batteries and systems.
- knowledge of the installation and commissioning of electrical devices and systems.
- knowledge of the applicable standards and directives.
- understood and complied with this document, including all safety precautions.
- understood and complied with the documents of the battery manufacturer, including all safety precautions.

1.3 Levels of Warning Messages

The following levels of warning messages may occur when handling the product.

 **DANGER**

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

 **WARNING**

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

**CAUTION**

CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

NOTICE indicates a situation which, if not avoided, can result in property damage.



INFORMATION provides tips which are valuable for the optimal installation and operation of the product.

1.4 Nomenclature

Complete designation	Designation in this document
SMILE-S6	6kW Hybrid system with 5.04kWh battery
SMILE-S6 II	6kW Hybrid system with 10.08kWh battery
SMILE-S6 III	6kW Hybrid system with 15.12kWh battery
SMILE-S6 IV	6kW Hybrid system with 20.16kWh battery
SMILE-S6 V	6kW Hybrid system with 25.20kWh battery
SMILE-S6 VI	6kW Hybrid system with 30.24kWh battery
SMILE-S5	5kW Hybrid system with 5.04kWh battery
SMILE-S5 II	5kW Hybrid system with 10.08kWh battery
SMILE-S5 III	5kW Hybrid system with 15.12kWh battery
SMILE-S5 IV	5kW Hybrid system with 20.16kWh battery
SMILE-S5 V	5kW Hybrid system with 25.20kWh battery
SMILE-S5 VI	5kW Hybrid system with 30.24kWh battery
SMILE-S3.6	3.6kW Hybrid system with 5.04kWh battery
SMILE-S3.6 II	3.6kW Hybrid system with 10.08kWh battery
SMILE-S3.6 III	3.6kW Hybrid system with 15.12kWh battery
SMILE-S3.6 IV	3.6kW Hybrid system with 20.16kWh battery
SMILE-S3.6 V	3.6kW Hybrid system with 25.20kWh battery
SMILE-S3.6 VI	3.6kW Hybrid system with 30.24kWh battery
SMILE-B5	5kW AC coupled system with 5.04kWh battery
SMILE-B5 II	5kW AC coupled system with 10.08kWh battery
SMILE-B5 III	5kW AC coupled system with 15.12kWh battery
SMILE-B5 IV	5kW AC coupled system with 20.16kWh battery
SMILE-B5 V	5kW AC coupled system with 25.20kWh battery
SMILE-B5 VI	6kW Hybrid system with 30.24kWh battery

In this manual, the SMILE-S5 will represent all the model number of the energy storage system because they share the same topologic.

2. Safety

2.1 Intended Use

The SMILE-S5, expandable battery packs (SMILE-BAT-5P) and the energy meters make up a system for optimization of self-consumption for a household.

The inverter can achieve bidirectional transfer between AC current and DC current. The battery pack is used for the energy storage.

The product is suitable for indoor and outdoor installation.

The product should not be installed in multiple phase combinations.

The product is to be installed in a high traffic area where the fault is likely to be seen.

All components must operate in a scenario suitable for their operation.

Be sure to use this product in accordance with the information provided in the accompanying documents and local applicable standards and directives. Any other operation may cause personal injury or property damage.

Alterations to the product, e.g. changes or modifications, are only permitted with the express written permission of AlphaESS. Unauthorized alterations will void guarantee and warranty claims. AlphaESS shall not be held liable for any damage caused by such changes.

Any use of the product other than that described in the Intended Use section does not qualify as appropriate.

The enclosed documentation is an integral part of this product. Keep the documentation in a convenient place for future reference and comply with all instructions contained therein.

The type label must remain permanently attached to the product.

2.2 Safety Precaution for Battery Pack

2.2.1 General Safety Precautions

Overvoltage or wrong wiring can damage the battery pack and cause deflagration, which can be extremely dangerous.

All types of breakdown of the battery may lead to a leakage of electrolyte or flammable gas.

Battery pack is not user-serviceable. There is high voltage in the device.

Read the label with Warning Symbols and Precautions, which is on the right side of the battery pack.

Do not connect any AC conductors or PV conductors directly to the Battery Pack which should be only connected to the Inverter.

Do not charge or discharge damaged battery.

Do not damage the battery pack in such ways as dropping, deforming, impacting, cutting or penetrating with a sharp object. It may cause a leakage of electrolyte or fire.

Do not expose battery to open flame.

2.2.2 Response to Emergency Situations

The battery pack is composed of multiple batteries and designed to prevent the danger caused by malfunction.

- If the user touches the inner material of the battery cells due to damage to the shell, the following actions are recommended.
Inhalation: Leave the contaminated area immediately and seek medical attention.
Eye injuries: Rinse eyes with running water for 15 minutes and seek medical attention.
Skin injuries: Wash the contacted area with soap thoroughly and seek medical attention.
Ingestion: Induce vomiting and seek medical attention.

If a fire breaks out in the place where the battery pack is installed, perform the following countermeasures:

- Fire extinguishing media
Respirator is not required during normal operations.
Use FM-200 or CO² extinguisher for battery fire.
Use an ABC fire extinguisher, if the fire is not from battery and not spread to it yet.
- Firefighting instructions
 1. If fire occurs when charging batteries, if it is safe to do so, disconnect the battery pack circuit breaker to shut off the power to charge.
 2. If the battery pack is not on fire yet, extinguish the fire before the battery pack catches fire.
 3. If the battery pack is on fire, do not try to extinguish but evacuate people immediately.

WARNING

There may be a possible explosion when batteries are heated above 150°C. When the battery pack is burning, it leaks poisonous gases. Do not approach.

- Effective ways to deal with accidents
On land: Place damaged battery into a segregated place and call local fire department or service engineer.
In water: Stay out of the water and don't touch anything if any part of the battery, inverter, or wiring is submerged.

Do not use submerged battery again and contact the service engineer.

2.3 Important Safety Instructions

This section contains safety precautions that must be observed at all times when working on or with the product.

To prevent personal injury and property damage and to ensure long-term operation of the product, please read this section carefully and follow all safety precautions at all times.

 **DANGER****Danger to life due to electric shock when live components or cables are touched**

High voltages are present in the conductive components or cables of the product. Touching live parts and cables results in death or lethal injuries due to electric shock.

- Do not touch non-insulated parts or cables.
- Disconnect the product from voltage sources and make sure it cannot be reconnected before working on the inverter or the battery pack.
- After disconnection, wait for 5 minutes until the capacitors have discharged.
- Do not open the product.
- Wear suitable personal protective equipment for all operations on the product.

 **DANGER****Danger to life due to electric shock when touching live system components in case of a ground fault**

If a ground fault occurs, parts of the system may still be live. Touching live parts and cables results in death or lethal injuries due to electric shock.

- Disconnect the product from voltage sources and make sure it cannot be reconnected before working on the device.

 **DANGER****Danger to life due to high voltages on the battery pack**

Lethal voltage is present at the pin connector for the power cable. Reaching into the pin connector for the power cable can result in lethal electric shock.

- Do not open the battery pack.
- Do not wipe over the battery pack with a damp cloth.
- Leave the protective caps on the pin connectors for the batteries power connection until the inverter cables are connected to the battery pack.
- Disconnect the product from voltage sources and make sure it cannot be reconnected before working on the inverter or the battery pack.

 **WARNING**

Risk of chemical burns from electrolyte or toxic gases

During normal operation, no electrolyte would leak from the battery pack and no toxic gases would form. Despite careful construction, if the battery pack is damaged or a fault occurs, it is possible that electrolyte may be leaked or toxic gases may form.

- Store the battery pack in a cool and dry place.
- Do not drop the battery pack or damage it with sharp objects.
- Only set the battery pack down on its back or its bottom.
- Do not open the battery pack.
- Do not install or operate the battery pack in potentially explosive atmosphere or areas of high humidity.
- If moisture has penetrated the battery pack (e.g. due to a damaged housing), do not install or operate the battery pack.
- In case of contact with electrolyte, rinse the affected areas immediately with water and consult a doctor without delay.

 **CAUTION**

Risk of burns due to hot heatsink and housing

The heatsink and housing can get hot during operation.

- During operation, do not touch any parts other than the cover of the inverter.

NOTICE

Damage to the inverter due to electrostatic discharge

- Touching electronic components can cause damage to or destroy the inverter through electrostatic discharge.
- Ground yourself before touching any component.

NOTICE










Damage due to cleaning agents

The use of cleaning agents may cause damage to the product and its components.












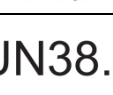
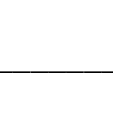
- Clean the product and all its components only with a cloth moistened with clear water.

2.4 Symbols on the Label

Symbols on the type label of the inverter

Symbol	Explanation
	Beware of a danger zone This symbol indicates that the product must be additionally grounded if additional grounding or equipotential bonding is required at the installation site.
	Beware of electrical voltage The product operates at high voltages.
	Beware of hot surface The product can get hot during operation.
	Danger to life due to high voltages in the inverter, observe a waiting time of 5 minutes. High voltages that can cause lethal electric shocks are present in the live components of the inverter. Prior to performing any work on the inverter, disconnect it from all voltage sources as described in this document.
	WEEE designation Do not dispose of the product together with the household waste but in accordance with the disposal regulations for electronic waste applicable at the installation site.
	Observe the documentation
	Certified safety The product is TÜV-tested and complies with the requirements of the EU Equipment and Product Safety Act.
	CE marking The product complies with the requirements of the applicable EU directives.
	RCM (Regulatory Compliance Mark) The product complies with the requirements of the applicable Australian standards.

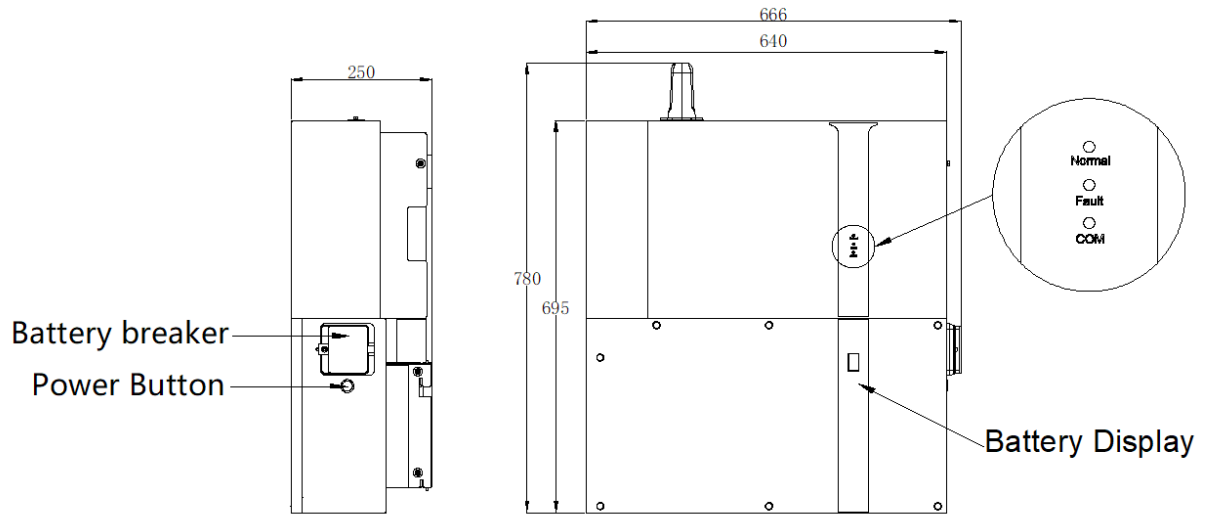
Symbols on the type label and warning label of the battery pack

Symbol	Explanation
	Beware of a danger zone This symbol indicates that the product must be additionally grounded if additional grounding or equipotential bonding is required at the installation site.
	Beware of electrical voltage The product operates at high voltages.
	Risk of chemical burns
	Risk of explosion
	Observe the documentation
	Risk of electrolyte leakage
	CE marking The product complies with the requirements of the applicable EU directives.
	Refer to the instruction for operation
	Use eye protection
	Fire, naked light and smoking prohibited
	No nearing
	Do not dispose of the battery pack together with the household waste but in accordance with the locally applicable disposal regulations for batteries
	Recycling code
UN38.3	Marking for transport of dangerous goods The product passes the certifications of the UN38.3









3. Product Introduction and Application Scenarios

3.1 Product Description

Appearance and Dimensions (mm)



Inverter LED Signals

LED	Status	Description
Normal		On: system is in working mode normally
		Flicker: system is in standby mode or self-checking process
		Off: system is in fault mode or off
Fault		Off: system is in working mode normally or off
		On: system is in fault mode
COM		On: network connection is normal
		Flicker: connecting to the server
		Off: system is not connected network

Battery LED Signals








Different colors represent different states:

green for SOC state

yellow for protection state

red for error state.

The LED indicators provide information about the SOC operational status of the battery pack.

	SOC Status	Description
SOC Instruction		SOC<5%
		5%=<SOC<25%
		25%=<SOC<50%
		50%=<SOC<75%
		75%=<SOC<95%
		SOC>95%
LED Outer Ring Light Flicker Status		Standby: green light flicker every 1s Work: green light flicker every 10s

3.2 Application Scenarios

SMILE-S5 is an AC-coupled all-in-one battery energy storage system (BESS). It can help to achieve the optimal usage of renewable energy. SMILE-S5 can control the bi-directional flow of electric power, work under auto/manual & time-of-use (TOU) modes, charge/discharge the battery as per customer's setting. Under the auto mode, SMILE-S5 stores surplus renewable energy onto the battery and discharge battery to supply power to local loads when renewable energy is not enough.

The standard schematic is as below:

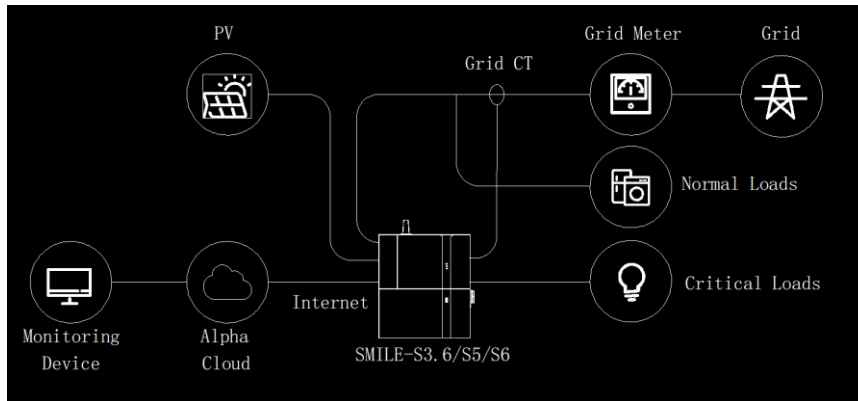


Figure 3.1 DC-coupled Storage System - Scheme

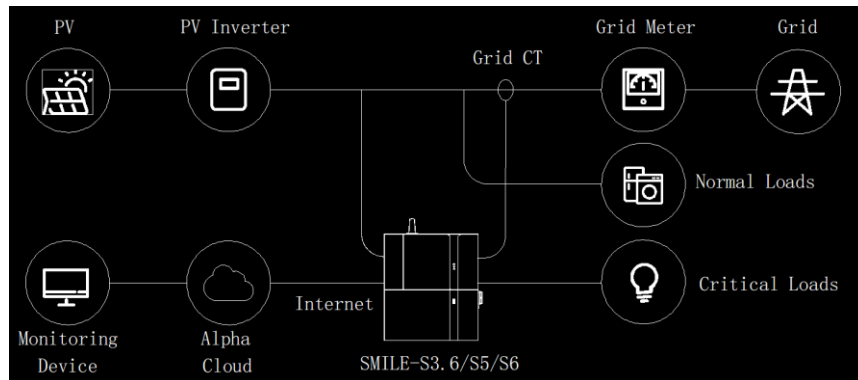


Figure 3.2 AC-coupled Storage System - Scheme

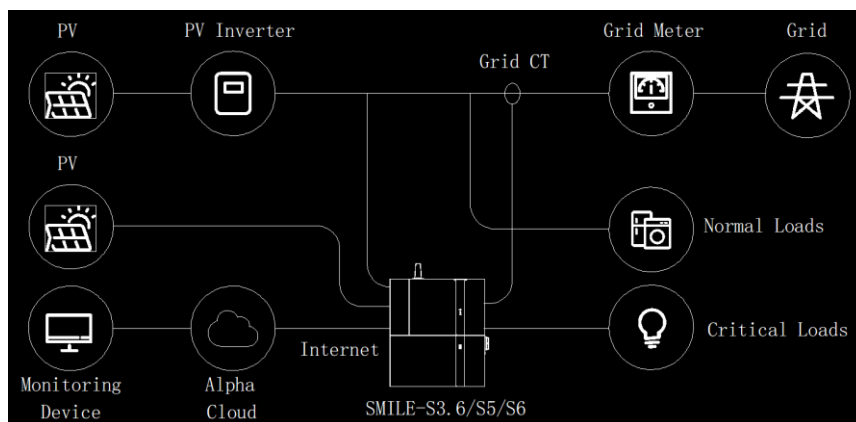


Figure 3.3 Hybrid-coupled Storage System - Scheme

4. Storage

4.1 Product Storage

The following requirements should be met if the product is not put into use directly:

1. Do not unpack the product.
2. The product should be stored in a clean and dry place and be protected from dust and water vapor corrosion.
3. Place product according to the signs on the packing case during storage
A maximum of 2 layers can be stacked. To avoid personal injury or device damage, stack products with caution to prevent them from falling over.
4. Store the product out of reach of children and animals.
5. Handle product with caution to avoid damage.
6. The storage environment requirements are as follows:
 - Ambient temperature: $-10\sim 55^{\circ}\text{C}$, recommended storage temperature: $15\sim 30^{\circ}\text{C}$
 - Relative humidity: 15%~ 85%
 - Place products in a place that is away from corrosive organic solvents and gases.
 - Keep products away from direct sunlight.
 - Keep products at least 2 meters away from heat sources.
8. The product in storage must be disconnected from external devices. The indicators (if any) on the products should be off.
9. Products should be delivered based on the "first in, first out" rule.
10. The warehouse keeper should collect battery storage information every month and periodically report the battery inventory information to the planning department. The batteries that have been stored for nearly 6 months should be recharged timely.
11. If a lithium battery is stored for a long time, capacity loss may occur. After a lithium battery is stored for 12 months in the recommended storage temperature, the irreversible capacity loss rate is 3%~10%. It is recommended that batteries not be stored for a long period. If the batteries need to be stored for more than 6 months, it is recommended to recharge the batteries to 65~75% of the SOC. For example, they should be recharged every 6 months at least, and must be recharged to at least 50% of the SOC.

