AlphaESS
your smart energy

V01

INSTALLATION, OPERATION & MAINTENANCE MANUAL OF SMILE - G3 - T12 / 15 / T20



DISCLAIMER

Copyright © AlphaESS Co., Ltd. 2023. All rights reserved.

No part of this document may be reproduced or transmitted in any form or by any means without prior written consent of AlphaESS Co., Ltd.

The material furnished in this document is believed to be accurate and reliable. The information and recommendations in this document do not constitute commitments or warranties in the form of assignments. The information in this document is subject to change without notice. You may refer to the Alpha Cloud Platform (https://cloud.alphaess.com) for the most updated version.

All company and brand products and service names are trademarks or registered trademarks of their respective holders.

COPYRIGHT STATEMENT

This manual is under the copyright of Alpha ESS Co., Ltd. with all rights reserved. Please retain this manual and operate the Product in accordance with all safety and operating instructions in this manual. Please do not operate the product before reading through the manual.

CONTENT

DISCLAIMER 1

COPYRIGHT STATEMENT 2

CONTENT 3

1. INTRODUCTION 7

1.1. Content and Structure of this Document 7

1.2. Target Group 7

1.3. Levels of Warning Messages 7

1.4. Definition of Abbreviations and Nouns 8

2. Safety 10

2.1. Intended Use 10

2.2. Safety Instructions for Battery 11

2.2.1. General Safety Precautions 11

2.2.2. Response to Emergency Situations 11

2.3. Important Safety Instructions 12

2.4. Symbols Explanation 16

3. Product Introduction and Application Scenarios 19

3.1. Naming Convention 19

3.2. System Introduction 20

3.3. Product Description 20

3.3.1. Inverter Electrical Interface & Connections Introduction 20

3.3.2. Inverter Display Interface Introduction 21

3.3.3. Battery Display Interface Introduction 23

3.3.4. Battery Introduction of SMILE-G3-BAT-4.5S 23

3.3.5. Battery Introduction of SMILE-G3-BAT-9.3S 24

3.4. Application Scenarios 26

3.4.1. DC-Coupled Energy Storage System 26
3.4.2. AC-Coupled Energy Storage System 26
3.4.3. Hybrid-Coupled Energy Storage System 27
3.4.4. Off-Grid Energy Storage System 27

4. Storage and Transport 28

4.1. Storage 28

4.1.1. Inverter Storage 28
4.1.2. Battery Storage 28

4.2. Transport 29

5. Mounting 30

5.1. Checking the Outer Packing 30

5.2. Scope of Delivery 30

5.3. Requirements for Mounting 34

5.3.1. Basic Requirements 34
5.3.2. Mounting Environment Requirements 34
5.3.3. Mounting Structure Requirements 35
5.3.4. Mounting Angle and Stack Requirement 35
5.3.5. Mounting Space Requirements 36

5.4. Preparing Tools and Instruments 38

5.5. Mounting the System 39

5.5.1. Mounting the Battery SMILE-G3-BAT-4.5S 39
5.5.2. Mounting the Battery SMILE-G3-BAT-9.3S 46
5.5.3. Mounting the Inverter 50
5.5.4. Mounting the Wi-Fi Module 50

6. Electrical Connection 52

6.1. Cable Requirements for Connection 52

6.2. Grounding Connection 53

6.3. AC Connection 53

6.3.1. Requirements for the AC Connection 53
6.3.2. Select Suitable AC Circuit Breaker 54

6.3.3. Grid and Backup Connection 55
6.3.4. Disassembling the AC Connectors 58
6.3.5. Meter Connection 58
6.4. PV Connection 66
6.4.1. Connecting the PV Array 66
6.4.2. Disassembling the PV Connector 67
6.5. Electrical Connection between the Inverter and Battery 68
6.5.1. Communication Connection between INV and BAT 68
6.5.2. System Connection between INV and BAT 69
6.5.3. Disassembling BAT Connectors 73
6.6. Communication Connection with Inverter 74
6.7. Mount Covers of the Inverter and Battery 76
7. Operation 80
7.1. Power on the System 80
7.2. Power off the System 80
8. COMMISSIONING 82
8.1. Checking before Power-On 82
8.2. Power on the Product before Commissioning 83
8.3. Installing New System and Setting up the App 83
8.3.1. Download and Install the App 83
8.3.2. Register as an Installer 83
8.3.3. Overview of Functions for Installer Account 84
8.3.4. Install New System on the App 85
8.3.5. Instruct the End User to Install the App 87
8.4. Wi-Fi Configuration and Basic Parameters 88
8.4.1. Wi-Fi Dongle Configuration 88
8.4.2. Basic Parameters Settings 90
8.4.3. Information on the main page 93
8.4.4. Function settings 94
8.5. Regiter on AlphaCoud 97

8.5.1. Register as Installer Account on AlphaCoud 97
8.5.2. Install New System on AlphaCoud 99
8.6. Check System Wiring and Meter Installation 100
9. Maintenance and Troubleshooting 106
9.1. Routine Maintenance 106
9.2. Troubleshooting 107
9.2.1. Common Errors 107
9.2.2. Battery Protection Description for Series Battery 115
9.2.3. Battery Error Description 116
10. Uninstallation & Return 118
10.1. Removing the Product 118
10.2. Packing the Product 118
10.3. Disposing of the Product 118
11. Technical Data 119
11.1. Datasheet of Inverter 119
11.2. Datasheet of Battery SMILE-G3-BAT-9.3S 121
Appendix 1: System Wiring Diagram 125

1. INTRODUCTION

1.1. Content and Structure of this Document

This document is valid for SMILE-G3 three phase energy storage system, which includes inverter SMILE-G3-T15/T20-INV and battery SMILE-G3-BAT-4.5S and SMILE-G3-BAT-9.3S. This document describes the mounting, installation, commissioning, configuration, operation, troubleshooting and decommissioning of the energy storage system as well as the operation of the user interface.

Please read all documentation that accompanies the product. Keep them in a convenient place and available at all times.

Illustrations in this document are reduced to the essential information and may deviate from the real product.

1.2. Target Group

This document is intended for qualified persons. Only qualified personnel are allowed to perform the operations marked with a warning symbol in this document.

Qualified persons must have:

1. Knowledge of working principle of inverters.
2. Knowledge of how to deal with the dangers and risks associated with installing and using electrical devices, batteries and energy storage system.
3. Knowledge of the installation and commissioning of electrical devices and energy storage system.
4. Knowledge of the applicable standards and directives relevant to the product and its installation.
5. Understood and complied with this document, including all safety precautions.
6. Understood and complied with the documents of the battery manufacturer and inverter manufacturer, including all safety precautions.

1.3. Levels of Warning Messages

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

DANGER

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

WARNING WARNING indicates a hazardous situation that could result in serious injury or even death if not avoided.
CAUTION CAUTION indicates a hazardous situation that could result in minor or moderate injury if not avoided.
NOTICE NOTICE indicates a situation that could result in property damage if not avoided.
INFORMATION provides tips for the optimal installation and operation of the product.

1.4. Definition of Abbreviations and Nouns

A

AC	alternating current
APP	application
AUX	auxiliary

B

BAT	battery
BMS	battery management system

D

DC	direct current

E

EMS	energy management system

I

INV	inverter

P

PV	photovoltaic

S

SOC	the State of Charge

2. Safety

2.1. Intended Use

The inverter, batteries and electricity meters together form a system designed to optimise the self-consumption of electrical energy in a household. The inverter transfers energy between AC current and DC current while the battery is used for the storage of energy (typically storing surplus energy produced by solar arrays).

SMILE-G3-T15/T20-INV and SMILE-G3-BAT-4.5S/9.3S are suitable for indoor and outdoor installation.

The SMILE-G3-T15/T20-INV must only be operated with PV arrays of protection class II in accordance with IEC 61730, application class A. The PV modules must be compatible with this product.

The product is not equipped with an integrated transformer and therefore has no galvanic isolation.

The product is not equipped with an integrated transformer and therefore has no galvanic isolation.

The product must not be operated with PV modules whose outputs are grounded. This can cause the product to be destroyed. The product may be operated with PV modules whose frame is grounded.

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

All components must be used in a manner and environment in compliance with the requirements of this manual and in compliance with all relevant local Standards and directives. Any other operation may cause personal injury or property damage.

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

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

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

The type label must remain permanently attached to the product.

2.2. Safety Instructions for Battery

2.2.1. General Safety Precautions

1. Before installing any part of the SMILE G3, please read the Installation Manual completely. If additional hardware is being installed at the same time as the SMILE G3 unit (e.g. a Backup device or a separate AC-coupled PV system), please read the Installation Manual for each component/system before commencing installation of any hardware. The installation of one piece of hardware may create hazards for the installation of another piece of hardware – be sure to read all Manuals to understand the interaction and safety implications of the combined systems.
2. Overvoltage or incorrect wiring can damage the battery and cause deflagration, which can be extremely dangerous.
3. All types of battery breakdown may lead to electrolyte or flammable gas leakage.
4. The battery is not user-serviceable because there is high voltage in the device.
5. Read the label with Warning Symbols and Precautions on the right side of the battery.
6. Do not connect any AC conductors or PV conductors directly to the battery which should be connected only to the inverter.
7. Do not charge or discharge a damaged battery.
8. Do not damage the battery by dropping, deforming, impacting, cutting or penetrating it with a sharp object. Battery damage may cause a leakage of electrolyte or fire.
9. Do not expose the battery to an open flame.

2.2.2. Response to Emergency Situations

The battery is designed to prevent the danger caused by malfunction.

In the case of user exposure to the electrolyte or other internal materials of the battery cells, the list below details recommended actions dependent on the type of exposure:

1. Inhalation: Leave the contaminated area immediately and seek medical attention.
2. Eye injuries: Rinse eyes with running water for 15 minutes and seek medical attention.
3. Skin injuries: Wash the affected area thoroughly with soap and seek medical attention.
4. Ingestion: Induce vomiting and seek medical attention.

If a fire breaks out in the place where the battery is installed, please follow these measures:

1. Fire extinguishing methods

(1) A Respirator is not required during normal operations.

(2) Use an FM-200 or CO_2 extinguisher for battery fire.

(3) In the case of a fire in the property but where the fire has not yet reached the battery, if it is safe to do so, use an ABC fire extinguisher and prevent the fire from reaching the battery.

2. Firefighting instructions

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

(2) If the battery is not on fire yet, extinguish the fire before the battery catches fire.

(3) If the battery 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.
The battery leaks poisonous gases when it is burning. Do not approach.

3. Effective ways to deal with accidents

(1) On land: Place damaged battery in a segregated place and call local fire department or technical service engineer.

(2) In water: Stay out of the water and don't touch anything if any part of the battery, inverter, or wiring is submerged.

(3) Do not use submerged battery again and contact an Alpha-Accredited or Battery-Accredited technical service engineer.

2.3. Important Safety Instructions

DANGER

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

The DC cables connected to a battery or a PV module may be live. Touching live DC cables can result in serious injury or even death due to electric shock. To avoid this danger:

- Disconnect the inverter and battery 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 product.
- Observe all safety information of this document.

DANGER

Danger to life due to electric shock if live system components in backup mode are touched

Even if the grid circuit breaker and the PV switch of the inverter are disconnected, parts of the system may still be live when the battery is switched on due to backup mode. To avoid this danger:

- Before performing any work on the inverter, disconnect it from all voltage sources as described in this document.

DANGER

Danger to life due to electric shock if touching live components or DC cables when working on the battery

The DC cables connected to the battery may be live. Touching live DC cables can result in serious injury or even death due to electric shock. To avoid this danger:

- Before performing any work on the battery, disconnect the inverter from all voltage sources as described in this document.

DANGER

Danger to life due to electric shock if touching live components when the inverter or battery cover is open

High voltages are present in the live parts and cables inside the system during operation. Touching live parts and cables can result in significant injuries or even death due to electric shock. To avoid this danger:

- Do not open the system cover.

DANGER

Danger to life due to electric shock if live components are touched during a ground fault

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

- 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.

DANGER

Danger to life due to electric shock if an ungrounded PV module or array frame is touched

Touching ungrounded PV modules or array frames can result in significant injuries or even death due to electric shock. To avoid this danger:

- Connect and ground the frame of the PV modules, the array mounting frame and the electrically conductive surfaces to ensure continuous conduction.
- Observe the applicable local regulations.

DANGER

Danger to life due to dangerous voltages on the battery

There is dangerous voltage at the terminal of the battery power cable. Touching the terminal of the battery power cable can result in a lethal electric shock. To avoid this danger:

- Do not open the battery cover.
- Leave the protective caps on the connectors for the battery's power connection until the inverter cables are connected to the battery.
- Disconnect the system from voltage sources and make sure it cannot be reconnected before working on the inverter or the battery.

WARNING

Risk of chemical burns from electrolyte or toxic gases

During normal operation, no electrolyte would leak from the battery and no toxic gases would form. Despite careful construction, if the battery is damaged or a fault occurs, it is possible that electrolyte may leak or toxic gases may form. To avoid this danger:

- Store the battery in a cool and dry place.
- Do not drop the battery or expose it to sharp objects.
- Protect the battery from mechanical damage from vehicles, tools and other objects.
- Only set the battery down on its back or its base.
- Do not open the battery.
- Do not install or operate the battery in potentially explosive atmosphere or areas of high humidity.
- If moisture has penetrated the battery (e.g. due to a damaged housing), do not install or operate the battery.
- In case of contact with electrolyte, rinse the affected areas immediately with water

and seek medical attention without delay.

WARNING

Danger to life due to burns caused by electric arcs through short-circuit currents

Short-circuit currents in the battery can cause heat build-up and electric arcs. Heat build-up and electric arcs may result in lethal injuries due to burns. To avoid this danger:

- Disconnect the battery from all voltage sources before performing any work on it.
- Observe all safety information of this document.

CAUTION

Risk of burns from the inverter's hot surface

The surface of the inverter can get extremely hot during operation, and touching it can result in burns. To avoid this danger:

- Correctly mount the inverter so that it cannot be inadvertently touched.
- Do not touch hot surfaces.
- Wait for 30 minutes for surfaces to cool down after switching the system off.
- Observe the safety messages on the inverter.
- During operation, don't touch any parts other than the display panel of the inverter.

CAUTION

Risk of injury due to weight of the inverter and battery

Injuries may be caused if the product is lifted incorrectly or dropped while being transported or mounted. To avoid this danger:

- Transport and lift the product carefully. Take the weight of the product into account. Use lifting and conveyance aids such as lifting trolleys wherever possible.
- Wear suitable personal protective equipment for all work on the product.

NOTICE

Damage to the inverter and battery due to electrostatic discharge

Touching electronic components can result in electrostatic discharge, which can damage or destroy the inverter and battery. To avoid this:

- Ground yourself before touching any component.

NOTICE

Damage due to cleaning agents or inappropriate cleaning methods

The use of cleaning agents may cause damage to the product and its components. To avoid this:

- Clean the product and all its components only with a cloth moistened with clear water.
- Never clean the unit with a hose or with the use of a water jet.

2.4. Symbols Explanation

Symbol	Explanation
	**Beware of a danger zone** This symbol indicates that the product must be additionally grounded if additional grounding or equipotential bonding is required at the installation site.
	**Beware of electrical voltage** The product operates at high voltages.
	**Beware of hot surface** The inverter can get hot during operation.
	**Danger to life due to high voltages in the inverter, observe a waiting time of 5 minutes** High voltages within the live components of the inverter that can cause lethal electric shocks.Prior to performing any work on the inverter, disconnect it from all voltage sources as described in this document.
	**WEEE designation** Do not dispose of the product together with the household waste but in accordance with the disposal regulations for electronic waste applicable at the installation site.
	**Observe the documentations** Observe all documentations supplied with the product.
	**CE marking** The product complies with the requirements of the applicable EU directives.

	RCM (Regulatory Compliance Mark) The product complies with the requirements of the applicable Australian standards.
UK CA	**UKCA marking** The product complies with the regulations of the applicable laws of England,Wales and Scotland.

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

Symbol	Explanation
	**Beware of a danger zone** This symbol indicates that the battery 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.
	**Corrosive substances warning** The product contains corrosive substances that can cause severe injury if they come into direct contact with the skin.
	**Potentially explosive substances warning** Improper handling or fire can cause the product to ignite or explode.
	**Warning of hazards from batteries** This symbol indicates the danger of handling batteries.
	**Observe the documentations** Observe all documentations supplied with the product.
	**Refer to the instruction for operation** Observe all documentations supplied with the product.
	**Use eye protection** Wear eye protection for all work on the device.

	**No open flame** Handling an open flame and sources of ignition is forbidden in the immediate vicinity of the product.
	**Access is prohibited for all children** Children must be kept at a safe distance from the product.
	**Do not short circuit the battery.** Touching the short-circuit connection of the battery can result in serious injuries or even death due to electric shock and massive energy release.
	**WEEE designation** Do not dispose of the battery together with the household waste but in accordance with the disposal regulations for electronic waste applicable at the installation site.
	**CE marking** The product complies with the requirements of the applicable EU directives.
	**RCM (Regulatory Compliance Mark)** The product complies with the requirements of the applicable Australian standards.
	**UKCA marking** The product complies with the regulations of the applicable laws of England,Wales and Scotland.
UN38.3	**Marking for transport of dangerous goods** The product passes the certifications of the UN38.3.

3. Product Introduction and Application Scenarios

3.1. Naming Convention

SMILE-G3-T20



1 2 3

Location	Name	Explanation
1	SMILE	Residential energy storage system
2	G3	3rd Generation of SMILE series
3	T15	**15** kW Inverter with Solar Connections – Three-phase Hybrid energy storage system
	T20	**20** kW Inverter with Solar Connections –Three-phase Hybrid energy storage system

Complete designation	Designation in this document
SMILE-G3-T15-INV SMILE-G3-T20-INV	Energy storage inverter
SMILE-G3-BAT-4.5S SMILE-G3-BAT-9.3S	Series battery/ Battery
SMILE-G3-T15 SMILE-G3-T20	Energy storage system/ System

3.2. System Introduction

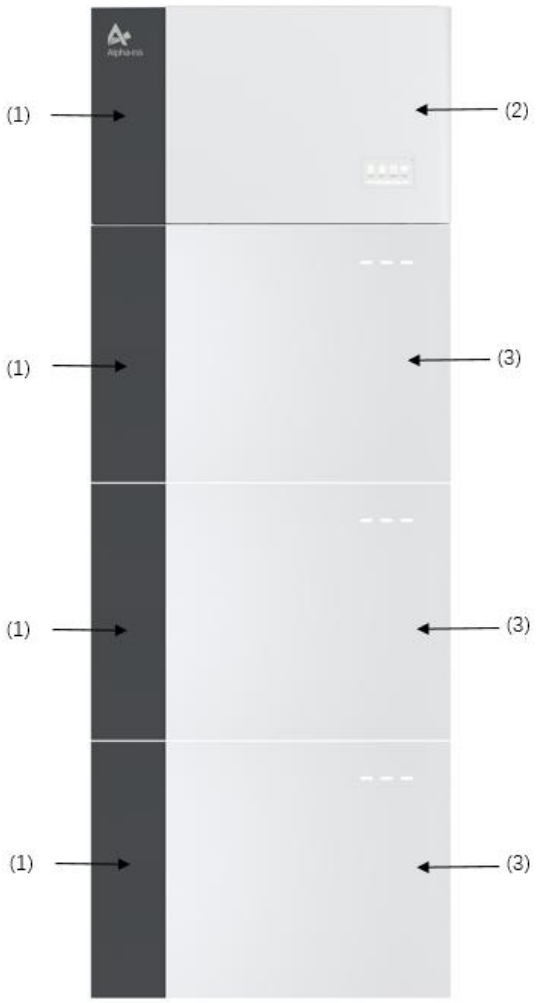


Figure 3-1 System product diagram

Object	Name	Explanation
1	Cable Cover	Covers for the left wiring area (There are two types of covers, one for the Battery Module(s) wiring and a second for the Inverter connections.)
2	SMILE-G3-T15-INV SMILE-G3-T20-INV	Product ontology of energy storage inverter
3	SMILE-G3-BAT-4.5S SMILE-G3-BAT-9.3S	Product ontology of series battery

3.3. Product Description

3.3.1. Inverter Electrical Interface & Connections Introduction

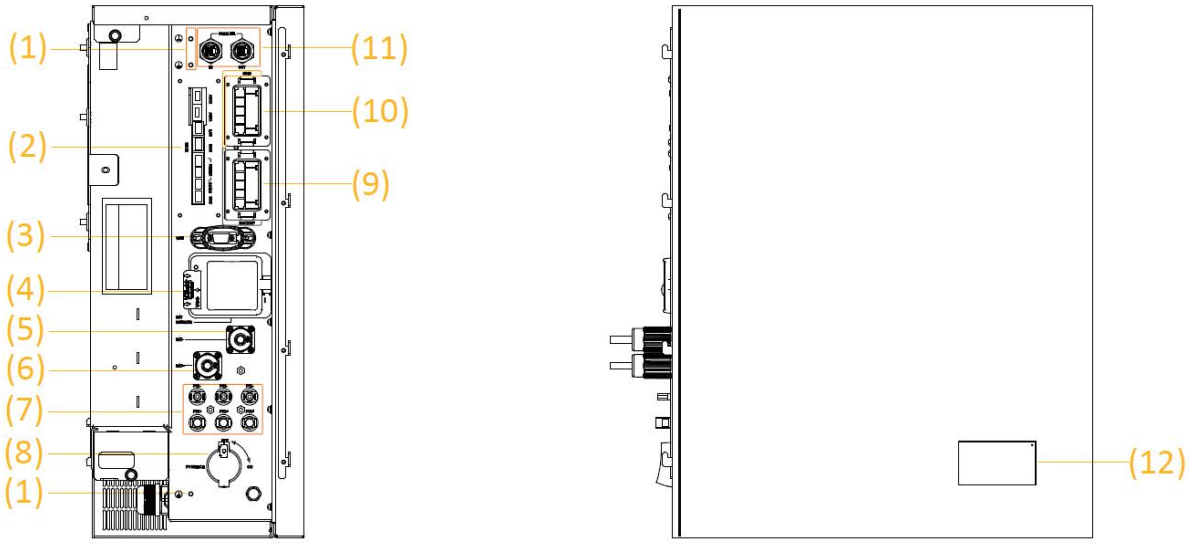


Figure 3-2 Inverter electrical interface diagram

Position	Designation
1	Grounding Points
2	Communication Ports
3	Wi-Fi Port
4	Battery Circuit Breaker*
5	Battery Negative Connector
6	Battery Positive Connector
7	Positive and Negative PV Connectors, PV1/ PV2, PV3
8	PV Switch*
9	Backup Connector
10	Grid Connector (AC Supply)
11	Parallel Communication Ports (Reserve)
12	LED Display

* Battery breaker and PV switch of the inverter are switched off when shipped.

3.3.2. Inverter Display Interface Introduction

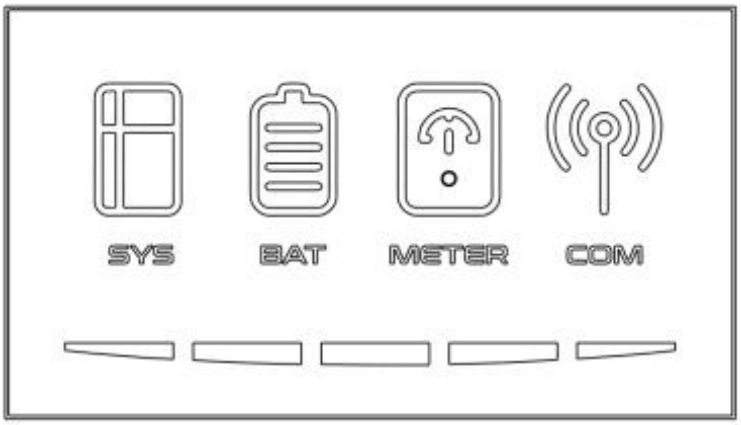


Figure 3-3 LED display

These LED indicators provide information about the operation status of the energy storage system.

Status	Explanation	Status	Explanation
SYS	**White light** The system works normally	BAT	**White light** The battery works normally
SYS	**Red light** The system is in fault	BAT	**No light** The battery is in fault
METER	**White light** Meter communication works normally	COM	**White light** Connected to the server
METER	**No light** Meter lost	COM	**No light** Disconnected to the server

The lower five LED indicators provide information about the State of Charge (SOC) of the batteries connected to this energy storage system.

LED Indicator	SOC	Description
LEDs show the SOC of batteries	▬ ▬ ▬ ▬ ▬	SOC＜5%
	▭ ▬ ▬ ▬ ▬	5%≤SOC＜20%
	▭ ▭ ▬ ▬ ▬	20%≤SOC＜40%
	▭ ▭ ▭ ▬ ▬	40%≤SOC＜60%

		60%≤SOC＜80%
		80%≤SOC≤100%

Note that the LED lights provide an approximation of the State of Charge and should be read as an indication and not as a set value.

3.3.3. Battery Display Interface Introduction

During normal operation of battery, three LED indicators on the front cover provide information the State of Charge (SOC) of the battery with white lights glowing and off or flashing (0.5S on, 1.5S off).

LED Indicator	No.	SOC	Description
LEDs show the SOC status	1		SOC≤10%
	2		10%＜SOC≤30%
	3		30%＜SOC≤50%
	4		50%＜SOC≤60%
	5		60%＜SOC≤90%
	6		90%＜SOC≤100%

State Display
The LEDs indicate the operating state of the product.
Standby: All white LEDs are flashing (0.5s on and 0.5s off).
Normal: White LEDs are glowing or flashing (0.5s on and 1.5s off).
Protection: Yellow LEDs are glowing or flashing (0.5s on and 0.5s off).
Error: Yellow LEDs are glowing or flashing (0.5s on and 0.5s off).
Shutdown: All LEDs are off.

3.3.4. Battery Introduction of SMILE-G3-BAT-4.5S

Battery appearance and dimensions

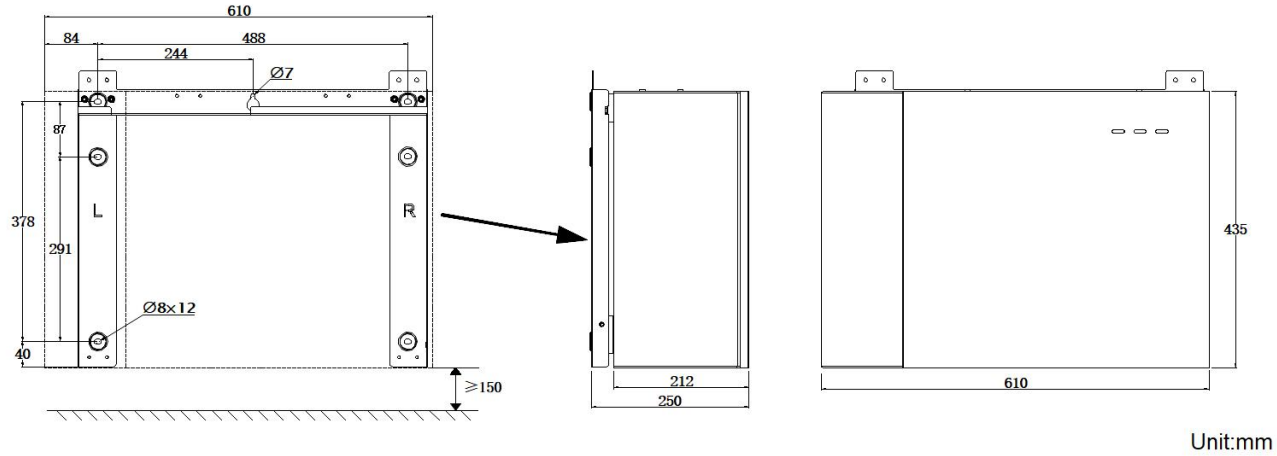


Figure 3-4 Battery appearance and dimensions

Connection area overview

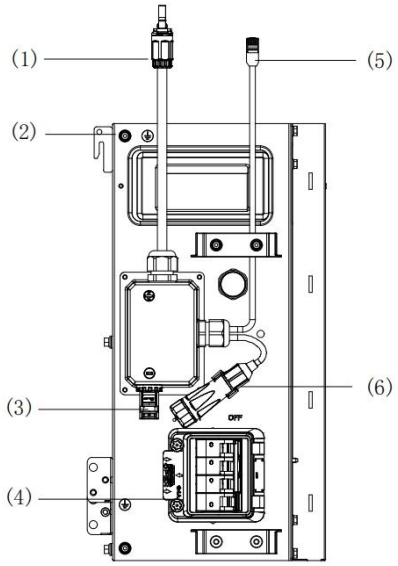


Figure 3-5 Connection area overview

Position	Designation
1	Battery Positive Cable Connector
2	Grounding Point
3	Battery Negative Cable Connector
4	Battery Circuit Breaker
5	BMS COM1
6	BMS COM2 (with Termination Resistor)
7	LED Display

3.3.5. Battery Introduction of SMILE-G3-BAT-9.3S

Battery appearance and dimensions

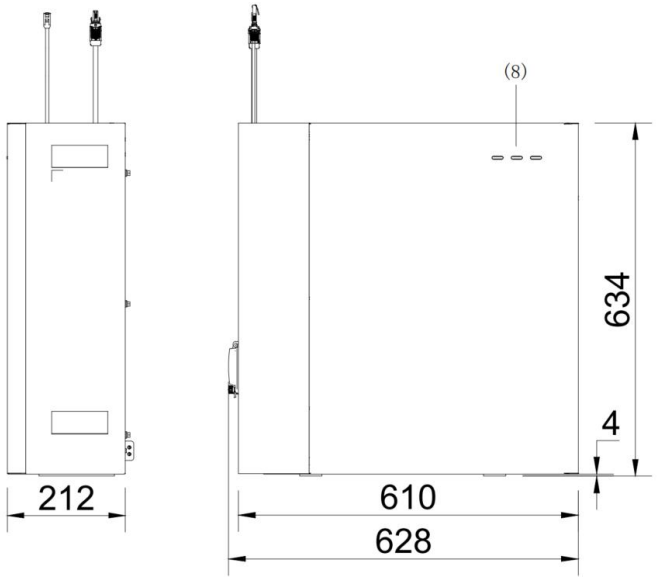


Figure 3-6 Battery appearance and size diagram

Connection area overview

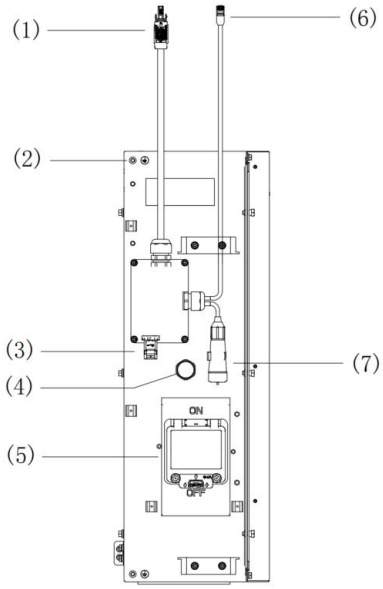


Figure 3-7 Battery connection area diagram

Position	Designation
1	BAT Positive Power Connector
2	Grounding Point
3	BAT Negative Power Connector
4	Explosion-proof Valve
5	Battery Circuit Breaker
6	BMS COM1

7	BMS COM2 (with Termination Resistor)
8	LED Display

3.4. Application Scenarios

SMILE-G3 three phase system (includes inverter SMILE-G3-T15/T20-INV, battery SMILE-G3-BAT-4.5S/9.3S) can be connected as a DC-Coupled systems (mostly new installation), AC-Coupled systems (mostly retrofit), Hybrid-Coupled systems (mostly retrofit, and increase the PV capacity), and Off-Grid (under development) systems as shown in the following diagrams:

3.4.1. DC-Coupled Energy Storage System

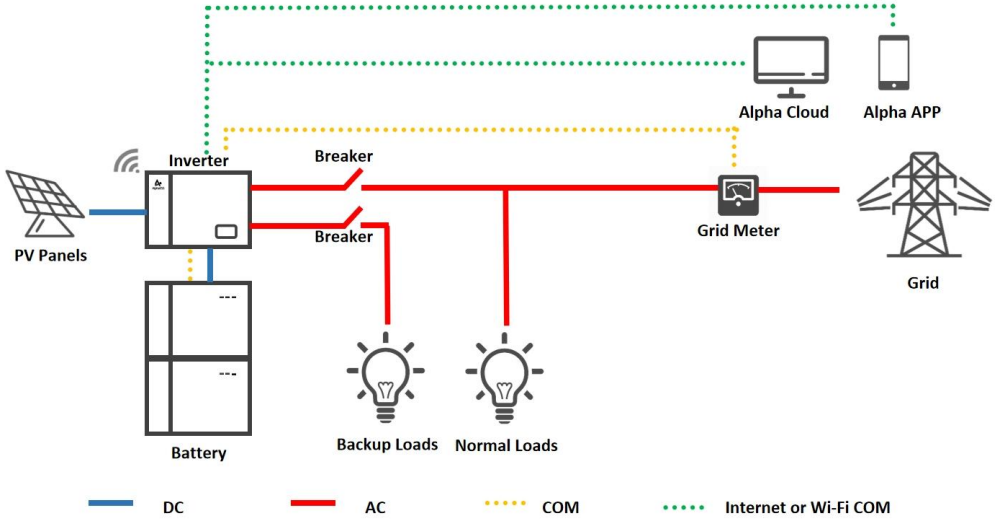


Figure 3-8 DC-Coupled Storage System – Scheme

3.4.2. AC-Coupled Energy Storage System

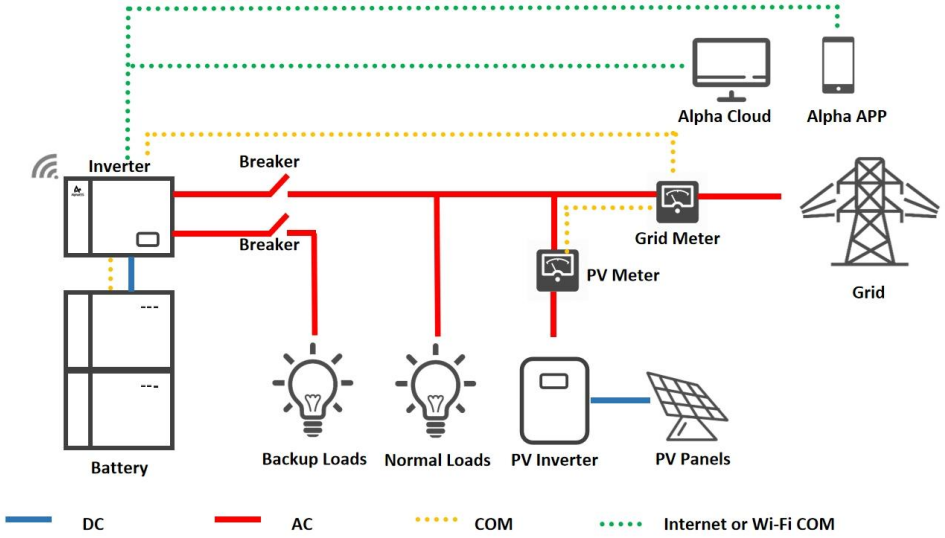


Figure 3-9 AC-Coupled Storage System – Scheme

3.4.3. Hybrid-Coupled Energy Storage System

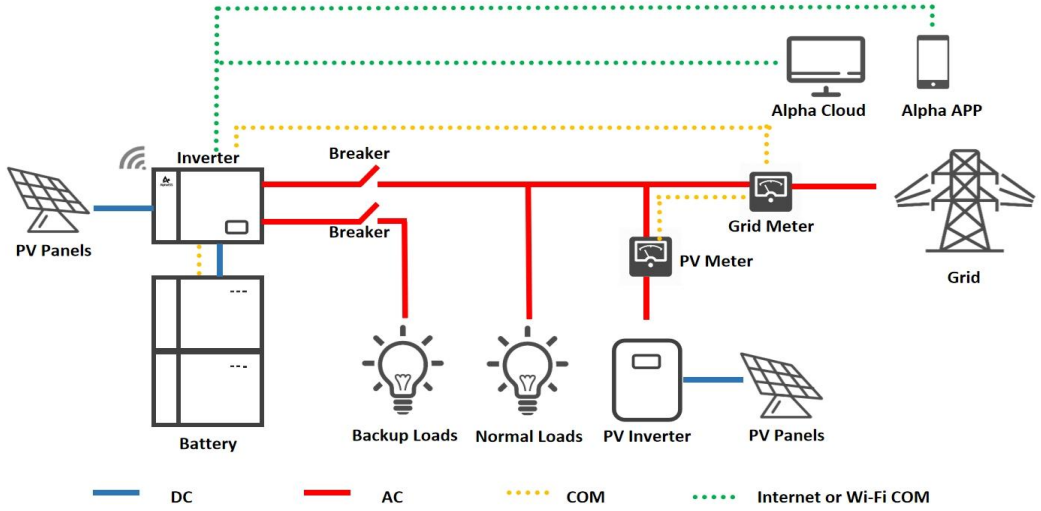


Figure 3-10 Hybrid-Coupled Storage System – Scheme

3.4.4. Off-Grid Energy Storage System

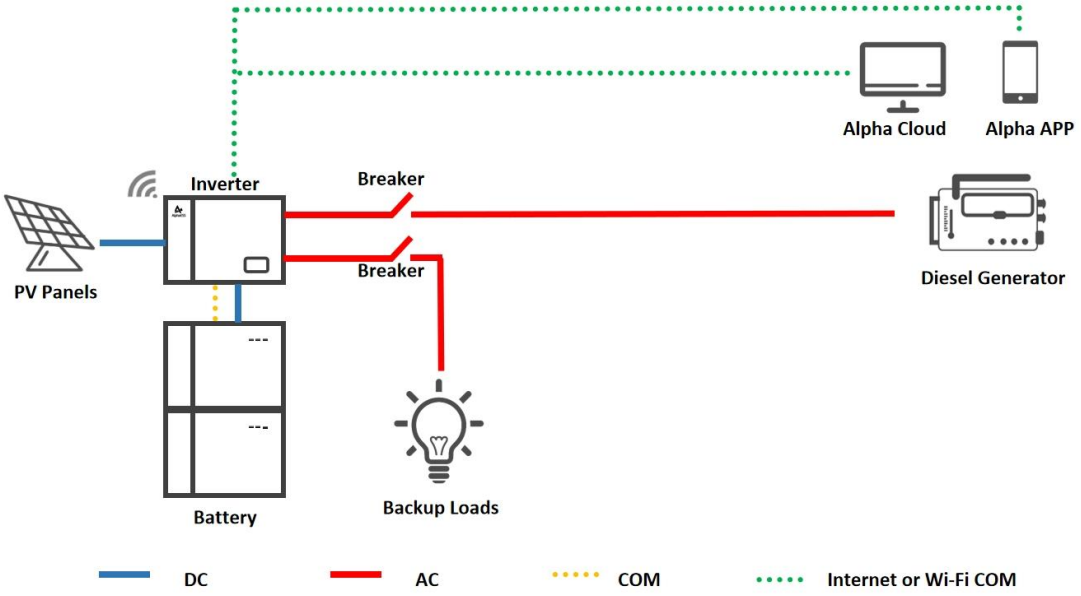


Figure 3-11 Off-Grid (with Generator) Storage System – Scheme

NOTES:

1. In all cases, Normal Loads and Essential Loads must be appropriately protected by earth fault protection devices (e.g. Type A or Type B RCDs, RCBOs) in accordance with appropriate Standards.
2. Backup/Essential Loads should not exceed the rated capacity of the inverter, even during on-grid operation.

