



UK Installation Manual

Energy Storage System (ESS)

SMILE5

V06

IMPRINT

China

Alpha ESS Co., Ltd.

Tel.: +86 (0)513 806 868 91

E-mail: info@alpha-ess.com

Web: www.alpha-ess.com

Add: JiuHua Road 888, High-Tech Industrial Development Zone
226300 Nantong City, Jiangsu Province

UK

Alpha ESS UK Ltd.

Tel: +44 (0) 1453 545 222

E-mail: info@alpha-ess.com

Web: www.alpha-ess.com

Add: Suite 4F, Drake House, Long Street, Dursley, Gloucestershire GL11 4HH

Copyright Statement

This manual is under the copyright of Alpha ESS Co., Ltd. with all rights reserved.

Please keep the manual properly and operate in strict accordance with all safety and operating instructions in this manual.

Please do not operate the system before reading the manual and following strict adherence to the installations instructions. Failure to do so will invalidate your warranty

Version Information

Version	Date	Content
V06	30.05.2022	Enclosed

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1. Introduction

1.1 Introduction

This document is only valid for the SMILE5 system.

The document scope includes the inverter SMILE5-INV, and a battery pack from the SMILE5-BAT/SMILE-BAT-10.1P/M4856-P models.

This document describes the mounting, installation, commissioning, configuration, operation, troubleshooting and decommissioning of the product as well as the operation of the product user interface.

Please observe all documentation that accompanies the product, always keep them in a convenient place and available for use when required.

Illustrations in this document are reduced to essential information and may be different from the actual product.

1.2 Target Group

This document is intended for trained and qualified installers and end users. It is important to note that only qualified persons are allowed to perform the activities marked in this document with a warning symbol. Tasks that do not require any qualification are not marked and can also be performed by end users.

Qualified persons must have the following skills:

- Knowledge of how an inverter works and is operated
- Training in how to deal with the dangers and risks associated with installing and using electrical devices, batteries, and systems
- Training in the installation and commissioning of electrical devices and systems
- Knowledge of the applicable standards and directives
- Knowledge of and compliance with this document, including all safety precautions
- Knowledge of and compliance with the documents of the battery manufacturer, including all safety precautions

1.3 Levels of Warning Sign

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 Designate

Complete designation	Designation in this document
SMILE-BAT-10.1P	Battery Pack (OUTDOOR)
SMILE5-BAT	Battery Pack (OUTDOOR)
M4856-P	Battery Pack (OUTDOOR)
SMILE5-INV (AU)	Inverter (OUTDOOR)
SMILE5-INV (UK)	Inverter (OUTDOOR)

1.5 SMILE5-INV

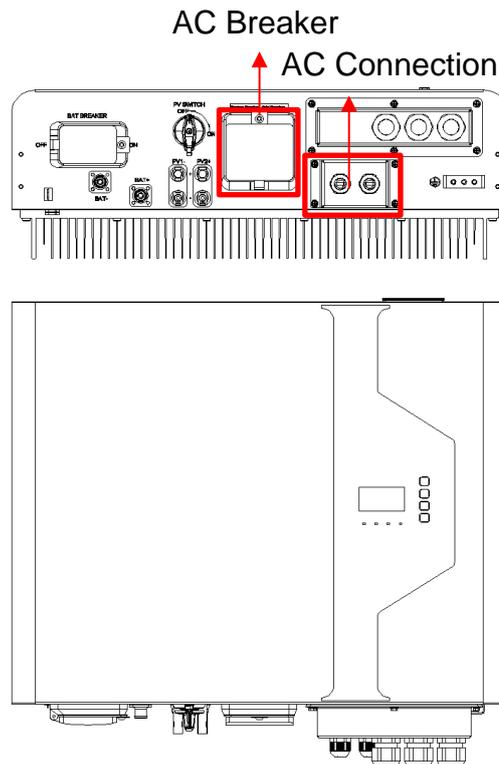


Figure 1.1
SMILE5-INV (UK Version)

2. Safety Instructions

2.1 Intended Use of the Inverter

The inverter, the battery pack, and the energy meters make up a system for optimization of self-consumption in a household. The inverter is equipped with two MPPT trackers and converts the direct current from the PV array into grid-compliant Single-phase current and feeds it into the utility grid. The Battery Pack is used for the intermediate storage of the energy.

The product is suitable for indoor and outdoor use.

The product must only be operated with PV arrays of protection class II in accordance with IEC 61730, application class A. The PV modules must be compatible with this product.

PV modules with a high capacity to ground must only be used if their coupling capacity does not exceed 1.0 μF .

All components must remain within their permitted operating ranges at all times.

Use this product only in accordance with the information provided in the enclosed documentation and with the locally applicable standards and directives. Any other application 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 all 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 follow all instructions contained within it.

The type label must remain permanently attached to the product.

2.2 Safety precaution for Battery Pack

2.2.1 General safety precautions

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

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

Battery pack is not user serviceable. High voltage is present in the device.

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

Do not connect any AC or PV conductors directly to the Battery Pack - they should only be connected to the inverter

Do not charge or discharge damaged batteries.

Do not damage the Battery Pack in such ways as dropping, deformation, impacting, cutting, or piercing. It may cause a leakage of electrolyte or lead to a fire.

Do not expose battery to an open flame.

2.2.2 Response to emergency situations

The Battery pack comprises multiple batteries that are designed to prevent hazards caused by failures. However, AlphaESS cannot guarantee total safety in every event and recommends the user follows the strict guidelines contained within this documentation.

If the user happens to be exposed to internal materials of the battery cell due to damage on the outer casing, the following actions are recommended.

- **Inhalation:** Leave the contaminated area immediately and seek medical attention.
- **Eye contact:** Rinse eyes with running water for 15 minutes and seek immediate medical attention.
- **Contact with skin:** Wash the contact 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, please take the following actions

- **Fire extinguishing media:** A respirator is not required during normal operations. Use an FM-200 or CO2 to extinguish the fire.
- Use an ABC fire extinguisher if the fire is not from battery and not spread to it yet.
- Fire Control instructions
 - If fire occurs when charging batteries, if it is safe to do so, turn off the battery pack circuit breaker to shut off the power to charge.
 - If the battery pack is not on fire, extinguish the fire before the battery

- pack catches fire.
- 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. Stay clear of the area

Please note the following methods to deal with any incidents you may incur:

- **On land:** Place damaged battery into a segregated place and call the fire service or your installer / service engineer dependent on the severity of the incident
- **In water:** Stay away from the water and don't touch anything if any part of the battery, inverter, or wiring is submerged. Do not use the submerged battery again and contact your installer / 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, 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 may result in death or lethal injuries due to electric shock.

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

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

When exposed to sunlight, the PV array generates high DC voltage which is present in the DC conductors. Touching the live DC cables may result in death or lethal injuries due to electric shock.

- Disconnect the inverter from voltage sources, test for voltage to prove isolation and make sure it cannot be reconnected before working on the device.
- Do not touch non-insulated parts or cables.
- Do not disconnect the DC connectors under load.
- Wear suitable personal protective equipment for all work on the inverter.

 **DANGER****Danger to life due to electric shock from touching an ungrounded PV module or array frame**

Touching ungrounded PV modules or array frames may result in death or lethal injuries due to electric shock.

- Connect and ground the frame of the PV modules, the array frame and the electrically conductive surfaces so that there is Continuity.
- Observe all applicable local regulations.

 **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 may result in death or lethal injuries due to electric shock.

- Disconnect the product from voltage sources, test for voltage to prove isolation and make sure it cannot be reconnected before working on the device.
- Only touch the cables of the PV array on the insulation.
- Do not touch any parts of the substructure or frame of the PV array.
- Do not connect PV strings with ground faults to the inverter.

 **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, test for voltage to prove isolation 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 can leak from the battery pack and no toxic gases can form. Despite careful construction, if the battery pack is damaged or a fault occurs, it is possible that electrolyte may have leaked, or toxic gases formed.

- 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, i.e., on the side with the mounting lugs.
- 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 enclosure), 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 10 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 Together with the red LED, this symbol indicates an error.
	Certified safety The product is TUV-tested and complies with the requirements of the EU Equipment and Product Safety Act.
	UKCA marking The product complies with the requirements of the applicable UK directives.
	RCM (Regulatory Compliance Mark) The product complies with the requirements of the applicable Australian standards.

Symbols on the Type Label of the Battery Pack

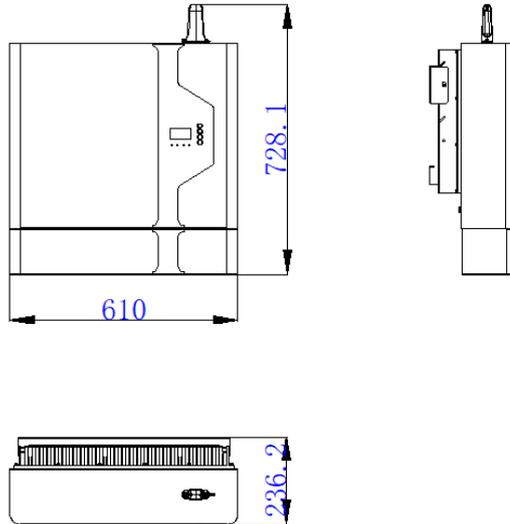
Symbol	Explanation
	Beware of a danger zone This symbol indicates that the product must be additionally grounded if additional grounding or equipotential bonding is required at the installation site.
	Beware of electrical voltage The product operates at high voltages.
	Risk off chemical burns
	Risk off Explosion
	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 Together with the red LED, this symbol indicates an error.
	Risk off Elektrolyte leakage
	UKCA marking The product complies with the requirements of the applicable UK directives.
	Refer to the instructions for operation
	Use eye protection
	Fire, naked light, and smoking prohibited
	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
---	----------------

3. Product Introduction and Applications

3.1 Inverter Description

Inverter appearance and dimensions (Dimensions in mm)



3.2 System Introduction

AlphaESS SMILE5 (incl. SMILE5-BAT and SMILE5-INV) can be applied in DC-coupled systems (new installation), AC-coupled systems (retrofit) and Hybrid-coupled systems (retrofit, and PV capacity-increase), as the following schemes show:

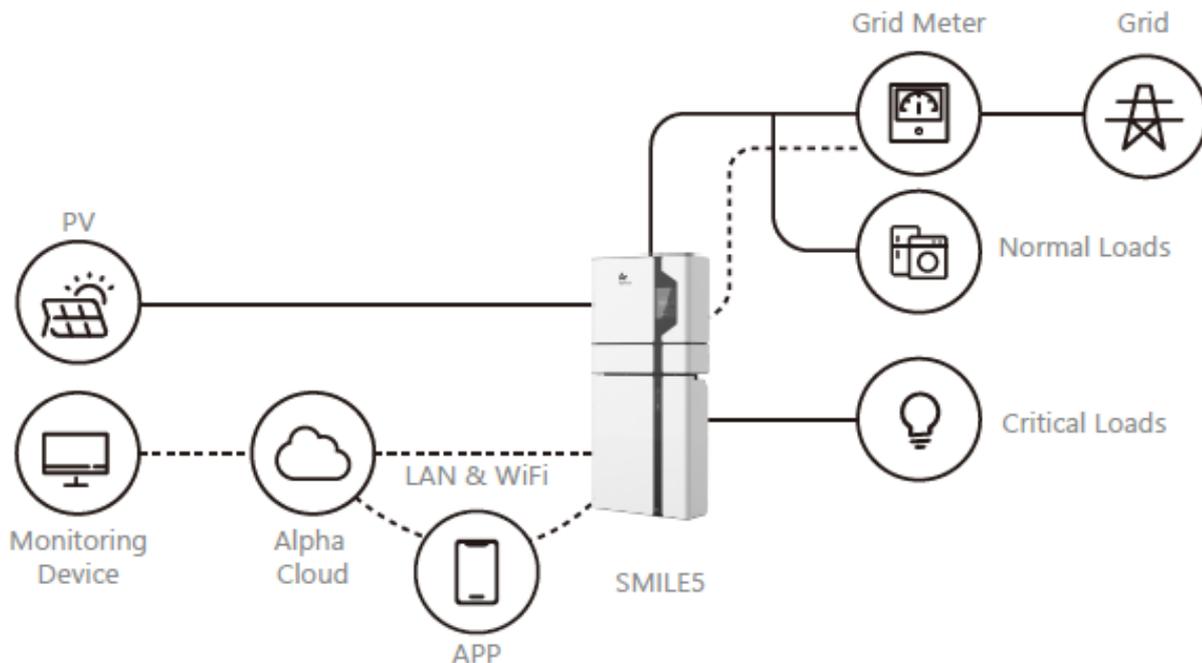


Figure 3.1 DC-coupled Storage System-Scheme

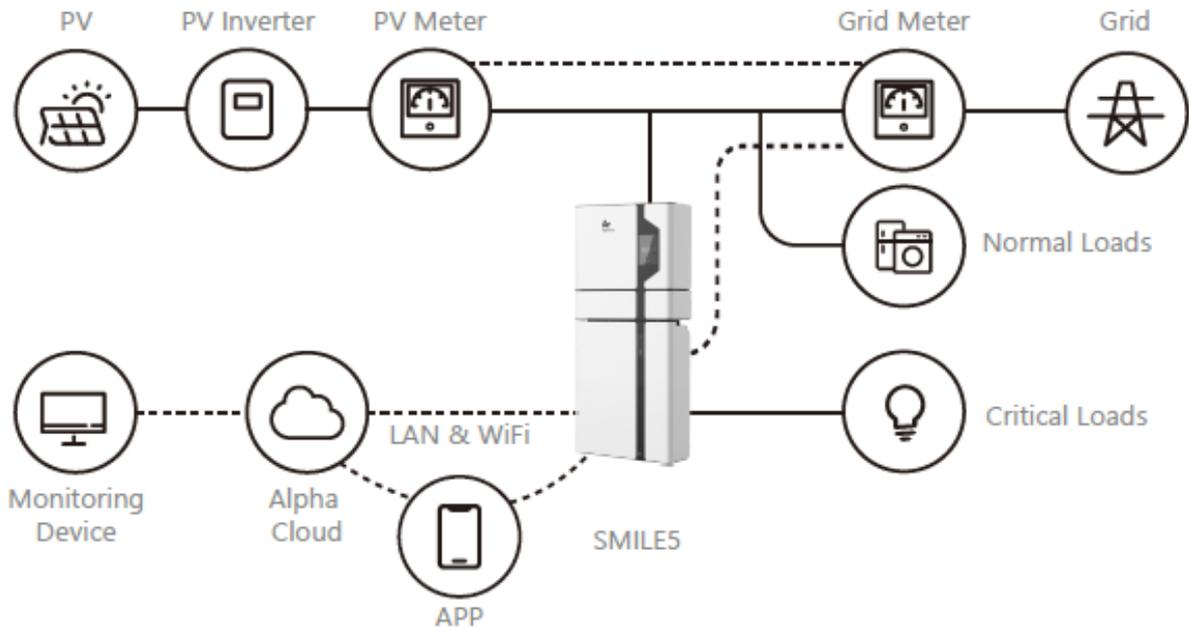


Figure 3.2 AC-coupled Storage System-Scheme

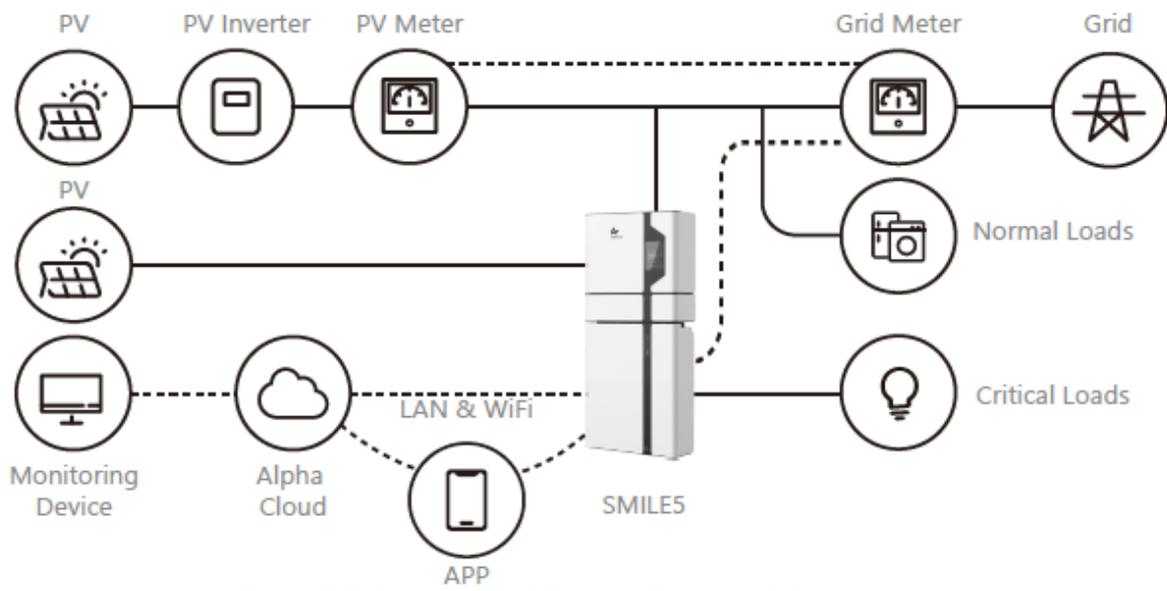


Figure 3.3 Hybrid-coupled Storage System-Scheme

CAUTION:

For the AC-/ Hybrid-coupled system, unlike DC, two ACR10-R power meters are to be mounted.

Please note the SMILE5 **cannot** be used in pure off-grid systems.

4. EMS Introduction and Set up

4.1 Function Description

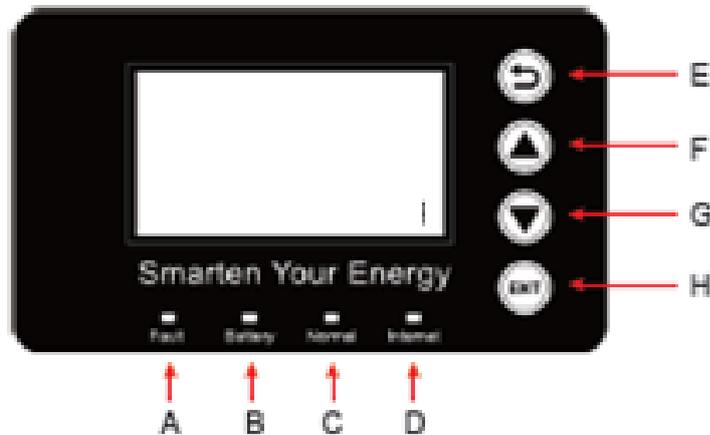


Figure 4.1 SMILE5 EMS Interface

Object	Name	Description
A	LED	Red: The inverter is in fault.
B		Green: The battery is charging or discharging.
C		Green: The inverter is working normally.
D		Green: The inverter is connected to the internet.
E	Button	Return Button: Exit from current interface or function.
F		Up button: Move cursor up or increase value.
G		Down Button: Move cursor down or decrease value.
H		ENT Button: Confirm selection.
I	LCD-Screen	Display the information of the inverter in this LCD screen.

4.2 Introduction

This part is for EMS firmware-version 1.01.67 and above.

4.2.1 Main Display

Power	0W
Total	00.0kWh
Battery	%
Normal	

Main display shows the inverter working status and information, including:

- Power: Current PV power
- Total: Total power generation.
- Battery: Current remaining battery power (SOC).
- Normal: Current working state of the equipment, including Standby.

>>>> MENU <<<<<
>Status
History
Setting

On the Main Display, press ENT button to enter the menu.

Use the up and down button to select a sub-menu, press the ENT button to enter the selected sub-menu, press Return button to return to the previous screen.

4.2.2 Status

>>>> Status <<<<<
>Grid
Solar
Battery

Status menu contains five sub-menus: Solar, Battery, Grid, UPS and Comm. These display the relevant information about the current physical or communication interface respectively.

>>>>> Grid <<<<<<	
> U	230.2V
I	2.0A
F	49.99Hz

Grid interface displays the real-time information on the AC grid side: voltage U, current I, frequency F, PInv, PMeterAC, PMeterDC.

```
>>>>> Solar <<<<<
> U1          360.0V
  I1          1.0A
  P1          360W
```

Solar menu displays the real-time information of PV system: DC voltage U1, current I1, power P1, DC voltage U2, current I2 and power P2.

```
>>> Battery <<<
> U          48.0V
  I          10.0A
  P          480W
```

Battery menu displays the real-time information of battery side: DC voltage U, current I, power P, residual capacity of Battery (SOC), the internal temperature Temp

```
>>>>> UPS <<<<<
> U          230.2V
  I          2.0A
  P          460W
```

UPS menu displays the real-time information in this mode: AC voltage U, current I, power P, frequency F

```
>>>>> Comm <<<<<
> BMS        Yes
  Net        Yes
  MeterGrid  Yes
```

Communication menu displays the real-time communication situation of BMS, Net, Meter Grid and Meter PV.

4.2.3 History

```
>>>> History <<<
> Grid Consump
  INV Gen.
  BAT Gen.
```

History menu contains seven sub-menus: Grid Consumption, INV Gen., BAT Gen., PV Gen., Grid Charge, PV Charge, Error Logs

```
> Grid CONSUMP <
> Total:
                                0.0kWh
```

Grid Consumption menu displays today's or total consumption from grid

```

>>> INV Gen.      <<<
> Today:
                                     29.1kWh
    
```

INV Gen. Menu displays today's or total electricity quantity generated from SMILE5-INV.

```

>>> Bat Gen.      <<<
> Today:
                                     13.8kWh
    
```

Bat Gen. menu displays today's or total electricity quantity discharged from the battery.

```

>>> PV Gen.       <<<
> Today:
                                     19.0kWh
    
```

PV Gen. menu displays today's or total electricity generated from the PV-panels.

```

>>> Grid Charge   <<
> Today:
                                     1.9kWh
    
```

Grid Charge menu displays today's or total amount of battery charging from the grid.

```

>>> PV Charge     <<
> Today:
                                     13.1kWh
    
```

PV Charge menu displays today's or total amount of battery charging from the PV-panels.

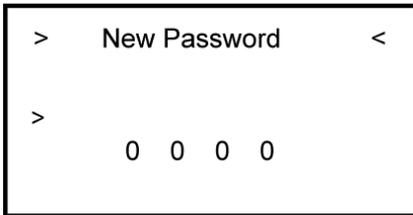
```

>>> Error Logs    <<<
1:
2018-02-02          16:48
    Chg SPI Fault
    
```

Error Logs menu displays the Last 10 fault records of this device, including the name of the fault and time of error.

