# User Manual

## H1 series 3–Phase Hybrid Inverter

SiH-9.9kW-TH-PRO SiH-10kW-TH-PRO
SiH-12kW-TH SiH-14.9kW-TH SiH-15kW-TH
SiH-19.9kW-TH SiH-20kW-TH
SiH-25kW-TH SiH-29.9kW-TH SiH-30kW-TH
SiH-40kW-TH SiH-50kW-TH


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Installation Video

User Manual Download

www.swatten.com

# About This Manual

The manual primarily encompasses product information, along with installation, operation, and maintenance guidelines. The manual does not include complete information about the photovoltaic (PV) system. Readers can get additional information at https://www.swatten.com or on the webpage of the respective component manufacturer.

It will refer to the device as the "inverter" unless otherwise specified.

**Target Group**

This manual is intended for professional technicians who have responsibilities for the installation, operation, and maintenance of inverters, as well as users who need to check inverter parameters.

**Installation Requirements:**

The installation of the inverter should only be carried out by professional technicians who meet the following requirements

- Possess knowledge of electronics, electrical wiring, and mechanical expertise, and be familiar with electrical and mechanical schematics.
- Have received professional training related to the installation and commissioning of electrical equipment.
- Capable of promptly responding to hazards or emergencies that may arise during the installation and commissioning process.
- Familiar with local standards and relevant safety regulations pertaining to electrical systems.
- Thoroughly read this manual and understand the safety instructions associated with the operations.

**How to Use This Manual**

- Please carefully read this manual before utilizing the product and store it in a readily accessible location.
- All content, images, trademarks, and symbols in this manual are the property of Swatten. No part of this document may be reproduced by individuals not employed by Swatten without written authorization.
- The contents of this manual may be periodically updated or revised, and the specifications of the actual product purchased should take precedence.

**Symbols**

This manual incorporates crucial safety instructions that are emphasized using specific symbols. These symbols are employed to ensure the safety of individuals and property during product usage or to assist in maximizing product performance efficiently..

It is essential to thoroughly comprehend the significance of the warning symbols to enhance your utilization of the manual.

DANGER

**Indicates the presence of high-risk potential hazards that, if not avoided, could result in severe injury or even death.**

WARNING

**Indicates the presence of moderate-risk potential hazards that, if not avoided, could result in serious injury or even death.**

CAUTION

**Indicates the presence of low-risk potential hazards that, if not avoided, may lead to minor or moderate injury.**

NOTICE

**Indicates potential risks that, if not avoided, may result in device malfunctions or financial losses.**

The "NOTE" designation is used to indicate supplementary information, emphasized content, or helpful tips that can assist you, such as problem-solving techniques or time-saving suggestions.

## Change History

Changes between document issues are cumulative, meaning that each subsequent document issue includes all the changes made in earlier issues.

**Issue 1 (2024-07-09)**

This issue is the first official release.

**Issue 2 (2024-09-30)**

Second edition released.

**Issue 3 (2025-01-14)**

Updated the communication interface of the stacked battery, the wire diameter and spare parts specifications, the wiring diagram of the electricity meter, and optimized some pictures.

**Issue 4 (2025-05-31)**

New 50kW model added. The model diagram and the quantity of parts have been adjusted.

**Issue 5 (2025-09-01)**

Chapter 6.9, Chapters 7 have been updated in terms of their descriptions.

# Contents

# 1 Safety Instructions

When installing, commissioning, operating, and maintaining the product, it is crucial to strictly adhere to the labels on the product and the safety requirements outlined in the manual. Incorrect operations or procedures may result in the following:

- Injury or death to the operator or third parties.
- Damage to the product and other properties.

WARNING

- Avoid operating the product and cables (including but not limited to product movement, installation, operation, powering up, maintenance, and working at heights) under harsh weather conditions such as lightning, rain, snow, or wind of level 6 or stronger.
- In the event of a fire, evacuate the building or the area where the product is located and immediately contact the fire department. Under no circumstances should re-entry into the burning area be attempted.

