V03

INSTALLATION MANUAL OF ENERGY STORAGE SYSTEM (ESS) SMILE-SP SYSTEM

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CONTENT

1. INTRODUCTION

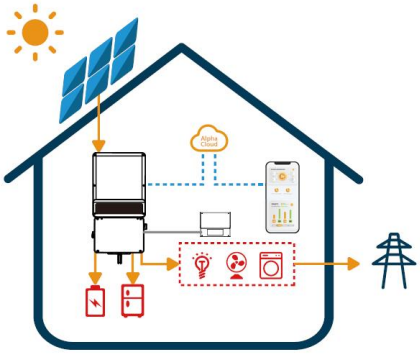
The SMILE-SP system is a fully-integrated hybrid energy storage system for residential use. If the PV power production exceeds the load consumption, the surplus will be stored in the battery modules. If the production is lower than consumption, the batteries will then discharge to power the loads. If the batteries are fully charged, the surplus will be fed back to the grid. Under normal operation, the energy storage system will not discharge its battery to the grid.

The above-mentioned introduction describes the general operation situation of the SMILE-SP system. The operation mode can be changed based on the system layout with the AlphaESS App.

The applicable operations for the SMILE-SP system are illustrated below.

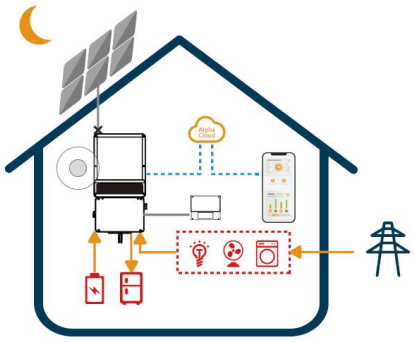
1.1. Operation Modes Introduction

SMILE-SP system normally has the following operation modes based on your configuration and layout conditions.



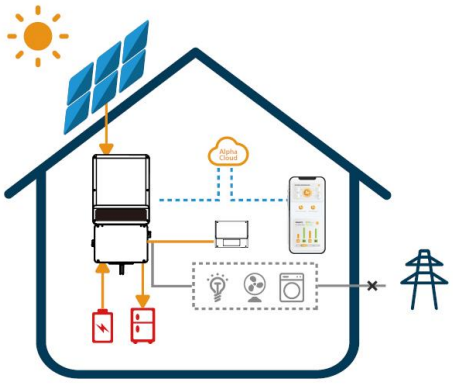
Mode I

The energy produced by the PV strings is primarily used to meet self-consumption needs. The excess energy is used to recharge the batteries. If there is still surplus energy, it will be exported to the grid.



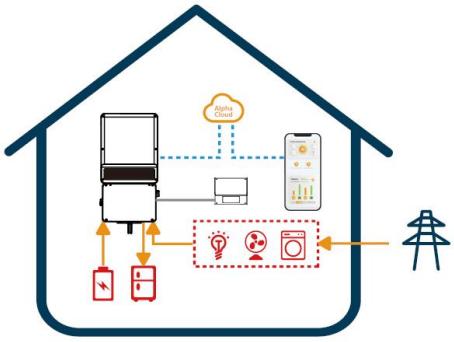
Mode II

If there is no PV while the battery is sufficient, the system can supply the load with the grid together.



Mode III

When the grid fails, the system will automatically switch to back-up mode. The back-up loads can be supplied by both PV and battery energy.



Mode IV

The battery could be charged by the grid, and charging time/power could be set to various options on the AlphaESS App.

1.2. Application Scenarios

The SMILE-SP System, including the SMILE-SP inverter and SMILE-BAT-8.2PHA (with or without EMS), can be used with DC-coupled solar systems (mostly for new installations), AC-coupled solar systems (mostly for retrofitting market) and Hybrid-coupled systems (mostly for retrofitting market and PV expansion). The schemes of DC-coupled systems which are the most common applications are shown below:

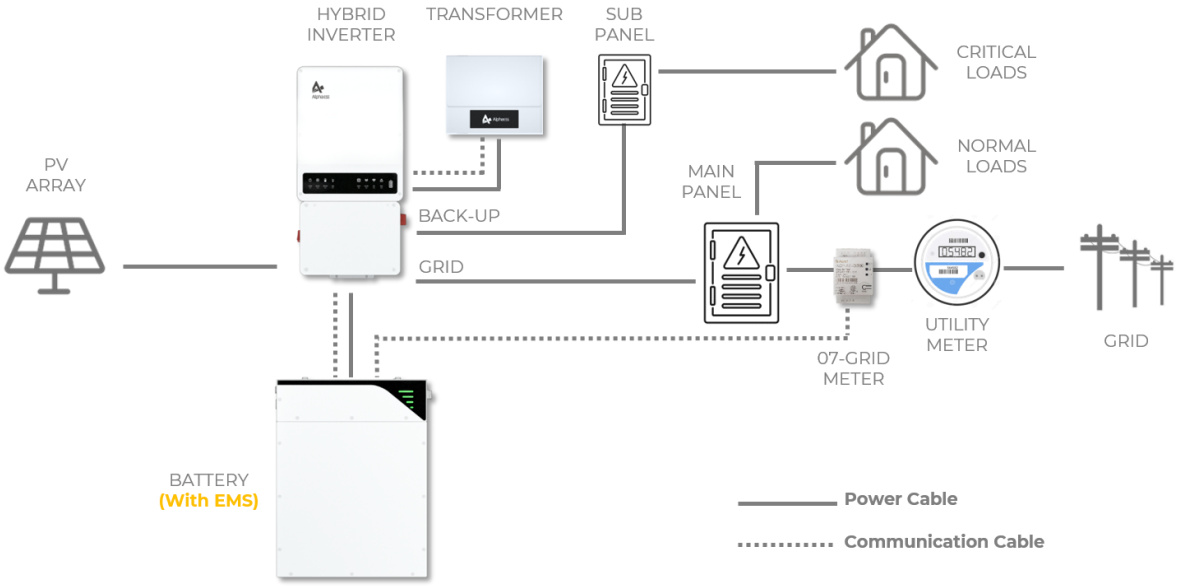


Figure 1 DC-coupled Energy Storage System – BACK-UP SELECTED CIRCUITS

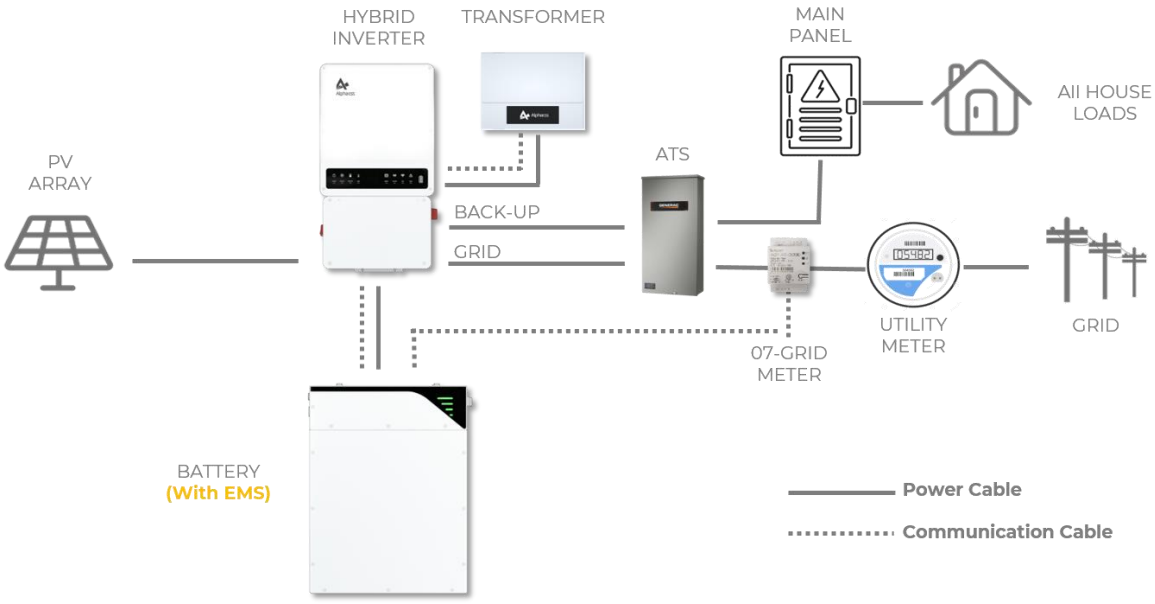


Figure 2 DC-coupled Energy Storage System – BACK-UP WHOLE HOME

1.3. Safety & Warning

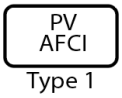
1.3.1. Inverter Safety & Warning

The SMILE-SP inverter has been designed and tested in accordance with necessary safety requirements. However, as with power electronic devices, there may still be residual risks despite strict standards. It is strongly recommended to read the following information carefully to prevent personal injury and property damage.

SAVE THESE INSTRUCTIONS - This manual contains important instructions for the proper installation and maintenance of the SMILE-SP inverter.

⚠ WARNING	These servicing instructions are for use by qualified personnel only. To reduce the risk of electric shock, do not perform any servicing other than that specified in the operating instructions.

Symbols Explanation

DANGER	DANGER indicates a hazardous situation which, if not avoided, will result in serious injury or even death.
WARNING	WARNING indicates a hazardous situation which, if not avoided, could result in serious injury or even death.
CAUTION	CAUTION indicates a hazardous situation which, if not avoided, can result in minor or moderate injury.
	Danger of high voltage and electric shock!
	Hot Surface – To reduce the risk of burns. Do not touch.
	Components of the product are recyclable.
	This side up! Ensure that the package is always transported, handled, and stored with the arrows pointing upwards.
	Stack no more than six (6) identical packages on each other.
	Do not dispose of products as household waste.
	Fragile – Handle the package/product carefully and avoid tipping or slinging it.
	Refer to the operating instructions.
	Keep dry! The package/product must be protected from excessive humidity and stored under cover.
	This symbol indicates that after disconnecting the inverter from the power grid or the PV arrays, you should wait at least 5 minutes before touching the inner components.
	CSA certified.
	Type 1 Arc-Fault Circuit-interrupter on the PV side.

1.3.2. Safety Warning

Any installation and operation on the inverter must be performed by qualified electricians, following the standards, wiring rules or requirements of local authorities or the grid company.

The input and output circuits are isolated from the enclosure. If the system grounding is required by Sections 690.41, 690.42 and 690.43 of the National Electric Code ANSI/NFPA 70, this is the responsibility of the installer.

Any operation on the AC or DC terminals during inverter operation is prohibited.

Before any wiring connection or electrical operation on the inverter, all DC and AC power must be disconnected from the inverter for at least 5 minutes to make sure it has been de-energized to avoid electric shock.

The temperature of the inverter surface might exceed 60℃ during operation, so please make sure it has cooled down before touching it, and make sure the inverter is out of reach of children.

Do not open the inverter's cover or change any components without the manufacturer's authorization, otherwise, the warranty commitment for the inverter will be invalid.

The use and operation of the inverter must follow the instructions in this user manual, otherwise, the protection design might be impacted and warranty commitment for the inverter will be invalid.

Appropriate methods must be adopted to protect the inverter from electrostatic damage. Any damage caused by electrostatic is not covered under the manufacturer's warranty.

PV negative (PV-) and battery negative (BAT-) on the inverter side are not grounded. Connecting PV- or BAT- to EARTH is strictly forbidden.

PV modules used on the inverter must have an IEC61730 class A rating, and the total open-circuit voltage of the PV string must be lower than the maximum DC input voltage (600V) of the inverter. Any damage caused by PV over-voltage is not covered under warranty.

The inverter has a built-in RCMU and may produce a DC residual current of no more than 6mA. An external Type A RCD (with operating current ≥30mA) can be used if required.

Before connecting the SMILE-SP inverter to the AC distribution grid, approval must be received from the appropriate local utility as required by national and state interconnection regulations.

All electrical installations must be carried out in accordance with the local electrical standards and the National Electrical Code ANSI/NFPA 70 or the Canadian Electrical

Code CSA C22.1. Before connecting the inverter to the grid, contact your local grid operator. The electrical connection of the inverter must be carried out by qualified persons only.

- When exposed to sunlight, the PV array generates dangerous DC voltage in the DC conductors among the live components, which can lead to significant electric shocks. If you disconnect the terminal plate with the connected DC conductors from the DC input slot while under load, an electric arc may occur, potentially resulting in electric shock and burns.
- Do not touch non-insulated conductors.
- Do not touch the DC conductors.
- Do not touch any live components of the inverters.
- Any equipment damage caused by incorrect cable connections will not be covered by the warranty.
- Operation personnel must wear proper PPE all the time when connecting cables.
- Incorrect installation of metal conductors may cause waterproof problems.
- Class 1 wiring methods are to be used for field wiring connections to terminals of a Class 2 circuit.
- AC output (neutral) is not bonded to ground.
- To reduce the risk of fire, please add an overcurrent protection circuit breaker in accordance with the National Electrical Code ANSI / NFPA 70.
- The inverter is not provided with an isolation transformer and is intended to be installed per NFPA 70, 690.35 with an ungrounded PV array
- A transmitter, which meets the SUNSPEC protocol, is integrated into the SMILE-SP inverters. It can integrate with any Rapid Shut-Down device in the market that complies with SUNSPEC protocol to meet the requirements of NEC2017 regulation.

1.3.3. Battery Safety & Warning

1.3.3.1 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.

Users are not supposed to fix the battery pack by themselves. The voltage in the device is high.

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, which should be only connected to the inverter, directly to the battery pack.

Do not charge or discharge damaged batteries.

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 the battery to naked light.

1.3.3.2 Response to Emergency Situations

The battery pack is composed of multiple batteries and is 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 where the battery pack is installed, please perform the following countermeasures:

- Fire extinguisher

A 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 the battery and has not spread to it yet.

- Firefighting instructions

If a fire occurs when charging batteries, if it is safe to do so, disconnect the battery pack circuit breaker to shut off the battery.

If the battery pack is not on fire yet, extinguish the fire before the battery pack catches fire.

If the battery pack is on fire, do not try to extinguish it 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: Segregate the damaged battery and call the 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 the submerged battery again and contact the service engineer.

1.3.3.3 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 ensure the 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 high voltages on the battery pack.

The voltage at the pin connector for the power cable can be lethal. Putting the pin connector for the power cable can result in a lethal electric shock.

- Do not open the battery pack.
- Do not wipe over the battery pack with a damp cloth.

The protective caps cannot be removed from 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 caused by electrolyte or toxic gases

During normal operation, no electrolyte would leak from the battery pack and no toxic gases would form. Despite the 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 a 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.

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.

DANGER

Danger to life due to electric shock when acting components or cables are touched

There are high voltages in the conductive components or cables of the product. Touching live parts and cables can result in significant injuries or even death 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 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 acting components or DC cables are touched

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

- Disconnect the inverter from voltage sources 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 can result in significant injuries or even death 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 continuous conduction.
- Observe the applicable local regulations.

DANGER

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

When a ground fault occurs, parts of the system may still be live. Touching live parts and cables can result in significant injuries or even death due to electric shock.

- Disconnect the product from voltage sources and make sure it cannot be reconnected before working on the device.
- Touch the cables of the PV array on the insulation only.
- 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.

CAUTION

Risk of burns due to hot enclosure of the inverter

- The enclosure of the inverter 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.

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

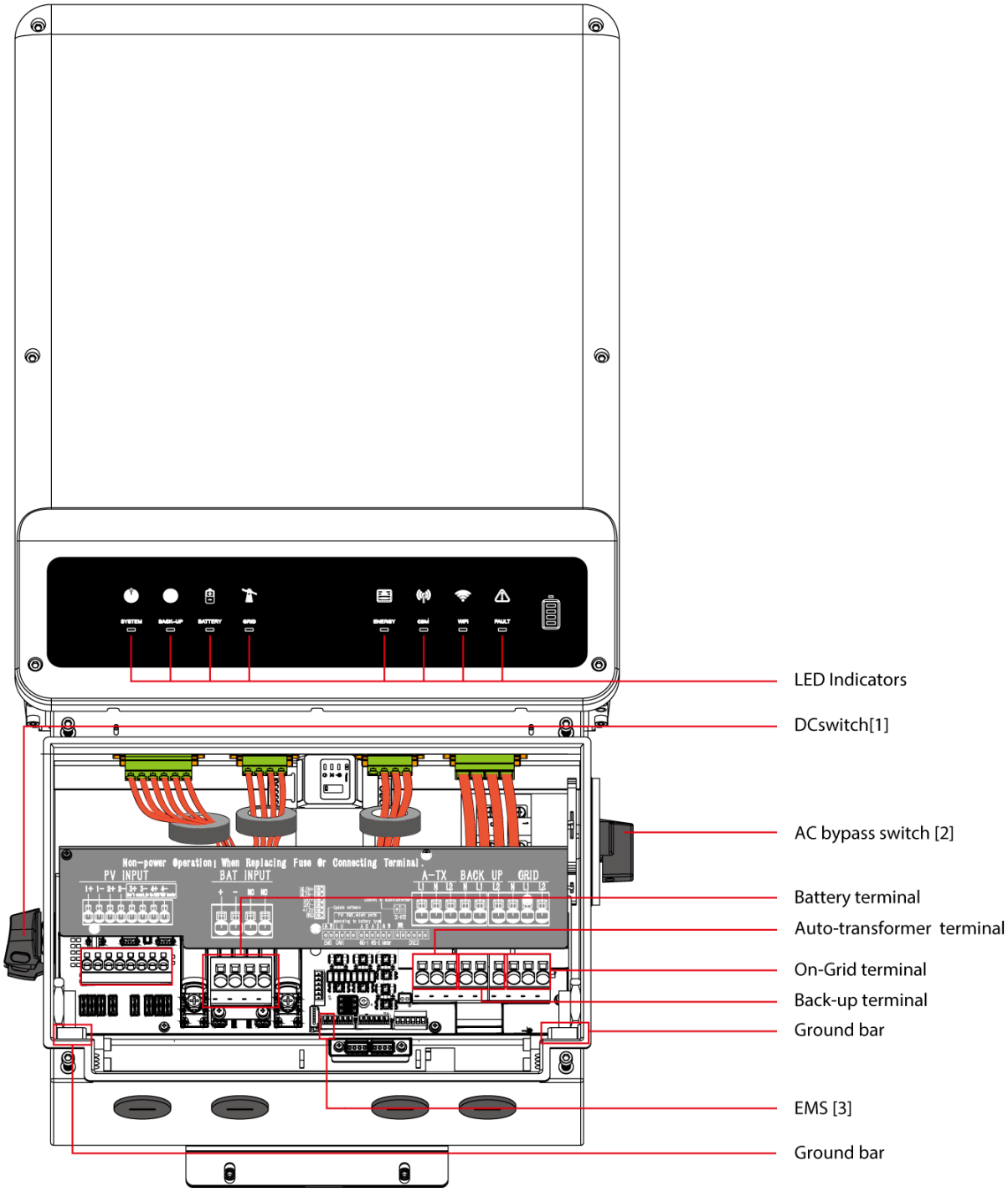
Symbol	Explanation
	Beware of a danger zone This symbol indicates that the product must be additionally grounded if additional grounding or equipotential bonding is required at the installation site.
	Beware of electrical voltage The product operates at high voltages.
	Risk of chemical burns
	Risk of 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
	Keep away

Symbol	Explanation
	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

Product Overview

1.3.4. Inverter Interface Introduction

1.3.4.1 Inverter Product Overview



Item	Object	Description
1	**DC switch**	DC switch is used to shut down the PV strings in case of emergency and also to avoid electric shock when wiring and maintenance. It also can be used as RSD (remote shutdown) switch
2	**AC bypass switch**	It is optional for SMILE-SP inverter. The switch may be used to "bypass" AC mains to backup loads only when the inverter malfunctions so that the backup load can be connected to the grid for power supply. The switch should be turned back to the original "Normal" position when the inverter is in normal operation so that normal back-up function can be enabled. The bypass switch is in "Normal" position by default.
3	**EMS**	Used to communicate with the battery pack SMILE-BAT-8.2PHA (with EMS).

1.3.4.2 User Interface Introduction

1.3.4.3 Inverter LED Signals

Eight LED indicators are provided on the display panel.

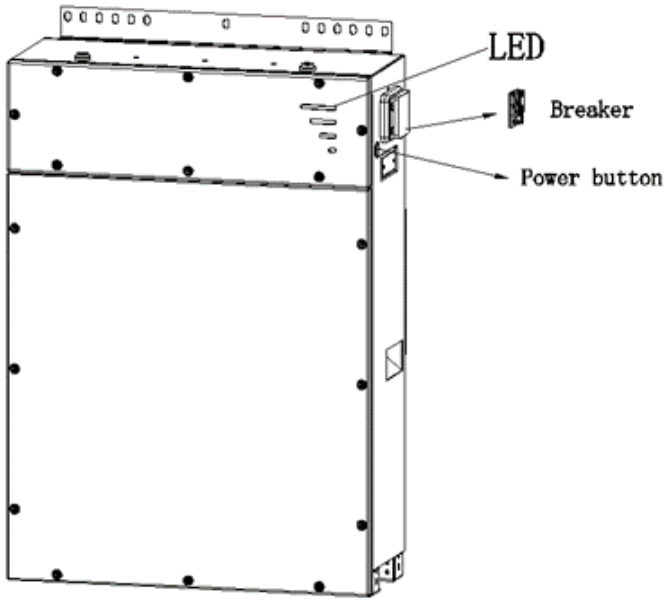
These LED indicators provide information about the operational status of the product.

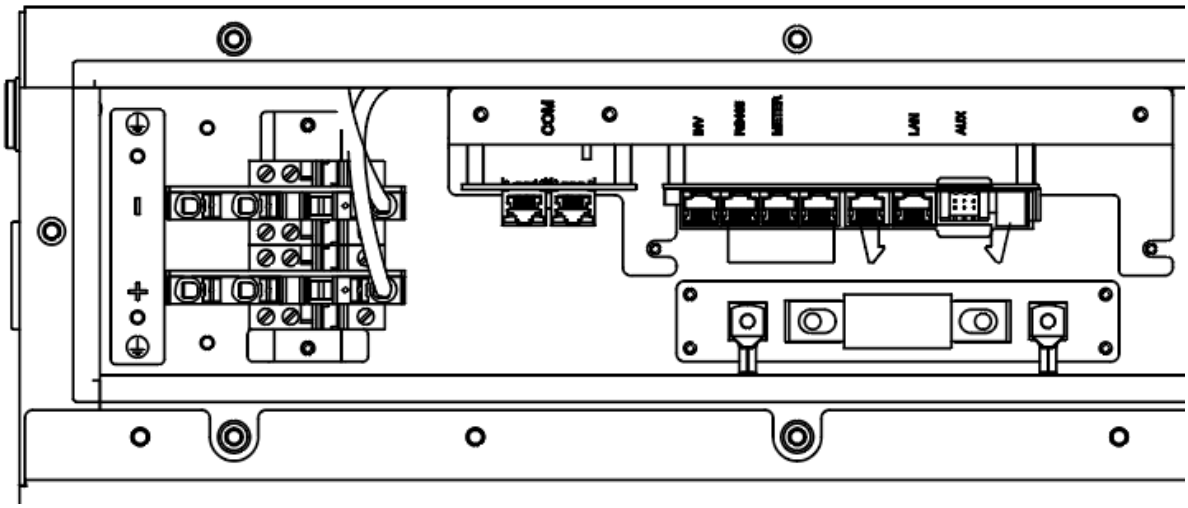
LED Indicator	Status	Explanation
SYSTEM		The system works normally.
		The system is not operating.
BACK-UP		Back-up is ready / power available.
		Back-up is off / power unavailable.
BMS COM		The communication between EMS and battery is normal.

		The communication between EMS and battery is abnormal.
GRID		Grid is active and connected.
		Grid is active but not connected.
		Grid is not active.
ENERGY		Consuming energy from the grid / buying.
		Supplying energy to the grid / zeroing
		Supplying energy to the grid / selling
		Grid not connected or system not operating.
INV COM		The communication between EMS and inverter is normal.
		The communication between EMS and inverter is abnormal.
COM		The communication between EMS and server is normal.
		The communication between EMS and server is abnormal.
FAULT		A fault of the system has occurred.
		No fault.

1.3.5. Battery Description

1.3.5.1 Battery Product Overview





1.3.5.2 Battery LED Signals

Four LED indicators are provided on the display panel.

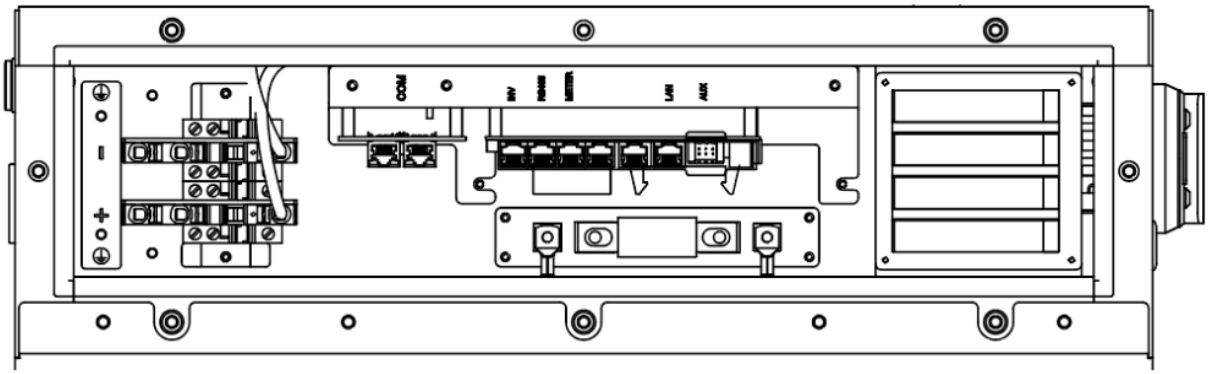
Different colors represent different states: green for SOC state, yellow for protection state, red for error state.