4. Storage and Transport

4.1. Storage

4.1.1. Inverter Storage

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

1. Do not unpack the inverter.
2. Keep the storage temperature at -40~60°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 four 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. Replace any damaged packaging promptly.
6. The inverters stored for more than 2 years should be inspected and tested before being put into service.

4.1.2. Battery Storage

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

1. Place batteries according to the signs on the carton during storage.
2. Stack battery cartons in accordance with the stacking requirements printed on the external carton.
3. Store the battery out of reach of children and animals.
4. Store the battery in an area where there is minimal dust and dirt.
5. Handle batteries with care to avoid damage.
6. The requirements for the storage environment are as follows:

(1) Ambient temperature: -10~55°C, recommended storage temperature: 15~30°C

(2) Relative humidity: 15%~85%

(3) Place batteries in a dry, clean, ventilated location free from dust.

(4) Store batteries in a place that is away from corrosive organic solvents and gases.

(5) Keep batteries away from direct sunlight.

(6) Keep batteries at least 2 meters away from heat sources.

7. The batteries in storage must be disconnected from external devices and the indicators (if any) on the batteries should be off.
8. Warehoused batteries should be delivered based on the "first in, first out" stock control.

9. The warehouse keeper should collect battery storage information every month and report to the planning department. Batteries stored for more than 6 months should be assessed and charged periodically.
10. Capacity loss may occur if a lithium battery is stored for a long time. After a lithium battery is stored for 12 months in the recommended storage temperature, the irreversible capacity loss rate is 3%~10%. It is recommended that batteries not be stored for a long period. If the batteries need to be stored for more than 6 months, it is recommended to recharge the batteries to 65~75% of the SOC.

4.2. Transport

During transportation, please follow these guidelines:

1. Use the original packaging for transportation. If the original packaging is not available, place the product inside a suitable cardboard box with adequate protection and seal the carton.
2. Handle with care, choose the corresponding handling method according to the weight, and pay attention to safety. Mechanical aids should always be used in preference to lifting by hand.

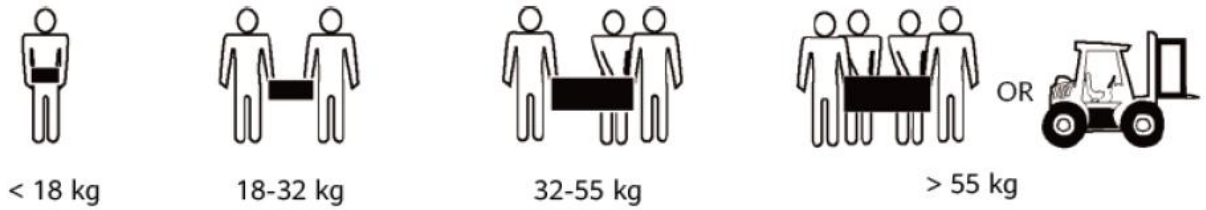


Figure 4-1 Handling methods for batteries of different weights

3. Keep the packaging dry and away from potential sources of damage during transportation.
4. Secure the Product during transportation to prevent falling or mechanical impact.

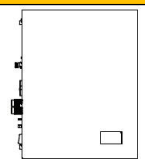
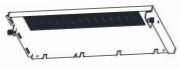
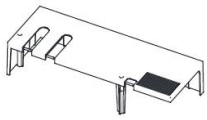
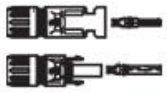
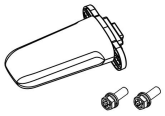
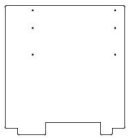
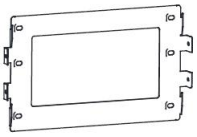
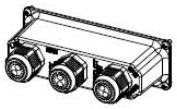
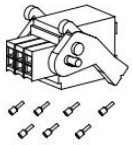
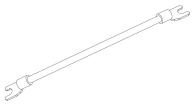
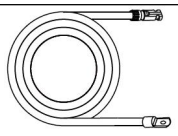
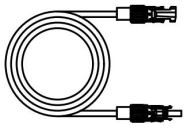
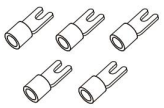
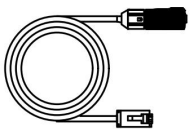
5. Mounting

5.1. Checking the Outer Packing

Before unpacking the product, check the outer packaging for damage, such as holes, signs of mechanical damage or water damage. If any damage is found, do not unpack the product and contact your dealer as soon as possible.

5.2. Scope of Delivery

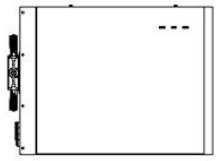
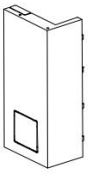
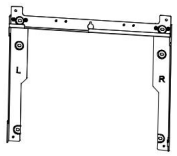
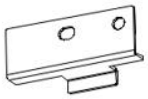
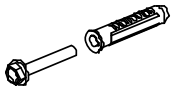
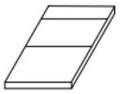
Check the scope of delivery and inspect components to ensure they are present and undamaged.
Contact your distributor if the packed components are incomplete or damaged.

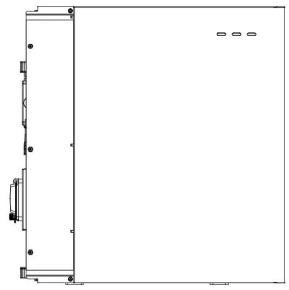
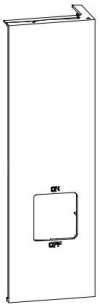
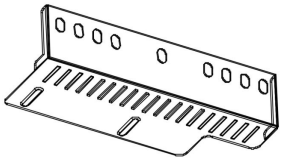
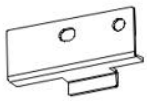
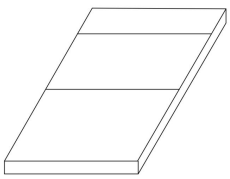
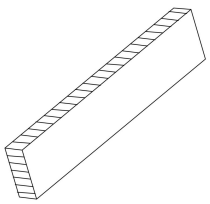
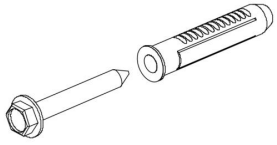
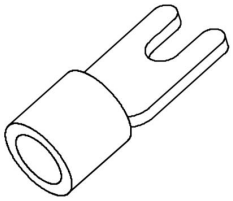
SMILE-G3 Three Phase Inverter				
				
Inverter (X1)	TOP Cover (X1)	Right Cover (X1)	Cable Cover (X1)	PV+&PV- Connectors (X3)
				
Grid Connectors (X1)	Backup Connectors (X1)	Screw M5*12 (X3)	Wall Anchor (X6)	Wi-Fi Module (X1)
				
Positioning Plate (X1)	Wall Bracket (X1)	COM Connection Cover (X1)	AUX Terminal Block (X2)	Grounding Cable Between INV and 1st Battery (X1)
				
Battery COM Cable Between INV and 1st Series Battery * (X1)	Series Batteries Main Positive Power Cable* (X1)	Series Batteries Main Negative Power Cable* (X1)	Power Cable Between Two Column Series Batteries* (X1)	Grounding Terminals (X5)
				
COM Cable Between Two Column Series	PV&BAT Connector Disassembling Tool (X1)	Parallel Connector (X2, optional)	Documents (X1)	

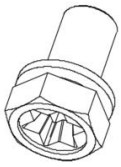
Batteries* (X1)				

Contact your distributor if the packed components are incomplete or damaged.

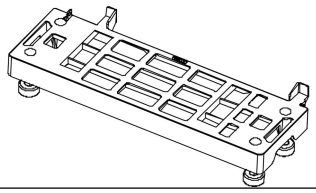
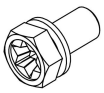
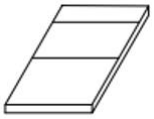
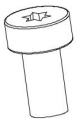
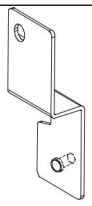
* Optional, used when working with series batteries

SMILE-G3-BAT-4.5S			
			
Battery (×1)	Battery Cable Cover (×1)	Wall Bracket (×1)	Grounding Bar (×1)
			
Wall Anchor ST6*55 (×6)	Hexagon Head Large Washer Screw M5*12 (×3)	Flange Nut M5 (×7)	Quick Installation Guide (×1)

SMILE-G3-BAT-9.3S			
			
Battery (×1)	Battery Cable Cover (×1)	Top Bracket (×1)	Grounding Bar (×1)
			
Quick Installation Guide (×1)	Limit Cardboard (×1)	Wall Anchor ST6*55 (×4)	M5 Grounding Terminal (×2)

			
BAT Connector Disassembling Tool (× 1)	Hexagon Head Screw M5*12 (× 4)	Countersunk Head Sc rew M5 * 8 (×2)	

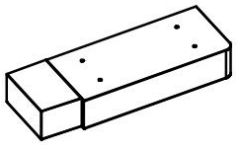
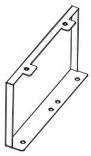
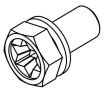
* For batteries top connection during batteries forward expansion mounting.
** Connect to SMILE-G3 single phase inverter with M6 OT battery connection terminals. Only provide for Australia and New Zealand markets.

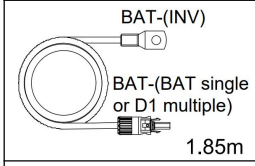
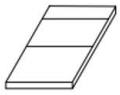
Base Unit of SMILE-G3-BAT-4.5S/9.3S			
			a 
Base Unit (×1)	Hexagon Head Screw M5*12 (×10)	Quick Installation Guide (×1)	Right Connection Plate (indoor) (×4)
b 	c 	d 	e 
Hexagon Head Limit Screw M5*10 (×9)	Top Wall Bracket (×1)	Limit block (×8)	Pan Head Screw M5*10* (×9)
f 			
Right Connection Plate (outdoor) (×4)			

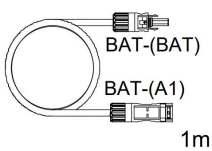
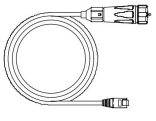
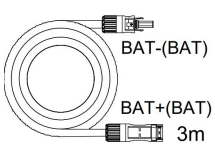
* a,b,c,d, and e are suitable for series battery installations in other models.

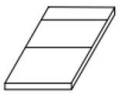
* f is for the installation of SMILE-G3-BAT-9.3S

(Optional) Top Cover Unit of SMILE-G3-BAT-9.3S

			
Top Cover (×1)	Top Cover Bracket (×2)	Hexagon Head Screw M5*12 (×5)	Countersunk Head Screw M4*8 (×5)

Cable Sets for Battery side Connection between SMILE-G3 Inverters and the first Column Batteries of SMILE-G3-BAT-9.3S			
			
Series Battery Main Negative Cable between SMILE-G3-T20/S5 Series Inverter and the first Column Batteries of SMILE-G3-BAT-4.5S/9.3S (×1)	Series Battery Main Positive Cable between SMILE-G3-T20/S5 Series Inverter and the first Column Batteries of SMILE-G3-BAT-4.5S/9.3S (×1)	M5 Y Type Terminal (×3)	BAT Connector Disassembling Tool (×1)
			
Quick Installation Guide (×1)			

Cable Sets for Distanced Horizontal Battery Expansion of SMILE-G3-BAT-9.3S			
			
Main Negative Power Extension	Communication Cable between two Column	Power Cable	M5 Y Type Terminal (×3)

Cable (×1)	Series Batteries (×1)	between two Column Series Batteries (×1)	
			
Connector removal wrench (×1)	Quick Installation Guide (×1)		

5.3. Requirements for Mounting

5.3.1. Basic Requirements

1. SMILE-G3-T15/T20-INV is suitable for indoor and outdoor installation.
2. SMILE-G3-BAT-4.5S/9.3S is suitable for indoor and outdoor installation.
3. Do not install the inverter in a place where people can easily touch it because the inverter's surface will get extremely hot during operation.
4. Do not engage screws into tapped holes using a Hammer Driver, Impact Driver or "Rattle gun". Do not damage screws or threaded holes by tightening with too much torque.

5.3.2. Mounting Environment Requirements

DANGER

Danger to life due to fire or explosion

Despite careful construction, electrical devices can cause fires.

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

1. Do not mount the ESS outdoors in areas of high salt mist likelihood where corrosion may cause damage. An area of high salt mist likelihood refers to a region within 500m from the coast or prone to the sea breeze.
2. Do not place the system near water sources such as downpipes or sprinklers.
3. The system must be mounted in a well-ventilated environment to ensure adequate heat dissipation.
4. Do not mount in a location that will be exposed to direct sunlight. Mount the system in a sheltered place or mount an awning over it. When mounted under direct sunlight,

the power of the system may be derated due to additional temperature rise and the longevity of the product will be reduced.

5. Favour locations that are indoors, under cover, or generally protected from the elements and extreme temperatures (e.g. in a garage). If the battery is mounted in the garage, ensure the product is adequately protected from potential mechanical impact.
6. The optimal temperature range for the battery to operate is 15 to 30 ℃.

5.3.3. Mounting Structure Requirements

1. The surface to which the system is to be mounted shall be fire-rated where required by local regulations.
2. Out of an abundance of caution, it is recommended that the system be mounted on non-flammable building materials, even when not required by local regulations.
3. Ensure that the mounting surface is sufficiently sturdy to bear the weight of the product.
4. In residential installation, do not mount the system on drywalls or walls made of gyprock or similar materials with poor sound insulation. The noises generated by the inverter can be noticeable and may be exacerbated by locations with poor insulation or where echoing may occur.
5. The mounting location must be suitable for the weight and dimensions of the product (see Section 5.3.5).

5.3.4. Mounting Angle and Stack Requirement

The battery should be mounted on the base unit or hanged on the wall bracket and secured to the wall.
The inverter should be hung on the top of the battery and secured to the wall.
The installation angle requirement is as follows: Do not mount the inverter at forward-tilted, side-tilted, horizontal, or inverted positions.

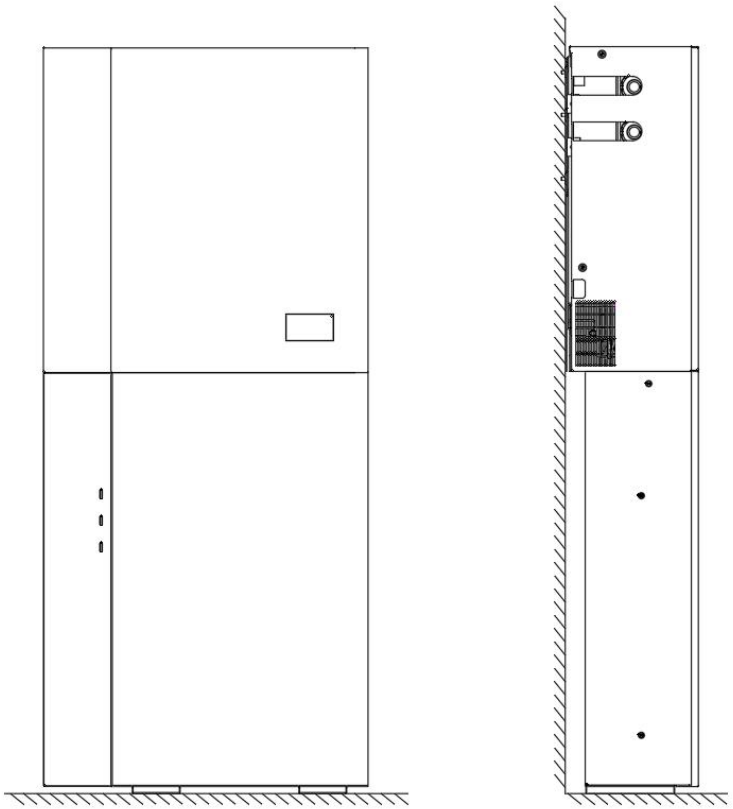


Figure 5-1 Product installation diagram

5.3.5. Mounting Space Requirements

1. Reserve sufficient space around the energy storage system to do installation, maintenance and heat dissipation.
2. Recommend a minimum of 100 mm off the ground was advisable to protect from submergence, so the series batteries should be mounted by wall brackets or base unit.
3. The side clearance is a recommendation which can be adjusted according to the end-users requirements. Clearances may be up to 100mm less than noted if ventilation is adequate and no restrictions or objects will limit access to the labelling or switches of the Product or to the use of tools to remove covers or service/remove the Product.

Recommended clearances for SMILE-G3-T15/T20 system with SMILE-G3-BAT-9.3S

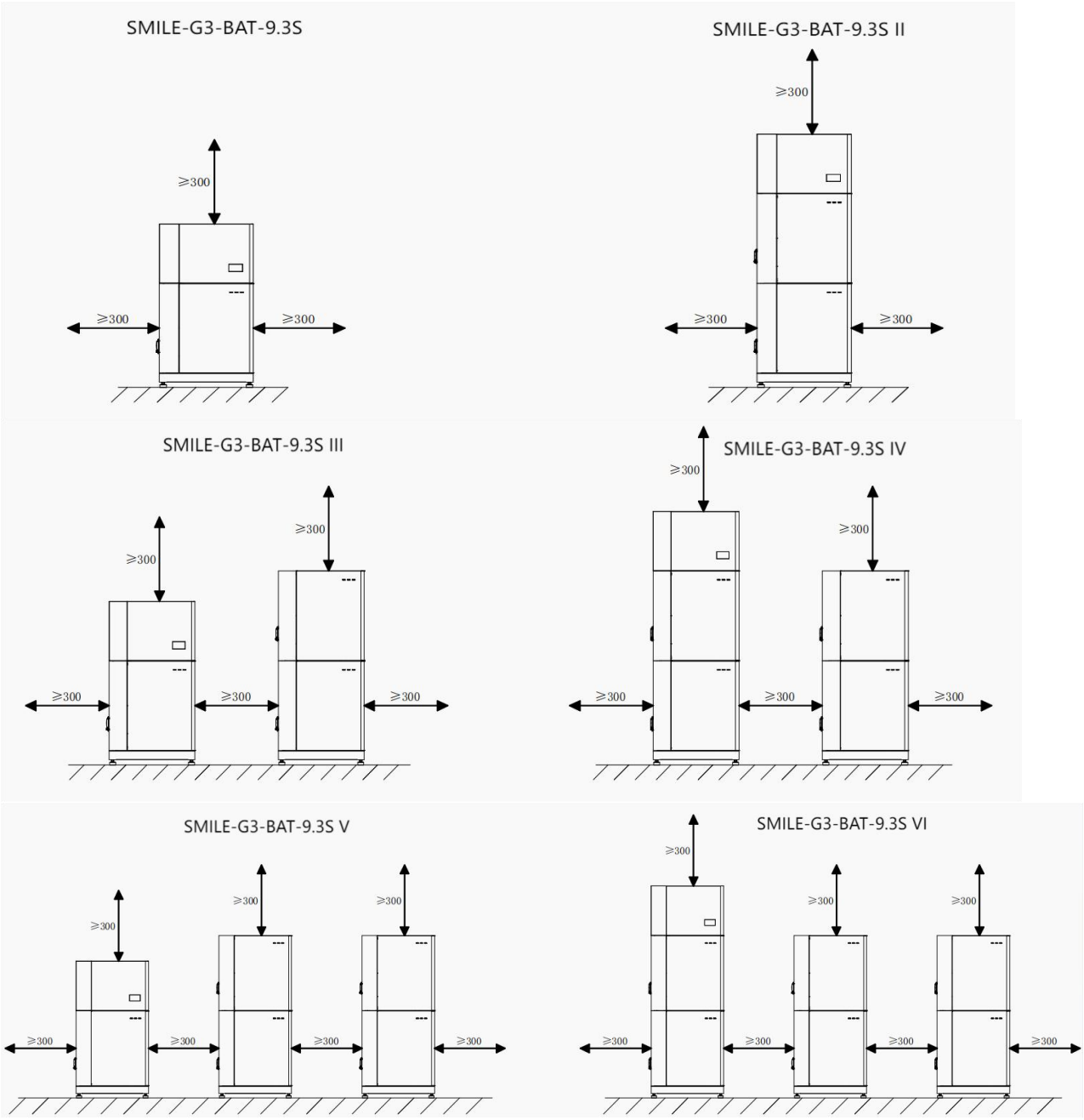
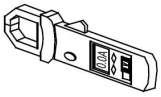
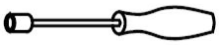
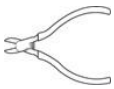
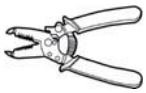
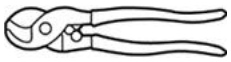
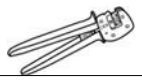
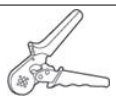


Figure 5-2 Installation space requirements

5.4. Preparing Tools and Instruments

Category	Tools and Instruments		
Installation			
	Multimeter (DC voltage range ⩾ 1000 V DC)	Current clamp	Hammer drill (with a Φ10 mm drill bit)
			
	Rubber mallet	Socket wrench SW8	Socket wrench SW8
			
	T20/PH2 screwdriver(torque range: 0~5 Nm), L=150mm	Blade width: 1.2/2.5 Flat head screwdriver	Utility knife
			
	Diagonal pliers	Wire stripper	Cable cutter
			
	Crimping tool (model: PV-CZM-22100)	Bootlace/Ferrule terminal crimper	Disassembly and assembly tool of PV connector
			
	Vacuum cleaner	Heat shrink tubing	Heat gun
			
	Marker	Measuring tape	Spirit level
Personal Protective Equipment			
	Safety gloves	Safety goggles	Anti-dust respirator
			
	Safety shoes		

5.5. Mounting the System

5.5.1. Mounting the Battery SMILE-G3-BAT-4.5S

5.5.1.1 Wall Bracket Installation for one Battery

Wall bracket installation for one battery installation, please follow the below steps.

1. Select a suitable height for the wall bracket location. Please reserve enough height if you want to add more batteries later.
2. Mark one drilling position which is used to secure the upper middle location of the wall bracket later and drill the marked hole with a Φ10 drill. Insert the screw anchor into the drill hole, and pre-tighten the wall bracket horizontally with the provided screw (tool: Socket wrench SW8, torque: 4 Nm). Retain 5~10 mm from the screw head to the wall. Refer to Figure 5-3.
3. Take out the wall bracket from the packaging and hang the wall bracket on the screw head, adjust its horizontal position, then mark the other drilling positions, drill the marked holes with a Φ10 drill and insert the screw anchors into the drill holes. Refer to 2 in Figure 5-4.
4. Secure the wall bracket to the wall (tool: Socket wrench SW8, torque: 6 Nm).Refer to 3 in Figure 5-4.
5. Horizontally lift the battery using the handles at two sides and let the top hooks on the back of the battery slide from right to left in the upper beam of the wall bracket. Refer to 4 in Figure 5-4.
6. Secure the battery to the wall bracket and tighten them with two M5*12 screws (tool: T20 screwdriver, torque: 2.5 Nm). Refer to 5 in Figure 5-4.

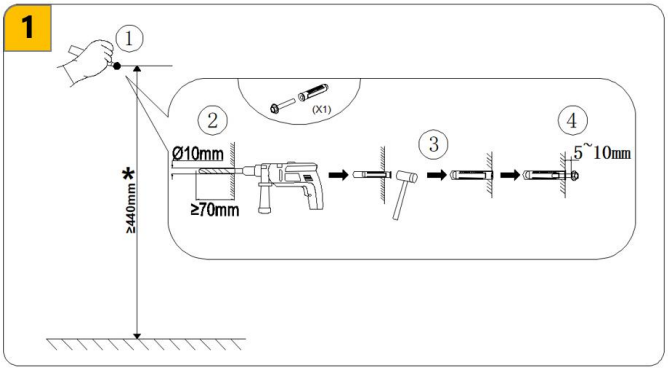


Figure 5-3 Selection of wall-mounted bracket position

* This recommended value “440 mm” is for wall bracket location of the bottom battery. Depending on the number of expansion batteries mounted later, meanwhile it is advisable to have a minimum of 100 mm off the ground to protect the system from submergence.

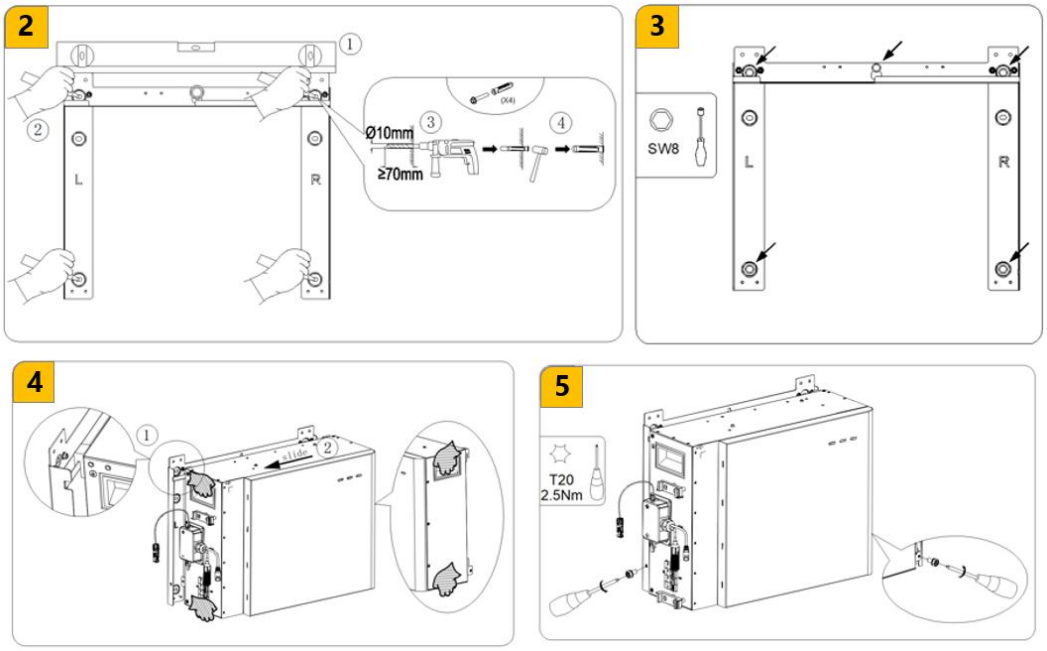


Figure 5-4 Installation diagram of a single battery wall-mounted bracket

5.5.1.2 Wall Bracket Installation for Multiple Batteries

When mounting multiple series batteries with wall brackets for the first time, please follow the below steps.

1. Take out the wall bracket from the packaging, and align the upper holes of the lower wall bracket to the lower rivets of the upper wall bracket, assemble them with M5 nuts (tool: Socket wrench SW8, torque: 2.5 Nm), and then combine several wall brackets into a whole.
2. For other mounting steps, please see Chapter 5.5.1.1 Wall Bracket Installation for one Battery Installation and follow step b to step e. Refer to 2-7 in Figure 5-5.
3. Take out the grounding bar from the packaging and use it to connect the lower left corner of the upper battery and the upper left corner of the lower battery (tool: T20 screwdriver, torque: 2.5 Nm). When doing so, unscrew the two screws before connecting the grounding bar. Refer to 8 in Figure 5-5.

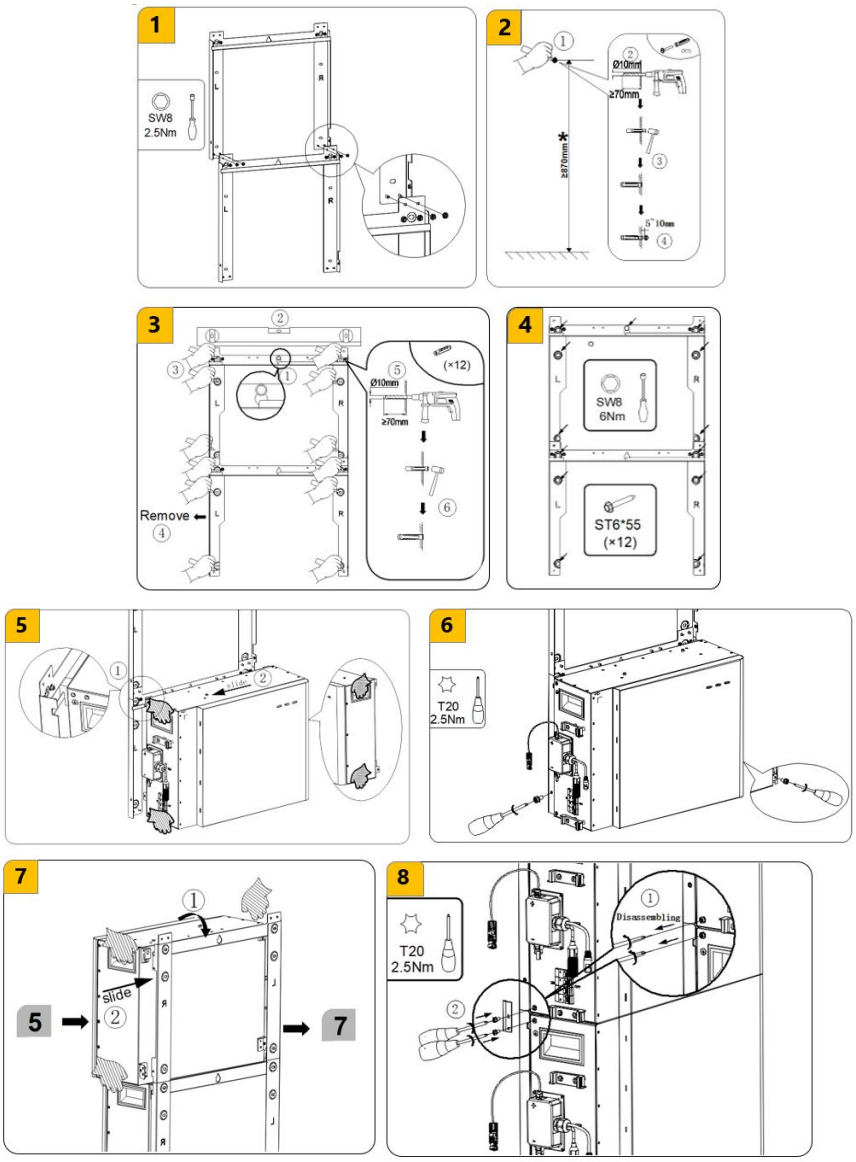


Figure 5-5 Multiple battery wall-mounted brackets are installed

5.5.1.3 Wall Bracket Installation for Batteries Expansion

For additional batteries installation, the expansion batteries should be mounted below existing batteries, please follow the below steps.

1. Assemble the upper hole of the lower bracket with the lower rivet of the upper bracket. Refer to 1 in Figure 5-6.
2. Use a marker pen do stents under punching tags, and then the new assembly under the bracket take started punching, and into the expansion screws. Refer to 3 in Figure 5-6.
3. The lower bracket and the bracket assembly together again after using screws, guarantee the hanging rack firmly fixed on the wall. Refer to 4-5 in Figure 5-6.
4. Take out the grounding bar from the packaging and use it to connect the lower left corner of the upper battery and the upper left corner of the lower battery (tool: T20 screwdriver, torque: 2.5 Nm). When doing so, unscrew the two screws before

connecting the grounding bar. Refer to 6 in Figure 5-6.