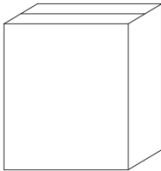
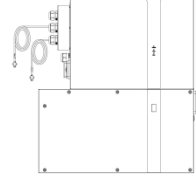
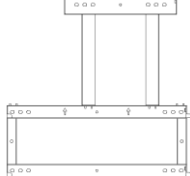

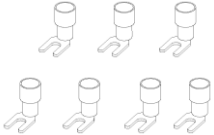
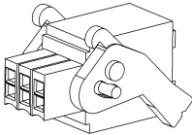
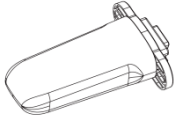
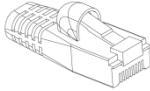
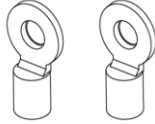

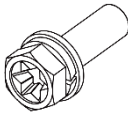
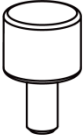

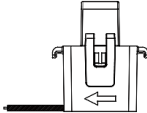

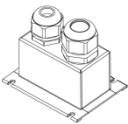

5. Unpacking

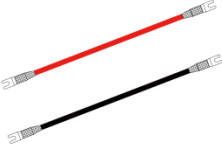




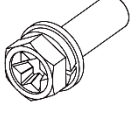
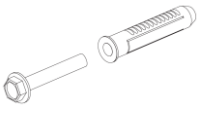


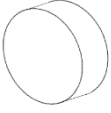
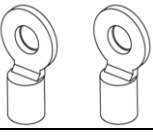
5.1 Checking the Outer Packing

Before unpacking the SMILE-S5, check the outer packing for damage, such as holes and cracks. If any damage is found, do not unpack the product and contact your dealer as soon as possible.

5.2 Scope of Delivery

Check the scope of delivery for completeness and any externally visible damage. Contact your distributor if the scope of delivery is incomplete or damaged.

SMILE-S5				
				
Carton (X1)	SMILE-S5 (X1)	Wall Bracket (X1)	Wall Anchor ST6*55 (X8)	Cord End Terminal (X7)
				
6 Pin Terminal Block (X1)	WiFi Module (X1)	Terminal Resistor (X1)	Ring Terminal Lug (X2)	T20 Screwdriver (X1)
				
Screw M5*10 (X2) Screw M6*16 (X6) Screw M4*12 (X10)	Screw M4 (X1)	Holder for Cable Box Cover (X2)	Grid CT (X1)	Cable Box Cover (X1)
				
AC Connection Cover (X1)	Installation Manual (X1)			

SMILE-BAT-5P				
				
Positive Power Cable (X1) Negative Power Cable (X1)	Communication Cable (X1)	Side Cover (X1)	Battery Wall Bracket (X1)	Expansion Bracket (X2)
				
Screw M6*16 (X4) Screw M5*12 (X1)	Wall Anchor ST6*55 (X6)	M4 Flange (X15)	User Manual (X1)	Silicone Plug (X8)
				
Ring Terminal Lug (X2)				

6. Mounting

6.1 Requirements for Mounting



WARNING

Danger to life due to fire or explosion

Despite careful construction, electrical devices can cause fires.

- Do not mount the product in areas containing highly flammable materials or gases.
- Do not mount the product in potentially explosive atmospheres.

Basic Requirements

- SMILE-S5 and SMILE-BAT-5P are suitable for indoor and outdoor use.
- Do not install the product in a place where a person can easily touch it because its housing and heatsink are hot during operation.
- Do not mount the product in areas with flammable or explosive materials.
- Do not mount the product at a place within children's reach.
- Do not mount the product outdoors in salt areas because it will be corroded there and may cause fire. A salt area refers to the region within 500m from the coast or prone to sea breeze. The regions prone to sea breeze vary depending on weather conditions (such as typhoons and monsoons) or terrains (such as dams and hills).

Mounting Environment Requirements

- The product must be mounted in a well-ventilated environment to ensure good heat dissipation.
- When mounted under direct sunlight, the power of the product may be derated due to additional temperature rise.
- Mount the product in a sheltered place or mount an awning over the product.
- The optimal temperature range for the battery pack to operate is from 15 to 30 °C.
- Do not expose or place near water sources like downspouts or sprinklers.
- If the battery pack is mounted in the garage, then ensure that it is above the height of the vehicle bumper and/ or door.

Mounting Structure Requirements

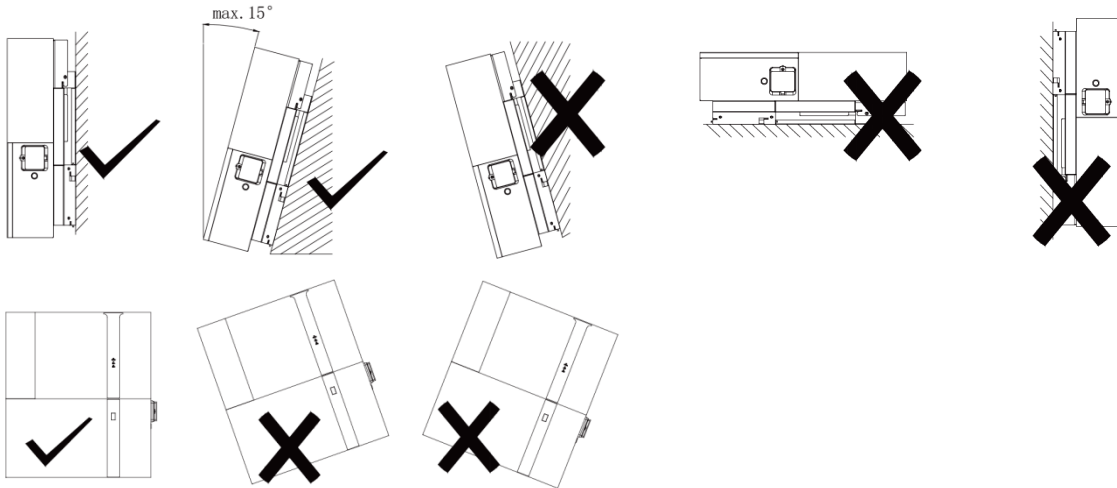
- The mounting structure where the product is mounted must be fireproof.
- Do not mount the product on flammable building materials.
- Ensure that the mounting surface is solid enough to bear the weight load.
- In residential areas, do not mount the product on drywalls or walls made of similar materials which have a weak sound insulation performance because the noise generated by the product is noticeable.

Mounting Angle and Stack Requirement

SMILE-S5 and SMILE-BAT-5P should be mounted on the wall.

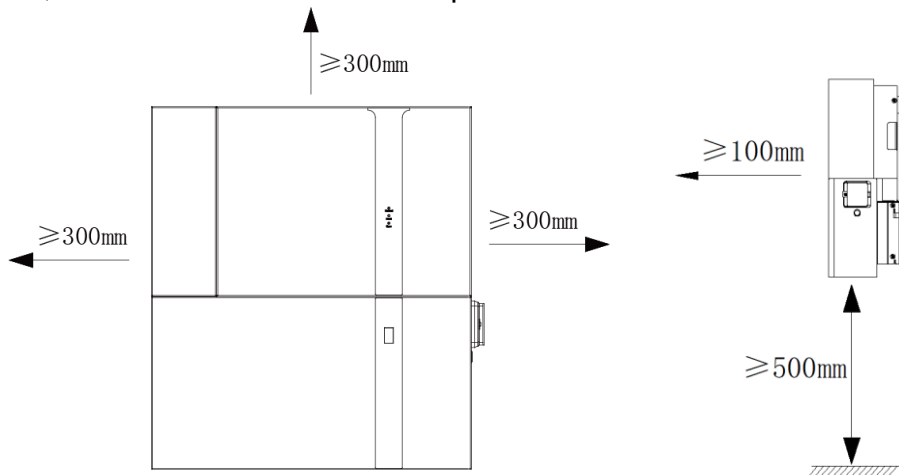
The installation angle requirement is as follow:

- Do not mount the product at forward tilted, side tilted, horizontal, or upside down positions.

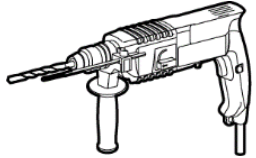


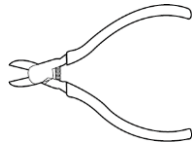
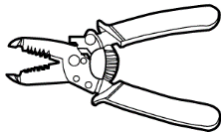
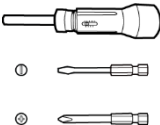

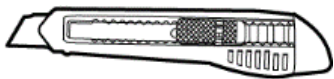

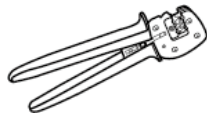






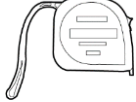






Mounting Space Requirements

- Reserve sufficient clearance around the product to ensure sufficient space for installation, maintenance and heat dissipation.



6.2 Preparing Tools and Instruments

Category	Tools and Instruments		
Installation	 Hammer drill (with a $\Phi 10$ mm drill bit)	 Torque socket wrench SW10	 Multimeter (DC voltage measurement range ≥ 1000 V DC)
	 Diagonal pliers	 Wire stripper	 Torque screwdriver (slotted head, torque range: 0~2 Nm)
	 Rubber mallet	 Utility knife	 Cable cutter
	 Crimping tool (model: PV-CZM-22100)	 Cord end terminal crimper	 Disassembly and Assembly Tool (model: PV-MS-HZ open-end wrench)
	 Vacuum cleaner	 Heat shrink tubing	 Heat gun
	 Marker	 Measuring tape	 Bubble or digital level
	Personal protective equipment	 Safety gloves	 Safety goggles
 Safety shoes		N/A	N/A

6.3 Mounting Inverter and Expansion Battery Pack



WARNING

Risk of injury due to weight of product

Injuries may be caused if the product is lifted incorrectly or dropped while being transported or mounted.

- Transport and lift the product carefully. Take the weight of the product into account.
- Wear suitable personal protective equipment for all work on the product.



CAUTION

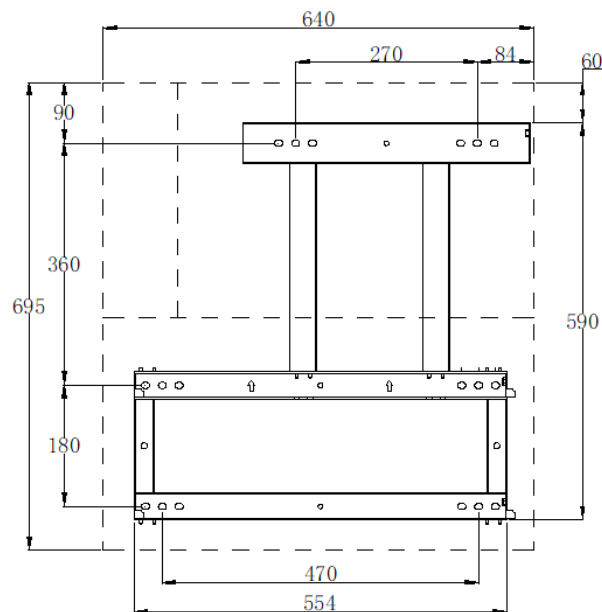
Risk of injury due to damaged cables

There may be power cables or other supply lines (e.g., gas or water) routed in the wall.

- Ensure that no lines are laid in the wall which could be damaged when drilling holes.

6.3.1 Mounting the SMILE-S5

Dimensions of wall bracket (mm)

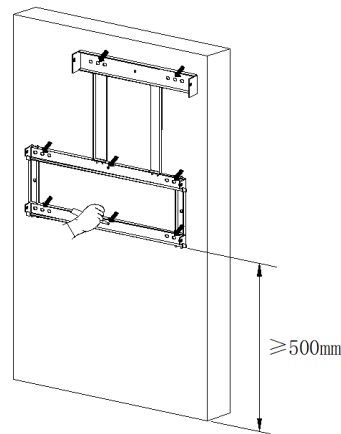


The steps to mount the SMILE-S5 are listed below:

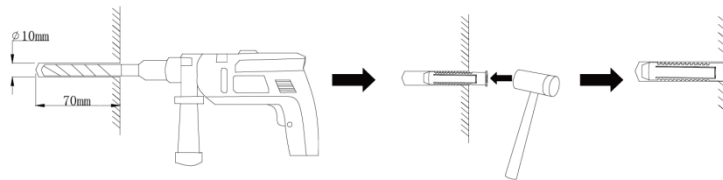
1. Remove the wall bracket from SMILE-S5, place it on the wall where the system will be installed, and use a marker to locate the bracket.

NOTE:

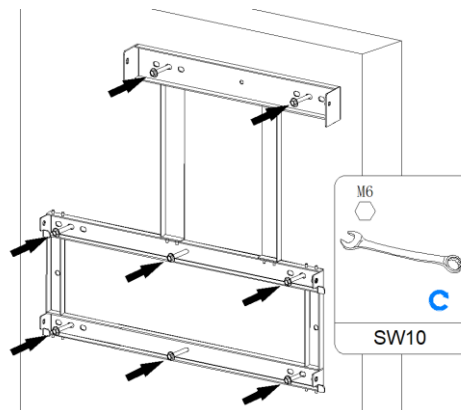
Considering the battery expansion, the bottom of the wall bracket should be at least 500 mm above the ground.



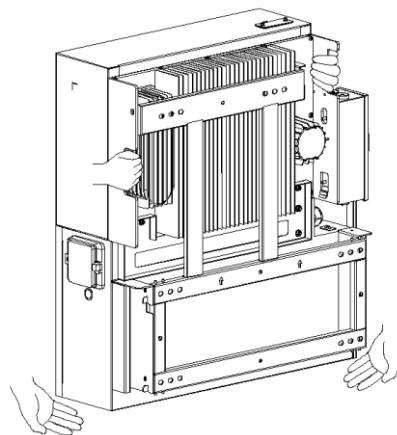
2. Drill 8 holes on the wall with $\Phi 10\text{mm}$ drill and insert 8 screw anchors into the drill holes.



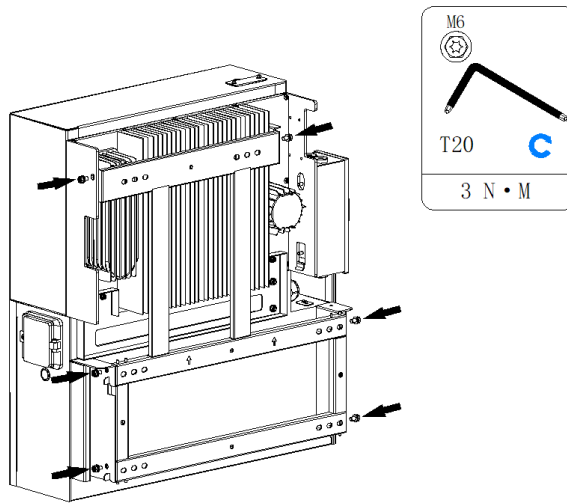
3. Attach the wall bracket to the wall and tighten the screws with the tool of SW10 hexagon sleeve.



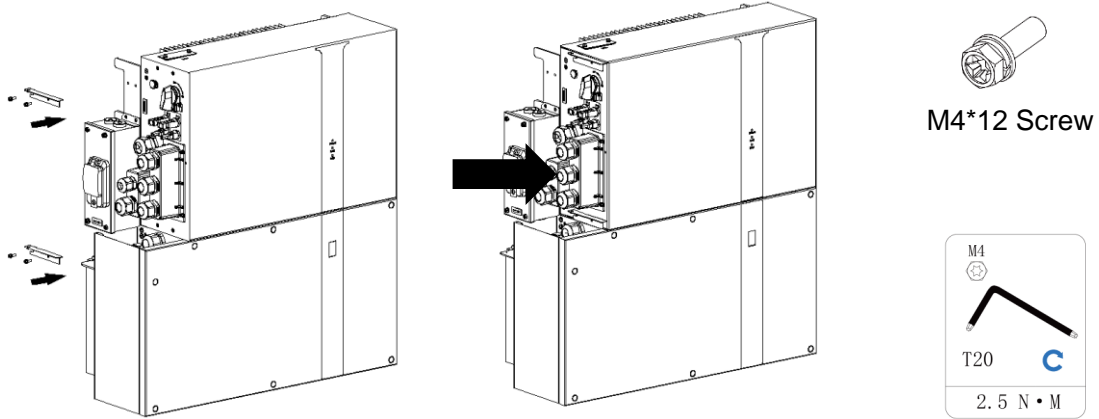
4. Hold the handles on both sides of the inverter and install SMILE-S5 on the wall bracket. This step should take two people to complete.