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

LED Indicator	SOC	Description
Standby: Green LEDs flash once per second		SOC≤5% The first line of the LED indicator flashes every 10s.
		5%＜SOC≤30% The first line of the LED indicator is always on. When the SOC is less than 30% and the battery is being charged, the first line of the LED indicator will flash every 3s.
		30%＜SOC≤55% The first and second line of the LED indicator are always on. When the battery is being charged and the SOC is between 30% and 55%, the second line of the LED indicator will flash every 3s.
		55%＜SOC≤80% The first, second and third line of the LED indicator are always on. When the battery is being charged and the SOC is between 55% and 80%, the third line of the LED indicator will flash every 3s.
		80%≤SOC≤100% All the LED indicators are always on. When the battery is being charged and the SOC is between 80% and 100%, the fourth line of the LED indicator will flash every 3s.

1.3.5.3 Battery Interface Introduction

SMILE-BAT-8.2PHA (WITH EMS)



Item	Definition	Description
1	COM*2	Communication port for expanded batteries
2	INV*1	Connect to EMS communication port on the inverter
3	RS485*1	Modbus dispatch and 12V Power
4	METER*1	Meter communication port
5	LAN*1	Ethernet connection port
6	AUX	AUX Contact

1- COM Port PIN Definition: Communication port for expanded batteries

1	2	3	4	5	6	7	8
RS485B	RS485A	NC	CAN_H	CAN_L	NC	NC	NC

2- INV Port PIN Definition: Connect to EMS communication port of the inverter

1	2	3	4	5	6	7	8
NC	RS485A	NC	CAN_H	CAN_L	NC	RS485B	NC

3- RS485 Port Definition: Modbus dispatch and 12V Power

1	2	3	4	5	6	7	8
12V	NC	GND	RS485B	RS485A	NC	NC	NC

4- METER Port Definition: Meter communication port

1	2	3	4	5	6	7	8
GRID_CT-	GRID_CT+	RS485A	NC	NC	RS485B	NC	NC

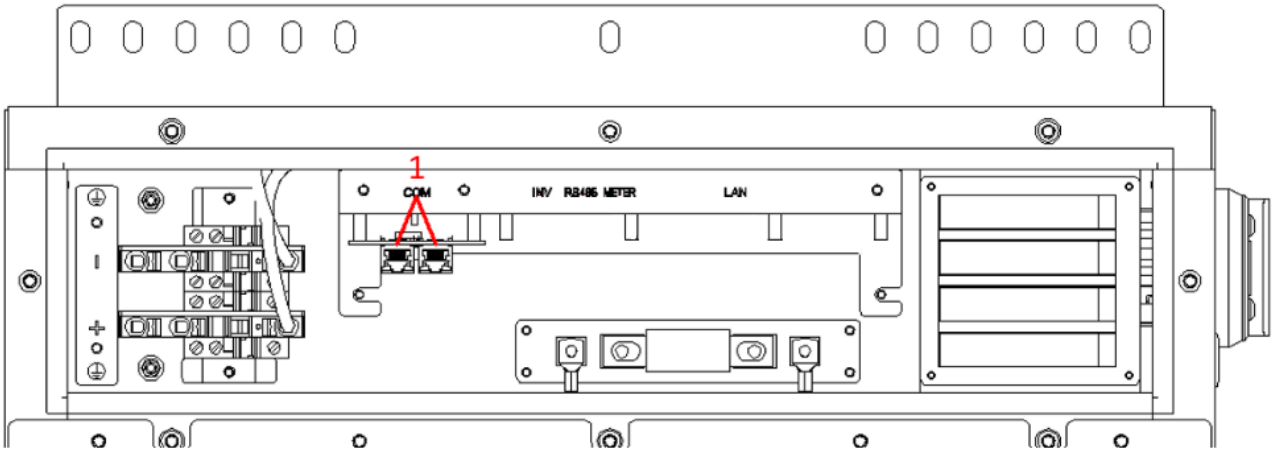
5- LAN Port: Ethernet connection port

1	2	3	4	5	6	7	8
TD+	TD-	RD+	TCT	RCT	RD-	NC	NC

6- AUX Port: AUX Contact

1	2	3	4	5	6
DO1_NO	DO1_COM	DO1_NC	DI_negative	DI_positive	GRD

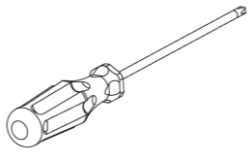
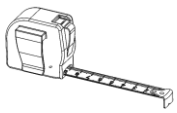
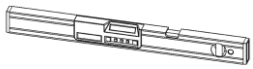
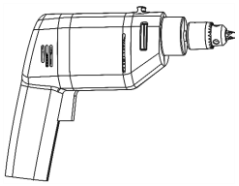
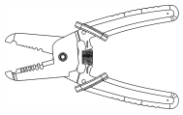
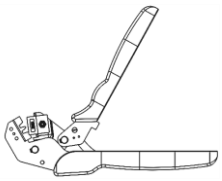
SMILE-BAT-8.2PHA (WITHOUT EMS)



Item	Definition	Description
1	COM*2	Connect to communication port on the next and the last batteries

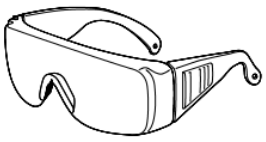
1.4. Tools Required

1.4.1. Installation Tools

			
Screwdriver (T20)	Ratchet wrench (with Sleeve: SW10)	Tape measure	Level
			
Pencil or marker	Drill (With broach: φ10mm (0.4in) L120mm (4.72in)	Wire stripper	Wire crimper for Making cable set with pin terminal

1.4.2. Safety Gear for Personal Protection

It is required to wear the following safety gear when handling the battery pack.

		
Insulated gloves	Safety goggles	Safety shoes

2. STORAGE

2.1. 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 at -40~70°C and the humidity at 5%~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 caution 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.

2.2. Battery Storage

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

1. Place batteries according to the signs on the packing case during storage. Do not put batteries upside down or sidelong.

2. Stack battery packing cases by complying with the stacking requirements on the external package.

3. Keep the battery pack out of reach of children and animals.

4. Store the battery pack in the area of minimal dust and dirt.

5. Handle batteries with caution to avoid damage.

6. The storage environment requirements are as follows:

– Ambient temperature: -10~55°C, recommended storage temperature: 15~30°C

– Relative humidity: 15%~ 85%

– Place batteries in a dry and clean place with proper ventilation.

– Keep batteries 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. The warehouse keeper should collect battery storage information every month and report the battery inventory information to the planning department. The batteries that have been stored for nearly 6 months should be recharged timely.

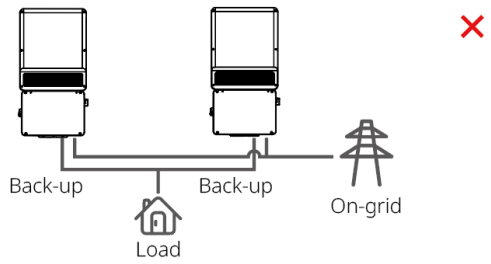
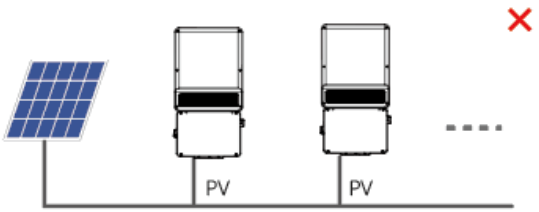
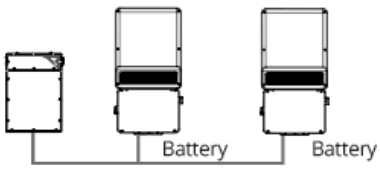
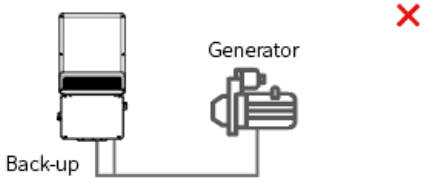
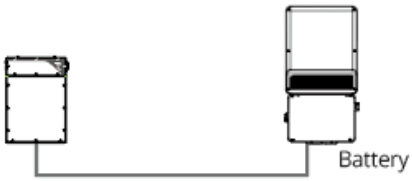
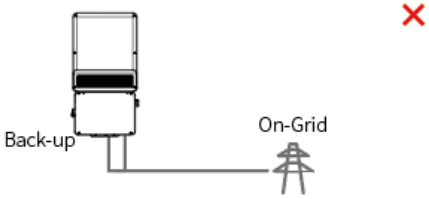
10. If a lithium battery is stored for a long time, capacity loss may occur. If a lithium battery is stored for more than 12 months in the recommended storage temperature, the irreversible capacity loss rate is 3%~10%. It is recommended that batteries not be stored for a long period. If the batteries 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.

3. INSTALLATION

3.1. Unacceptable Installation

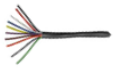
Please avoid the following installations, which will damage the system or the inverter.

Following installations should be avoided. Any damage caused will not be covered by warranty policy.

	
No parallel connection of the back-up is allowed in general application. Please contact AlphaESS first for advanced application.	Single PV String cannot be connected to multiple inverters.
	
Single Battery bank cannot be connected to multiple inverters.	On-Grid or back-up side cannot be connected to any AC generator.
	
Battery without official compatibility statement cannot be connected to inverter.	Back-up side cannot be connected to the grid.

3.2. Other accessories

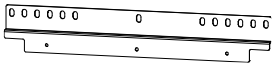
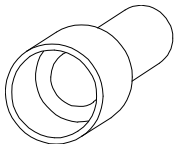
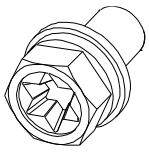
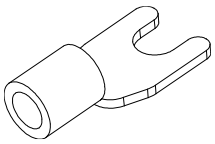
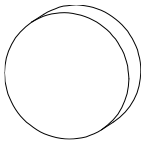
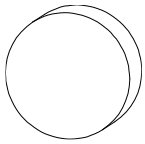
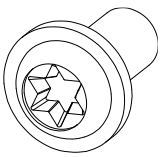
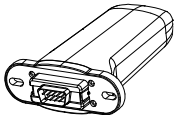
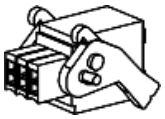
Some accessories should be prepared by installer as follows.

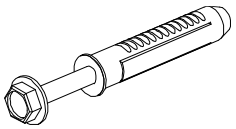
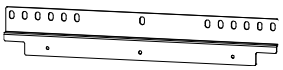
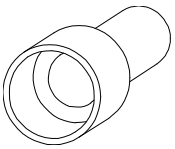
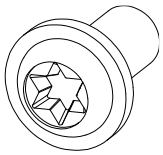
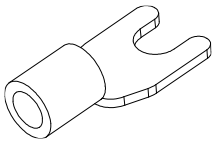
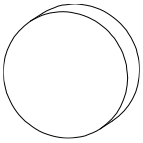
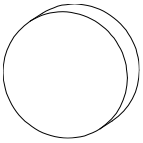
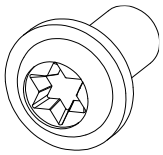
					
Rj45 Plugs CAT5	Ethernet Cables CAT5	NTC Cables 22/24AWG 600 V	AC Copper Conductor SPB7.6: 8~10 AWG SPB9.6: 6~8 AWG	DC Copper Conductor 6AWG	Conduits According to local regulations

Other accessories are also required depending on what back-up wiring solutions you choose, BACK-UP SELECTED and BACK-UP WHOLE HOME.

3.3. Mounting

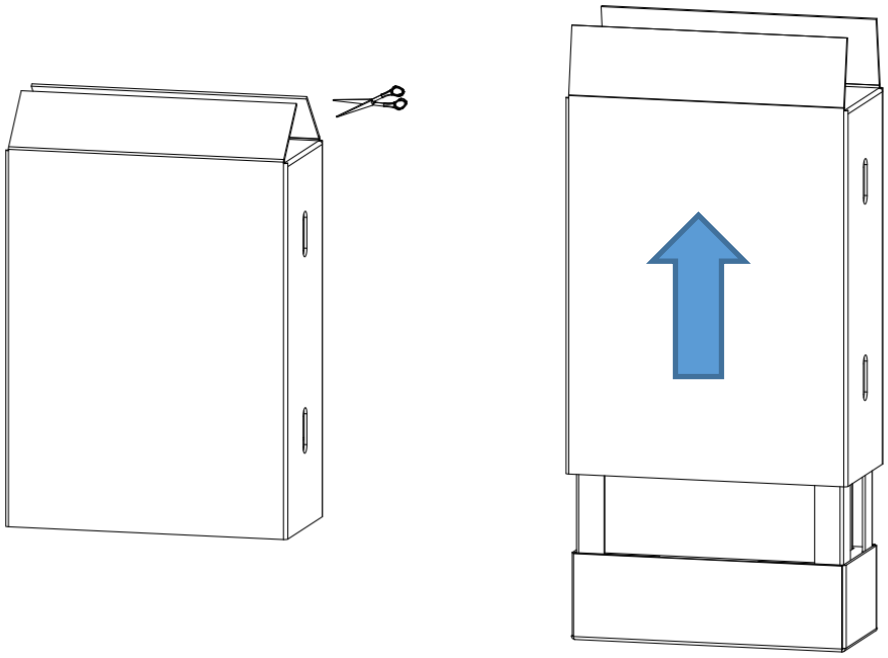
3.3.1. Battery Packing List

SMILE-BAT-8.2PHA (WITH EMS)			
			
Quick Installation Manual (X1)	Expansion Pipe Screw (X4)	Wall Panel (X1)	Pin Terminal (X5)
			
M5*10 Screw (X4)	Non-Insulated Spade Terminal (X2)	White Silicone Plug (X5)	Black Silicone Plug (X5)
			
M6*10 Screw (X1)	M4*12 Screw (X3)	Wi-Fi module (X1)	Terminal block (X1)

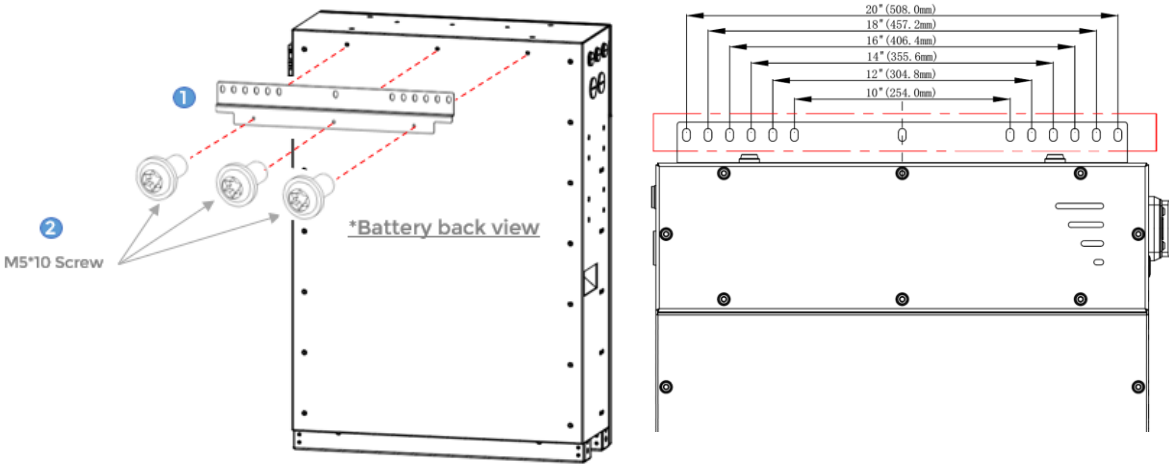
SMILE-BAT-8.2PHA (WITHOUT EMS)			
			
Quick Installation Manual (X1)	Expansion Pipe Screw (X4)	Wall Panel (X1)	Pin Terminal (X5)
			
M5*10 Screw (X4)	Non-Insulated Spade Terminal (X2)	White Silicone Plug (X5)	Black Silicone Plug (X5)
			
M6*10 Screw (X1)			

3.3.2. Batteries Installation

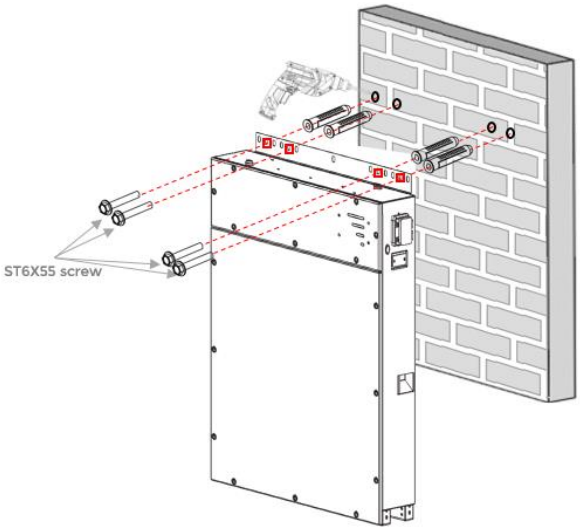
Step 1: Remove the carton tape, and after taking out the accessories, and take the carton in the direction shown below.



Step 2: Install the wall bracket on the battery (tool: T20 screwdriver, torque: 1.8ft-lb).



Step 3: Place the battery against the wall, select 4 points and mark them through the wall panel. Then drill holes on the wall ϕ10*80 mm (Φ0.4 in, depth: 3.1 in). Fix the battery to the wall with screws (tool: SW10 screwdriver). There should be 2 sets of each left and right symmetrical holes.



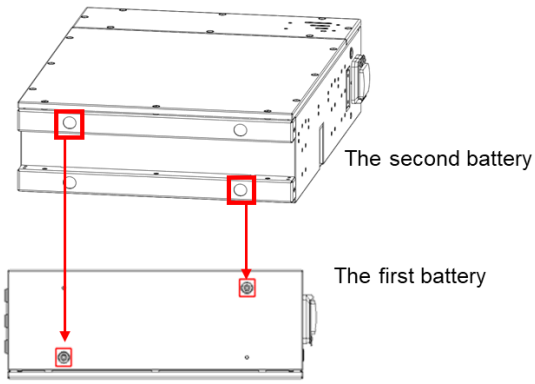
3.3.3. Mounting More Batteries

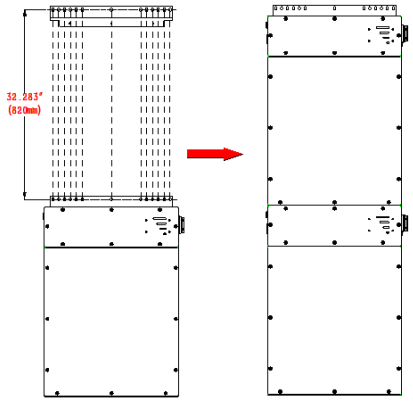
You can install extra batteries (up to 6) in a system. The extra batteries can be installed by side or by stacking.

1) Please refer to the following steps If the second battery is installed by stacking.

Step 1: Mark and drill holes for the battery on the top, and the vertical distance from these holes to the marked points for the battery on the bottom is 32.3 inches.

Step 2: Snap the plastic feet (A) on the top of the first battery into the bottom of the second battery and then fix the batteries to the wall with screws (tool: SW10 screwdriver).



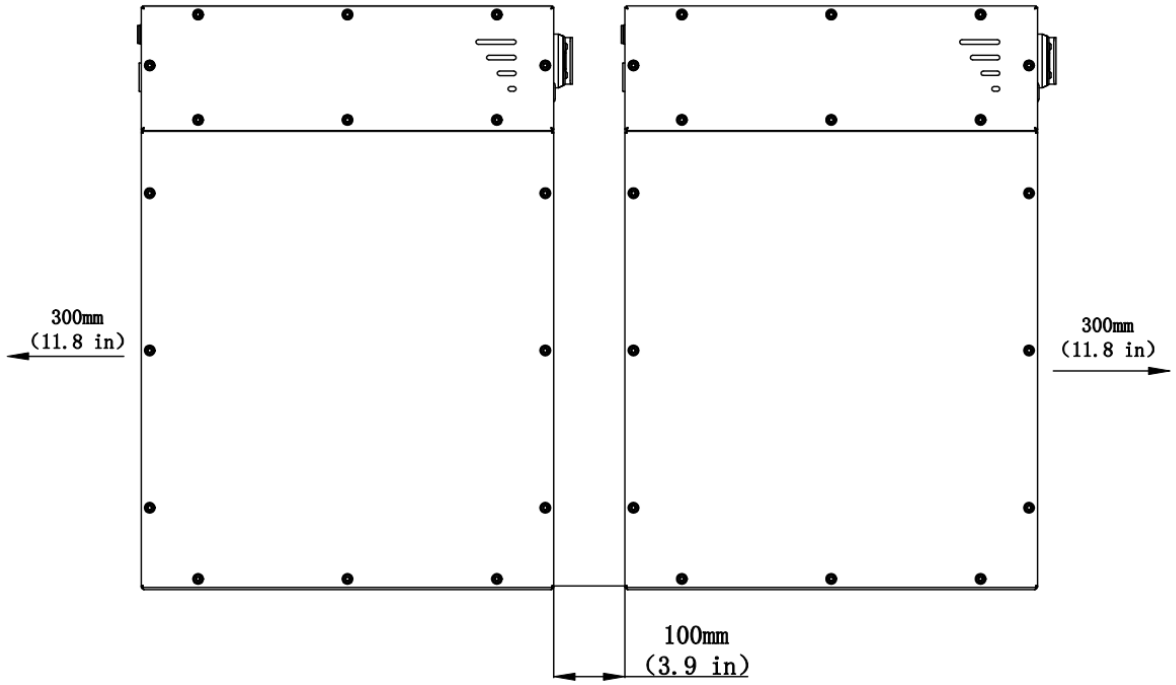


NOTE

Only two batteries can be stacked in each column.

Due to its heavy weight, it is recommended to use an additional tool to lift the second battery during the installation.

2) Batteries also can be installed by side (please refer to step 1~3 in chapter 3.3.2). The distance between the two batteries should larger than 100 mm (3.9 inch).



Step 4: Open the Front cover and keep the removed screws. You will see electrical interfaces, include power and communication part.

Remove the black waterproof cover and then you can install your own glands.

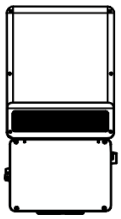
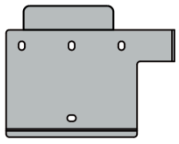
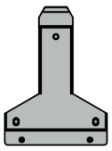
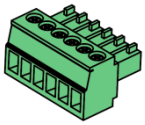
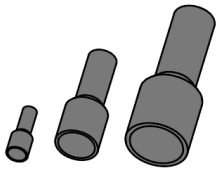
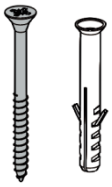
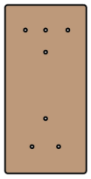
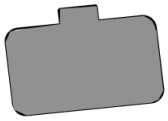
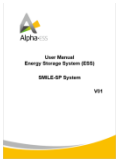
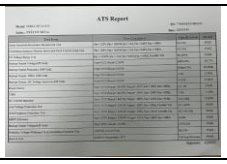
> **NOTE**
>
> **You can choose any hole by yourself for wiring on the premise of local safety regulations.**

3.3.4. Checking the Outer Packing

Before unpacking the battery and inverter, check the outer packing 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.

3.3.5. Inverter Packing List

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

					
Inverter	Wall-Mounted Bracket 1	Wall-Mounted Bracket 2	Allen Wrench	6-Pin Terminal	2-Pin Terminal
					
Pin Terminal 3 sizes: L, M, S	Fixed Screw	Expansion Bolts	Frame post	Cap Removal Tool	User Manual
					
ATS Test Report					

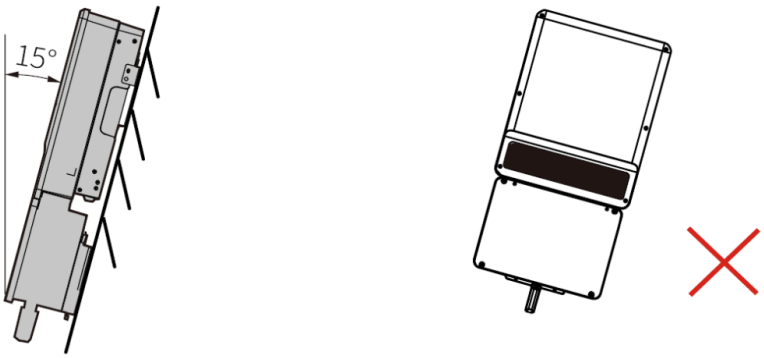
3.3.6. Select Mounting Location

As for the protection and maintenance of inverter, mounting location for inverter should be selected carefully based on the following rules:

Rule 1. Any part of this system shouldn't block the switch and breaker from disconnecting the inverter from DC and AC power.

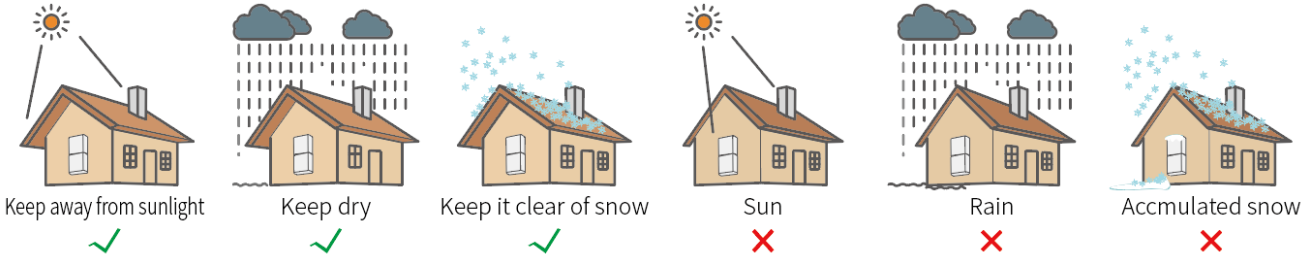
Rule 2. Inverter should be installed on a solid surface, where it is suitable for inverter's dimensions and weight.

Rule 3. Inverter should be installed vertically or on a maximum slope of 15°.



Rule 4. Ambient temperature should be lower than 45°C. (High ambient temperature will cause power derating of inverter.)