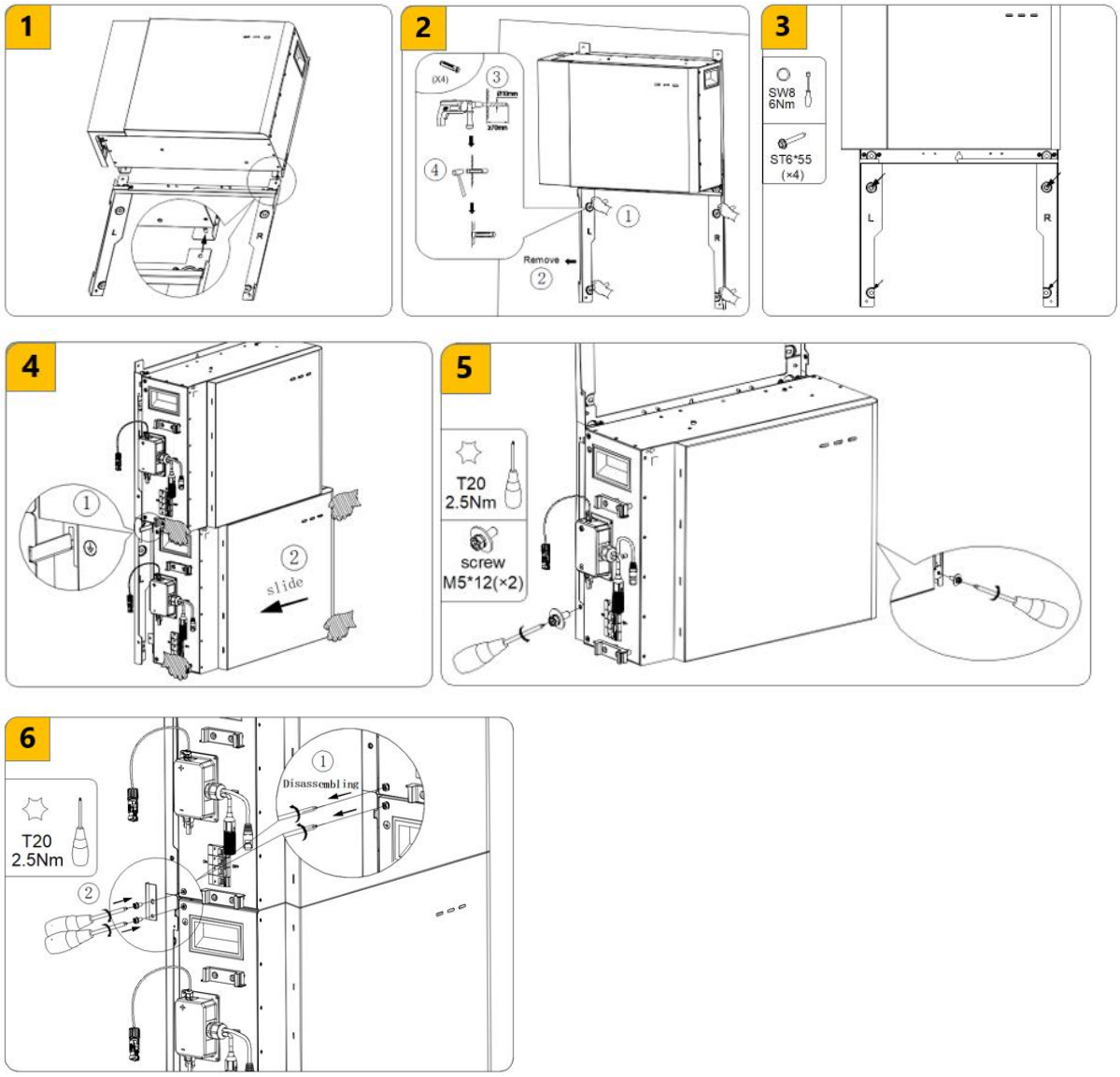


Figure 5-6 Battery expansion wall-mounted installation diagram

5.5.1.4 Wall-Mounted Battery Disassembling

CAUTION

Risk of injury due to the weight of the battery

Injuries may be caused if the product is lifted improperly or dropped while being transported or mounted. To avoid this danger:

- Transport and lift the product carefully. Take the weight (about 38.5kg) of the product into account and use lifting and conveyance aids such as lifting trolleys.
- Ensure that at least two individuals are present for mounting and disassembling the product.
- Wear suitable personal protective equipment for all work on the product.

Before disassembling the batteries, please turn off all switch, unplug the cables and disassemble the cable cover.

When disassembling a battery that has been mounted with wall bracket and is not directly connected to the inverter, always hold the handles on both sides of the battery firmly and slide it to the right. Once the arrow on the upper left of the cover aligns to the left protruding side of the upper battery, carefully lift the battery forward and off the wall bracket. Refer to Figure 5-7.

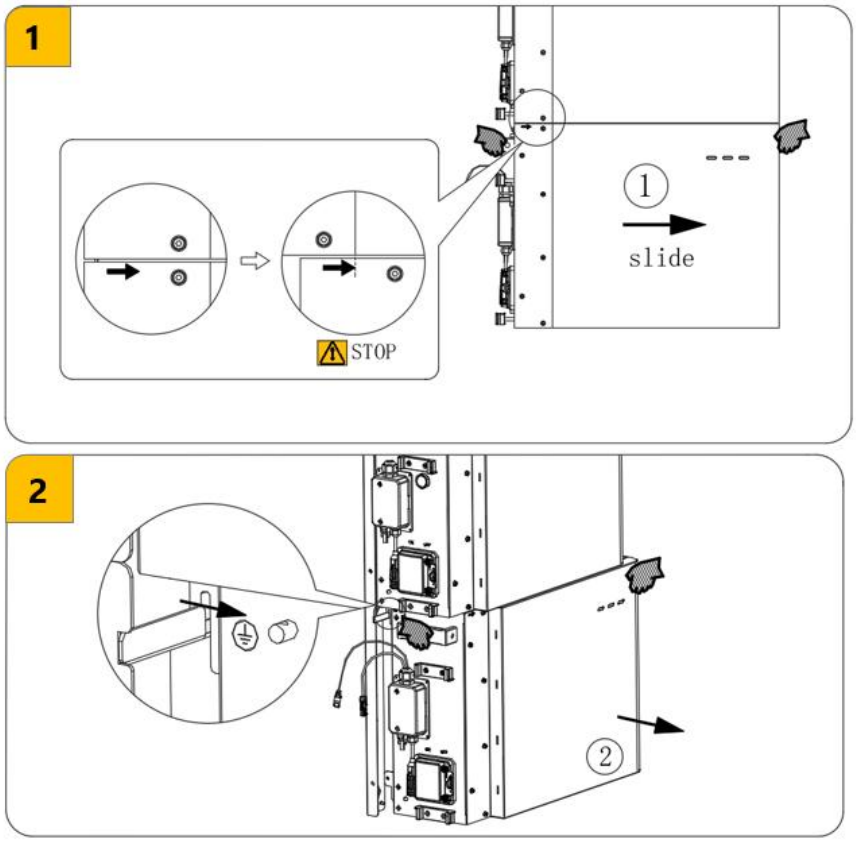


Figure 5-7 Wall-mounted battery disassembly diagram

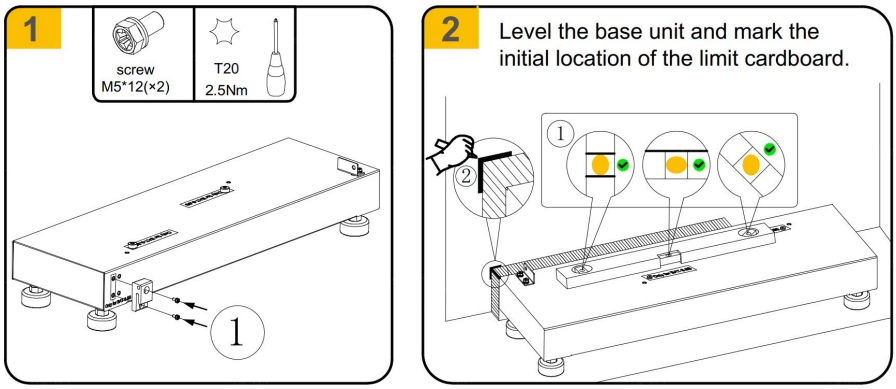
5.5.1.5 Base Unit Installation for Multiple Batteries

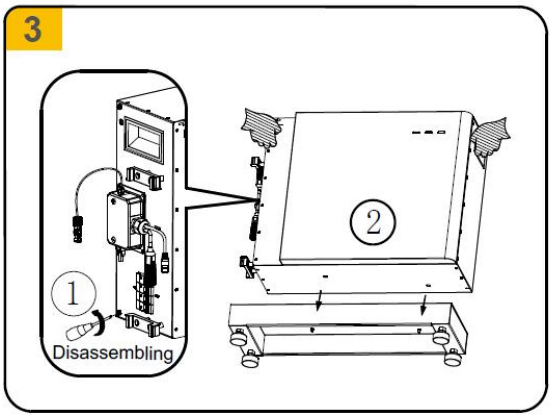
When mounting multiple series batteries with base installation for the first time, please follow the below steps.

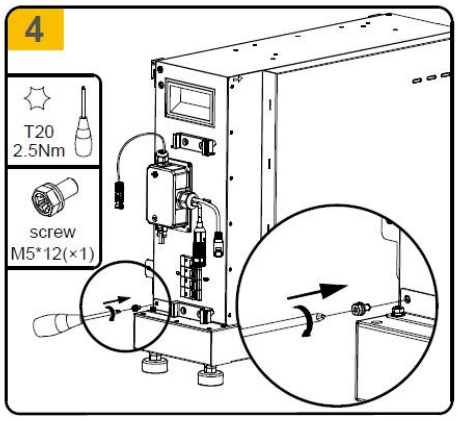
1. Take out the right connection block for battery base from the packaging and tighten it to the right side of the battery base back (tool: T20 screwdriver, torque: 2.5 Nm).
2. Take out the position plate and place it against the wall. Place the battery base against the position plate and adjust the feet to level the battery base. Refer to 1-2 in Figure 5-8.
3. Unscrew the screw at the lower left of the bottom battery. Refer to 3 in Figure 5-8.
4. Lift the battery by using the handles at two sides, align the bottom holes of the first battery to the screw heads on the top of the battery base. Secure the battery to the battery base, tighten them with one screw M5*12 from the lower left of the battery (tool: T20 screwdriver, torque: 2.5 Nm). Refer to 3-4 in Figure 5-8.
5. Take out one right connection plate from the battery base packaging, use it to

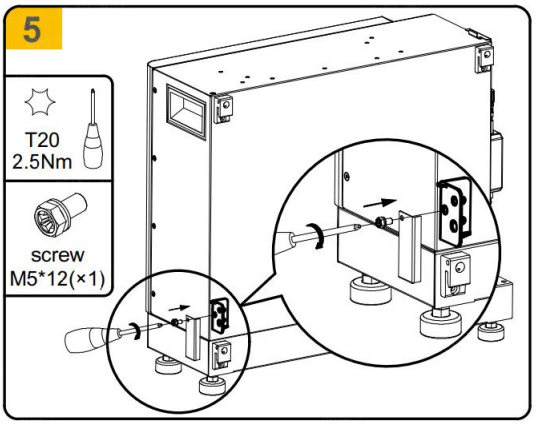
connect the lower right corner of the first battery and the upper right corner of the battery base (tool: T20 screwdriver, torque: 2.5 Nm). Refer to 5 in Figure 5-8.

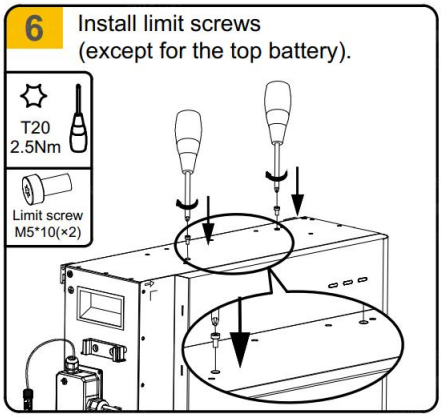
6. Take out 2 cheese head screws M5*10 and tighten them to battery top's designated location for later position limit. Refer to 6 in Figure 5-8.
7. Take out the next battery from the packaging.
8. Lift the second battery by using the handles at two sides, align the bottom holes of the second battery to the screw heads on the top of the lower battery. Refer to 7 in Figure 5-8.
9. Take out the grounding bars from the battery packaging, and use it to connect the lower left corner of the upper battery and the upper left corner of the lower battery (tool: T20 screwdriver, torque: 2.5 Nm). When doing so, unscrew the two screws before connecting the grounding bar. Refer to 8 in Figure 5-8.
10. Take out the right connection plates from the battery base packaging, use them to connect the lower right corner of the upper battery and the upper right corner of the lower battery (tool: T20 screwdriver, torque: 2.5 Nm). Refer to 9 in Figure 5-8.
11. Take out 2 cheese head screws M5*10, and tighten them to battery top's designated location for later position limit. Continue mounting more batteries by repeating step. Refer to 10 in Figure 5-8.
12. Pre-mount the top wall bracket to the upper battery top and mark drilling positions. Refer to 11 in Figure 5-8.
13. Remove the top wall bracket and cover the top of the battery with a plastic bag. Then, drill 3 holes in the wall with a Φ10 drill to a depth of about 70 mm and clean the holes and insert screw anchors into the drill holes. Refer to 12 in Figure 5-8.
14. After removing the plastic bag, tighten the top wall bracket to the top of the battery (tool: T20 screwdriver, torque: 2.5Nm). Refer to 13 in Figure 5-8.
15. Secure the top wall bracket to the wall with the provided screws (tool: Socket wrench SW8, torque: 6 Nm). Refer to 14 in Figure 5-8.

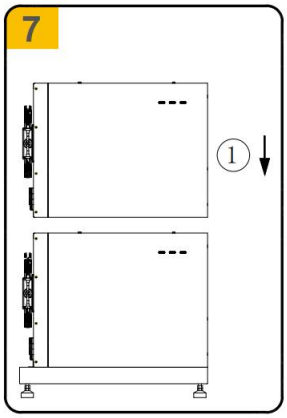


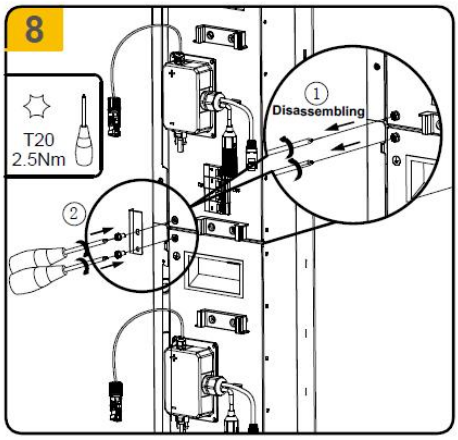


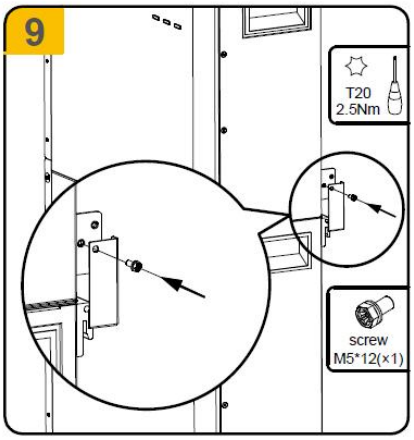


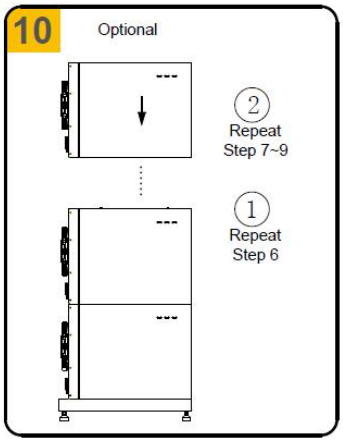








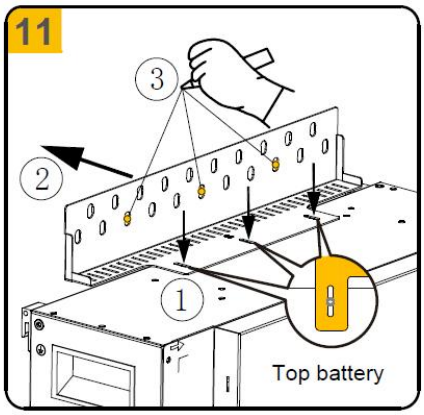


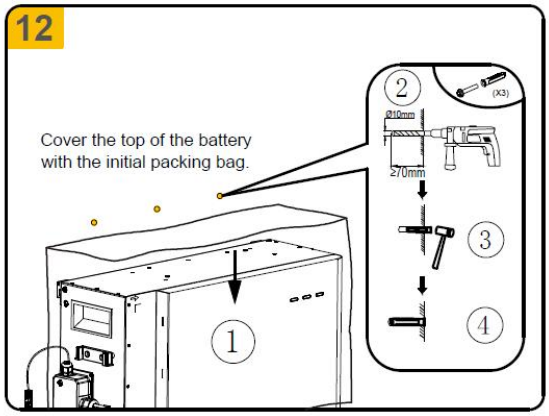


NOTE

Please adjust the battery bodies if two batteries are not aligned perfectly.

Recommend to stack Max. 4 batteries in a single column





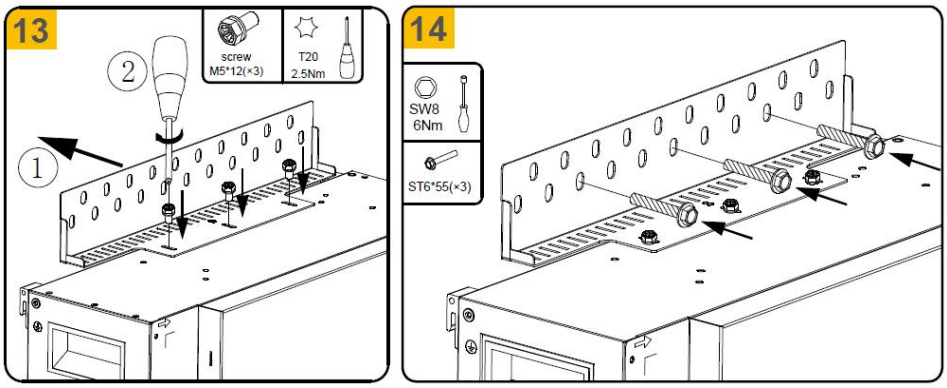


Figure 5-8 Mounting multiple series batteries with base unit

5.5.2. Mounting the Battery SMILE-G3-BAT-9.3S

5.5.2.1 Mounting the Battery with Base Unit

When mounting multiple series batteries SMILE-G3-BAT-9.3S with base unit, please follow the below steps.

1. Take out the base unit, place it on the floor, and level it using a spirit level. Refer to 1 in Figure 5-9.
2. Release the base unit clip and place the first battery onto the base unit. Refer to 2 in Figure 5-9.
3. Tighten the M5 screw into the limit hole. (tool: T20 screwdriver, torque: 2.5 Nm). Refer to 3 in Figure 5-9.
4. Tighten the base unit to the battery using the connection plate. (tool: T20 screwdriver, torque: 2.5 Nm). Refer to 4 in Figure 5-9.
5. Position the wall bracket at the top of the battery, aligning it with the battery's mounting holes. Mark the contact points against the wall using a marker pen. Refer to 5 in Figure 5-9.
6. Cover the top of the battery with the packaging bag. Using a hammer drill, bore holes along the previously marked positions on the wall. Drive the expansion plugs into the holes using a hammer, then remove the packaging bag. Refer to 6 in Figure 5-9.
7. Secure the wall bracket and the top of the battery using M5 screws. (tool: T20 screwdriver, torque: 2.5 Nm). Refer to 7 in Figure 5-9.
8. Screw the ST6 into the expansion nut. (tool: SW8, torque: 6 Nm). Refer to 8 in Figure 5-9.
9. Place the second battery on top of the first battery, ensuring the battery switch is closed. Refer to 9 in Figure 5-9.

10. Secure the grounding bar between the two batteries. (tool: T20 screwdriver, torque: 2.5 Nm). Refer to 10 in Figure 5-9.

11. Repeat steps 5 to 8 to complete the installation of two batteries.

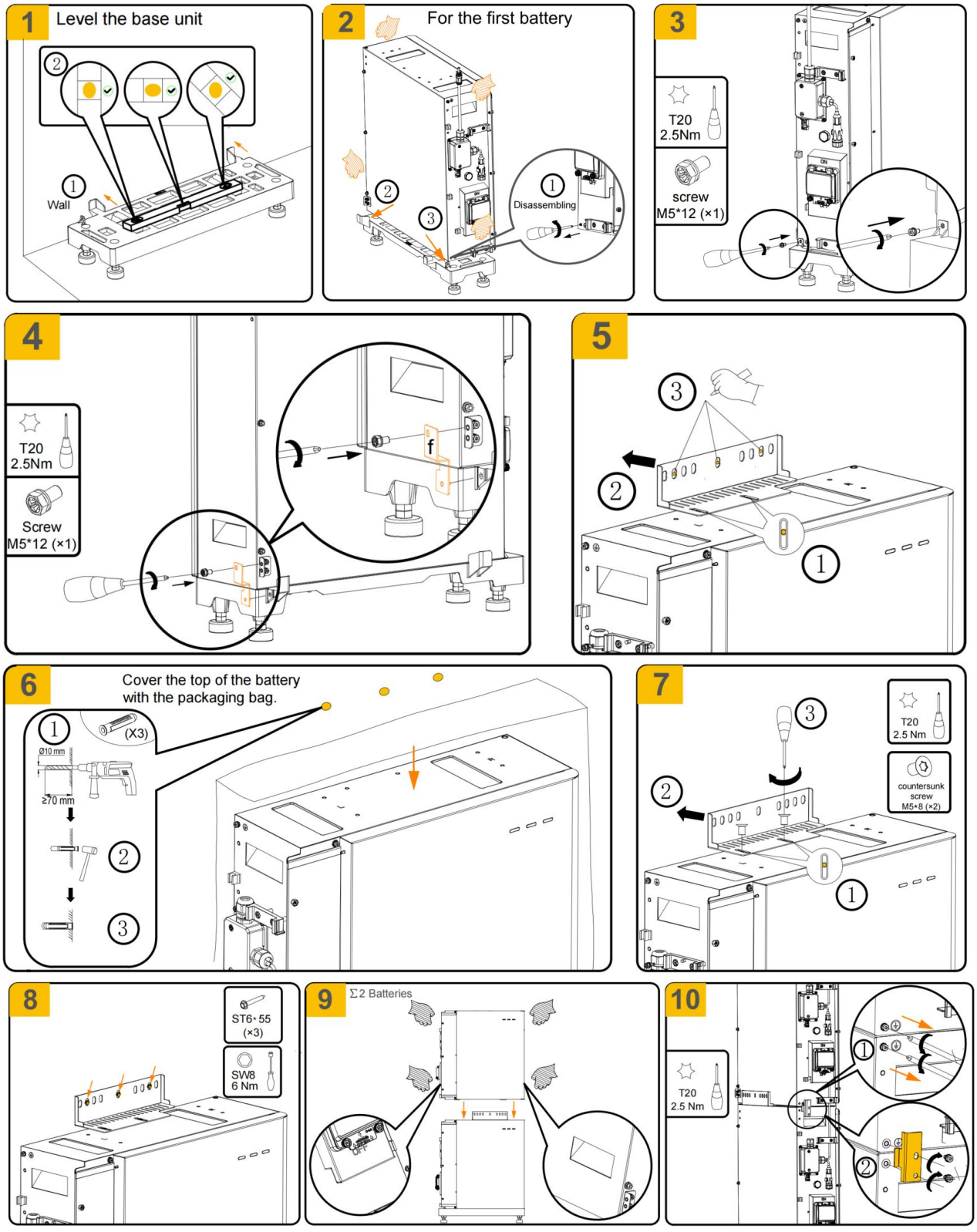
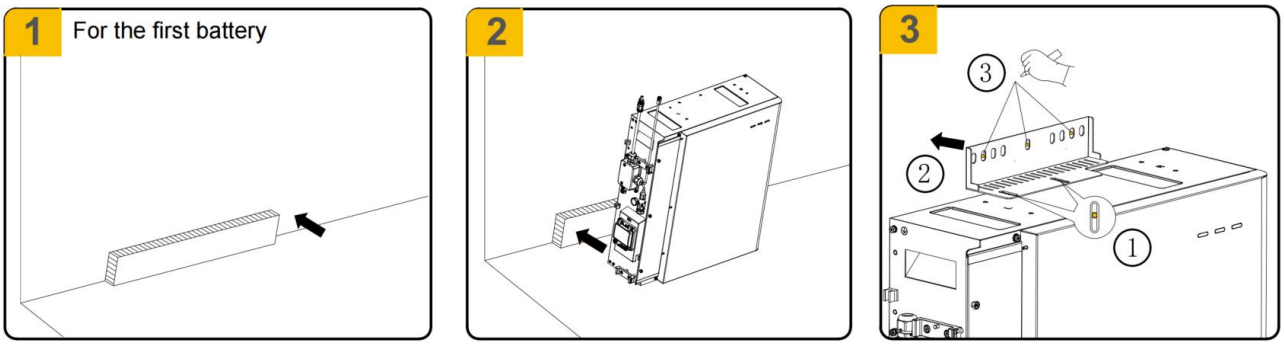


Figure 5-9 Battery Base Installation Steps Diagram

5.5.2.2 Mounting the Battery without Base Unit

When mounting multiple series batteries SMILE-G3-BAT-9.3S without base unit, please follow the below steps.

1. Take out the limit cardboard, place horizontally against the wall. Refer to 1 in Figure 5-10.
2. Attach the battery tightly to the limit cardboard. Refer to 2 in Figure 5-10.
3. Position the wall bracket at the top of the battery, aligning it with the battery's mounting holes. Mark the contact points against the wall using a marker pen. Refer to 3 in Figure 5-10.
4. Cover the top of the battery with the packaging bag. Using a hammer drill, bore holes along the previously marked positions on the wall. Drive the expansion plugs into the holes using a hammer, then remove the packaging bag. Refer to 4 in Figure 5-10.
5. Secure the wall bracket and the top of the battery using M5 screws. (tool: T20 screwdriver, torque: 2.5 Nm). Refer to 5 in Figure 5-10.
6. Screw the ST6 into the expansion nut. (tool: SW8, torque: 6 Nm). Refer to 6 in Figure 5-10.
7. Place the second battery on top of the first battery, ensuring the battery switch is closed. Refer to 7 in Figure 5-10.
8. Secure the grounding bar between the two batteries. (tool: T20 screwdriver, torque: 2.5 Nm). Refer to 8 in Figure 5-10.
9. Repeat steps 3 to 8 to complete the installation of two batteries.



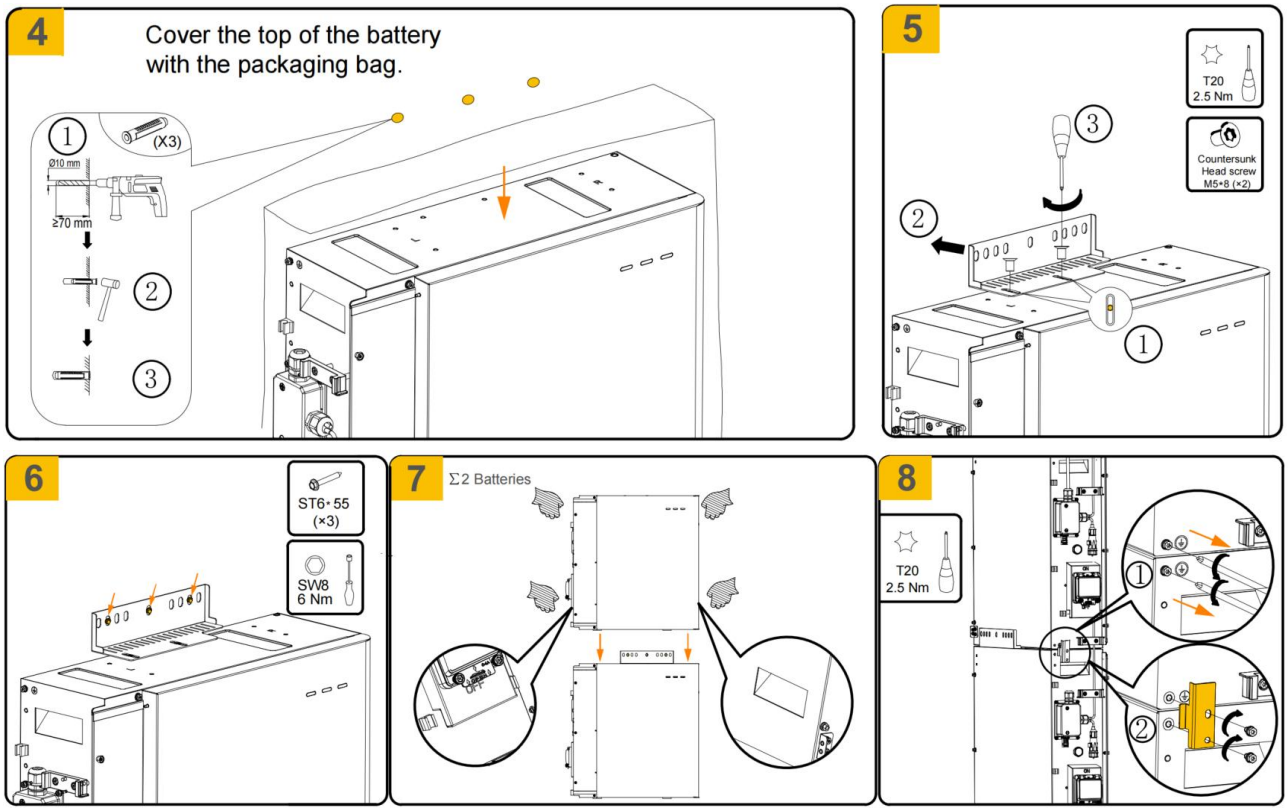


Figure 5-10 Battery Base Installation Steps Diagram

5.5.2.3 Mounting the top Cover of the Battery(Optional)

Mount the top cover on the battery top, detailed steps as follows:

1. Take out the top cover support from the package.

Mount two top cover supports onto the top of the second column battery with four hexagon head screws M5*12 (tool: T20 screwdriver, torque: 2.5 Nm). Refer to 1 in Figure 5-5.

2. Take out the top cover from the package.

Mount the top cover onto the top of two top cover supports with four countersunk head screws M4*8 (tool: T20 screwdriver, torque: 1.6 Nm). Refer to 2 in Figure 5-5.

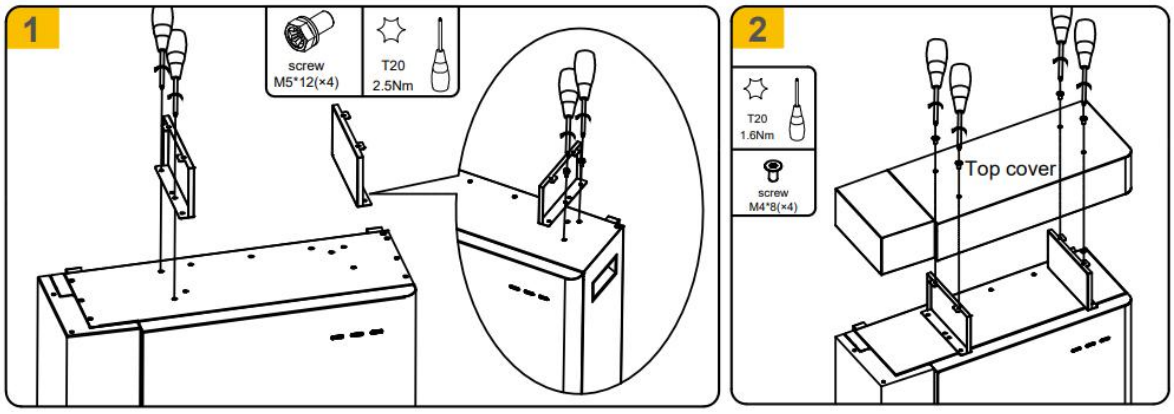


Figure 5-11 Battery top cover installation

5.5.3. Mounting the Inverter

Mount the inverter with wall bracket, please follow the below steps.

1. Fit the bottom notch of the inverter's positioning plate into the top wall bracket of the battery against wall, mark the positions of the drilling holes. Refer to 1 in Figure 5-6.
2. Cover the top of the battery with plastic bag and drill 6 holes on the wall with drill Φ10, insert the screw anchors into the drilling holes.
3. Secure the wall bracket of the inverter to the wall, adjust horizontal position and tighten the screws (tool: Socket wrench SW8, torque: 6Nm). Refer to 2 in Figure 5-6.
4. Hook the inverter into the wall bracket with two persons. Ensure that the inverter is securely in place. Refer to 3 in Figure 5-6.
5. Secure the inverter to the wall bracket. To do so, insert screws M5X12 into the side threaded holes on both sides of the inverter anchorage bracket respectively and tighten them.

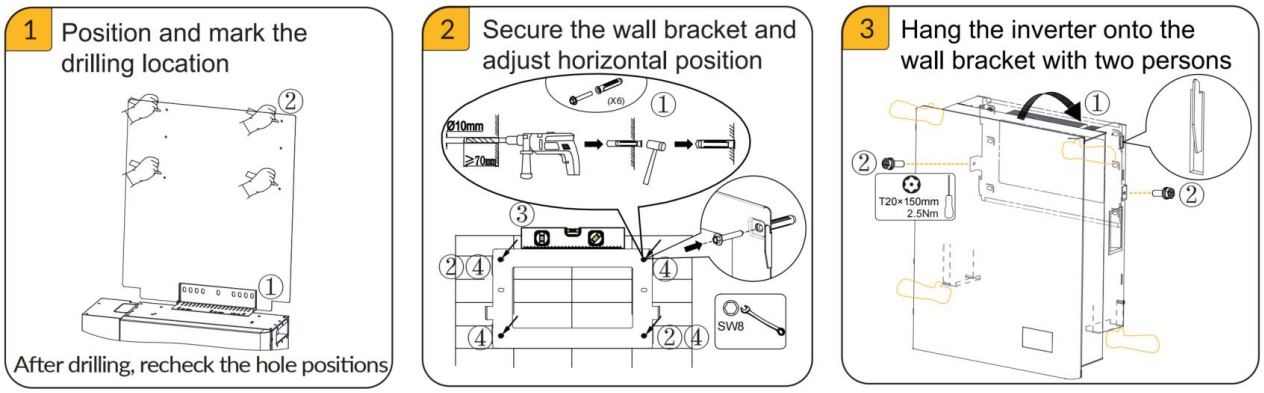


Figure 5-12 Inverter installation diagram

5.5.4. Mounting the Wi-Fi Module

Mount the Wi-Fi module at the left of the inverter, detailed steps as follows:

1. Remove the protective cover of Wi-Fi port at the left of the inverter. Refer to 1 in Figure 5-7 .
2. Tighten the Wi-Fi module onto the inverter with two M4*12 screws provided (Tool: T20 screwdriver, torque: 1.6Nm). DO NOT OVERTIGHTEN – do not damage the plastic housing of the Wi-Fi module. Note that Alpha always recommends a LAN cable connection over the use of a Wi-Fi module. Refer to 2 in Figure 5-7.

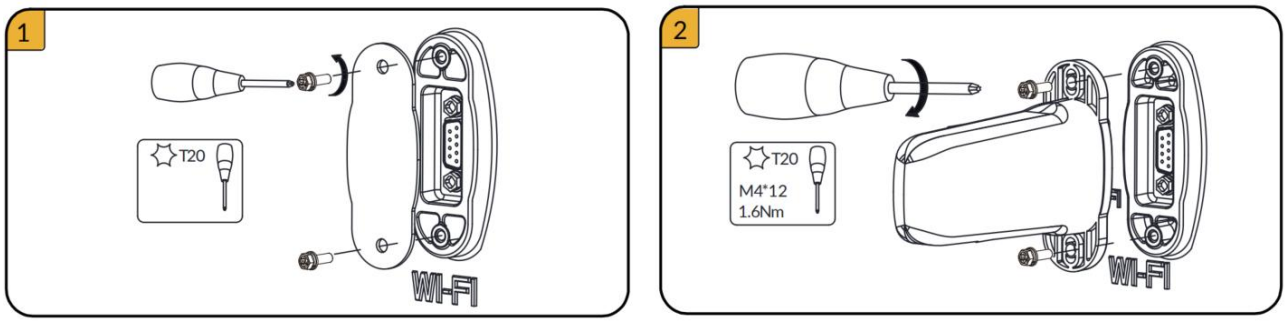


Figure 5-13 Installation diagram of Wi-Fi adapter

6. Electrical Connection

Precautions

DANGER

Electric Shock Hazard - Before connecting cables, switch OFF all circuit breakers and switches connected to the inverter and batteries.

CAUTION

- Damage to the energy storage system caused by incorrect cable connections is not covered under warranty.
- Only certified electricians accredited by Alpha are allowed to connect cables.
- Appropriate PPE must be worn when installing or connecting the product.