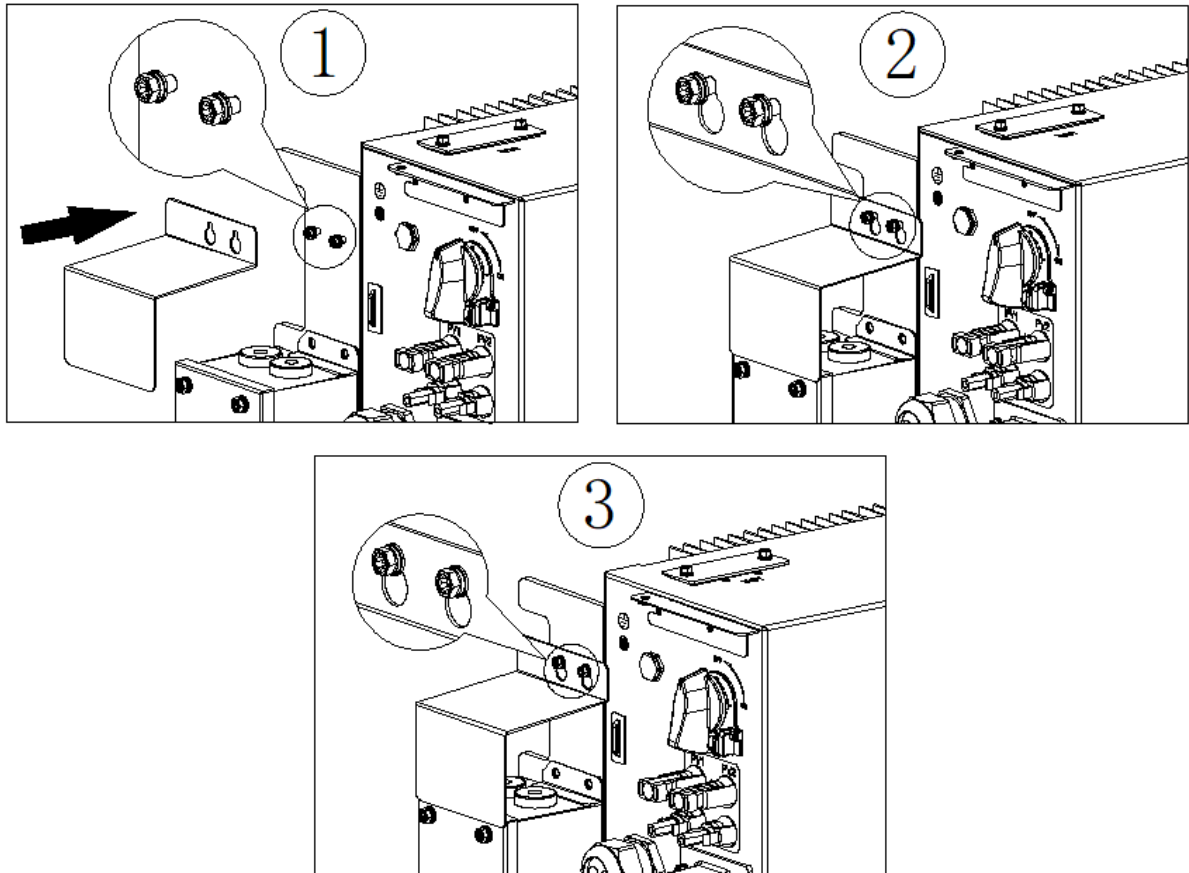
5. Tighten the wall bracket and SMILE-S5 with screw M6*16 (X6) (tool: T20 screwdriver, torque: 3.0 Nm).



6. Install the holders for cable box cover (tool: T20 screwdriver, torque: 2.5 Nm)



7. 安装挡水罩，第一步将 M4*12 螺丝手拧在如图位置，注意不要全部拧进去；第二步将挡水罩卡在螺钉上；第三步锁紧螺钉。



8. Perform electrical connection work (please refer to Section [错误!未找到引用源。](#) Electrical Connection).

6.3.2 Mounting the Expansion Battery Pack

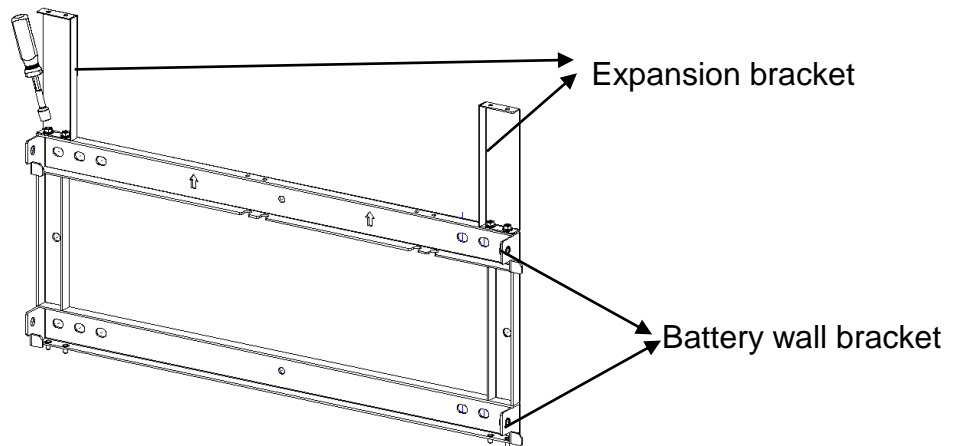
You can install up to 5 extra batteries in a system.

The steps for expanding the battery is as below. Expansion wiring refer to Chapter 7.7.

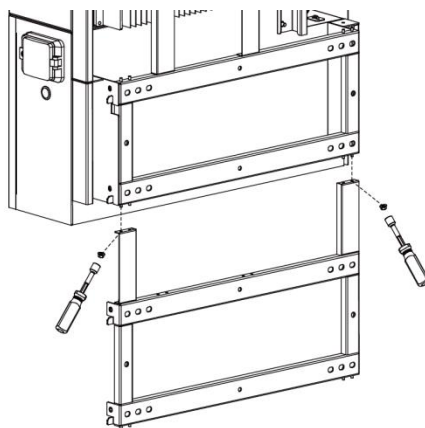
NOTE:

If there are no expansion batteries to install, please ignore Chapter 6.3.2 and skip to 6.3.3.

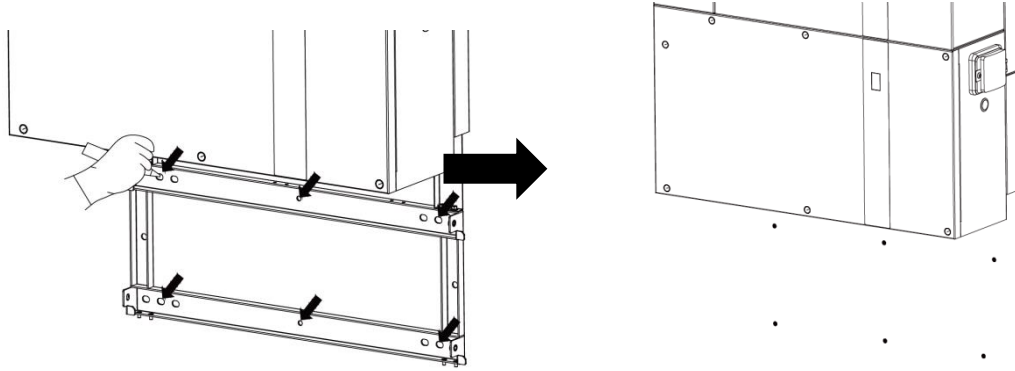
1. Take out the expansion brackets and the battery wall bracket, then fix them together with four M4 flange nuts (tools: SW7 sleeve or other tools for M4 flange, torque: 1.6 Nm).



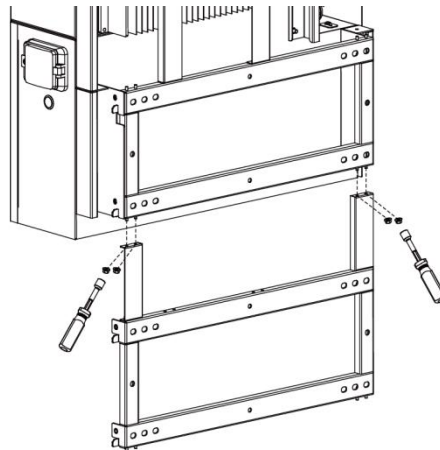
2. Use two M4 flange nuts to fix the wall bracket assembled in the step 1 to the wall bracket of SMILE-S5 (tools: SW7 sleeve or other tools for M4 flange, torque: 1.6 Nm).



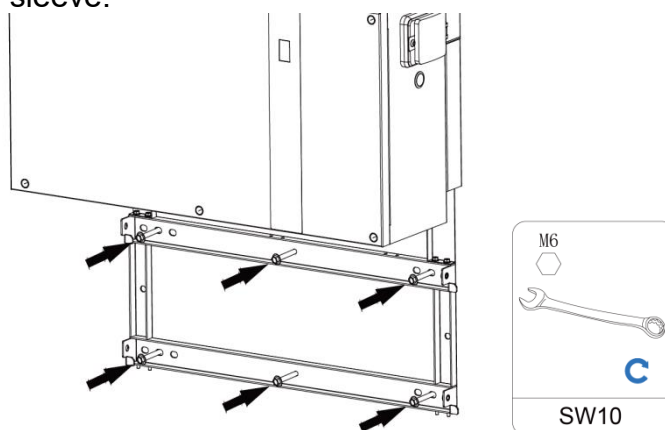
3. Mark the points according to holes on the bracket and remove the assembled wall bracket.



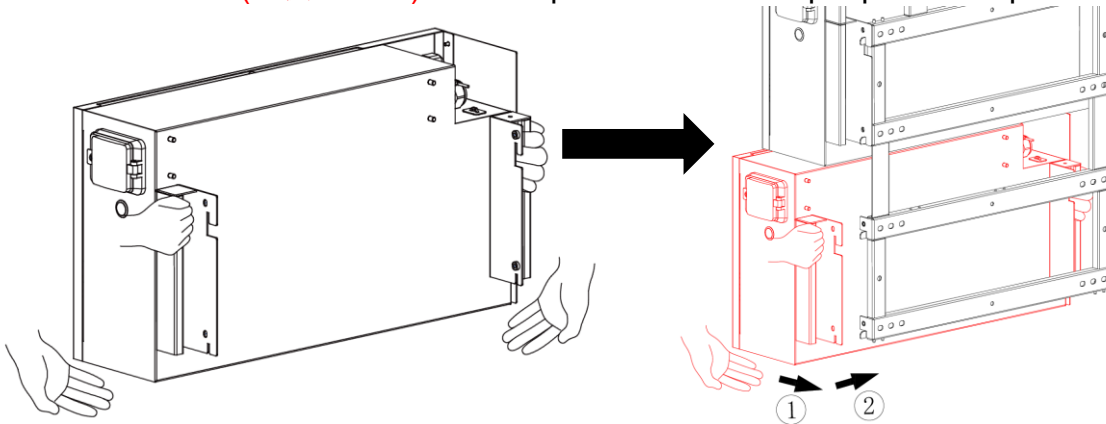
4. Drill 6 holes on the wall with $\Phi 10\text{mm}$ drill and insert 6 screw anchors into the drill holes.
5. Use four M4 flange nuts to fix the wall bracket assembled in the step 1 to the wall bracket of SMILE-S5 again (tools: SW7 sleeve or other tools for M4 flange, torque: 1.6 Nm).



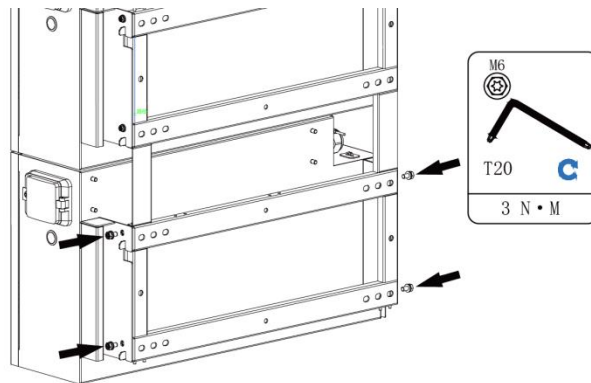
6. Attach the wall bracket for expansion to the wall by tightening the screws with SW10 hexagon sleeve.



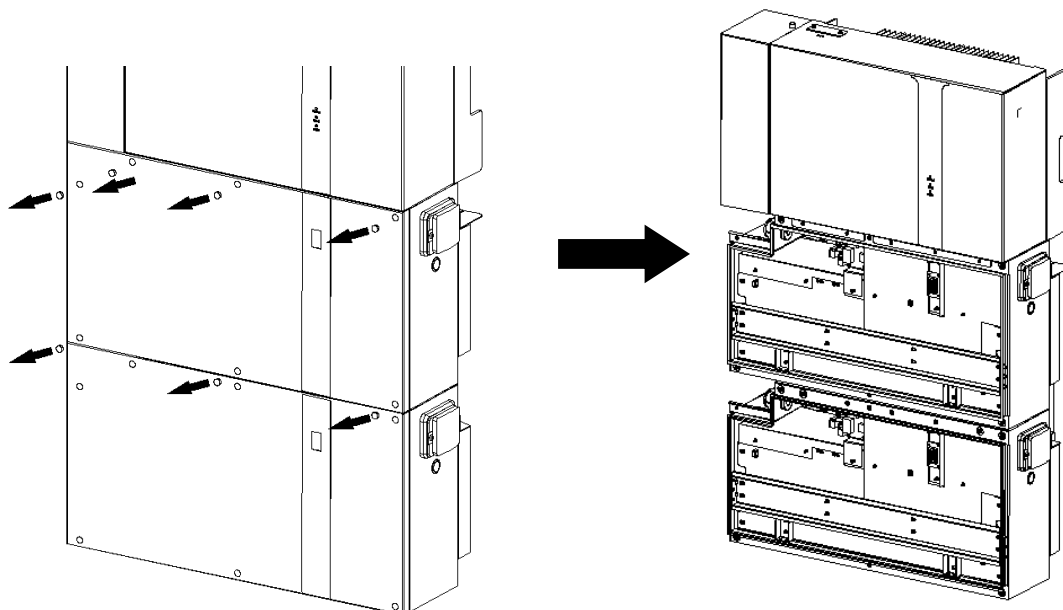
7. Hold the handles on both sides of the battery pack and install the battery pack on the wall bracket(从侧边平推). This step should take two people to complete.



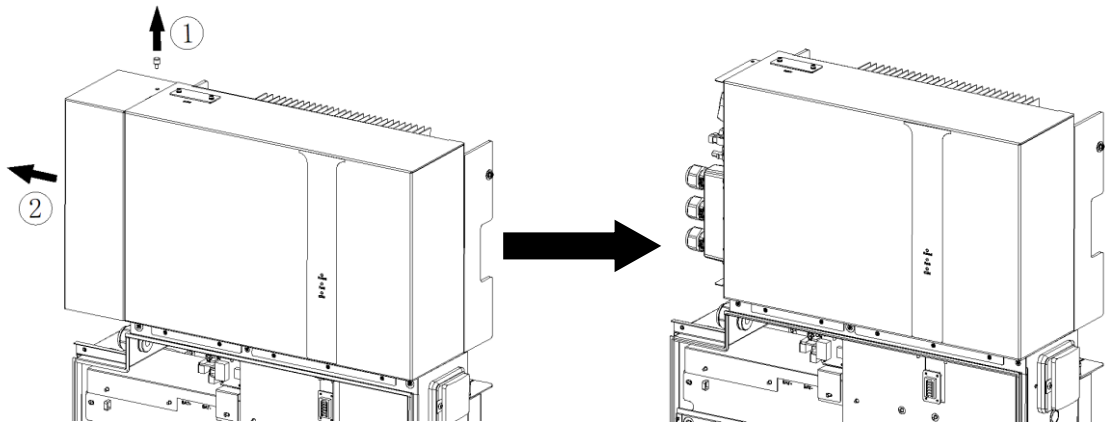
8. Tighten the wall bracket and the battery pack with screw M6*16 (X4) (tool: T20 screwdriver, torque: 3.0 Nm).



9. Remove the rubber plugs from the battery, and then remove the front cover after unscrewing screws with T20 screwdriver.

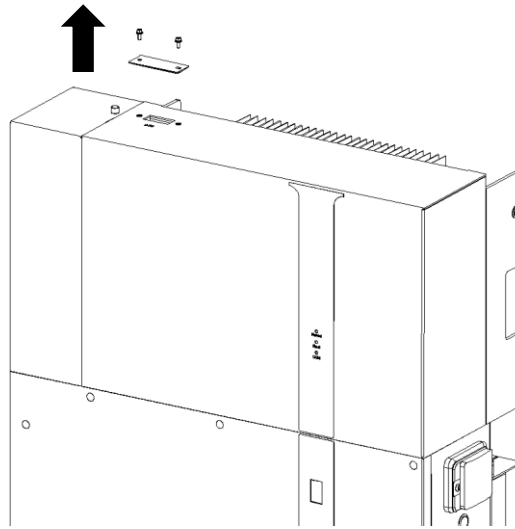


10. Remove the cable box cover by unscrewing the screws at the top of the inverter by hand and perform electrical connection work (please refer to Chapter 7.7).

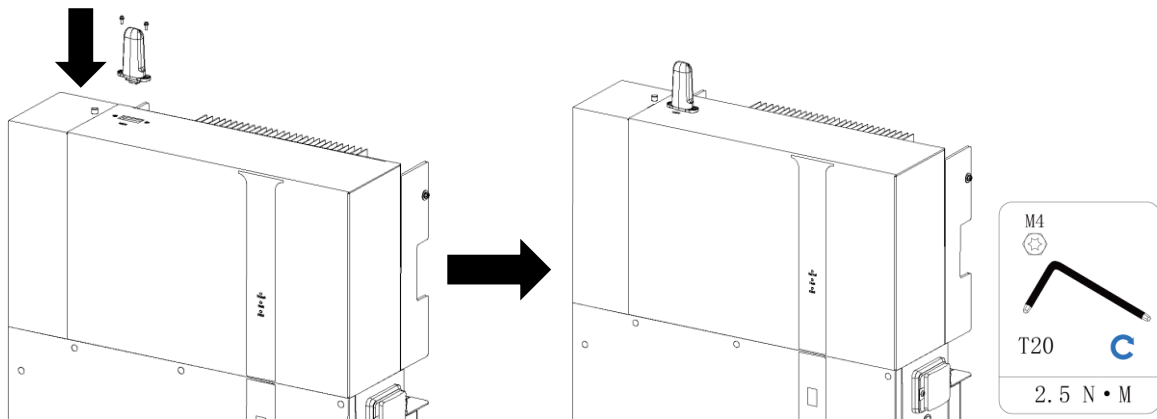


6.3.3 Mounting the WiFi Module

1. Remove the WiFi cover from the top of the inverter with Torx 20 screwdriver.



2. Tighten the WiFi module on the top of SMILE-S5.



7. Electrical Connection

Precautions

 **DANGER**

Before connecting cables, ensure that all breakers of the SMILE-S5 and the battery pack and all the switches connected to SMILE-S5 and the battery pack are set to OFF. Otherwise, the danger voltage of the product may result in electric shocks.