Rule 5. It is recommended that the installation of the inverter should be prevented from direct sunlight, snow, rain and other negative influences which may cause function impact or life aging.

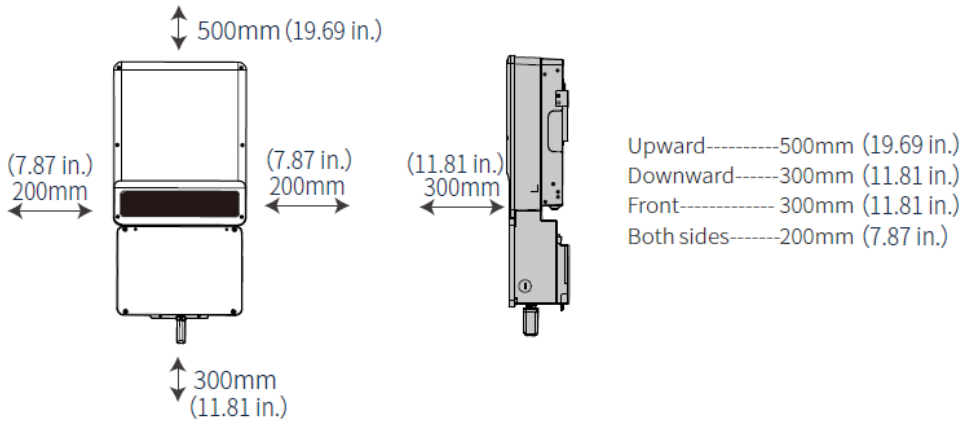


Rule 6. Inverter should be installed at eye level for convenient maintenance.

Rule 7. Product label on inverter should be clearly visible after installation. Do not damage the label.

Rule 8. Do not install the inverter when it is snowing or raining. If you have to, pay attention to the waterproof and moisture-proof of the inverter and distribution box.

Rule 9. Leave enough space around the inverter according to the below figure for natural heat dissipation.



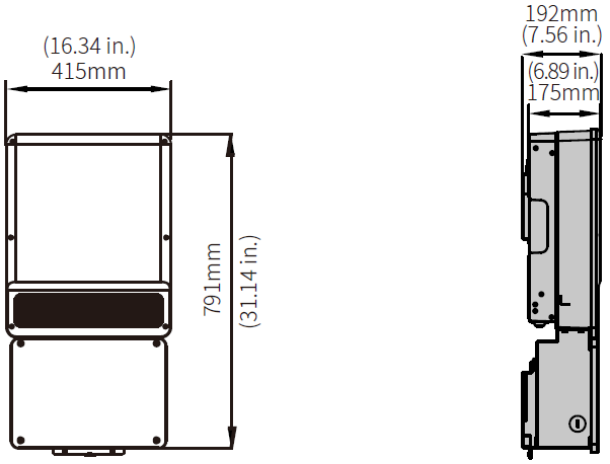
3.3.7. Wall Mounted Bracket and Inverter Installation

WARNING

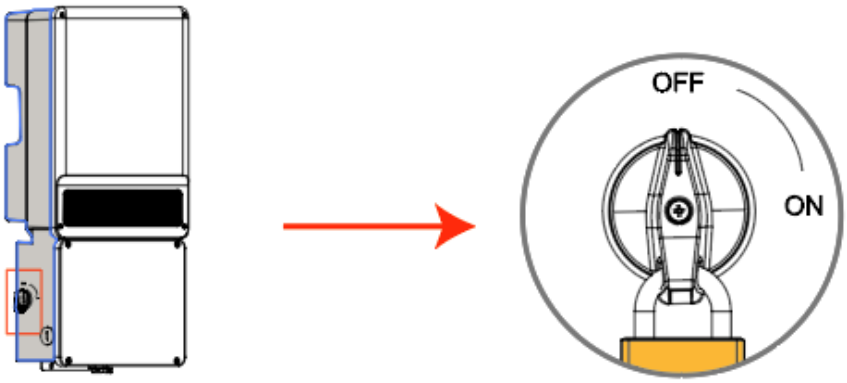
Inverter should be installed away from combustible, explosive and strong electro-magnetic materials. The inverter is suitable for mounting on concrete or other non-combustible surface only.

WARNING

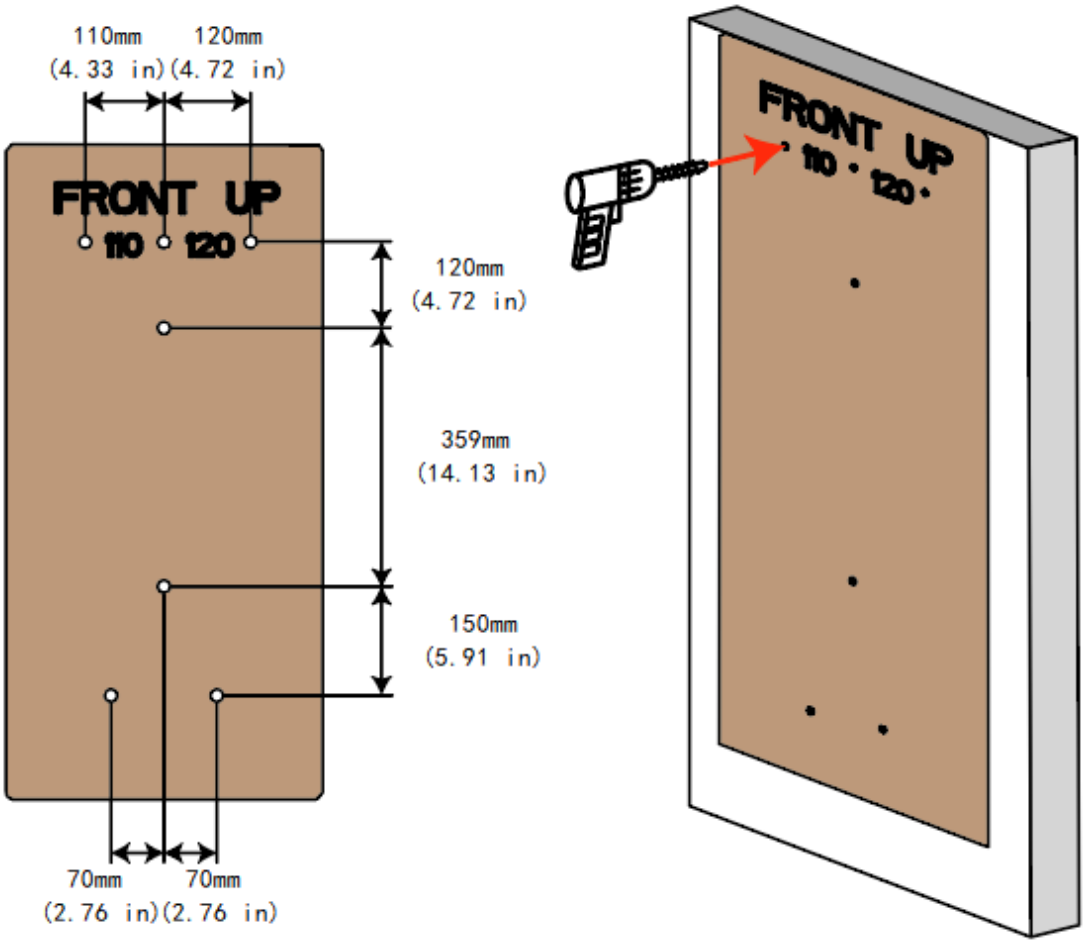
Avoid drilling holes in walls which with cables inside or on the back. Make sure the hole positions are horizontal and vertical.



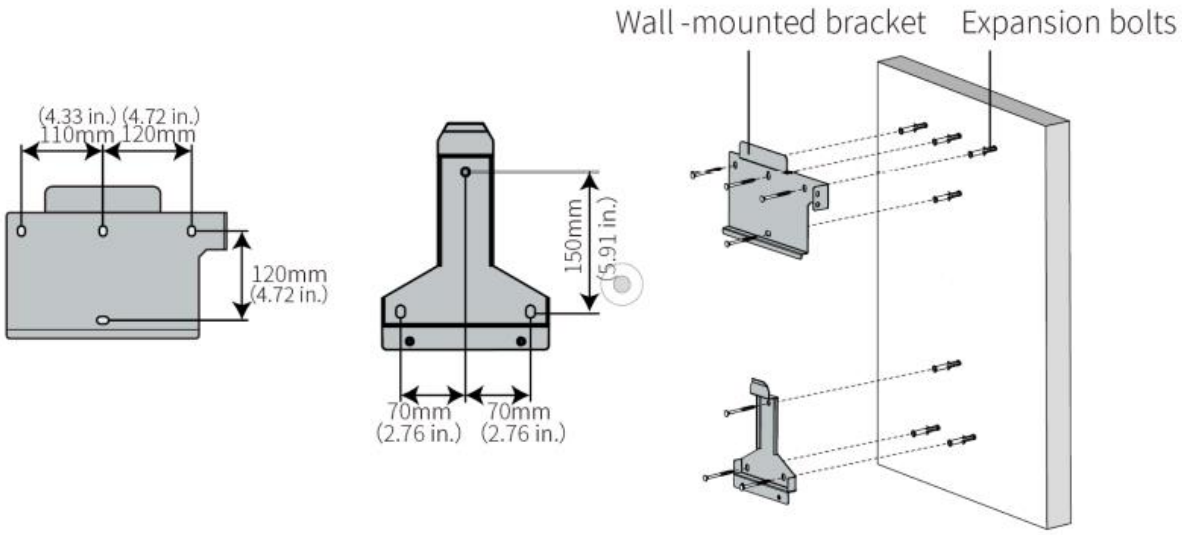
Step 1: DC switch should be in "OFF" position during installation and maintenance. A lock can be applied to prevent wrong operation.



Step 2: Take out the frame post which is to locate the hole position of the wall mounted bracket. Fix the frame post on the wall which is suitable for installation of inverter. Please drill 7 holes (0.31'' in diameter, and 3.15'' in depth) on the wall according to the size on the frame post.



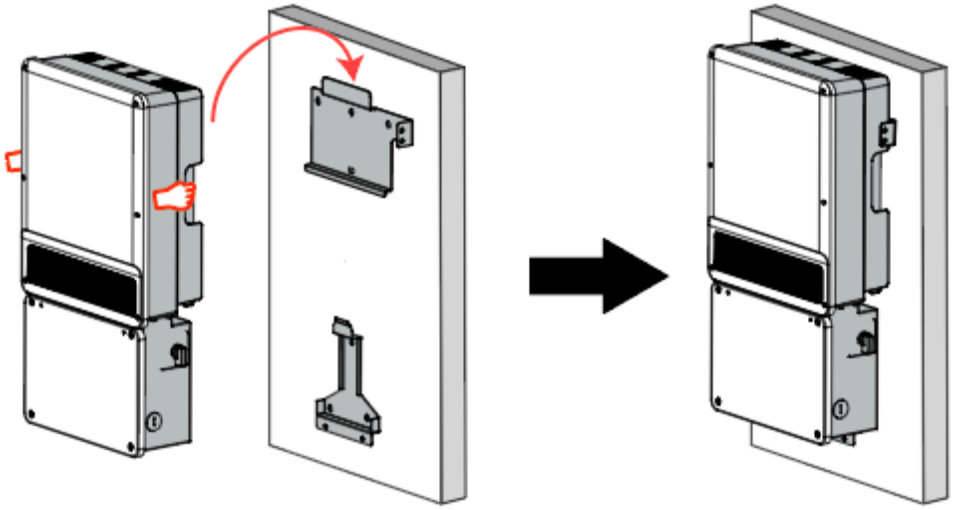
Step 3: Use expansion bolts in accessory box to fix the wall-mounted bracket onto the wall tightly.



WARNING

Load capacity of the wall must be higher than 300 lb, otherwise it may not be able to prevent the inverter from dropping.

Step 4: Carry the inverter by holding the enclosure on two sides and place the inverter on the wall-mounted bracket.

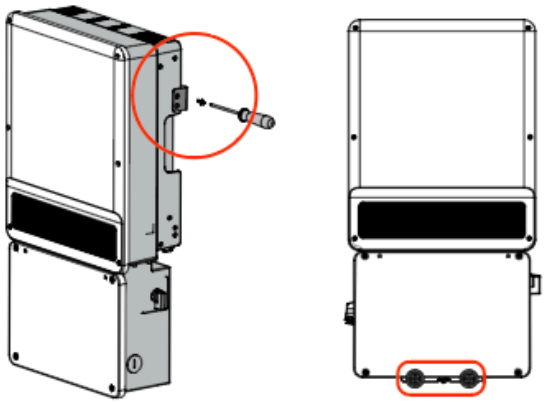


WARNING

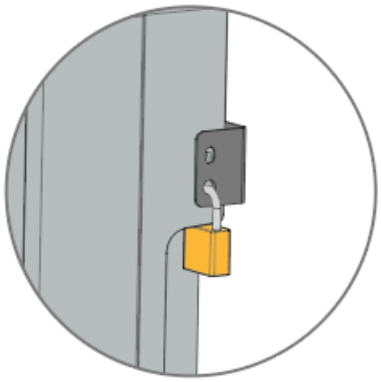
Do not use force beyond the heatsink sides to avoid damage to the inverter.

Avoid holding and lifting the wiring box, keep balance of the inverter during moving.

Step 5: Fasten the inverter by fixed screws. (3 positions)

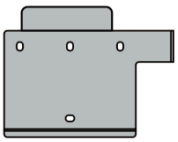
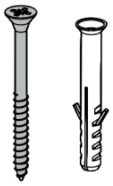
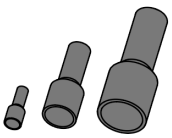


Step 6: Inverter can be locked for anti-theft. Lock will not be provided by inverter manufacturer.



3.3.8. Transformer Packing List

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

					
Transformer	Wall-Mounted Bracket	Expansion Bolts	Allen Wrench	Fixed Screw	Pin Terminal

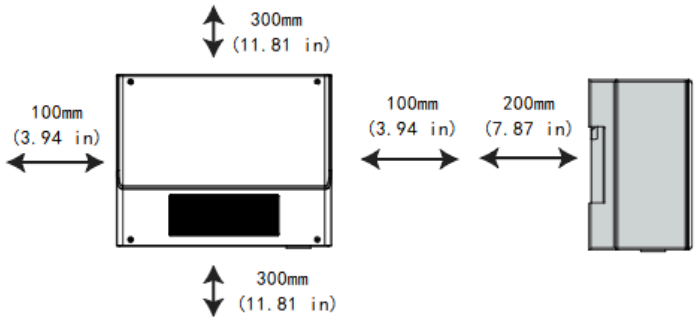
3.3.9. Auto-transformer Installation (Optional)

The off-grid and back-up functions can be used only after the auto-transformer is installed.

DANGER

The auto-transformer cannot be installed near flammable, explosive or strong electro-magnetic equipment.

Leave enough space around the auto-transformer according to the figure below for natural heat dissipation.



Upward -------- 300mm (11.81 in)

Downward ----- 300mm (11.81 in)

Front ---------- 200mm (7.87 in)

Both sides ----- 100mm (3.94 in).

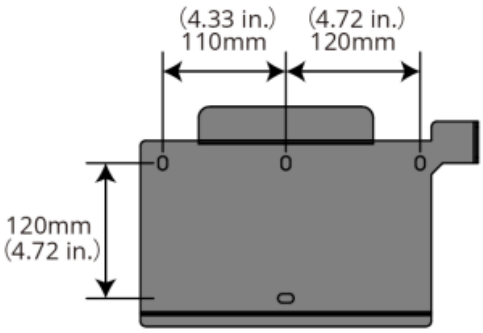
WARNING

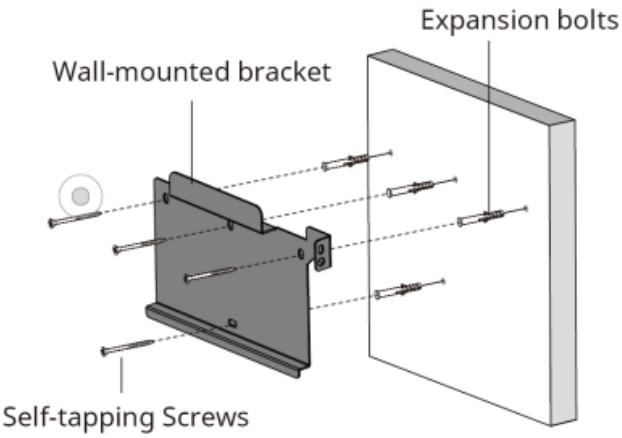
The auto-transformer is of small size, but very heavy.
It is recommended that two people carry it during installation.

Step 1:

Use the wall-mounted bracket as a template and drill holes in the wall, 0.39 in diameter and 3.15 in deep.

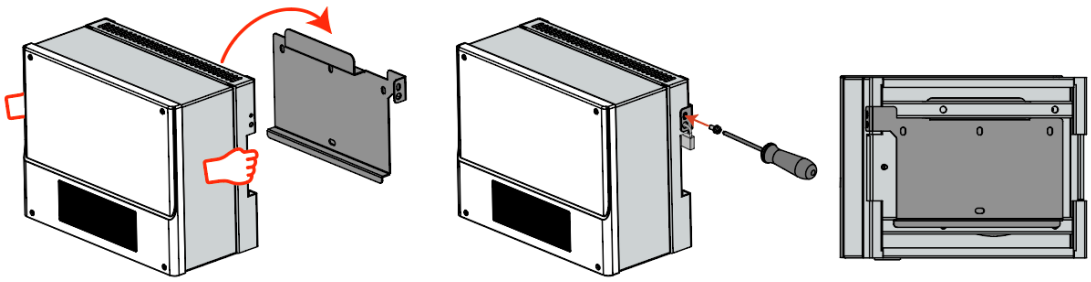
Fix the wall-mounted bracket on the wall using the expansion bolts in the accessories bag.





Step 2:

Carry the auto-transformer by holding the housing on two sides and place the equipment on the mounting bracket.



3.4. Electrical Connection

DANGER

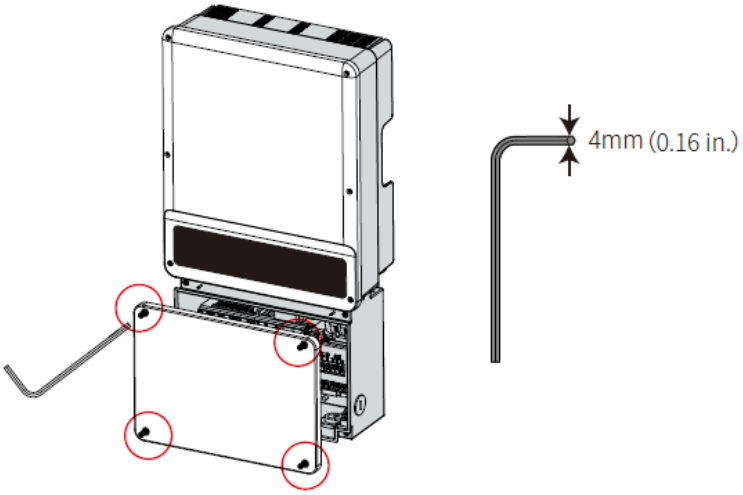
Before starting installation or commissioning SMILE-SP, please read the statements below carefully.

- During wiring connection, the operator should always wear proper PPE.
- Installation and commissioning must be performed by a licensed electrician in accordance with local, state, and National Electrical Code ANSI/NFPA 70 requirements.
- The method and process of installing and wiring connection must comply with all US National Electric Code (NEC) requirement and local AHJ inspector requirements in the United States.
- The wiring installation must strictly observe specification. Otherwise, it may bring waterproof and electrical problems.
- The wiring diagram should be refer to the schematic diagram in Annex 2.

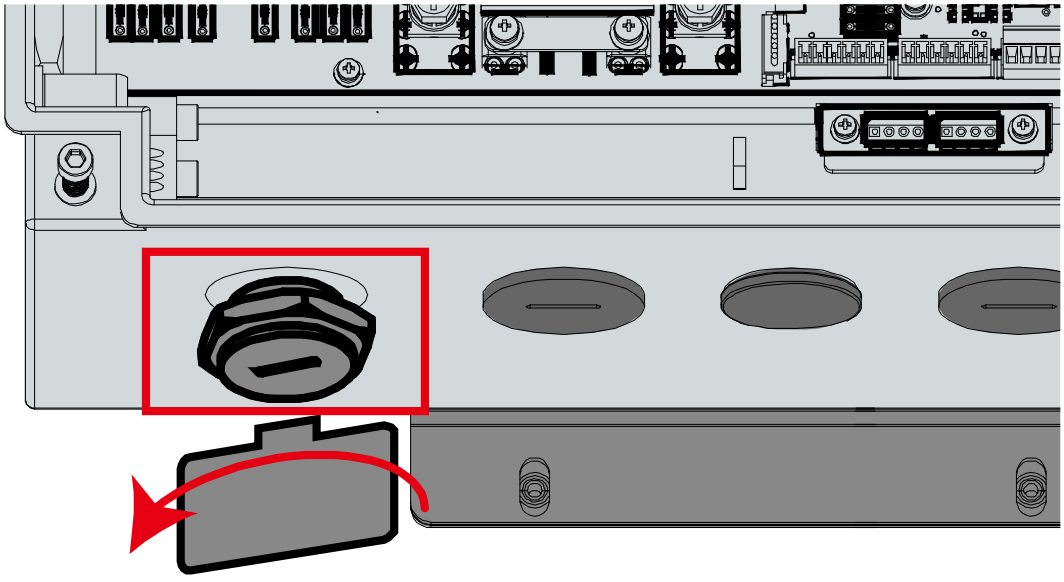
3.4.1. Inverter Wiring Box Conduit Plugs

Conduit plugs are provided for conduit fittings of diameter 1''. An appropriate conduit adaptor should be applied when conduit fittings with different dimensions used.

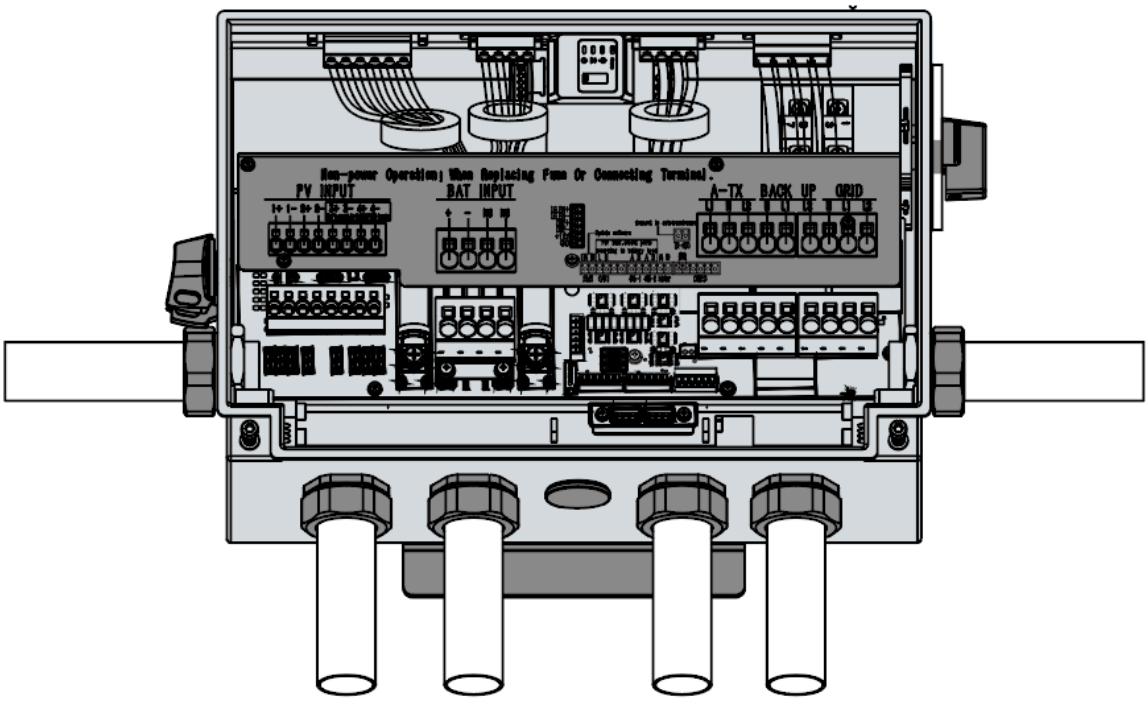
Step 1: Remove the 4 screws by Allen Wrench to remove the shelter of connection box.



Step 2: Remove the waterproof cover by a cap removal tool.

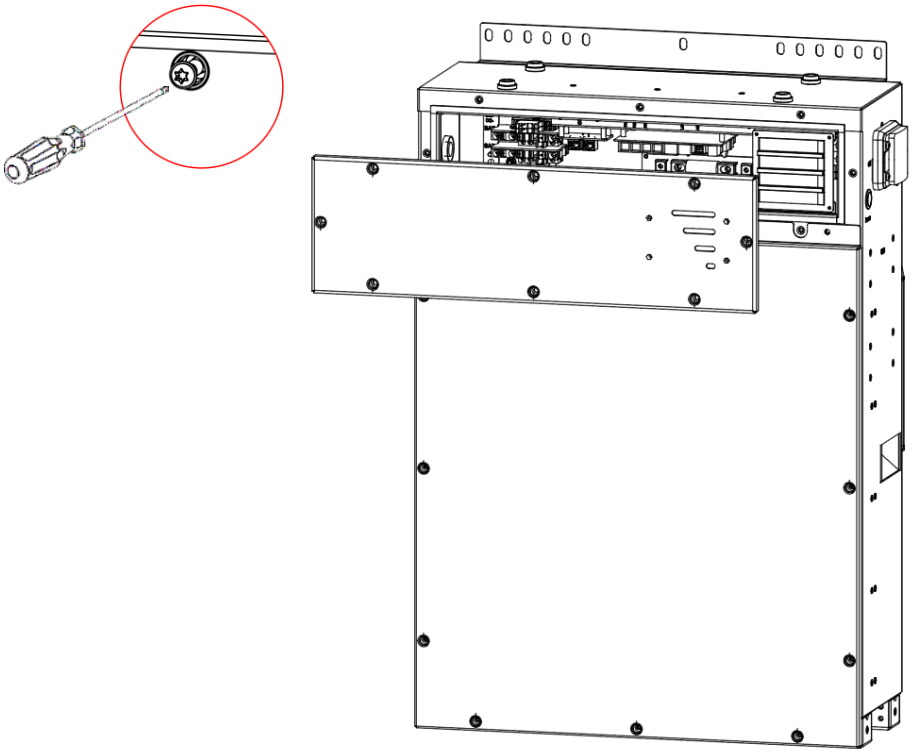


Step 3: Insert the corresponding conduit and fittings, then fasten the joint.