NOTICE

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

6.1. Cable Requirements for Connection

No.	Cable	Type	Conductor Cross Section Area Range	Outer Diameter	Source
1	PV Power cable	Standard PV cable (recommended type: H1Z2Z2-K)	4~6mm^2	5~ 8mm	Purchased by the installer
2*	Signal cable	Standard network cable (recommended type: Cat5e, SFTP, UV-resistant for outdoor use)	0.12~0.2mm^2 (AWG26~AWG24)	4~6mm	Purchased by the installer
3**	Signal cable	Two-core outdoor shielded twisted pair copper cable	0.5~1.5mm^2	4~6mm	Purchased by the installer
4***	Signal cable	Outdoor shielded twisted pair copper cable	0.5~1.3mm^2	4~6mm	Purchased by the installer
5	AC power cable	Five-core (L1, L3, L3, N and PE) outdoor copper cable	6~10mm^2	11~26mm	Purchased by the installer

6	PE cable	Single-core outdoor copper cable	4~10mm^2	N/A	Purchased by the installer

* For RS485, LAN, three phase meter (with CT), DRM communication connection with inverter.

** For three phase meter (without CT) communication connection with inverter.

*** For AUX communication connection with inverter.

6.2. Grounding Connection

CAUTION

Electric Shock Hazard

Before doing electrical connection, please ensure the PV switch & all AC and DC circuit breakers in the energy storage system are switched OFF and cannot be accidentally or unintentionally reactivated.

A grounding point is provided at the upper left of the energy storage inverter.

Prepare M5 Eye/Ring terminals, strip the grounding cable insulation, insert the stripped conductor into the ring terminal lug and crimp with a crimping tool.

Connect the grounding terminal to the inverter (tool: T20 screwdriver, torque: 2.5Nm).

Grounding connection for the energy storage inverter.

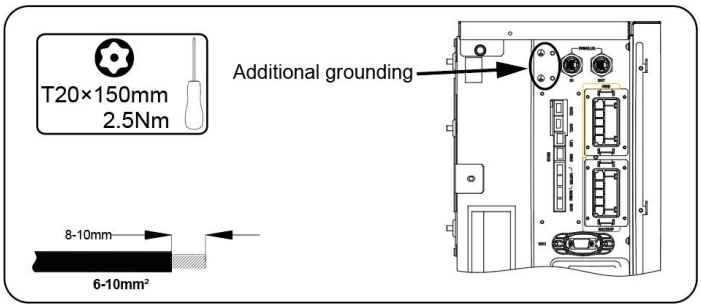
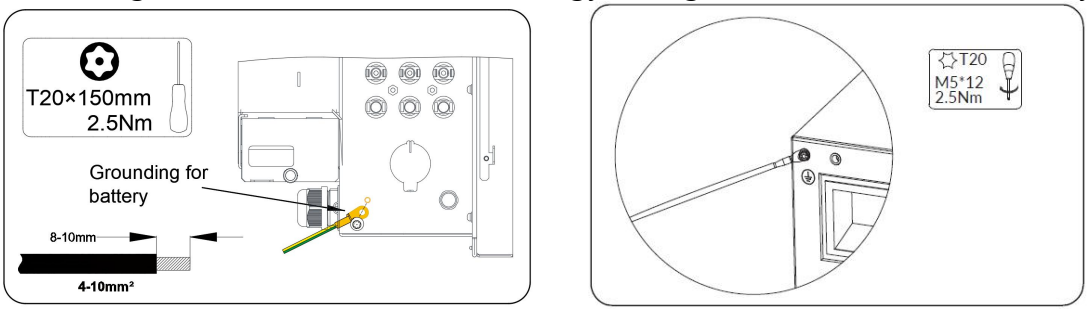


Figure 6-1 Grounding connection of the energy storage inverter

Grounding connection between the energy storage inverter and series battery.



Inverter side Battery side

Figure 6-2 Grounding connection and series battery

6.3. AC Connection

6.3.1. Requirements for the AC Connection

AC cable requirements as follows:

1. Conductor type: copper conductor (tinned copper preferred).
2. Current carrying capacity depends on the Model selected and should be such that the AC cable can carry the full current of the AC supply and the Backup output.

Note: Account for temperature derating and voltage drop/rise when selecting wire diameters. 110°C or higher rated cable derates slower as temperatures increase.

Description	External diameter	Conductor cross-section	Insulation stripping length	Sheath stripping length
Grid connector Backup connector	11~26mm	4~10 mm^2	12 mm	75~80 mm

DANGER

You must protect each inverter with an individual grid/backup circuit breaker in order to ensure that the inverter can be disconnected safely.

CAUTION

Residual-current monitoring unit

The inverter does not require an external residual-current device when operating.

If local regulations or a particular installation configuration requires the use of a residual-current device, or a Hybrid-coupled storage system with a big coupling capacity from the PV array and PV inverter, the following must be observed:

- The inverter is compatible with type A residual-current devices with a rated residual current of 100mA or higher. Each inverter in the system must be connected to the utility grid via a separate residual-current device.

6.3.2. Select Suitable AC Circuit Breaker

The general requirements for the selection of circuit breakers are determined by standards and country-specific provisions. The following factors should be considered when selecting a suitable circuit breaker:

Factors influencing the current-carrying capacity of the cable: type of cable used, ambient temperature around the cable, type of cable routing, bundling of cables.

Other influencing factors: loop impedance, mutual heating of circuit breakers, ambient temperature at the circuit breaker, selectivity, type of connected device.

If these factors are ignored, it will increase the risk of the circuit breaker tripping under normal operating conditions.
Selecting circuit breakers for the AC supply and Backup output is dependent on the maximum current of the backup circuit and the inverter (if it is force-charged), the model of MCBs used and their derating current rating considering their maximum temperatures. Supplier datasheet shows detailed temperature derating for their MCBs. Ensure the MCBs used are appropriate for the current and the operating temperature. Otherwise, the risk of the circuit breaker tripping will increase under normal operating conditions.

AC connection recommendation for SMILE-G3-T15-INV

Description	Max. Current	Breaker Type	Recommended Cable Cross Section
Grid Side	29 A	50 A	6~10mm2
Backup Side	23.9 A	40 A	6~10 mm2

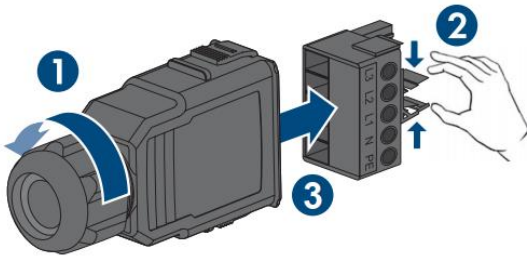
AC connection recommendation for SMILE-G3-T20-INV

Description	Max. Current	Breaker Type	Recommended Cable Cross Section
Grid Side	36.2 A	50 A	6~10mm2
Backup Side	31.9 A	50 A	6~10 mm2

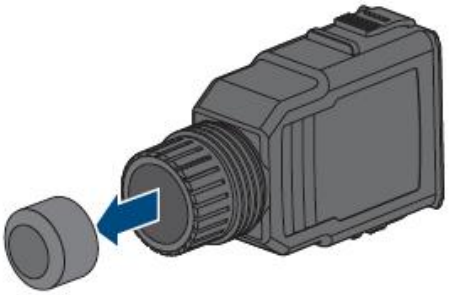
6.3.3. Grid and Backup Connection

The steps for connecting the grid connector as follows:

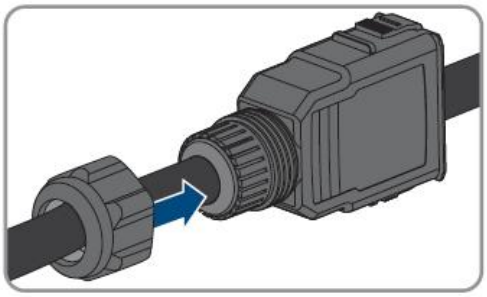
1. Disconnect the PV switch, grid, backup and battery circuit breaker and secure against reconnection. Ensure that the batteries are switched off.
2. Pay attention to the labels on the AC plug connectors to prevent subsequent confusion with the grid connector for connection to the backup loads.
3. Unscrew the swivel nut of the AC plug connector and remove the terminal from the AC plug connector.



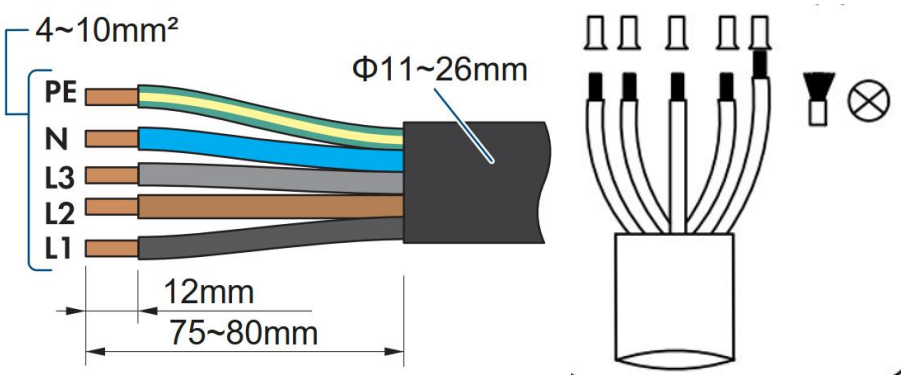
4. For a cable diameter of ⩾ 19mm, remove the inner sealing ring from the AC plug connector.



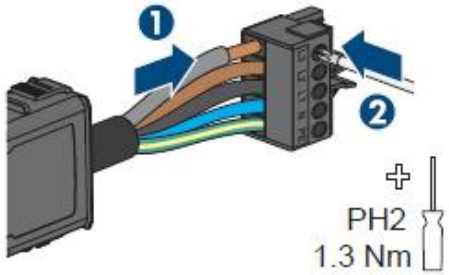
5. Route the AC cable through the swivel nut and connector housing.



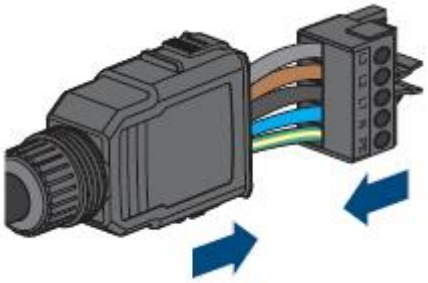
6. Dismantle the AC cable by 75mm to 80mm. Strip the insulation of L1, L2, L3, N and the grounding conductor 12mm. In the case of fine stranded conductor L1, L2, L3, N and PE are to be fitted with bootlace ferrules.



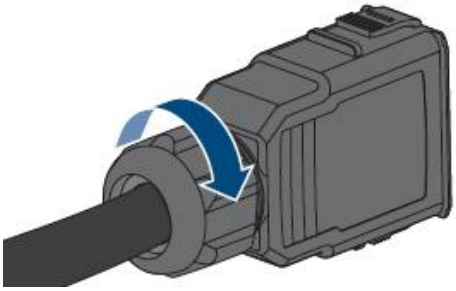
7. Insert the conductors L1, L2, L3, N, and grounding conductor into the terminal block according to the labeling and tighten the terminal block screws (tool: PH2 screwdriver, torque: 1.3Nm).



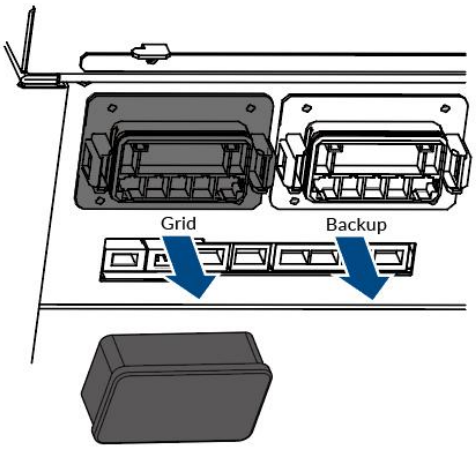
8. Ensure that the conductors are correctly assigned and firmly seated in the terminal.
9. Insert the terminal into the connector housing. The terminal must snap audibly into place.

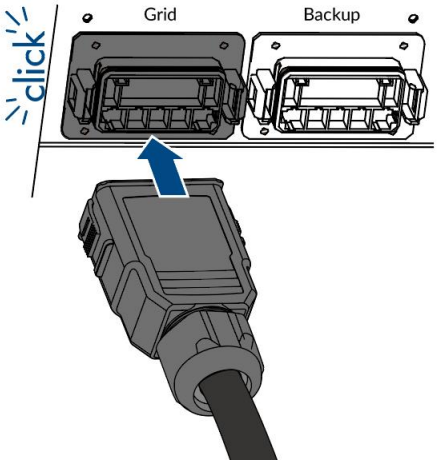


10. Tighten the swivel nut on the connector housing.



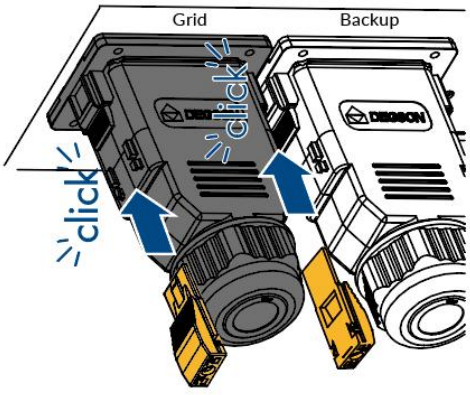
11. Remove the protective cap from the grid connection socket.
12. Insert the grid plug connector into the grid connection socket. The grid plug connector must snap audibly into place.





13. Take out two fuse terminal blocks provided with grid plug connector, insert them onto the bracket of the AC plug connector from two sides.

The steps for backup connection are the same as the grid connection.



6.3.4. Disassembling the AC Connectors

The steps for disassembling the AC connectors as follows:

1. Disconnect the PV switch, grid, backup and battery circuit breaker and secure against reconnection. Ensure that the batteries are switched off.
2. Unscrew the left-hand and right-hand screws inside two fuse terminal block and remove two fuse terminal blocks.
3. Hold the side brackets of the AC connectors and pull outward.
4. Tight the screw inside the fuse terminal block (tool: PH2 screwdriver, torque: 0.5 Nm).
5. Reattach the protective caps on the AC sockets.

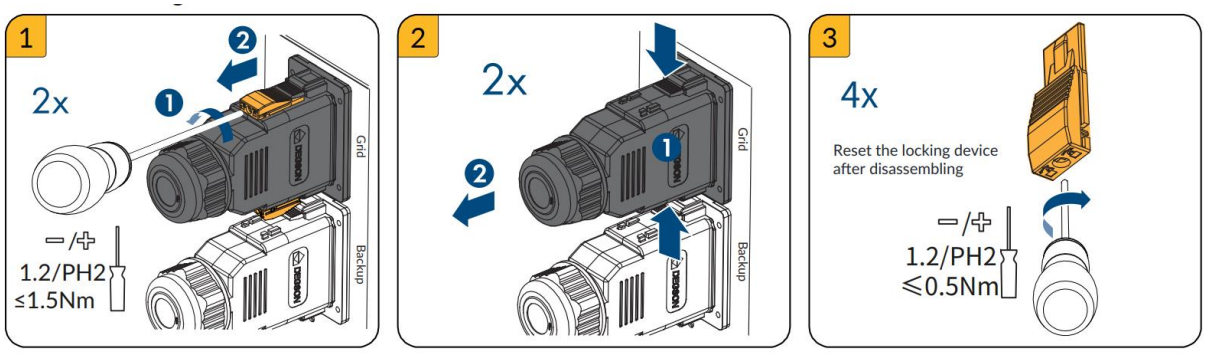


Figure 6-2 Disassembly of AC connectors

6.3.5. Meter Connection

Item	Current	Scenarios
DTSU666-3*230V 5(80)A	80 A	Three-phase meter (without CT)
DTSU666-3*230V 100A/40mA	100 A	Three-phase meter (with CT)
SMILE-TLMeter-CH3C60/100/250 (Single-Circuit)	60/100/250A	Three-phase single-circuit meter (with CT)
SMILE-TLMeter-CH6C60/100/250 (Dual-Circuit)	60/100/250A	Three-phase dual-circuit meter (with CT)

Loosen the strain relief nuts of the cable glands on the COM connection cover of inverter, and unscrew the 4 screws on the corners, then you will see meter communication ports. Any of the meter communication ports can be used.

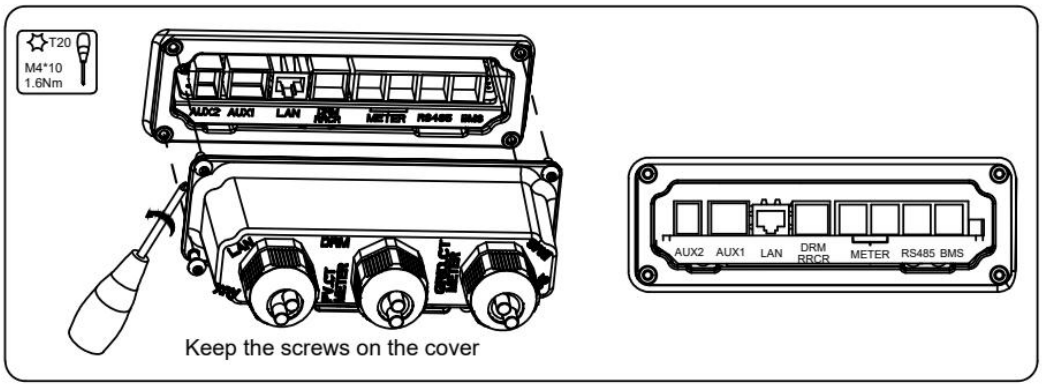


Figure 6-3 Meter connection diagram

6.3.5.1Meter Wiring

Pass the meter communication cable through the cable gland of the COM connection cover but don't tighten the strain relief nut of the cable gland.
Insert the RJ45 plug of the meter communication cable into the METER communication port of the inverter.

The other steps for meter connection as follows:
1. DSTU666-3*230V 5(80)A: Three phase meter (without CT) connection

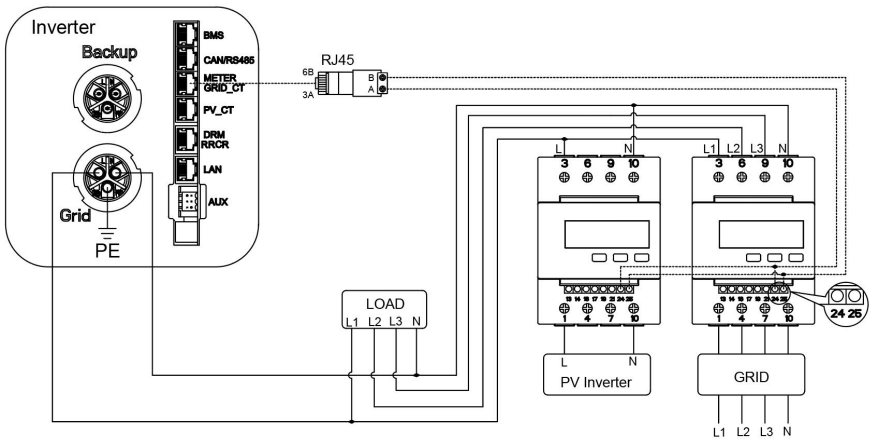


Figure 6-4 Wiring at three-phase feed in

Meter communication cable requirements: two-core outdoor shielded twisted pair copper cable (flexible), conductor cross-section 0.5~1.5mm^2, wires terminal should be fitted with bootlace ferrules.
2. DSTU666-3*230V 100A/40mA, DTSU666-3*230V 250A/50mA: Three phase meter (with CT) connection

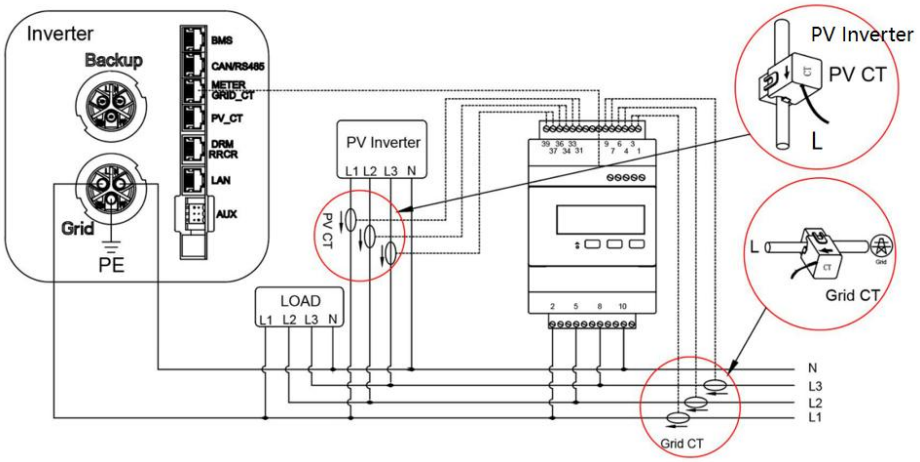


Figure 6-5 Wiring at three-phase feed in

Meter communication cable requirements: standard network cable (recommended type: Cat5e, SFTP, UV-resistant for outdoor use).

The connections are marked clearly on the meter.

Wiring location description of Chint three phase meter (with CT)

Grid CT	**PV CT**	**GRID**
1--------IA* (White)	31--------IA* (White)	2----------L1
3--------IA (Blue)	33--------IA (Blue)	5----------L2
4--------IB* (White)	34--------IB* (White)	8----------L3
6--------IB (Blue)	36--------IB (Blue)	10-------- N
7--------IC* (White)	37--------IC* (White)	
9--------IC (Blue)	39--------IC (Blue)	

CT Group	Grid-> Load								PV->Load					
CT Phase	IA*	IA	IB*	IB	IC*	IC			IA*	IA	IB*	IB	IC*	IC
Terminal	1	3	4	6	7	9	X	X	31	33	34	36	37	39
Colour	White	Blue	White	Blue	White	Blue			White	Blue	White	Blue	White	Blue

3. SMILE-TLMeter-CH3C60/100/250 (Single-Circuit)： Three-phase single-circuit meter (with CT) connection

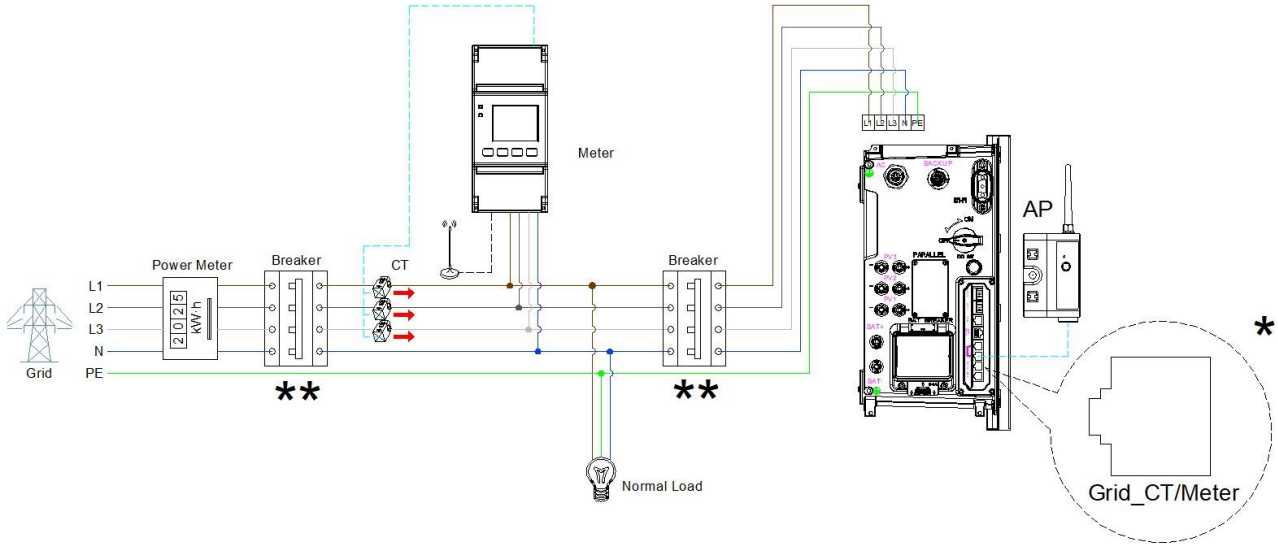


Figure 6-6 Wiring at three-phase feed in

4. SMILE-TLMeter-CH6C60/100/250 (Dual-Circuit)：Three-phase dual-circuit meter (with CT) connection

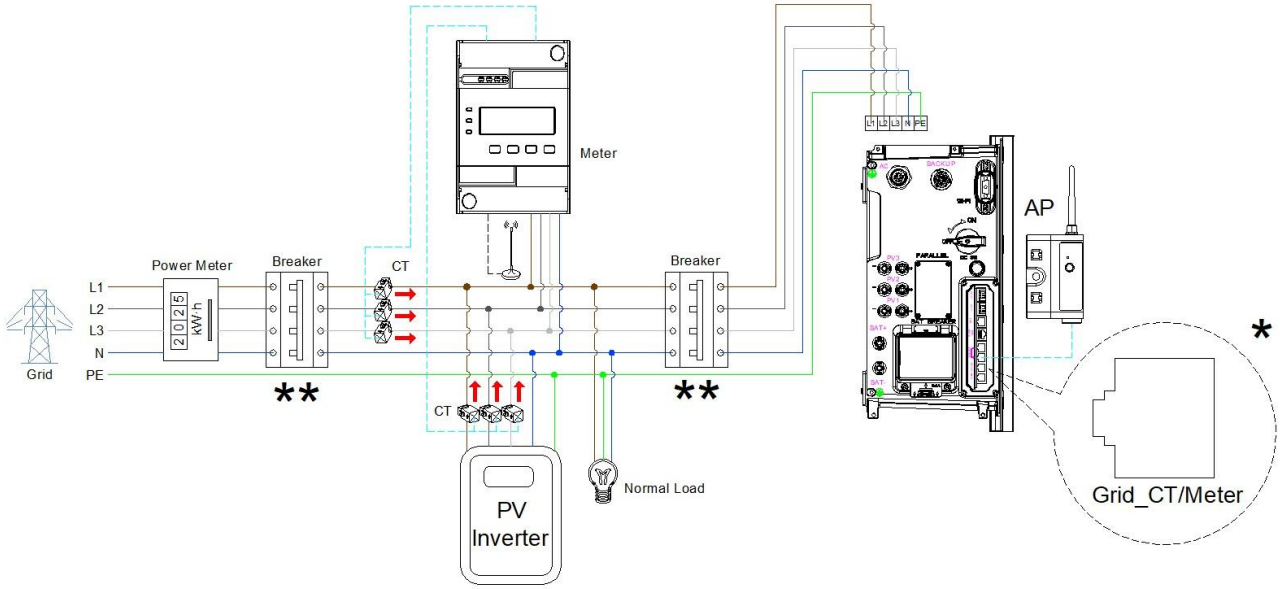


Figure 6-7 Wiring at three-phase feed in

NOTICE

Be VERY careful when wiring or checking these connections because the connections appear reversed when the meter is secured in place on the Din Rail. Always physically check the label on the meter when wiring any CTs or grid reference wires.

6.3.5.2 Meter Configuration

Meter Setting on the Meter's Display

If connecting Chint DTSU666 meters without CTs, two meters are required if there is any AC coupled PV inverter, one for the Grid Import/Export and one for the AC coupled PV inverter measurements.

Model	Grid Meter Address	PV Meter Address
DTSU666-3*230V 5(80)A (without CT)	1	2
DTSU666-3*230V 100A/40mA (with CT)	1	N/A
SMILE-TLMeter-CH3C60/100/250 (Single-Circuit)	1	2
SMILE-TLMeter-CH6C60/100/250 (Dual-Circuit)	1	N/A

1. Meter setting for type DTSU666-3*230V 5(80)A, which is three-phase meter (without CT)

When the meter is used as grid meter, the default address is 1. The installer doesn't need to make any other settings.

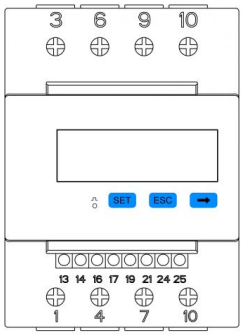


Figure 6-8 DTSU666-3*230V 5 (80) A type three-phase electricity meter (without CT) setting

If installer wants to have a check, please follow the steps below.

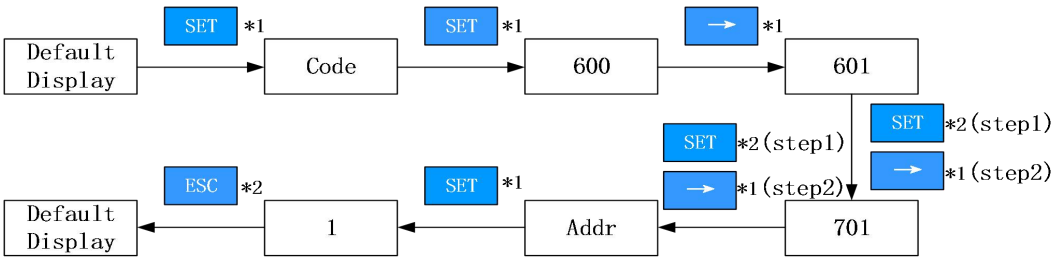


Figure 6-9 Installer check steps

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

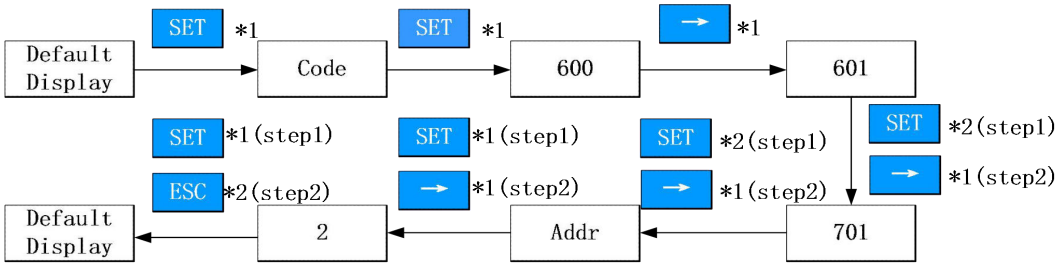


Figure 6-10 Address setting for photovoltaic electricity meters

2. Meter setting for type DTSU666-3*230V 100A/40mA and DTSU666-3*230V 250A/50mA, three-phase meter (with CT)

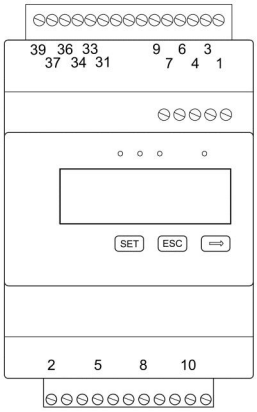


Figure 6-11 Range setting of DTSU666-3*230V 100A/40mA and DTSU666-3*230V 250A/50mA three-phase electricity meter (with CT)

The installer doesn't need to make any other settings.

If installer wants to have a check, please follow the steps below.

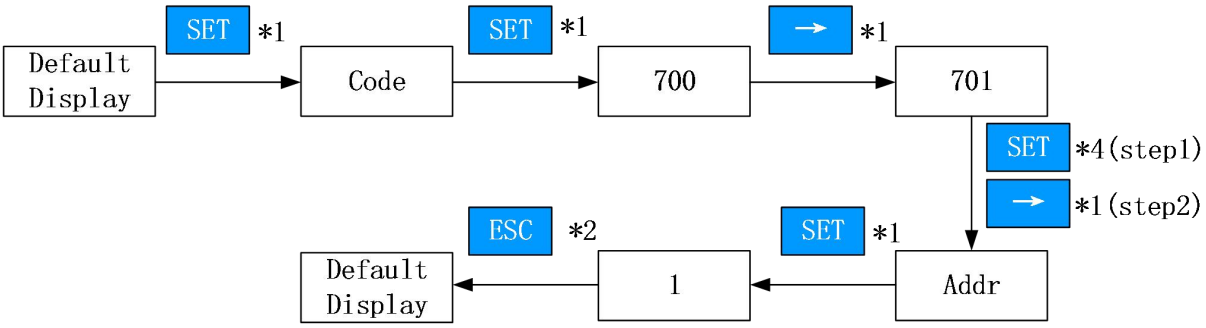


Figure 6-12 Installer check steps

The display order of parameters

The following images show the information read and displayed by the meter in real time.

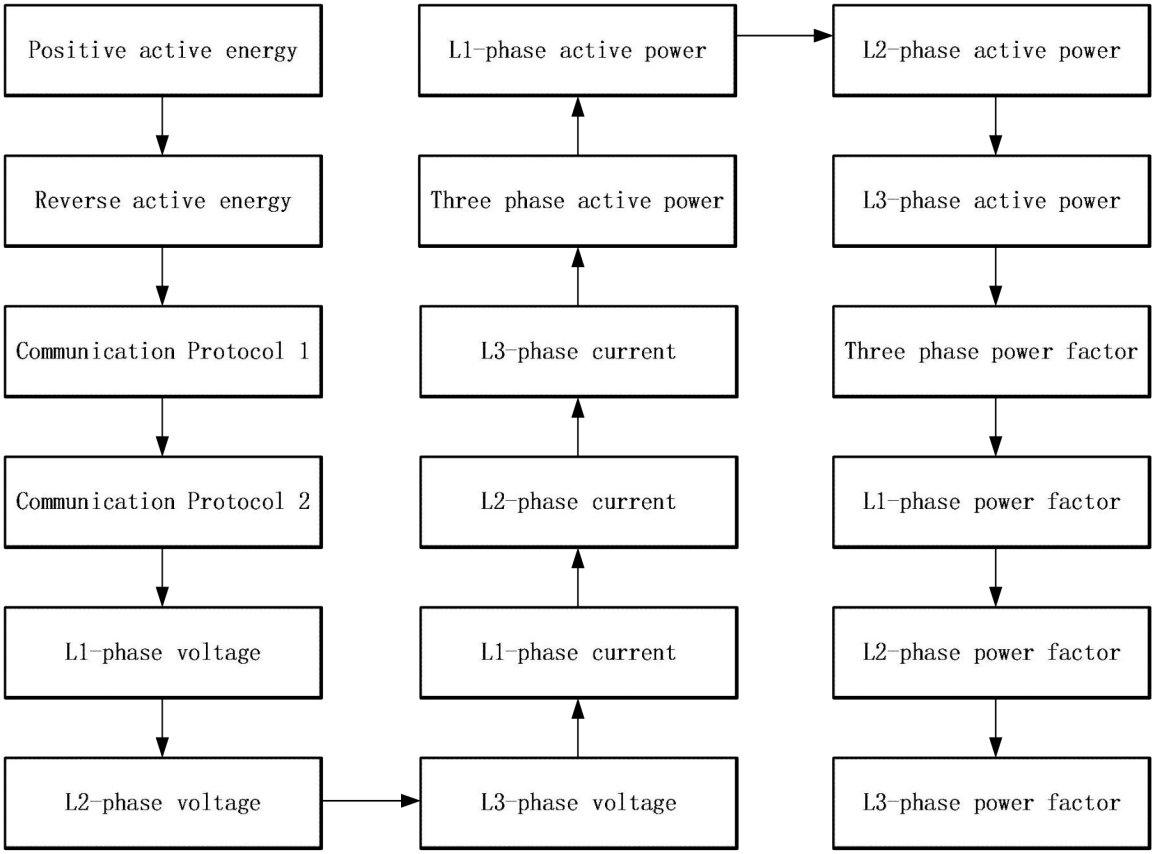


Figure 6-13 Parameter display sequence

3. Meter setting for type SMILE-TLMeter-CH3C60/100/250 (Single-Circuit) is the same as DTSU666-3*230V 5(80)A.
4. Meter setting for type SMILE-TLMeter-CH6C60/100/250 (Dual-Circuit) is the same as DTSU666-3*230V 100A/40mA.