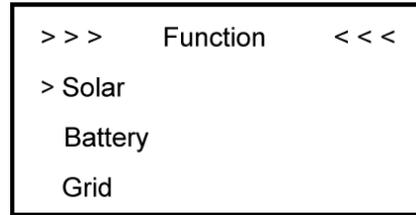
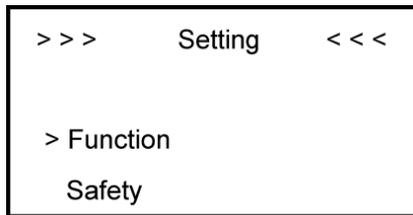
4.2.4 Settings

4.2.4.1 General Setting



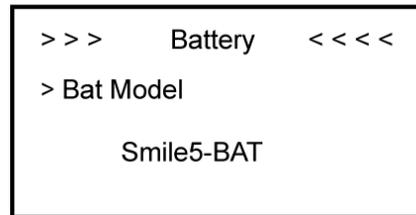
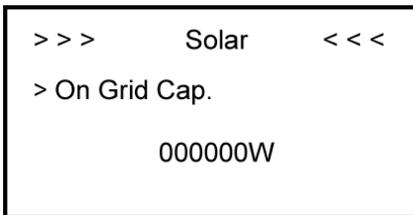
Step 1: Click setting and enter the password.

The password is 1111, after the password is entered correctly, this brings you into the main Setting interface (administrator permissions).



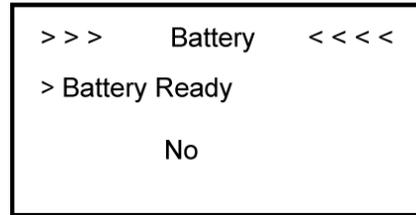
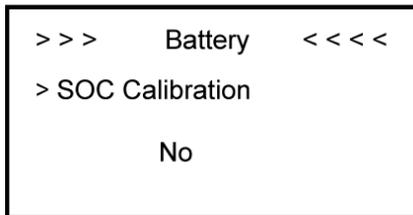
Step 2: Click Function to enter function setting.

Step 3: Click Solar to set the Solar relevant information.



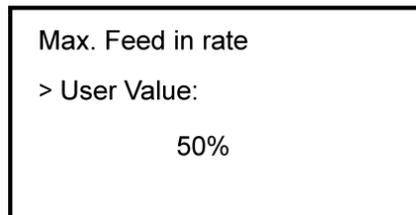
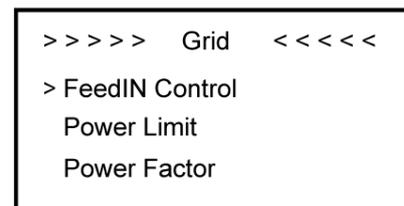
Step 4: Set on-grid capacity, storage capacity and number of PV strings (MPPT number).

Step 5: Click the Battery Function and check battery type SMILE5-BAT.



Step 6: Check SOC Calibration function is set to No.

Step 7: Check the Battery Ready function is set to No. If you are using the inverter without a battery, please set it to Yes.



Step 8: Click the Grid Function to set up relevant parameters about the grid

Step 9: Set the Max. Feed in rate value.

```
>> System Mode <<
> DC
  AC
  Hybrid
```

Step 10: Click Function-System Mode to set system mode: DC, AC, or Hybrid.

```
>>> Safety <<<<
> Country
      AS4777
```

Step 11: Click Safety in the setting menu. Set safety standard.

G98/1 or G99/2 for Great Britain,

```
>>> CT Meter <<<<
> Enable OFF
      Ratio 1
```

Step 12: When using the ACR10-r CT meter, please set CT meter enable to ON and the ratio to 120.

```
>> UPS System <<
> Mute YES
  Frequency: 50Hz
```

Step 13: If you use UPS function, please set mute as YES in the UPS System interface and 50Hz.

```
>>> Date&Time <<<
> 2018 - 02 - 02
      09 : 46
```

Step 14: Click System in the setting menu. Click Date&Time to change this to local time.

```
>>> Ethernet <<<<
      IP method
> DHCP
```

Step 15: Click Ethernet to set a Static IP address. If this is not required, then set to DHCP mode for the system to automatically connect to the internet

If you want to set up the IP address manually, please choose manual mode.

```
>>> Language <<<<
> English
  Deutsch
```

Step 16: Click Language to set language

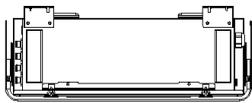
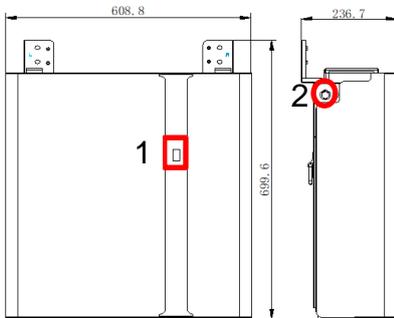
```
>> Information <
> SN:
      AL20020YYMMXXXX
```

Step 17: Make sure you set the correct serial numbers

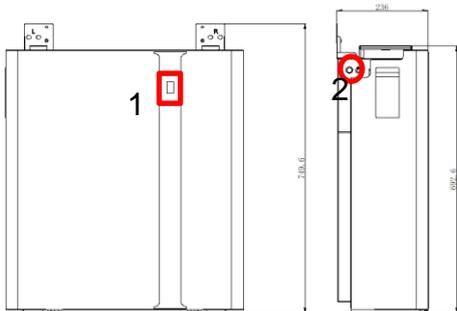
4.3 Battery Pack Description

Battery pack appearance and Dimensions (Dimensions in mm)

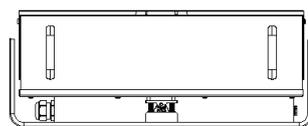
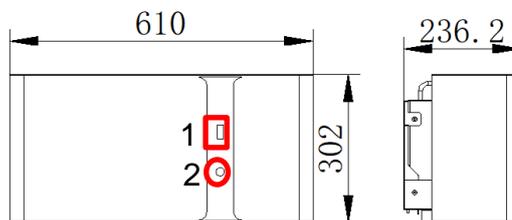
1. SMILE5-BAT



2. SMILE- BAT-10.1P



3. M4856-P



1 & 2 highlight Location of the Battery pack LED Signals

4.4 Switch On/Off

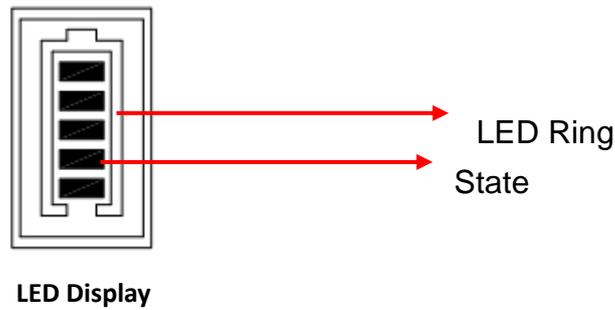
The system needs to be turned on in the correct sequence to avoid any damage.

Switch on:

Press the power button for about 2-4 seconds. The BMS will start up. The LED display and power button will light up as well.

Switch off:

Pressing the power button for more than 5 seconds, the battery modules will be turned off.



LED Display

In normal condition, LED display indicates the SOC as the figure below:

LED Ring	SOC	Description
Standby: Green light flickering 1 s Work: Green light flickering 10s		SOC<5%
		5%=<SOC<25%
		25%=<SOC<50%
		50%=<SOC<75%
		75%=<SOC<95%
		SOC>95%

5. Storage

5.1 Inverter Storage

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

1. Do not unpack the inverter.
2. Keep the storage temperature between $-40\sim 70^{\circ}\text{C}$ and the humidity to $5\%\sim 95\%$ RH.
3. The inverter should be stored in a clean and dry place and be protected from dust and water vapor corrosion.
4. A maximum of six inverters can be stacked. To avoid personal injury or device damage, stack inverters with carefully to prevent them from falling over.
5. During the storage period, check the inverter periodically. (It is recommended that the check is performed every three months.) Replace the packing materials that are damaged by insects or rodents in a timely manner.
6. If the inverters have been stored for more than two years, it must be checked and tested by professionals before use.

5.2 Battery Storage

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

1. Store batteries according to the signs on the packaging during storage. Do not put batteries upside down or sidelong.
2. Stack the batteries to comply with the stacking requirements on the external packaging.
3. Store the battery pack out of reach of children and animals.
4. Store the battery pack in a location to avoid dust and dirt.
5. Handle batteries 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: $15\%\sim 85\%$
 - Place batteries in a dry and clean place with proper ventilation.
 - Place batteries in a place that is away from corrosive organic solvents and gases.
 - Keep batteries away from direct sunlight.
 - Keep batteries at least 2 meters away from heat sources.

7. The batteries in storage must be disconnected from external devices. The indicators (if any) on the batteries should be off.
8. Batteries should be delivered based on the "first in, first out" rule.
9. 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 are not stored for a long period of time. 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 can be recharged every 6 months at least, and must be recharged to at least 50% of the SOC.

6. Unpacking

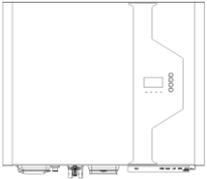
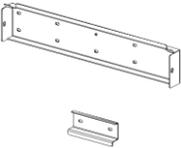
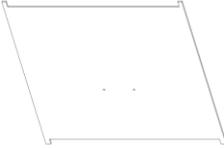
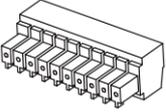
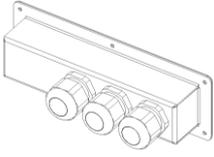
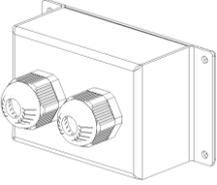
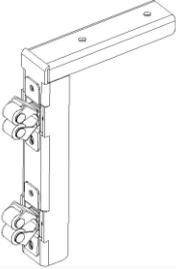
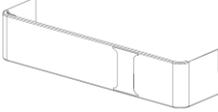
6.1 Checking the Outer Packing

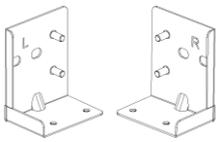
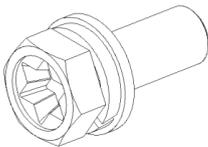
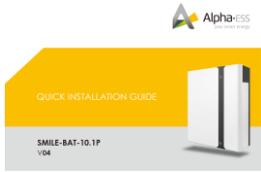
Before unpacking the battery pack and inverter, check the packaging for damage, such as holes and cracks. If any damage is found, do not unpack the product and contact your distributor as soon as possible.

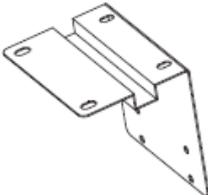
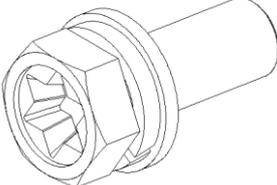
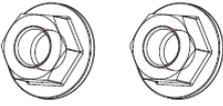
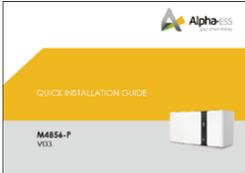
6.2 Scope of Delivery

Check the scope of delivery for any missing parts and any externally visible damage.

Contact your distributor if the scope of delivery is incomplete or damaged.

SMILE5-INV Hybrid Inverter				
				
Inverter (X1)	Wall Bracket (X1)	Wall Anchor ST6*55 (X10)	Positioning Paper Plate for AU (X1)	Positioning Paper Plate for UK (X1)
				
PV Connector (X4)	6 Pin Terminal (X1)	Wi-Fi module (X1)	EMS Connection Cover (X1)	AC Connection Cover (X1)
				
CB Bracket (X2)	Screw M5*10 (X3) Screw M6*10 (X2) Screw M4*10 (X4)	Installation Manual (X1)	CB Cover (X1)	gasket (X5)

SMILE- BAT-10.1P/ SMILE5- BAT			
			
Wall brackets (X2)	BAT Power Cable (1 Black, 1 Red) (X2)	BAT Communication Cable (X1)	Wall Anchor ST6*55 (X4)
			
M5*10 Screw (X6)	Quick Installation Man- ual (X1)		

M4856-P			
			
Expansion Bracket (X1)	Positive Power Cable (X1) Negative Power Cable (X1)	BAT Communication Cable (X1)	Wall Anchor ST6*55 (X4)
			
M5*10 Screw (X6)	M4 Flange (X2)	Quick Installation Manual (X1)	

7. Mounting

7.1 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
- Do not mount the product in potentially explosive atmospheres.

Basic Requirements

- Do not install the inverter in a place where a person can easily touch it because its housing and heat sinks are extremely hot during operation.
- Do not install the product in areas with flammable or explosive materials.
- Do not install the product at a place within children's reach.
- Do not install the product outdoors in salt areas because it will become corroded and may cause fire. A salt area refers to the region within 500 meters from the coast or prone to sea breezes. The regions prone to sea breeze vary depending on weather conditions (such as storms and severe weather) or terrains (such as dams and hills).

Mounting Environment Requirements

- The Product must be installed in a well-ventilated environment to ensure good heat dissipation.
- When installed under direct sunlight, the power of the product may be derated due to additional temperature rise.
- Install the product in a sheltered place or install an awning on 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.

Mounting Structure Requirements

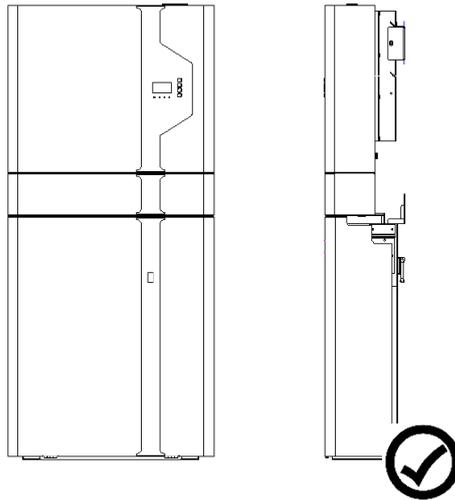
- The mounting structure where the product is mounted must be fireproof.
- Do not mount the product on flammable building materials.
- Ensure that the mounting surface is solid enough to bear the weight load.
- In residential areas, do not mount the product on drywalls or walls made of similar materials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

Mounting Angle Requirements

The battery pack should be floor-mounted, and the inverter should be wall-mounted.

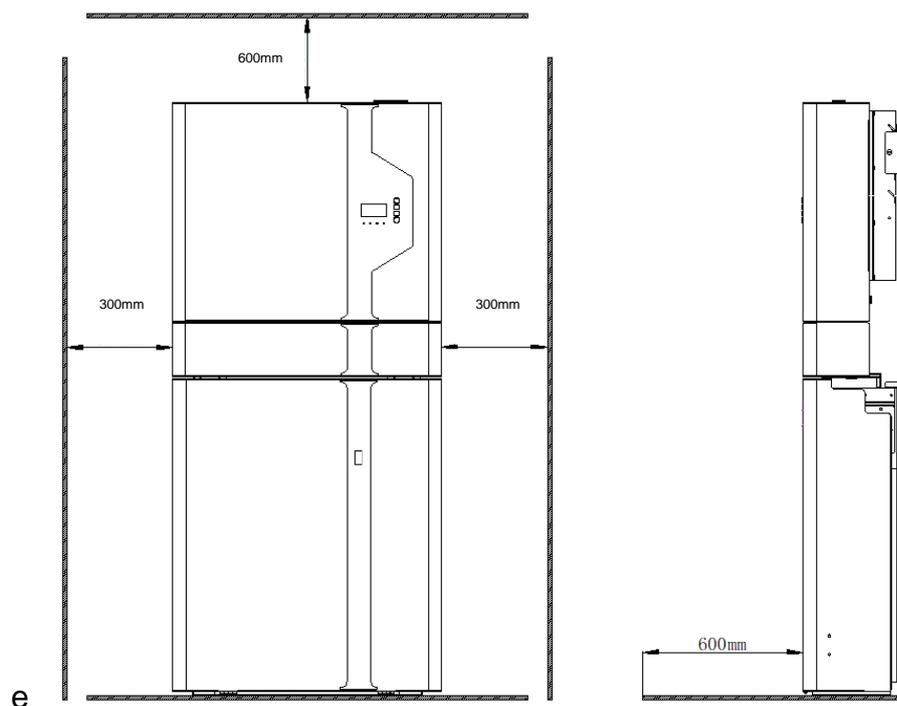
The installation angle requirements are as follow:

- The battery and inverter need to be mounted on a flat wall with no tilt in any direction.

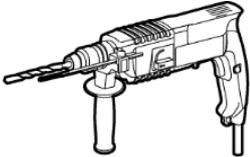
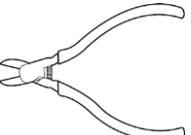
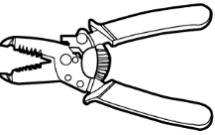
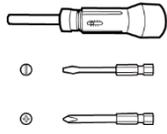
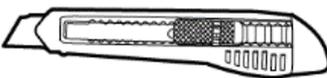
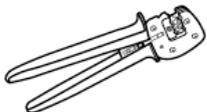
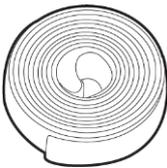
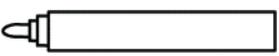


7.2 Mounting Space Requirements

- Ensure there is sufficient clearance (600mm at top, 300mm at sides) around the battery pack and inverter to ensure sufficient space for installation and heat dissipation.



7.3 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: 0–5 N m)
	 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
	PPE	 Safety gloves	 Safety goggles
 Safety shoes		N/A	N/A

	Safety shoes		
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7.4 Mounting the Battery Pack and Inverter

7.4.1 Mounting the Battery Pack

NOTE:

The customer needs to confirm the installation method according to different batteries.

Step 1: Take out the battery pack from the packaging.

Do not put the battery pack upside down on the ground.

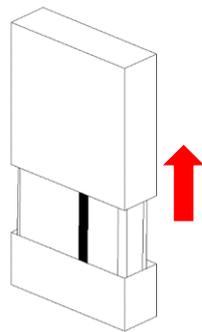


Figure 7.1 Take out SMILE-BAT-10.1P/SMILE5-BAT

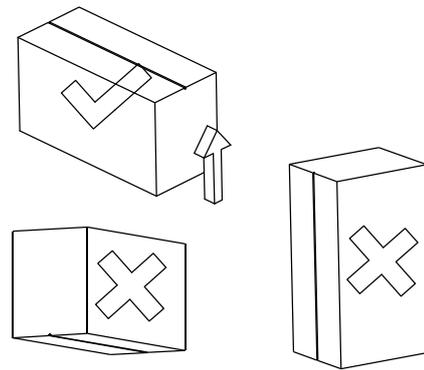


Figure 7.2 Take out M4856-P

7.4.1.1 Install SMILE-BAT-10.1P

NOTE:

Step 2: Assemble the wall brackets on the top of the battery (tool: T20 screwdriver, torque: 2.5 N.m).

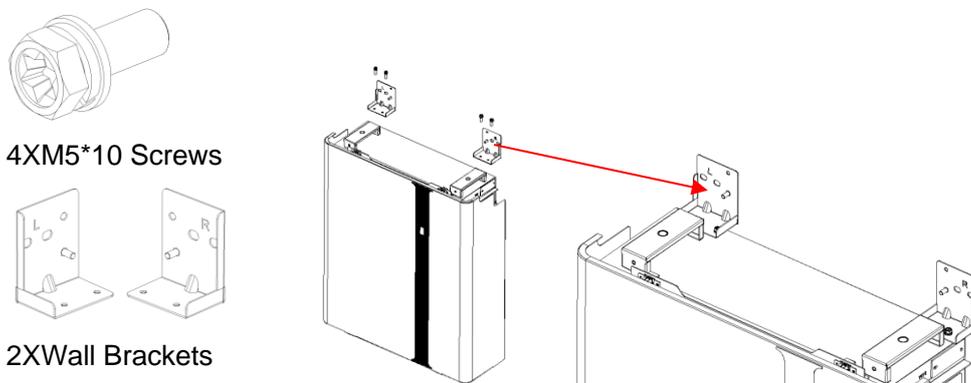


Figure 7.3 Install wall brackets

Step 3: Move the battery to the wall to be installed and position it according to the locating holes of the wall mounting bracket. After marking its position, remove the battery and drill the mounting holes, (Φ 10, hole depth: 65mm).

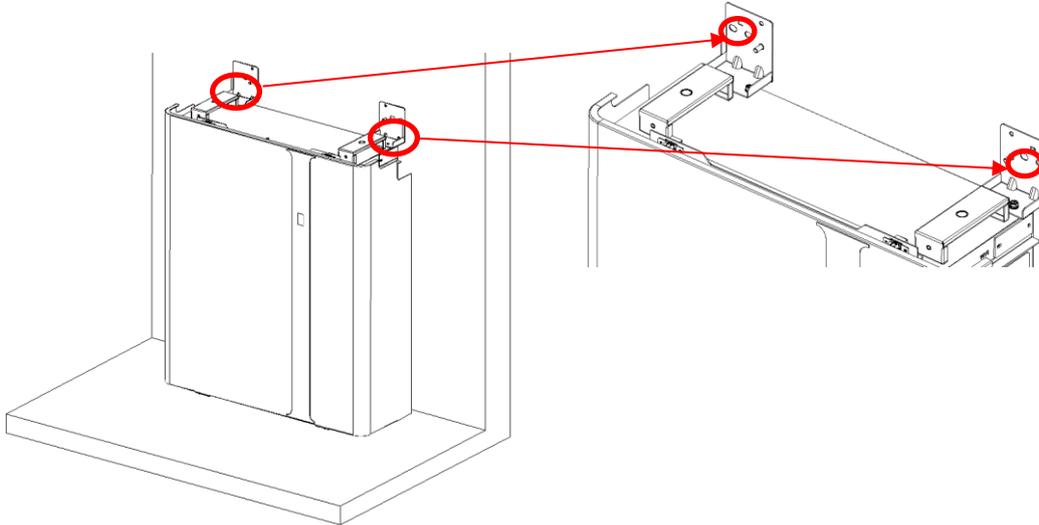


Figure 7.4 Locating holes

NOTE:

If the ground is not level, the gaps between the battery covers will become larger. In this case, the PC sheet in the accessory package can be placed on an area with uneven ground to solve the problem.

Step 4: Secure the battery to the wall. (Tool: SW10 sleeve).