3.4.2. Removing Battery Maintenance Cover

Step 1: Remove the battery maintenance cover



3.4.3. PV Wiring Connection

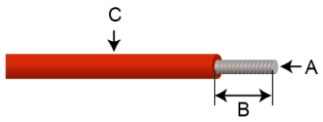
WARNING

Before PV wiring connection, please read this section carefully.

- The total short-circuit current of PV string must not exceed inverter's maximum DC short-circuit-15.2 A.
- Positive and negative poles of PV strings should not be grounded.
- Conductors 's specification should be no less than 12AWG due to not connected with fuse.
- For the minimum isolation resistance to ground of the PV string, please refer to the below table.

Please use 90℃ cable, 12AWG Copper conductor. Do not use aluminum conductor.

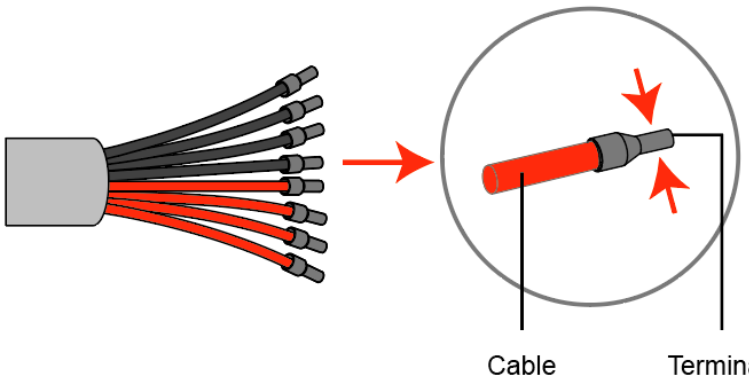
Inverter Model	Minimum isolation resistance
SMILE- SP7.6-INV	395 kΩ
SMILE- SP9.6-INV	313 kΩ



Grade	Description	Value
A	Conductor core section	12AWG
B	Conductor core length	0.71 in
C	Outside Diameter	Max. 0.22 in

Step 1:

Use the right pin terminal from the accessory box. Crimp the pin terminal on the conductor core tightly.



NOTE

Make sure cable jacket is not locked within the pin terminal.

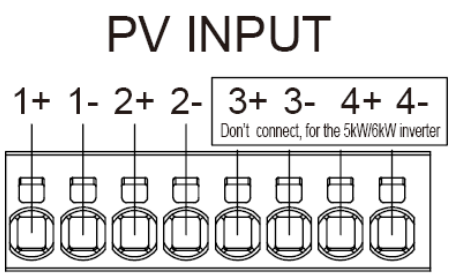
It is not necessary to press the terminal if you use the hard conductor or single conductor, just remove the insulation.

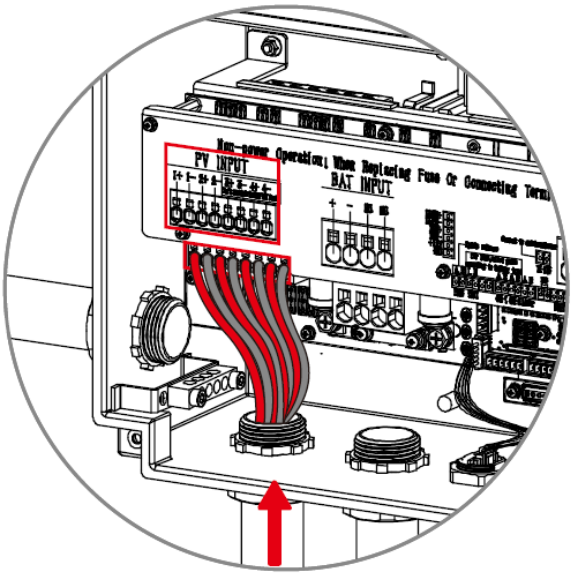
Step 2:

Drag the PV cables through the PV port or left port shown as the picture.

Connect PV cables to PV terminals.

For 7.6/9.6 kW, the operator needs to connect 8 PV cables to PV terminals.





DANGER

The polarity of PV strings cannot be connected reversely, otherwise the inverter could be damaged.

Do not connect multiple PV inputs in parallel. If required, add a fuse outside or a breaker which observes safety specifications.

The output terminal of PV strings may have dangerous voltages. Touching the terminals may cause electric shock. Before connecting PV input terminal, please make sure DC switch is switched off and there is no voltage at the terminals of DC input products.

When SMILE-SP inverter is running, do not operate on the PV input terminals in case of electric shock, such as connecting or disconnecting the PV strings or PV modules in the PV strings.

WARNING

Do not remove the waterproof cover from DC input terminals if the DC input terminals of SMILE-SP inverter are not connected to PV strings. Otherwise, it may affect the IP level of the inverter.

3.4.4. Power Connection between Battery and Inverter

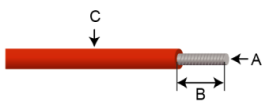
WARNING

Please follow the requirements and steps below strictly, or SMILE-SP system damage or even fire may occur if not satisfied with next conditions.

- Before connecting battery power cable, make sure that all the switches and breakers connected to the inverter and battery pack are closed and that there is no power left in the inverter.
- Be careful about any electric shock or chemical hazard. Personal injury may be caused by short circuit of battery. High transient current will release energy surge, even be able to cause fire.
- Do not connect or disconnect battery power cable when SMILE-SP system is running.
- According to the inverter specification for battery input circuit protection, it needs an external DC breaker (63A) to connect battery and inverter. The breaker can also be configured according to the actual maximum operating current of the battery.
- Make sure that the battery breaker is off and the open circuit battery voltage is always less than or equal to 500 VDC.
- Do not connect load in SMILE-SP inverter and battery.
- Using improper cables may cause bad contact and high impedance, which is dangerous to the system.
- Make sure the battery cables are connected correctly. The polarities of battery should be connected correspondingly.

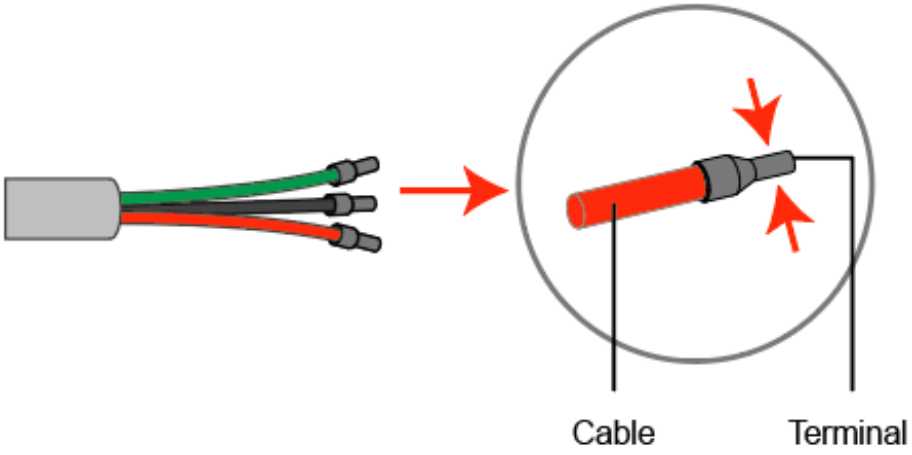
The maximum battery charging/discharging current is 50 A, Please use 90℃ cable, 6AWG Copper.

Do not use aluminum conductor.



Grade	Description	Value
A	Conductor core size	6 AWG
B	Conductor core length	0.71 in
C	Outside Diameter	Max. 0.29 in

Step 1: Use the right pin terminal from the accessory box. Press the pin terminal on the conductor core tightly.



NOTE

Make sure cable jacket is not locked within the pin terminal.

It is not necessary to press the terminal if you use the hard conductor or single conductor, just remove the insulation.

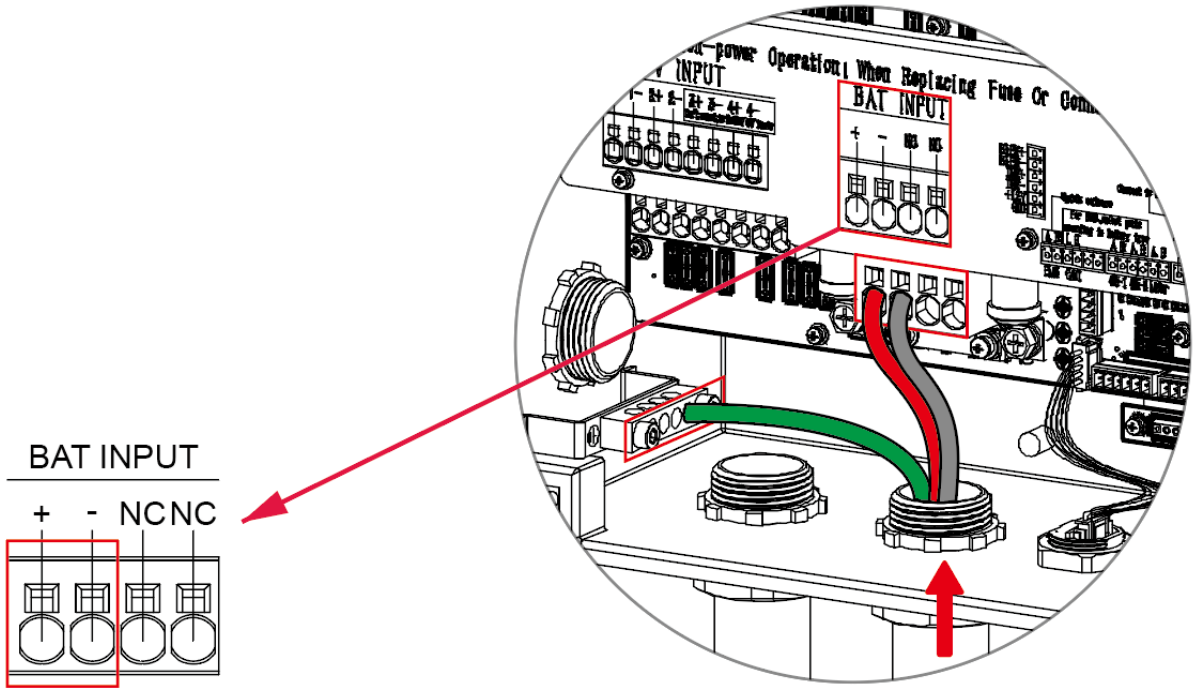
Step 2: Drag the battery power cables through battery port. Connect battery power cables to relative terminals.

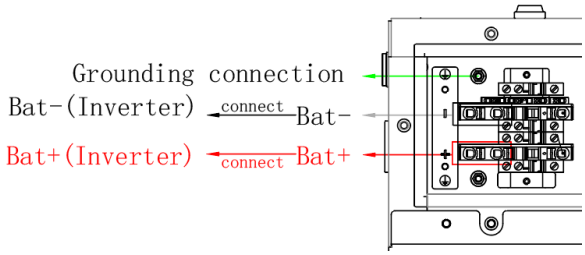
NOTE

The battery connected to the inverter must be equipped with EMS [product model: SMILE-BAT-8.2PHA (WITH EMS)].

The battery without EMS [product model: SMILE-BAT-8.2PHA (WO EMS)] can be selected as expansion battery.

Cables used to connect the battery and inverter should at least meet 6AWG, and can withstand temperatures above 90℃ and DC voltage above 1000V.





3.4.5. On-Grid Connection

An external AC breaker, usually located in a load panel or solar dedicated AC sub-panel, is needed for an on-grid / AC connection to isolate the inverter from the utility grid when necessary.

Proper specifications of an AC circuit breaker for the specific inverter model is advised. Please read the following table for the recommended maximum ampacity rating of the AC circuit breaker and local (AHJ) requirements before selecting a suitable AC circuit breaker

Inverter model	AC breaker specification
SMILE-SP7.6-INV	50 A
SMILE-SP9.6-INV	50 A

NOTE

The absence of AC breaker will lead to inverter damage if an electrical short circuit happens on grid side.

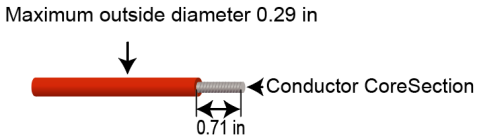
DANGER

Make sure the inverter is totally isolated from any DC or AC power before connecting AC cable.

The maximum AC current from the grid is 38 A for SMILE-SP7.6-INV. Please use 90℃ cable, 6~8 AWG Copper conductor.

The maximum AC current from the grid is 40 A for SMILE-SP9.6-INV. Please use 90℃ cable, 6~8 AWG Copper conductor.

Do not use aluminum conductor.



Inverter Model	Conductor Core Size (Recommended)
SMILE-SP7.6-INV	6 ~ 8 AWG
SMILE-SP9.6-INV	6 ~ 8 AWG

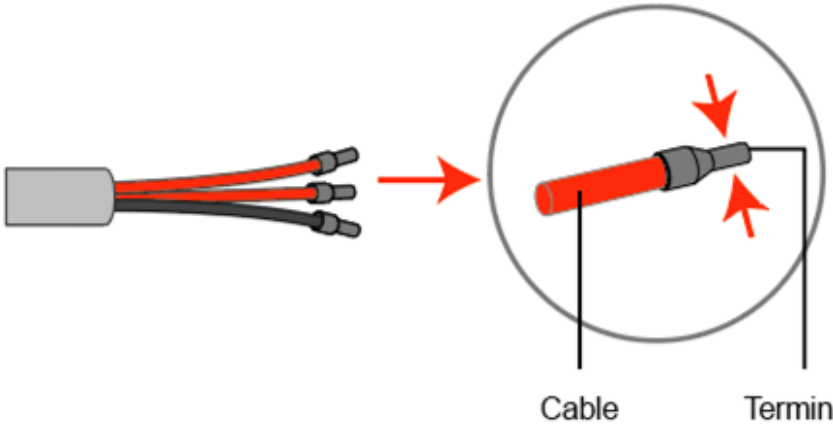
Step 1:

Use the right pin terminal from the accessory box. Press the pin terminal on the conductor core tightly.

NOTE

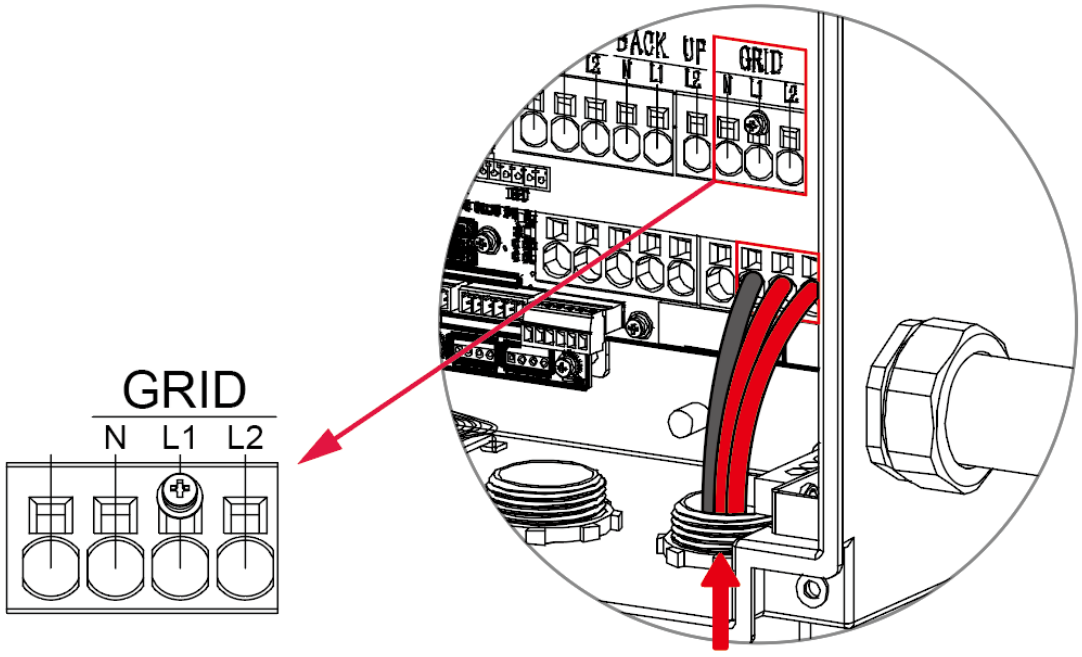
Make sure cable jacket is not locked within the pin terminal.

It is not necessary to press the terminal if you use the hard conductor or single conductor, just remove the insulation.

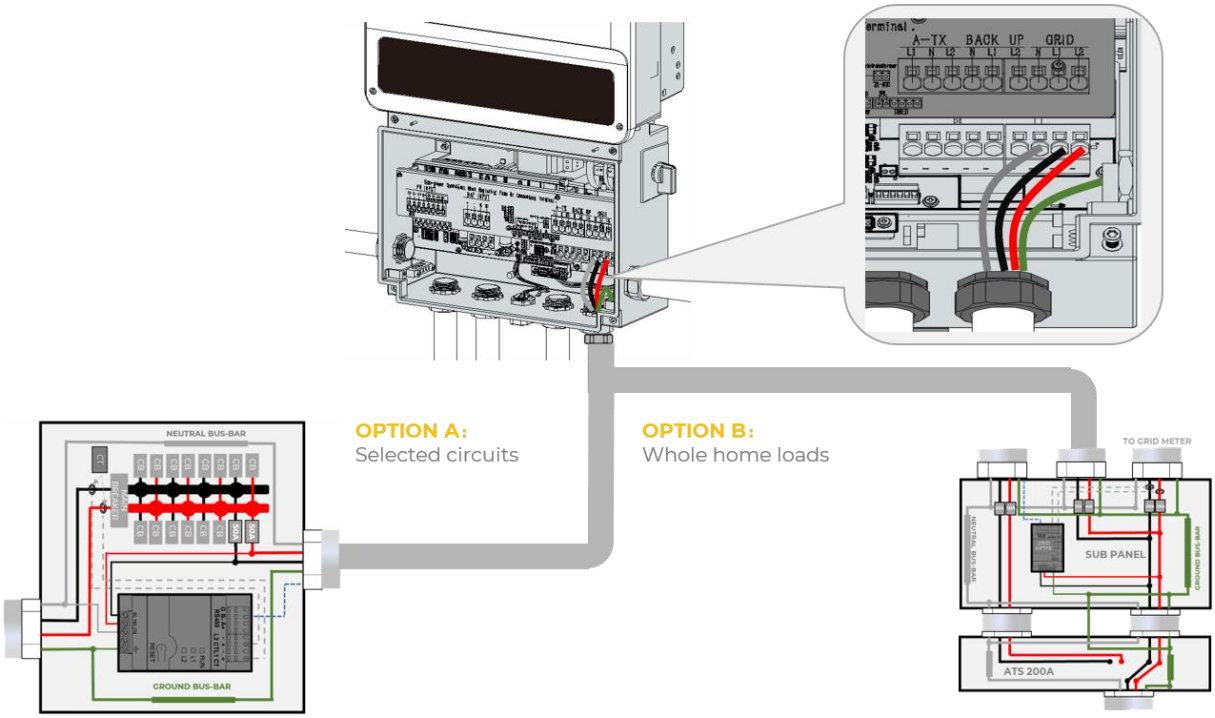


Step 2:

Drag the on-grid cables through the On-Grid port. Connect On-Grid cables to On-Grid terminal.



Wire the AC Cables between inverter Grid port and MAIN PANEL or ATS.



3.4.6. Back-up Connection

3.4.6.1 Declaration for back-up function

The below statement lays out general policies governing the Hybrid-coupled energy storage inverters.

1. The back-up function need to add an extra auto-transformer for 120 V back-up loads. Otherwise, the off grid function may not be used, and back-up load may be damaged.

2. For SMILE-SP system, the standard PV strings typically consists of the connection of the inverter with both PV strings and batteries. In case of systems not connected to the batteries, the back-up function is strongly not advised to use. AlphaESS shall not cover the standard warranty and be liable for any consequences arising from users not following this instruction.

3. Some external factors may cause the system to fail on back-up mode. As such, we recommend the users to be aware of conditions and follow the instructions as below:

- Do not connect loads if they need a stable energy supply for a reliable operation.
- Do not connect the loads which may exceed the maximum back-up capacity in total.
- Try to avoid those loads which may create very high start-up current surges such as Inverter Air-conditioner, high-power pump etc.
- Due to the condition of battery itself, battery current might be limited by some factors including but not limited to the temperature, weather etc.

3.4.6.2 Declaration for back-up loads

SMILE-SP inverters are able to supply over load output at its back-up. For details please refer to the technical parameters of SMILE-SP inverter. The inverter has self-protection derating at high ambient temperature.

3.4.6.3 Declaration for back-up overload protection

Inverter will restart itself as overload protection happens. The preparation time for restarting will be longer and longer (max. one hour) if overload protection repeats. Take following steps to restart inverter immediately.

Decrease back-up load power within max. limitation.

3.4.6.4 Accepted loads as below:

Common household loads can be used normally. For specific loads please refer to following section.

- Inductive Load: 5000BTU non-frequency conversion air-conditioner can be connected to back-up side. More than 5000BTU non-frequency conversion air-conditioner connected to back-up side may cause UPS mode to be unstable.
- Capacitive Load: Total power ≤ 0.6 x nominal power of model. (Any load with high startup current at start-up is not accepted.)
- For complicated application, please contact service.
- An external AC breaker is needed for back-up connection to be isolated when necessary.

3.4.6.5 Back-up connection

DANGER

Make sure the inverter is totally isolated from any DC or AC power before connecting to back-up cable.

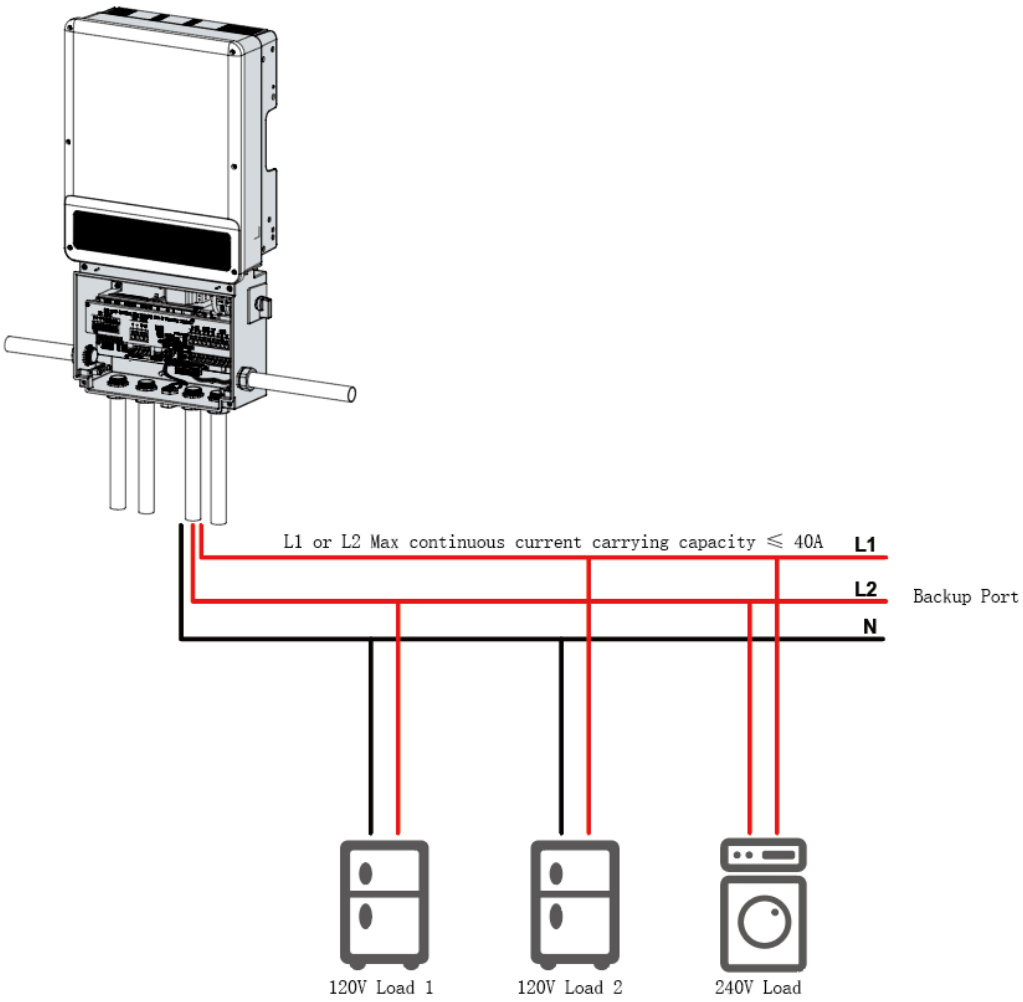
When using the back-up function of the inverter, corresponding protective devices like AC breaker should be applied to ensure safety or satisfy local requirement.

Inverter model	AC breaker specification
SMILE-SP7.6-INV	50 A
SMILE-SP9.6-INV	50 A

NOTE

No AC breaker on the back-up side will lead to inverter damage if an electrical short-circuit happened on the back-up side. Under On-Grid condition, the back-up function cannot turn off.

3.4.6.6 Back-up Load Configuration



Case1. If there is no 240 V load, both 120 V Load 1 and Load 2 individually have a total Max. power ≤5 kVA.