6.3.5.3 P1 Meter Reader Connection

The installation connection steps for the P1 reader are as follows. For other detailed information, please refer to the P1 Meter Reader Installation Manual.

1. Install the P1 Reader

Insert the electricity meter reader: As shown in the figure below, first confirm the direction of the interface of the electricity meter reader RJ12. Insert the electricity meter along the arrow direction.

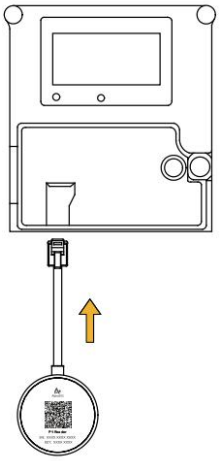


Figure 6-14 Insert the electricity meter reader

The installation effect is as follows:

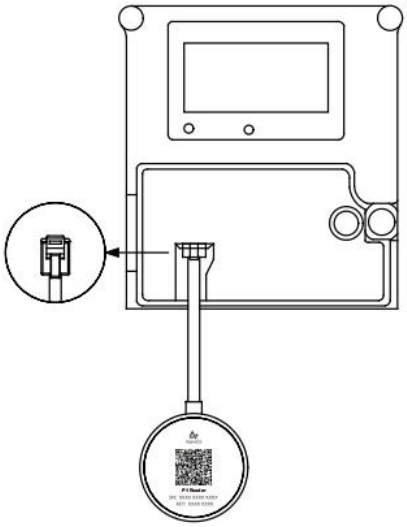


Figure 6-15 Installation completion diagram

2. Disassemble the P1 Reader

Gently press the tab on the back of the P1 Reader, then pull it out along the arrow direction. As shown in the figure below:

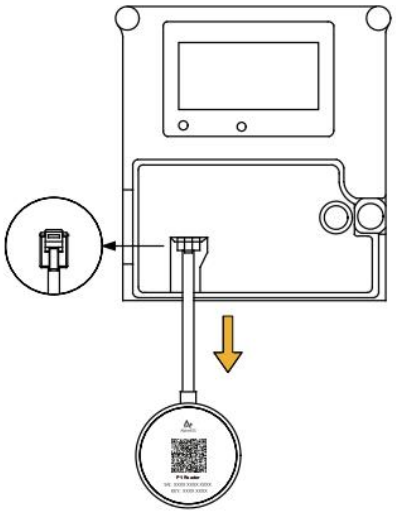


Figure 6-16 Disassemble the electricity meter reader

6.4. PV Connection

6.4.1. Connecting the PV Array

DANGER

Danger to life due to electric shock if live components or DC cables are touched

The DC cables connected to a battery or a PV module may be live. Touching live DC cables can result in serious injury or even death due to electric shock. To avoid this danger:

- Disconnect the inverter and battery 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 product.
- Observe all safety information in this document.

NOTICE

Risk of the inverter due to overvoltage

The inverter can be destroyed if the open-circuit voltage of the PV modules exceeds the maximum input voltage of the inverter.

- If the open-circuit voltage of the PV modules exceeds the maximum input voltage of the inverter, do not connect any strings to the inverter and check the design of the PV system.

NOTICE

Risk of product damage due to ground fault on DC side during operation

Due to the transformerless topology of the inverter, ground faults on DC side during operation can lead to irreparable damage. Damages to the inverter due to a faulty or damaged DC installation are not covered by warranty. Although the inverter is equipped with a protective device that checks whether a ground fault is present during the starting sequence, the inverter is not protected during operation.

- Ensure that the DC installation is carried out correctly and no ground fault occurs during operation.

NOTICE

Risk of the inverter damage due to sand, dust and moisture ingress if the PV inputs are not closed

The inverter is properly sealed only when all unused PV inputs are closed with sealing plugs. Sand, dust and moisture penetration can damage the inverter and impair its functionality.

- Seal all unused PV inputs with sealing plugs.

Please ensure the follows before connecting PV strings to the inverter:

- Make sure the open voltage of the PV strings will not exceed the max. DC input voltage (1000Vdc). Violating this condition will void the warranty.
- Make sure the polarity of the PV connectors is correct.
- Make sure the PV-switch, circuit breakers of battery, AC-BACKUP and AC-Grid are all isolated/in their "off" states.
- Make sure the PV resistor to ground is higher than 200K Ohms.

The inverter uses the Vaconn D4 PV connectors. Please follow the picture below to assemble the PV connectors. PV conductor cross section requirements: 4~6 mm^2.

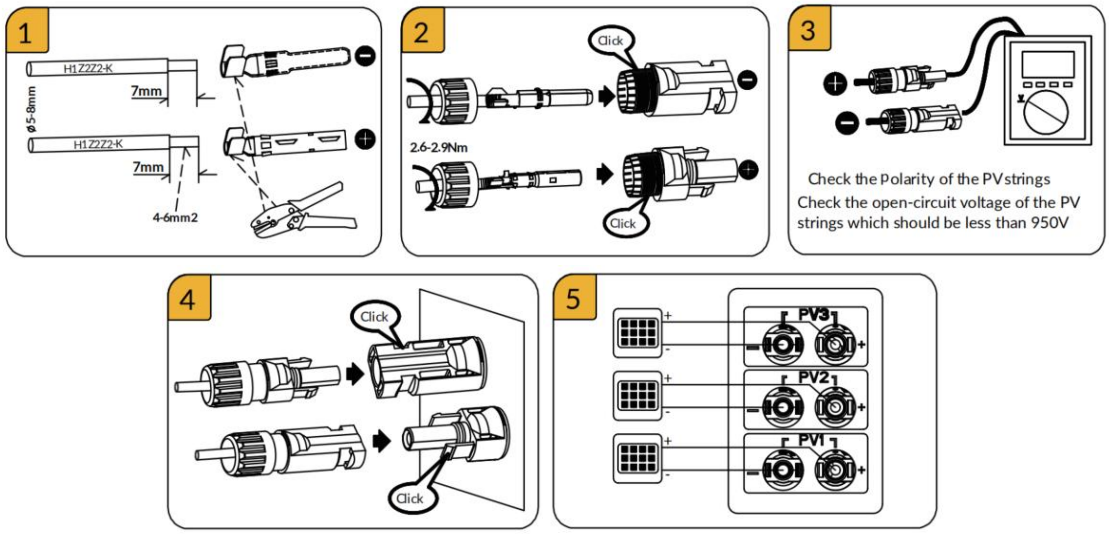


Figure 6-14 Assembly of photovoltaic connectors

6.4.2. Disassembling the PV Connector

DANGER

Danger to life due to electric shock if live components or DC cables are touched

The DC cables connected to a PV module may be live. Touching live DC cables can result in serious injury or even death due to electric shock. To avoid this danger:

- Disconnect the inverter and battery 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 product.
- Observe all safety information in this document.

Ensure that the PV connector can only be removed via using the removal wrench.

Removing the PV connector without the removal wrench isn't allowed and dangerous.

Procedure:

1. Release and remove the PV connectors. To do so, insert the removal wrench into the bayonet, press the wrench with an appropriate strength to release the locking mechanism, then pull the PV connectors out. Please do not pull on the cable.

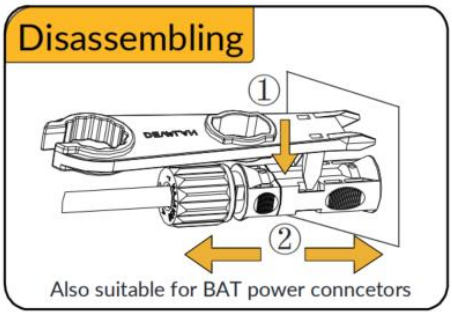


Figure 6- 15 Disassembly of PV connector PV

2. If there are PV connectors unused, please use the PV covers to seal the PV connectors.

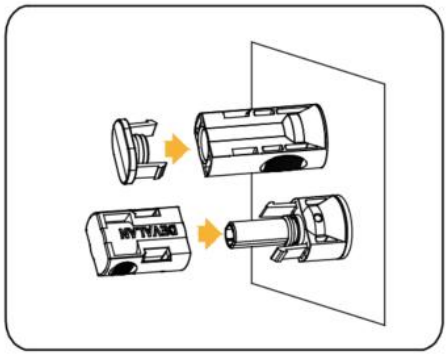


Figure 6-16 Seal the PV connectors

6.5. Electrical Connection between the Inverter and Battery

6.5.1. Communication Connection between INV and BAT

Communication cable connection between inverter and series battery, proceed as follows:

1. Pass the battery communication cable of the upper battery (directly below the inverter) through the cable gland of the COM connection cover of inverter. Do not tighten the strain relief nuts of the cable glands yet.
2. Insert the RJ45 plug into the BMS communication port on the inverter communication ports labelled "BMS".
3. Only secure the COM connection cover in place after the Meter communication cable, the BMS cable and the LAN cable (if used) have been clipped into their respective ports.
4. When securing the COM connection cover over the communication ports, tighten the cover in place and then lightly push the communication cables into the cover as you tighten the strain relief nuts onto the cables. This will ensure the communication cables are well-seated in the RJ45 ports.

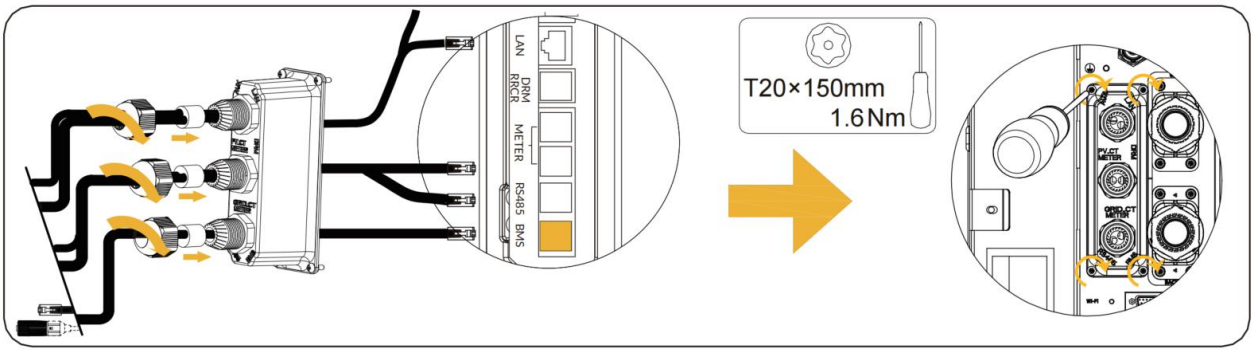


Figure 6-17 The electrical connection between the inverter and the battery

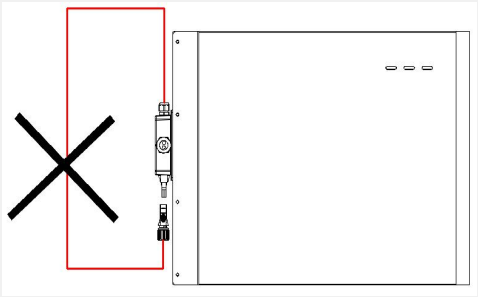
6.5.2. System Connection between INV and BAT

DANGER

Danger to life due to burns caused by electric arcs through short-circuit currents

Short-circuit currents in the battery can cause heat build-up and electric arcs. Heat build-up and electric arcs may result in lethal injuries due to burns.

- Disconnect the battery from all voltages sources prior to performing any work on the battery.
- The upper power connector of the lower battery must connect to the lower power connector of the upper battery, otherwise the short-circuiting of the battery will occur.



- Please connect both ends of one battery power cable completely before starting to connect the next power cable.

- Observe battery safety information provided in the manual.

NOTICE

The original cable sets (Amphenol connector) provided by the inverter SMILE-G3-T15/T20-INV are not suitable for connecting with Battery SMILE-G3-BAT-9.3S.
When SMILE-G3-T15/T20 series inverter installs with batteries SMILE-G3-BAT-9.3S, please purchase cable sets (HD connector) accessory 93600409 and 93600408.
• Cable sets product number 93600409 is for single column battery side wiring.
• Cable sets product number 93600408 is for the second column battery side wiring.

Max. 2 series batteries SMILE-G3-BAT-9.3S can be installed in the first column of SMILE-G3-T15/T20 energy storage system.
Cables connection between the inverter and series batteries of single column as follows:
Detailed electrical connection between the inverter and single column of series batteries as follows:

1. Take out all cables from the inverter packaging.
2. Use the provided grounding cable to connect the grounding point of the first series battery (directly below the inverter) and the grounding point of the inverter.
3. Remove the protective caps from the battery power connectors of the inverter.
4. Complete the grounding, power and communication connection between the upper and lower series batteries.

(1) Connect the upper power connector of the lower series battery to the lower power connector of the upper series battery.
(2) Connect the upper communication cable of the lower series battery to the lower communication connector of the upper series battery. Disassemble the battery communication connector components, remove the termination resistor, unscrew the swivel nut and push the cable support sleeve out of the threaded sleeve.
(3) Thread the swivel nut and threaded sleeve over the battery communication cable. At the same time, thread the cable through the opening in the cable support sleeve. Insert the RJ45 plug of the lower battery into the BMS communication port of the upper battery and screw the threaded sleeve. Press the cable support sleeve into the threaded sleeve. Screw the swivel nut onto the threaded sleeve.
(4) Retain the termination resistor of last battery.

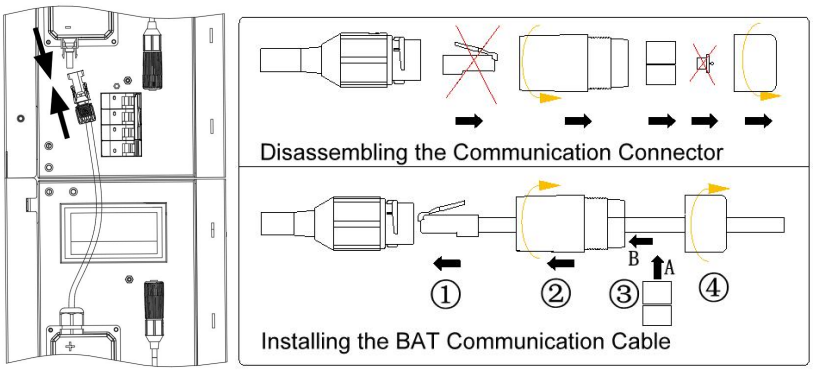


Figure 6-18 Installation of battery connection cables

5. Pick up the red power cable, connect BAT main positive connector of series batteries (directly below the inverter) to the BAT positive connector of inverter.
6. Pick up the black power cable, connect BAT main negative connector of series batteries (the last series battery) to the BAT negative connector of inverter.

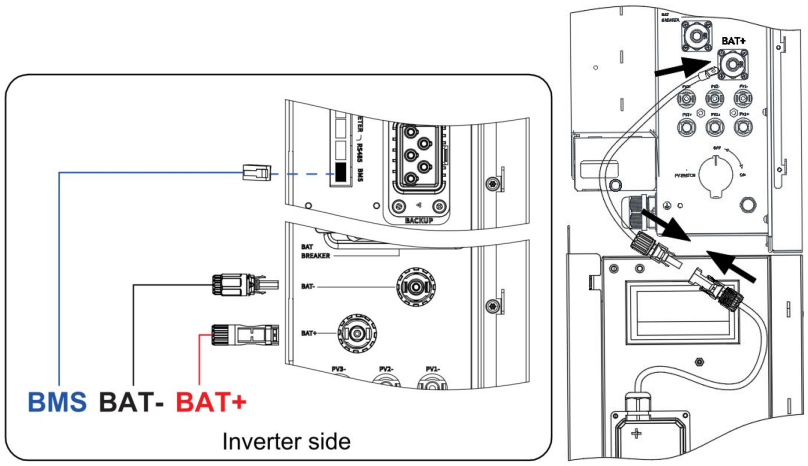


Figure 6-19 Single-column battery side wiring diagram

Battery Side Wiring Diagram of Single Column as follows:

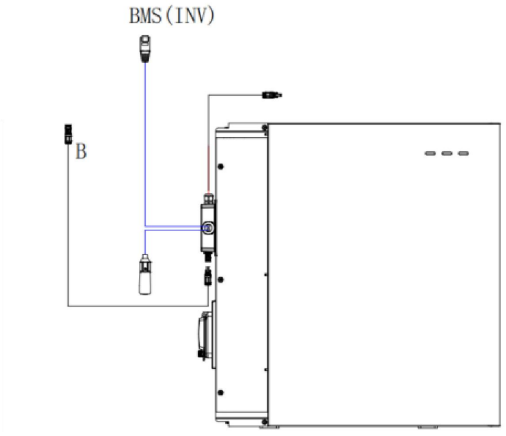


Figure 6-20 Wiring diagram of one battery

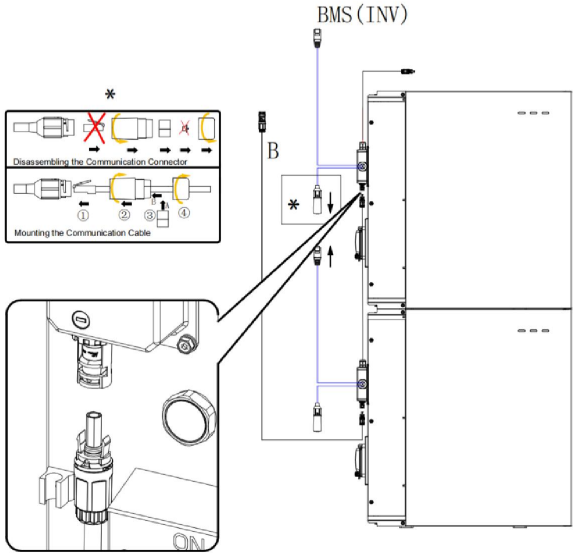


Figure 6-21 Wiring diagram of two batteries

Cables connection between the Inverter and two columns of series batteries as follows.

Detailed electrical connection between the inverter and the second column of series batteries as follows:

1. Disconnect the energy storage system from all voltages sources prior to performing any work on the system.
2. Installer should prepare the grounding cable. Take out M5 Y terminals and grounding conductor, strip the insulation of the grounding conductor, insert the stripped conductor into the terminal lug and crimp with a crimping tool. Use the prepared grounding cable to connect the grounding points between the two columns of series battery.
3. Complete the electrical connection between the second column of series batteries. Retain the termination resistor of the last battery of the second column series batteries.
4. Complete the rest electrical connection. Take out three cables from the package of Cables for Distanced Horizontal Battery Expansion.

(1) Remove the termination resistor of the bottom battery of the first column series batteries.

(2) Use the provided communication cable to connect the lower communication connector of the bottom battery of the first column series batteries and the upper communication cable of the top battery of the second column series batteries.

(3) Use the provided power cable to connect BAT negative connector of the bottom battery of the first column series batteries and BAT positive connector of the top battery of the second column series batteries.

(4) Take out the main negative power extension cable, connect BAT main negative connector of series battery (the last series battery) and the existing BAT negative power cable (connecting with the BAT negative connector of inverter)

Battery side wiring diagram as follows:

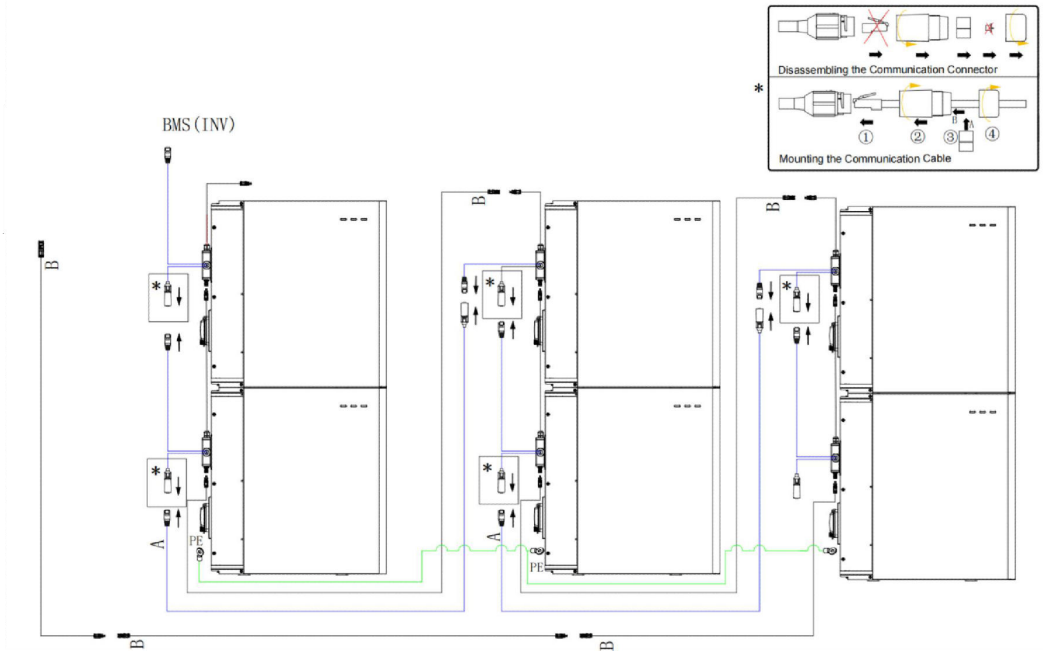


Figure 6-23 Separate series batteries side wiring diagrams

6.5.3. Disassembling BAT Connectors

To disassemble the BAT connectors (e.g. due to faulty installation), proceed as follows.

DANGER

Danger to life due to electric shock when touching exposed DC conductors or BAT plug contacts if the BAT connectors are damaged or loose

The BAT connectors can break or become damaged, become free of the DC cables, or no longer be connected correctly if the BAT connectors are released and disconnected incorrectly. This can result in the DC conductors or BAT plug contacts being exposed. Touching live DC conductors or BAT plug connectors will result in death or serious injury due to electric shock.

- Do not disconnect the BAT connectors under load.
- Before removing the BAT connectors, ensure that the BAT circuit breakers of the battery and inverter are OFF.
- Wear insulated gloves and use insulated tools when working on the BAT connectors.
- Ensure that the BAT connectors are in perfect condition and that none of the DC conductors or BAT plug contacts are exposed.
- Carefully release and remove the BAT connectors as described in the following.

Ensure that the BAT connector can only be removed via using the removal wrench. Removing the BAT connector without the removal wrench isn't allowed and dangerous.

Procedure:
Release and remove the BAT connectors. To do so, insert the removal wrench into the bayonet, press the wrench with an appropriate strength to release the locking mechanism, then pull the BAT connectors out. Please do not pull on the cable.

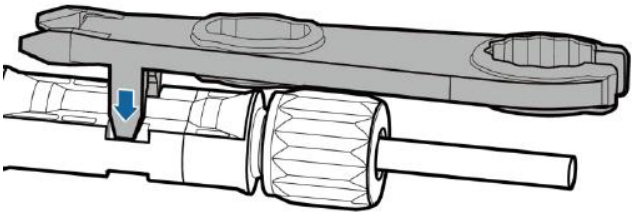


Figure 6-24 Disassemble the BAT connector

6.6. Communication Connection with Inverter

For other communication (AUX2, AUX1, LAN, RRCR, DRM, Meter, RS485) connection, please follow the steps below.

1. Unscrew the 4 screws on the COM connection cover of the inverter, then loosen the strain relief nuts of the cable glands on the COM connection cover.

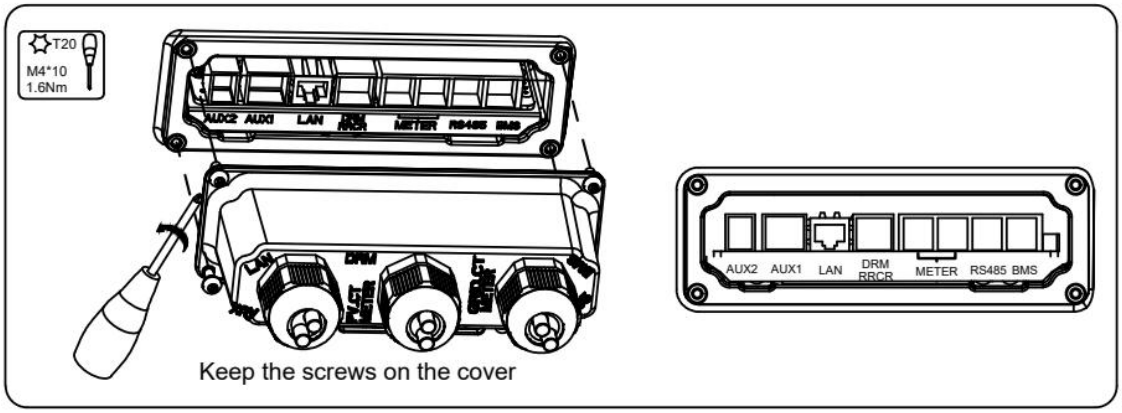


Figure 6-25 COM connection cover

2. Pass the communication cables through the cable glands of the COM connection cover. Do not tighten the strain relief nuts of the cable glands yet.

(1) Insert the RJ45 plugs to the relative RJ45 sockets.

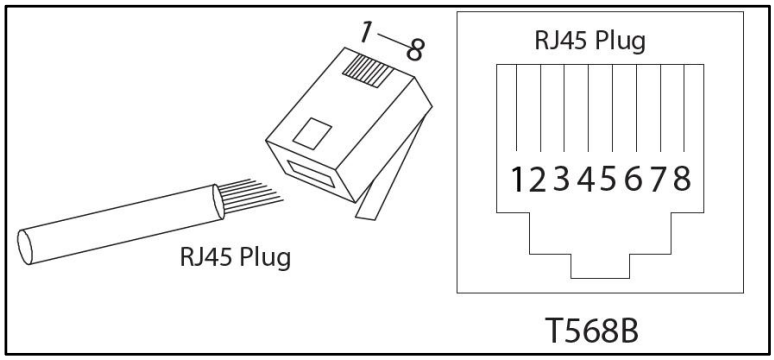


Figure 6-26 RJ45 plug connection

- For meter wiring, please refer to Chapter 6.3.5.1 Meter Connection.
- If DRM support is specified, the system may only be used in conjunction with a Demand Response Enabling Device (DRED). This ensures that the system implements the commands from the grid operator for active power limitation at all times. The system and the Demand Response Enabling Device (DRED) must be connected in the same network.
  Only DRM0 is available for inverter SMILE-G3-T15/T20-INV.
- Take out 2 pieces of 6 pin terminal blocks for AUX connection.

(2) For AUX position definition, please refer to the AUX wiring documentation.

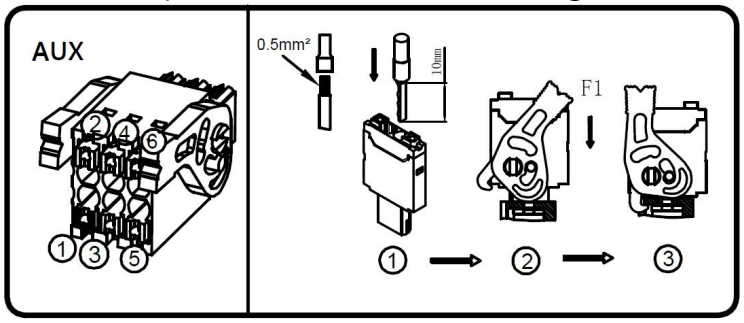


Figure 6-27 A 6-pin terminal block with AUX connection

- In emergency situations, such as fire, the end user can manually press the EPO (Emergency Power Off) button to shut down the inverter and switch off the battery (except for the PV array). End users or installer should prepare the external EPO.
- AUX cable requirements: outdoor shielded copper cable (flexible), recommended conductor cross-section 0.5 mm2. Conductor ends should be fitted with bootlace ferrules.
- To disconnect the AUX connection, rotate the handles on both sides clockwise, unplug the AUX connector, insert a screwdriver (blade width: 1.2 mm) into the relative connection position side and unplug the conductor.

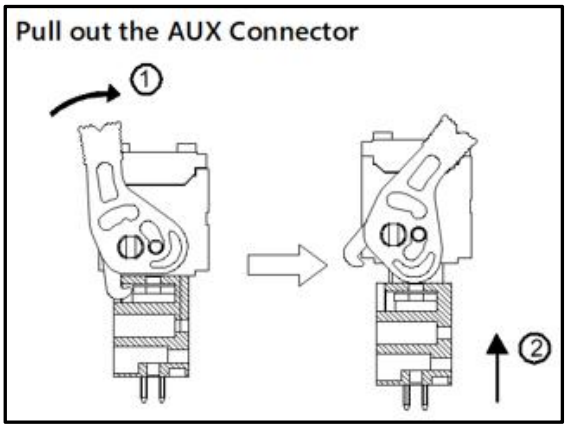


Figure 6-28 Disconnect the AUX connection

3. Place the COM connection cover against the inverter enclosure and tighten the 4 screws. When securing the cover over the communication ports, tighten the cover in place and then lightly push the communication cables into the cover as you tighten the strain relief nuts onto the cables. This will ensure the communication cables are well-seated in the RJ45 ports.

The pin definition of the communication ports

BMS	1	2	3	4	5	6	7	8
	/	RS485_A4	/	CAN1_H	CAN1_L	/	RS485_B4	/
RS 485	1	2	3	4	5	6	7	8
	12V	DEBUG_RXD_COM	GND	RS 485_ B5	RS 485_A5	/	DEBUG_TXD_COM	/
METER	1	2	3	4	5	6	7	8
	/	/	RS485_A7	/	/	RS485_B7	/	/
DRM	1	2	3	4	5	6	/	/
	DRED 1 /5	DRED 2/6	DRED 3/7	DRED 4/8	REF GEN/0	COMLOAD/0	/	/
RRCR	1	2	3	4	5	6		
	K1	K2	K3	K4	3.3V	/		
AUX1	1	2	3	4	5	6		
	DO1_NO	DO1_COM	DO1_NC	DI_negative	DI_positive	GND		
AUX2	1	2	3	4	5	6		
	DO2_NO	DO2_COM	DO2_NC	DI_negative	DI_positive	GND		

6.7. Mount Covers of the Inverter and Battery

After finishing electrical connection of energy storage system, please follow the below steps to mount the covers.

1. Mount the cable cover of battery, Refer to 1-2 in Figure 6-30.

(1) Cut a cable hole based on the cabling routing and route the cables through the cable hole.

(2) Align the top surface of the cable cover to the top surface of the battery housing.

(3) Align the protrusions on the right side of the cable cover to the slots on the left side of the battery's front cover, then push the cable cover right to the battery housing till hearing the "click" sound.

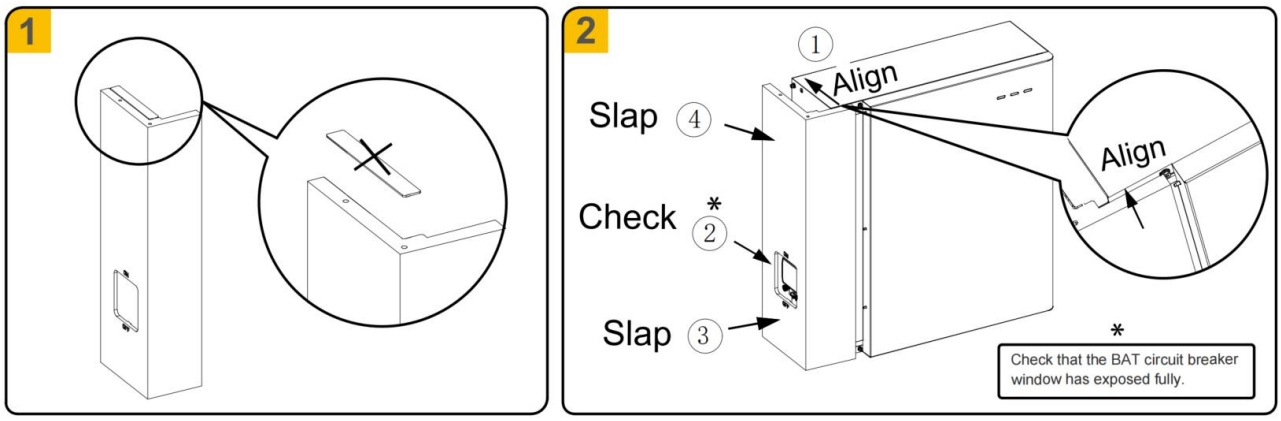


Figure 6-29 Install the cable cover for the battery

2. Disassemble the cable cover of the battery

(1) Grasp the cable cover, then pull it to the left, Refer to 1 in Figure 6-31.

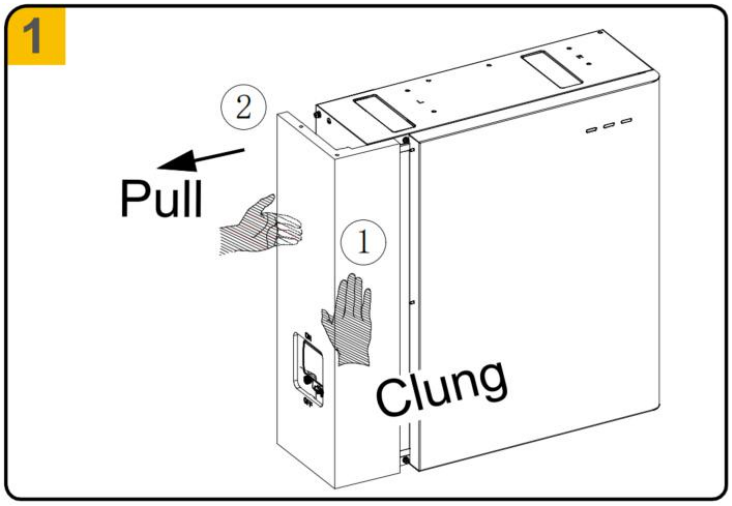


Figure 6-30 Remove the c wire of the battery

3. Mount the covers of the inverter

(1) Attach the top cover to the inverter.

Place the top cover on top of the inverter, align two locating pins on the inverter housing to the holes on the top cover and slide it forward. The two side screws of the top cover should align to the inverter mounting threaded holes. Secure the top cover to the inverter (tool: T20 screwdriver, torque: 1.6Nm).

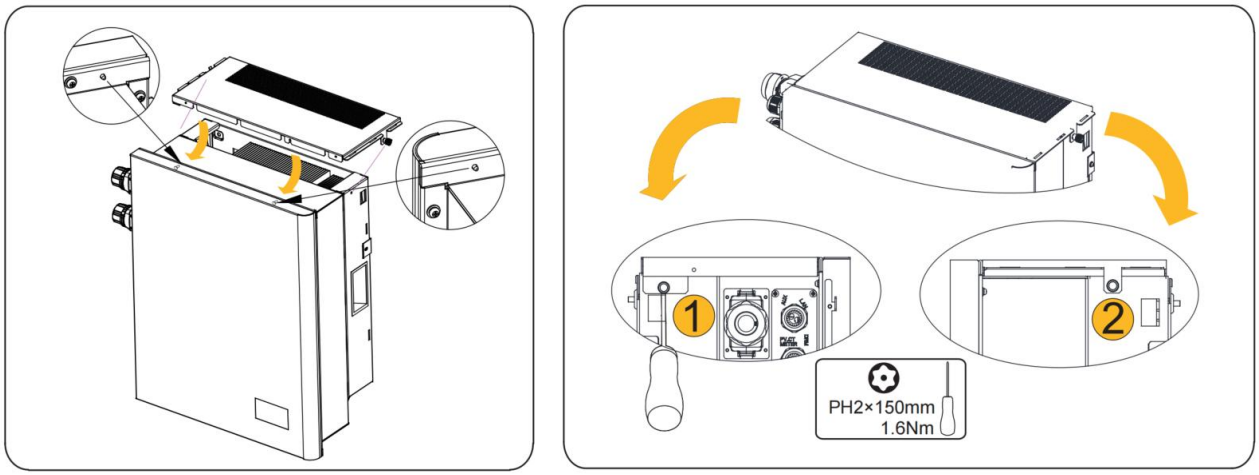


Figure 6-31 Attach the top cover to the inverter

(2) Mount left cable cover and right cover of the inverter, please follow the steps below.