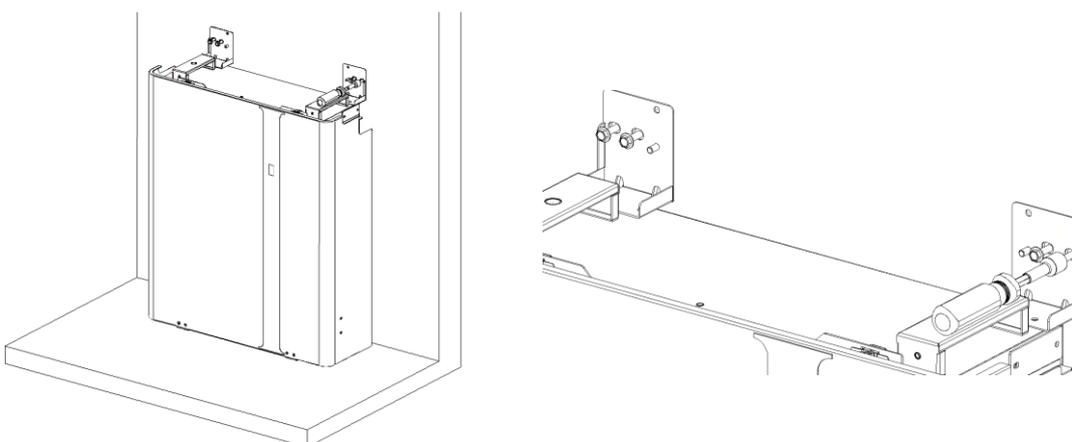


Figure 7.5 Fix the battery

7.4.1.2 Install SMILE5-BAT

Step 1: Assemble the mounting panels on the top of the SMILE5-BAT

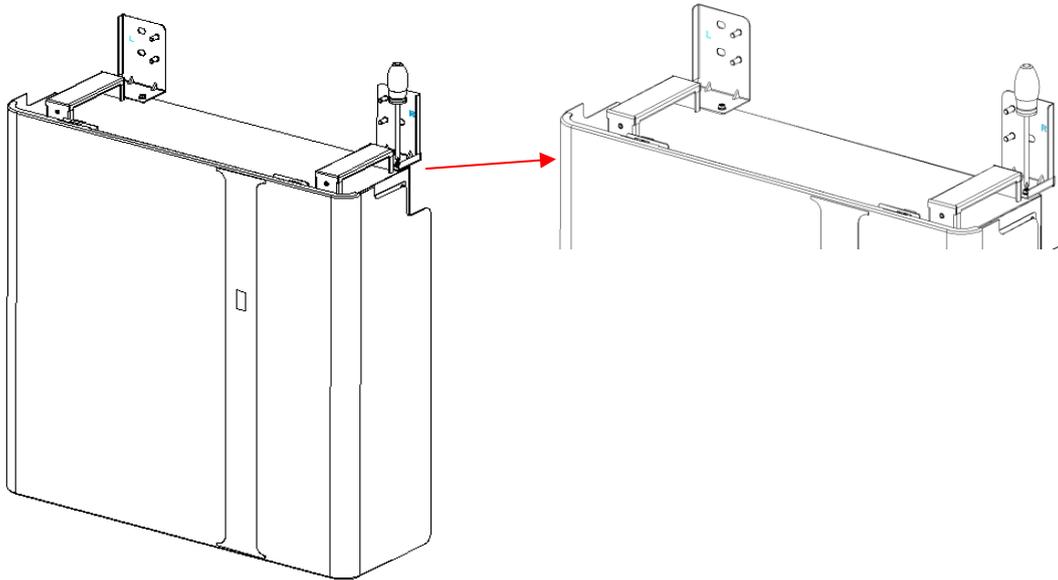


Figure 7.6 Assemble Battery Mounting Panel

Step 2: Move the battery to the wall to be installed and position it according to the locating holes of the wall mounting bracket. After marking its position, remove the battery and drill the mounting holes, (Φ 10, hole depth: 65mm).

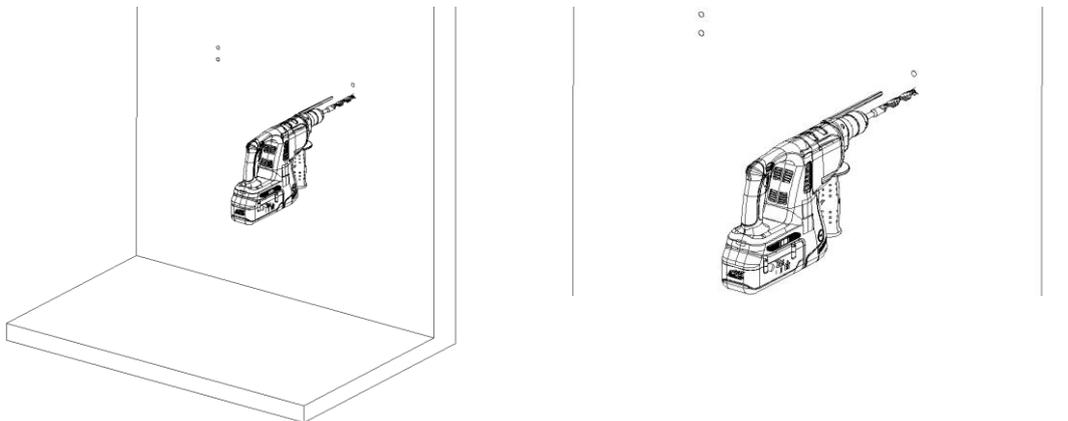


Figure 7.7 Drill positioning holes

NOTE:

If the ground is not level, the gaps between the battery covers will become larger. In this case, the PC sheet in the accessory package can be placed on an area with uneven ground to solve the problem.

Step 3: Secure the battery to the wall. (Tool: SW10 sleeve).

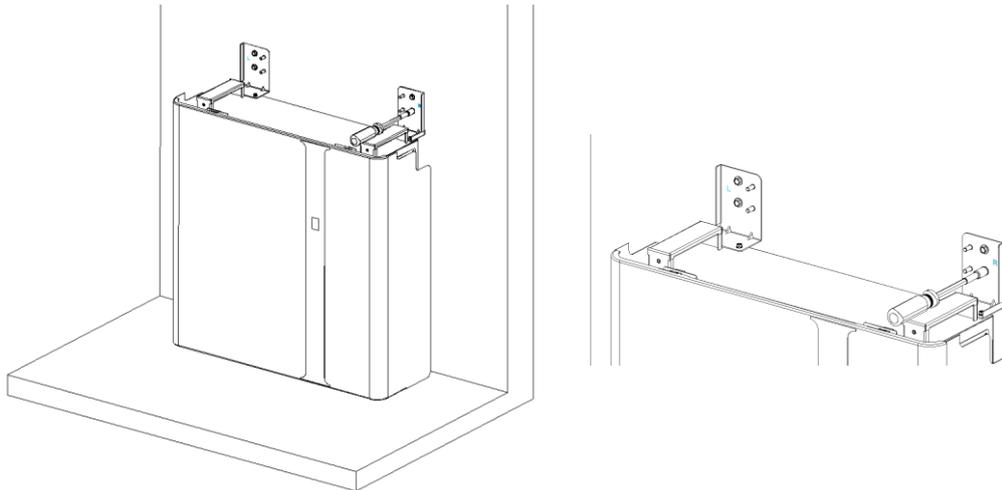


Figure 7.8 Secure the first battery

Step 4: Take out the second battery, place it on the first battery, and repeat steps 1-3, respectively.

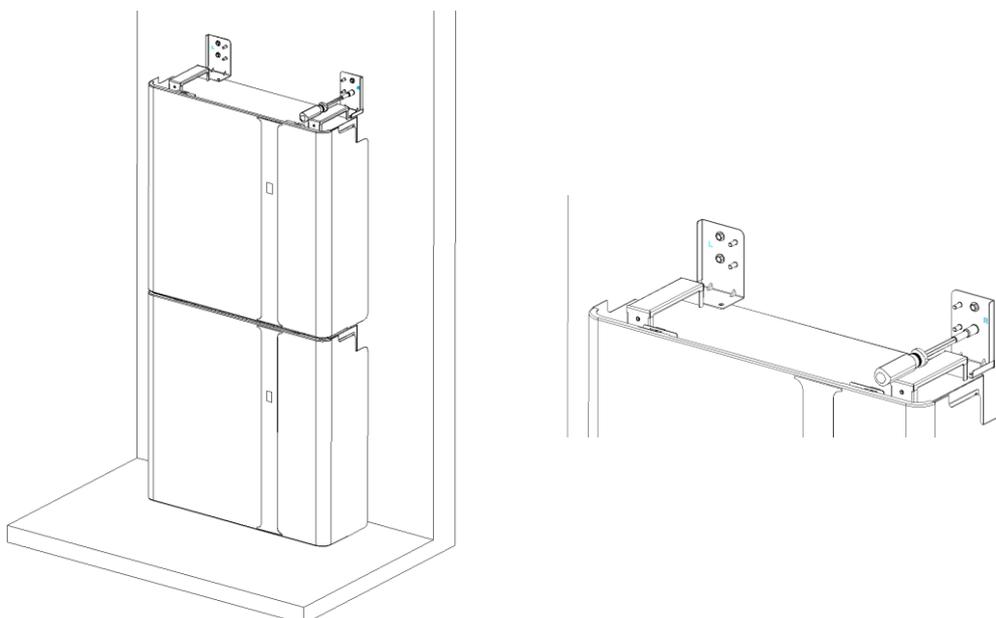


Figure 7.9 Install the second battery

7.4.1.3 Install M4856-P

Step 1: Take out the front panel and unscrew the screws that fix the cabinet and the wall bracket by using a screwdriver.

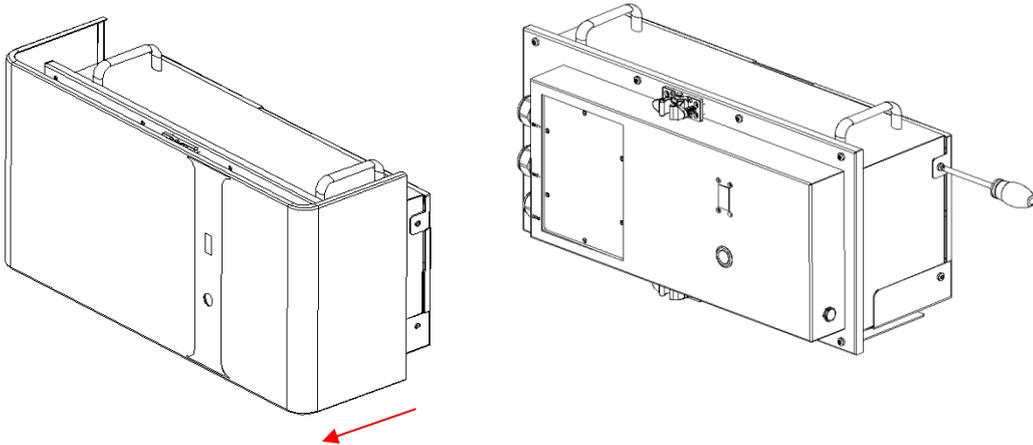


Figure 7.10 Remove the wall bracket of M4856-P

Step 2: Place the wall bracket on the wall, mark the holes for fixing the battery and use a drill ($\Phi 10$, depth: 65mm) to drill after positioning.

NOTE:

The four points on the left and right sides of the wall bracket must be secured with screws.

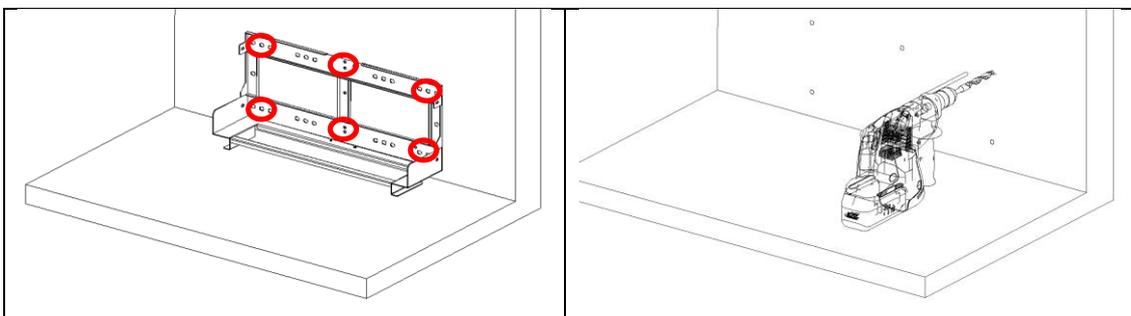


Figure 7.11 Drill Holes

NOTE:

If the ground is not level, the gap between the covers will become larger. In this case, the PC sheet in the accessory package can be placed on an area with uneven ground to solve the problem.

Step 3: Secure the battery to the wall (Tool: SW10 sleeve).

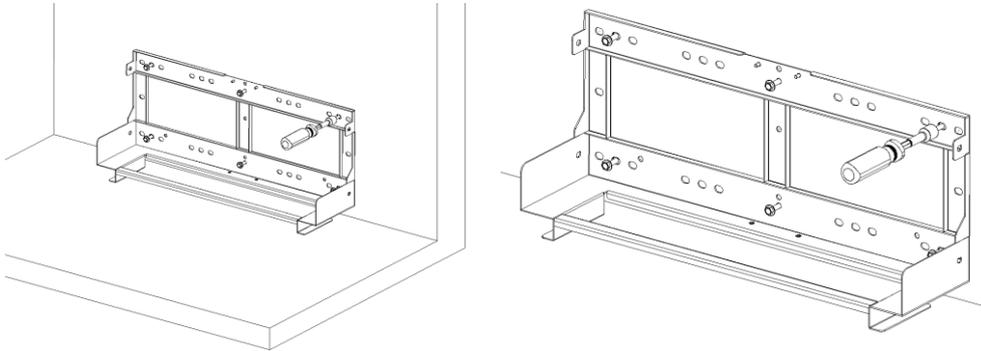


Figure 7.12 Secure the wall bracket

Step 4: Install the expansion batteries.

Step 4.1: Take out the expansion bracket of M4856-P and connect it with the first wall bracket with the M4 nuts.

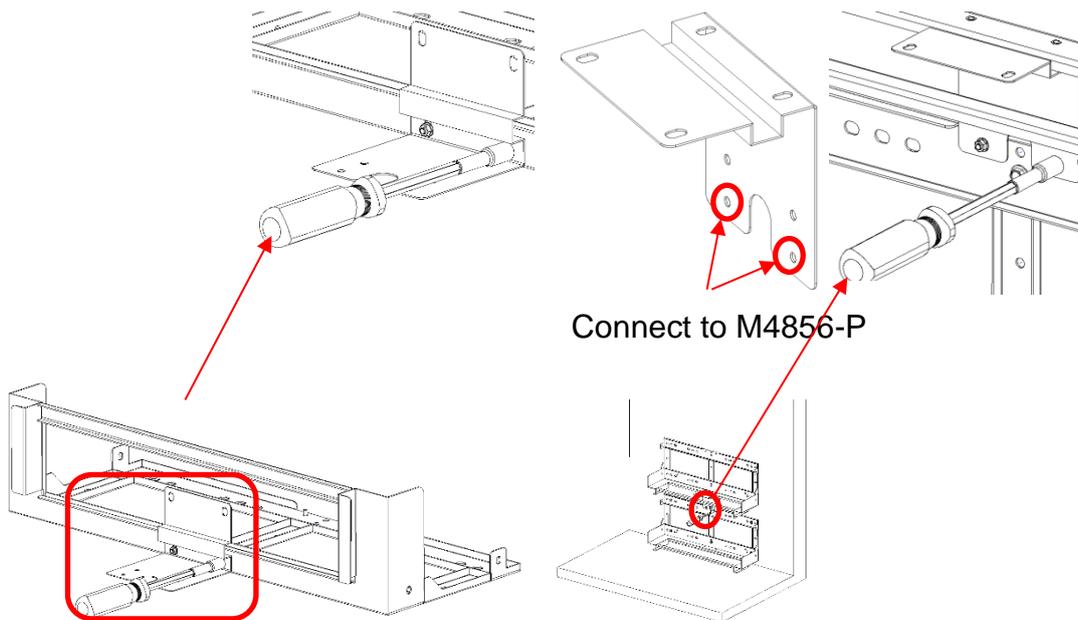


Figure 7.13 Install the expansion bracket

NOTE:

When the expansion bracket is connected with the wall bracket, the two holes below must be used to connect, otherwise the subsequent installation cannot be carried out.

Step 4.2: Place the wall bracket of the expansion battery on the expansion bracket for positioning, and drill holes after positioning;

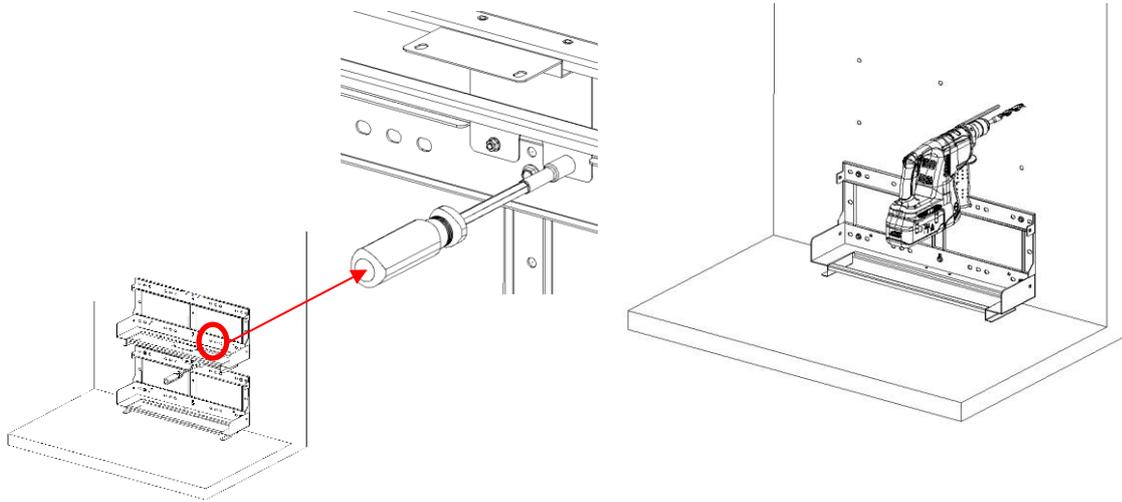


Figure 7.14 Drill Holes

Step 4.3: Secure the battery to the wall (Tool: SW10 sleeve).

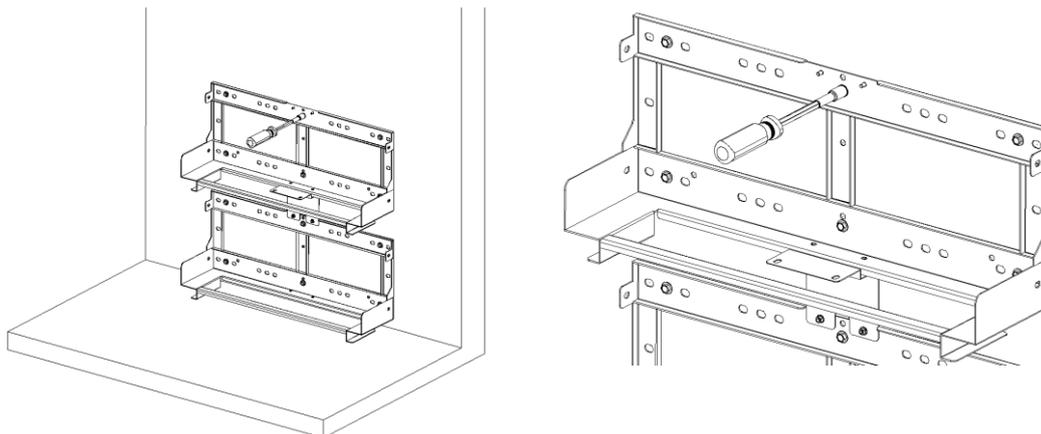


Figure 7.15 Secure the wall bracket

Step 4.4: Remove the expansion bracket;

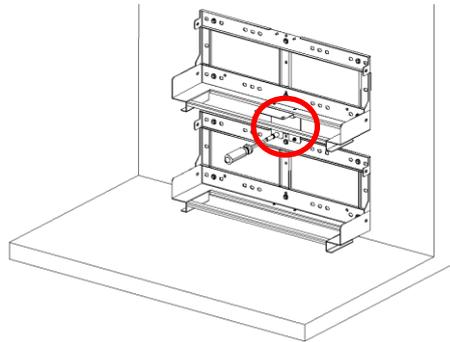


Figure 7.16 Remove the expansion bracket

Step 4.5: Install M4856-P:

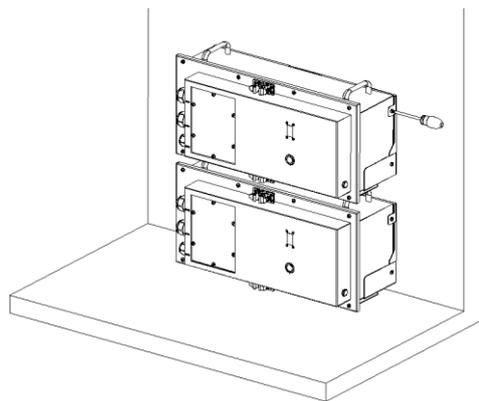


Figure 7.17 Install M4856-P

7.4.2 Mounting the Inverter

The steps to mount the inverter are listed below:

Step 1: Remove the Wi-Fi panel on the top and install the Wi-Fi module
(Tool: T20 screwdriver, Torque: 1.6Nm).

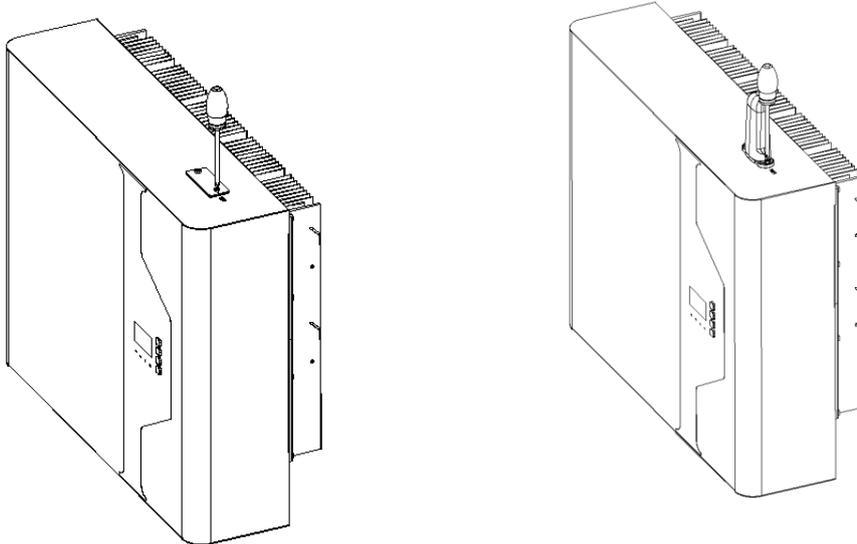


Figure 7.18 WiFi Module Installation

Step 2: Connect the positioning cardboard to the wall bracket of battery.

The cardboard of SMILE5-BAT and SMILE-BAT-10.1P are not the same as the M4856-P. Please follow the steps below:

- 1) Install the cardboard of SMILE5-BAT and SMILE-BAT-10.1P.