Case2. If there is only a 240 V Load and no 120 V Load, inverter output power ≤10 kVA

Case2. If there is 240 V load with a power draw = P1, then any 120 V Load has a maximum power ≤ (10-P1)/2 kVA

WARNING

The 120 V and 240 V load configuration of auto-transformer should meet the below requirements.

L1-N: voltage between L1 and Neutral line

L2-N: voltage between L2 and Neutral line

It is stipulated that the 120 V load received by L1-N and L2-N do not exceed 5 kW respectively. If there is 240 V load, 240 V load power needs to be subtracted and distributed equally. For example, 240 V load power is P1, then (10kw-P1) / 2 is the remaining 120 V power of the assemble able L1-N and L2-N. The imbalance load cannot exceed the new power distribution.

3.4.6.7 Back-up wiring connection

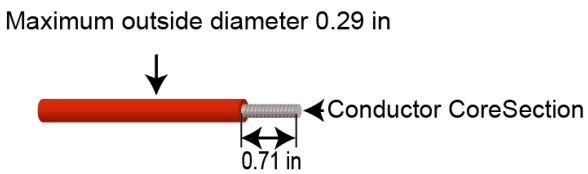
WARNING

To reduce the risk of fire, do not connect to an AC load center (circuit breaker panel) having multi wire branch circuits connected.

The maximum back-up output current for SMILE-SP7.6-INV is 31.7 A. Please use 90℃ cable, 8-10AWG copper conductor.

The maximum back-up output current for SMILE-SP9.6-INV is 40 A. Please use 90℃ cable, 6-8AWG copper conductor.

Do not use aluminum conductor.



Inverter model	Conductor Core Size (Recommended)
SMILE-SP7.6-INV	8 ~ 10AWG
SMILE-SP9.6-INV	6 ~ 8 AWG

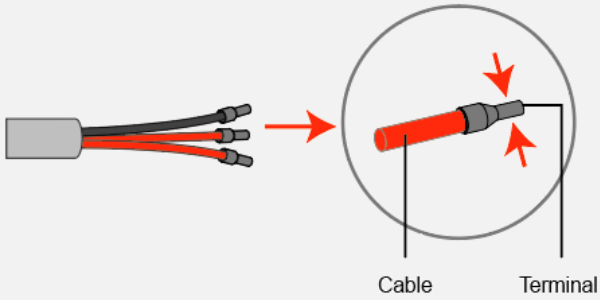
Step 1:

Use the right pin terminal from the accessory box. Press the pin terminal on the conductor core tightly.

NOTE

Make sure cable jacket is not locked within the pin terminal.

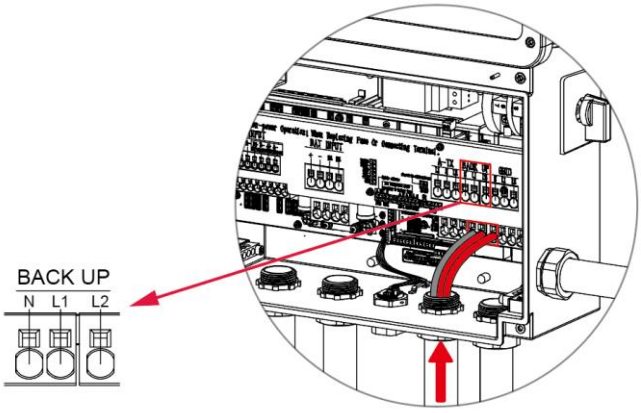
It is not necessary to press the terminal if you use the hard conductor or single conductor, just remove the insulation.



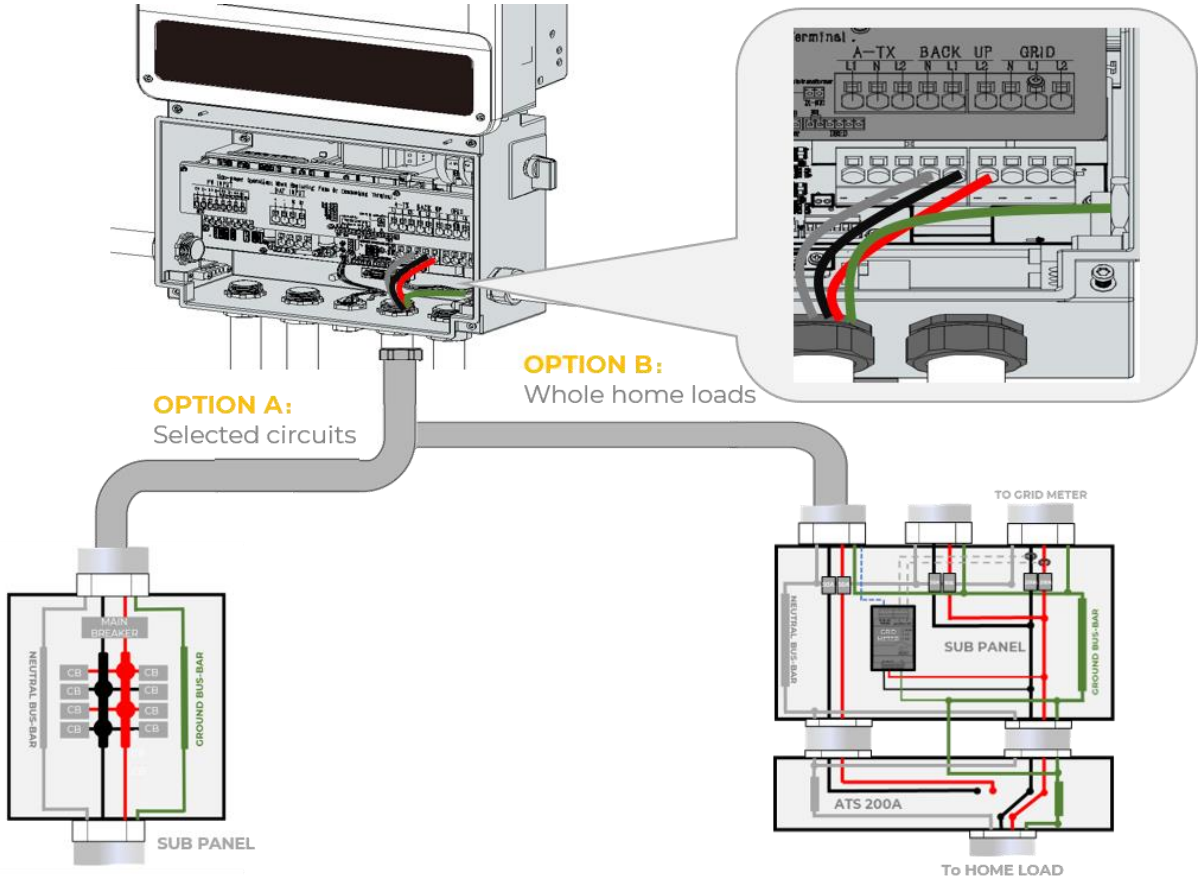
Step 2:

Drag the back-up cables through the back-up port.

Connect back-up cables to back-up terminals.

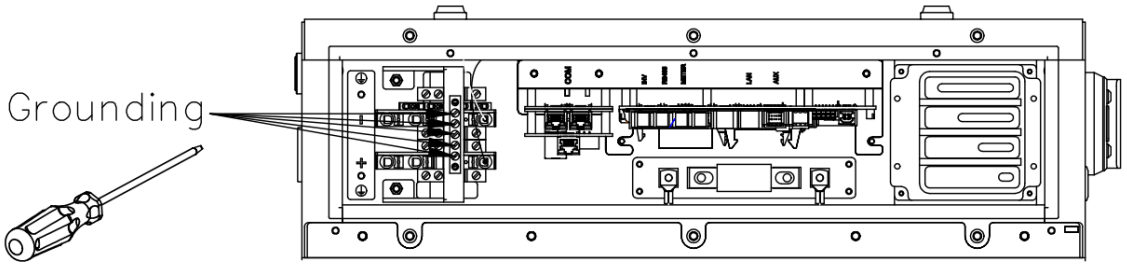


Wire the AC Cables between inverter backup port and SUB PANEL or ATS.



3.4.7. Ground Wiring

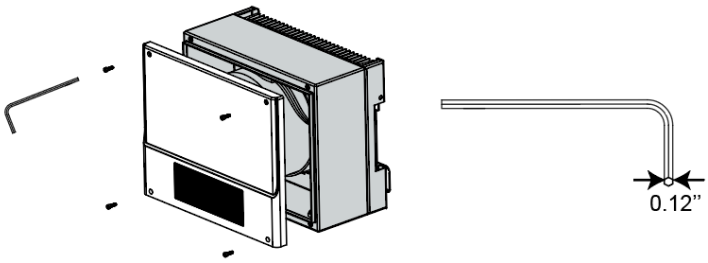
Connect the ground wire to one of the ground points by the non-insulated Spade terminal. Choose one of the ground points for connection.



3.4.8. Auto-transformer (Optional) Wiring

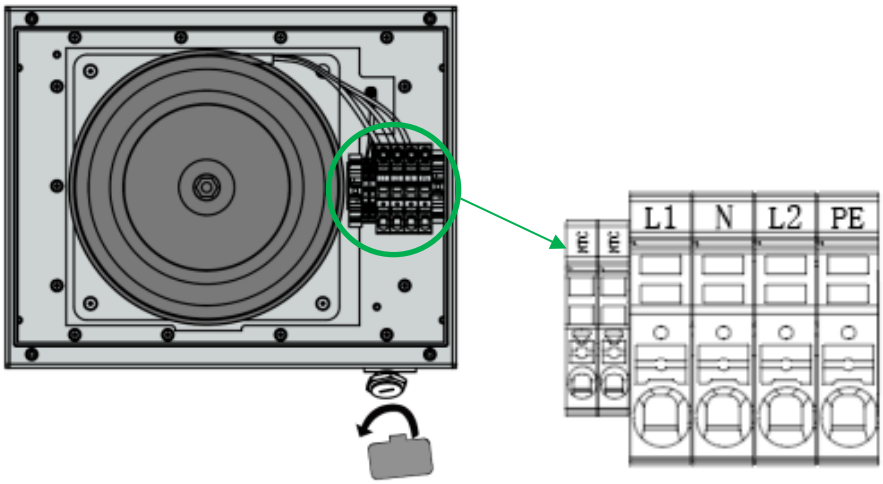
Step 1:

Remove the 4 screws by Allen Wrench of the auto-transformer and remove the cover.

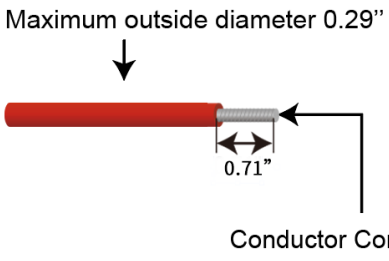


Step 2:

Remove the waterproof cover by a cap removal tool.



Please use 90℃ cable, copper conductor.



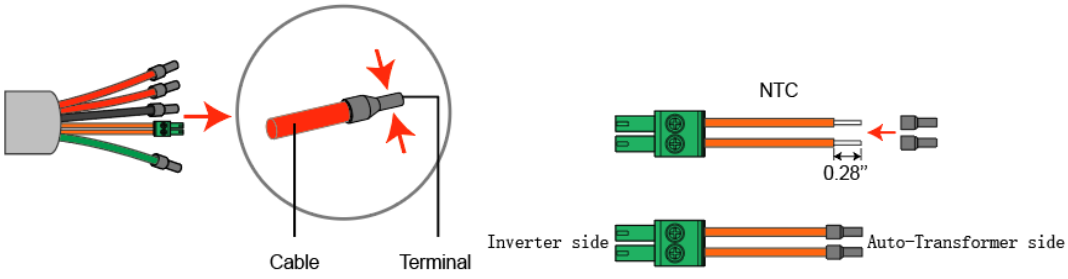
Inverter model	Conductor Core Size (Recommended)
SMILE-SP7.6-INV	8 ~ 10 AWG
SMILE-SP9.6-INV	6 ~ 8 AWG

Do not use aluminum conductor

Step 3:

NTC of auto-transformer use the cable 22AWG or 24AWG, 600V insulated. One end is connected with a 2-pin terminal for inside inverter connection, and the other end is pressed with the smallest pin terminal in the packing list for auto-transformer connection.

Use the right pin terminal from the accessory box. Press the pin terminal on cable.



NOTE

Make sure cable jacket is not locked within the pin terminal.

It is not necessary to press the terminal if you use the hard conductor or single conductor, just remove the insulation.

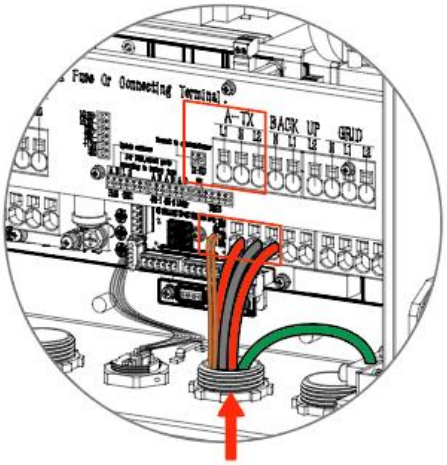
Step 4:

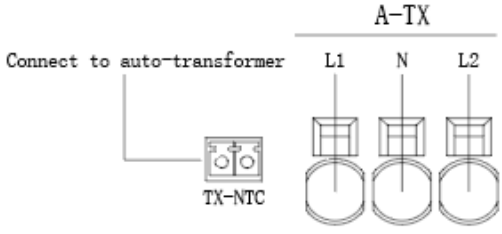
Drag the cables through auto-transformer port.

Connect cables to auto-transformer terminal.

Connect yellow-green cables to PE terminal.

Connect the 2-Pin terminal to TX-NTC.



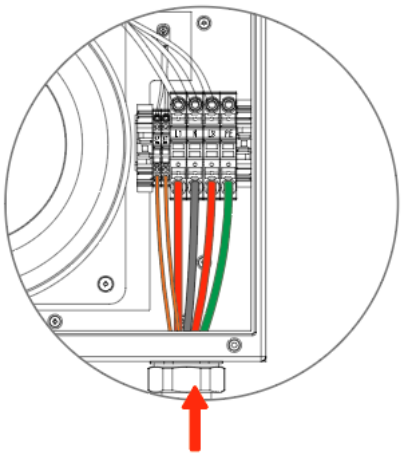


Step 5:

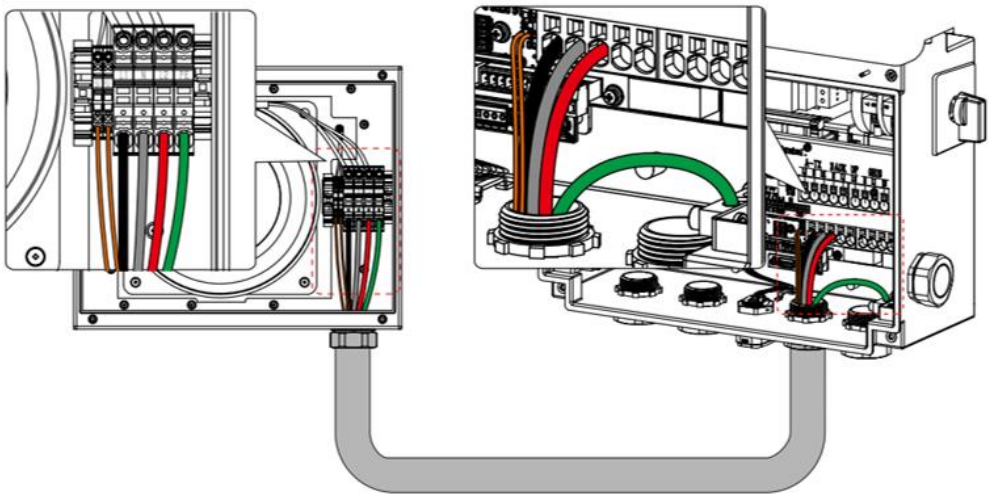
Pass the corresponding conduit and fasten the joint.

Cross the cables through the auto-transformer port.

Connect cables to auto-transformer port.



Wire the power and communication cables between inverter and transformer as below:



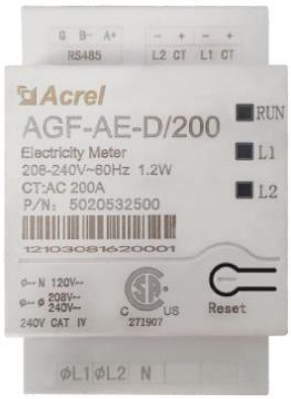
3.4.9. Meter Connection

NOTICE

· If the extra PV inverter are not used, the system is suitable for DC mode.

The electricity meter is not a standard accessory and needs to be purchased additionally.

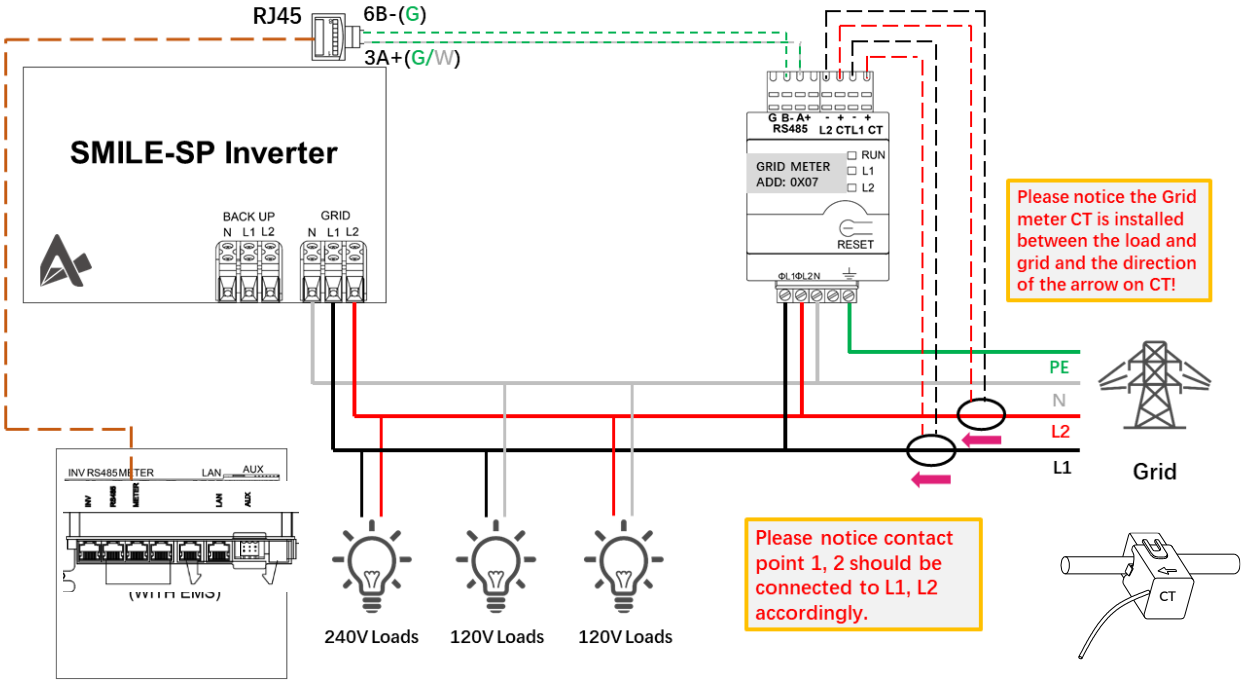
Type: AGF-AE-D/200



07-Grid Meter (With 2 CTs)

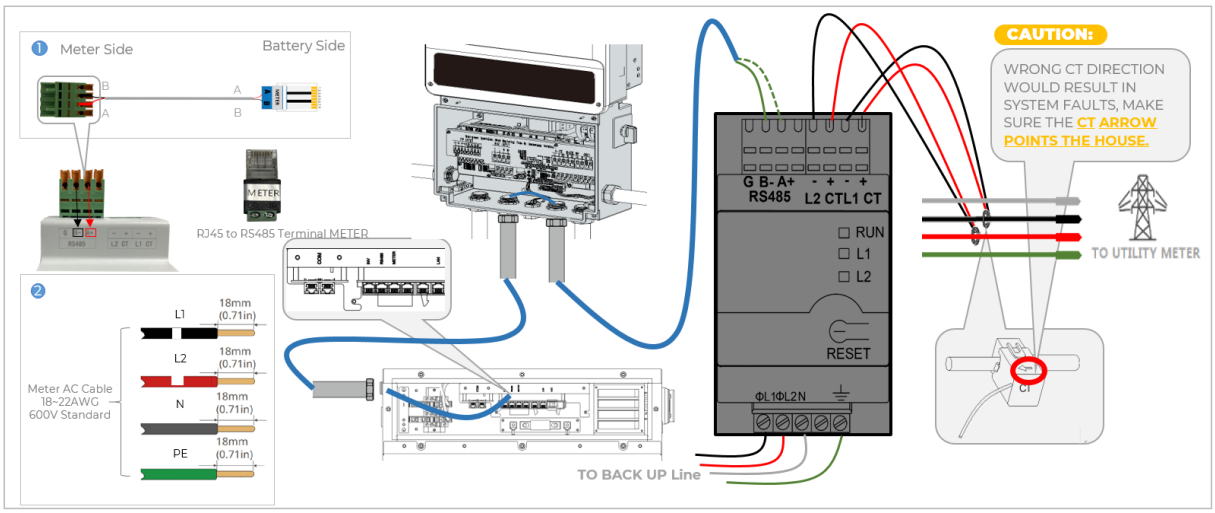
0A-Grid Meter (With 2 CTs)

3.4.9.1 Meter wiring introduction



DC-coupled system

Wire the communication and power cables on METER



Communication connection:

Connect the RS485A and RS485B on the RJ45 to RS485 Terminal of METER, which is factory installed on the battery (with EMS), to the RS485A+ and RS485B- port on the meter, by using a twisted-pair cable. The connection rules are as follows:

Meter port (on Battery)	Terminal	RS485 (on Meter)
3	A	A+
6	B	B-

The CT connection rules are as follows:

Grid CT	PV CT
L1 CT+ ——Red	L1 CT+ ——Red
L1 CT- ——Black	L1 CT- ——Black
L2 CT+ ——Red	L2 CT+ ——Red
L2 CT- ——Black	L2 CT- ——Black

Meter Address Setting

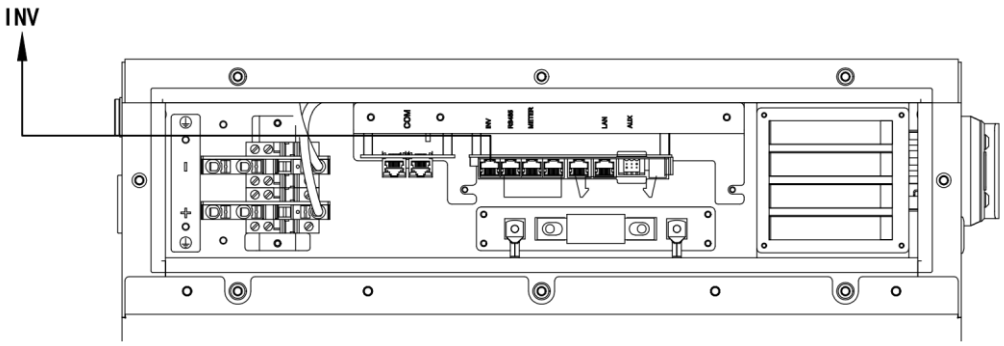
Model	Grid Meter Address	PV Meter Address
AGF-AE-D/200.	0x07	0x0A

NOTE

The meter address has been set before delivery.

Do not exchange wiring positions between the two addresses. Please connect according to the specified wiring positions.

Communication Connection between Battery (with EMS) and Inverter



Connect the RS485A and RS485B on the RJ45 to RS485 Terminal of INV, which is factory installed on the battery (with EMS), to the EMSA and EMSB of EMS port on the inverter, by using a twisted-pair cable. The connection rules are as follows:

INV (on Battery)	Terminal	EMS (on Inverter)
2	A	A
7	B	B

Step 1:

Use the right pin terminal from the accessory box. Press the connectors on cable conductor core tightly.

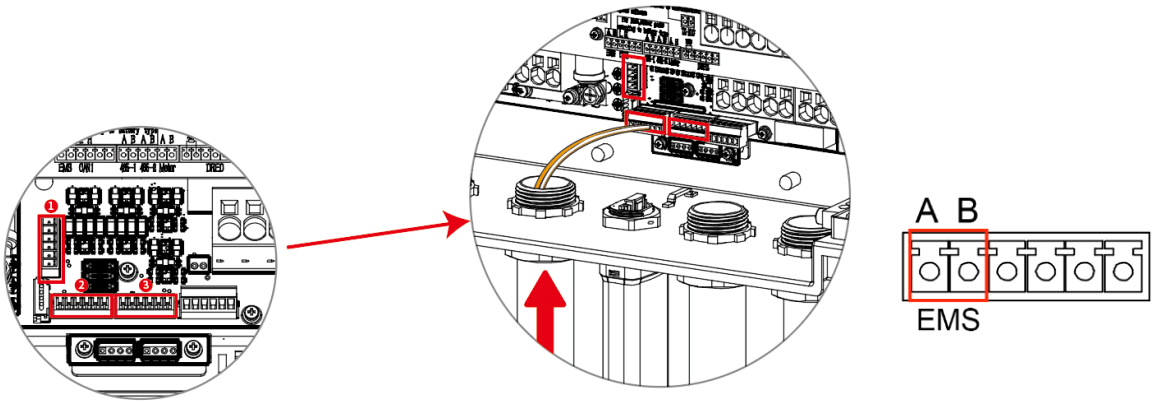
NOTE

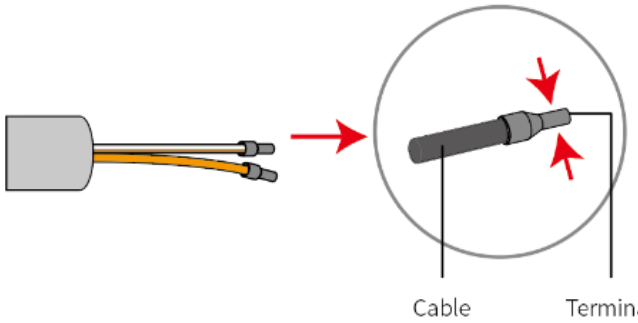
Make sure cable jacket is not locked the pin terminal.