- Align the hooks on the top side of the right cover to the slots at the right side of the top cover, downwards insert the right cover along the edge of the inverter front cover.

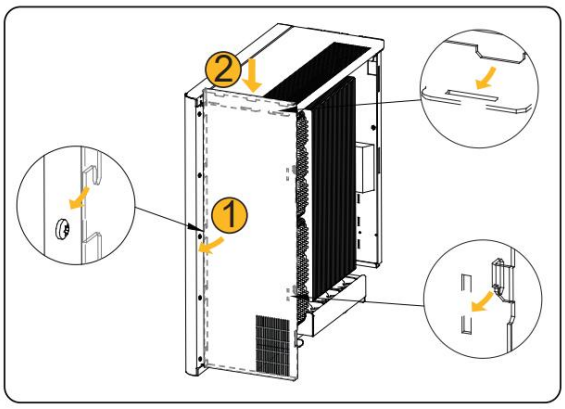


Figure 6-32 Mount the right cover

- Cut cable holes based on the PV and AC cabling routing and route the cables through the cable holes.

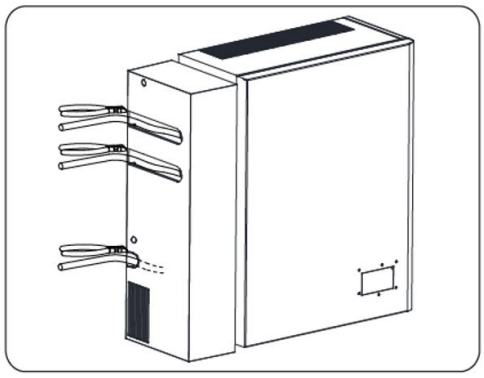


Figure 6-33 Cut cable holes

- Lift the top surface of the cable cover over the top surface of the inverter about 10mm, place the right edge of the cable cover against the left edge of the front cover of the inverter, downwards push the cable cover along the left edge of the inverter front cover till the two top surfaces are flush. When doing so, insert the bottom positioning pin and two clips into the bottom positioning hole and slots in turn.

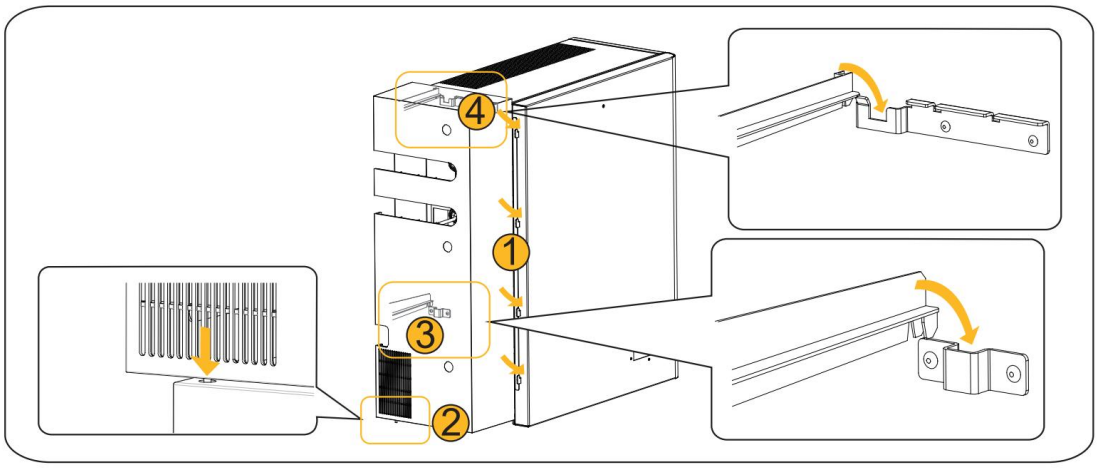


Figure 6-34 Mount the cable cover

7. Operation

7.1. Power on the System

WARNING

- Before power on the energy storage system, please ensure the PV switch & all AC and BAT circuit breakers in the system are switched OFF and cannot be reactivated.
- Never power on the energy storage system without the correct and reliable installation and electrical connection.

1. Switch on the battery circuit breaker which is at the lower left of the inverter.
2. Switch on the battery circuit breakers of all batteries (located on the left-hand side of the battery).
3. Switch on the AC circuit breaker between the grid port of the energy storage inverter and the mains grid (this AC circuit breaker should be labelled Main Switch Battery ESS Supply or similar).
4. Switch on the AC circuit breaker between the backup port of the energy storage inverter and the loads (this AC circuit breaker should be labelled Main Switch Battery ESS Backup or similar).
5. Switch on the PV switch at the left middle of the inverter if there are PV strings directly connected to the energy storage inverter.
6. Switch on the AC circuit breaker (if there is any) between any separate PV inverter and the mains grid. These separate PV inverters are also referred to as “AC-coupled PV inverters”.

7.2. Power off the System

WARNING

After the energy storage system is powered off, the remaining electricity and heat may still cause electric shocks and body burns. Please put on protective gloves and operate the product 5 minutes after the system is powered off .

1. Switch off the AC circuit breaker between the energy storage inverter and the backup loads.

2. Switch off the AC circuit breaker between the energy storage inverter and the mains grid.
3. Switch off the PV DC Isolator(s) between the PV strings and the energy storage inverter if there are any.
4. Switch off the PV switch on the left-hand side of the energy storage inverter (if there are PV strings directly connected to the energy storage inverter).
5. Switch off the battery circuit breakers of all batteries (located on the left-hand side of the battery).
6. Switch off the battery circuit breaker which is at the lower left of the inverter.

8. COMMISSIONING

8.1. Checking before Power-On

No.	Check Item	Acceptance Criteria
1	Installation/Mounting environment	The installation environment is safe and the unit has adequate clearance as per the instruction in this manual as well as in compliance with local standards. The area around the installation should be free from clutter and should not be flood-prone.
2	Battery and inverter mounting	The battery and inverter should be mounted correctly, securely, and reliably.
3	Wi-Fi mounting	The Wi-Fi module should be mounted correctly, securely, and reliably.
4	Cable layout	Cables should be routed neatly and protected adequately where exposed, in accordance with standards.
5	Cable tie	Cable ties should be secured and trimmed evenly and no burr exists.
6	Grounding	The grounding cables should be connected correctly, securely, and reliably. Impedance/resistance checks should be conducted to confirm reliable Earth connections.
7	Switches and breakers status	The PV switch (if there is any) and battery circuit breakers and any AC circuit breakers connecting to the energy storage system should be OFF.
8	Cable connections	The AC cables, PV cables (if there are any), battery power cables, and communication cables should be connected correctly, securely, and reliably.
9	Unused ports	Unused power ports and communication ports should be sealed from water or dust ingress by watertight caps.

8.2. Power on the Product before Commissioning

WARNING

- Before doing electrical connection, please ensure the PV switch & all AC and BAT circuit breakers in the system are switched OFF and cannot be reactivated.
- Never power on the energy storage system without the correct and reliable installation and electrical connection.
- Don't switch on the PV switch on the energy storage inverter.
- Don't switch on the AC circuit breaker on the PV inverter (if there is any).

1. Switch on the battery circuit breaker at the left middle of the energy storage inverter.
2. Switch on the battery circuit breakers of all batteries.
3. Switch on the external AC circuit breaker between the grid and the energy storage inverter.
4. Please strictly follow the aforementioned steps to power on the system.

8.3. Installing New System and Setting up the App

8.3.1. Download and Install the App

1. Android device users can download the App through major Android App stores such as Google Play. You can also scan the following QR code to install.
2. IOS device users can search for "AlphaESS" in the App Store and download the App. You can also scan the following QR code to install.

Figure 8-1 AlphaESS App

8.3.2. Register as an Installer

If you don't have an installer account, please register first.

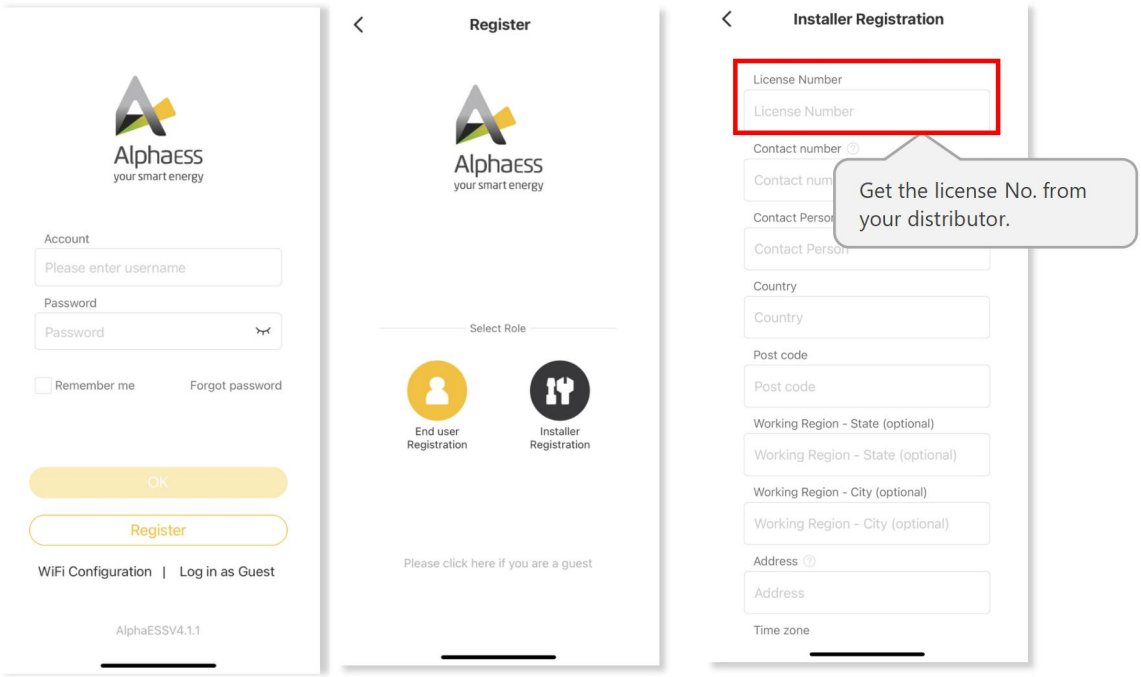


Figure 8-2 APP register and login

If you already have an installer account, please log in directly.

8.3.3. Overview of Functions for Installer Account

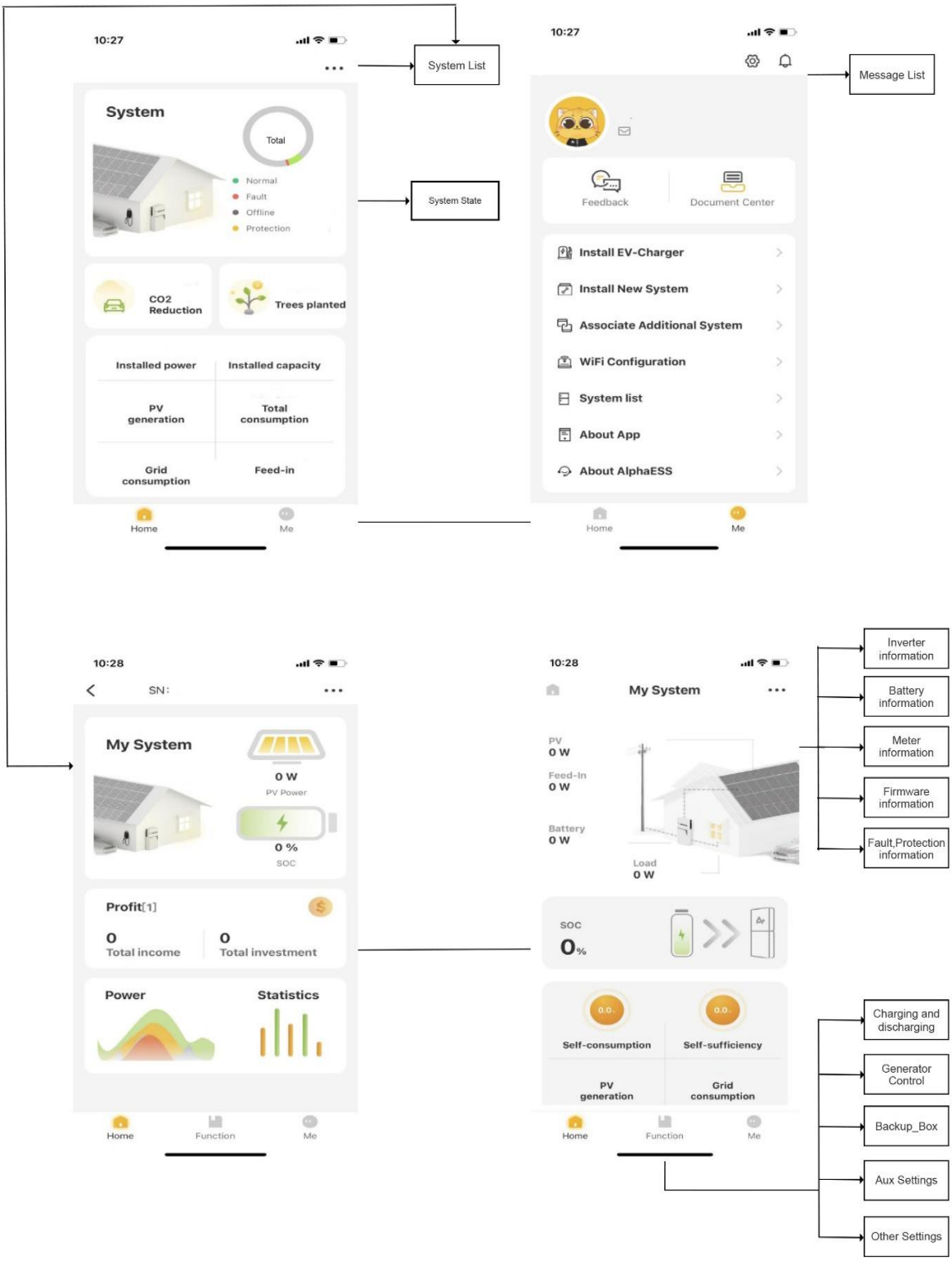


Figure 8-3 Account Functions

8.3.4. Install New System on the App

You can carry out “Install New System” as follows:

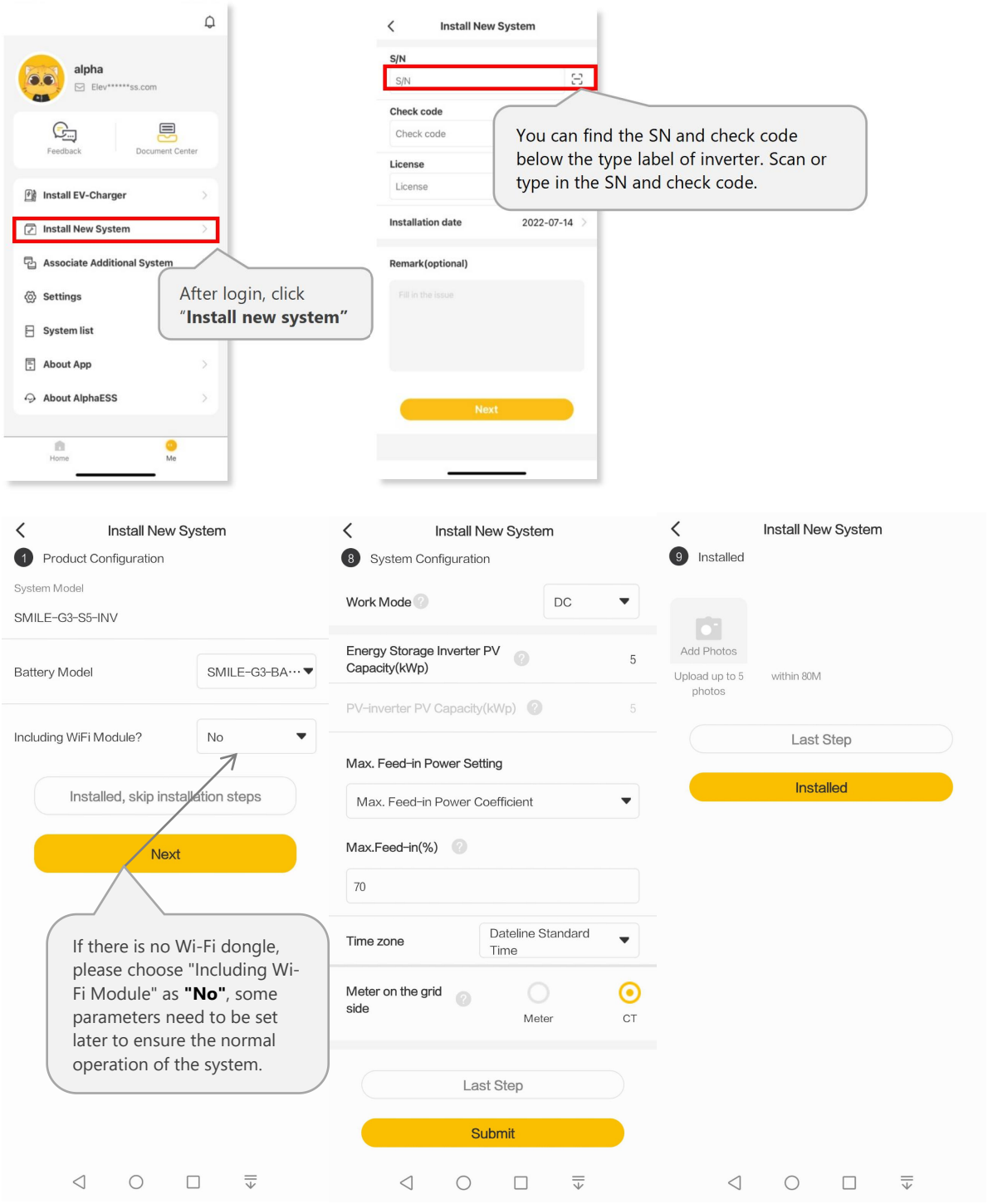


Figure 8-4 Install the new system in APP

For regular installers, please click “Install New System”, enter your installer account ID in the “license” field to bind the system to your account and “activate” the system. Enter S/N, check code, license, installation time and click the “save” button.

NOTICE

More settings are needed for installers in Australia. If you are an installer in Australia, you will need to fill in the Street (NMI), Suburb (NMI), Postcode (NMI) fields for the Region section, which has six fixed options (NSW, QLD, VIC, SA, TAS, WA). If SA is selected as the region, two more fields are required, which are Agent and NMI. These fields are necessary in response to the requirements of the Network Operator for Dynamic Export and PV output control by a Relevant Agent.

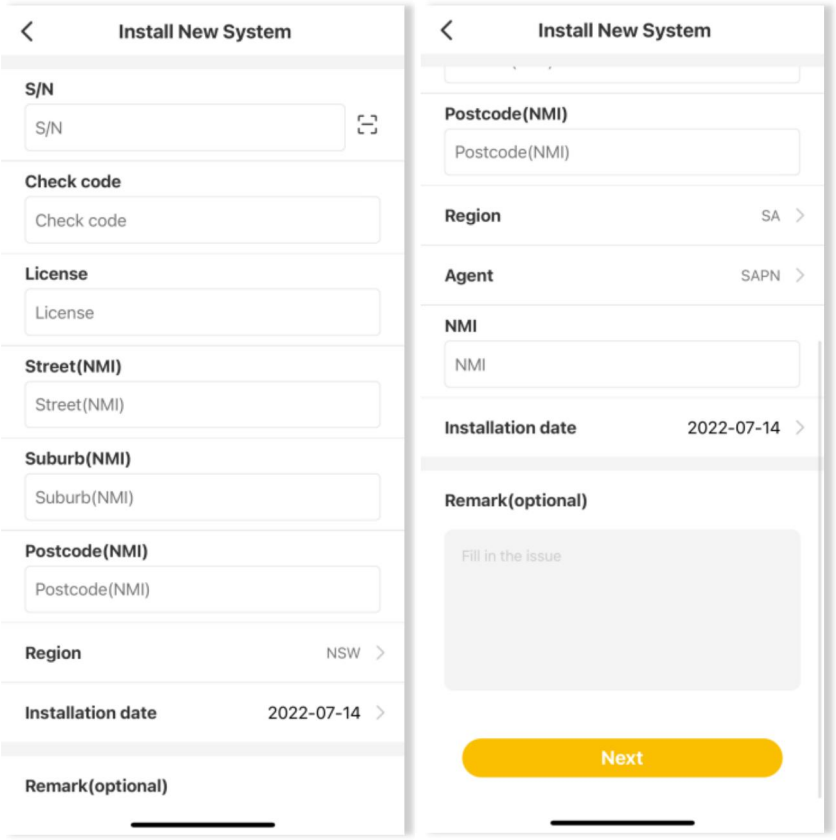


Figure 8-5 Australian Installer

Fields that are not marked "optional" need to be filled in.

Click "Next".

8.3.5. Instruct the End User to Install the App

Please make sure that end user has downloaded the App, registered the account correctly, and bound the system SN.

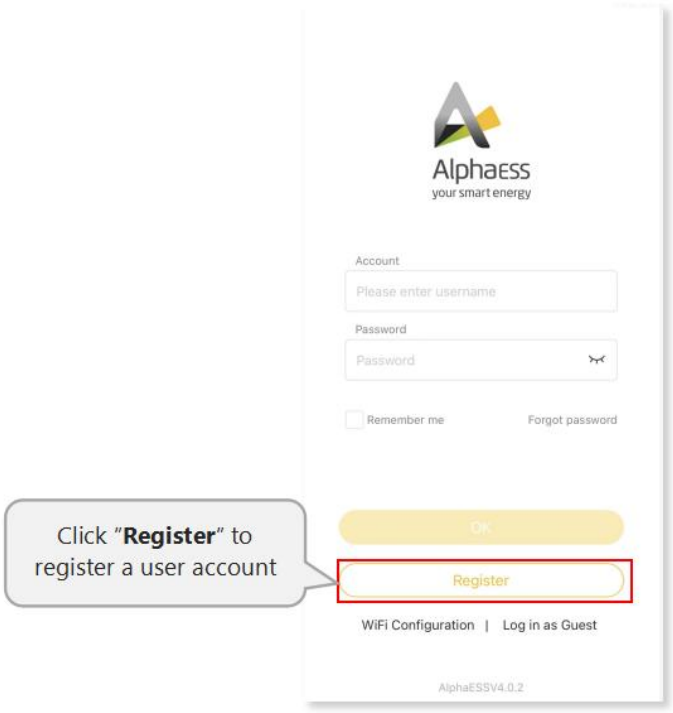
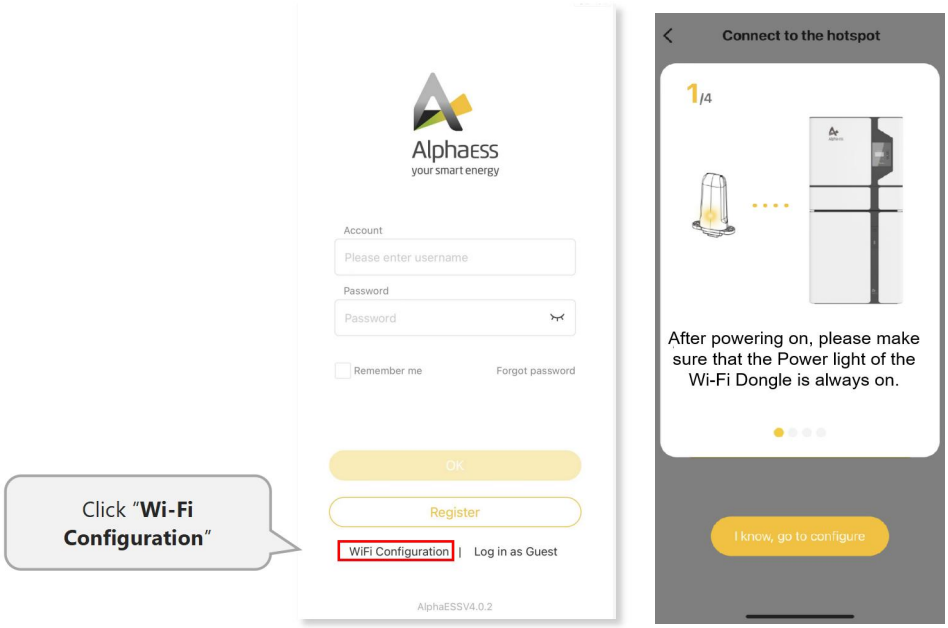


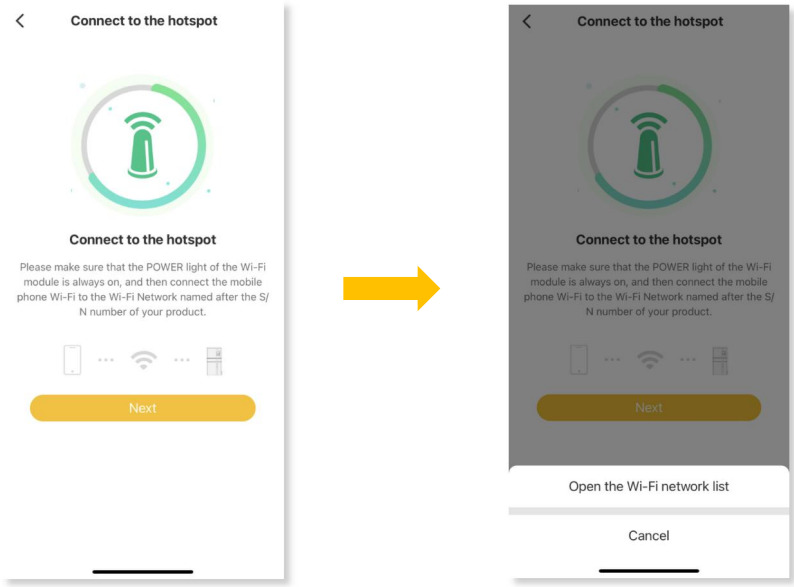
Figure 8-6 User account registration

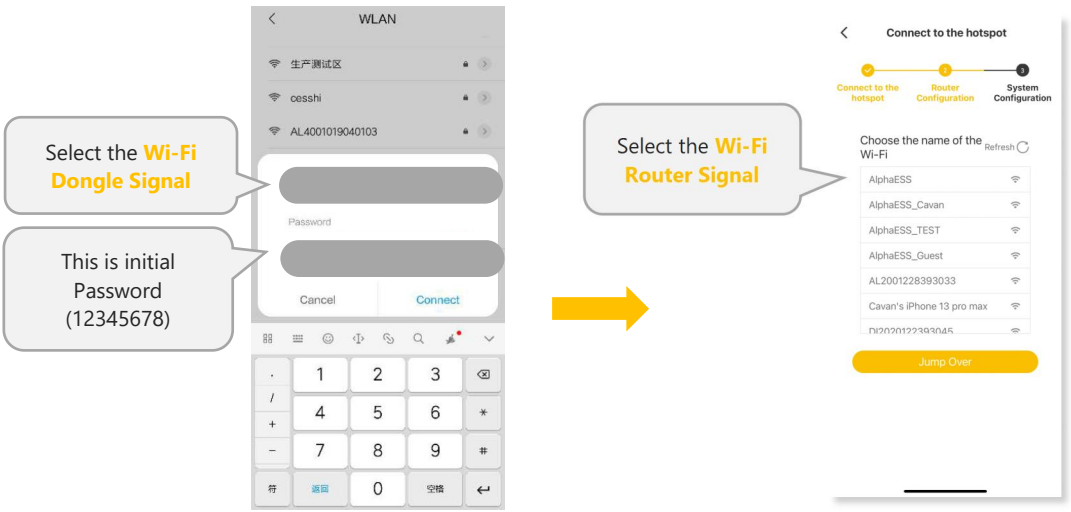
8.4. Wi-Fi Configuration and Basic Parameters

This section is for user who has an energy storage system with a Wi-Fi dongle.
The AlphaESS APP is used to configure the network, set system basic parameter, monitor system operating status and check configuration .

8.4.1. Wi-Fi Dongle Configuration


Alphaess
your smart energy
Account
Please enter username
Password
Password
Remember me
Forgot password
OK
Register
WiFi Configuration
Log in as Guest
AlphaESSV4.0.2
Click "Wi-Fi Configuration"
Connect to the hotspot
1/4
After powering on, please make sure that the Power light of the Wi-Fi Dongle is always on.
I know, go to configure


Connect to the hotspot
Connect to the hotspot
Please make sure that the POWER light of the Wi-Fi module is always on, and then connect the mobile phone Wi-Fi to the Wi-Fi Network named after the S/N number of your product.
Next
Connect to the hotspot
Connect to the hotspot
Please make sure that the POWER light of the Wi-Fi module is always on, and then connect the mobile phone Wi-Fi to the Wi-Fi Network named after the S/N number of your product.
Next
Open the Wi-Fi network list
Cancel


Select the Wi-Fi Dongle Signal
This is initial Password (12345678)
WLAN
生产测试区
cesshi
AL4001019040103
Password
Cancel
Connect
Select the Wi-Fi Router Signal
Connect to the hotspot
Connect to the hotspot
Router Configuration
System Configuration
Choose the name of the Wi-Fi
Refresh
AlphaESS
AlphaESS_Cavan
AlphaESS_TEST
AlphaESS_Guest
AL2001228393033
Cavan's iPhone 13 pro max
Jump Over

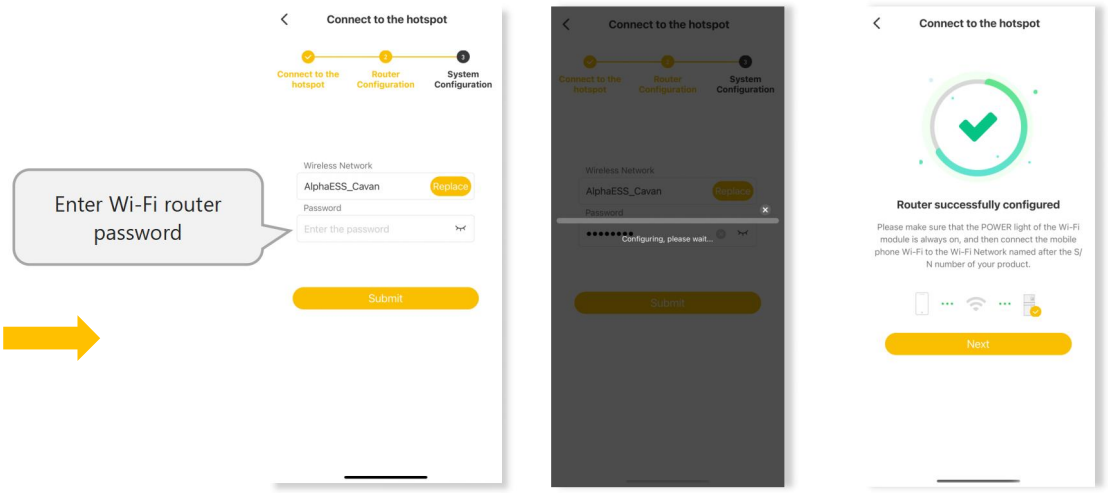


Figure 8-7 APP Wi-Fi connection and configuration

NOTICE

- The system will not be able to connect to the internet without either a physical LAN cable connection or configured Wi-Fi if the Wi-Fi module is used.
- To ensure account security, change the Wi-Fi password periodically and keep the new password in mind. Not changing the initial password may cause password disclosure. A password left unchanged for a long period of time may be stolen or cracked. If a password is lost, devices cannot be accessed.