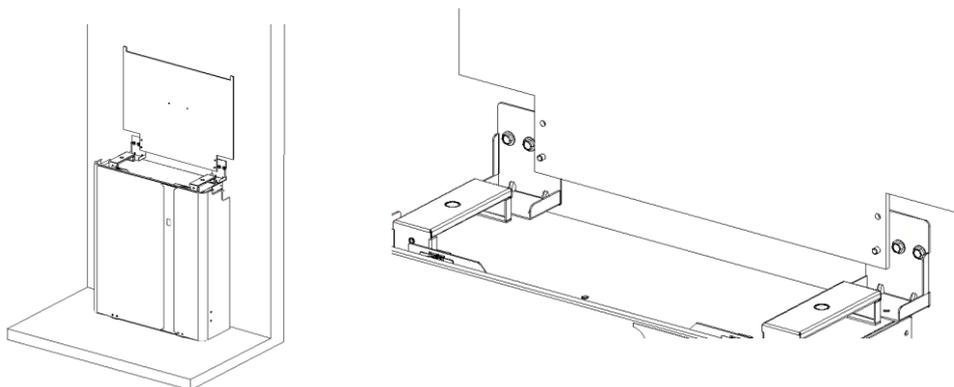


Figure 7.19 Install the cardboard of SMILE5-BAT
and SMILE-BAT-10.1P.

2) Install the cardboard of M4856-P.

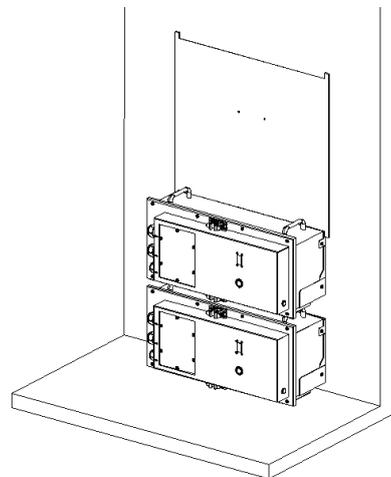


Figure 7.20 Install the cardboard of M4856-P

Step 3: Take out the wall bracket of the SMILE5-INV, clip it into the slot of the positioning cardboard, and position it with a marker pen (Figure 7.21):

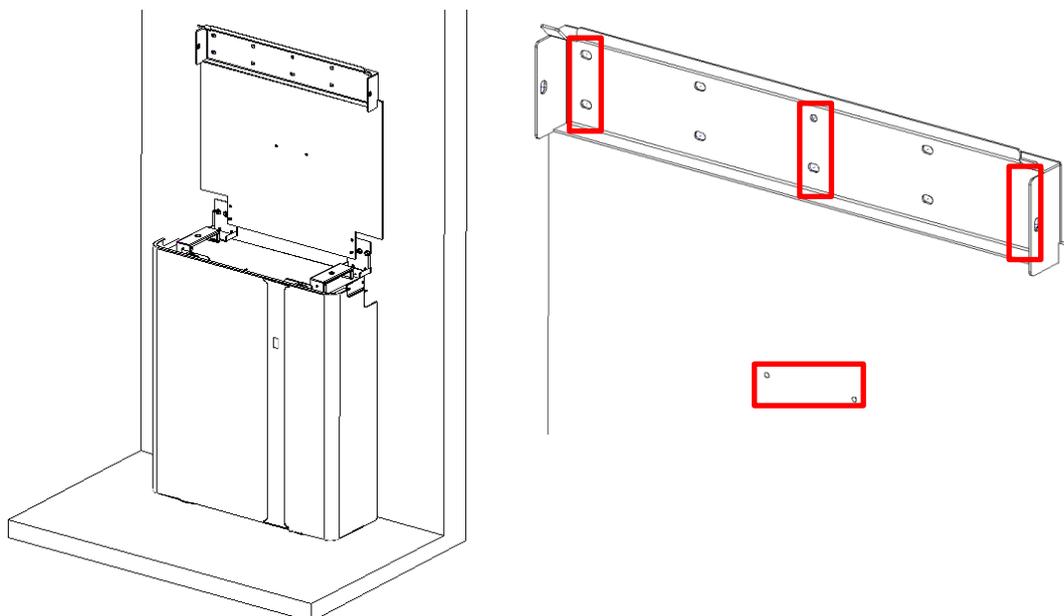
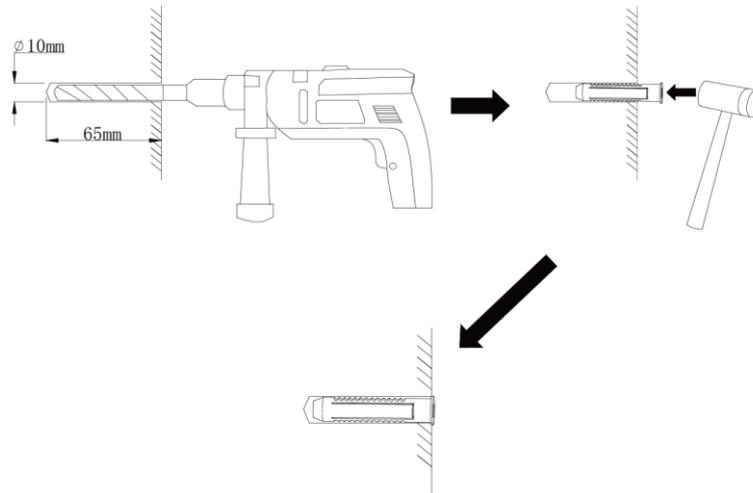


Figure 7.21 Positioning

Step 4: Remove the board and wall bracket, drill at the anchor point ($\Phi 10$, Depth: 65mm).



Step 5: Install the positioning cardboard, clip the wall bracket into the slot of the cardboard and use expansion screw to fix the wall bracket on the wall (Tool: SW10 sleeve).

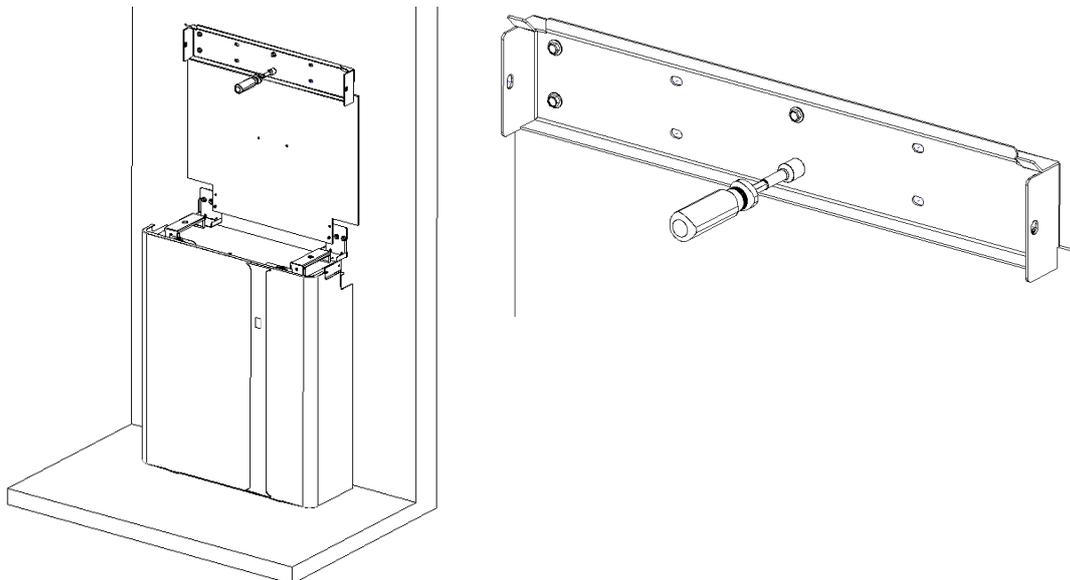


Figure 7.22 Fix the wall brackets

Step 6: Remove the cardboard and install the limit bracket.

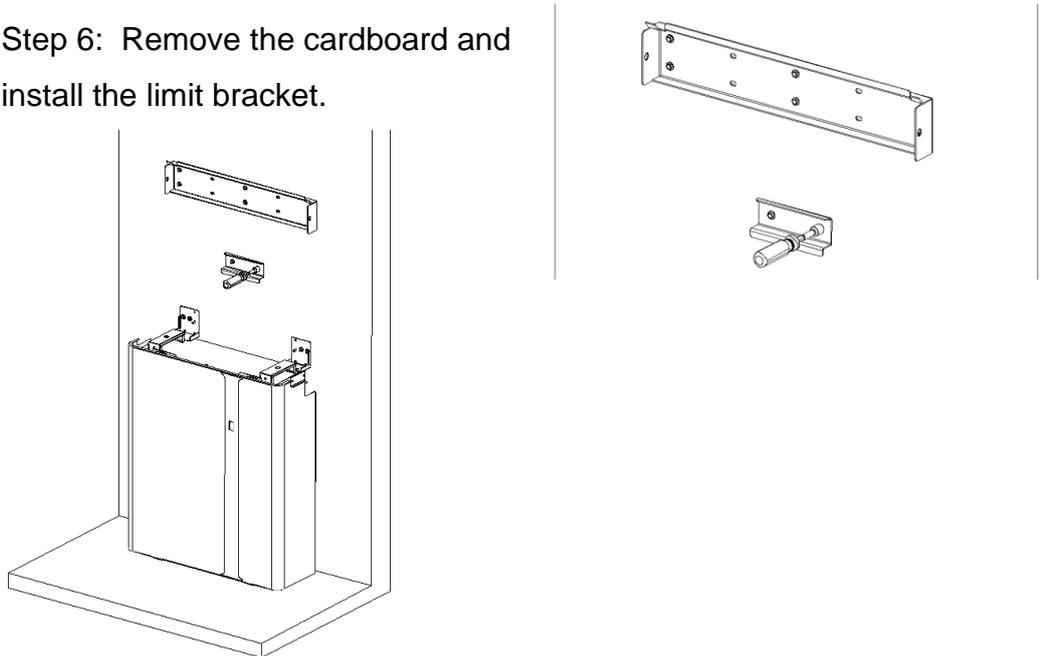


Figure 7.23 Install the limit bracket.

Due to uneven walls, the surface of the inverter and the battery may not be on the same horizontal plane after installation. The following steps are needed to make the surface of the inverter and the battery on the same horizontal plane.

Step 7: Install CB brackets

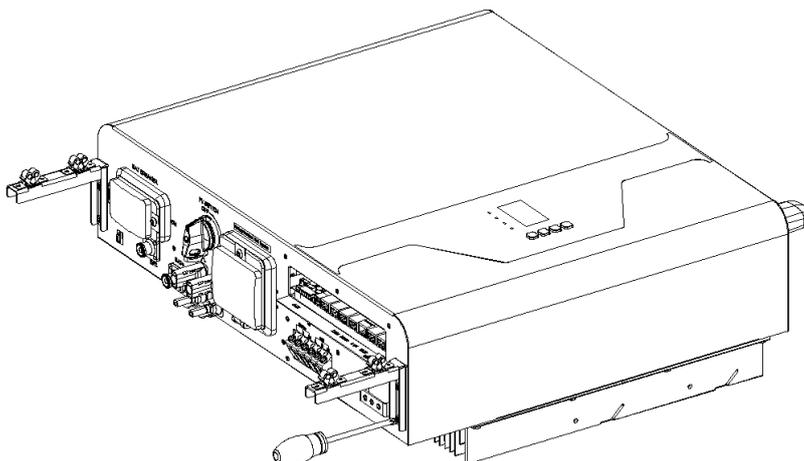


Figure 7.24 Install CB brackets

Step 8: Hang the inverter on the wall bracket at slot A (Figure 7.25).

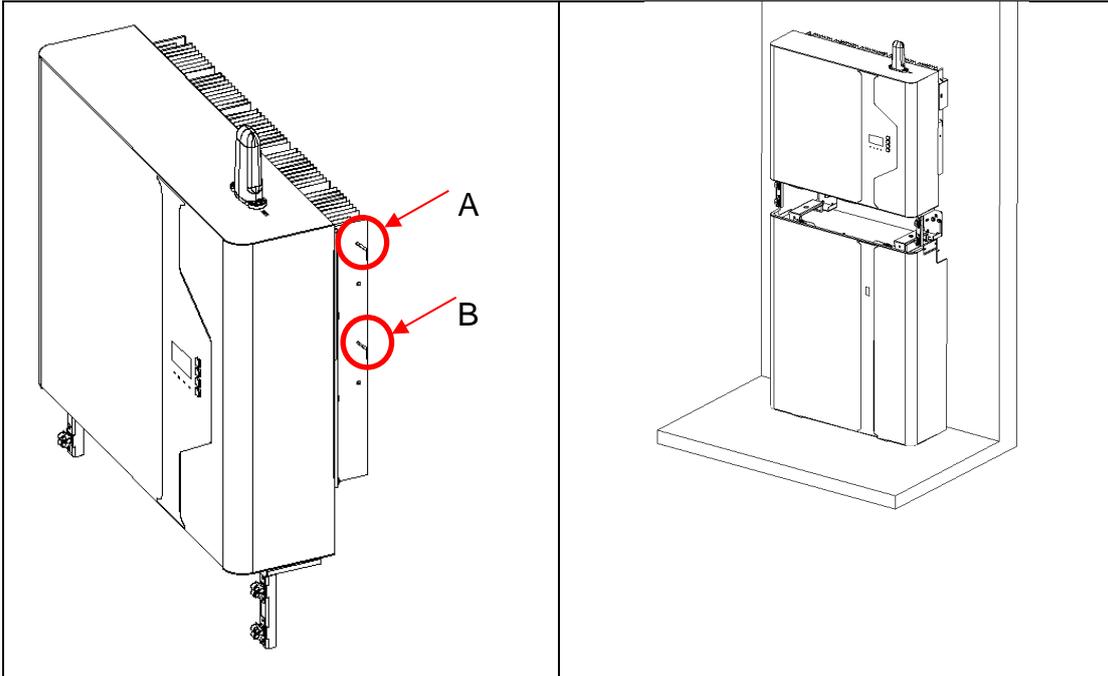


Figure 7.25 Install the inverter

Step 9: Install CB cover.

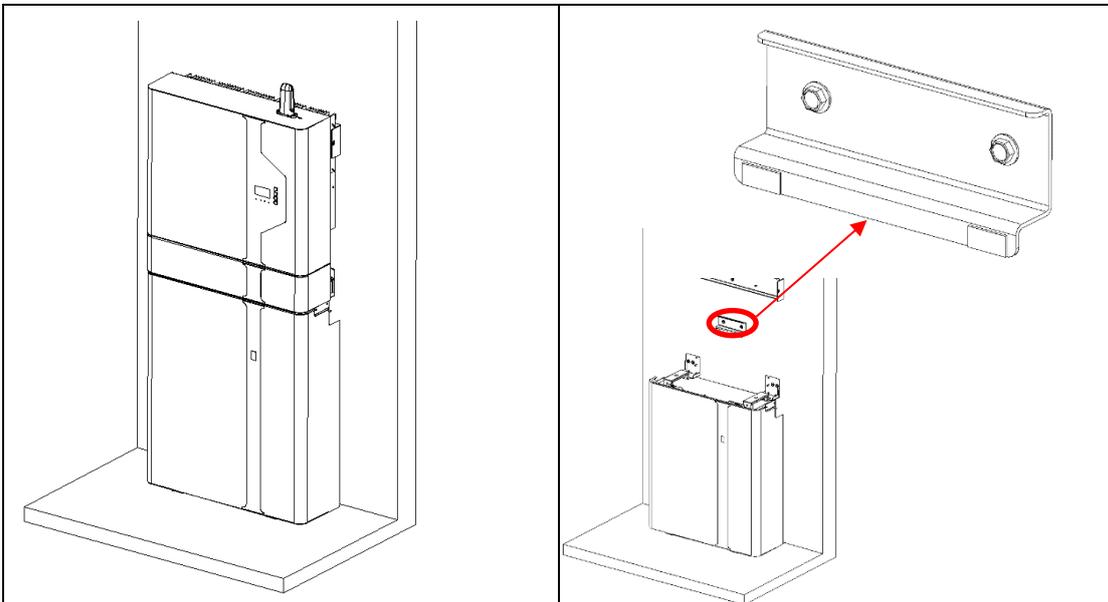


Figure 7.26 Install CB cover.

Figure 7.27 Add insulation sheet

NOTE:

- (1) After the installation of CB cover, confirm whether the CB cover is level with the battery surface. If not, remove the inverter and use the insulation sheet in the accessory package to stick it to the limit bracket (the insulation sheet can be used)
- (2) To proceed with the above steps, the decorative pieces of M4856-P should be installed first (Figure 7.28).

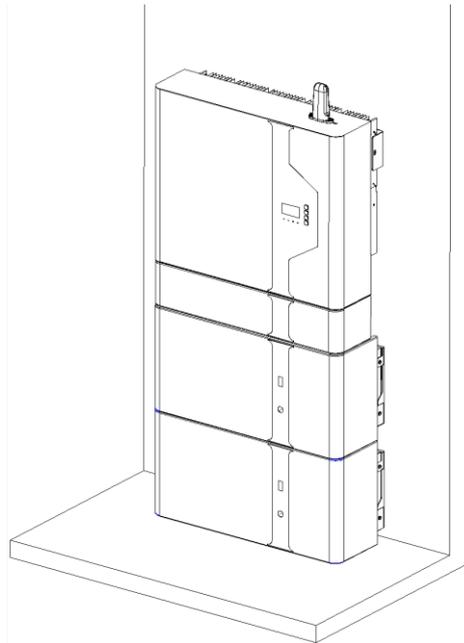


Figure 7.28

7.4.3 Connection Preparation

- 1) Remove CB cover.
- 2) Hang the inverter on the wall bracket at slot B.
- 3) To facilitate cables connection, the CB brackets on both sides need to be removed.

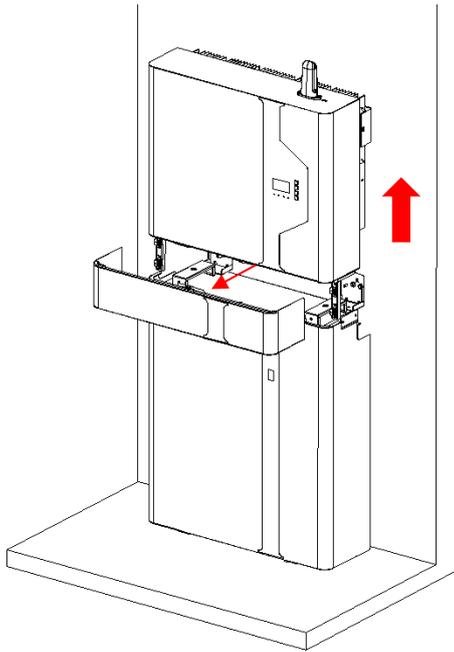


Figure 7.29 Remove CB Cover

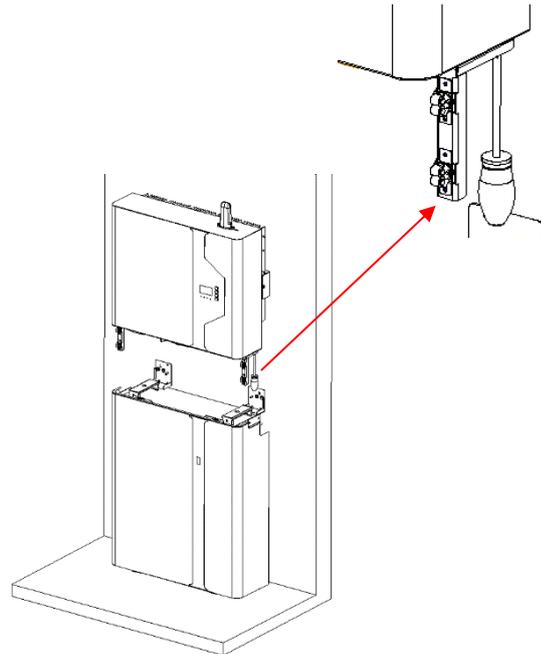


Figure 7.30 Remove CB Brackets

8. Electrical Connection

8.1 Precautions

DANGER

Before connecting cables, ensure that the DC switch on the battery and all the switches connected to the battery are set to OFF. Otherwise, the high voltage of the battery may result in electric shocks.

WARNING

1. The device damage caused by incorrect cable connections is not covered under any warranty.
2. Only certified electricians are allowed to connect cables.
3. 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).

The single line diagrams of DC-, AC- and Hybrid-coupled system are as below: Please note that the maximum number of batteries the system supports is 6.