**NOTICE**

- Ensure that the product and terminals are securely fastened using the specified torque and appropriate tools. Failure to do so may result in product damage, and any resulting damage will not be covered by the warranty.
- Familiarize with the correct usage of tools to prevent injury to individuals or damage to the device.
- Perform maintenance on the device with adequate knowledge of this manual and utilize proper tools.
- The safety instructions provided in this manual are supplementary and may not encompass all precautions that should be followed. Always consider the actual on-site conditions when performing operations.
- Swatten will not be held liable for any damages caused by the violation of general safety operation requirements, general safety standards, or any safety instructions stated in this manual.
- When installing, operating, and maintaining the product, comply with local laws and regulations. The safety precautions provided in this manual serve as supplements to local laws and regulations.

## 1.1 Unpacking and Inspection

**WARNING**

Before decommissioning the device, carefully inspect all safety signs, warning labels, and nameplates to ensure they are in place and clearly visible. These signs and labels should not be removed or covered at any time.

**NOTICE**

Upon receiving the product, conduct a thorough inspection to verify the condition of the device's appearance and structural components. Additionally, compare the contents of the packaging with the ordered product to ensure consistency. If any issues arise during these inspections, refrain from installing the device and promptly reach out to your distributor. If the problem persists, contact Swatten for further assistance.

## 1.2 Installation Safety

**DANGER**

- Before installation, ensure that there is no electrical connection present.

- Prior to drilling, take precautions to avoid any water or electrical wiring within the wall.

**CAUTION**

Improper installation can result in personal injury!

- If the product supports hoisting for transportation using hoisting tools, it is strictly prohibited for anyone to remain under the product.
- When moving the product, take into account its weight and maintain balance to prevent tilting or falling.

**NOTICE**

Prior to operating the product, it is crucial to inspect and verify that the tools to be used have undergone regular maintenance.

## 1.3 Electrical Connection Safety

**DANGER**

Before making electrical connections, it is essential to ensure that the inverter is undamaged to prevent potential dangers!

Before electrical connections, confirm that the inverter switch and all switches connected to the inverter are set to the "OFF" position to avoid the risk of electric shock!

**DANGER**

The PV string generates a lethal high voltage when exposed to sunlight. Please observe the following safety precautions during electrical connections.

- Operators must wear appropriate personal protective equipment.
- Use a measuring instrument to verify that cables are voltage-free before touching DC cables.
- Adhere to all safety instructions provided in relevant documents concerning PV strings.

**DANGER**

There is a risk of high voltage inside the inverter that can be life-threatening. Please take note of the following precautions!

- Use specialized insulation tools during cable connections.
- Follow and strictly adhere to the warning labels on the product and the safety instructions.
- Respect all safety instructions stated in this manual and other relevant documents.

**DANGER**

Batteries deliver electrical power and can cause burns or fire hazards when short-circuited or incorrectly installed, which may cause fire and personal injury.

Lethal voltages are present at the battery terminals and cables connected to the inverter. Avoid touching the cables and terminals to prevent severe injuries or death.

**WARNING**

- Damage to the product resulting from incorrect wiring is not covered by the warranty.
- Electrical connections should be performed by professionals.
- All cables used in the PV generation system must be securely attached, properly insulated, and adequately sized.
- Do not damage the ground conductor. Do not operate the product in the absence of a properly installed ground conductor. Otherwise, it may cause personal injury or product damage.

**WARNING**

Ensure to check the positive and negative polarity of the PV strings and connect the PV connectors to the corresponding terminals only after confirming the correct polarity. During the installation and operation of the inverter, prevent the positive or negative poles of PV strings from short-circuiting to the ground to avoid AC or DC short-circuits that could lead to equipment damage. Such damage is not covered by the warranty.

**NOTICE**

- Comply with the safety instructions regarding PV strings and adhere to the regulations applicable to the local grid.
- Install the external protective grounding cable first when performing electrical connection and remove the external protective grounding cable last when re moving the inverter.

## 1.4 Operation Safety

DANGER

- Do not touch the enclosure of the inverter while it is running.
- It is strictly prohibited to plug or unplug any connectors on the inverter while it is running.
- Avoid contact with any terminals of the inverter while it is running to prevent electric shock.
- Do not disassemble any parts of the inverter while it is running, as it may result in electric shock.
- Refrain from touching any hot parts of the inverter, such as the heat sink, while it is running to avoid burns.
- Do not connect or remove any battery. Otherwise, electric shock may occur.
- Do not connect or remove any PV string or any PV module in a string. Otherwise, electric shock may occur.
- If the inverter is equipped with a DC switch, do not operate it while the inverter is running to prevent device damage or personal injury.