It is not necessary to press the terminal if you use the hard conductor or single conductor, just remove the insulation.

Step 2:

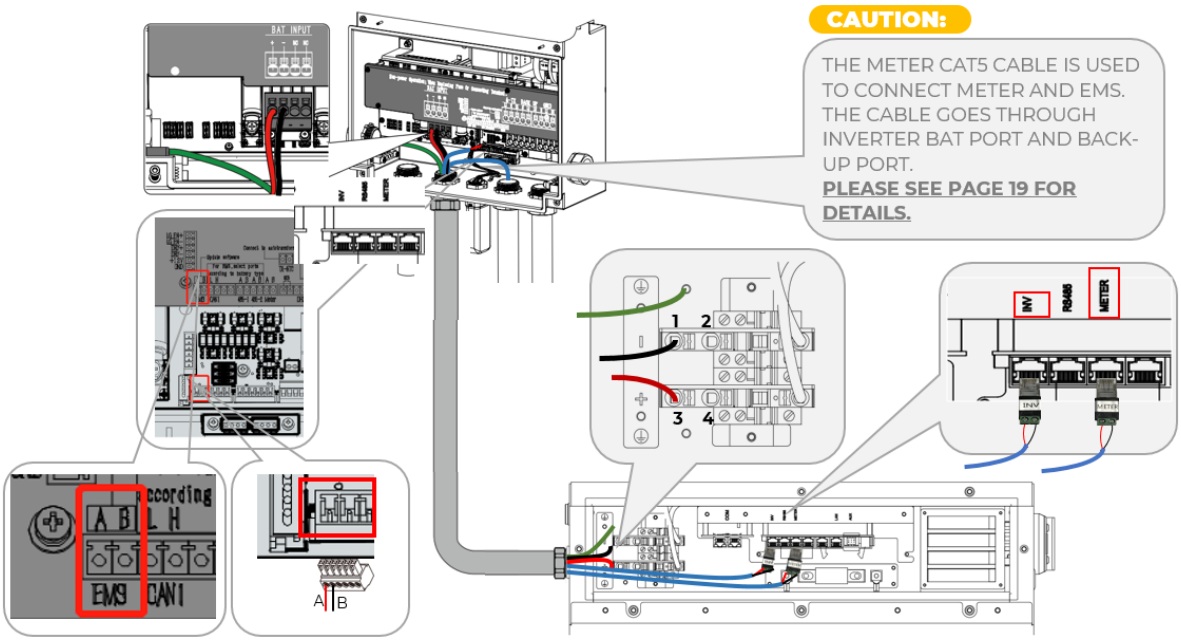
Drag the cables through EMS port. Connect cables to EMS port.





RJ45 to RS485 Terminal INV

Wire the DC & communication cables between inverter and battery (EMS) as below:



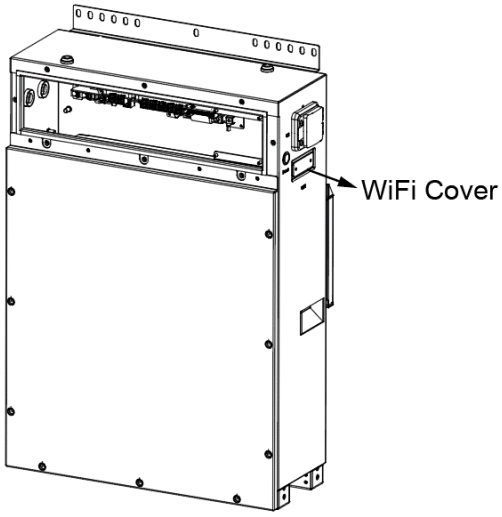
SMILE-BAT-8.2PHA (WITH EMS)

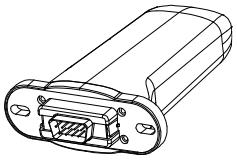
3.4.10. Wi-Fi Module Connection

Remove the Wi-Fi Cover on the right side and install the Wi-Fi module (tool: T20 screwdriver, torque:1.2 lbf.ft).

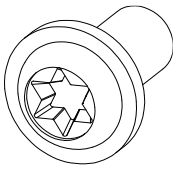
NOTE

If you do not use Wi-Fi module for communication, you can refer to chapter 3.4.12. LAN Connection (Optional) for communication connection.





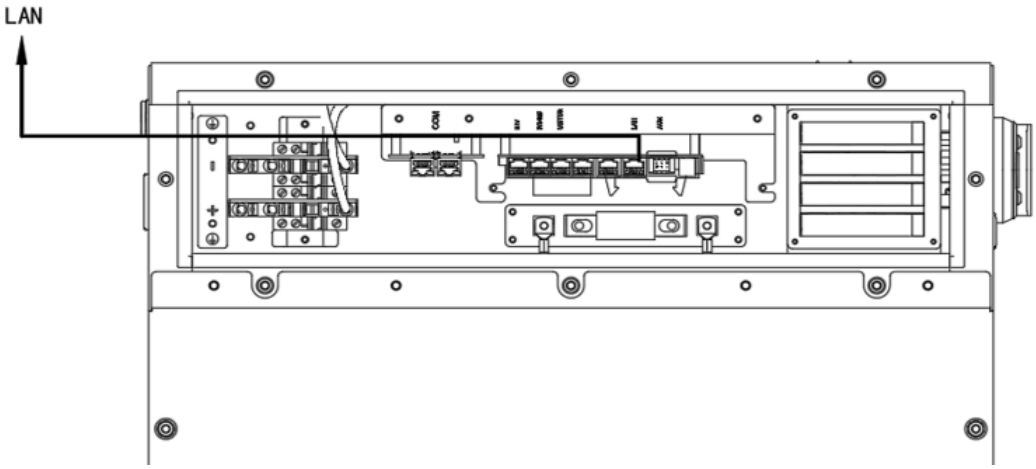
Wi-Fi module (X1)



M4*12 Screw (X2)

3.4.11. LAN Connection (Optional)

Connect the LAN port on the battery (with EMS) to the router by using a network cable (CAT5) with sequence 568B.



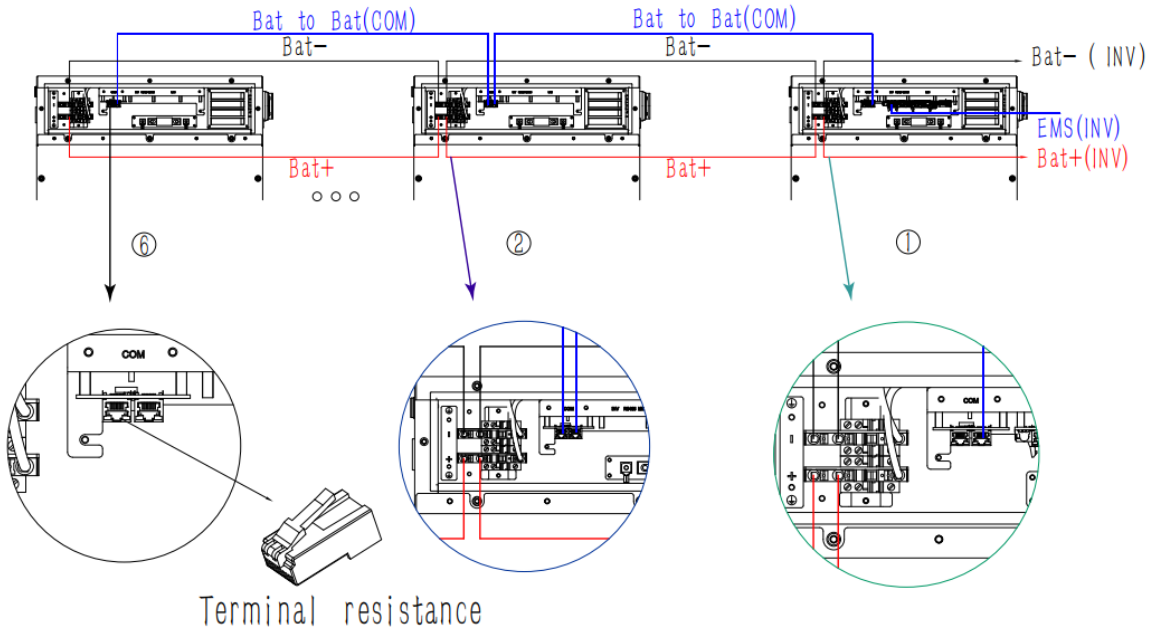
3.4.12. Battery Expansion Electrical connections

3.4.12.1 Power connection between batteries

Connect the power cables between batteries according to the following figure.

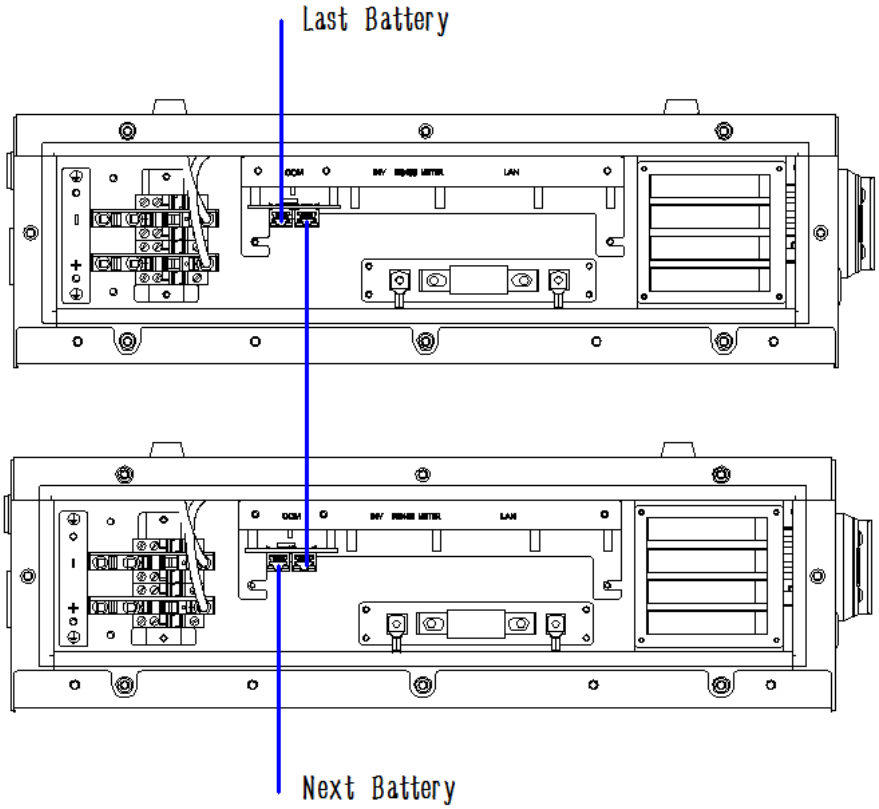
> **NOTE**
>
> **Cables used to connect the batteries should at least meet AWG 8, and can withstand temperatures above 105℃ and DC voltage above 1000V.**

Before delivery, the terminal resistance has been installed on the battery with EMS; If the expanded batteries are needed to install, insert the terminal resistance into the COM port of the last battery (6#battery in the following picture).

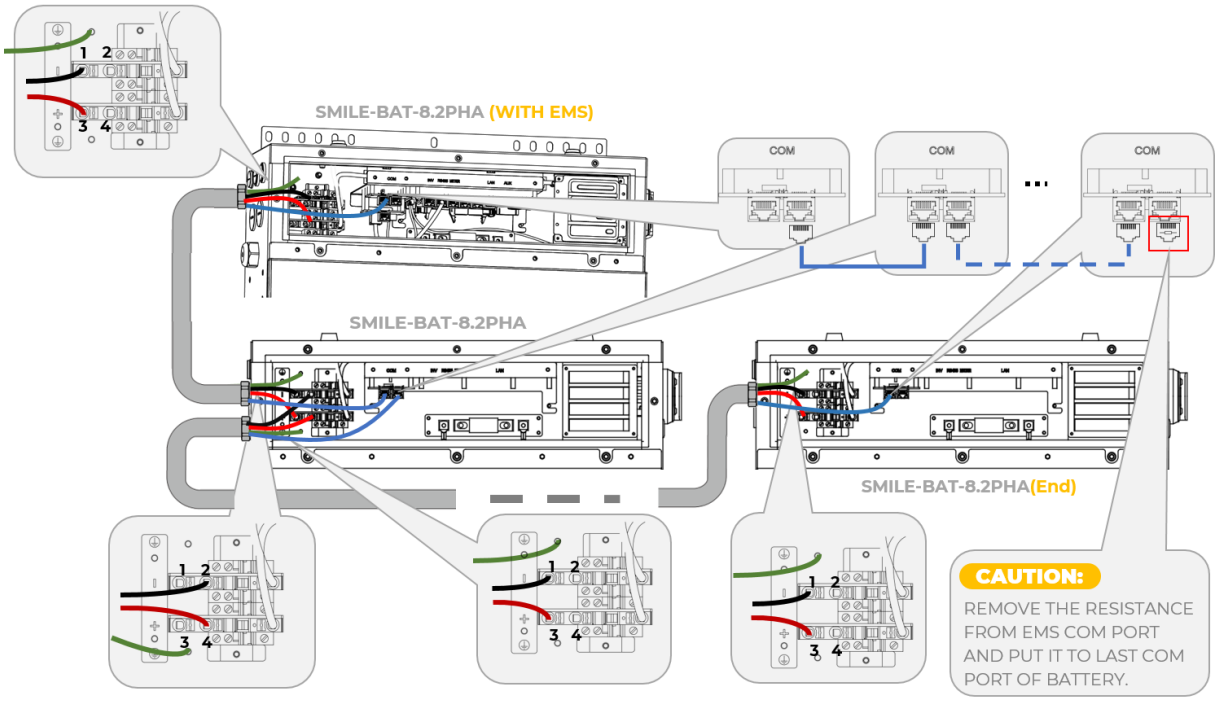


3.4.12.2 Communication connection between batteries

Connect the communication cables (CAT5) between batteries according to the following figure.



Wire the DC & communication cables between battery and battery.

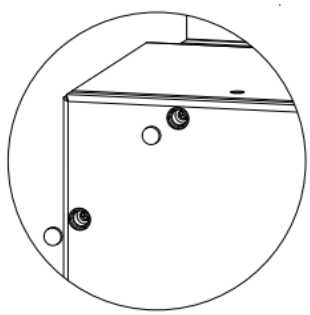


3.4.13. System Operation

Step 1:

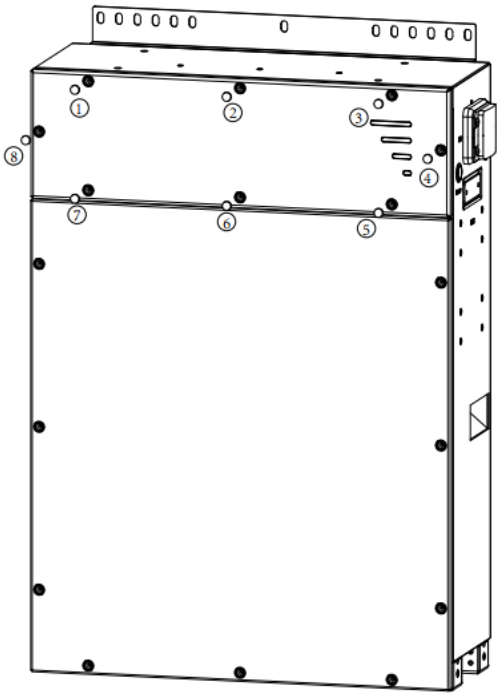
Confirm that all wiring has been completed, and then install the maintenance cover (tool: T20 screwdriver, torque: 1.8 ft-lb).

As shown in the figure below, put eight silicone plugs into the maintenance cover.



1-4: Black Silicone Plug

5-8: White Silicone Plug

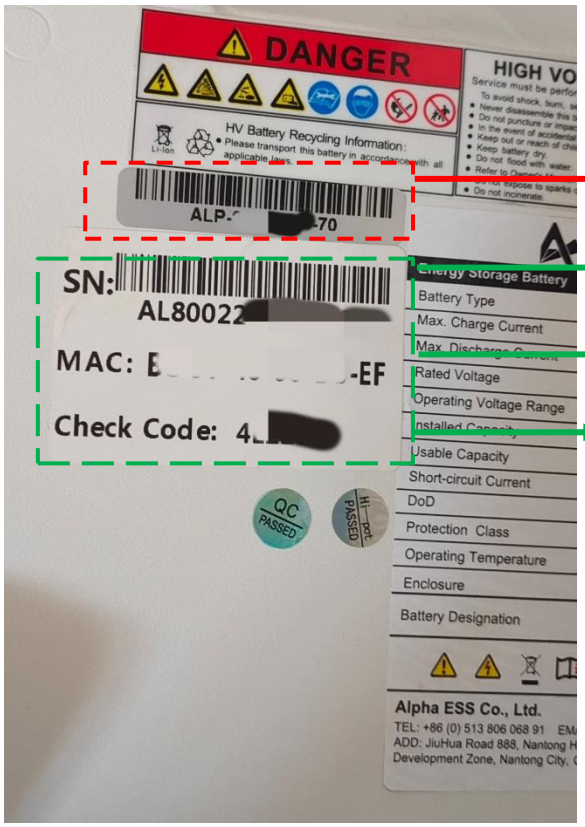


Step 2:

Turn on: Turn on the breaker and press the power switch for 1-2 seconds. The battery will be turned on and LED lights will be lighted up. If there is more than one battery, each battery should be turned on one by one within 30 seconds.

Turn off: Long press the power switch for 5 seconds and turn off the battery breaker. The battery will be off. If there is more than one battery, each battery should be turned off one by one.

3.4.14. Battery Label Instruction



The SMILE-BAT-8.2PHA with EMS (Host battery) has two labels, one is battery label including the battery serial number, another is the EMS label including the EMS serial number, MAC address and check code.

The SMILE-BAT-8.2PHA without EMS has one battery label, and does not have the EMS label.

3.5. Wi-Fi Setting

3.5.1. Download and Install App

1. Android device users can download the App through major Android application markets such as Google Play.

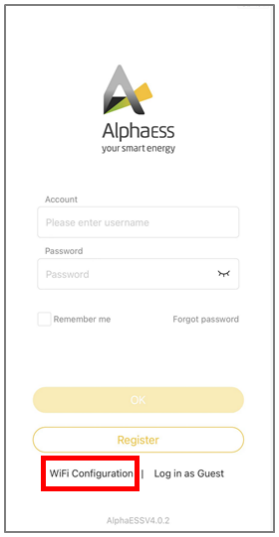
2. IOS device users can search for "AlphaESS" in App Store and download the App.

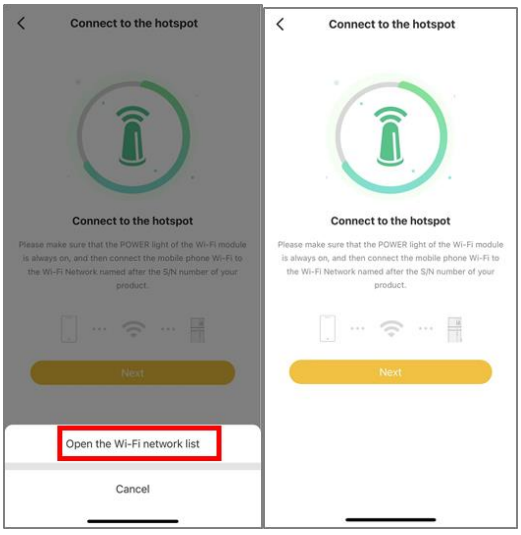
AlphaESS App

3.5.2. Wi-Fi Module Setting

This section is for the users who have a system with a Wi-Fi module.

AlphaESS App can be used to do network configuration, set system basic parameter, monitor system operation status and check configuration information.

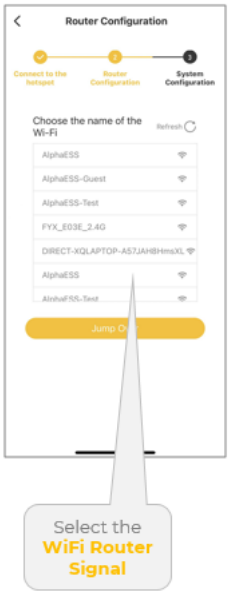




Step 1: Open AlphaESS App, click the "Wi-Fi Configuration" button and enter the Wi-Fi configuration interface.

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 input the password "12345678" and connect to it. After successfully setting it, please go back to App and click "Next".



Step 4: Select the Wi-Fi of your home you are using and input the password, then complete the Wi-Fi configuration and submit. If there is no network currently, you can click 'Jump Over' to skip the Wi-Fi configuration step and directly set the system parameters.

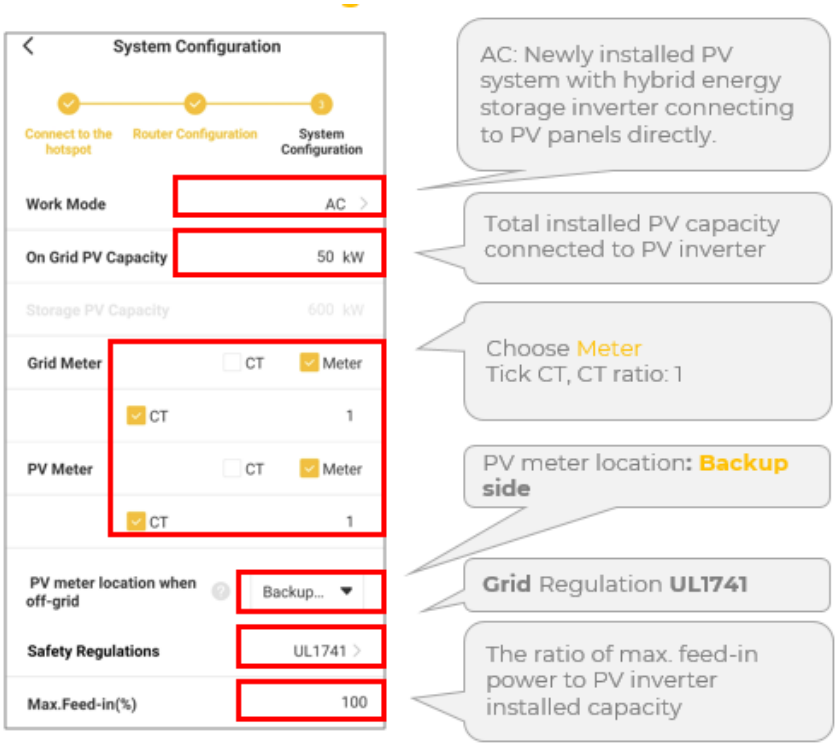
Step 5: For the configuration of network monitoring, please refer to the user manual AlphaCloud monitoring user manual (For Installers). You can scan the following QR code for download

NOTE

The system will not be able to connect to the internet through Wi-Fi module without Wi-Fi configuration.