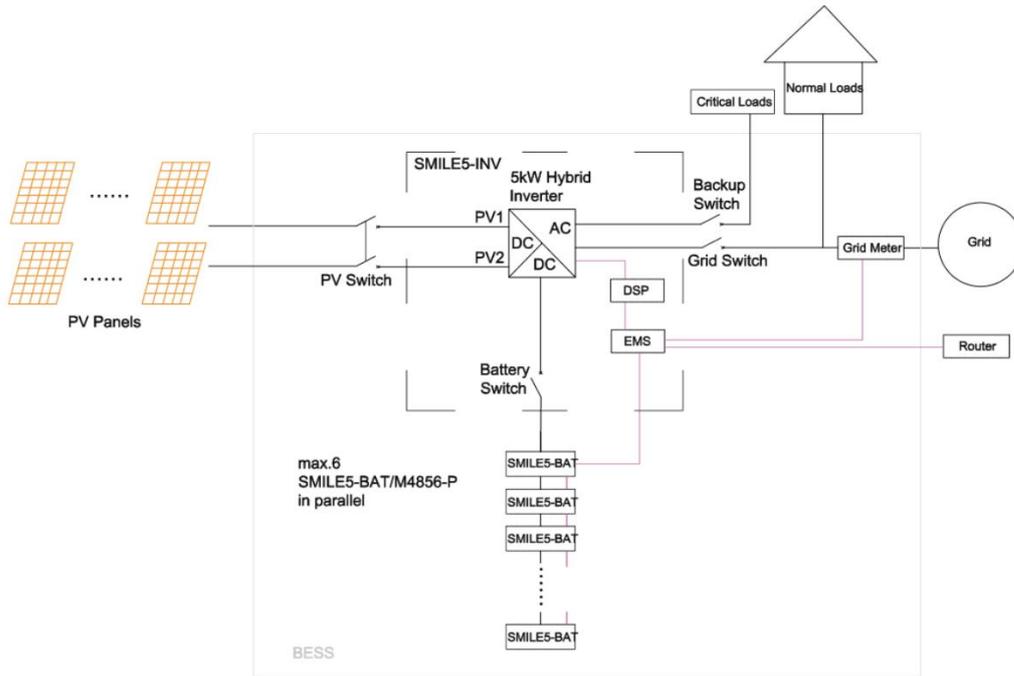


Figure 8.1 DC-coupled system

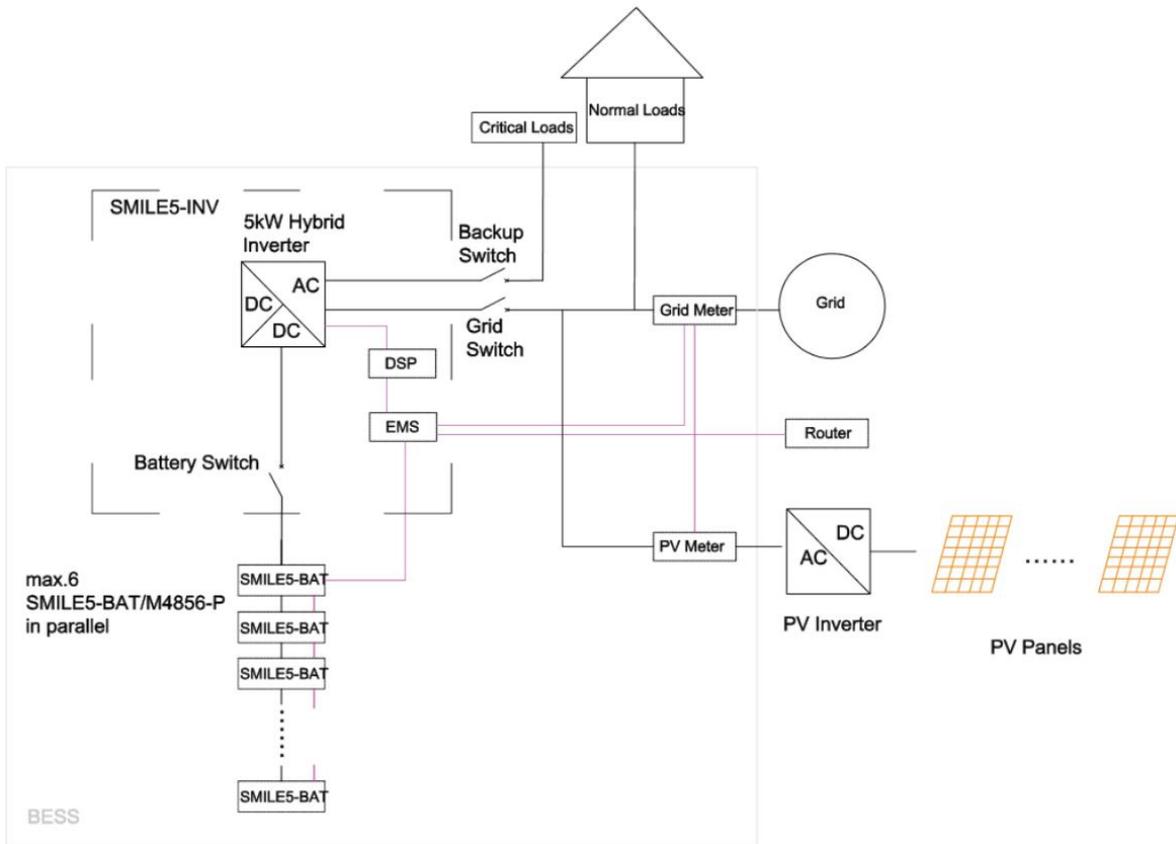


Figure 8.2 AC-coupled system

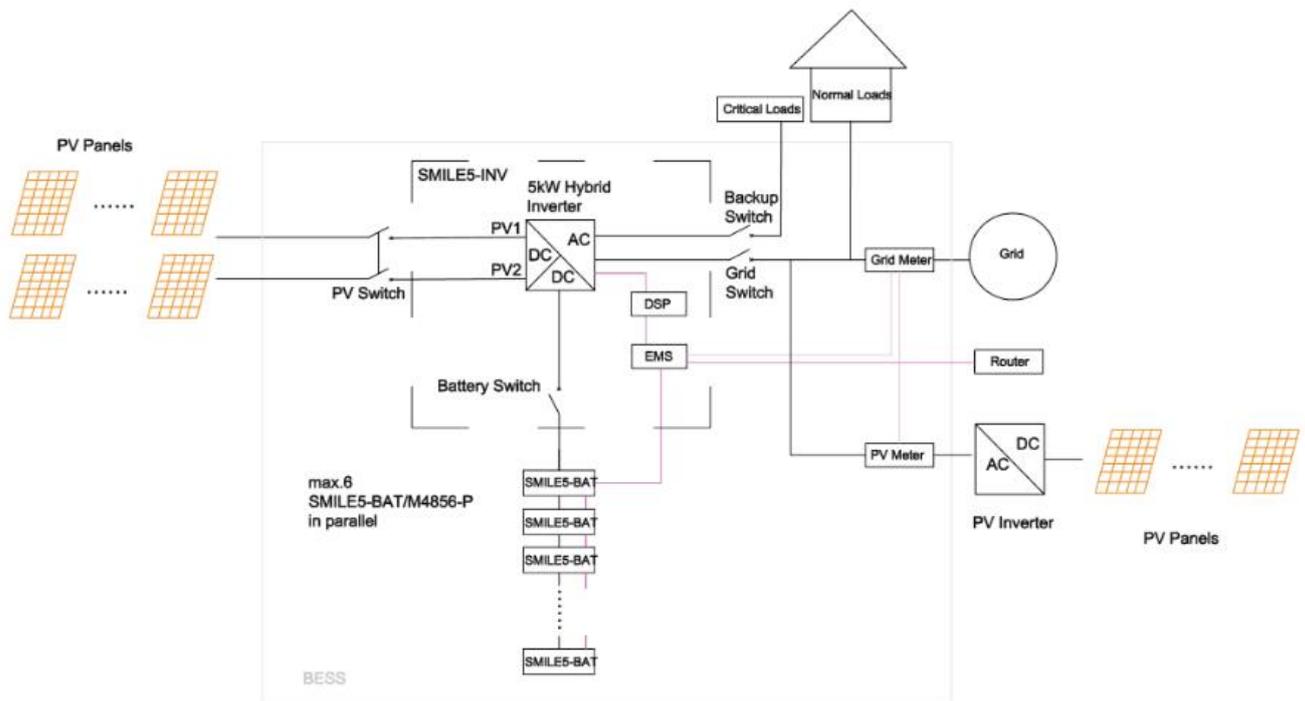


Figure 8.3 Hybrid-coupled system

8.2 Preparing Cables

8.2.1 Overview of the Inverter Connections

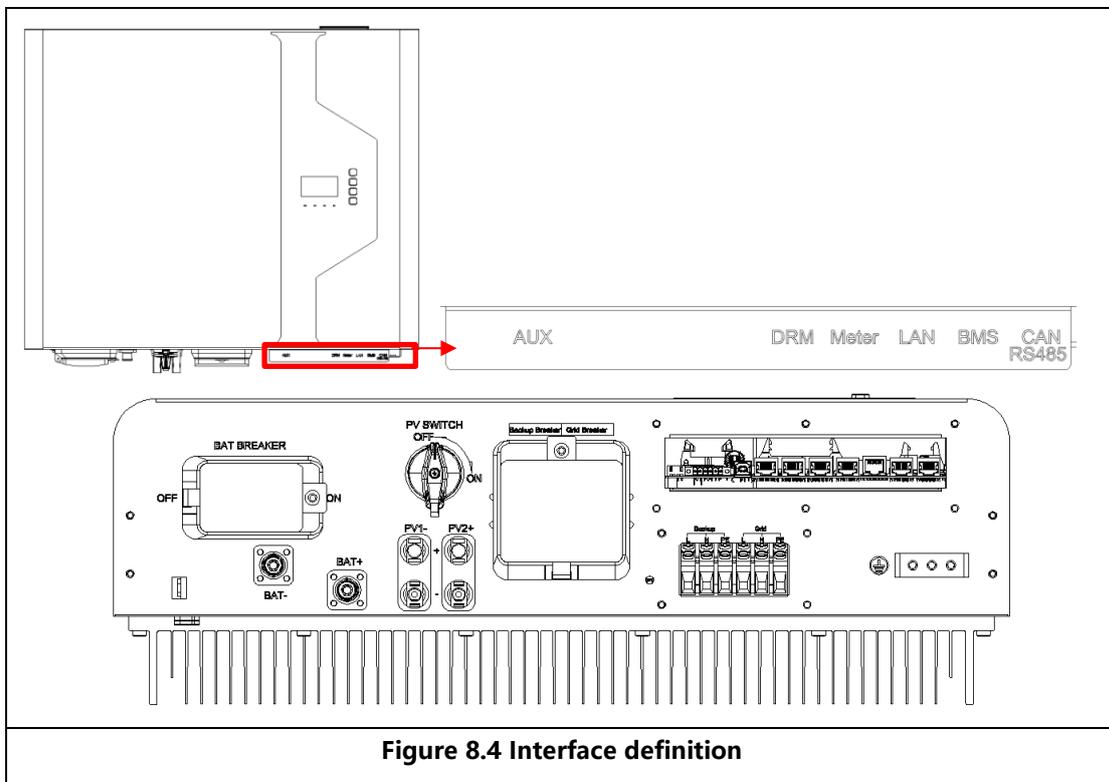


Figure 8.4 Interface definition

Item	Description	Item	Description
BAT Breaker	Battery Switch	PV-Switch	PV-Switch
BAT+, BAT-	Battery Connector	PV1, PV2	PV connector
Backup Breaker	Backup Switch	Grid Breaker	Grid Switch
Backup	Terminal Board Backup Load	Grid	Terminal Board Grid
AUX	Dry Contact	DRM	Power Dispatching Port
Meter	Meter Communication Port	LAN	Net Wire Connection Port
BMS	Battery Communication Port	CAN/RS485	External Expansion Port or External Dispatching Port

8.2.2 Overview of the Battery Pack Connection

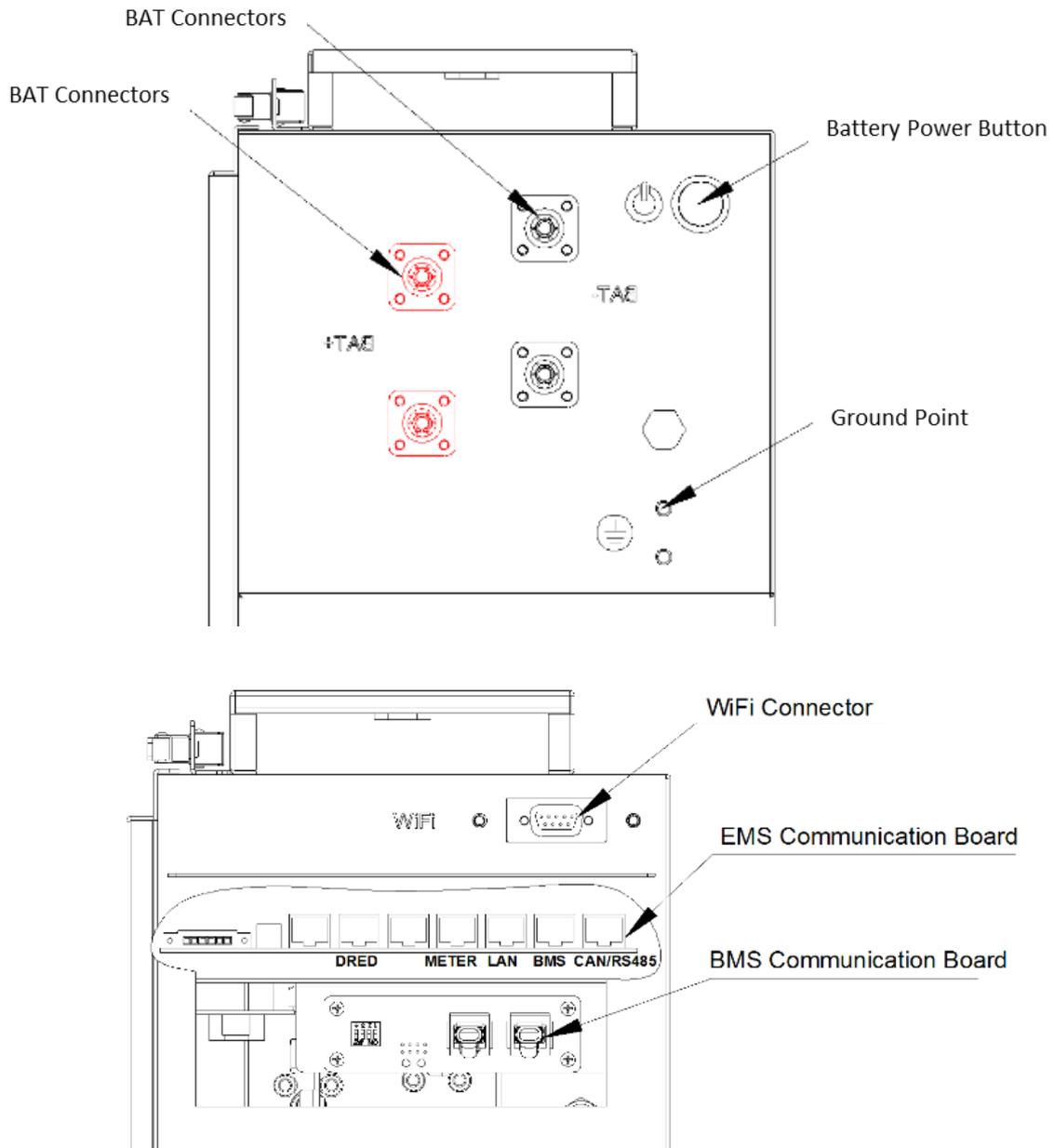


Figure 8.5 SMILE-BAT 10.1P

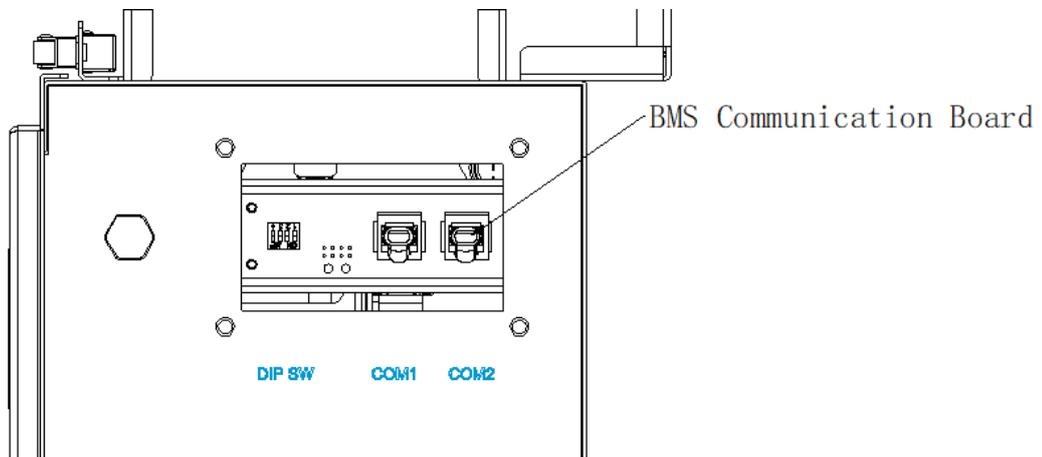
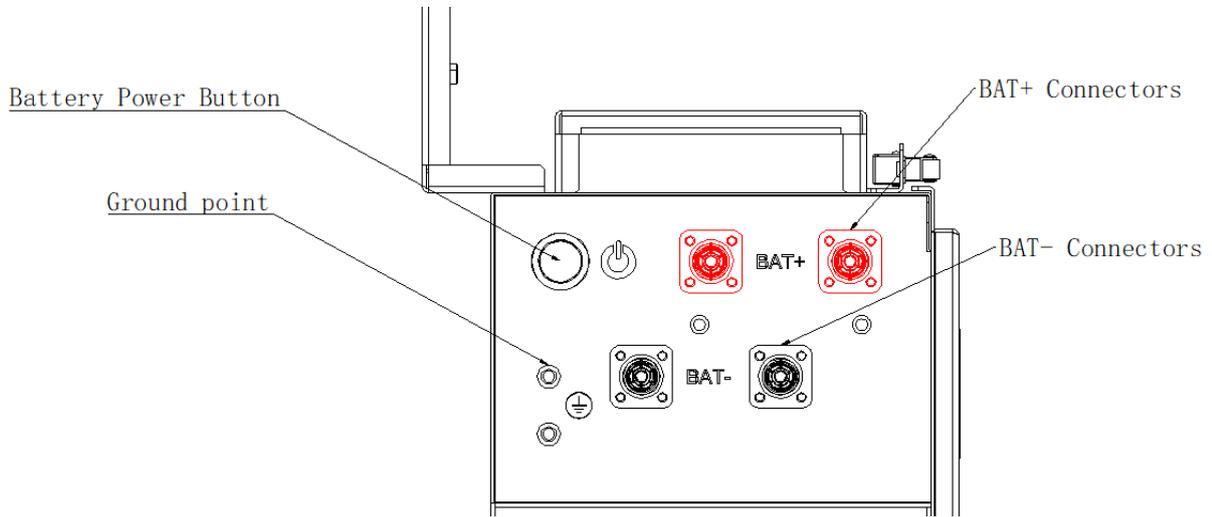


Figure 8.6 SMILE5-BAT

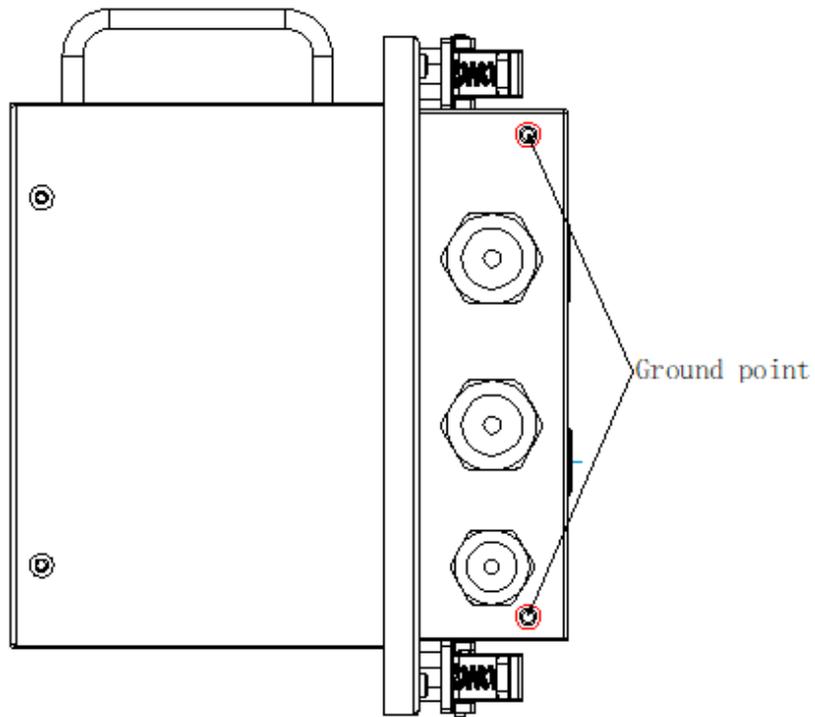
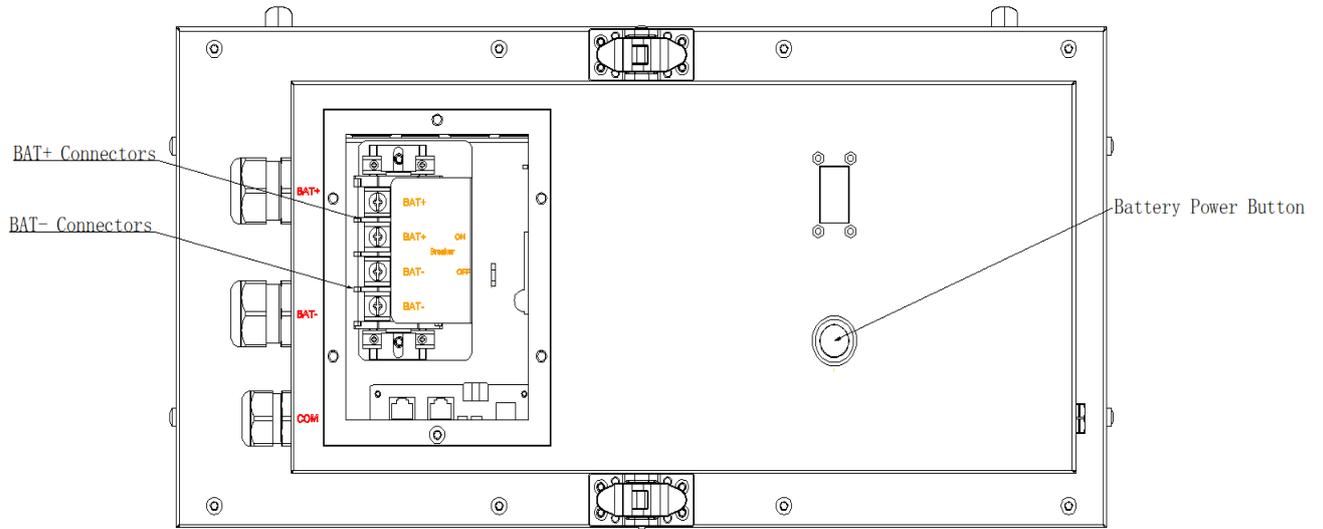


Figure 8.7 M4856-P

8.3 Connecting PE Cables

An external ground connection is provided at the bottom of the inverter. 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 to the ground cable to the bottom of inverter. The torque is 3 Nm, tool: T20 screwdriver.

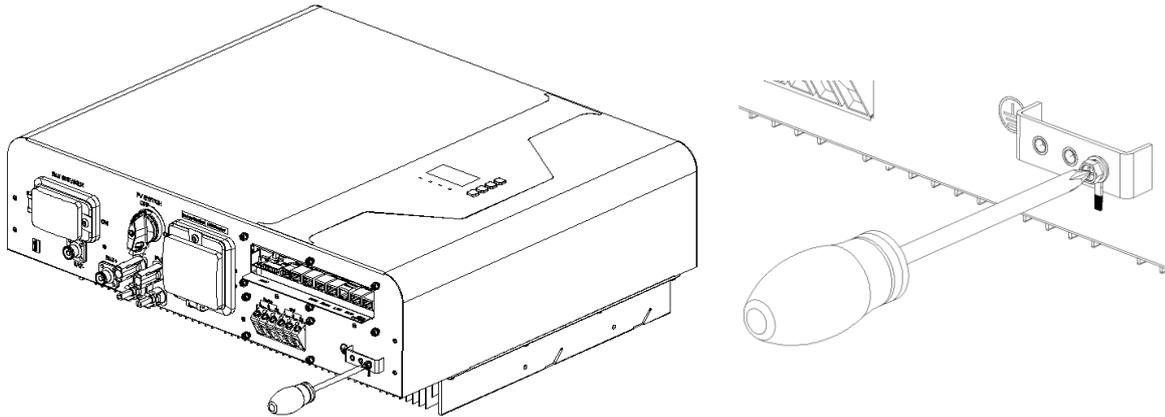
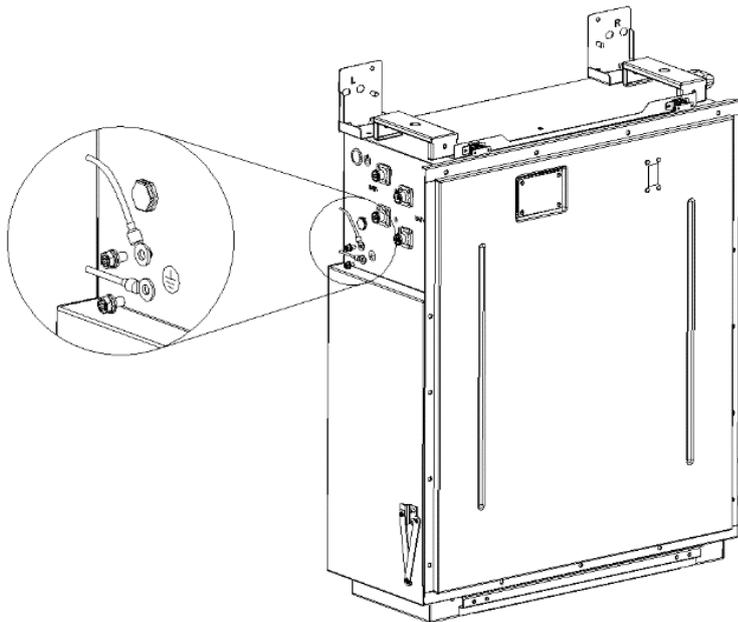


Figure 8.8 Connecting PE Cables

An external ground connection is provided at the left side of the battery pack. 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 the ground cable to the bottom of inverter. The torque is 3 Nm, tool: T20 screwdriver.