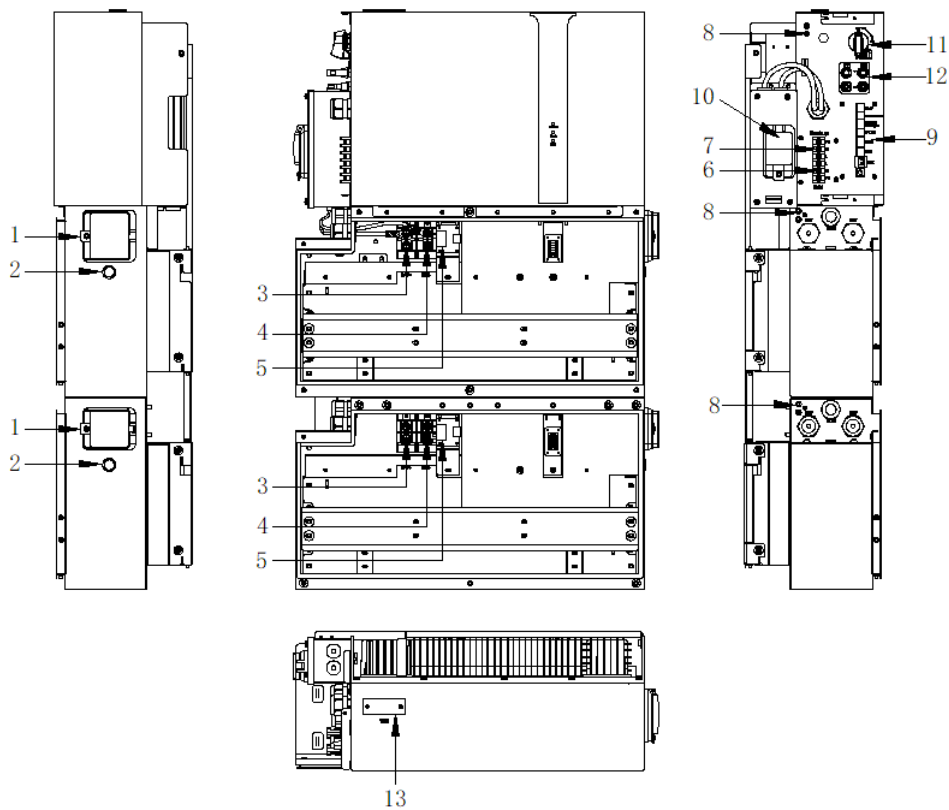
 **WARNING**

- The device damage caused by incorrect cable connections is not covered under any warranty.
- Only certified electricians are allowed to connect cables.
- Operation personnel must wear proper PPE when connecting cables.

NOTICE

The cable colors shown in the electrical connection diagrams provided in this chapter are for reference only.
Select cables in accordance with local cable specifications (green-and-yellow cables are only used for PE).

7.1 Overview of the Connection Area



Position	Designation
1	Battery breaker* of battery pack
2	Power button of battery pack
3	BAT+ connection port
4	BAT- connection port
5	BMS Communication connectors
6	Grid connection port ;
7	Backup connection port ;
8	Connection point for an additional grounding
9	Communication port (CAN/RS485,BMS, LAN, Meter/Grid-CT, DRM**, PV-CT, AUX)
10	Battery breaker* of SMILE-S5
11	Connection port for the WiFi module

*All breakers of SMILE-S5 are switched off when shipped.

**The DRM is only for regions with AS/NZW 4777.2 safety regulations.

The following table is about DRM interface definition, only for Australia. And only DRM0 is available for this energy storage system.

Mode	Requirement
DRM0	Operate the disconnection device
DRM1	Do not consume power
DRM2	Do not consume at more than 50% of rate power
DRM3	Do not consume at more than 75% of rate power AND Source reactive power if capable
DRM4	Increase power consumption (subject to constraints from other active DRMs)
DRM5	Do not generate power
DRM6	Do not generate at more than 50% of rate power
DRM7	Do not generate at more than 75% of rate power AND Sink reactive power if capable
DRM8	Increase power generation (subject to constraints from other active DRMs)

7.2 Preparing Cables

No.	Cable	Type	Conductor Cross Section Area Range	Outer Diameter	Source
1	Battery power cable	Standard PV cable in the industry (recommended type: PV1-F)	16 mm ²	N/A	Delivered with the battery pack
2	Battery communication cable	Standard network cable in the industry (recommended type: Cat5e, UTP, UV-resistant for outdoor use)	0.12 ~ 0.2 mm ² (AWG26~AWG24)	N/A	Delivered with the battery pack
3	PV power cable	Standard PV cable in the industry (recommended type: PV1-F)	4 ~ 6 mm ²	5.5~9 mm	Purchased by the installer
4	CT communication cable	Standard network cable in the industry (recommended type: Cat5e, FTP, UV-resistant for outdoor use)	0.12 ~ 0.2 mm ² (AWG26~AWG24)	N/A	Delivered with the inverter
5 ¹	Signal cable	Standard network cable in the industry (recommended type: Cat5e, FTP, UV-resistant for outdoor use)	0.12 ~ 0.2 mm ² (AWG26~AWG24)	4 ~ 6 mm	Purchased by the installer
6 ²	Signal cable	Multiple-core outdoor shielded twisted pair cable	0.1 ~ 1.3 mm ²	4 ~ 6 mm	Purchased by the installer
7	Grid power cable	Three-core (L, N and PE) outdoor copper cable	4 ~ 6 mm ²	13-18 mm	Purchased by the installer
8	Backup power cable	Three-core (L, N and PE) outdoor copper cable	2.5 ~ 6 mm ²	6-12 mm	Purchased by the installer
9	PE cable	Single-core outdoor copper cable	6 ~ 10 mm ²	N/A	Purchased by the installer

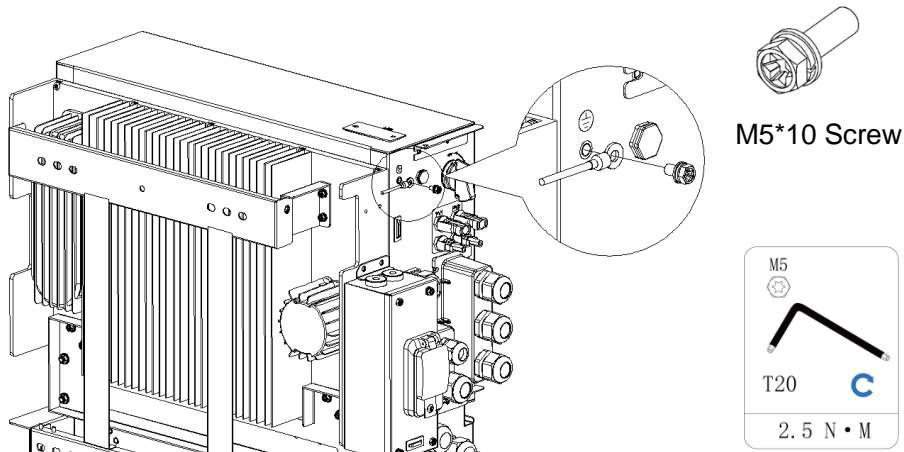
※1 For CAN/RS485, LAN, Meter, DRM communication connection with inverter.

※2 For AUX communication connection with inverter

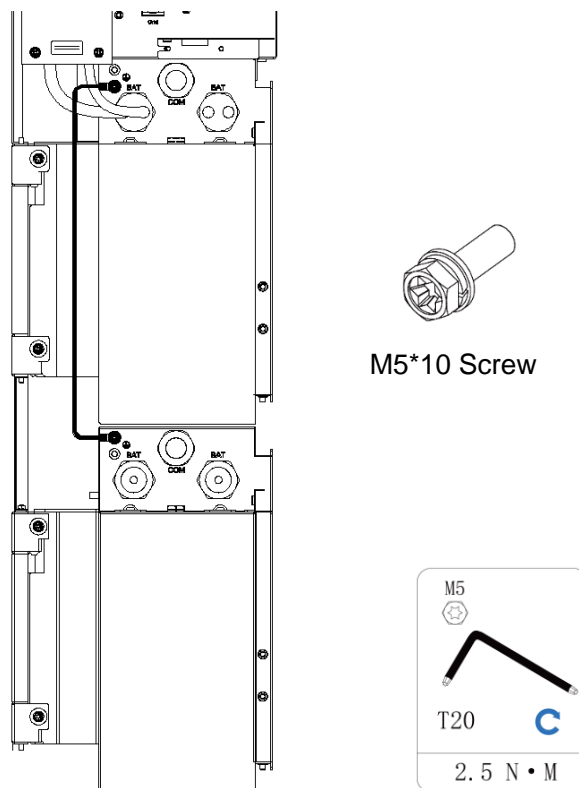
7.3 Connecting Additional Grounding

An external grounding connection is provided at the left side of the SMILE-S5. Prepare M5 OT terminals, strip the grounding cable insulation, insert the stripped part of the grounding cable into the ring terminal lug and crimp using a crimping tool.

Connect the OT terminal with ground point using the torque is 2.5 Nm with T20 screwdriver.



Connect the expanded battery to the ground point of SMILE-S5 with the grounding cable.



If the system occurs an earth fault, the user will receive a mail like this to remind them check the grounding status.

Dear User, ↓

⊕ Your system has an earth fault, the details are as follows: ↓

SN ↓	Status ↓	Error Code ↓	UpdateTime ↓
AL0000327090007 ↓	GFCI Err ↓	EMS:15 ↓	7/10/2021 4:51:27 PM ↓

Please contact your installer company to correct these faults. ↓

This email is automatically sent by the system, please do not reply directly. ↓

Sincerely, ↓

Alpha ESS Co., Ltd ↓

7.4 AC Connection

7.4.1 Conditions for the AC Connection

AC breakers must be installed on the AC side of the SMILE-S5 to ensure that the system can be safely disconnected from the power grid and the load.



DANGER

Danger to life due to fire!

You must protect each SMILE-S5 with an individual AC circuit breaker in order to ensure that the system can be disconnected safely.

Do not connect loads between the SMILE-S5 and the grid breaker.

For load switching, please use dedicated circuit breakers with load switch function. The selection of the AC circuit breaker rating depends on the wiring design (wire cross section area), cable type, wiring method, ambient temperature, inverter current rating, etc. Derating of the AC circuit breaker rating may be necessary due to self-heating or if exposed to heat.

The maximum AC current of SMILE-S5 can be found in the following table.

We recommend the following AC circuit breaker for AC connection.

Description	Max Current	Recommend AC Circuit Breaker Rating
Grid side	26A	40A
Backup side	13A	25A

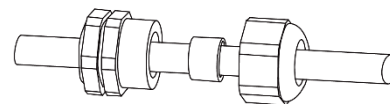
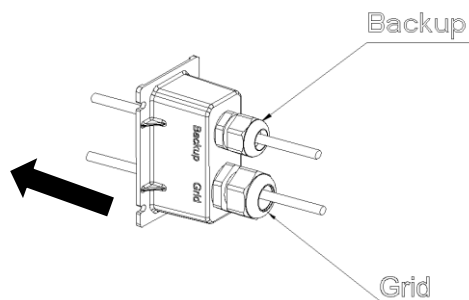
7.4.2 Grid and Backup Connection

There are two AC terminal blocks for grid and backup connection which have the same installation steps.

Following cable requirements for AC connection are recommended.

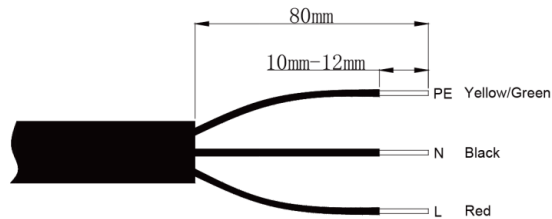
Description	Value
Cable diameter	9-16 mm
Copper conductor cross section area range	4~6 mm ²
Stripping length of the insulated conductors	10~12 mm

1. Take out the cord end terminals and remove AC connection cover from SMILE-S5.
2. Lead the AC cable through the cable gland of the AC connection cover, don't tighten the pressure cap of the cable gland.

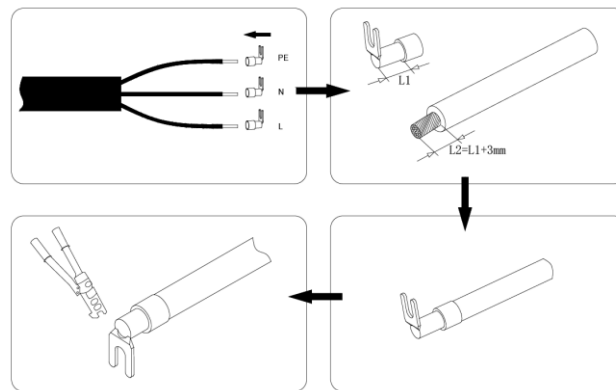


Installation method of AC cable via cable gland

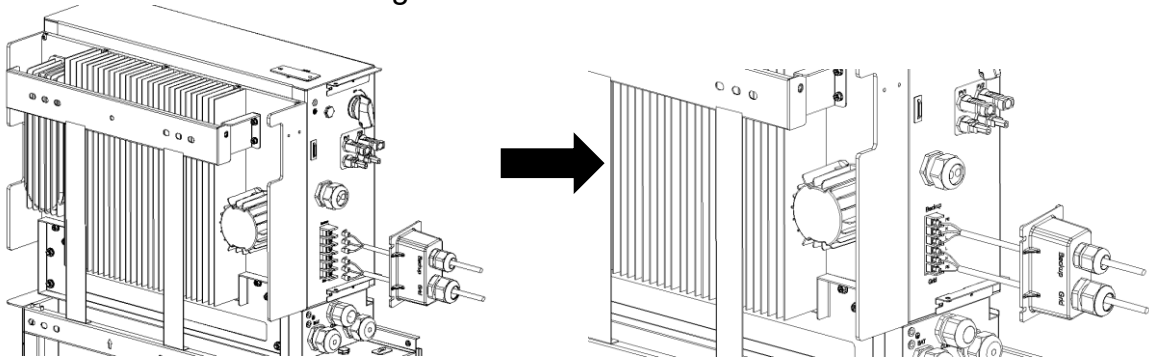
3. Dismantle the AC cable by 80 mm, and strip the insulation of L, N and PE conductors by 10 mm.



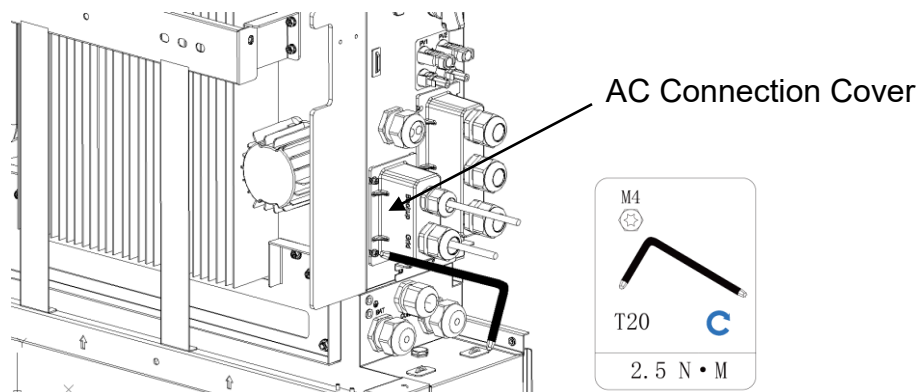
4. Insert the stripped part of the conductors into the cord end terminals and crimp them by using a crimping tool.



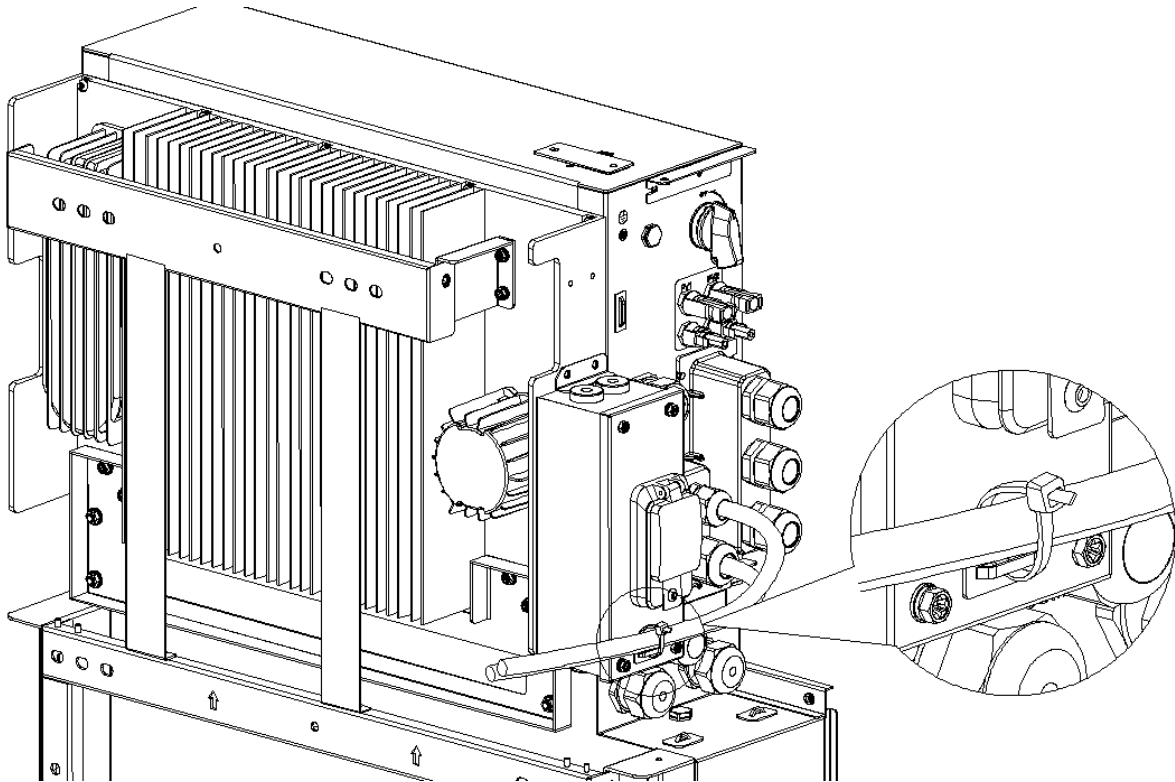
5. Use the #2 screw driver to tighten the screws with the cable.