8.4.2. Basic Parameters Settings

DC Mode

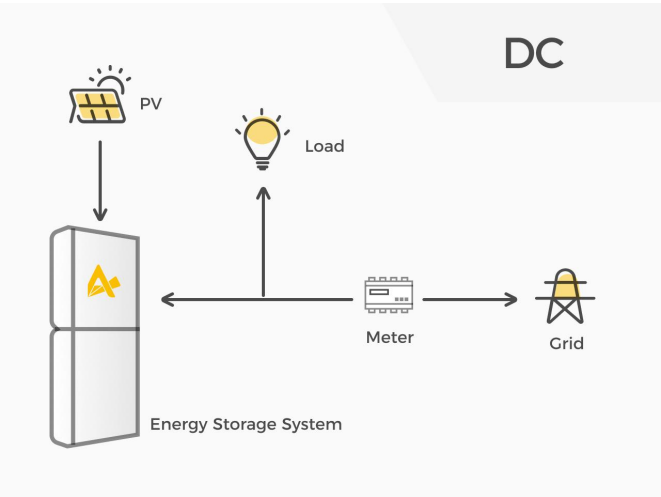


Figure 8-8 DC Mode

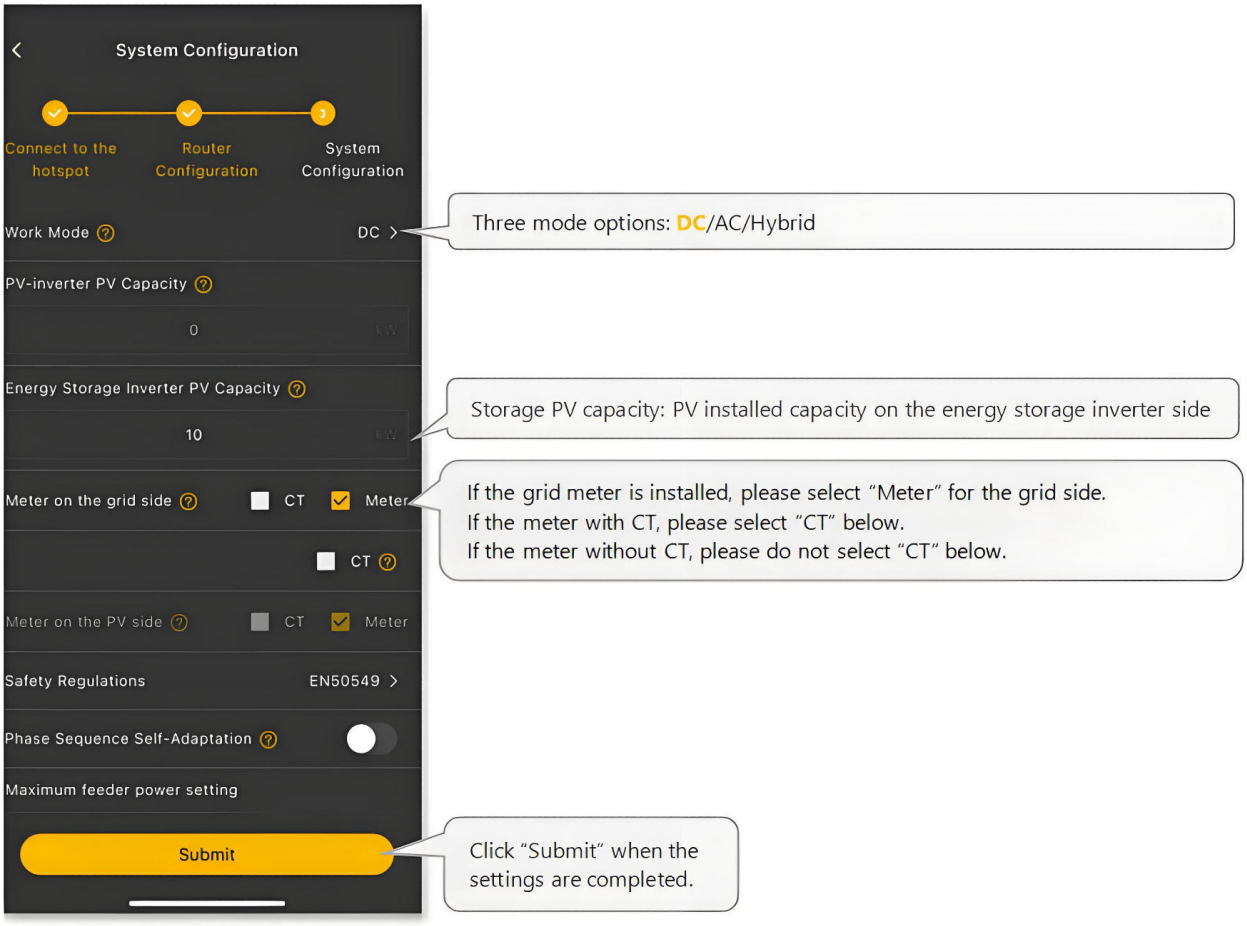


Figure 8-9 APP DC mode Settings

AC Mode

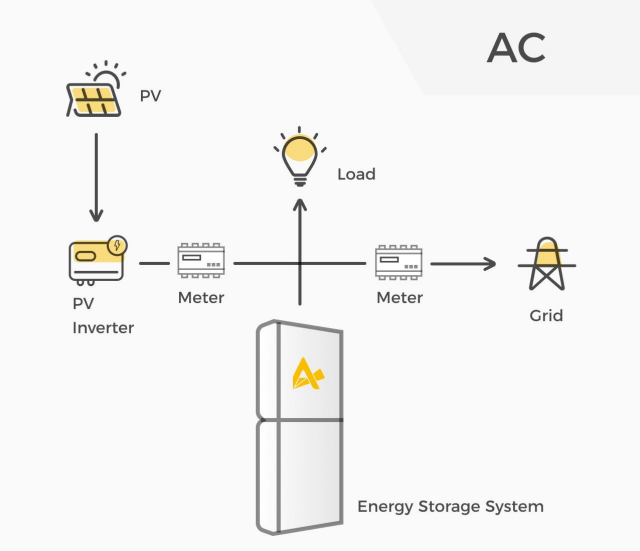


Figure 8-10 AC Mode

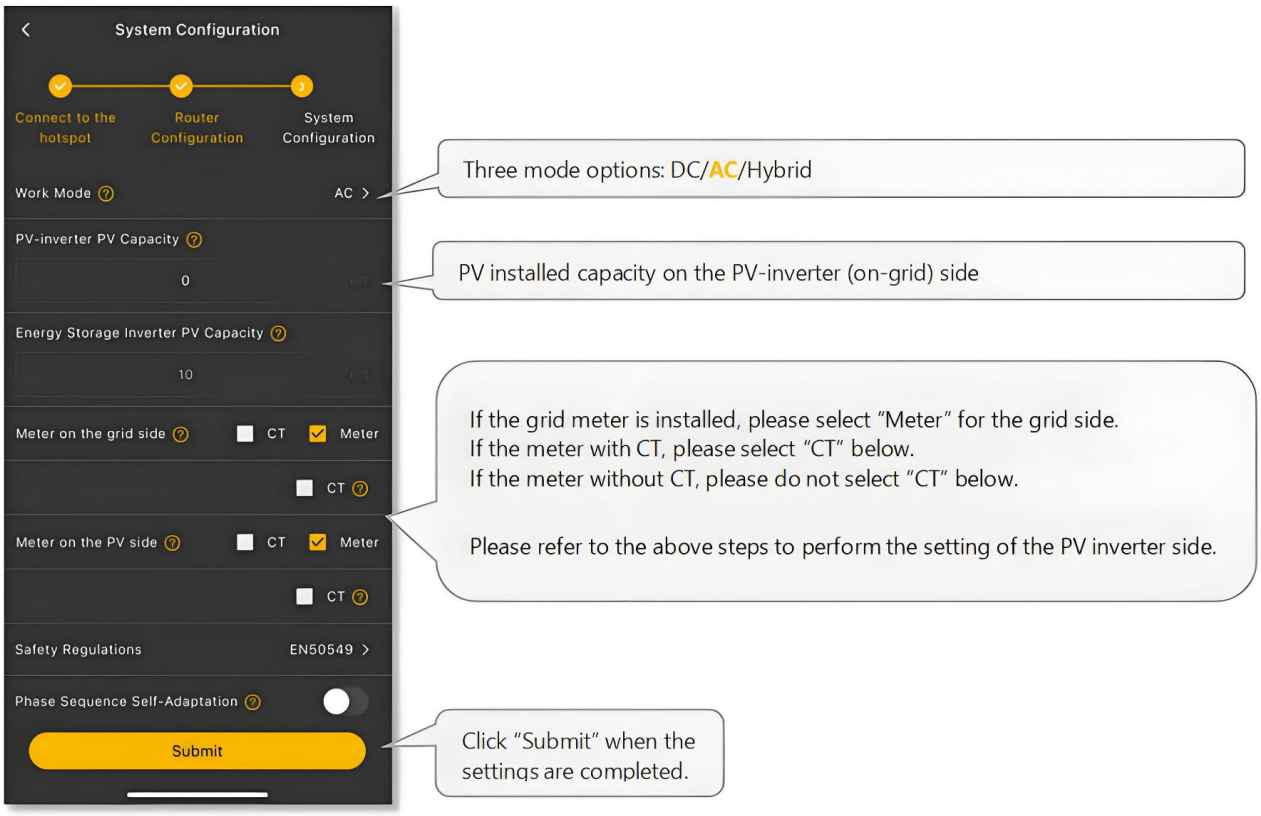


Figure 8-11 APP AC mode Settings

Hybrid Mode

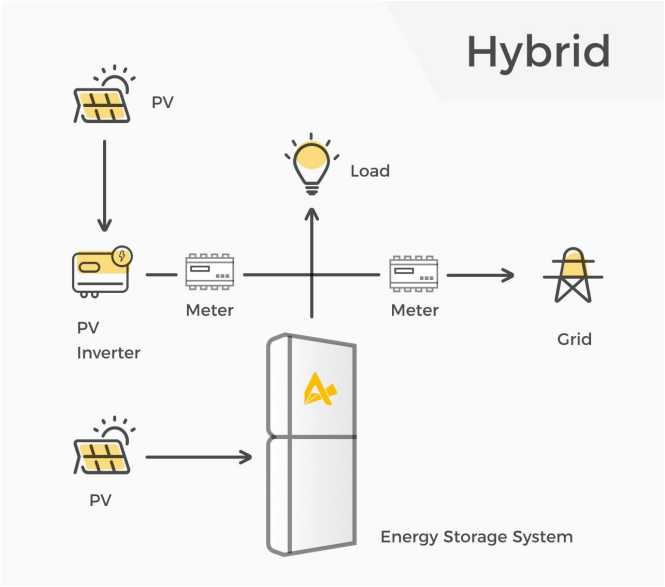


Figure 8-12 Hybrid Mode

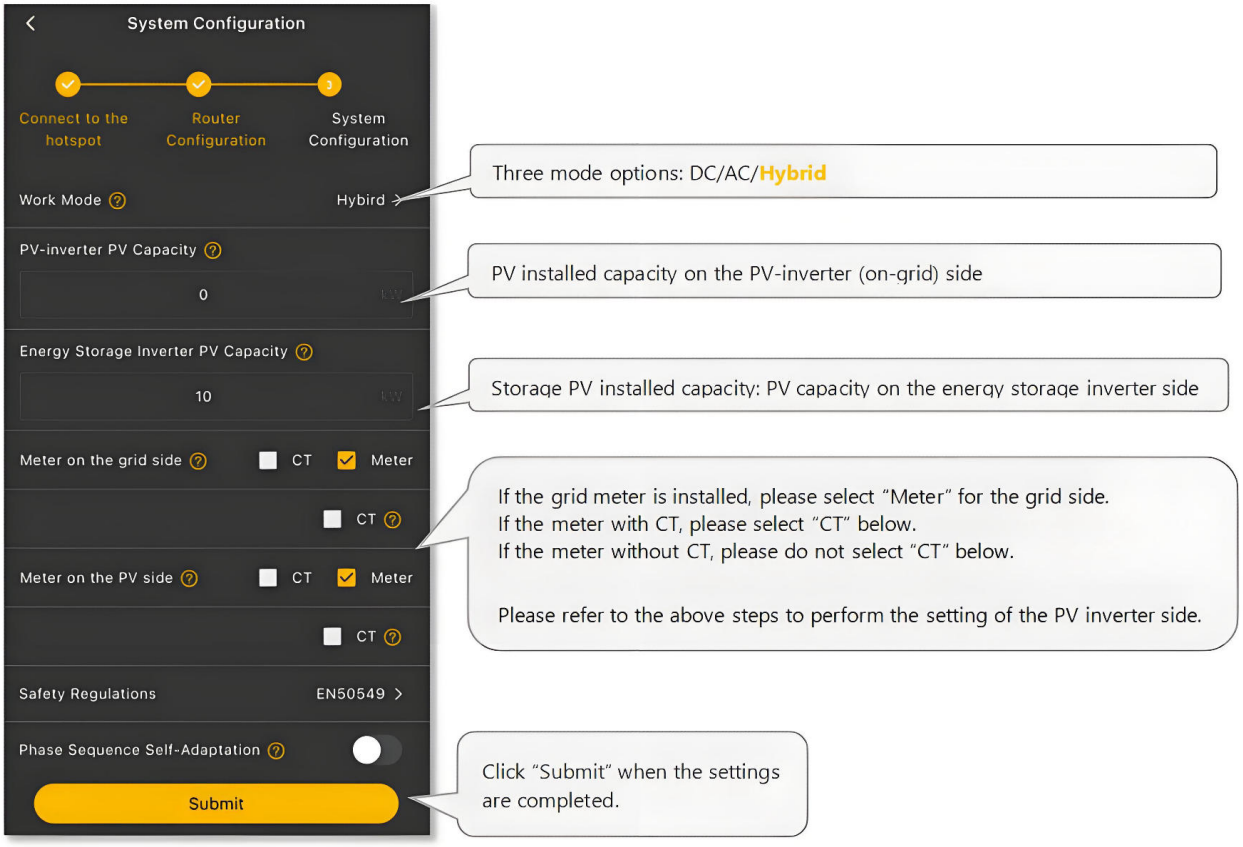
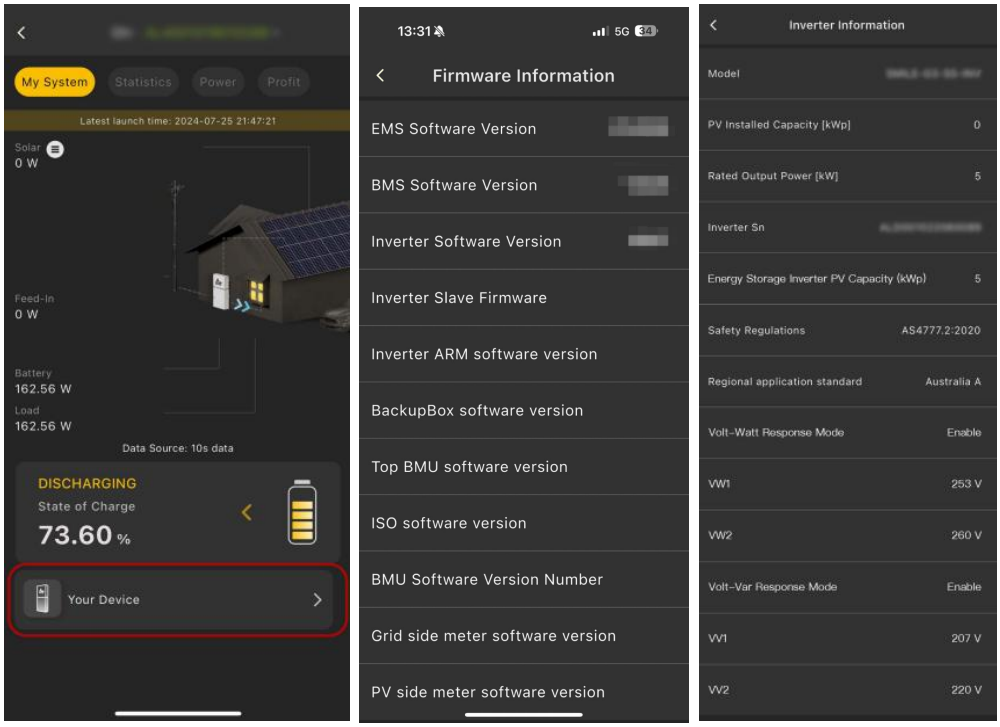


Figure 8-13 APP Hybrid mode Settings

8.4.3. Information on the main page

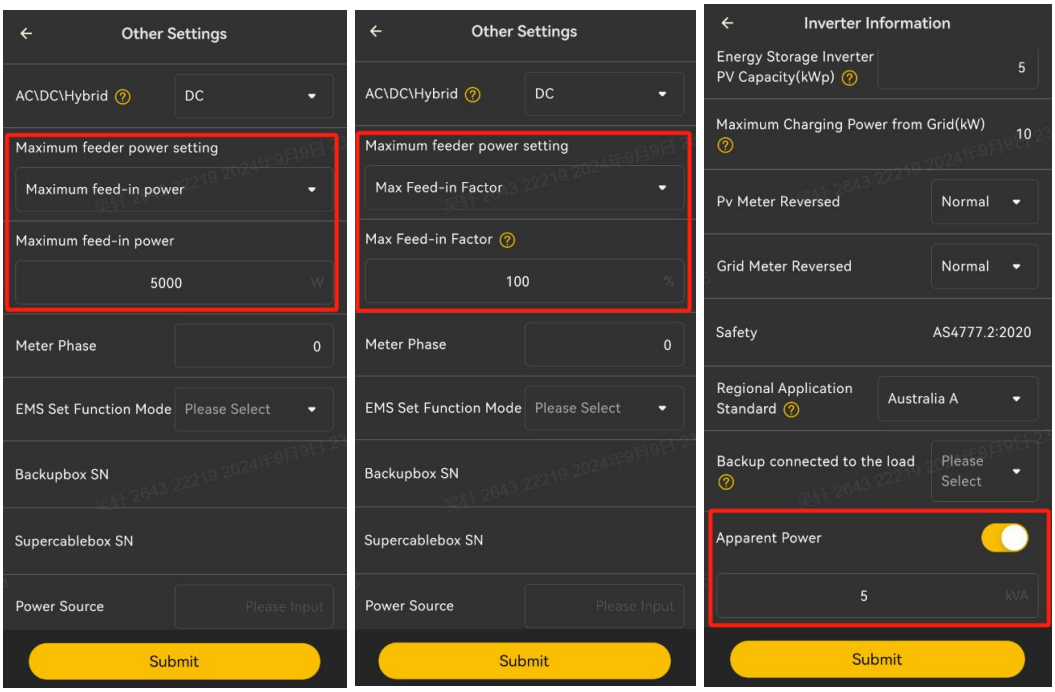
After finishing the basic parameters setting, all the stauts can be found via the main page. On the main page, tap "your device" to view the information for the system. The firmware version can be checked in the "Firmware information", and the safety regulations, the power quality modes and setpoints can be viewed through the "inverter information". Once the safety regulation is chosen during the basic parameters setting, only the Alpha service engineer can change the safety regulation and the setpoints for the power quality response modes. Please contact AlphaESS to change settings when necessary.



8.4.4. Function settings

8.4.4.1 Generation and export limitation

Specifically, if you are an installer who wants to set the soft export limit, you can set the allowable max feed-in factoe from 0-100%, the output to the grid will be reduced based on the inverter maximum output power multiplied by the factor. Or you can set the allowable max feed-in power from 0 W to the rated power of inverter. To switch to the hard export limit and keep the same value, please contact Alpha ESS. To set up the generation limit (for both hard and soft limit), go to your device after the configuration and choose "Inverter Information", where you can set the number of the apparent power for generation limit.



CAUTION

The safety standard field must be set correctly

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

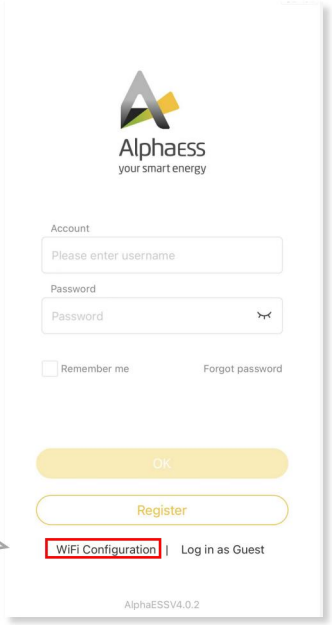
- If you are not sure which safety standard is valid for your country, region or purpose, contact your Network Operator for information on which safety standard should be used.

NOTICE

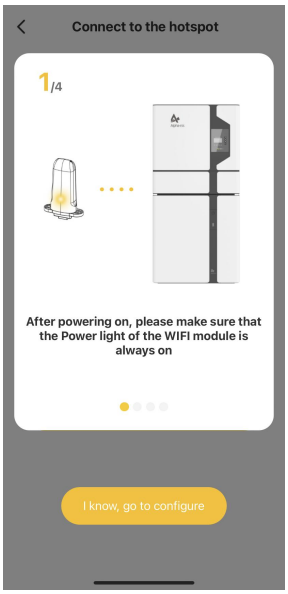
A Note on setting Feed-In limits with multiple PV systems

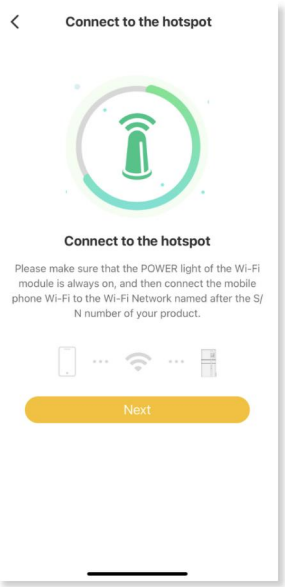
If the product is installed with DC-connected Solar Panels as well as with an existing AC-coupled PV system, Installers may need to set a Feed-In limit to comply with Local Regulations.

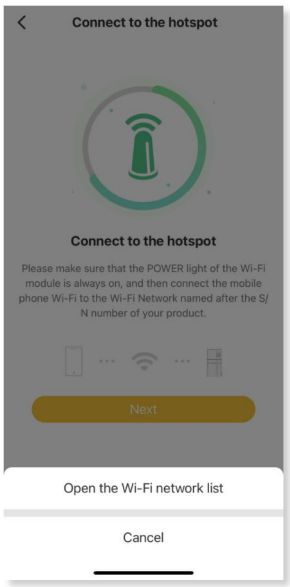
The Feed-in limit should be set to the total Phase feed-in limit set by the Network Operator, regardless of the size of the existing AC-coupled PV system. Only set the feed-in limit to *zero* if the Network Operator has dictated *zero feed-in* from the house.



Click "**WiFi Configuration**"





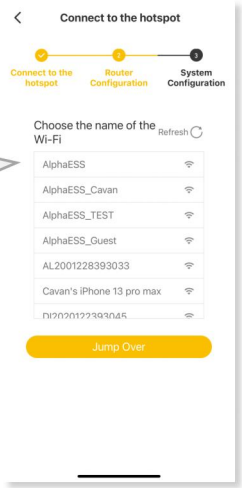


Select the **Wi-Fi Module Signal**

This is default Password (12345678)



Select the **Wi-Fi Router Signal**



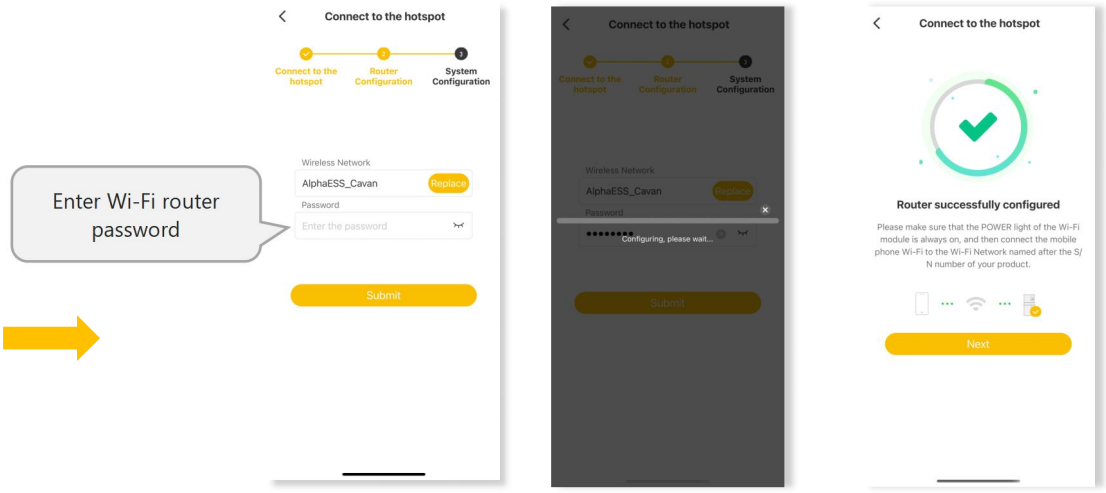


Figure 8-14 APP Wi-Fi connection and configuration

NOTICE

- The system will not be able to connect to the internet without either a physical LAN cable connection or configured Wi-Fi if the Wi-Fi module is used.
- To ensure account security, change the Wi-Fi password periodically and keep the new password in mind. Not changing the initial password may cause password disclosure. A password left unchanged for a long period of time may be stolen or cracked. If a password is lost, devices cannot be accessed.

8.5. Regiter on AlphaCoud

8.5.1. Register as Installer Account on AlphaCoud

If you do not already have an Installer account, you can create a new account on our web server for system monitoring purposes. In addition, Alpha Warranty is predicated on this connection to our web server.

The data produced prior to registration can be synchronized to the web server.

Step1： Please open the portal: www.alphaess.com.

Step2： Please fill in “Username”, “Password” and click “Login” if you have already registered.

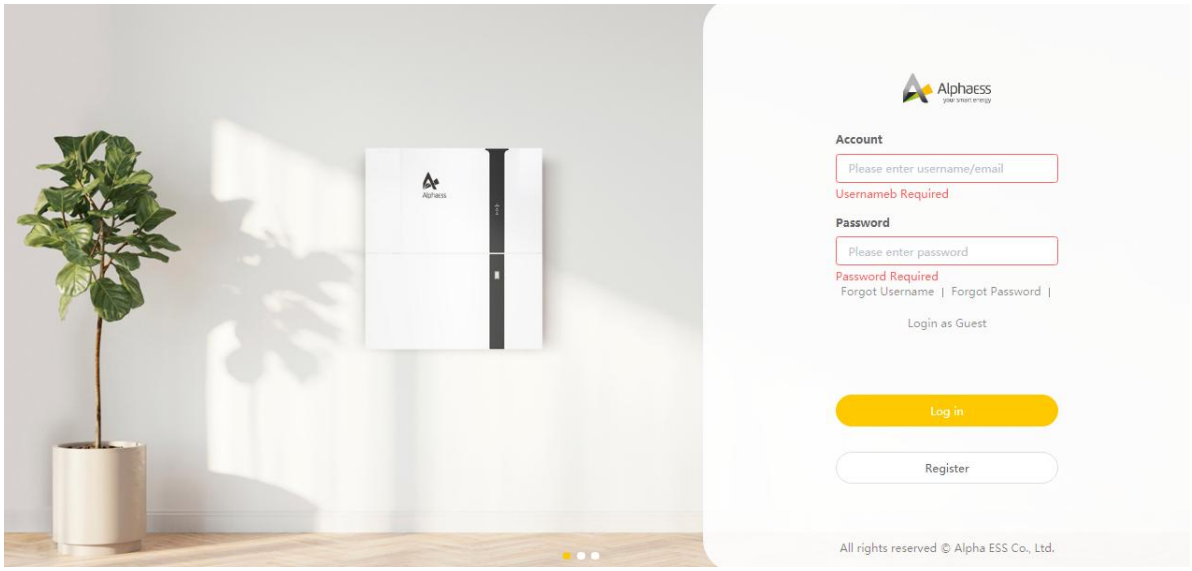


Figure 8-15 Alpha Cloud platform login page

If not, please register by filling in the following web form；

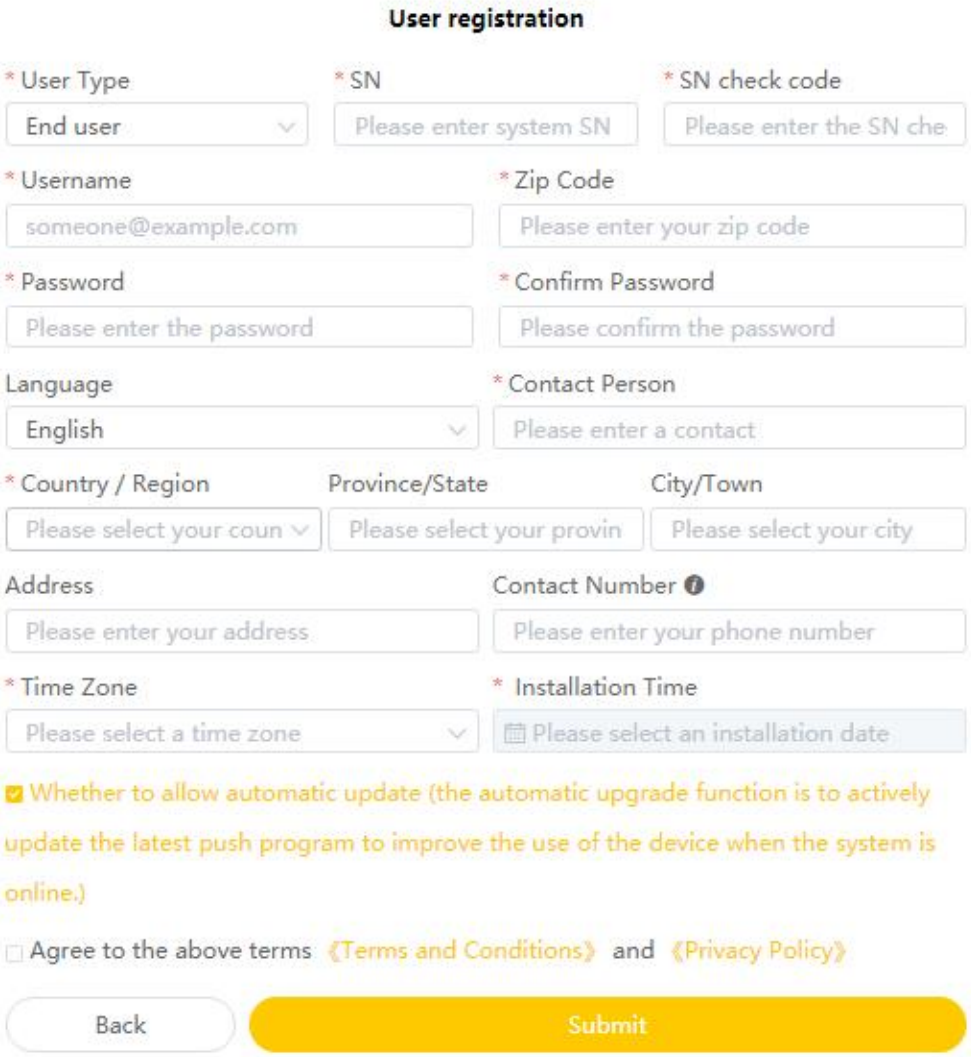


Figure 8-16 User registration

In this form, all fields with a red star are compulsory.

***Serial Number:** SN (please see the type label of the inverter)

***Username:** 5-15 letters / numbers

***Password:** 5-15 letters / numbers / characters

More details are available in the Online Monitoring Web Server Installers User Manual, which can be downloaded from the AlphaESS homepage.

8.5.2. Install New System on AlphaCoud

Installers who haven't yet registered need to click “Register” to visit the registration page. Please refer to the “AlphaCloud Online Monitoring Web Server Installers User Manual”, which you can get from the Alpha sales team and get a Alpha Installer license number.

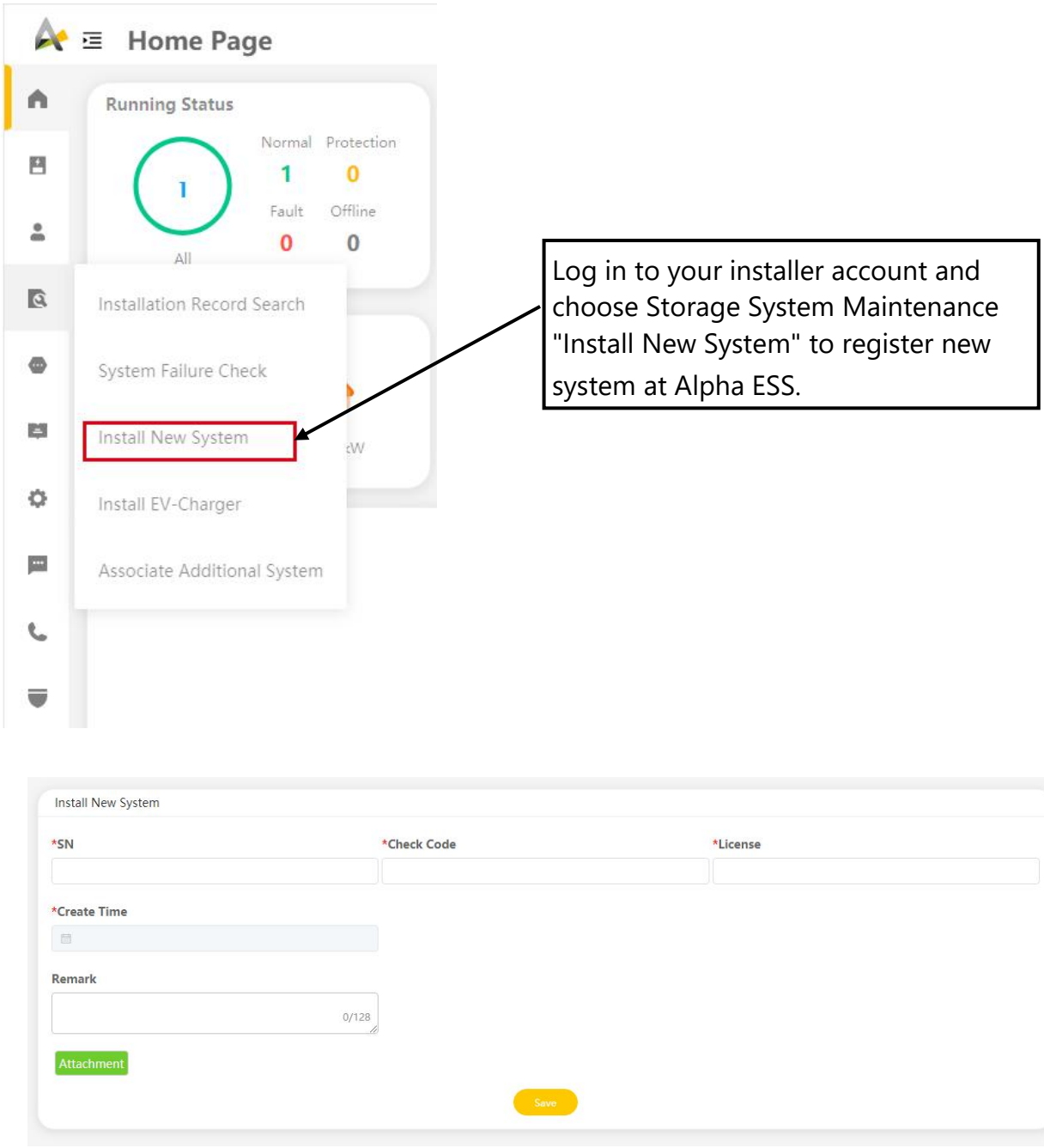


Figure 8-17 Install the new system on the Alpha Cloud platform

Enter the system S/N, check the code, license, and installation date, then click the “Save” button. The red * indicated a required field. Click the “Browse” button to select any attachment you want to add.

8.6. Check System Wiring and Meter Installation

Check the grid's voltage range and frequency range and the installation (including location, direction and phase sequence) of all CT(s) and/or meter(s).

You can directly commission the system after the system configuration process.

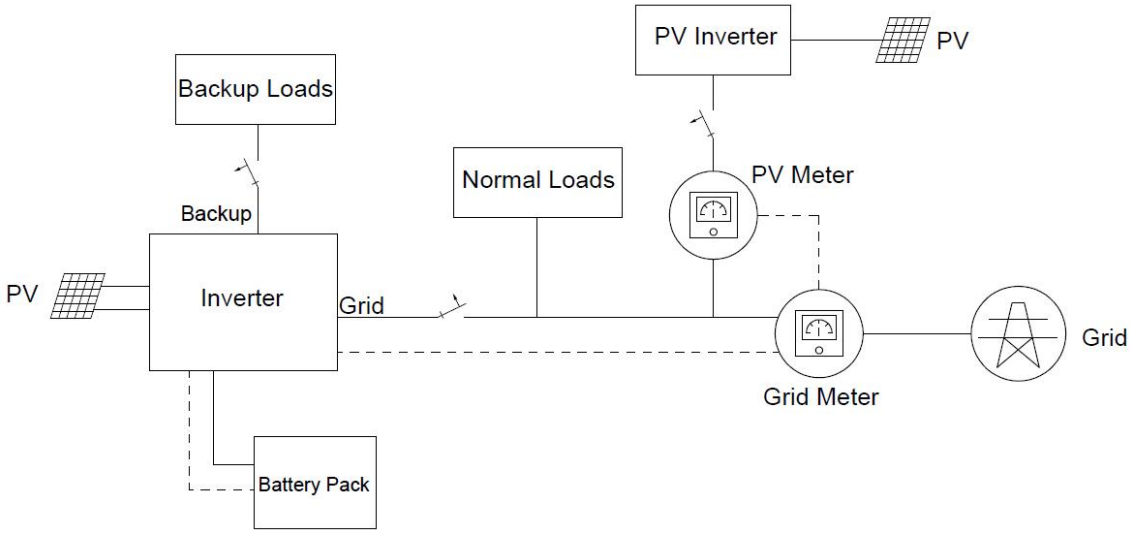


Figure 8-18 Brief wiring diagram of hybrid system

1. Detailed operating steps to check system wiring and meter installation as follows:

Please perform the steps below for the circuit breakers and PV switch in the system.

- Switch on the battery circuit breaker of the energy storage inverter.
- Switch on the battery circuit breakers of all batteries.
- Switch on the AC circuit breaker between the grid port of the energy storage inverter and the grid.
- Switch on the AC circuit breaker between the backup port of the energy storage inverter and the loads.
- Switch off the PV switch of the energy storage inverter.
- Switch off the AC circuit breaker (if there is any) between the PV inverter and the grid.
- At this moment, the energy storage inverter will enter NORMAL state.
- Please turn off all loads. If you can’t, please ensure that there aren't loads of large power fluctuations connected in the system.
- Log on to the AlphaESS APP and click to page “My System” and note the current "Load".