8.4 AC Connection

8.4.1 Conditions for the AC connection

An AC isolator must be installed on the AC side of the inverter to ensure that the inverter can be safely disconnected from the grid.

WARNING

Do not connect loads between the inverter and the AC Isolator.

8.4.2 Grid and backup connection

Step 1: Connect the Backup and Grid cables;

Fix the AC waterproof Cover on the inverter (tool: T20 screwdriver, torque: 1.6Nm) and tighten it (torque: 3.75Nm) after connecting the Backup and Grid cables to the terminal through the waterproof Cover.

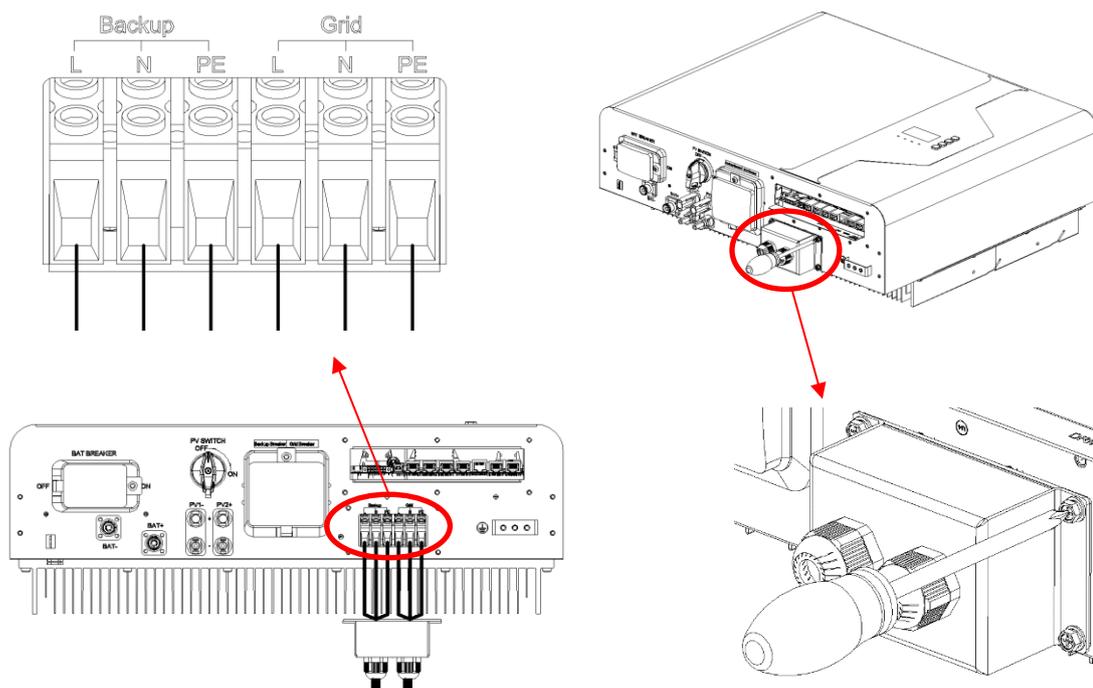


Figure 8.9 Connect the Backup and Grid cables

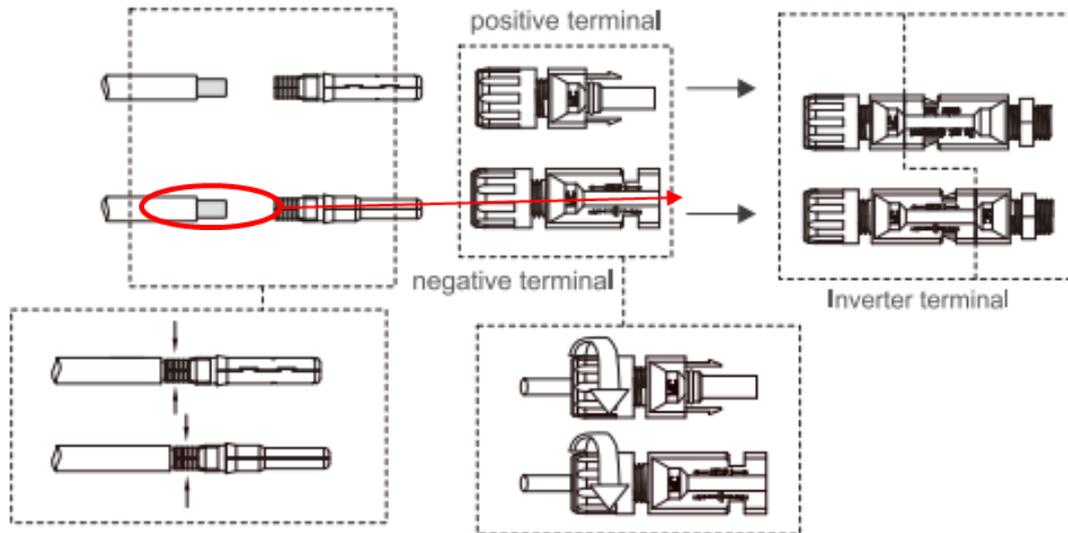
8.5 PV Connection

Please ensure the following before connecting the inverter:

- Make sure the voltage of the PV string will not exceed the max DC input voltage (600Vdc). Exceeding this voltage will void the warranty.

- Make sure the polarity of the PV connectors is correct.
- Make sure the PV-Isolator, battery breakers, AC-Backup and AC-Grid are all in their off-states.
- Make sure the PV resistance to ground is higher than 20K ohms.

The inverter uses the MC4 PV connectors. Please follow the picture below to assemble the MC4 connectors. PV cable cross section requirements: 2.5~4mm².

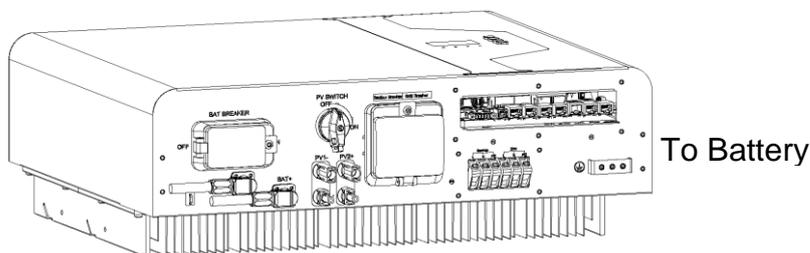


Use appropriate crimping tools for crimping

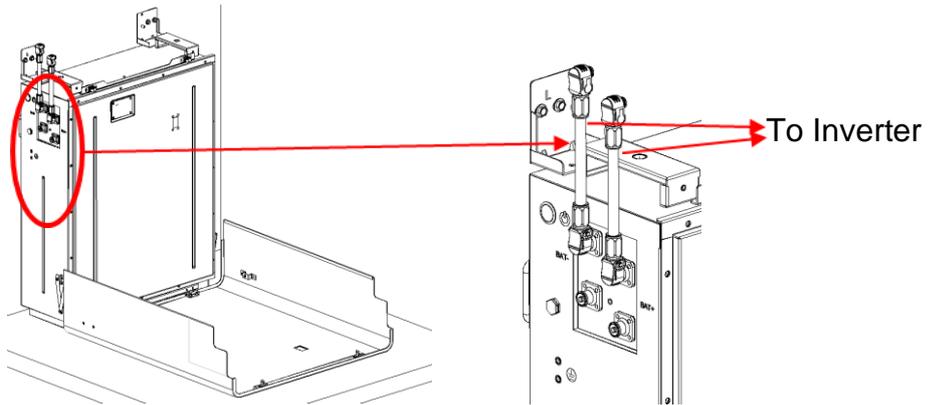
8.6 Battery Power Connection

Turn off the battery circuit breaker and secure it to prevent reconnection. Ensure the correct polarity of the batteries cables before connecting it to the inverter. Connect the battery cables to the inverter and make sure the positive and negative poles are correct.

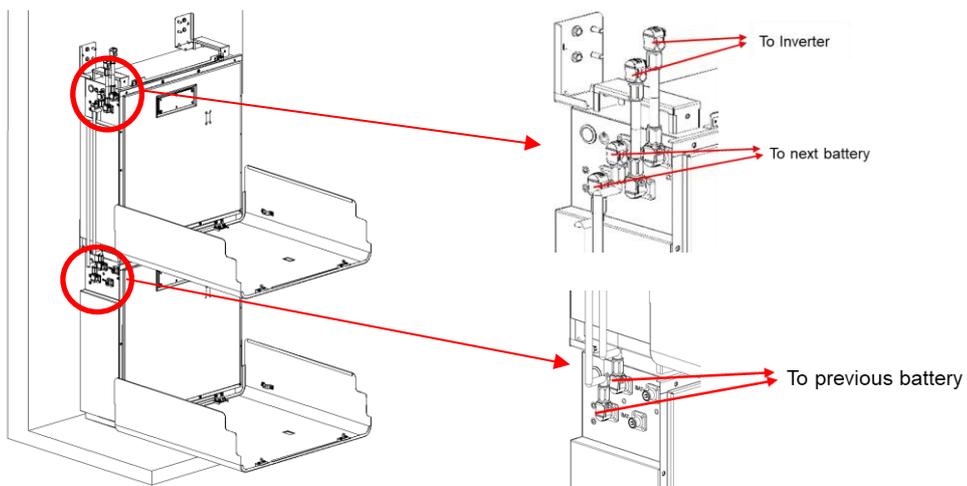
- 1) SMILE5-INV power cables connection:



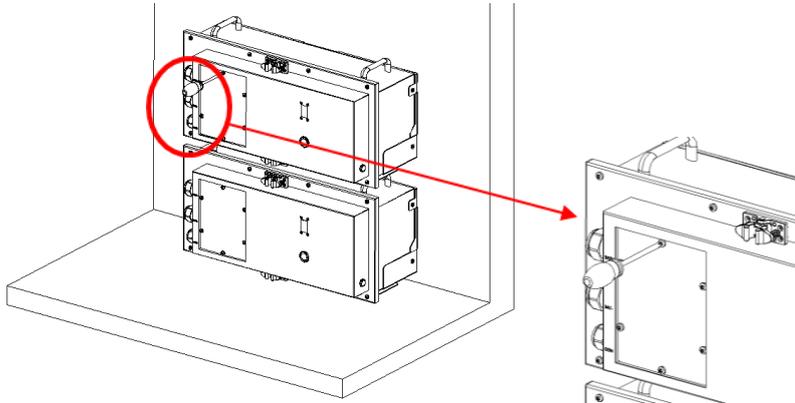
2) SMILE-BAT-10.1P power cables connection;



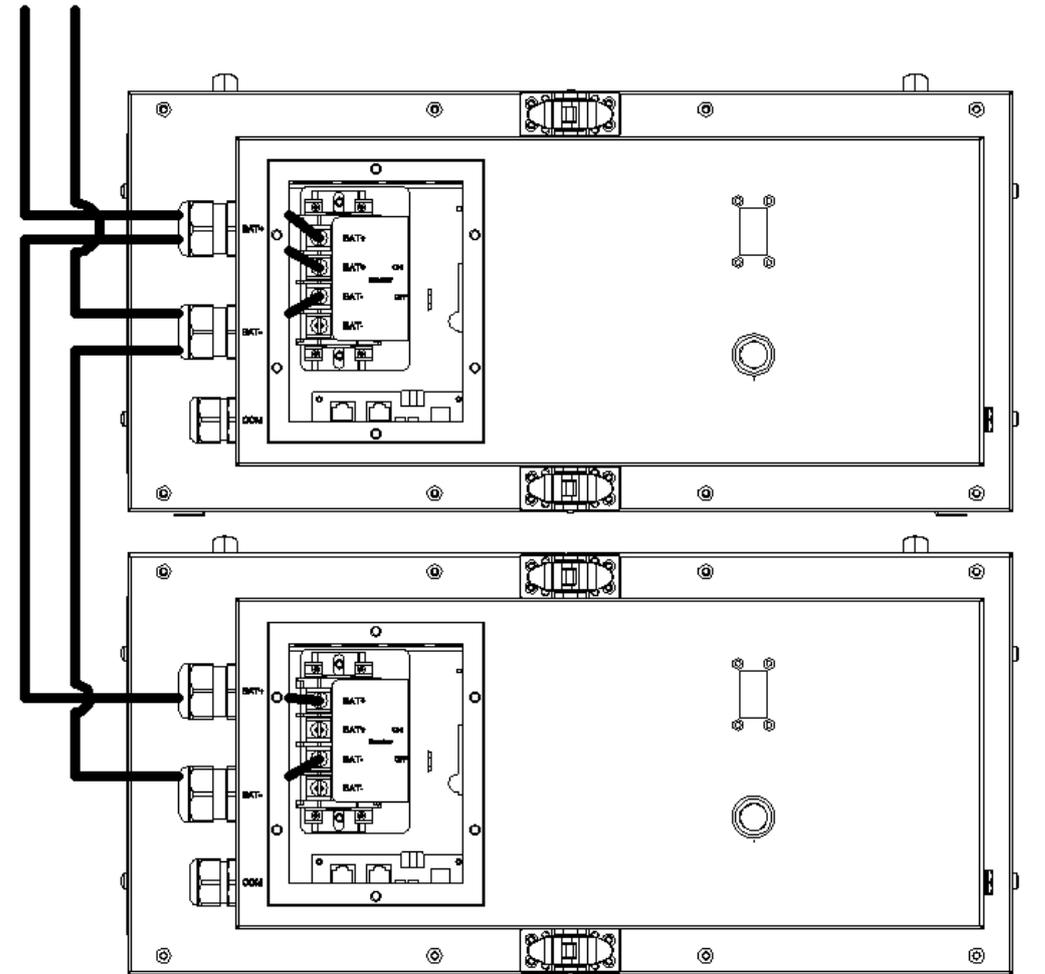
3) SMILE5-BAT power cables connection;



- 4) M4856-P power cables connection;
Step 1: Remove the Maintenance cover;



- Step 2: Connect power cables;



8.7 Communication Connection

Step 1: Connect the communication BMS cables between the battery and the inverter;

1) SMILE5-INV communication BMS cables connection

NOTE:

If other cables need to be connected, the cover can be fixed and locked after all the cables are connected.

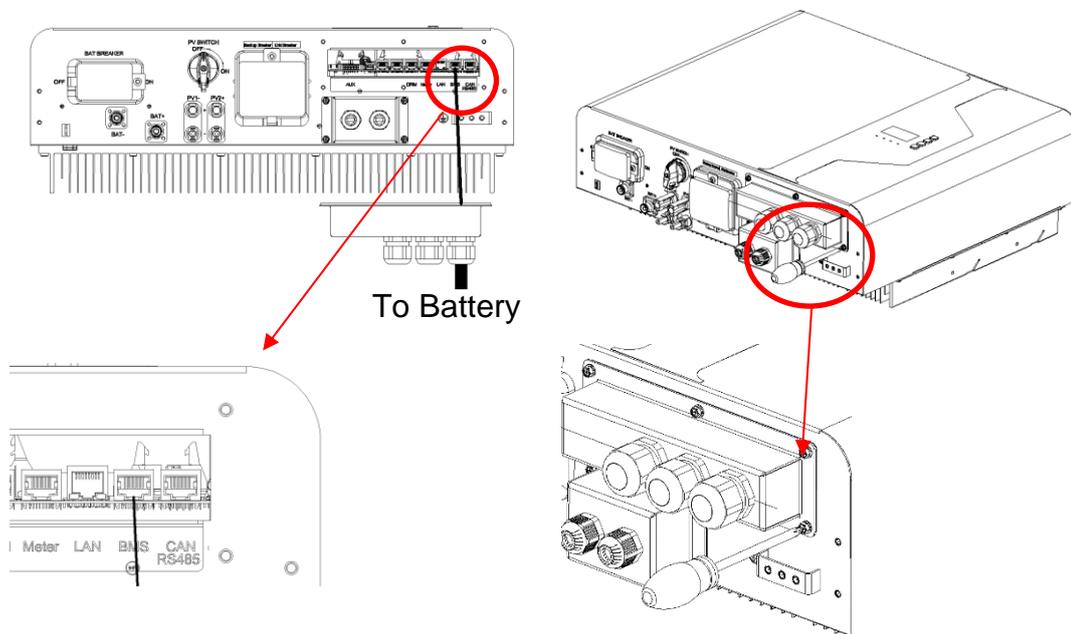


Figure 8.10 Connect the communication cable between the battery and the inverter

2-1) SMILE-BAT-10.1P

Step 1: Remove the communication cover;

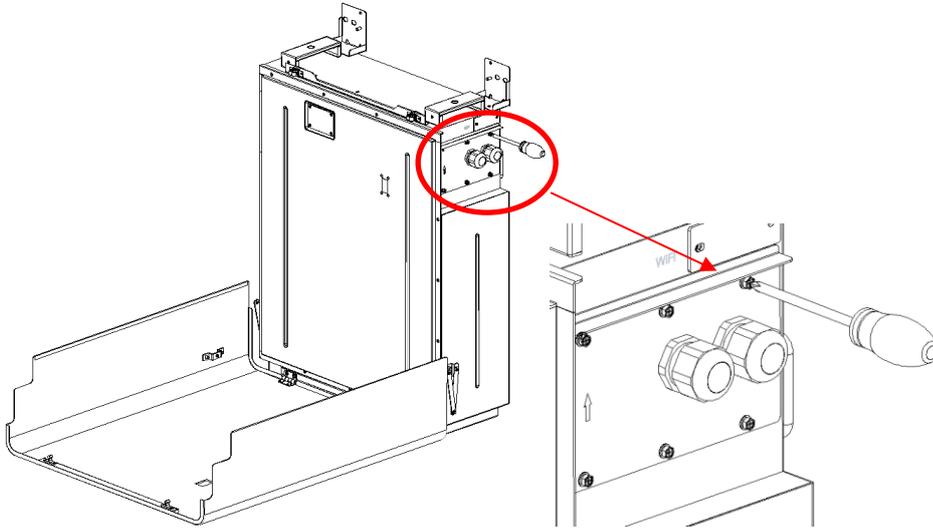
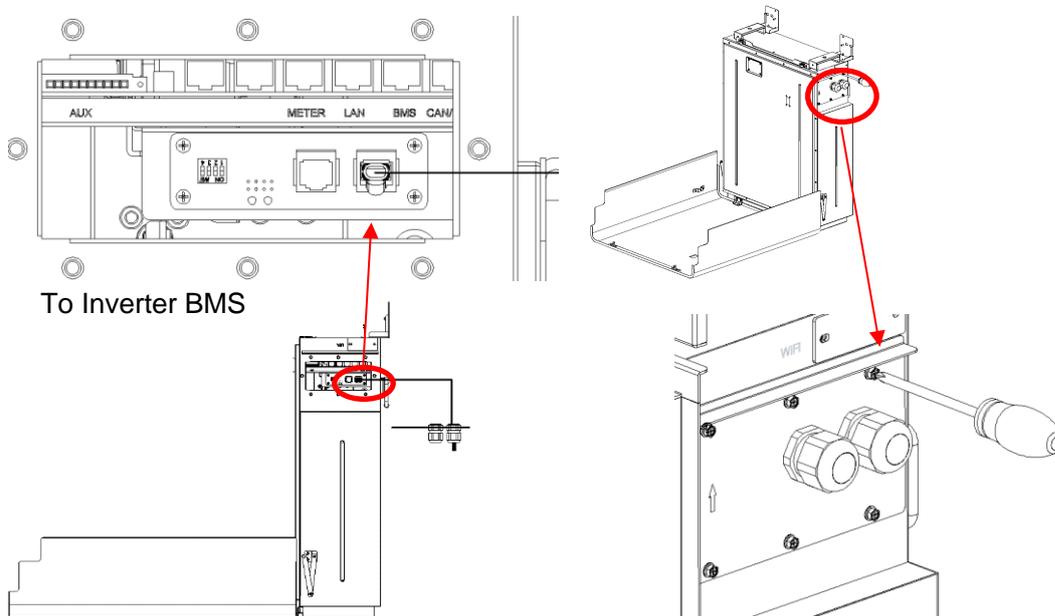


Figure 8.11 Remove the communication cover

Step 2: Connect the communication BMS cables;