6. Place the AC connection cover against the inverter and tighten it.



7. Fix the AC power cable as the picture shown below.



NOTICE

For Australia and New Zealand installation site, the neutral cable of grid side and backup side must be connected together, otherwise backup output function will not work.

7.4.3 Residual Current Protection

The inverter is equipped with an all-pole sensitive residual current monitoring unit (RCMU) with an integrated differential current sensor which fulfills the requirement of DIN VDE0100-712(IEC60364-7-712:2002).

Therefore, an external residual current device (RCD) is not required. If an external RCD needs to be installed because of local regulations, a RCD type A or type B can be installed as an additional safety measure.

The all-pole sensitive residual current monitoring unit (RCMU) detects alternating and direct differential currents. The integrated differential current sensor detects the current difference between the neutral conductor and the line conductor. If the current difference increases suddenly, the inverter will disconnect from the grid. The function of the all-pole sensitive residual current monitoring unit (RCMU) has been tested according to IEC62109-2.



Notice of installing an external residual current device (RCD) for installation of Australia and New Zealand

Where an external residual current device (RCD) is required in a TT or TN-S system, install a residual current device which trips at a residual current of 30 mA.

7.5 Meter & CT Connection

7.5.1 CT Connection

The CT cables have been installed with SMILE-S5 when shipped.

Please take out 2 CTs (Grid CT and PV CT) provided as accessory.

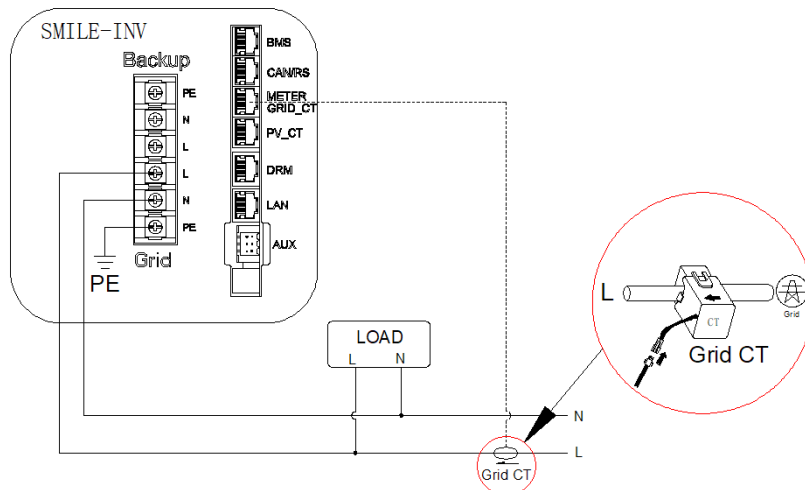
Step 1: Buckle the Grid CT on the house-service live wire. The arrow of the Grid CT should point to the Grid port of SMILE-S5.

Step 2: Buckle the PV CT on the grid live wire. The arrow of the PV CT should point to the Grid port of PV inverter.

Step 3: Connect the CT cables to the Grid CT and PV CT respectively.

NOTE:

The CT cable marked Grid CT should be connected to the Grid CT, and the CT cable marked PV CT should be connected to the PV CT.

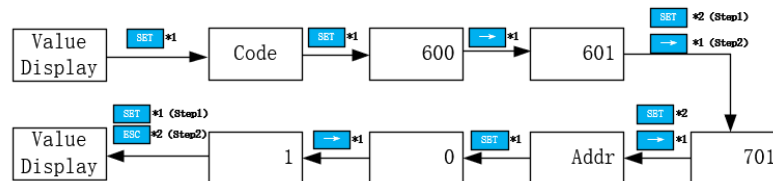


Meter Setting

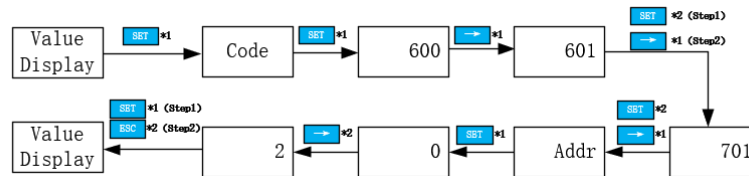
Model	Grid Meter Address	PV Meter Address
DTSU666-3*230V 5A (without CT)	1	2
DTSU666-100/40mA (with CT)	1	N/A

1. DTSU666-3*230V 5A: Three-phase meter (without CT)

When the meter is used as Grid meter, please follow the steps below to complete the address setting.

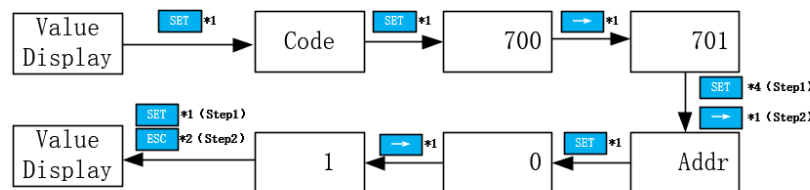


When the meter is used as PV meter, please follow the steps below to complete the address setting.



2. DTSU666-100/40mA: Three-phase meter (with CT)

When the meter is used as Grid meter, please follow the steps below to complete the address setting.



Meter Setting on AlphaCloud

Step 1:

When the system work mode is selected as DC, click the button under the “Grid Meter” to turn the “Meter” icon green.

When the system work mode is selected as AC or Hybrid, click the buttons under the “Grid Meter” and “PV side meter” to turn the “Meter” icon green.

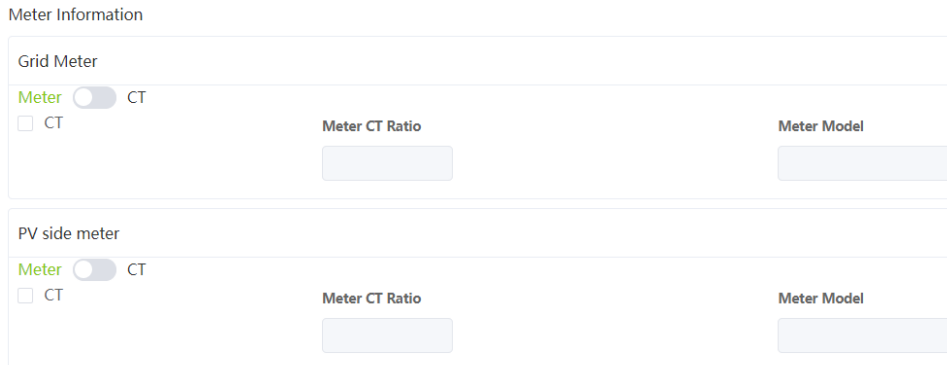
Step 2:

Click "Save" and wait a few minutes to refresh the page.

When the “Meter Model” displays DTSU666 model, the setting is successful.

NOTE:

It is forbidden to tick CT to modify the CT ratio.



Meter Information

Grid Meter

Meter CT

CT

Meter CT Ratio

Meter Model

PV side meter

Meter CT

CT

Meter CT Ratio

Meter Model

Meter Setting on AlphaAPP

Step 1:

When the system work mode is selected as DC, only tick "Meter" icon on the right of the “Grid Meter”.

When the system work mode is selected as AC or Hybrid, both tick "Meter" icon on the right of the “Grid Meter” and “PV side meter”.

Step 2:

Click "Submit" and enter the “System information” page to check the meter model.

When the “Meter Model” displays DTSU666 model, the setting is successful.

NOTE:

It is forbidden to tick CT to modify the CT ratio.

WiFi Configuration

Connect to the hotspot Router Configuration System Configuration

Basic Parameter Setting

AC/DC/Hybrid Hybrid

On Grid PV Capacity(KW) 5 (kW)

Storage PV Capacity(KW) 6 (kW)

Grid Meter CT Meter

PV Meter CT Meter

Safety Regulations VDE4105/11.18

Max.Feed-in(%) 100

Submit

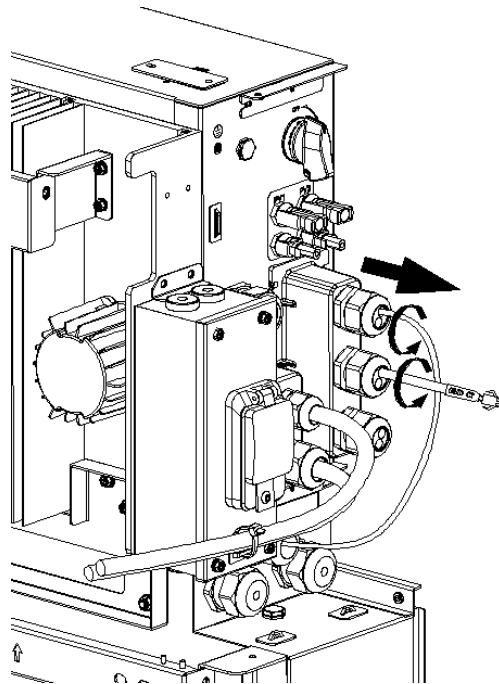
7.5.2 Meter Connection (Optional)

The system supports the following two different metering schemes in order to record the feed-in energy and consumption from grid:

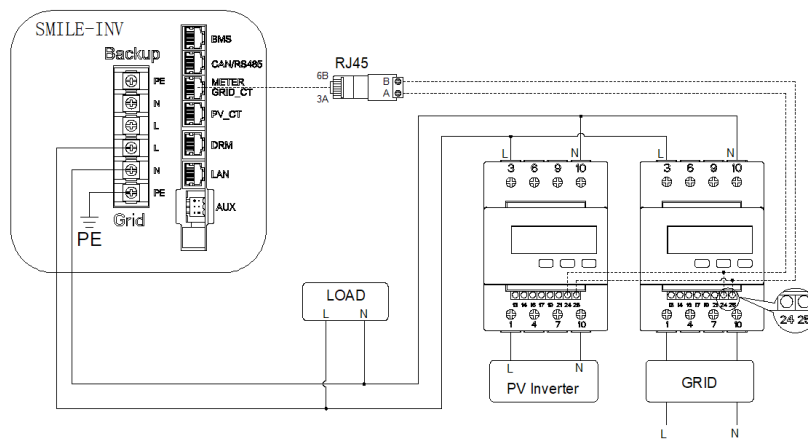
- DTSU666-3*230V 5A: Three/single-phase meter (without CT)
- DTSU666-100/40mA: Three/single-phase meter (with 3 or 6 CTs)

Meter wiring introduction

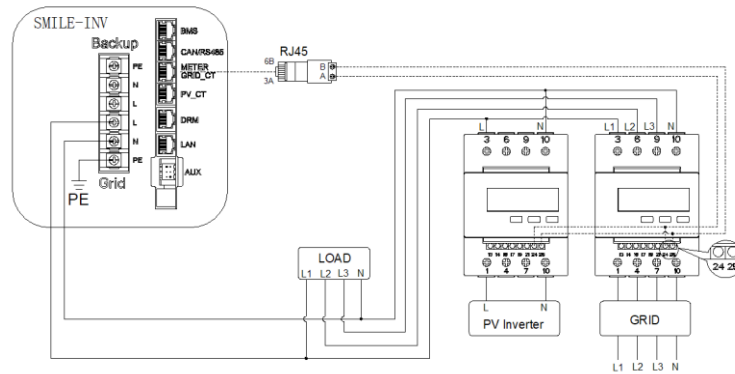
Loosen the waterproof connectors on the COM connection cover, and then remove the screws on the COM connection cover.



1. DSTU666-3*230V 5A: Three/single -phase meter (without CT) connection

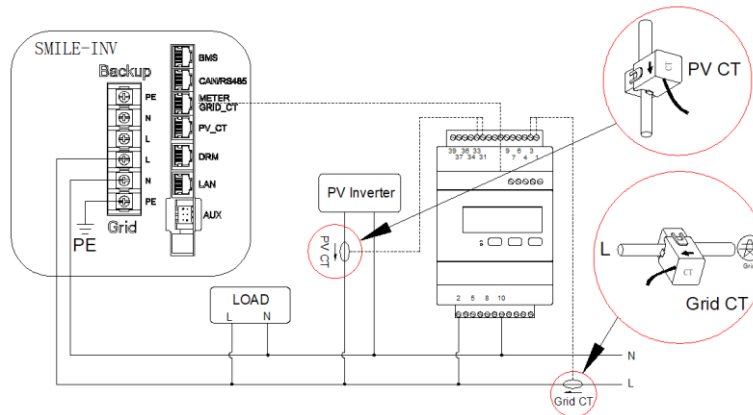


Wiring at single-phase home

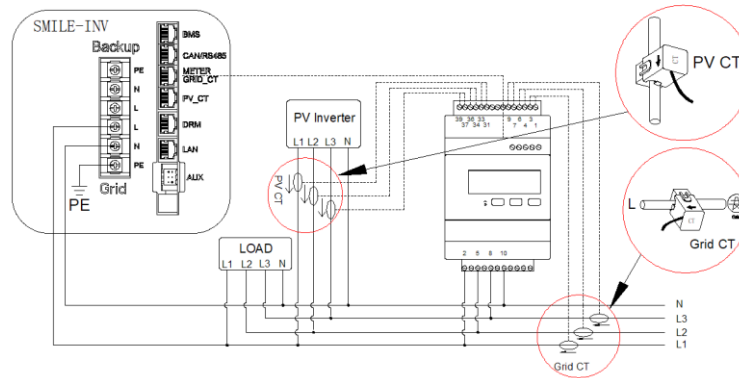


Wiring at three-phase home

2. DSTU666-100/40mA: Three/single-phase meter (with CT) connection



Wiring at single-phase home



Wiring at three-phase home

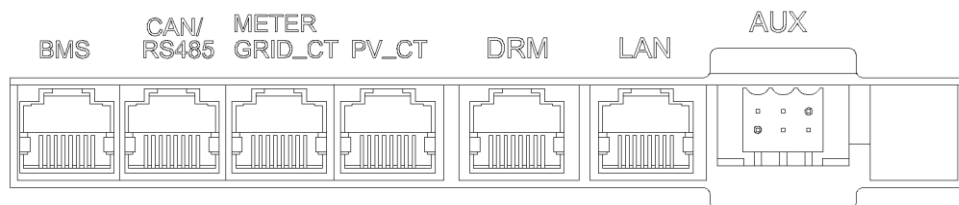
Grid CT	PV CT
1-----IC (White)	31-----IC (White)
3-----IC (Blue)	33-----IC (Blue)
4-----IB (White)	34-----IB (White)
6-----IB (Blue)	36-----IB (Blue)
7-----IA (White)	37-----IA (White)
9-----IA (Blue)	39-----IA (Blue)

Communication Connection

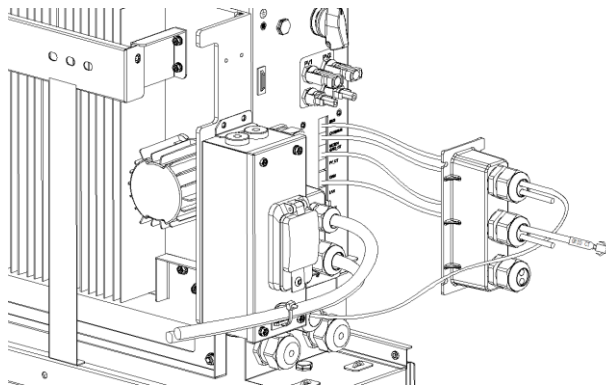
For other communication (AUX, DRM, Meter, CAN/RS485) connection, please follow the below steps.

Loosen the waterproof connectors on the COM connection cover, and then remove the screws on the COM connection cover.

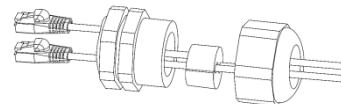
Communication connection port as follows:



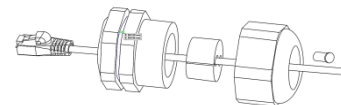
1. Lead the communication cables through the cable glands of the COM connection cover, don't tighten the pressure caps of the cable glands. Insert the RJ45 plugs to the relative RJ45 sockets.