Step 6: Configure the system on App and check system information

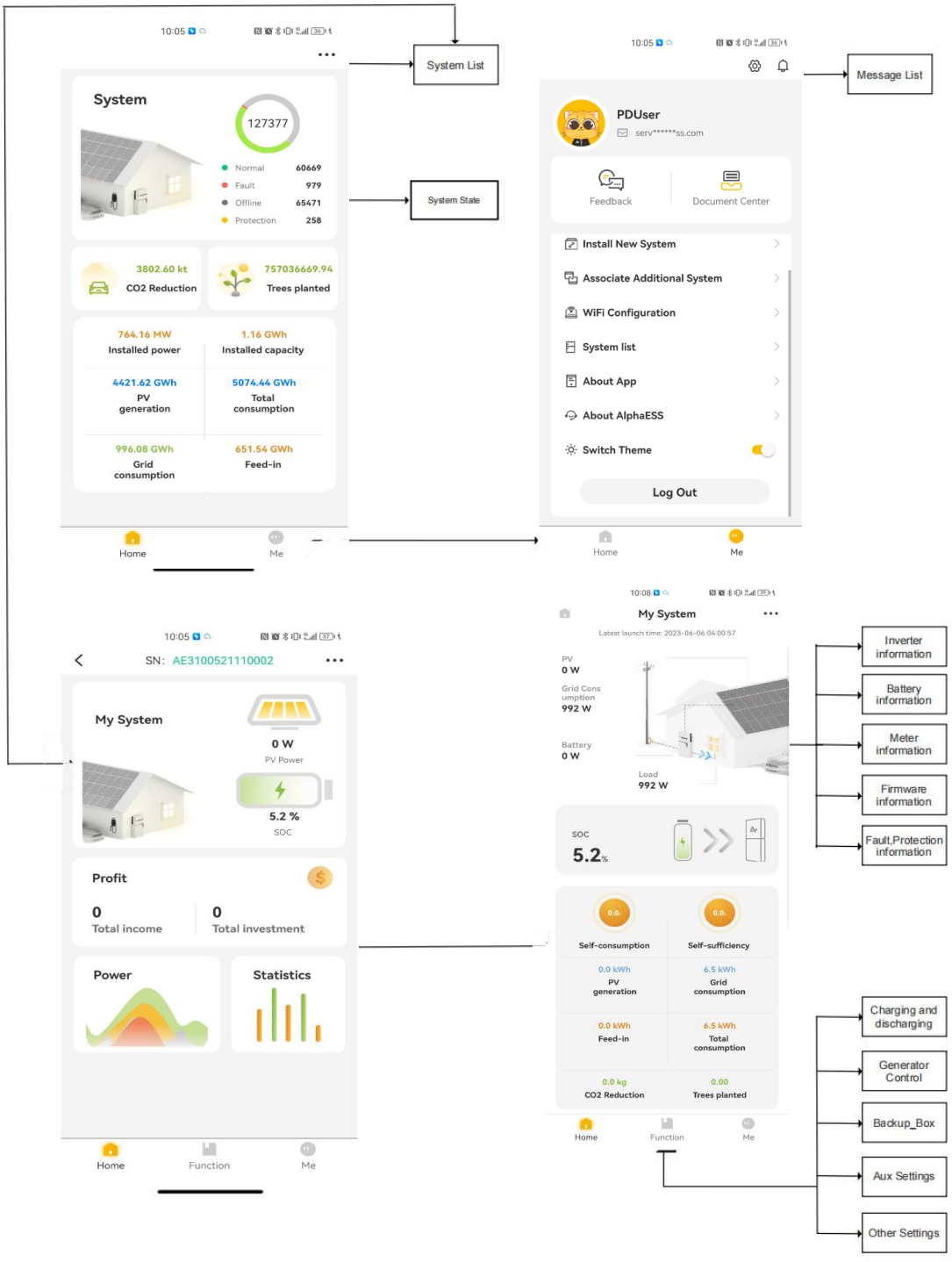
Parameters Setting



Check running status

Check system information

3.5.3. Overview of Functions for Installer Account

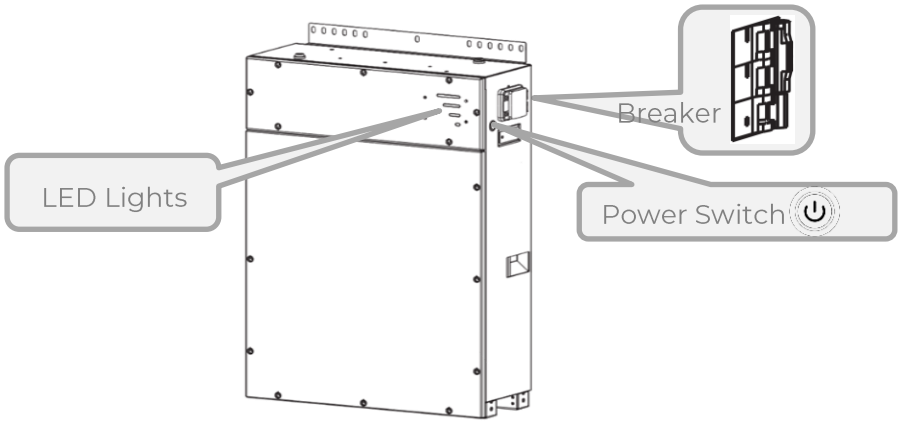


3.5.4. Turn On the System before Wi-Fi Module Setting

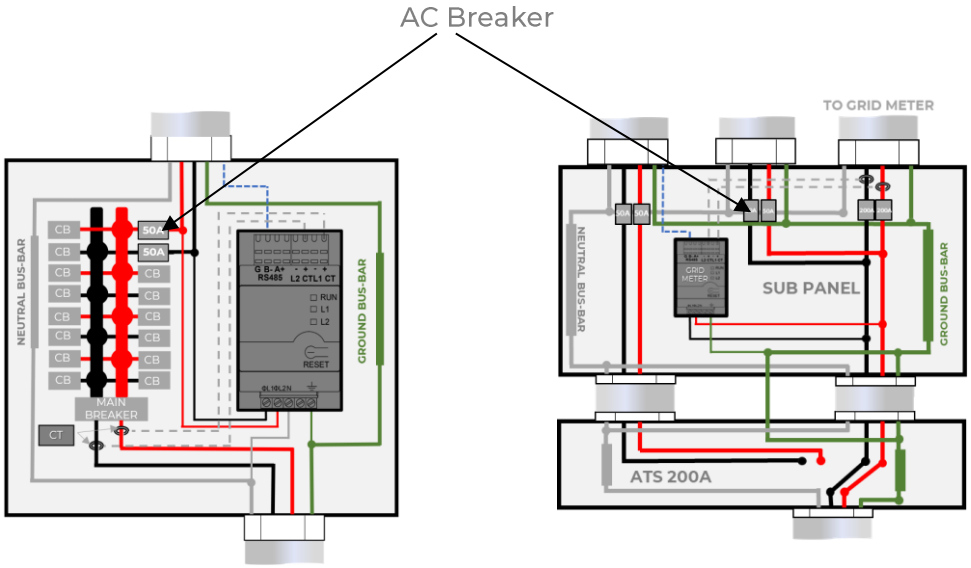
Follow the turning on steps as below

1. Ensure that the battery breakers of the product and all other breakers connecting to the product are “OFF”.

2. Short press the battery power switch on the left side of battery pack, then switch on the battery breaker of battery pack, the battery will be turned on and LED lights will be lighted up. If there is more than one battery, each battery should be turned on one by one within 30 seconds.



3. Wait for the inverter all LED lights become normal (except FAULT).
4. Switch on the AC breaker between grid and the inverter.



OPTION A:

Selected circuits BACK-UP

OPTION B:

Whole home loads BACK-UP

4. COMMISSIONING

4.1. 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	The battery pack and inverter are mounted correctly, securely, and reliably.
3	Wi-Fi mounting	The Wi-Fi 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	Switch and breakers status	The PV switch and battery breakers and all the breakers connecting to the product are OFF.
8	Cable connections	The grounding cable, AC cable, PV cable, battery cable, and communication cables are connected correctly, securely, and reliably.
9	Unused power terminals	Unused power terminals are blocked by watertight caps.

4.2. Check the Running State

Prerequisites

Before switching on the AC breaker between the inverter and the grid, make sure that the AC voltage on the power grid side of the AC breaker is within the specified range (Voltage: 211~264V, Frequency: 50~66Hz)

Please select the acceptance of installation on site when the light intensity is strong.

Procedure

1. Ensure that the PV switch, AC and battery breakers of the product and all other breakers connecting to the product are OFF.
2. Check the grid-connected state of the product.

Short press the power button on the left side of battery pack, then switch on the battery breaker of battery pack.

Switch on the external battery breaker between the battery pack and the inverter.

Switch on the PV switch which is located at the left of the inverter.

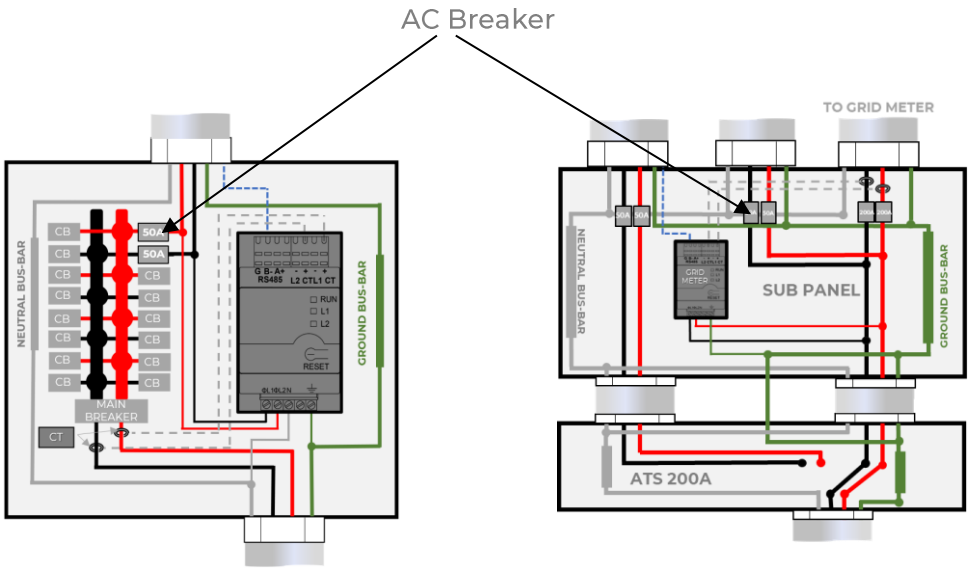
Switch on the external AC breaker between the grid and the inverter.

Set the operating parameters through the App.

Wait about 3 minutes for the inverter to enter the grid-connected state, and observe the indicators states on the display panel of the inverter. At this time, the following 5 LEDs ("SYSTEM", "BACK-UP","BMS COM", "GRID", "INV COM") on the display panel is always on. " Energy " LED is always flashing which is showing supplying energy to the grid / zeroing. "COM" LED is always on when the communication between EMS and server is normal.

3. Check the UPS state of the product

Switch off the external AC breaker between the grid and the inverter.



OPTION A:

Selected circuits
BACK-UP

OPTION B:

Whole home loads
BACK-UP

The inverter will enter the UPS state at once, and observe the indicators states on the display panel of the inverter. At this time, the following 4 LEDs ("SYSTEM","BACK-UP","BMS COM", "INV COM",) on the display panel is always on. " Energy " LED is always

flashing which is showing supplying energy to the grid / zeroing. "COM" LED is always on when the communication between EMS and server is normal.

4. Check the wiring of the backup load

Switch on the external AC breaker between the backup loads and the inverter.

Please connect a low-power electrical appliance to the socket of backup load.

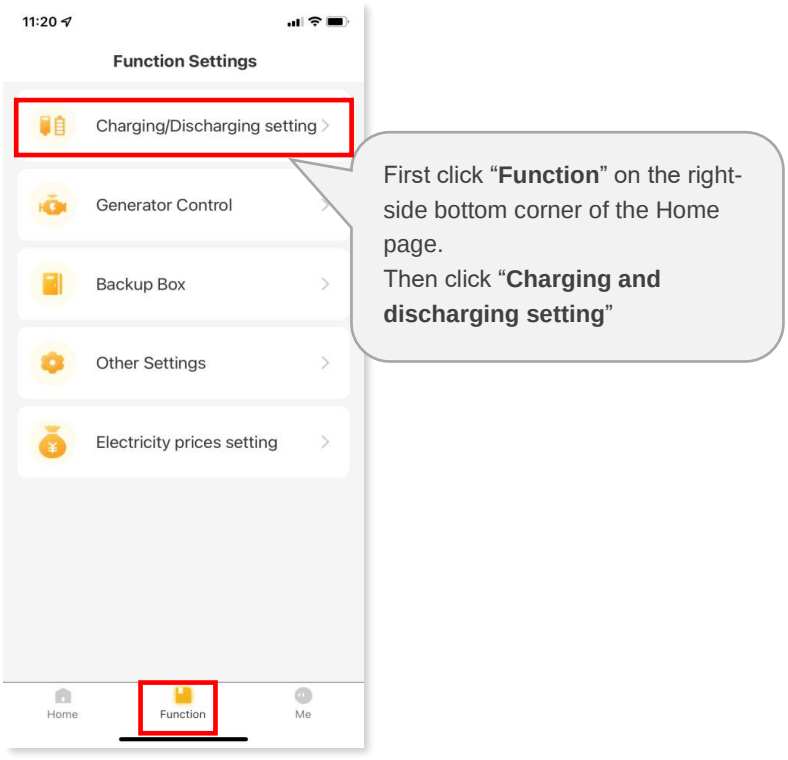
If the electrical appliance can work normally, it means that the wiring of the backup has been installed successfully.

> **NOTICE**
>
> **During commissioning, if the LED indicators on the display panel of the inverter or the battery pack show red, please refer to Section 5.1 for troubleshooting.**

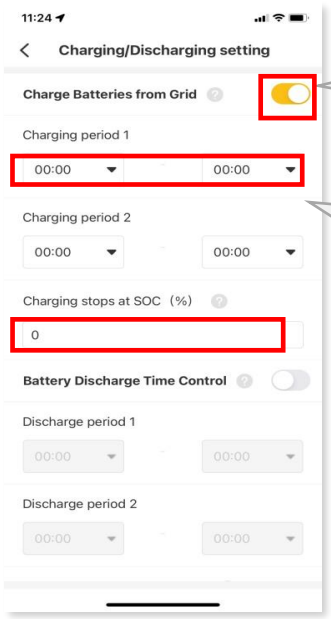
5. Check the CT direction of the Meter

To make sure the system is installed and operating correctly, please set the system to “grid force charging mode” by following the instructions below and check the running status of the system.

Step1



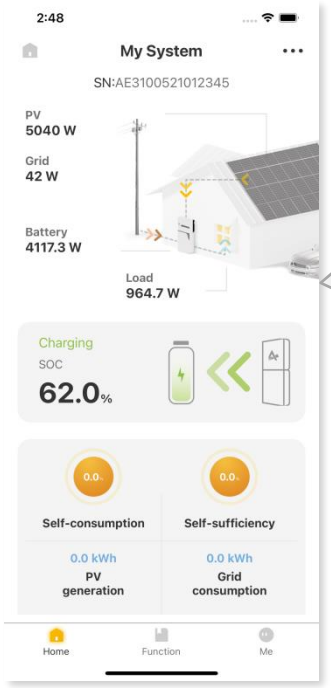
Step2



Select "**ON**" to Charge Batteries from Grid"

please set the "Charging period 1" for the time and the SOC would be **100** under this operation.

Step3



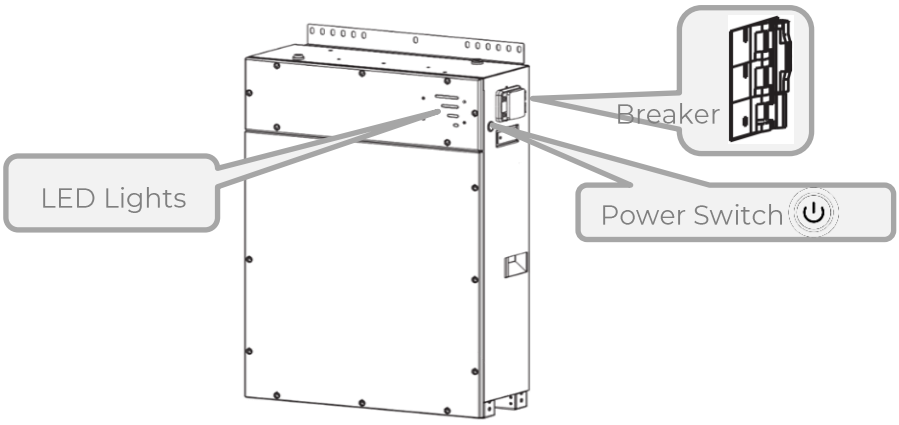
The relative value should be like this:Load = PV ± GRID – Battery
Battery should be in **charging** status.**PV arrow** should be as the picture shows.±: >>absorbing from grid: +; << feed-in to grid:-
If not correct, please check the CT or meter installed direction of both grid and PV side

NOTE

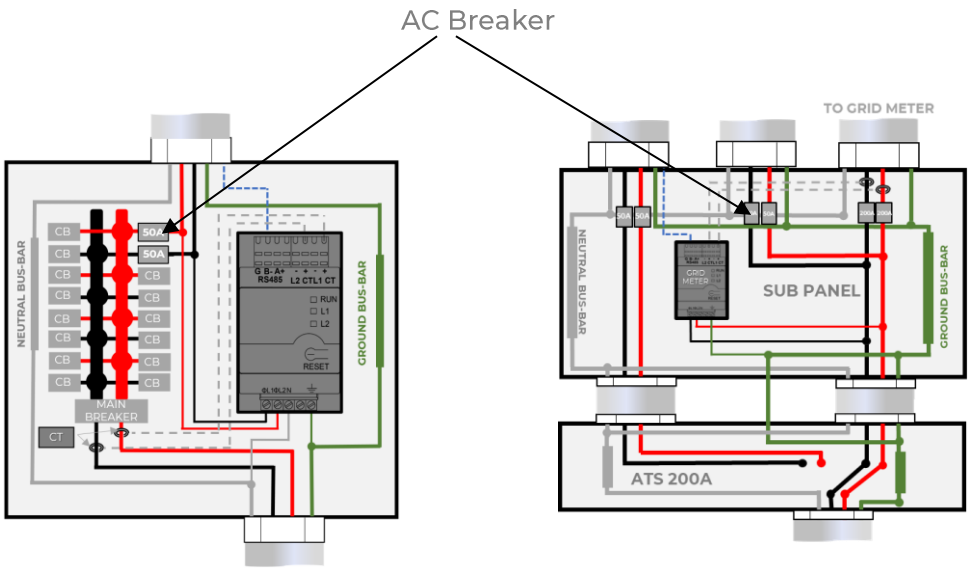
If the operation is normal as descripted in "Step3", please remember to deactivate the "grid force charging mode" by clicking "OFF" and save the changes

6. Turn off system

Long press the battery power switch on the right side of battery pack for at least 5 seconds, the battery will be turned off and LED lights will be off. Then switch off the battery breaker of battery pack.



Switch off the external AC breaker between grid and the inverter.



OPTION A:

Selected circuits
BACK-UP

OPTION B:

Whole home loads
BACK-UP

5. TROUBLESHOOTING

5.1. Problem During Operation

SMILE-SP SYSTEM does not start up with battery only

Solution:

Make sure the voltage of battery is higher than 100V, otherwise battery cannot start up SMILE-SP inverter.

SMILE-SP SYSTEM not started up with PV only

Solution:

1. Make sure the voltage of PV is higher than 100V (need 200V to enter on-grid mode).
2. Make sure the connection between SMILE-SP inverter and PV strings: polarities are (+/-) not reversed.

SMILE-SP Inverter doesn't discharge or output without PV or when PV is lower than load power.

Solution:

1. To check whether the Meter is Installed correctly.
2. Make sure load power is higher than 100W.

a. Battery will not discharge continuously unless load power is higher than 100W;

b. If battery does not discharge when Meter power is higher than 100W, please check CT connection and direction.

3. Check discharging cut off SOC (State of charge). If the battery SOC is equal to the discharge cut-off SOC, the battery will not discharge.
4. Check on App whether the charge time has been set, as during charge time, battery will not discharge (battery will charge in priority during coincident time charge/discharge).

Battery does not charge when PV power higher than load power

Solution:

1. Check the charge time setting on App. Make sure SOC is higher than charge Cut off SOC.
2. Check if battery is fully charged or not, or if battery voltage reaches “charge voltage” or not.

High power fluctuation on battery charge or discharge

Solution:

1. Check if there is a fluctuation on load power.
2. Check if there is fluctuation on PV power.

Battery does not charge

Solution:

1. Check if Meter is connected in the right position and connected to right direction and right phase.
2. Check if the total load power is much higher than PV power.

5.2. Question & Answers (Q&A)

About Wi-Fi Configuration

Q: Why can’t I connect hotspot signal on my phone?

A: The Wi-Fi module can only connect to one device at a time. If the signal is already connected to another device at the time for some reason, you cannot connect to signal.

About Battery Operation

Q: Why is there no output on backup side?

A: Under UPS mode, Backup supply will be cut off when the battery BMS send discharge current to zero.

Q: The battery cannot be fully charged to 100%?

A: Battery will stop charging when battery BMS send charge current to zero.

Q: Why battery breaker always be tripped when it starts up?

A: The breaker of lithium battery normally trips because of following reasons:

1. Battery SOC is too low, battery trips to protect itself.
2. An electrical short-circuit happened on battery connection side. Or for other reasons please contact service.

About AlphaESS App Operation and Monitoring

Q: Why can't I save setting on AlphaESS App?

A: It could be caused by losing connection to hotspot.

Make sure you have already connected hotspot (make sure no other devices connected). Complete Wi-Fi configuration and save setting.

About Meter and Power Limit Function

Q: How to activate output power limit function?

A: For SMILE-SP SYSTEM, the function could be realized by:

Turn on export power limit function and set the Max. output power to the grid on App.

> **NOTE**
>
> **Even if output power limit is set to 0%, there might still be a deviation of a maximum of 100W exported to the grid.**

Q: Why is there still power exported to the grid after I set power limit as 0%?

A: Export limit could be 0% theoretically, but there will a deviation of around 0-100W for SMILE-SP system.

Other Question

Q: Will the warranty of the SMILE-SP inverter and battery pack still be valid if for some special conditions we can not 100% follow the user manual instructions on the installation or operation?

A: Normally we still provide technical support to problems caused from disobeying the instructions on the user manual, however we cannot guarantee any replacements or returns. So if there are any special conditions where you can not 100% follow the instructions, please contact service for suggestions.

5.3. Protection and Error Messages

5.3.1. Inverter Error Troubleshooting

Installers can check the error codes on the page "Running logs" on AlphaCloud monitoring by selecting the log type as "Fault/Warning".

Error No.	Error description	Solution
100005	BUS_OVP1	Restart the inverter to see if the fault still exists. If it still exists, contact service.
100007	Insulation fault	1. Use multi-meter to check if the resistance between ground & inverter frame is close to zero. If it's not, please ensure that the connection is well. 2. If the humidity is too high, isolation failure may occur. 3. Check the resistance between PV1+/PV2+/PV3+/PV4/+BAT+/PV- to ground. If the resistance is lower than the minimum isolation resistance (313K ohms for 9.6KW system & 395K ohms for 7.6KW system), check the system wiring connection. 4. Restart the inverter to see if the fault still exists. If it still exists, contact service.
100009	Leakage current test failure	Restart the inverter to see if the fault still exists. If it still exists, contact service.
100010	Grid relay fault	1. Check (use multi-meter) if there is high voltage (normally should be lower than 10V) between N & PE cable on the AC side. 2. If the voltage is higher than 10V, it means the Neutral & ground cable are not connected well on AC side or restart inverter. 3. Restart the inverter to see if the fault still exists. If it still exists, contact service.

Error No.	Error description	Solution
100011	Over Temperature	1. Try to lower the ambient temperature. 2. Confirm to install the inverter according to the manual. 3. After the inverter is powered off and waiting for 30 minutes, then restart it. If the fault still exists, contact service.
100014	M_S_com fault	Restart the inverter to see if the fault still exists. If it still exists, contact service.
100017	MPPT1_OVP	Check if PV string Voc is lower than max. PV input voltage of the inverter. If Voc of PV string is high, please decrease panels to make sure Voc is within the max. DC input voltage of the inverter.
100038	Output_DC over current	Restart the inverter to see if the fault still exists. If it still exists, contact service.
100043	Output overload	1. Check whether the backup load exceeds the rated power. 2. Restart the inverter to see if the fault still exists. If it still exists, contact service.
10058	AFCI_check_protect	1. If it is the first time this problem has occurred, restart the inverter to see if the fault still exists. If not, it means it is caused by an occasional situation. 2. If the problem persists, check whether connectors or cables in PV strings are improperly connected or are damaged. Unplug all the cables and reconnect or replace the damage cable, then start the inverter. 3. If it still exists, contact service.
100122	EEPROM R/W Failure	Restart the inverter to see if the fault still exists. If it still exists, contact service.
100129	Ground Current Failure	1.Check (use multi-meter) if there is voltage (normally should be close to 0V) between ground & inverter frame. If there is a voltage, it means the neutral & ground cables are not connected well on the AC side. 2. If it happens only in the early morning/dawn /rainy days with higher air humidity and is recovered soon, it should be normal

Error No.	Error description	Solution
100130	Utility Loss	1. Check (use multi-meter) if AC side has voltage. Make sure grid power is available. 2. Make sure AC cables are connected tightly and correctly. 3. If all is well, please try to switch off AC breaker and switch on again in 5 mins. 4. If the fault still exists, contact service.
100131	AC_HCT Failure	Restart the inverter to see if the fault still exists. If it still exists, contact service.
100135	AC_HCT Check Failure	Restart the inverter to see if the fault still exists. If it still exists, contact service.
100136	Vac Failure	1. Make sure safety country of the inverter is set right. 2. Check (use multi-meter) if the AC voltage (Between L & N) is within a normal range (also on AC breaker side) a. If the AC voltage is high, then make sure the AC cable complies with that required on user manual and the AC cable is not too long. b. If the voltage is low, make sure the AC cable is connected well and the jacket of the AC cable is not compressed into the AC terminal. 3. Make sure the grid voltage of your area is stable and within normal range.
100137	Fac Failure	1. Make sure the safety country of the inverter is set right. 2. If safety country is right, then please check whether the AC frequency (Fac) is within a normal range. 3. If Fac failure only appears a few times and is resolved soon, it should be caused by occasional grid frequency instability.
100139	AFCI_Device Failure	2. Check whether connectors or cables in a PV system are improperly connected or are damaged. Unplug all the cables and reconnect or replace the damage cable, then start the inverter. 3. If it still exists, contact service.

5.3.2. Battery Protection Description

LED Indicator	Protection Code	LED Display	Description	Troubleshooting
Yellow LEDs flash once per second	1		Temperature difference	Wait for automated recovery. In case the problem is not recovery for a long time, please call the service center.
	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		Over-current charge	Wait for automated recovery. In case the problem is not recovery for a long time, please call the service center.
	6		Over-current discharge	
	8		Cell overvoltage	
	9		Cell under voltage	Stop discharging and please call the service center immediately.
	11		Low-temperature charge	Stop discharging until this code is eliminated and wait for the temperature to rise.

NOTE

When the protection code NO. 9 appears, please quickly push the power button 5 times in 10 seconds to force the BMS startup the MOSFET of discharging. Thus the open-circuit voltage of the battery will be detected by the inverter and get charged.

5.3.3. Battery Error Description

LED Indicator	Error Code	LED display	Description	Troubleshooting
Red LEDs flash once per second	Error 01		Hardware error	Wait for automated recovery. In case the problem is not resolved, please call the service center.
	Error 05		Hardware error	
	Error 06		Circuit breaker open	Switch on circuit breaker after shutting down the battery.
	Error 08		LMU disconnect (Follower)	Reconnect the BMS communication cable.
	Error 09		SN missing	Please call the service center.
	Error 10		LMU disconnect (Host)	Reconnect the BMS communication cable.
	Error 11		Software version inconsistent	Please call the service center.
	Error 12		Multi-Host	Restart all batteries.
	Error 13		MOSFET overtemperature	Power off the battery and power on the battery after 30 minutes.
	Error 14		Insulation fault	Restart battery and in case the problem is not resolved, please call the service center.
	Error 15		Total voltage fault	Restart battery and in case the problem is not resolved, please call the service center.

6. DISCLAIMER

The SMILE-SP system are transported, used and operated under environmental and electrical conditions. Manufacturer has the right not to provide services or assistance under following conditions:

- Product is damaged during transportation.
- Product is out of warranty year and extended warranty is not bought.
- Product is installed, refitted or operated in improper ways without authority from manufacturer.
- Product is installed or used under improper environment or technical condition mentioned in this user manual, without authority from manufacturer.
- Installation or configuration of the product does not follow requirements mentioned in this user manual.
- Product is installed or operated against the requirements or warnings that are mentioned in this user manual.
- Product is broken or damaged by any force majeure like lightening, earthquake, fire hazard, storm and volcanic eruption etc.
- Product is disassembled, changed or updated on software or hardware without authority from manufacturer.
- Product is installed, used or operated against any related items in international or local policies or regulations.
- Any non-compatible batteries, loads or other devices connected to SMILE-SP system.