**Figure 8.12 Connect the communication cables
between SMILE5-INV and SMILE-BAT-10.1P**

2-2) SMILE5-BAT

Step 1: Remove the communication cover

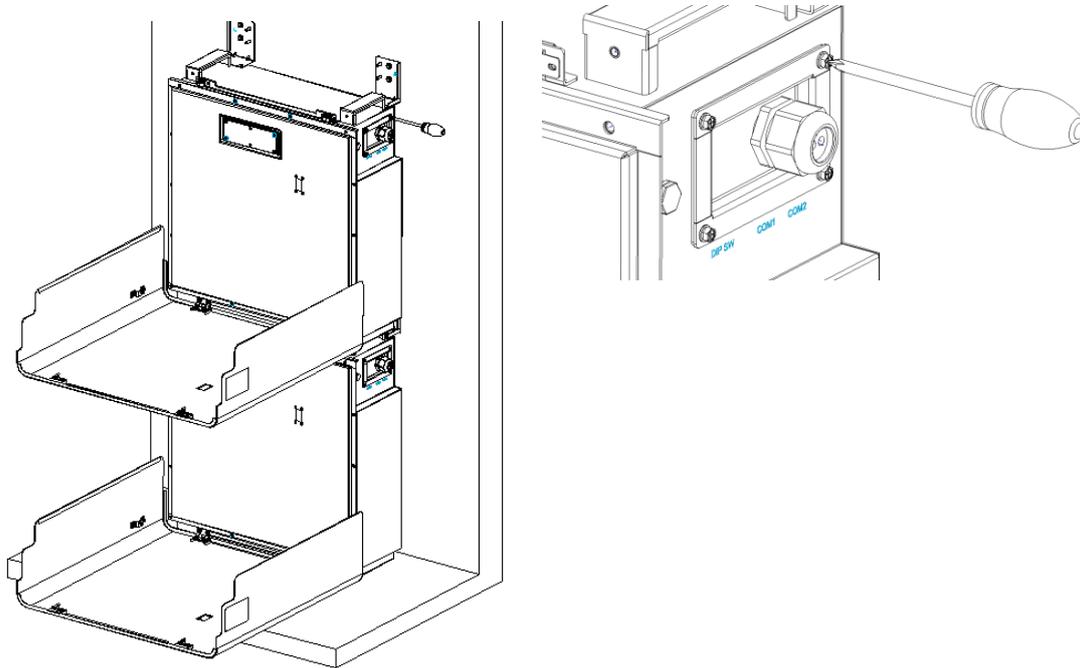


Figure 8.13 Remove the communication cover

Step 2: Connect the communication BMS cables

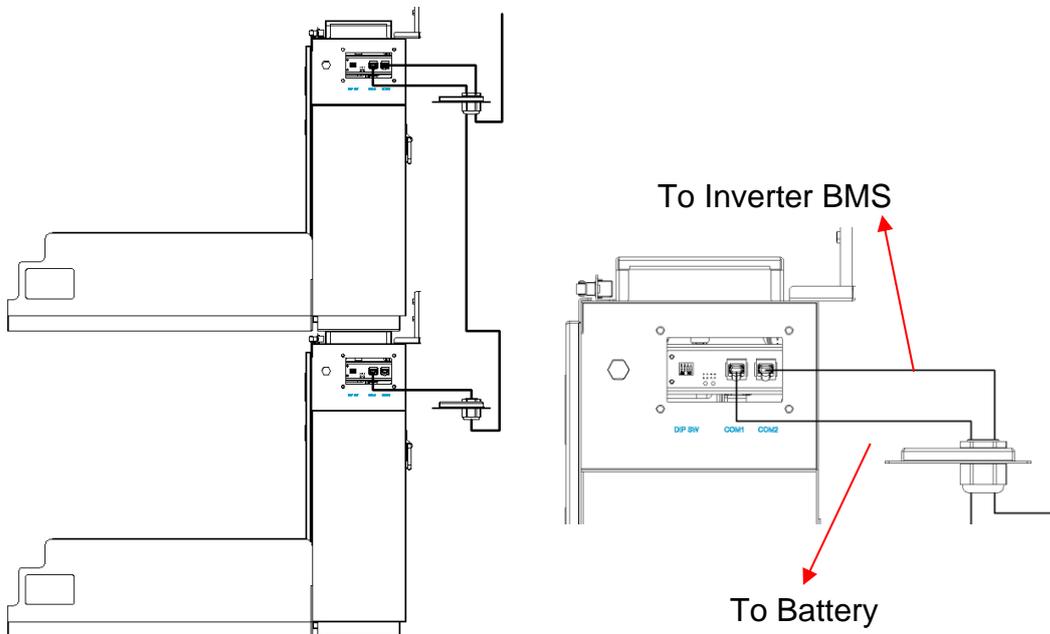


Figure 8.14 Connect the communication cables of SMILE5-BAT

Step 3: Close the communication cover;

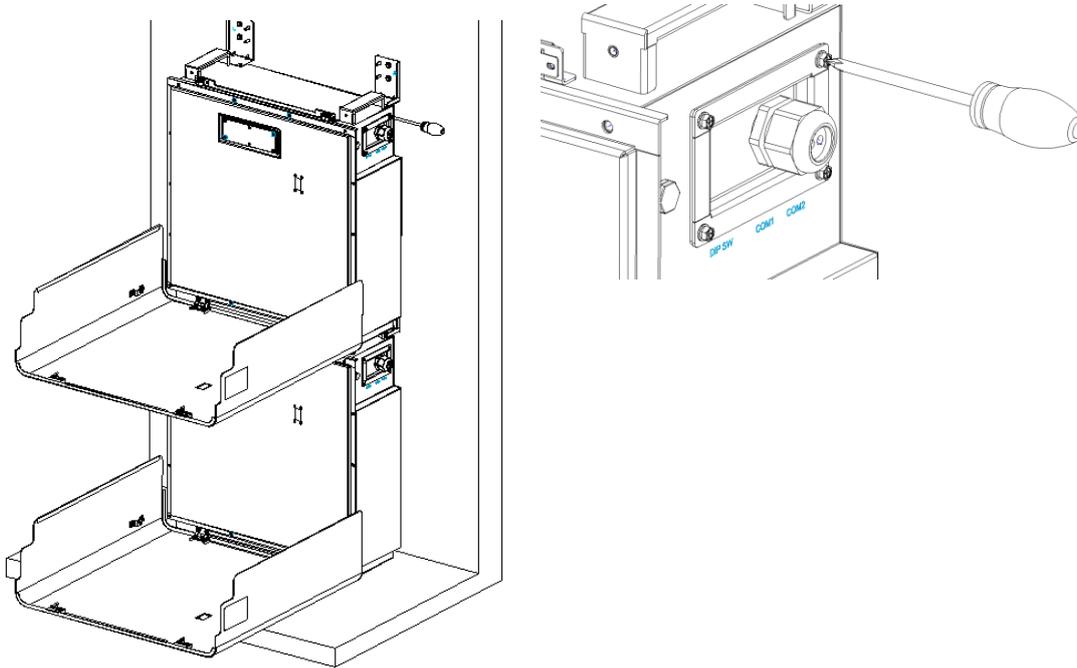


Figure 8.15 Close the communication cover of SMILE5-BAT

2-3) M4856-P

Step 1: Connect the communication BMS cables

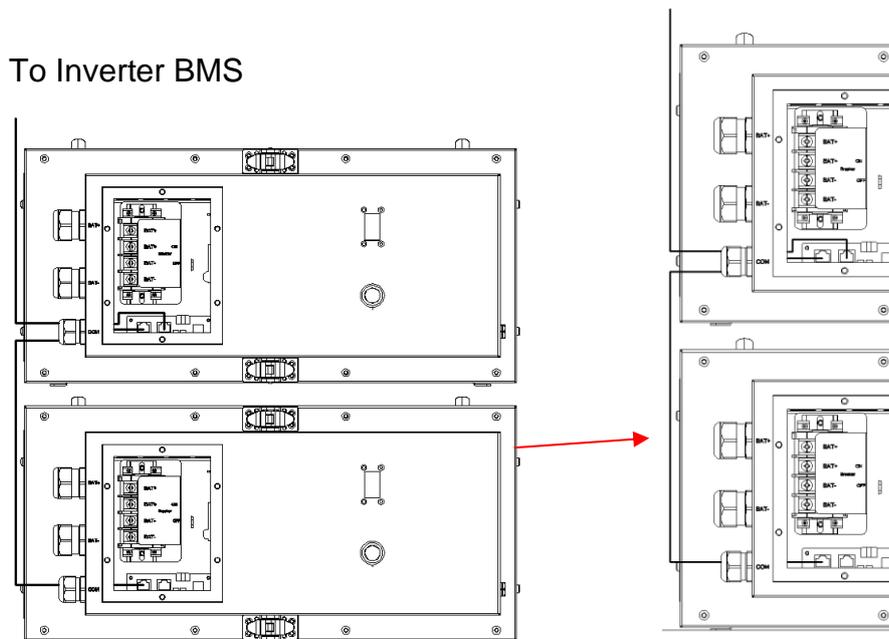


Figure 8.16 Connect the communication cables of M4856-P

8.8 Meter Connection

The CT meter should be mounted and connected at the grid connection point (feed-in point) so that it can measure the grid consumption and feed-in power.

The CT meter used for Smile 5 is the ACR10-R

ACR10R: can be used as a single or three-phase meter

Table 1 CT meter ratio and accuracy table

Model	CT Ratio	Accuracy
ACR10R-120A CT	120	1.2kWh

8.8.1 Meter ACR10R

a) ACR10R single-phase connection

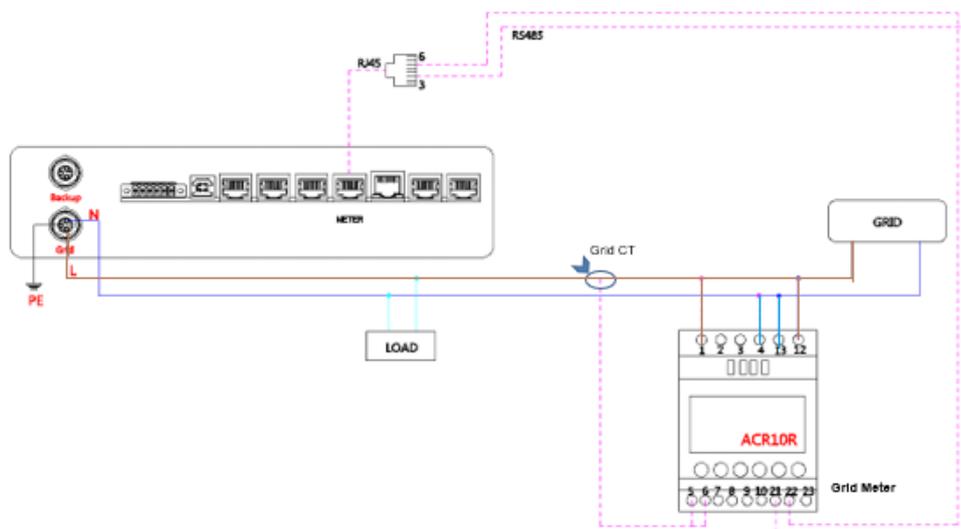
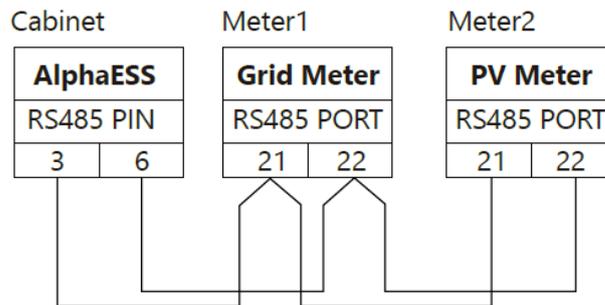


Figure 52 ACR10R single-phase connection (if applicable)

NOTE: Connect the power meter (PIN 21, 22) to the meter port of the cable box (PIN 3, 6) using the RJ45 cable.

For AC/Hybrid system, there are two meters needed:

Without Meter Plug

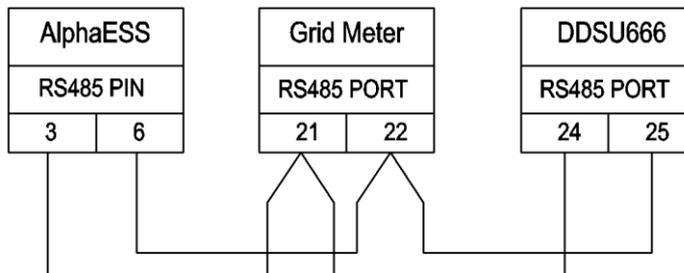


Two Meter Connect, without Meter Plug

If the ACR10R meter is used as a grid meter, the direction of arrow in CT should point away from the grid to the consumer unit/distribution board.

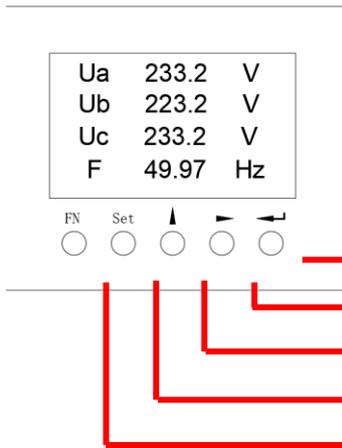
If the ACR10R meter is used as a PV meter in hybrid system, the direction of arrow in CT should point away from the PV inverter to the consumer/distribution board

2. Connect the power meter (PIN 21, 22) to the meter port of the cable box (PIN 3, 6) using the RJ45 cable.



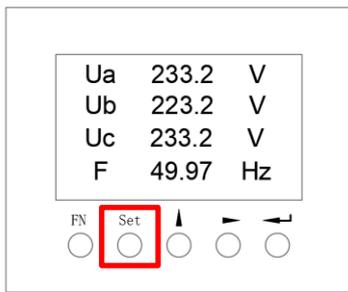
PV Meter not DDsu666

8.8.6.3 ACR10R

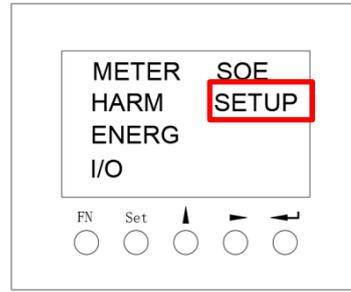


There are 5 buttons on the meter's front:

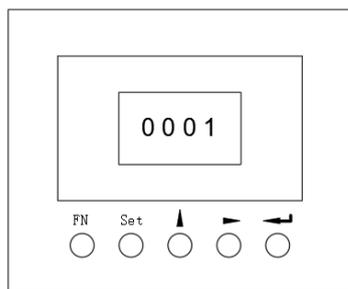
1. Enter key
2. Arrow to the right
3. Up arrow
4. SET button
5. FN key (no function)



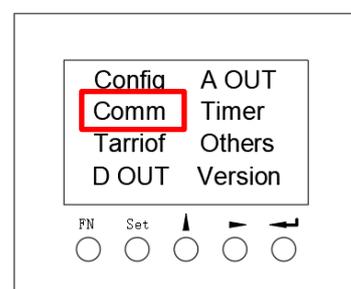
Step 1: Activate the meter display by pressing any key. Then click the "Set" button.



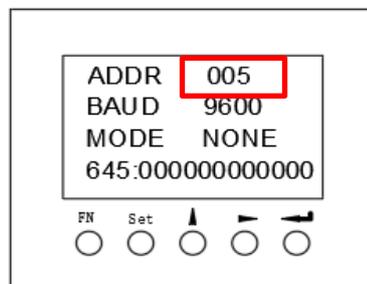
Step 2: Use the arrow buttons to select the "SETUP" menu and confirm your selection with the Enter button.



Step 3: Enter the password "0001" and confirm by pressing the Enter button.



Step 4: Select the menu item "Comm" in the settings menu to change to the communication settings.



Step 5: Set the communication address and communication baud rate in the communication setting interface.

When the meter is used as Grid meter, the address is set to "005".

When it is used as the PV meter, the address is set to "006".

The baud rate is set to 9600.

8.9 Switch the Battery on

The following will introduce the five batteries.

1. SMILE-BAT-10.1P

Remove the switch cover, turn on the switch, and then replace the switch cover;

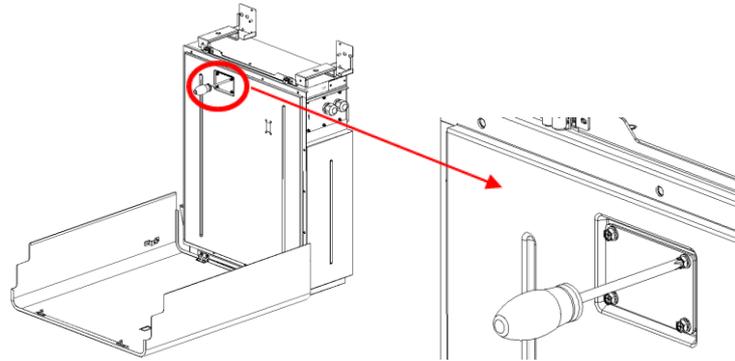


Figure 8.17 Turn on the switch of SMILE-BAT-10.1P

2. SMILE5-BAT

Remove the switch cover, turn on the switch, and then remove the switch cover;

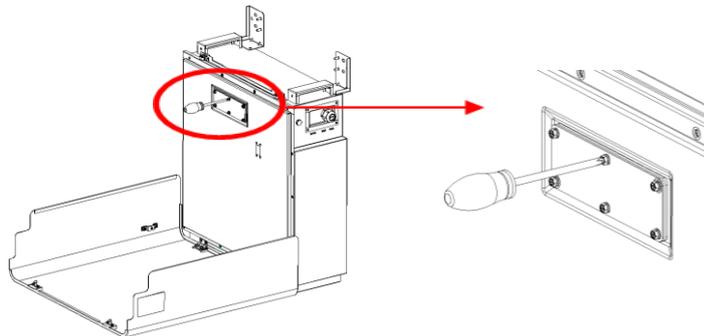


Figure 8.18 Turn on the switch of SMILE5-BAT

3. M4856-P

1) Turn on the switch

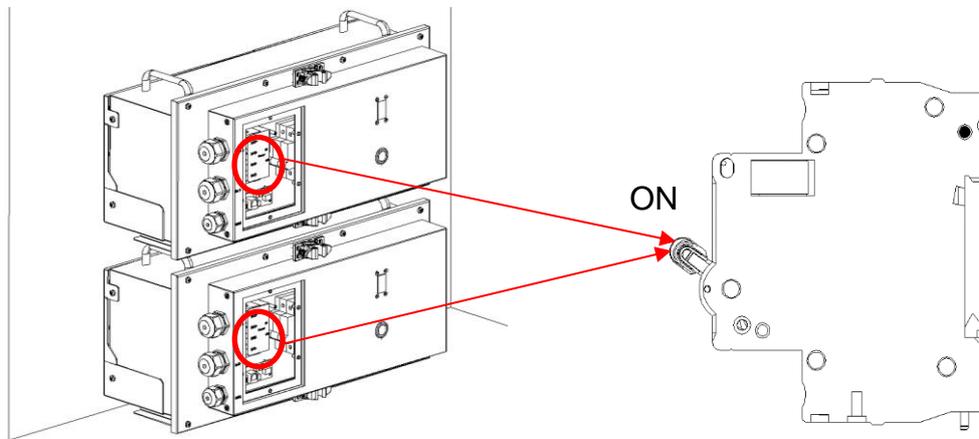


Figure 8.19 Turn on the switch of M4856-P

2) Replace the maintenance cover;

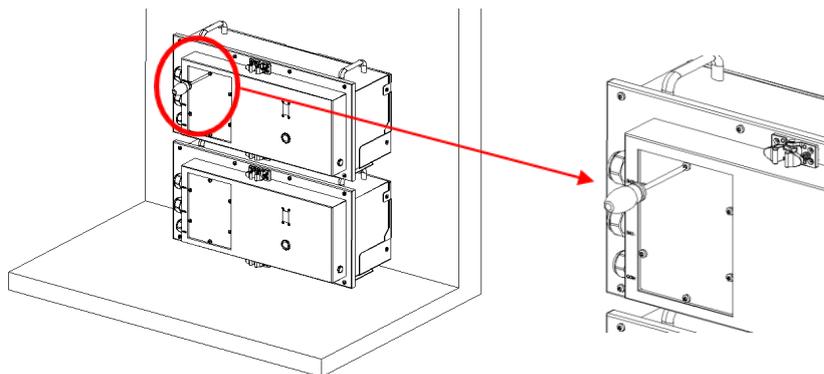


Figure 8.20 Install the maintenance cover of M4856-P

Note: For the expansion of batteries, the DIP switch needs to be set; Please refer to the manual of the corresponding battery.

8.10 Fix the Inverter

Step 1: Install the CB brackets on both sides;

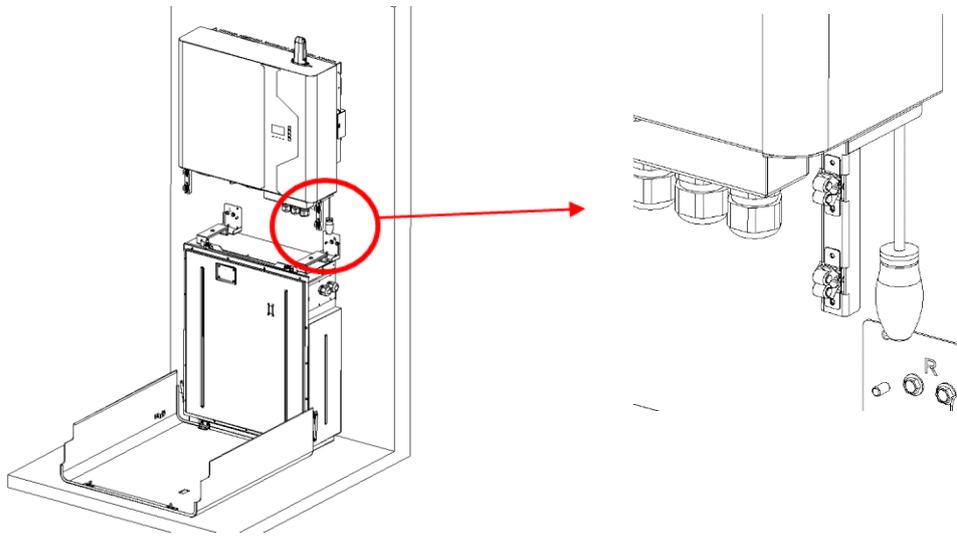


Figure 8.21 Install the CB brackets on both sides

Step 2: Hang the inverter on the wall bracket through the card slot on the heat sink (the first one from top to bottom) and bolt the two sides of the heat sink and the wall bracket.

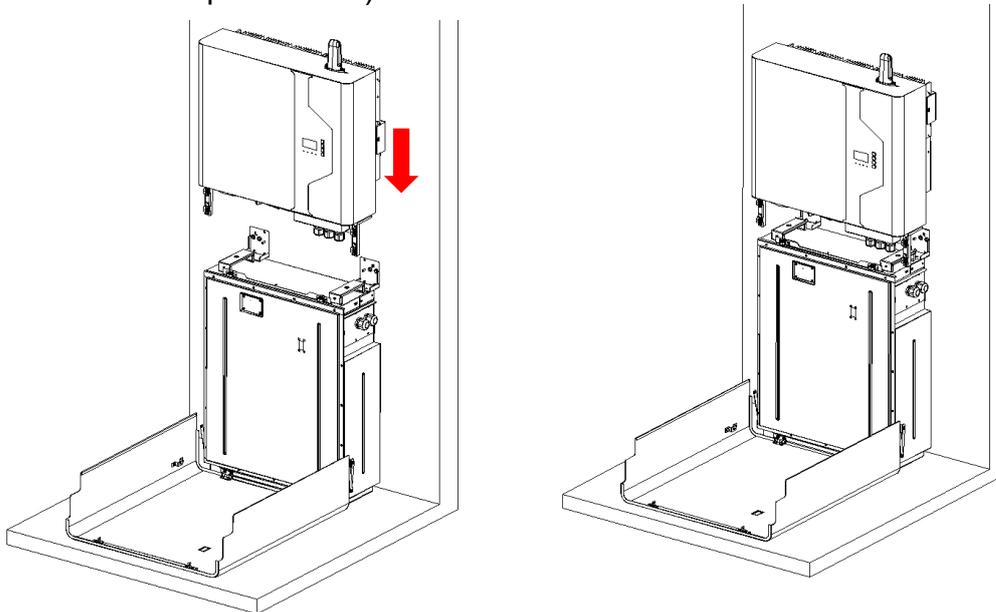


Figure 8.22 Install the inverter

Step 3: Install the CB cover and fix the wall bracket to the radiator using the M6 screw. The installed system is shown in the figure below.