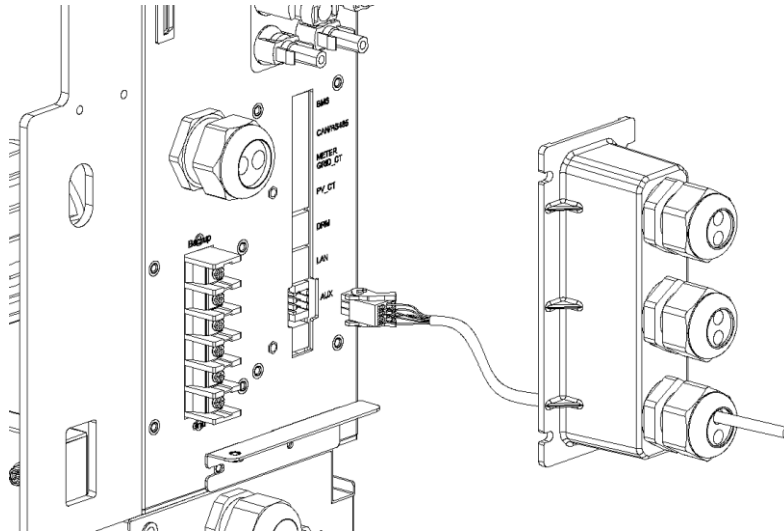
Installation method of two communication cables via M25 cable gland



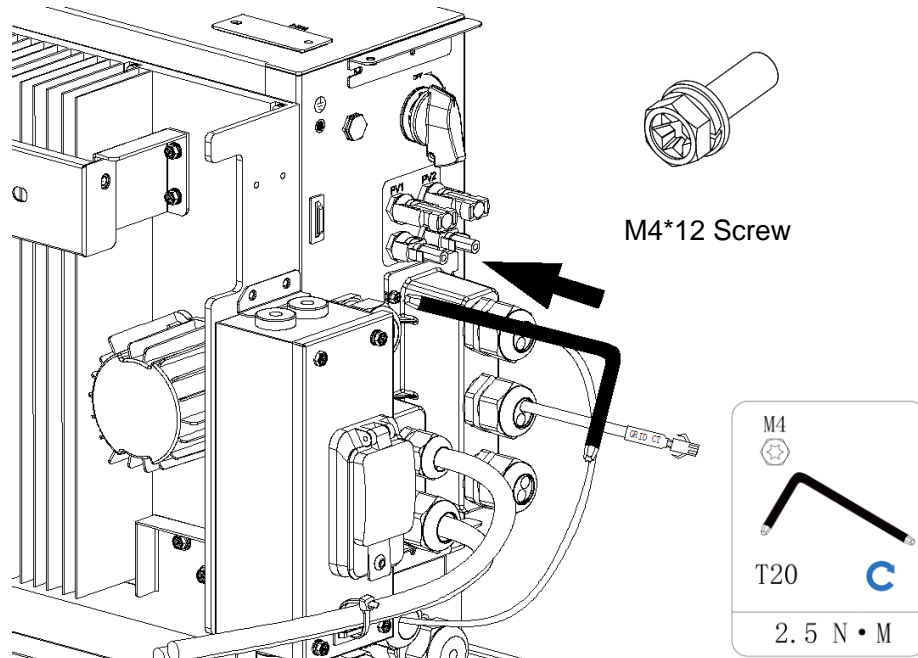
Installation method of only one communication cable via M25 cable gland



- 1) For meter wiring, please refer to Chapter 7.4.4 Meter Connection.
 - 2) If DRM support is specified, the system may only be used in conjunction with a Demand Response Enabling Device (DRED). This ensures that the system implements the commands from the grid operator for active power limitation at all times. The system and the Demand Response Enabling Device (DRED) must be connected in the same network. Only DRM0 is available for SMILE-S5.
 - 3) Take out 6 pin terminal block for AUX connection. Tighten them one by one using the torque of 0.2 Nm with tool of #0 slotted screwdriver.
- For AUX position definition, please see the AUX wiring documentation.

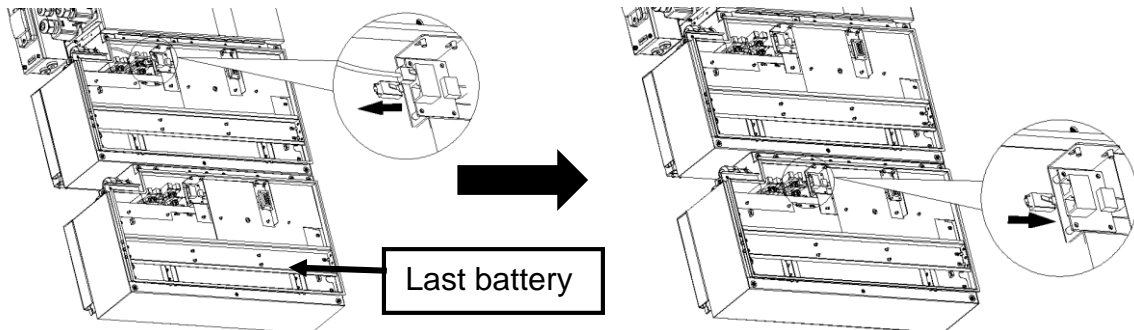


2. Place the COM connection cover against the inverter housing and tighten them.

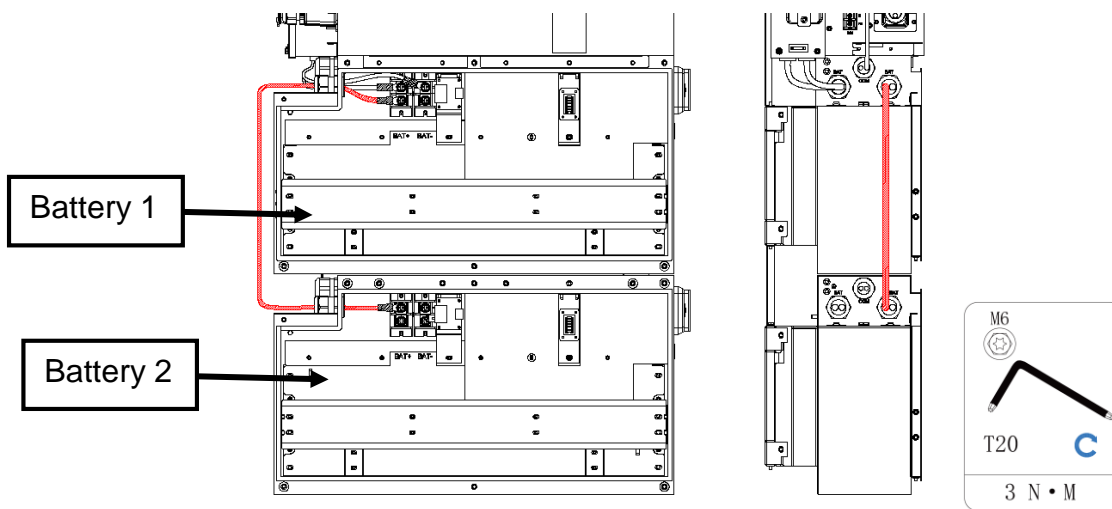


7.6 Electrical Connection of Expansion Battery Packs

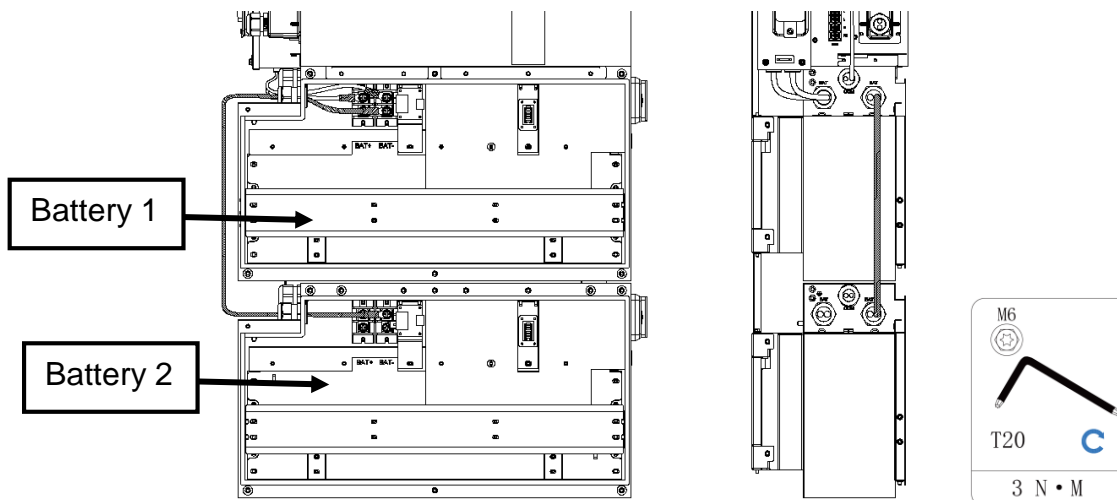
1. Remove the terminal resistance from the battery and insert it into the BMS communication port of the last battery (the battery furthest from the inverter).



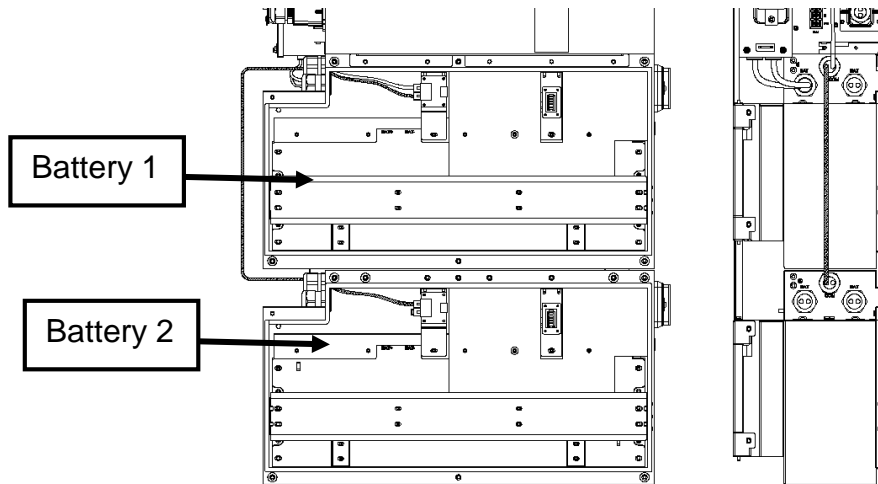
2. Connect the positive power cable from battery 2 to battery 1 (tool: T20 screwdriver, torque: 3 Nm).



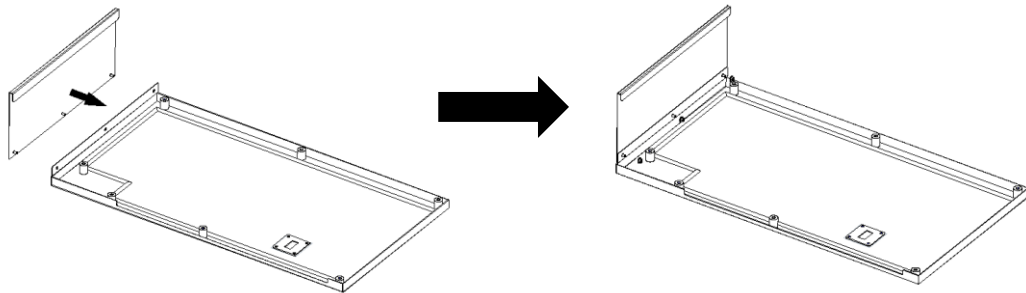
3. Connect the negative power cable from battery 2 to battery 1 (tool: T20 screwdriver, torque: 3 Nm).



4. Connect the BMS communication cables from battery 2 to battery 1.



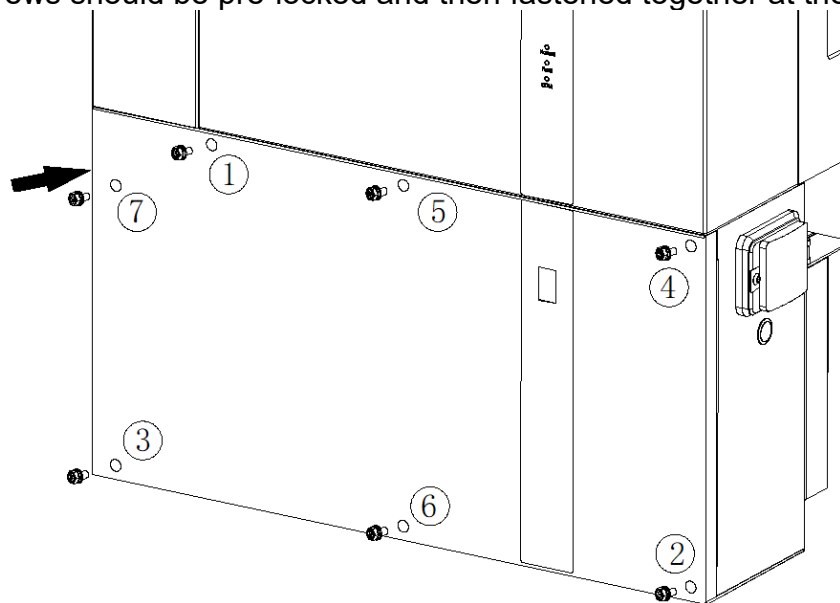
5. Assemble front cover and side cover of the expanded battery with 3 M4 flange nuts (tools: SW7 sleeve or other tools for M4 flange, torque: 1.6 Nm).



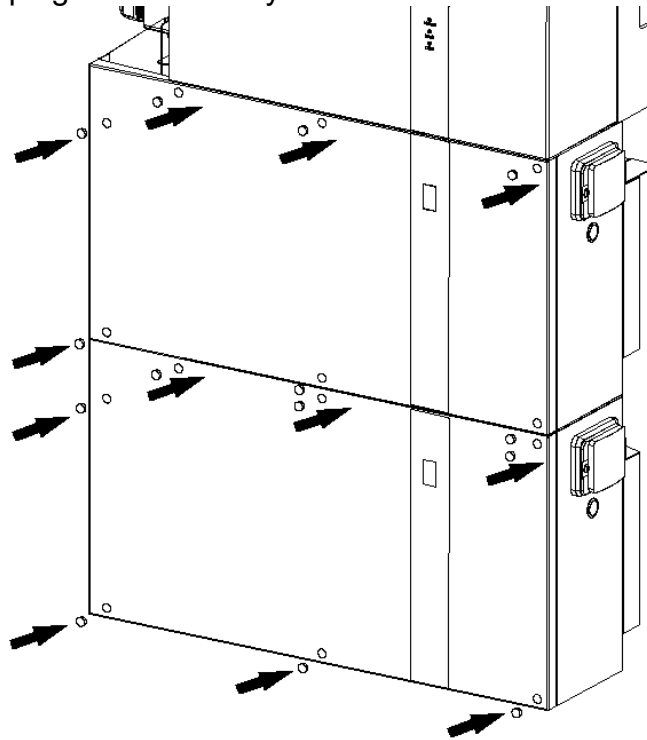
6. Attach the cover to the battery pack.
Fasten the cover on the battery with screws in sequence 1-7 and screw M5*12 (X4) (tool: T20 screwdriver, torque: 2.5 Nm).

NOTE:

Seven screws should be pre-locked and then fastened together at the end.



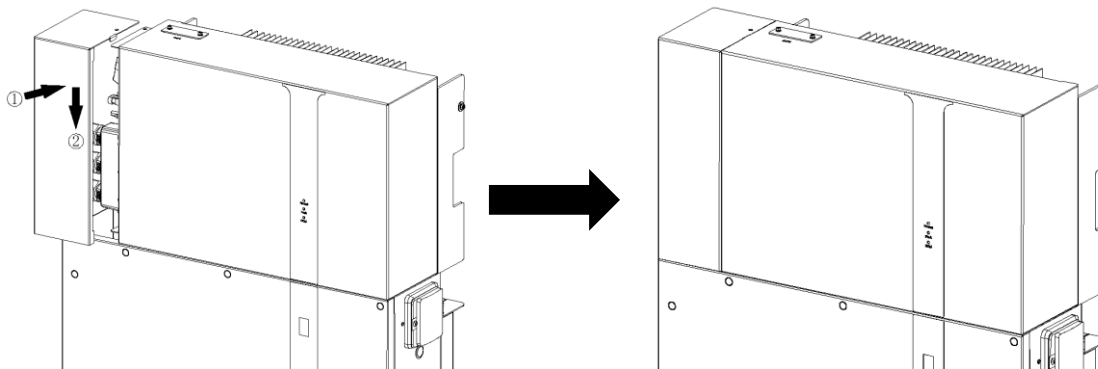
7. Insert the rubber plugs of the battery.



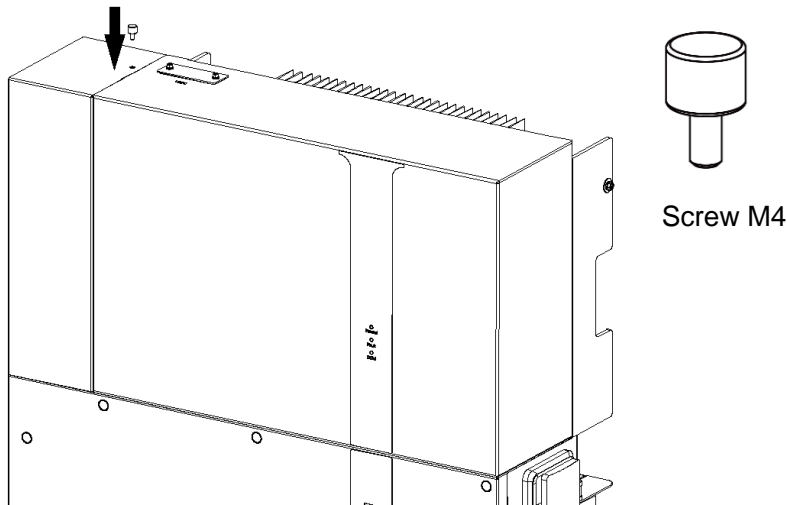
7.7 Mounting the Cable Box Cover

Take out the cable box cover which is provided as accessory.