NOTE

Manufacturer will keep the right to explain all the contents in this user manual. To insure NEMA Type 4X, product must be sealed well, please install the product within one day after unpacking, otherwise please seal all unused terminals / holes, unused terminals / holes are not allowed to be kept open, confirm that there is no risk of water or dust entering the terminals / holes.

7. TECHNICAL PARAMETERS

7.1. Inverter Specifications

Technical Data	SMILE-SP7.6-INV	SMILE-SP9.6-INV
Battery Input Data		
Battery Type	Li-ion	
Battery Voltage Range (V)[*1]	80~495	
Max. Charging Current (A)	50	
Max. Discharging Current (A)	50	
Charging Strategy for Li-ion Battery	Self-adaption to BMS	
PV String Input Data		
Max. DC Input Power (W)	11400	15000
Max. DC Input Voltage (V)[*2]	600	600
MPPT Range (V)[*3]	80~550	80~550
Start-up Voltage (V)	95	95
MPPT Range for Full Load (V)	230~500	300~500
Nominal DC Input Voltage (V)	380	380
Max. Input Current (A)	12.5/12.5/12.5/12.5	12.5/12.5/12.5/12.5
Max. Short Current (A)	15.2/15.2/15.2/15.2	15.2/15.2/15.2/15.2
No. of MPP Trackers	4	4
No. of Strings per MPP Tracker	1/1/1/1	1/1/1/1
AC Output Data (On-Grid)		
Output Voltage Range (Vac)	211 to 264@240	211 to 264@240
Nominal Output Frequency (Hz)	60	60
Max. Apparent Power output to the Grid (VA)	7600	9600
Max. Apparent Power from the Grid (VA)	9120	9600
Max. AC Current Output to the Grid (A)	31.7	40
Max. AC Current from the Grid (A)	38	40
Output Power Factor	~1 (adjustable from 0.8 leading to 0.8 lagging)	
Output THDi (@Nominal Output)	< 3%	
AC Output Data (Back-up) (Optional)		
Nominal Output Voltage L1-L2/L-N (Vac)	240/120	240/120
Nominal Output Frequency (Hz)	60	60
Output THDv (@Linear Load)	< 3%	< 3%

Max. Output Apparent Power@240V (VA)	7600	9600
Peak Output Apparent Power@240V (VA)[*4]	9120, 60sec	11520, 60sec
Max. Continuous Output Current@240V (A)	31.7	40
Efficiency		
PV Max. Efficiency	97.6%	
Battery Charged by PV Max. Efficiency	98.1%	
Battery Charge/discharge to AC Max. Efficiency	96.6%	
Protection		
Insulation Resistor Detection	Integrated	
Residual Current Monitoring Unit	Integrated	
Output Over Current Protection	Integrated	
Back-up Output Short Protection	Integrated	
Output Over Voltage Protection	Integrated	
Battery Input Reverse Polarity Protection	Integrated	
PV Arc Fault Detection	Integrated	
General Data		
Operating Temperature Range	-31°F~140°F (-35℃~60℃)	
Relative Humidity	0~95%	
Operating Altitude	≤13123ft(4000m)	
Cooling	Intelligent Fan	
Noise (dB)	< 45	
User Interface	LED & App (Wi-Fi)	
Communication with BMS	RS485; CAN	
Communication with Meter	RS485	
Communication with EMS	RS485 (Insulated)	
Communication with Portal	LAN, Wi-Fi (Optional)	
Communication with RSD	SUNSPEC	
Weight	70.5lb (32kg)	
Size (Width*Height*Depth)	16.3in*31.1in*6.9in (415mm*791mm*175mm)	
Mounting	Wall Bracket	
Protection Degree	NEMA Type 4X	
Standby Self Consumption (W)[*5]	< 20	
Topology	Transformerless	
Standard warranty	10 Years	
Certifications & Standards		

Grid Regulation	UL1741 SA, UL9540 California Rule 21, HECO Rule 14, IEEE 1547, IEEE 1547.1
Safety Regulation	UL1741, CSA22.2 No.107-01, UL1998, UL1699B
EMC	FCC Part15 CLASS B

*1 Battery discharge/charge power limited by voltage

*2 Inverter will not work when PV input voltage ≥585V.

*3 When there is no battery connected, inverter starts feeding in only if string voltage is higher than 200V.

*4 Can be reached only if PV and battery power is enough

*5 No Back-up Output

7.2. Auto-transformer Specifications

Technical Data	**SMILE-SP9.6-TR**
Rated Voltage (Vac)	120/240V Split Phase
Rated Frequency (Hz)	60
Max. Continuous Output Current per Phase @120V (A)	40
Split Phase Imbalance Current @Rated Power (A)	40
Thermal Protection	YES
General Data	
Operating Temperature Range	-31°F~140°F (-35℃~60℃)
Relative Humidity	0~95%
Operating Altitude	≤13123ft (4000m)
Cooling	Natural Convection
Noise (dB)	< 25
Weight	48.5lb (22kg)
Size (Width*Height*Depth)	13.58in*10.91in*6.85in (345mm*277mm*174mm)
Mounting	Wall Bracket
AC Conduit Size	1''
Protection Degree	NEMA type 4X
Standard warranty	10 Years
Certifications & Standards	
Safety	UL 1741

7.3. Grid Parameter Setting

For parameter, which used in grid support and protection function, adjustable requirement of CA Rule 21, HECO 14H and IEEE1547.

7.4. Battery Specifications

Model	**SMILE-BAT-8.2PHA (with EMS)**	**SMILE-BAT-8.2PHA (without EMS)**
Battery Type	LFP (LiFePO4)	
Max. Charging Current	38.4A	
Max. Discharging Current	38.4A	
Rate Voltage	256V	
Operation Voltage Range	240~288V	
Capacity	8.2kWh	
Usable Capacity	7.8kWh	
Depth of Discharge	95%	
Operation Temperature Range	-10~50℃[*1]	
Relative Humidity	15% ~ 85%	
Short-Circuit Current	4400A, 500μs	
Protection Class	IP65	
Transportation	UN38.3	
Safety	UN1973	

[*1]When the ambient temperature is too low or too high, the performance of batteries may be limited.

8. MAINTENANCE

WARNING

These servicing instructions are for use by qualified personnel only. To reduce the risk of electric shock, do not perform any servicing other than that specified in the operating instructions.

8.1. Routine Maintenance

Normally, the inverter and battery pack need no maintenance or calibration.

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 enclosure of the inverter are free from obstacles or dust.	Once every 6 to 12 months
Product visible damage	The inverter and battery pack are not damaged or deformed.	Once every 6 months
Product running status	1. The inverter and battery pack operate with no abnormal sound. 2. All parameters of the inverter and battery pack are correctly set. Perform this check when the inverter and battery pack is running.	Once every 6 months
Electrical connections	1. Cables are securely connected. 2. Cables are intact, and in particular, the cable jackets touching the metallic surface are not scratched.	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 enclosure of the inverter
The enclosure 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 enclosure of the inverter has cooled down.

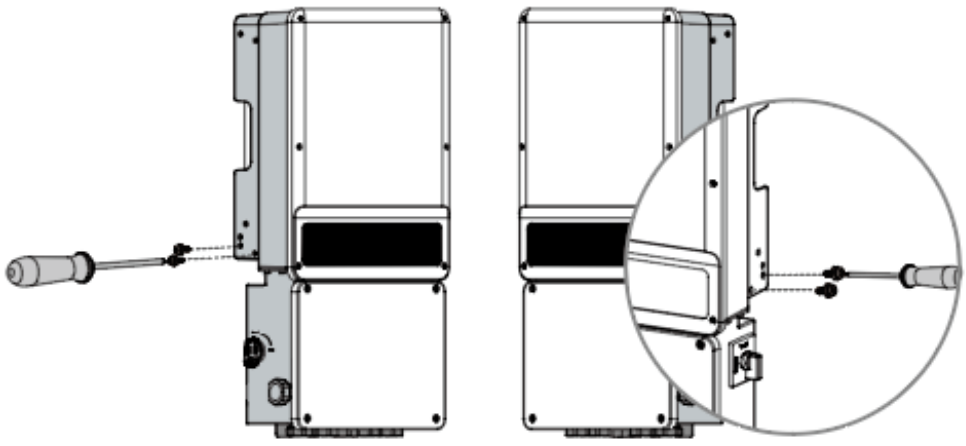
8.2. Fans Clear and Replacement

SMILE-SP inverter is equipped with three fans on its left side. The fans should be cleared yearly. Before clearing or replacing the fans, turn off all switches and breakers including battery side and inverter side.

Step 1:

Rotate DC switch in "OFF" position.

Remove 4 screws by cross screwdriver.



Step 2:

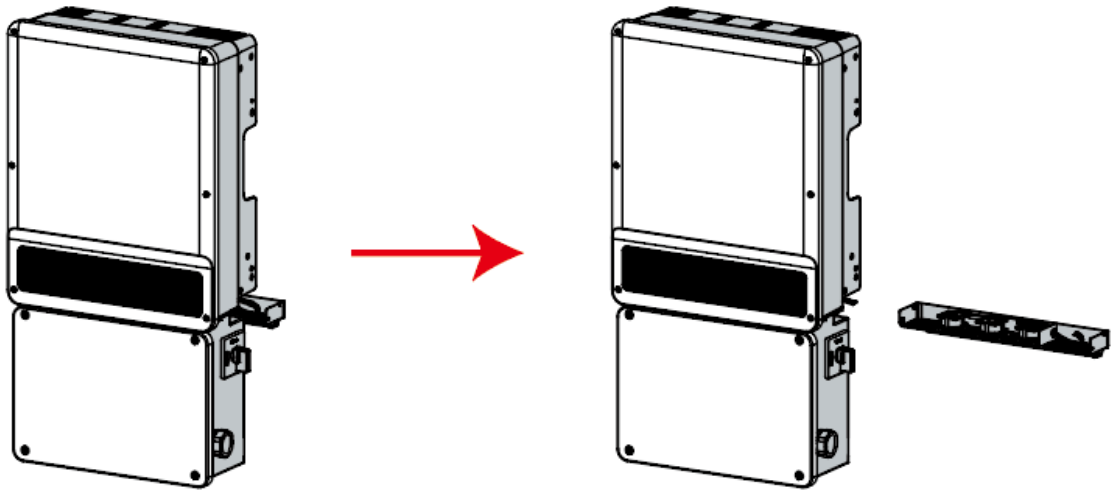
Separate the plug terminal by pressing the buckle.

Step 3:

Clean the ventilation grid and the fan with soft brush, paint brush, or compressed air.

Reassemble the fans into the cabinet.

If there is something wrong with the fan and need to be repaired or replaced, disassemble the fans following the above steps.



8.3. Fuse Replacement

If the inverter fuses are broken, replace them quickly. Before the replacement, all the power (PV, battery, AC) connected by SMILE-SP inverter must be switched off. Otherwise it will bring danger. The fuse must be of the same size, the current specification must be the same as the original fuse or higher, not less than the original specification. Steps are as follows:

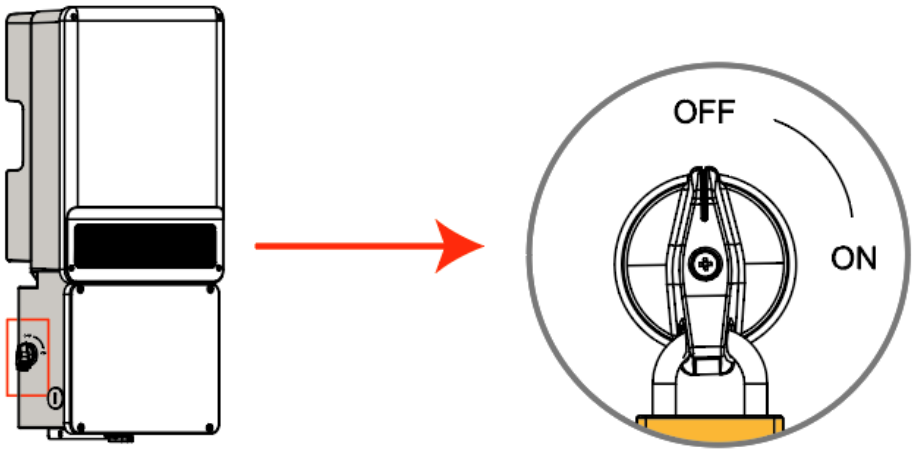
Step 1:

Rotate DC switch in “OFF” position.

Turn off all switches and breakers including battery side and inverter side.

Install a lock on DC switch.

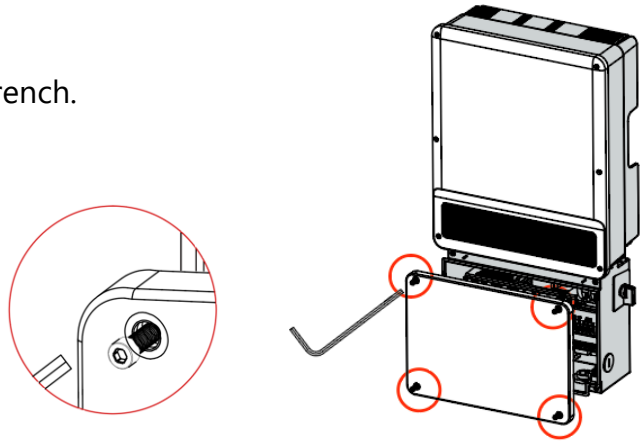
Wait at least 5 minutes to do the next operation.



Step 2:

Remove the 4 screws by Allen Wrench.

Remove the cover.

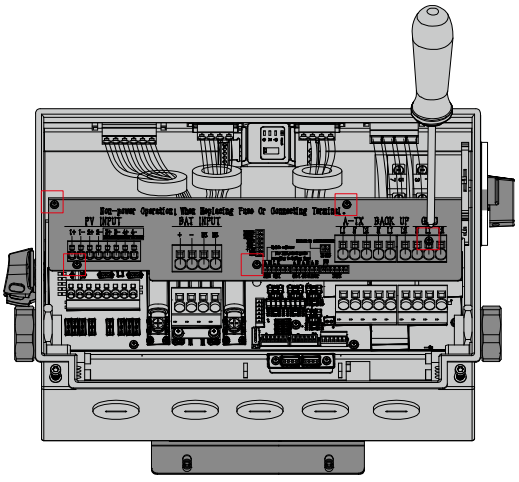


Step 3:

Remove 5 screws by cross screwdriver.

Remove the black plastic board.

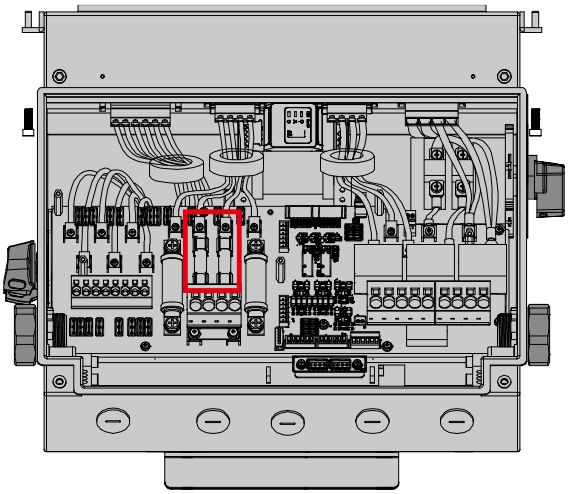
Confirm that the fuses are broken.

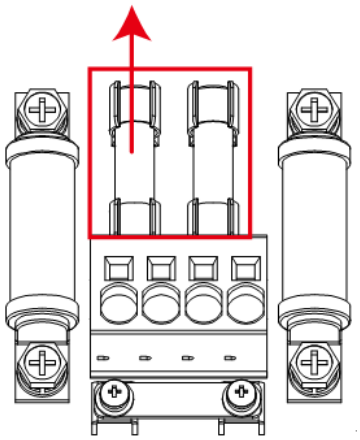


Step 4:

Remove the broken fuses in the middle on vertical direction which is shown in the right figure and don't remove fuses by prying or other methods.

Replace the fuses on vertical direction.



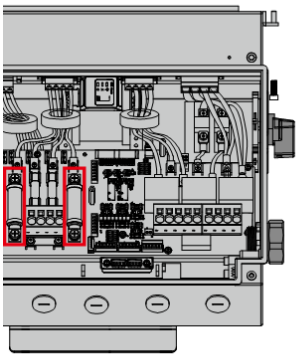


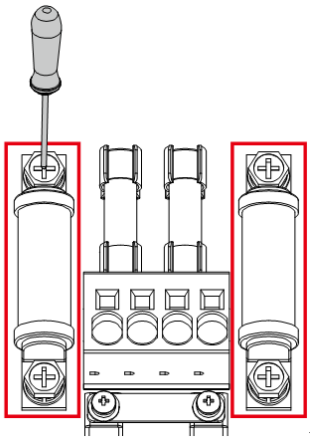
Step 5:

Remove 4 screws.

Remove the broken fuses which is shown in the right figure and replace them.

Fasten the screws.





Appendix 1: Protection Category Definition

Overvoltage Category Definition

Category I	Applies to equipment connected to a circuit where measures have been taken to reduce transient overvoltage to a low level.
Category II	Applies to equipment not permanently connected to the installation. Examples are appliances, portables tools and other plug-connected equipment.
Category III	Applies to a fixed equipment downstream, including the main distribution board. Examples are switchgear and other equipment in an industrial installation.
Category IV	Applies to equipment permanently connected at the origin of an installation (upstream of the main distribution board). Examples are electricity meters, primary over-current protection equipment and other equipment connected directly to outdoor open lines.

Pollution Degree Definition

Pollution Degree I	No pollution or only dry, non-conductive pollution occurs. The pollution has no influence.
Pollution Degree II	Normally only non-conductive pollution occurs. Occasionally, however, a temporary conductivity caused by condensation must be expected.
Pollution Degree III	Conductive pollution occurs, or dry non-conductive pollution occurs, which becomes conductive due to condensation, which is expected.
Pollution Degree IV	Persistent conductive pollution occurs, for example, the pollution caused by conductive dust, rain or snow.

Appendix 2: System Connection Diagram

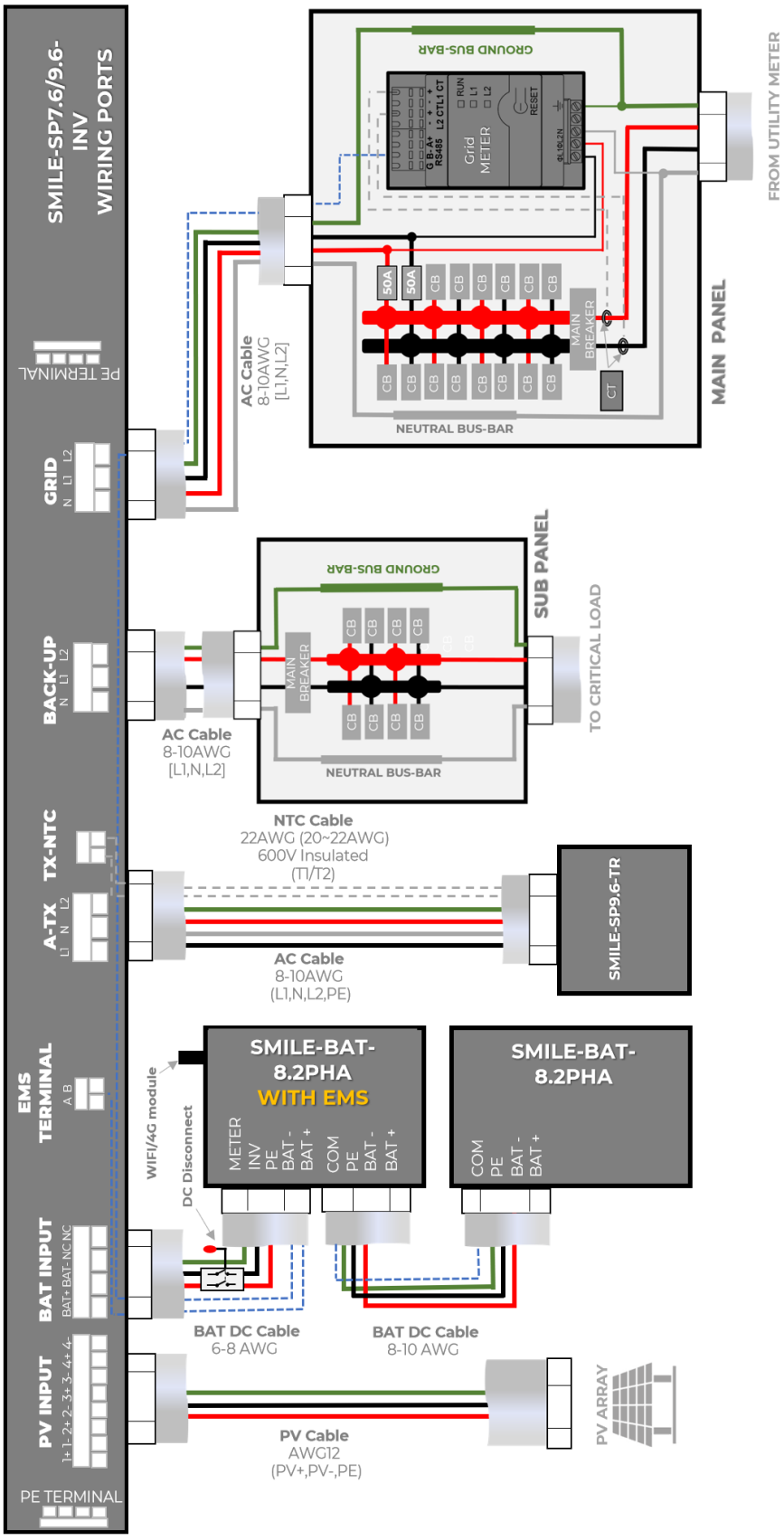


Figure 1 BACK-UP SELECTED CIRCUITS

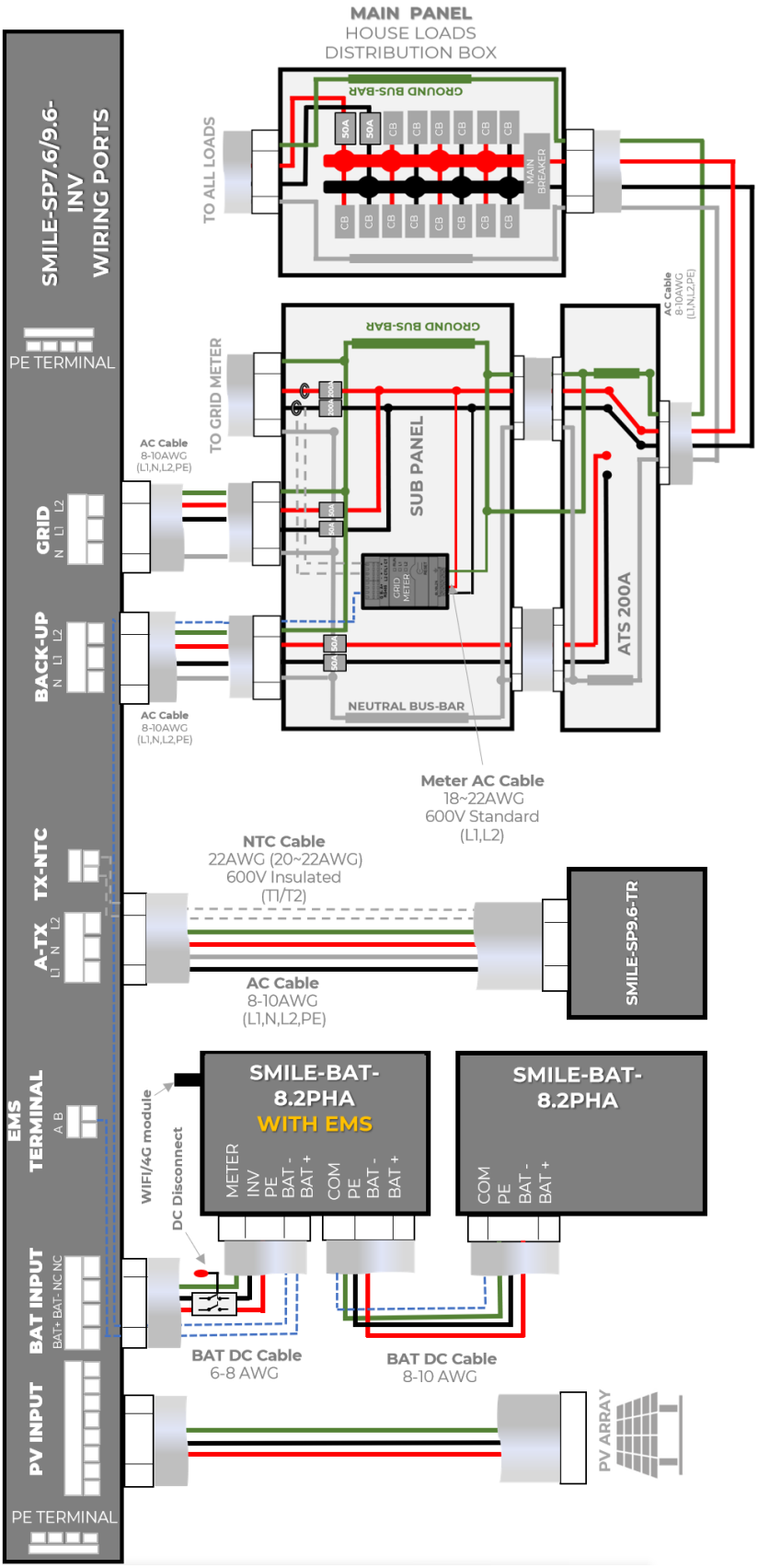


Figure 2 BACK-UP WHOLE HOME

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