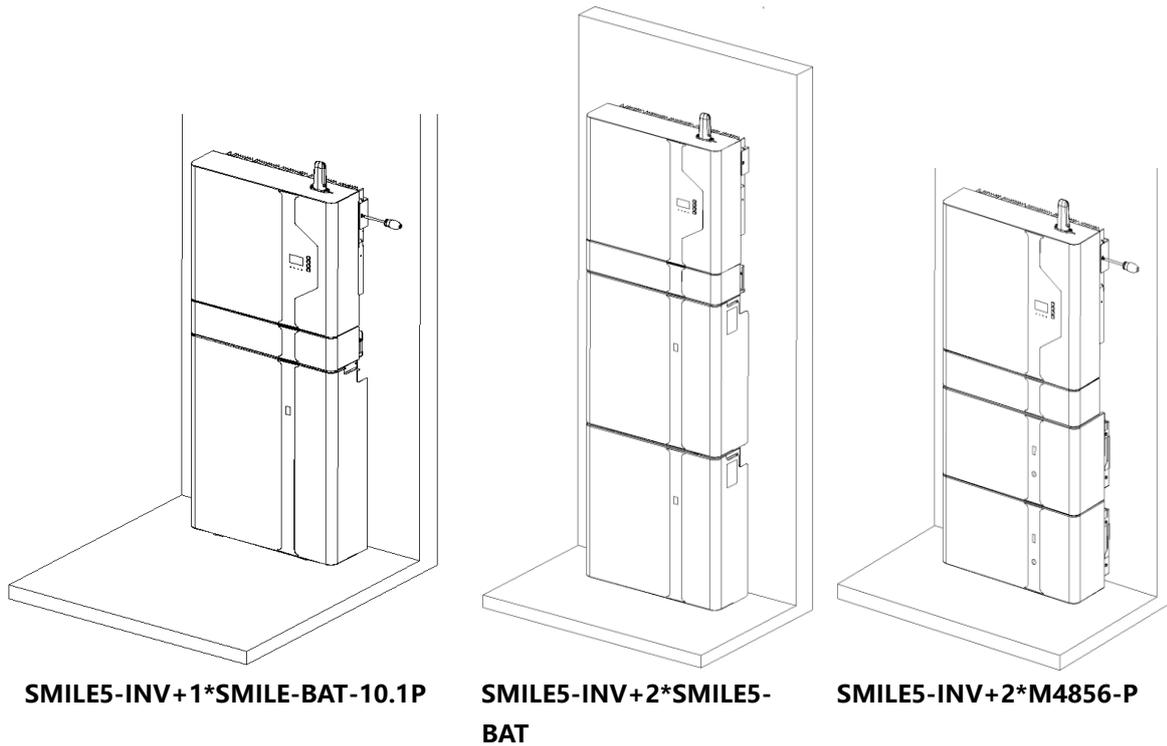


Figure 8.23 Installed system

NOTE:

- 1) If SMILE-BAT-10.1P needs to be expanded, it can only be expanded on the side. Stacking is not supported. Please refer to the corresponding battery manual for details.
- 2) Up to 2 SMILE5-BAT can be stacked per column. Please refer to the corresponding battery manual for details.
- 3) Up to 4 M4856-P can be stacked per column. Please refer to the corresponding battery manual for details.

8.20

1. Before start please check the following on the EMS.

- 1. Status – Grid ok
- 2. Status -BMS Ok
- 3. Status- Ok
- 4. Meter OK

If any not ok/ticked please check that connection

2. Please ensure grid code is set to UK specification

9. Wi-Fi Setting

9.1 Download and Install APP

Download and install the APP by scanning the QR code, and directly connect to this device by Wi-Fi module.



Figure 4-1 AlphaESS-APP

9.2 Wi-Fi module Setting

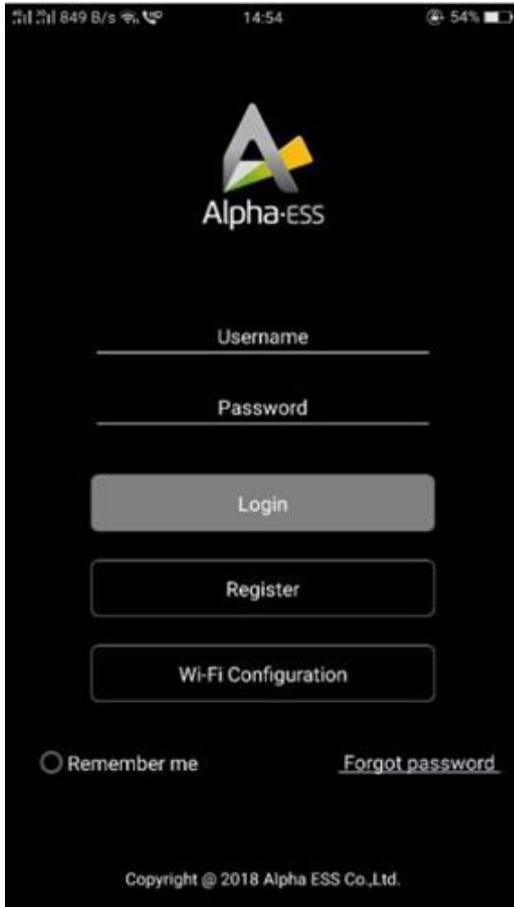


Figure 4-2 Network Setting

Step 1: Open AlphaESS APP, click the “Wi-Fi Configuration” button and enter the Wi-Fi configuration interface as shown in Figure 4-2.

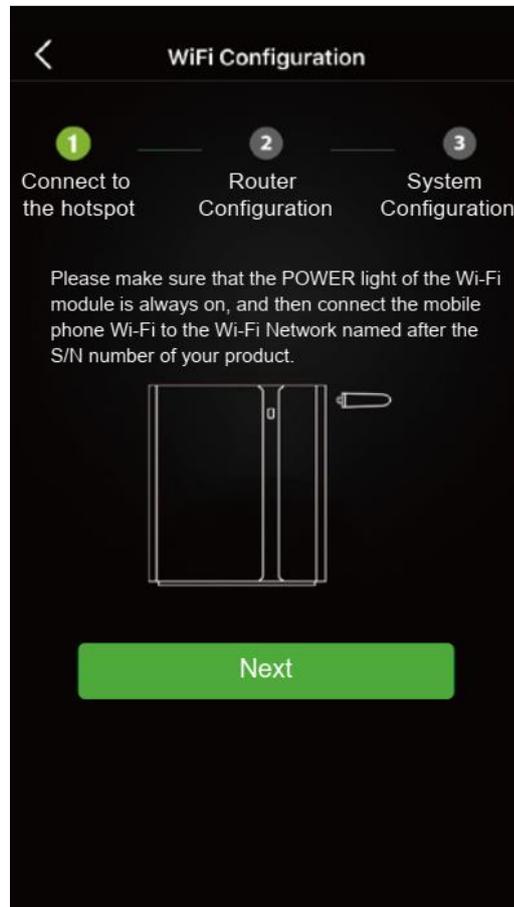


Figure 4-3 Hardware Connection

Step 2: Then check whether your phone has connected to the system hotspot, as shown in Figure 4-3.

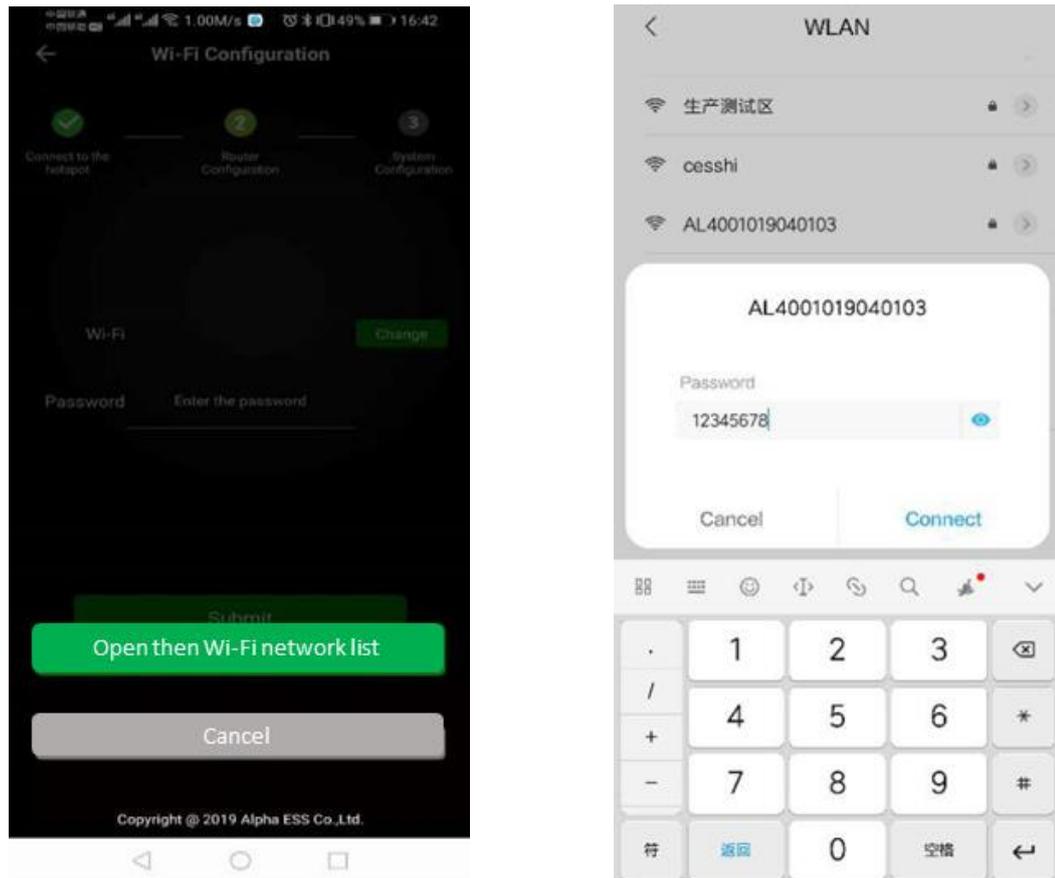


Figure 4-4 Open Wi-Fi network list

Step 3: If your mobile phone hasn't connected to the system hotspot, please open the Wi-Fi network list. Please find the hotspot after the product SN in WLAN list then enter the password 12345678 and connect to it. After successfully setting it, please go back to APP and click "Next".



Figure 4-7 Wi-Fi Setting

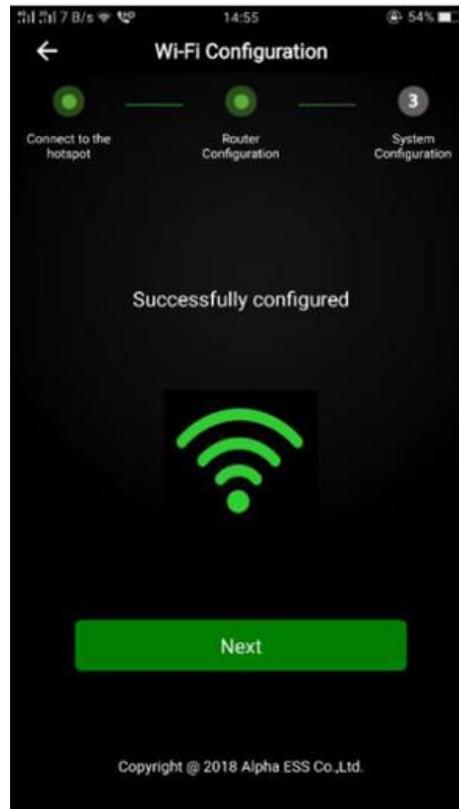


Figure 4-8 Configuration Success

Step 4: Enter the Wi-Fi account, password and then save it, when the configuration is successful, click “Next”.



Figure 4-9 Basic Parameter Setting

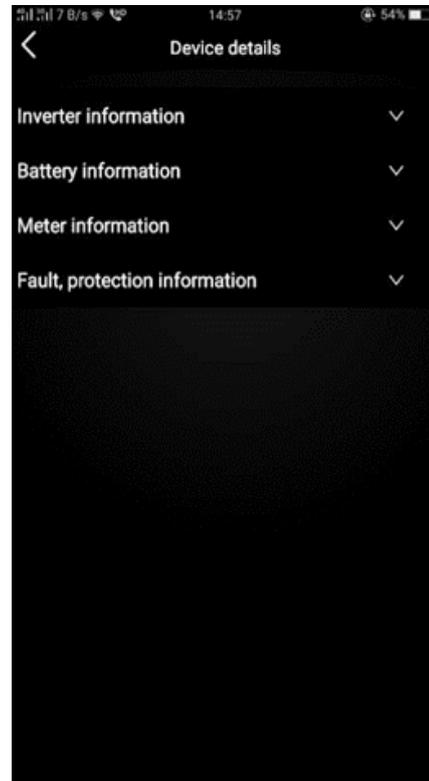


Figure 4-10 Equipment Details

Step 5: Set the basic parameters and click “Submit” button. Then you can see the device details.

Note: If you haven't registered, please register your account according to the hint after downloading and installing App.

10. Commissioning

10.1 Checking Before Power-On

Table 10-1 Installation checklist

No.	Check Item	Acceptance Criteria
1	Battery pack and inverter mounting	The battery pack and inverter are mounted correctly, securely, and reliably.
2	Wi-Fi mounting	The Wi-Fi module is mounted correctly, securely, and reliably
3	Cable layout	Cables are routed properly as required by the customer.
4	Cable tie	Cable ties are secured evenly, and no burr exists.
5	Grounding	The ground cable is connected correctly, securely, and reliably.
6	Switch and breakers status	The PV switch and all the battery and AC breakers connecting to the product are OFF.
7	Cable connections	The AC cable, PV cable, battery cable, and communication BMS cables are connected correctly, securely, and reliably.
8	Unused power terminals	Unused power terminals are blocked by water-tight caps.
9	Mounting environment	The mounting location is correct, and the mounting environment is clean and tidy,

10.2 Powering On the Product

Prerequisites

Before switching on the AC breaker between the inverter and the grid, check that the AC voltage on the power grid side of the AC breaker is within the specified range.

Procedure

1. Short press the power button on the left side of battery pack, then switch on the battery breaker on the right side of battery pack.
2. Switch on the battery breaker which is at the bottom left inverter.
3. Switch on the PV switch between the PV string and the inverter.
4. Switch on the AC breaker between the grid and the inverter.
5. Set the operating parameters through the APP.
6. Observe the LEDs to check the operating status of the battery pack and inverter.: Battery, Normal, Internet and Fault

10.3 Powering Off the Product



WARNING

After the inverter and battery pack is powered off, the remaining electricity and heat may still cause electric shocks and body burns. Therefore, put on protective gloves and do not work on the product until after 5 minutes after the power-off.

Procedure

- Step 1** Switch off the AC breaker between the inverter and the load.
- Step 2** Switch off the AC breaker between the inverter and the grid.
- Step 3** Switch off the PV switch at the bottom of the inverter.
- Step 4** Switch off the PV switch between the PV string and the inverter if there is any.
- Step 5** Switch off the battery breaker which is at the bottom left inverter.
- Step 6** Long press the power button for 6 seconds on the left side of battery pack, then switch off the battery breaker on the right side of battery pack.

11. Maintenance

11.1 Routine Maintenance

Normally, the inverter and battery pack need no maintenance or calibration. Regularly inspect the inverter and the cables for visible damage. Disconnect the inverter and battery pack from all power sources before cleaning. Clean the housing, cover and display with a soft cloth.

To ensure that the inverter and battery pack 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 heat sinks of the inverter are free from obstacles or dust.	Once every 6 to 12 months
Product running status	<ol style="list-style-type: none"> 1.The inverter and battery pack are not damaged or deformed. 2.The inverter and battery pack operate with no abnormal sound. 3.All inverter and battery pack parameters are correctly set. Perform this check when the inverter and battery pack is running. 	Once every 6 months
Electrical connections	<ol style="list-style-type: none"> 1.Cables are securely connected. 2.Cables are intact, and in particular, the cable jackets touching the metallic surface are not scratched. 3.Unused PV input terminals, battery terminals, COM ports, are locked by watertight 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 of the inverter.
- Wait approx. 30 minutes before cleaning until the heatsink has cooled down.

12. Troubleshooting

12.1 Inverter Error Troubleshooting

Error No.	Error description	Solution
BUS OVP	Bus voltage is too high	Restart inverter or contact installer.
DC DC Trip	Hardware failure on the dc side	Restart inverter or contact installer.
Out Short	Output short circuit	Restart inverter or contact installer.
BAT OVP	Battery overvoltage protection	Restart inverter or contact installer.
BAT UVP	Battery under voltage protection	Restart inverter or contact installer.
BuckBstSTF	Buck Boost Soft start failure	Restart inverter or contact installer.
LLC STF	LLC Soft start failure	Restart inverter or contact installer.
Grid loss	Grid loss	Restart inverter or contact installer.
Grid OVP	Grid overvoltage protection	Restart inverter or contact installer.
Grid UVP	Grid under voltage protection	Restart inverter or contact installer.
Grid OFP	Grid over frequency protection	Restart inverter or contact installer.
Grid UFP	Grid over frequency protection	Restart inverter or contact installer.
Active Island	Active island detection	Restart inverter or contact installer.
Passa Island	Passive island detection	Restart inverter or contact installer.
InvB OTP	Over temperature protection	Restart inverter or contact installer.
GFCI Err	Leakage current protection	Restart inverter or contact installer.
Over Power	The power is too large.	Restart inverter or contact installer.
PV1_OVP	PV1 overvoltage protection	Restart inverter or contact installer.
PV2_OVP	PV2 under voltage protection	Restart inverter or contact installer.
PV1_Reverse	PV1 Reverse connection	Restart inverter or contact installer.
PV2_Reverse	PV2 Reverse connection	Restart inverter or contact installer.
Boost1_STF	BOOST1 Soft start failure	Restart inverter or contact installer.
Boost2_STF	BOOST2 Soft start failure	Restart inverter or contact installer.
GFCI_Sensor	GFCI Sensor failure	Restart inverter or contact installer.
CURR_Sensor	Current sensor failure	Restart inverter or contact installer.
PV1_ISO	PV1 Abnormal insulation re- sistance	Restart inverter or contact installer.
PV2_ISO	PV2 Abnormal insulation re- sistance	Restart inverter or contact installer.
HbridgeFail	H bridge failure	Restart inverter or contact installer.
GridRlyResetErr	Grid relay failure	Restart inverter or contact installer.
InvRlyResFail	Inverter relay failure	Restart inverter or contact installer.
M_SComFial	Internal communication failure	Restart inverter or contact installer.
M_SComStatusErr	Master-slave communication line failure	Restart inverter or contact installer.
GridVoltHigh	The voltage of the Grid is high.	Restart inverter or contact installer.
GridVoltLow	The voltage of the Grid is low.	Restart inverter or contact installer.
GridFreqHigh	The frequency of the grid is high.	Restart inverter or contact installer.
GridFreqLow	The frequency of the grid is low.	Restart inverter or contact installer.
GridZeroLoss	No Grid detected	Restart inverter or contact installer.
GridVoltLongHigh	Grid voltage is high for a long time.	Restart inverter or contact installer.

GridWave	Abnormal wave of the Grid	Restart inverter or contact installer.
PhaseLoss	Phase lock failure	Restart inverter or contact installer.
PV1VoltLoss	PV1 voltage is low or PV1 is not connected	Restart inverter or contact installer.
PV2VoltLoss	PV2 voltage is low or PV2 is not connected	Restart inverter or contact installer.
PVVoltLoss	No PV input	Restart inverter or contact installer.
EepromFail	Internal ROM failure	Restart inverter or contact installer.
IslandDetect	Island detection	Restart inverter or contact installer.
BatVoltLow	Battery voltage is low	Restart inverter or contact installer.
BatLoss	No PV input	Restart inverter or contact installer.
DCModuleLoss	DC/DC module is not detected	Restart inverter or contact installer.
InvHsTempHigh	The temperature of the heat sink is high.	Restart inverter or contact installer.
AlphaEmsLoss	No EMS detected	Restart inverter or contact installer.

12.2 Battery Error Code

12.2.1 Protection Code

LED Ring	Protection Code	LED Display	Description
Green light flickering every 3 seconds.	1		Temperature difference
	3		High temperature
	4		Low-temperature discharge
	5		Over-current charge
	6		Over-current discharge
	8		Cell overvoltage
	9		Cell under voltage
	11		Low-temperature charge

12.2.2 Error Code

LED Ring	Error Code	LED display	Description	Troubleshooting
Red light Flickering every 3 seconds.	Error 01		Hardware error	Wait for automated Restart the batteries. In case problem is not resolved, call in for repair.
	Error 05		Hardware error	
	Error 06		Circuit Breaker Open	Close circuit breaker after shutting down the battery system.
	Error 07		DIP difference	Keep consistence of DIP switches then restart the system.

Error 08		LMU Disconnect (slave)	Reconnect the communication cable
Error 09		SN missing	Enter the serial number, restart the system or call in for call for service.
Error 10		LMU Disconnect (master)	Reconnect the communication cable
Error 11		Software version inconsistent	Call installation for Service.
Error 12		Multi master	Restart all batteries within 30s
Error 13		MOS over temperature	Power off the battery and Power on the battery after 30-40 minutes

i NOTE:

In the case of parallel mode or work mode, if Protection 09 appears and the power button is pressed 5 times within 10 seconds, the BMS will be forced to turn on MOS of discharge so that the battery voltage can be detected by the inverter and the battery can be charged.

13. Uninstallation & Return

13.1 Removing the Product

Procedure

Step 1 Power off the product by following the instructions in 8.3 Powering Off the product.

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

Step 3 Remove the Wi-Fi module from the inverter.

Step 4 Remove the inverter from the mounting bracket.
Remove the Battery pack from the mounting bracket.

Step 5 Remove the mounting bracket.

13.2 Packing the Product

If the original packaging is available, put the battery pack or inverter inside it and then seal it using adhesive tape.

If the original packaging is not available, put the battery pack or inverter inside a suitable cardboard box and seal it properly.

13.3 Disposing of the Product

If the battery pack or inverter 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 the inverter and the battery pack with normal domestic waste.



14. Specification

14.1 Datasheet of SMILE5-INV

Topology	High frequency insulation (for battery)
Operation temperature range	-25 ~ +60°C
Ingress protection	IP65
Noise emission	<30 dB(A)
Cooling concept	Natural convection
Max. operation altitude	3000 m
Grid connection standard	G98 or G99, , IEC 62116, IEC 61727, IEC 60068, IEC 61683, EN 50530,
Safety/EMC standard	IEC62040-1, IEC62109-1/-2, AS3100, NB/T 32004, EN61000-6-2, EN61000-6-3
Features	
DC connection	MC4 connector
AC connection	Terminal block
Communication	LAN, Wi-Fi (optional)

14.2 Datasheet of batteries

Module	SMILE-BAT-10.1P	SMILE5-BAT	M4856-P
Module Capacity	10.1kWh	5.7kWh	2.56kWh
Nominal Voltage	48V	51.2V	51.2V
Operating Temperature Range	-10°C~50°C *	-10°C~50°C *	-10°C~50°C *
Max. Modules In Parallel	6	6	6
Max. Charging/Discharging Current	100A (0.5C)	56A (0.5C)	56A (1C)
Cycle Life	10000	10000	10000