1. Install the cover as the picture shown below.



2. Fix the cable box cover by tightening the screws by hand.



8. WiFi Setting

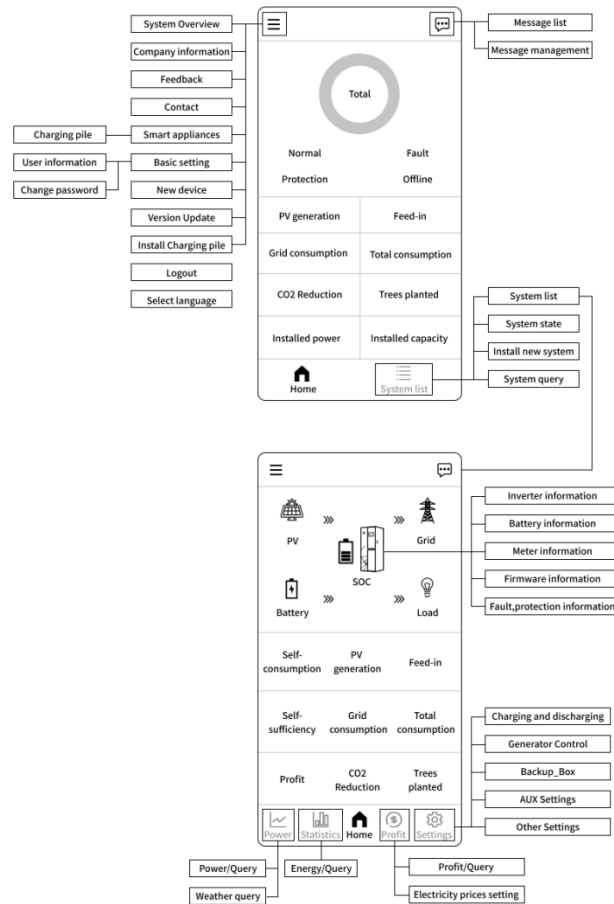
8.1 Download and Install APP

1. Android device users can download the application through major Android application markets such as Google Play.
2. IOS device users can search for "AlphaESS" in Appstore and download the application.



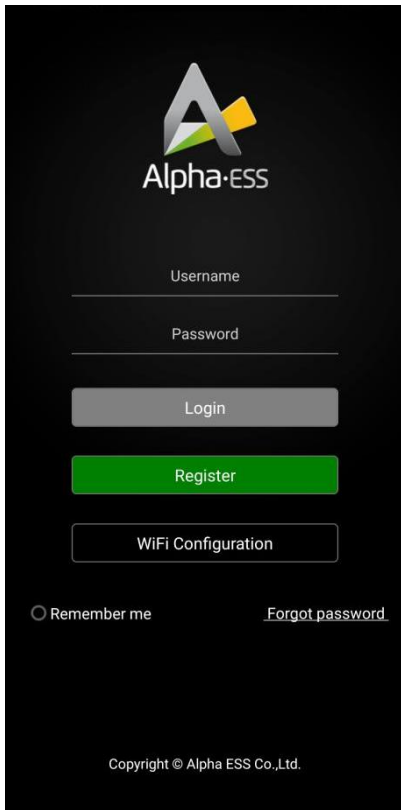
AlphaESS-APP

8.2 Overview of Functions for Installer Account

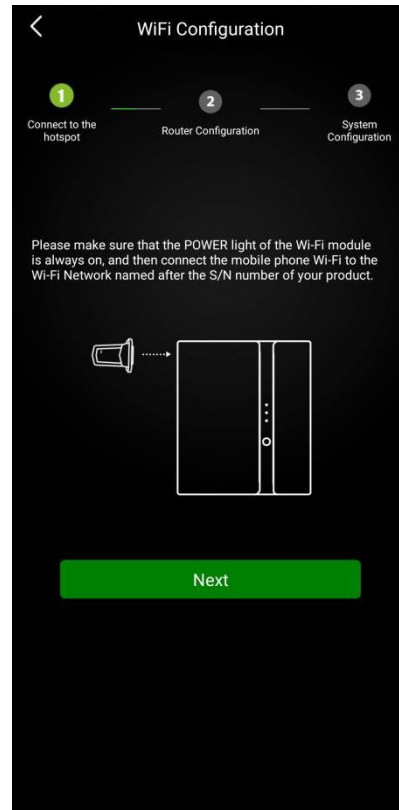


8.3 WiFi Module Setting

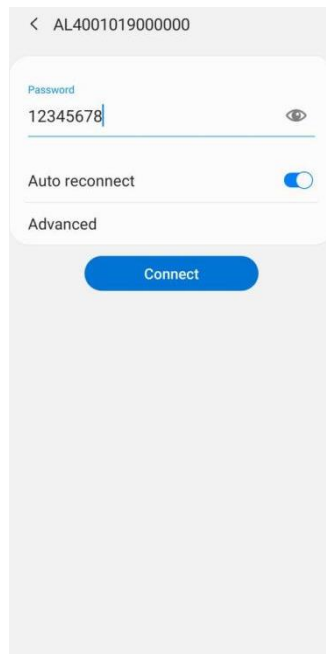
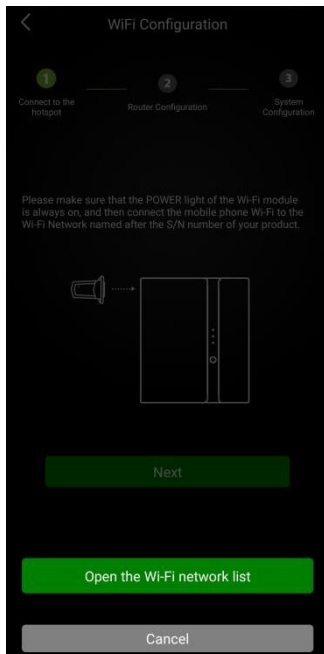
This section is for the installer who install a system with a WiFi module. AlphaESS App is able to complete network configuration, change setting of the system basic parameter, and monitor system operation and configuration information.



Step 1: Open AlphaESS APP, click the “Wi-Fi Configuration” button and enter the WiFi configuration interface.

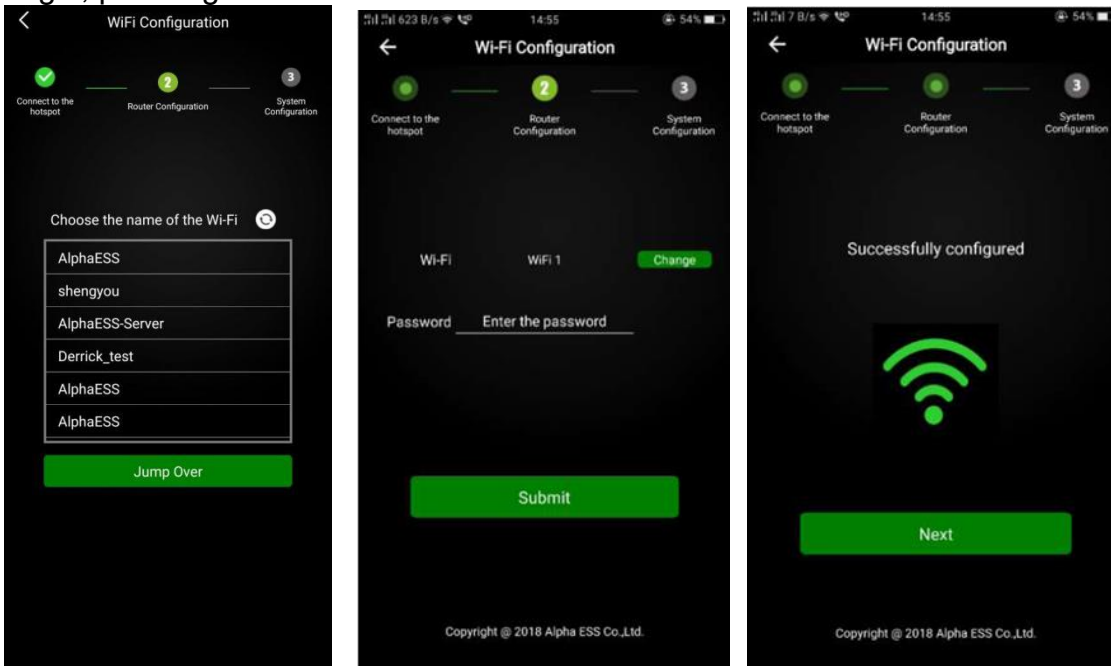


Step 2: After that, please check whether your mobile phone has connected to the system’s hotspot.



Step 3: If your mobile phone hasn’t connected to the system’s hotspot, please open the Wi-Fi network list and find the hotspot named by the product SN,

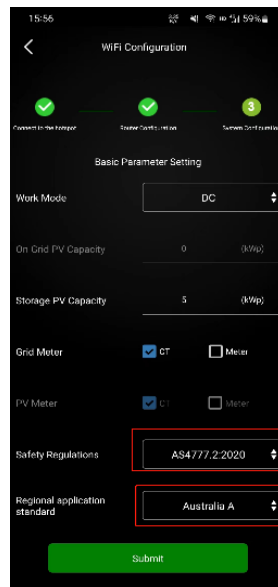
then enter the password “12345678” and connect to it. After successfully setting it, please go back to the APP and click “Next”.



Step 4: Select the WiFi of your home, enter the password, complete the WiFi configuration and submit. If there is no network currently, you can click Jump over to skip the WiFi configuration step and directly set the system parameters.

Note:

The system will not be able to connect to the Internet without WiFi configuration.

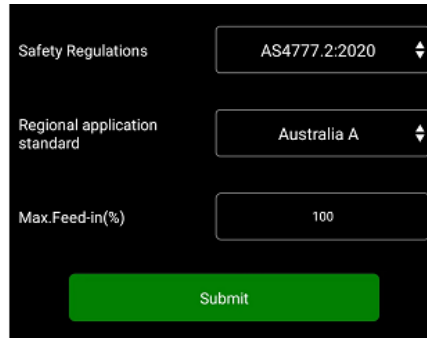


Step 5: Set basic parameters, including PV capacity on the grid side, the type of meters, safety regulations and regional application standard. Click “Submit” when the settings are complete.

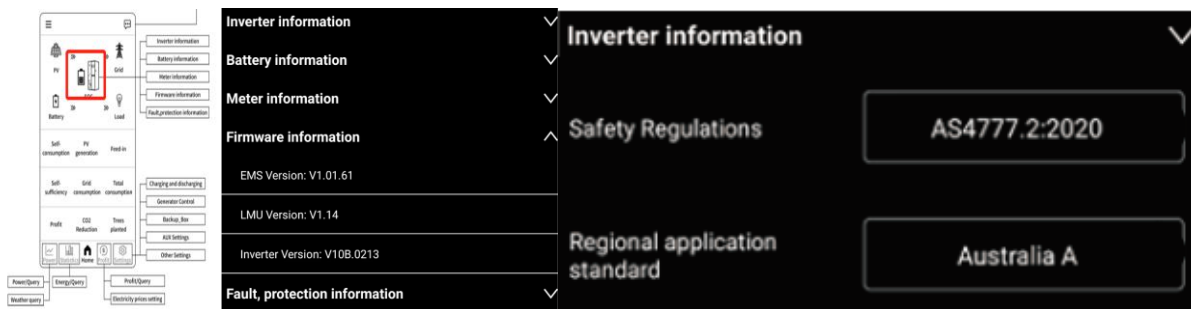
Note:

When the safety regulation is set as AS4777.2, the secondary sub-options can be selected according to the region or local grid company (Please refer to Appendix 2). If end user wants to change or view the safety regulation, please contact the manufacturer or your installer.

Step 6: The max feed-in can be set after chosen the safety regulation in the same page.

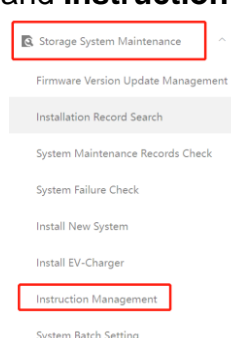


Step 7: After finishing the WIFI setting, all the status can be found on the main page. The firmware version also can be checked in the 'Firmware information' and the safety regulations/regional application standard can be checked in the 'Inverter information' (only the installer or service engineer can change the safety regulation and regional application standard after commissioning).

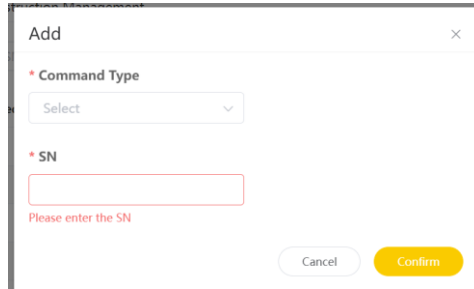


8.4 Generation Limit Control *

1. Go to the alpha cloud: <https://cloud.alphaess.com/>
2. Enter the account and password, login your account
3. **Storage System Maintenance and Instruction Management.**



4. Command Type: Software Limit Enable/Disable, Hardware Limit Enable/Disable or S&H Limit Enable/Disable and enter the inverter SN



The image shows a modal dialog box titled "Add" with a close button (X) in the top right corner. It contains two required fields: "Command Type" with a dropdown menu currently showing "Select", and "SN" with an empty text input field. Below the SN field is a red error message that reads "Please enter the SN". At the bottom of the dialog are two buttons: "Cancel" and "Confirm".

5. Execute

SN	Create Date	Creator	Execute or not	Operate
AL2002222020282	2022-09-27 06:18:20	Henry Chen	Executed	Execute

* This function is only available for the installer or manufacturer under AS4777.2 2020 safety regulation.

9. Commissioning

9.1 Checking Before Power-On

No.	Check Item	Acceptance Criteria
1	Mounting environment	The mounting space is proper, and the mounting environment is clean and tidy, without foreign object.
2	Battery pack and inverter mounting	SMILE-S5 and expansion battery packs are mounted correctly, securely, and reliably.
3	WiFi mounting	The WiFi module is mounted correctly, securely, and reliably
4	Cable layout	Cables are routed properly as required by the customer.
5	Cable tie	Cable ties are secured evenly and no burr exists.
6	Grounding	The ground cable is connected correctly, securely, and reliably.
7	Switches and breakers status	The battery switches and all the breakers connecting to the product are OFF.
8	Cable connections	The AC cable, battery cable, and communication cables are connected correctly, securely, and reliably.
9	Unused cable glands	Unused cable glands are blocked by rubber sealings which are secured by pressure caps.

9.2 Configuring the safety standard

Please set the safety standard appropriate for your country or purpose via APP or Web during pilot run;



The safety standard must be set correctly

If you select a safety standard which is not valid for your country and purpose, it can cause a disturbance in the energy storage system and lead to problems with the grid operator. When selecting the safety standard, you must always observe the locally applicable standards and directives as well as the properties of the PV system (e.g. PV system size, grid-connection point).

- If you are not sure which safety standard is valid for your country or purpose, contact your grid operator for information on which safety standard is to be configured.

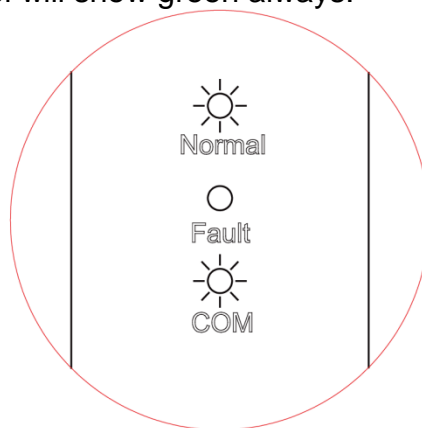
9.3 Check the Running State

Prerequisites

Before switching on the AC breaker between the SMILE-S5 and the grid, check that the AC voltage on the power grid side of the AC breaker is within the specified range. Please select the acceptance of installation on site when the light intensity is strong.

Procedure

1. Ensure that the battery switches and all breakers connecting to the product are OFF.
2. Check the grid-connected state of the product and the installation of two CTs. Short press the power button on the right side of battery pack, then switch on the battery breaker. Switch on the breaker located at the middle left of SMILE-S5. Switch on the external AC breaker between the grid and SMILE-S5. Switch on PV and PV Inverter. Set the operating parameters through the APP. Wait about 3 minutes for the SMILE-S5 and the PV Inverter to enter the grid-connected status, and observe the LED states on the front panel. At this time, the 2 LEDs ("Normal", "COM") and battery indicators on the front panel will show green always. Check the running status through the APP. When PV power is not more than 3kW, PV supplies power to the battery and load. If the grid power is not more than 100W in this scenario, then the installation is normal.
3. Check the UPS status of the product Switch off the external AC breaker between the grid and the SMILE-S5. The SMILE-S5 will enter the UPS status at once, and observe the LED states on the front panel. At this time, the following 2 LEDs ("Normal", "COM") and battery indicators on the front panel will show green always.



NOTICE

During the running test, if the "Fault" LED indicator of the inverter or LED indicators of the battery pack show red, please refer to Section 10.2 for troubleshooting.

9.4 Powering Off the Product



WARNING

After the product is powered off, the remaining electricity and heat may still cause electric shocks and body burns. Therefore, put on protective gloves and operate the product 5 minutes after the power-off.

Procedure

1. Long press the power button of battery pack for 6 seconds, then switch off the battery breaker of battery pack.
2. Switch off the battery breaker located at the middle left of the inverter.
3. Switch off the AC breaker between the SMILE-S5 and the load.
4. Switch off the AC breaker between the SMILE-S5 and the grid.

10. Maintenance and Troubleshooting

10.1 Routine Maintenance

Normally, SMILE-S5 need no maintenance or calibration. Disconnect SMILE-S5 from all power sources before cleaning. Clean the housing, cover and display with a soft cloth.

To ensure that the SMILE-S5 can operate properly in the long term, you are advised to perform routine maintenance on it as described in this chapter.