Figure 8- 19 My system page on the APP

2. Operate the App and follow the instructions below to enable "Charge Batteries from the Grid".

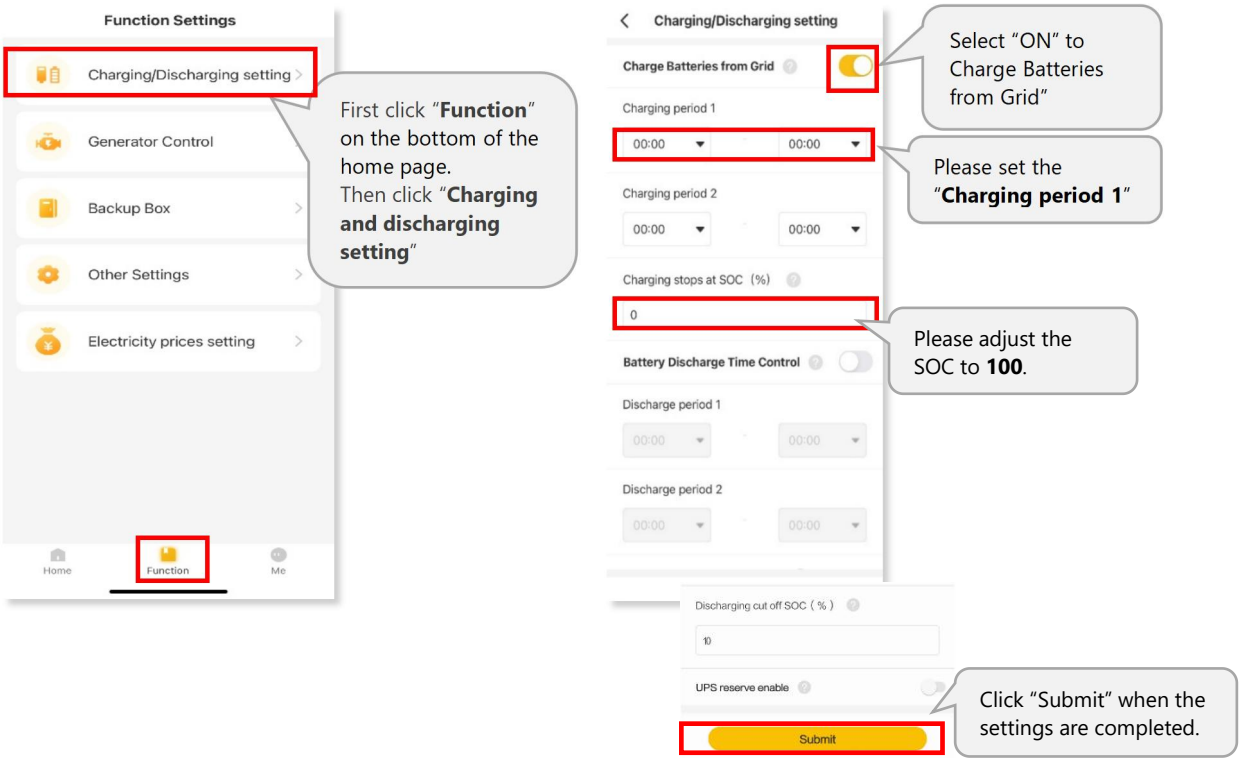


Figure 8-20 Settings for charging the battery from the power grid

If the formula "Grid Power≈ **Load**+ Battery Charging Power" fits well, the grid meter installation of the energy storage inverter is correct. Please remember to deactivate the "Charge Batteries from Grid" by clicking "OFF" and save the changes.



Figure 8-21 Confirmation of installation of power grid electricity meters

If the data doesn't fit well, please perform the troubleshooting below.

Meter Type	Solution
BB, BB Plus	Please refer to the relative system wiring diagram to check the wiring. If the error persists, contact AlphaESS customer service for further check.
Meter (without CT)	Check the wiring and location of the grid meter.
Meter (with CT)	Check the location, direction, phase sequence and cable connection of the grid CT.
CT Only	Check the location, direction and cable connection of the grid CT.
P1 meter reader	Check the connection and installation configuration of the P1 meter reader.

3. If there isn't PV inverter in the system, please skip this step.

If PV inverter exists in the system, switch on the AC breaker between the PV inverter and the grid.

Click the App, turn to page "Running Information" and check the power value of "PV Inverter Power". If the power value is positive, the meter installation of PV inverter is correct.

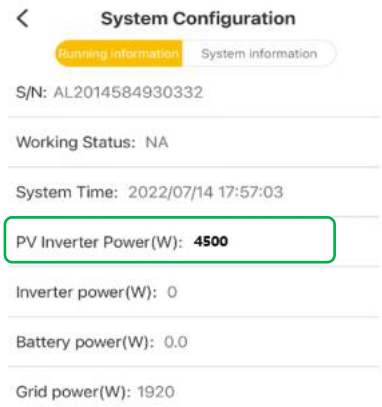


Figure 8-22 Check the power of the photovoltaic inverter

If the power value of "PV Inverter Power" is negative, please perform the troubleshooting below.

Meter Type	Solution
BB, BB Plus	Please refer to the relative system wiring diagram to check the wiring. If the error persists, contact AlphaESS customer service for further check.
Meter (without CT)	Check the wiring and location of the grid meter.
Meter (with CT)	Check the location, direction, phase sequence and cable connection of the grid CT.
CT Only	Check the location, direction and cable connection of the grid CT.
P1 meter reader	Check the connection and installation configuration of the P1 meter reader.

4. If there are PV modules connected directly to the energy storage inverter, switch on the PV switch of the energy storage inverter.
5. Switch off the AC breaker between the grid port of the energy storage inverter and the grid. At this moment, please check whether the electrical appliance connected to backup side of the energy storage inverter runs normally. Otherwise, please contact Alpha service for further check.

NOTICE

During commissioning, if the LEDs on the display panel of the inverter or the battery show red or yellow, please refer to troubleshooting chapter of the Installation, Operation & Maintenance Manual.

6. Congratulation. All required checks of system wiring and meter installation have been finished successfully.

9. Maintenance and Troubleshooting

9.1. Routine Maintenance

In order to maintain the accuracy of the SOC, it is recommended to perform a full charge calibration for SOC (charge the battery until the charge power is 0W) on the battery at regular intervals (such as two weeks).
Before cleaning, ensure that the system is disconnected from all power sources. Clean the housing, cover and display panel with a soft cloth.
To ensure that the energy storage system can operate properly in the long term, it is advised to perform routine maintenance as described in this chapter.

Maintenance checklist

Check Item	Acceptance Criteria	Maintenance Interval
Product cleanliness	The enclosure of the inverter should be free from obstacles or dust.	Once every 6 to 12 months
Product visible damage	The product should be not damaged or deformed.	Once every 6 months
Product running status	1. The product should operate without any abnormal sound. 2. All parameters of the product should be set correctly. Perform this check when the product is running.	Once every 6 months
Electrical connections	1. Cables should be securely connected. 2. Cables should be intact, and in particular, the cable jackets touching the metallic surface should not be scratched. 3. Unused cable glands should be blocked by rubber sealing which are secured by pressure caps.	Perform the first maintenance 6 months after the initial commissioning. Thereafter, perform the maintenance once every 6 to 12 months.

CAUTION

Risk of burns due to hot enclosure of the inverter

The enclosure of the inverter can get hot during operation.

- Do not touch any parts other than the display panel during operation.
- Wait approximately 30 minutes for the inverter to cool down before cleaning.

9.2. Troubleshooting

9.2.1. Common Errors

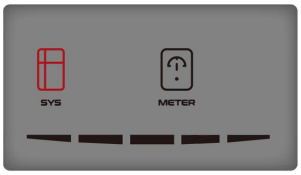
NOTICE

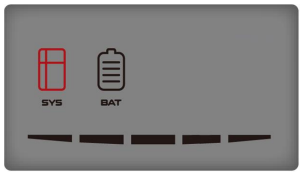
1. The four LEDs in the first row are system (SYS), battery (BAT), meter (METER), and communication (COM).
2. The five LEDs in the second row serve two functions:

- During normal system operation, they indicate the SOC operation status of the batteries connected in this energy storage system.
- During abnormal system operation, they display corresponding error codes. Each light represents a number, with values of 1, 2, 4, 8, and 16, from right to left.

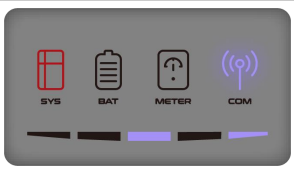
Communication Troubleshooting

LED Indictor	Error Code	LED Display	Description	Troubleshooting
SYS red light is flashing fast	4		Inverter lost	Inverter communication lost 1. Restart the system. 2. Contact service to remotely update the inverter program. 3. If the error persists, contact service for further check.
SYS red light is glowing. METER light is flashing fast if Grid meter lost. METER light is flashing slow if PV meter lost. METER light is off if all meters lost.	5		Grid meter lost	Grid side meter lost 1. Check whether the system configuration parameters of AlphaESS APP or AlphaCloud are correct and whether the meter is used on the grid side 2. Check whether the communication cable of the grid meter is connected correctly (RS485：

				3A6B). 3．Check whether the communication configuration parameters of the grid meter are correct (communication address and baud rate). 4. If the error persists, contact service for further check.
	6		PV meter lost	PV inverter side meter lost 1. Check whether the system configuration parameters of AlphaESS APP or AlphaCloud are correct and whether the meter is used on the PV inverter side 2. Check whether the communication cable of the meter of PV inverter side is connected correctly (RS485:3A6B). 3. Check whether the communication configuration parameters of the meter on the PV inverter side are correct (communication address and baud rate). 4. If the error persists, contact service for further check

SYS red light is glowing, BAT light is off	7		BMS lost	BMS lost 1. Check whether the BMS communication connection between the battery and the inverter is correct. 2. Check if the battery is switched on. 3. If the error persists, contact service for further check.

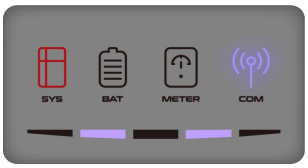
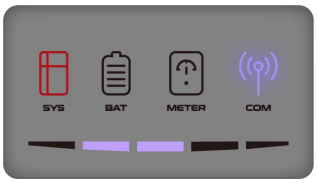
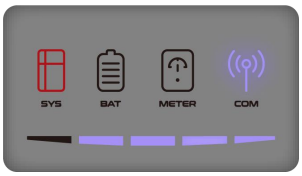
Battery Error Troubleshooting

LED Indicator	Error Code	LED Display	Description	Troubleshooting
SYS red light is on; BAT light is flashing if the battery is faulty.	60002		Circuit_Breaker_ Open	Try to switch on all batteries' circuit breakers. If the error persists, contact customer service for further check.
	60004		Follower_ Battery_ Communication_Lost	Check the communication cables between batteries. If the error persists, contact customer service for further check.
	60006		Host_Battery_ Communication_ Lost	
	60008		Multi_Host_ error	

Inverter Error Troubleshooting

LED Indictor	Error Code	LED Display	Description	Troubleshooting

SYS red light is flashing fast.	100000		Grid_OVP	1. Check whether grid is abnormal. 2. Confirm whether the grid cable connection is normal. 3. Restart inverter. If the error persists, contact service for further check.
	100001		Grid_UVP	
	100002		Grid_OFP	
	100003		Grid_UFP	
	100005		BUS_OVP1	1. Check whether the PV input voltage of PV1, PV2 and PV3 exceeds 1000V. If there is no PV input overvoltage, restart the inverter. If the error persists, contact service for further check.
	100007		Insulation_ fault	1. Check whether PV cable connection is reliable. 2. Check whether PV cable is damaged. If the error persists, contact service for further check.
SYS red light is flashing	100008		GFCI_fault	1. Restart inverter and check whether the error persists. If it so, please call customer service..
	100010		Grid_relay_ fault	

fast	100011		Over_ Temperature	1. Check whether the environment around inverter has poor heat dissipation. 2. Confirm whether inverter installation meets the installation requirements.
	100012		PV_Reverse	1.Check whether the PV terminal of the inverter is reversed. If the PV terminal is right, please call service.
	100013		BAT_Reverse	1.Check whether the BAT terminal of the inverter is reversed. If the BAT terminal is right, please call service.
	100017		MPPT1_OVP	Check the PV1/2/3 voltage. If it exceeds 950V, reduce the number of PV modules.
	100021		MPPT2_OVP	Check the PV2 voltage. If it exceeds 950V, reduce the number of PV modules
	100025		BAT_OVP	Check whether the actual battery voltage exceeds the battery charge cut-off voltage by more than 20V.
	100026		BAT_UVP	1. Check whether the actual battery voltage is lower than the battery discharge cut-off voltage. If the error persists,

SYS red light is flashing fast.				contact service for further check.
	100027		Battery_lose	1. Confirm whether the battery communication cable connection is normal. 2. check whether the battery voltage sampling value is less than 75V. If the error persists, contact service for further check.
	100042		Output_short_ circuit	1. Use a multimeter to test the impedance of the off-grid output. If it is low, check whether the wiring is correct. 2. Restart the inverter. If the error persists, contact service for further check.
	100043		Output_ overload	1. Check whether the load exceeds the rated power. 2. Restart the inverter. If the error persists, contact service for further check.
	100052		Backup_ovp	1. Restart the inverter. If the error persists, contact service for further check.
	100211		Para_CAN	Check the communication cables connection between inverters. If the error persists,

				contact service for further check.
	100213		Para_SW_Diff	Check the inverter software versions. If they are inconsistent, upgrade the inverters to the same software version.
	100214		Para_Module_Fault	Check parallel inverter mode Settings. Only one host is allowed.
	100216		Para_Multi_ Master	
SYS red light is flashing fast.	100403		pe_fault	Shutdown inverter and check whether the PE cable and ground cable are properly connected. If the error persists, contact service for further check.
	100412		inv_selfcheck_failure	Restart the inverter. If the error persists, contact service for further check.

Accessories Error Troubleshooting

LED Indictor	Error Code	LED Display	Description	Troubleshooting
	39		EV Charger Lost	EV Charger lost 1. Check whether the EV communication connection between the EV charger and the inverter is normal. 2. Check whether the

SYS red light is on, METER light is flashing fast.				batteries are switched on. If the error persists, contact service for further check.
	200000		Relay OTP	1. Unplug the charging connector of the EV charger, and wait for about 10 minutes before plugging it back in. If the error persists, contact service for further check.
	200001		Output overload	1. Check whether the load exceeds the rated power. 2. Restart the inverter. If the error persists, contact service for further check.
	200010		AC leakage current	1. Unplug the charging connector of the EV charger, and wait for about 10 minutes before plugging it back in. If the error persists, contact service for further check.
	200011		Input terminal OTP	1. Unplug the charging connector of the EV charger, and wait for about 10 minutes before plugging it back in. If the error persists, contact service for further check.

SYS red light is on, METER light is flashing fast.	200014		Relay abnormal	1. The EV charger has a hardware failure and need to be replaced, please contact service.
	200015		Ground fault	1. Check whether the grounding method is correct. If there is no grounding or the grounding method is wrong, please follow the correct grounding method.
	200016		Reverse phase	1. Shut off the leakage current protection switch of the power distribution cabinet immediately. 2. Check whether the AC input/output cable connection is normal, and verify whether there is an inverse connection of L/N input cables.

NOTICE

1. The four LEDs in the first row are system (SYS), battery (BAT), meter (METER), and communication (COM).
2. The five LEDs in the second row serve two functions:

- During normal system operation, they indicate the SOC operation status of the batteries connected in this energy storage system.
- During abnormal system operation, they display corresponding error codes. Each light represents a number, with values of 1, 2, 4, 8, and 16, from right to left.

9.2.2. Battery Protection Description for Series Battery

The three LED indicators on the front cover provide information about the protection status of the battery.

: **Yellow LEDs flashing**

: **Yellow LEDs on**

: **Yellow LEDs off**

LED Display State	Description	Troubleshooting
	Temperature difference	Wait for automatic recovery. If this protection state persists, please call customer service.
	High temperature	Stop discharging and charging until this protection state disappears. Wait for the temperature to drop.
	Low temperature discharge	Stop discharging until this protection state disappears. Wait for the temperature to rise.
	Overcurrent charge	Wait for automatic recovery. If this protection state persists, please call customer service.
	Overcurrent discharge	
	Cell overvoltage	Wait for automatic recovery. If this protection state persists for a long time, please call customer service.
	Cell under voltage	Stop discharging and call customer service immediately.
	Low temperature charge	Stop charging until this protection state disappears. Wait for the temperature to rise.

NOTICE

During work mode, if the protection status "Cell under voltage" appears, please take the following action:

First, switch off the circuit breaker which is located at the lower left of the battery, switch on the circuit breaker and wait for 3~5 seconds, switch off the circuit breaker, then switch on the circuit breaker and wait for 3~5 seconds, switch off the circuit breaker, at last switch on the circuit breaker of the battery. The BMS will be forced to turn on the MOSFET of discharge, allowing the energy storage inverter to detect the battery's open voltage and begin charging it.

9.2.3. Battery Error Description

The three LED indicators on the front cover provide information about the error status of the battery.

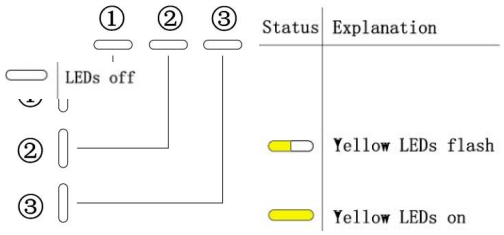


Figure 9-1 LED display

LED Display State	Description	Troubleshooting
	Hardware error	Wait for automatic recovery. If this error persists, please call customer service.
	Hardware error	
	Circuit breaker open	Switch on circuit breaker after power off the battery.
	LMU disconnect (follower)	Reconnect the BMS communication cable.
	SN missing	Please call customer service.
	LMU disconnect (host)	Reconnect the BMS communication cable.
	Software version inconsistent	Please call customer service.
	Multi-host	Restart all batteries.
	MOS over temperature	Power off the battery and power on the battery after 30 minutes.
	Insulation fault	Restart battery. In case this error persists, please call customer service.
	Total voltage fault	Restart battery. In case this error persists, please call customer service.
	Precharge failure	Restart battery. In case this error persists, please call customer service.

10. Uninstallation & Return

10.1. Removing the Product

Procedure

Step 1: Power off the energy storage system as described in Chapter 7.2 Power off the System.
Step 2: Disconnect all cables from the system, including communication cables, PV power cables, battery power cables, AC cables, and PE cables.
Step 3: Remove the Wi-Fi module.
Step 4: Remove the cable covers of the inverter and the battery. Remove the right cover of the inverter.
Step 5: Remove the inverter from the top of the battery.
Step 6: Remove the batteries.
Step 7: Remove the battery wall brackets.

10.2. Packing the Product

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

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

10.3. Disposing of the Product

If the product's service life expires, dispose of it according to the local disposal rules for electrical equipment and electronic waste.
Dispose of the packaging and replaced parts according to the rules at the installation site where the device is installed.
Do not dispose the product with regular household waste.



11. Technical Data

11.1. Datasheet of Inverter

Item	SMILE-G3-T15-INV	SMILE-G3-T20-INV
Input DC (PV side)		
Recommended max. PV power	30 kW	40 kW
Max. PV input voltage	1000 V	
Rated voltage	700 V	
Start-up voltage	220 V	
MPPT voltage range	200 ~ 850 V	
Max. input current Per MPPT	18 A /18 A /18 A	
Max. short circuit current per MPPT	22.5 A /22.5 A /22.5 A	
MPPT number	3	
Max. input strings number per MPPT	1	
Surge category in accordance with IEC 62109-1	II	
Battery		
Battery type	LFP (LiFePO4)	
Battery voltage range	160 - 650 V	
Max. charge power	15 kW	20 kW
Max. discharge power	15 kW	20 kW
Max. charge current	52.5 A	
Max. discharge current	52.5 A	
Communication	CAN	
Output AC (Back-up, On Grid)		
Rated output power	15 kW	20 kW
Rated apparent output power	20 kVA	25 kVA
Rated output current	21.7 A	28.9 A
Max. continuous output power	15.75 kW	22 kW
Max. continuous output apparent power	15.75 kVA	22 kVA
Max. output current	21.7 A	31.9 A
Rated output voltage	3L/N/PE，380/400 V	
Rated frequency	50/60 Hz	
Output AC (Back-up， Off Grid)		
Rated output power	15 kW	20 kW
Rated apparent output power	15 kVA	20 kVA

Rated output current	21.7 A	28.9 A
Max. continuous output power	20 kW	22 kW
Max. apparent output power	20 kW	22 kVA
Output power < 10 minutes		24 kW
Output apparent power < 10 minutes		24 kVA
Output power < 10 s		26 kW
Output apparent power < 10 s		26 kVA
Back-up switch time		<20 ms
Rated output voltage	3L/N/PE，380/400 V	
Rated frequency	50/60 Hz	
Input AC (Grid side)		
Rated output voltage	3L/N/PE，380/400V	
Rated frequency	50/60 Hz	
Max. input power	20 kW	25 kW
Max. input current	29.0 A	36.2 A
Output AC (Grid side)		
Rated output power	15 kW	20 kW
Rated apparent output power	15.75 kVA	20 kVA
Rated grid output current		29 A
Operation phase	Three phase	
Rated grid voltage	3L/N/PE，380/400V	
Grid voltage range	150 ~ 288 V	180 ~ 270 V
Rated grid frequency	50 Hz	
Power factor	>0.99 (0.8 leading - 0.8 lagging)	
Protection class	I	
Overvoltage category	III	
Surge category in accordance with IEC 60664-1	II	
Efficiency		
Max. efficiency, η_{max}	97.6%	98%
European weighted efficiency, η_{EU}	96.8%	97.6%
Protection		
Anti-Islanding protection	Integrated	
Insulation resistor detection	Integrated	
Residual current monitoring unit	Integrated	
Output over current protection	Integrated	
Output short protection	Integrated	

Output overvoltage protection	Integrated	
PV reverse polarity protection	Integrated	
PV overvoltage protection	Integrated	
PV switch	Integrated	
Battery breaker	Integrated	
General data		
Dimensions (W*H*D)	610*416*212.5 mm	610*610*250 mm
Weight	26.7 kg	40 kg
Topology	Transformerless	
Operation temperature range	-25 ~ +60 °C	
Max. permissible value for relative humidity (condensing)	100%	
Ingress protection	IP65	
Display	LED	
Noise emission	<50 dB(A) @1m	
Cooling concept	Natural air cooling	Fan cooling
Max. operating altitude above MSL	3000 m	
Features		
PV connection	Vaconn D4 connectors	
Grid connection	Plug in connector	
Backup connection	Plug in connector	
BAT connection	Screw terminal	
Communication	LAN, Wi-Fi	

11.2. Datasheet of Battery SMILE-G3-BAT-9.3S

Model	**SMILE-G3-BAT-9.3S II**	**SMILE-G3-BAT-9.3S III**	**SMILE-G3-BAT-9.3S IV**
Battery Type	LFP ($LiFePO_4$)		
Battery Module	9.3 kWh, 81 kg		
Modules Connection	2	3	4
Usable capacity	18.6 kWh	27.9 kWh	37.2 kWh
Weight	162 kg	243 kg	324 kg
Dimension (W*D*H)	620 * 212 * 1268 mm	620 * 212 * 634 mm and 620 * 212 * 1268 mm	620 * 212 * 1268 mm X 2
Nominal voltage	96 V		

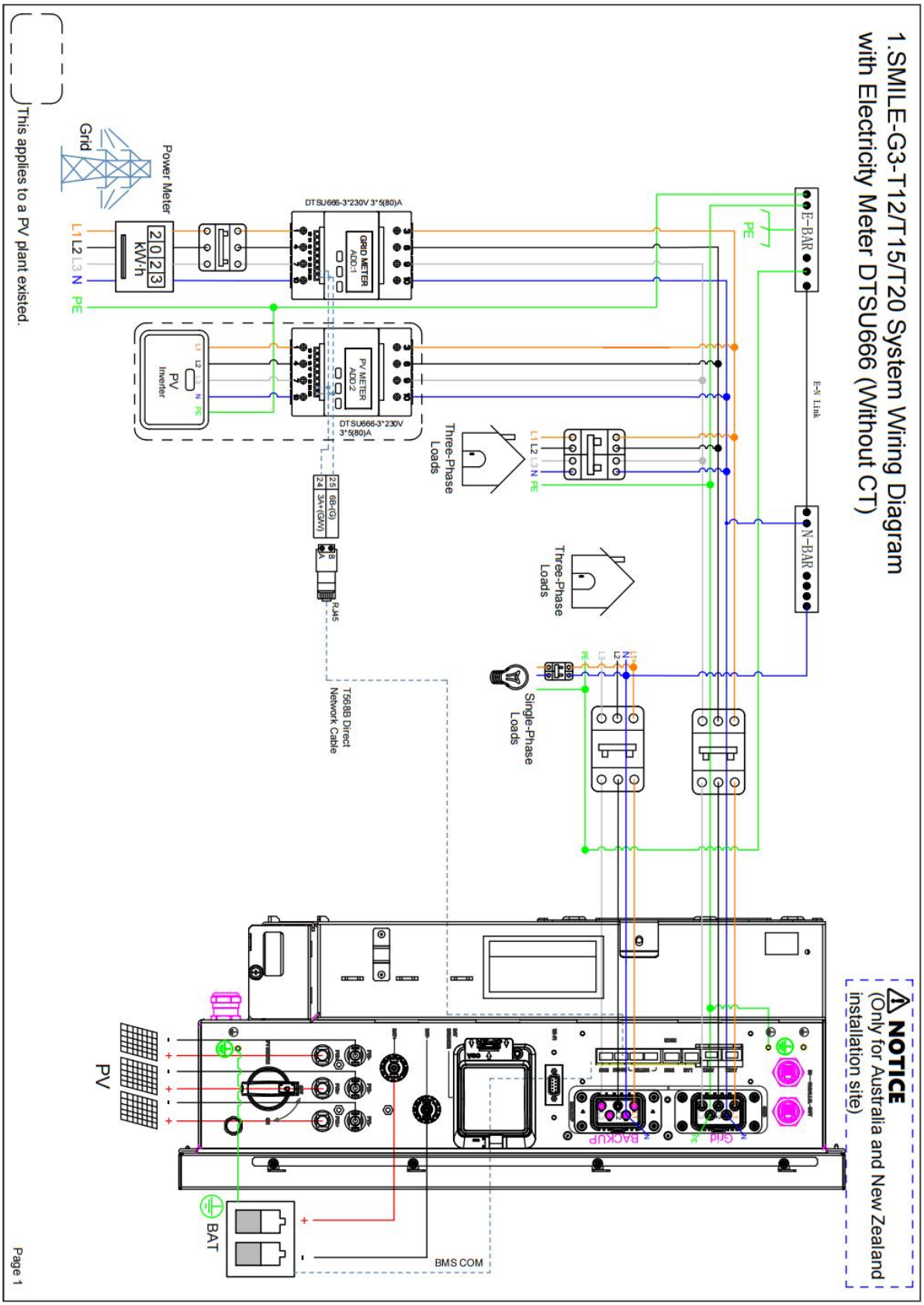
Operating voltage range	90 to 105.6 V	
Max. charge current*	52.5 A	
Max. discharge current*	52.5 A	
Monitoring parameters	System voltage, current, cell voltage, cell temperature, PCBA temperature	
BMS communication	CAN	
General Date		
Environmental Category	Outdoor	
Ingress protection	IP65	
Operating temperature range	Charge：-20＜T≤50℃ Discharge：-20＜T≤50℃	
Relative Humidity	0 ~ 100% (No condensation)	
Safety	IEC 62619, IEC 62040, IEC 61000-6-1/3	
Transportation	UN38.3	
Warranty	10 Years Product Warranty, 10 Years Battery Performance Warranty	
Model	**SMILE-G3-BAT-9.3S V**	**SMILE-G3-BAT-9.3S VI**
Battery Type	LFP ($LiFePO_4$)	
Battery Module	5 kWh, 49.5 kg	
Modules Connection	5	6
Usable capacity	46.5 kWh	55.8 kWh
Weight	405 kg	486 kg
Dimension (W*D*H)	620 * 240 * 634 mm and 620 * 240 * 1268 mm X 2	620 * 212 * 1268 mm X 3
Nominal voltage	96 V	
Operating voltage range	90 to 105.6 V	
Max. charge current*	52.5 A	
Max. discharge current*	52.5 A	
Monitoring parameters	System voltage, current, cell voltage, cell temperature, PCBA temperature	
BMS communication	CAN	
General Date		
Environmental Category	Outdoor	
Ingress protection	IP65	
Operating temperature range	Charge：-20＜T≤50℃ Discharge：-20＜T≤50℃	
Relative Humidity	0 ~ 100% (No condensation)	
Safety	IEC 62619, IEC 62040, IEC 61000-6-1/3	
Transportation	UN38.3	
Warranty	10 Years Product Warranty, 10 Years Battery Performance Warranty	
Model	**SMILE-G3-BAT-9.3S II**	**SMILE-G3-BAT-9.3S III**
Battery Type	LFP ($LiFePO_4$)	

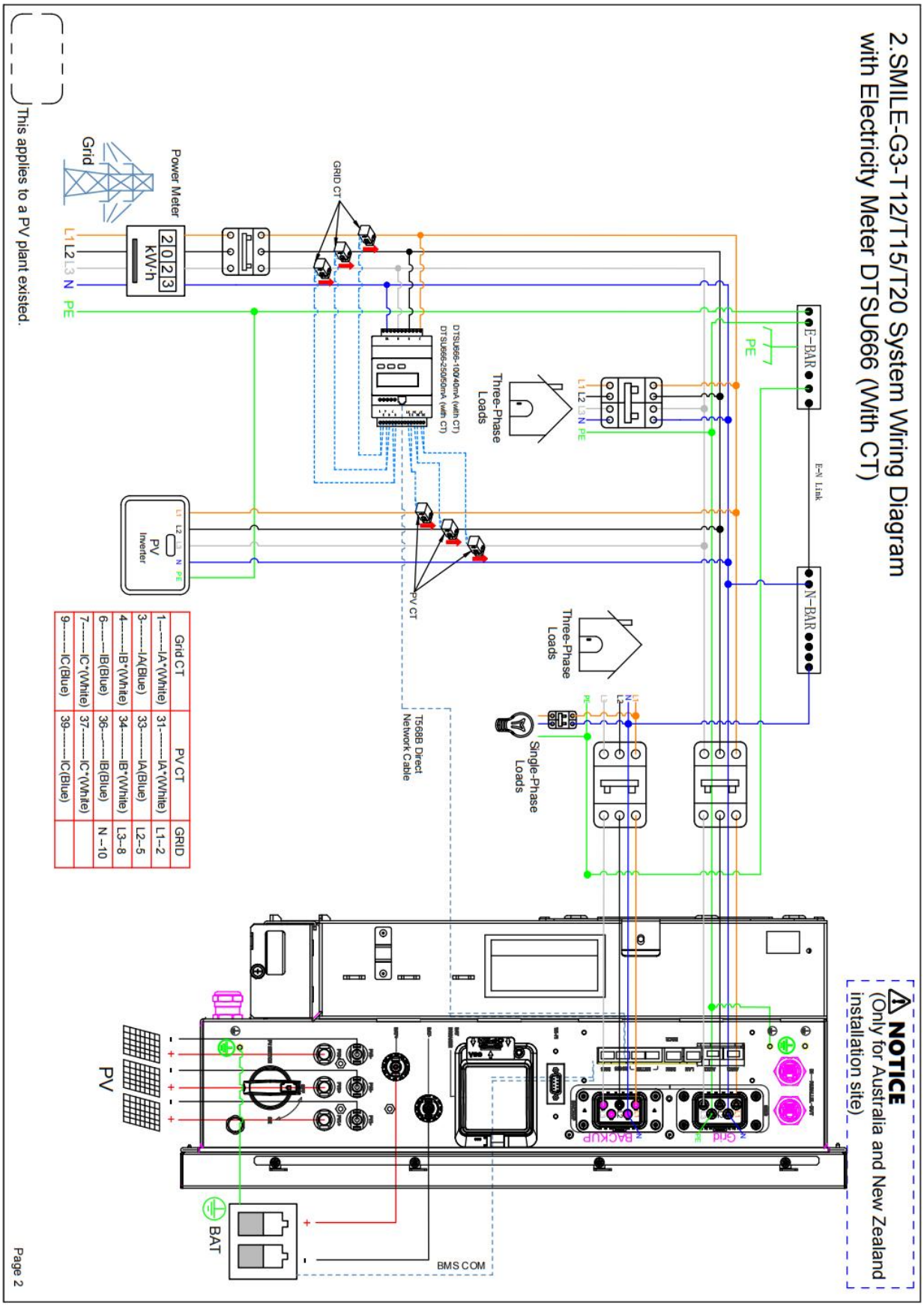
Battery Module	9.3 kWh, 81 kg	
Modules Connection	2	3
Usable capacity	18.6 kWh	27.9 kWh
Weight	162 kg	243 kg
Dimension (W*D*H)	620 * 212 * 1268 mm	620 * 212 * 634 mm and 620 * 212 * 1268 mm
Nominal voltage	96 V	
Operating voltage range	90 to 105.6 V	
Max. charge current*	52.5 A	52.5 A
Max. discharge current*	52.5 A	52.5 A
Monitoring parameters	System voltage, current, cell voltage, cell temperature, PCBA temperature	
BMS communication	CAN	
General Date		
Environmental Category	Outdoor	
Ingress protection	IP65	
Operating temperature range	Charge：-20＜T≤50℃ Discharge：-20＜T≤50℃	
Relative Humidity	0 ~ 100% (No condensation)	
Safety	IEC 62619, IEC 62040, IEC 61000-6-1/3	
Transportation	UN38.3	
Warranty	10 Years Product Warranty, 10 Years Battery Performance Warranty	
Model	**SMILE-G3-BAT-9.3S V**	**SMILE-G3-BAT-9.3S VI**
Battery Type	LFP ($LiFePO_4$)	
Battery Module	5 kWh, 49.5 kg	
Modules Connection	5	6
Usable capacity	46.5 kWh	55.8 kWh
Weight	405 kg	486 kg
Dimension (W*D*H)	620 * 240 * 634 mm and 620 * 240 * 1268 mm X 2	620 * 212 * 1268 mm X 3
Nominal voltage	96 V	
Operating voltage range	90 to 105.6 V	
Max. charge current*	52.5 A	52.5 A
Max. discharge current*	52.5 A	52.5 A
Monitoring parameters	System voltage, current, cell voltage, cell temperature, PCBA temperature	
BMS communication	CAN	
General Date		
Environmental Category	Outdoor	
Ingress protection	IP65	
Operating temperature range	Charge：-20＜T≤50℃	

	Discharge：-20＜T≤50℃
Relative Humidity	0 ~ 100% (No condensation)
Safety	IEC 62619, IEC 62040, IEC 61000-6-1/3
Transportation	UN38.3
Warranty	10 Years Product Warranty, 10 Years Battery Performance Warranty

* Max. charge/discharge current derating may occur with changes in temperature and SOC.

Appendix 1: System Wiring Diagram




2.SMILE-G3-T12/T15/T20 System Wiring Diagram
with Electricity Meter DTSU666 (With CT)
NOTICE
(Only for Australia and New Zealand installation site)
This applies to a PV plant existed.
Grid
Power Meter
kW·h
L1 L2 L3 N PE
GRID CT
DTSU666-100/40mA (with CT)
DTSU666-250/50mA (with CT)
Three-Phase Loads
E-BAR
N-BAR
E-N Link
PV Inverter
PV CT
Three-Phase Loads
Single-Phase Loads
T568B Direct Network Cable
Grid CT
1------IA*(White)
3------IA(Blue)
4------IB*(White)
6------IB(Blue)
7------IC*(White)
9------IC(Blue)
PV CT
31------IA*(White)
33------IA(Blue)
34------IB*(White)
36------IB(Blue)
37------IC*(White)
39------IC(Blue)
GRID
L1~2
L2~5
L3~8
N ~10
PV
BAT
BMS COM
BACKUP
Grid
Page 2

Alpha ESS Co., Ltd.

☎ +86 513 8060 6891
✉ info@alpha-ess.com
🌐 www.alphaess.com
🏠 No. 1086 Bihua Road, Tongzhou District, Nantong City, Jiangsu Province, 226300, P.R. China

Alpha ESS International Pte. Ltd.

☎ +65 6513 1125
+65 6513 1126
✉ singapore@alpha-ess.com
🏠 2 Corporation Road #01-06A Corporation Place 618494 Singapore

Alpha ESS Australia Pty. Ltd.

☎ +61 02 9000 7676
✉ techsupport@alphaess.au
🌐 www.alphaess.au
🏠 8/15-21 Gibbes Street, Chatswood, NSW 2067 Australia

Alpha ESS South Africa (Pty) Ltd.

☎ +27 010 745 5653
✉ Email: measervic@alpha-ess.com
🏠 Johannesburg, South Africa

Alpha ESS Europe GmbH

☎ +49 6196 7863485
✉ europe@alpha-ess.de
🌐 www.alphaess.de
🏠 Alfred-Herrhausen-Allee 3-5, 65760 Eschborn

@AlphaEnergyStorageSystem @AlphaESS @alpha_ess @AlphaESS www.alphaess.com

V05.01122025 | Text and images correspond to the current state of technology at the time of printing. Subject to modifications. All information is without guarantee in spite of careful editing-liability excluded.