Maintenance checklist

Check Item	Acceptance Criteria	Maintenance Interval
Product cleanliness	The heatsink at the back of SMILE-S5 are free from obstacles or dust.	Once every 6 to 12 months
Product visible damage	The SMILE-S5 are not damaged or deformed.	Once every 6 months
Product running status	<ol style="list-style-type: none"> SMILE-S5 operate with no abnormal sound. All parameters of SMILE-S5 are correctly set. Perform this check when SMILE-S5 is running. 	Once every 6 months
Electrical connections	<ol style="list-style-type: none"> Cables are securely connected. Cables are intact, and in particular, the cable jackets touching the metallic surface are not scratched. Unused cable glands are blocked by rubber sealing which are secured by pressure caps. 	Perform the first maintenance 6 months after the initial commissioning. From then on, perform the maintenance once every 6 to 12 months.



CAUTION

Risk of burns due to hot heatsink and housing









The heatsink and housing can get hot during operation.

- During operation, do not touch any parts other than the cover.
- Wait approx. 30 minutes before cleaning until the heatsink has cooled down.

10.2 Troubleshooting

10.2.1 Inverter Error Troubleshooting

Inverter LED Signals









LED	Status	Description
Normal		On: system is in working mode normally
		Flicker: system is in standby mode or self-checking process
		Off: system is in fault mode or off
Fault		Off: system is in working mode normally or off
		On: system is in fault mode
COM		On: network connection is normal
		Flicker: connecting to the server
		Off: system is not connected network

	Description	Solution
Warning	Grid AC over voltage	1. If these warnings occur occasionally, it is a short-time fault of the grid. The inverter will resume work after the grid is normal. No action is required. 2. If these warnings occur frequently but can be automatically cleared, contact the local power operator for permission and modify the grid protection parameters of the inverter. 3. If the recovery fails for a long time, please confirm: 1) Whether the AC circuit breaker is switched off. 2) Whether the AC terminal is in good contact 3) Whether the grid is disconnected.
	Grid AC under voltage	
	Grid AC absent	
	Grid AC over frequency	
	Grid AC under frequency	
	Grid abnormal	
	Inverter over temperature	1. If the warning occurs occasionally and the inverter can resume work automatically. No action is required. 2. If this warning occurs frequently or continuously, check whether the installation site is exposed to direct sunlight, with good ventilation and high ambient temperature. If there is no direct sunlight and there is good ventilation and heat dissipation, please contact AlphaESS after-sales team.
	Ground disconnection alarm	Please check whether the grounding cable is connected properly.
	Zero firewire reverse alarm	Please check whether the live line and neutral line are inversely connected.
	NTC fail	Please check whether the cable connection to the NTC terminal is loose.
Battery voltage very high	If the warning occurs at the first installation, please check whether the battery voltage is within the allowable range. If this warning occurs during operation, check whether the battery cable is loose and whether the BMS communication is abnormal.	

	Eps capacitance decrease	If the warning occurs occasionally, please restart the system. If the warning still occurs after restart, please contact AlphaESS after-sales team.
Fault	Leakage current abnormal	1.If this warning occurs occasionally, it may be caused by the occasional exception of the external line. When the exception disappears, the system will return to normal. No action is required. 2. If this warning occurs continuously, please contact AlphaESS after-sales team.
	Control power low	1. If this warning occurs occasionally, the inverter will resume work automatically. No action is required 2. If this warning occurs continuously, please contact AlphaESS after-sales team.
	Output DC over current	1. If the warning occurs occasionally, it is a short-time fault of the grid. The inverter will resume work after the grid is normal. No action is required. 2. If this warning occurs continuously, please contact AlphaESS after-sales team.
	Inverter relay abnormal	1. If the warning occurs occasionally, it is a short-time fault of the grid. The inverter will resume work after the grid is normal. No action is required 2. If this warning occurs continuously, please contact AlphaESS after-sales team.
	Leakage current HCT abnormal	1.If this warning occurs occasionally, it may be caused by the occasional exception of the external line. When the exception disappears, the system will return to normal. No action is required. 2. If this warning occurs frequently or cannot be cleared for a long time, please use a multimeter to measure the resistance between the Grid port, L, N and the ground. If the resistance are less than 100 K Ω , please check whether cables are damaged, connected, or flooded.
	Bus over voltage	1. If this warning occurs occasionally, please restart the inverter. 2. If this warning occurs frequently or cannot be cleared for a long time, please contact AlphaESS after-sales team.
	Internal communication error	Please contact AlphaESS after-sales team.
	EEPROM error	Please contact AlphaESS after-sales team.
	Consistent warning	1. If the warning occurs occasionally, please restart the inverter. 2. If this warning occurs frequently or cannot be cleared for a long time, please contact AlphaESS after-sales team.
	Inverter abnormal	1. If this warning occurs occasionally, please restart the inverter. 2. If this warning occurs frequently or cannot be cleared for a long time, please contact AlphaESS after-sales team.
Boost abnormal	1. If this warning occurs occasionally, please restart the inverter. 2. If this warning occurs frequently or cannot be cleared for a	

	long time, please contact AlphaESS after-sales team.
Battery absent	<ol style="list-style-type: none"> 1. Check whether battery cables are connected properly; 2. Check whether the DC Switch is on; 3. Check whether the BMS communication is normal.
EMS communication error	Check whether the connection terminal between the EMS board and the inverter control board is loose.
UPS overload	Please reduce the loads on the Backup port and restart the inverter, or wait for the warning to be cleared after 5 minutes.
EPS output short	Disconnect the loads on the Backup port and restart the inverter. If the problem is not been solved, please contact AlphaESS after-sales team.
Inv HW over current	<ol style="list-style-type: none"> 1. If the warning occurs occasionally, please restart the inverter. 2. If this warning occurs frequently or cannot be cleared for a long time, please contact AlphaESS after-sales team.
Bus under voltage	<ol style="list-style-type: none"> 1. If this warning occurs occasionally, please restart the inverter. 2. If this warning occurs frequently or cannot be cleared for a long time, please contact AlphaESS after-sales team.
Battery Over Total Voltage	If the warning occurs occasionally, check whether it is cleared after three minutes;
Battery Under Total Voltage	If the warning occurs frequently, please contact AlphaESS after-sales team.
Inv over current	<ol style="list-style-type: none"> 1. If this warning occurs occasionally, please restart the inverter. 2. If this warning occurs frequently or cannot be cleared for a long time, please contact AlphaESS after-sales team.
DC HW over current	<ol style="list-style-type: none"> 1. If this warning occurs occasionally, please restart the inverter; 2. If this warning occurs frequently or cannot be cleared for a long time, please contact AlphaESS after-sales team.
Battery Discharge over current	Please reduce the loads on the Backup port and restart the inverter, or wait for the warning to be cleared after 5 minutes.










10.2.2 Battery Protection Description

LED Indicator	Protection Code	LED Display	Description	Troubleshooting
Green LEDs flicker once every 3S.	1		Temperature difference	Wait for automated recovery. In case the problem is not recovery for a long time, call for service.
	3		High temperature	Stop discharging and charging until this code is eliminated and wait for the temperature to drop.
	4		Low-temperature discharge	Stop discharging until this code is eliminated and wait for the temperature to rise.
	5		Overcurrent charge	Wait for automated recovery. In case the problem is not recovery for a long time, call for service.
	6		Overcurrent discharge	
	8		Cell overvoltage	
	9		Cell under voltage	Stop discharging and call service immediately.
	11		Low-temperature charge	Stop discharging until this code is eliminated and wait for the temperature to rise.

i **NOTE:**

In the case of work mode, if the protection code 09 appears, please press the power button of the battery with this code 5 times within 10 seconds, the BMS will be forced to turn on the MOSFET of discharge so that the inverter can detect the battery open voltage and charge the battery.

10.2.3 Battery Error Description

LED Indicator	Error Code	LED display	Description	Troubleshooting
Red LEDs flicker once every 3S.	Error 01		Temperature sensor failure	Please restart the battery. If the problem is not resolved, please call for service.
	Error 05		MOSFET error	
	Error 06		Circuit breaker open	Switch on circuit breaker after powering off the battery.
	Error 08		LMU disconnect (slave)	Reconnect the BMS communication cable.
	Error 09		SN missing	Call for service.
	Error 10		LMU disconnect (master)	Reconnect the BMS communication cable.
	Error 11		Software version inconsistent	Call for service.
	Error 12		Multi master	After shutting down the battery system, please restart all batteries within 30s.
	Error 13		MOS over temperature	Please power off the battery and turn on the battery after about 2 hours.

11. Uninstallation & Return

11.1 Removing the Product

Procedure

Step 1: Power off the product by following instructions in Chapter 9.3 Powering Off the Product.

Step 2: Disconnect all cables from the product, including communication cables, battery power cables, AC cables, and PE cables.

Step 3: Remove the WiFi module.

Step 4: Remove SMILE-S5 from the wall bracket.

Step 5: Remove the mounting bracket.

11.2 Packing the Product

If the original packaging is available, put SMILE-S5 inside it and then seal it using adhesive tape.

If the original packaging is not available, put SMILE-S5 inside a suitable cardboard box and seal it properly.

11.3 Disposing of the Product

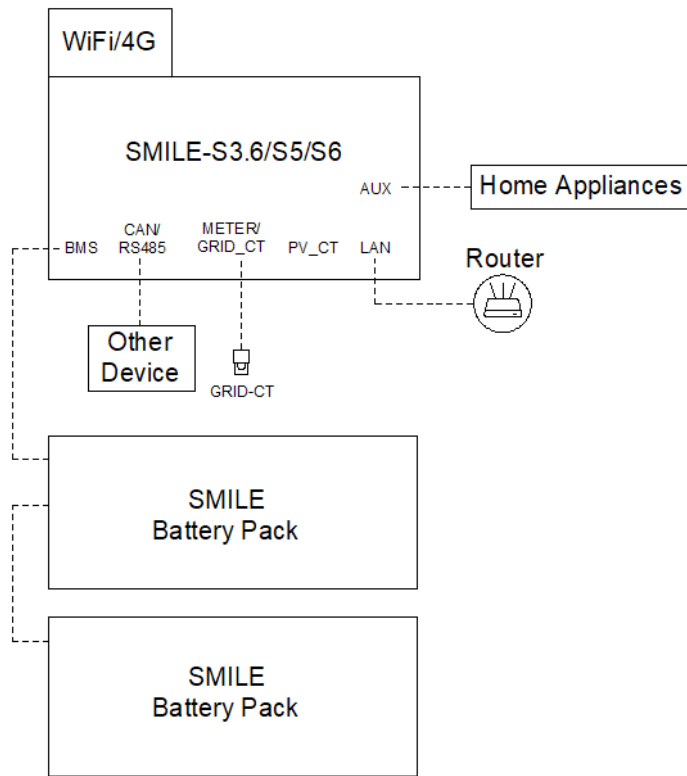
If SMILE-S5 service life expires, dispose of it according to the local disposal rules for electrical equipment and electronic component waste.

Dispose of the packaging and replaced parts according to the rules at the installation site where the device is installed.

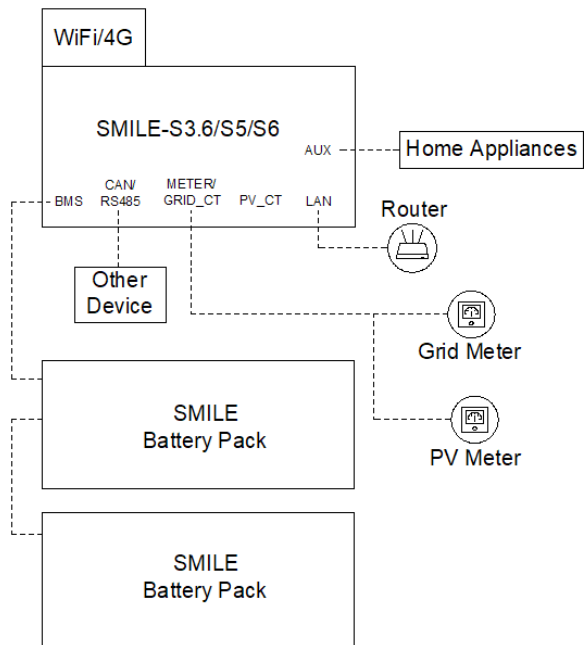
Do not dispose SMILE-S5 with normal domestic waste.



Appendix 1: Communication Connection Figure



Connect the CT



Connect the Meter

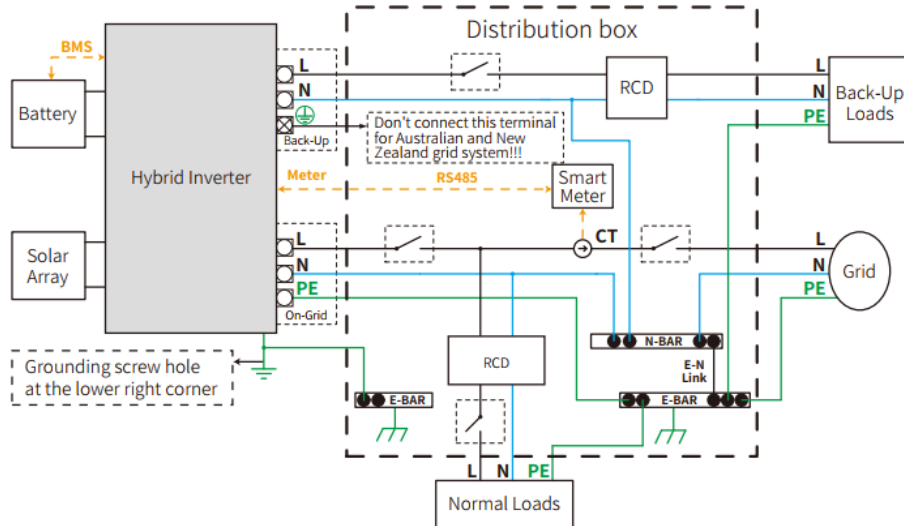
Appendix 2: Regional Application Standard

Regional application Standard	Electric Company
Australia A	N/A
Australia B	N/A
Australia C	N/A
New Zealand	N/A
Vector	Vector in New Zealand

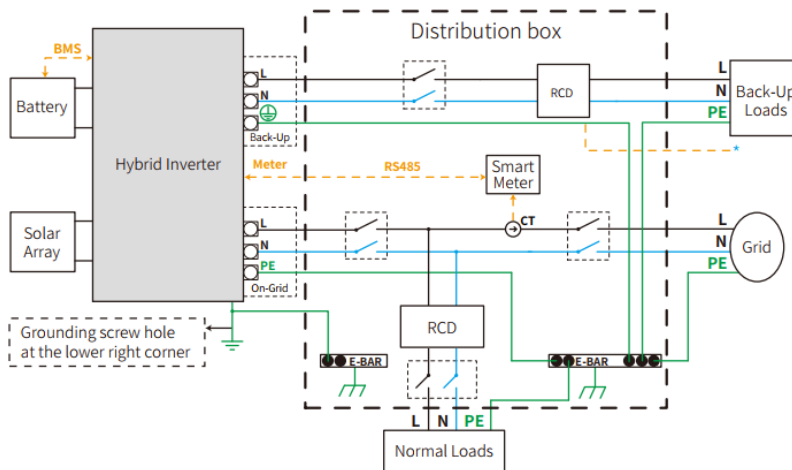
- Choose the correspond Regional Application Standard, the power quality response modes (Volt-Watt, Volt-Var, Reactive Power, Fixed Power Factor and Power Rate Limit) will run automatically. (Only for Australia)
- For compliance with AS/NZS 4777.2:2020 please select from Australia A/B/C. Please contact your local electricity grid operator for which region to select.
- For changes to default settings please contact the installer or Alpha ESS.

Appendix 3: System Connection Diagrams

Example for application that Neutral connects together with PE in distribution box, such as Australia, New Zealand, South Africa, etc. (Please follow local wiring regulations!)



Example for grid systems without special requirements on electrical wiring connection. (The back-up PE line and earthing bar must be grounded properly and effectively. Otherwise the back-up function may be abnormal when the grid fails.)



Appendix 4: Technical Data of SMILE-S6/S5/S3.6/B5 series

MODELS LIST		SMILE-S6 series	SMILE-S5 series	SMILE-S3.6 series	SMILE-B5 series
INPUT	V _{MAX} PV [Vdc]	600			/
	I _{SC} PV [A]	22.5/22.5			/
	MPP Voltage Range V _{MPP} [Vdc]	90~520V			/
	Max. Input Current I _{max} [A]	15/15			/
	MPP Full Power Voltage Range [Vdc]	300~450			/
	Start PV Voltage [Vdc]	120V			/
	Backfeed Current [A]	0			/
	Battery Voltage Range[Vdc]	42~54V			
	Max.Charing Current[Adc]	80	100		
	Max.Discharging Current[Adc]	80	100		
	Overvoltage Category (OVC)	II			
OUTPUT	Rated Output Voltage Un [Vac]	230			
	Normal Operating Voltage Range Un [Vac]	180~270			
	Rated Output Frequency F _{NETZ} [Hz]	50/60			
	Rated Power from Grid [kW]	7.59	7.59	5.5	7.59
	Rated Current from Grid [Aac]	33	33	23.9	33
	Rated Power Output to Grid [kW]	6	5	3.6	5
	Rated Current Output to Grid [Aac]	26.1	21.7	15.7	21.7

SYSTEM	Rated Backup Power [kW]	5	5	3.6	5
	Rated Backup Current [Aac]	21.7	21.7	15.7	21.7
	Power Factor $\cos\phi$ [λ]	[-0.8, 0.8]			
	Night Power Consumption [W]	<20			
	THD [\forall / I] (100% full power)	< 3%			
	Acoustic Noise [dB]	30			
	Overvoltage Category (OVC)	III			
	Protective Class	I			
	Enclosure Protection (IP)	IP65			
	Operating Temperature Range [°C]	-25 to +60(derating above 45 °C)			
	Pollution degree (PD)	PD 3(outside),PD 2(inside PD2)			
	Altitude [m]	3000			
	Array Insulation Resistance Detection [k Ω]	200			/
	The accuracy of resistance measurement [%]	1			/
Weight [kg]	25	25	25	23	
Size [mm]	530*350*240				