Do not take other actions, such as setting parameters or cutting off power, during the process of inverter firmware update, to avoid update failure.

## 1.5 Maintenance Safety

DANGER

There is a risk of inverter damage or personal injury resulting from incorrect service procedures!

- Prior to performing any service work, disconnect the grid-side AC circuit breaker and check the status of the inverter. If the inverter indicator is off, wait until nighttime before disconnecting the DC switch. If the inverter indicator is on, you can directly disconnect the DC switch.
- After the inverter has been powered off for at least 10 minutes, use a professional instrument to measure the voltage and current. Only when there is no voltage or current detected, and operators are wearing

proper protective equipment, can they proceed with operating and maintaining the inverter.

- Even when the inverter is shut down, it may still retain heat and can cause burns. Therefore, it is essential to wear protective gloves when operating the inverter after it has cooled down.

DANGER

Touching the power grid or the contact points and terminals on the inverter connected to the power grid can result in electric shock!

- The power grid side may have voltage. Always use a standard voltmeter to ensure there is no voltage before touching.

CAUTION

To prevent misuse or accidents caused by unauthorized personnel, prominently display warning signs or designate safety warning areas around the product.

NOTICE

To avoid the risk of electric shock, refrain from performing any maintenance operations beyond those described in this manual. If necessary, contact your distributor first. If the issue persists, contact Swatten for maintenance. Failure to do so may result in losses that are not covered by the warranty.

## 1.6 Disposal Safety

WARNING

Please dispose of the product in accordance with the applicable local regulations and standards to prevent property losses or injuries

## 1.7 EU Declaration of Conformity

Shanghai Sieyuan Watten Technology Co., Ltd. hereby declares that the inverter without wireless communication modules sold in the European market meets the requirements of the following directives:

- Electromagnetic compatibility Directive 2014/30/EU (EMC)
- Electrical Apparatus Low Voltage Directive 2014/35/EU (LVD)
- Battery Directive 2006/66/EC and Amending Directive 2013/56/EU
- Waste Electrical and Electronic Equipment 2012/19/EU
- Registration, Evaluation, Authorization and Restriction of Chemicals (EC) No.RZUN2023-2770 (REACH)

You can download the EU Declaration of Conformity on the official website: https://www.swatten.com

# 2 Product Description

## 2.1 System Introduction

The inverter is a transformerless 3-phase hybrid inverter that plays a crucial role in the power system. Its primary function is to convert the direct current power generated by PV modules or batteries into AC current that is compatible with the utility grid. The inverter enables the feed-in of AC current to the utility grid. It is suitable for use in both on-grid and off-grid PV systems.

One of the key features of the 3-phase hybrid inverters is the integration of an Energy Management System (EMS). This system allows for effective control and optimization of the energy flow within the system. By intelligently managing the energy, the inverter enhances the self-consumption of the system, maximizing the utilization of generated power.

WARNING

- Operate the inverter only with PV strings having class II protection (IEC 61730, application class A). Avoid grounding the positive or negative poles of the PV strings to prevent damage to the inverter.
- Warranty does not cover damages caused by faulty or damaged PV installations.
- Only use the inverter as described in this document; any other use is not permitted.
- During installation and operation, ensure that the positive and negative polarities of PV strings and batteries do not short-circuit to the ground to avoid equipment damage. Warranty does not cover damage resulting from such short-circuits.
- Avoid short-circuiting the Backup port during operation to prevent severe damage to the inverter or power distribution system. Such damage is not covered by the Swatten warranty.
- Do not connect any local load between the inverter and the AC circuit breaker.

NOTICE

- In a TT utility grid, ensure that the N line voltage to ground is 30V or below.
- For off-grid applications, the utility grid must be a TN system.
- The inverter applies only to the scenarios described in this manual.

## 2.2 Product Introduction

**Model Description**

The model description is follows (take SiH-40kW-TH as an example):

SiH: Swatten Hybrid inverter

40kW: Power level

TH: Three phase, High voltage

**Appearance**

The image shown here is for reference only. The actual product received may differ.

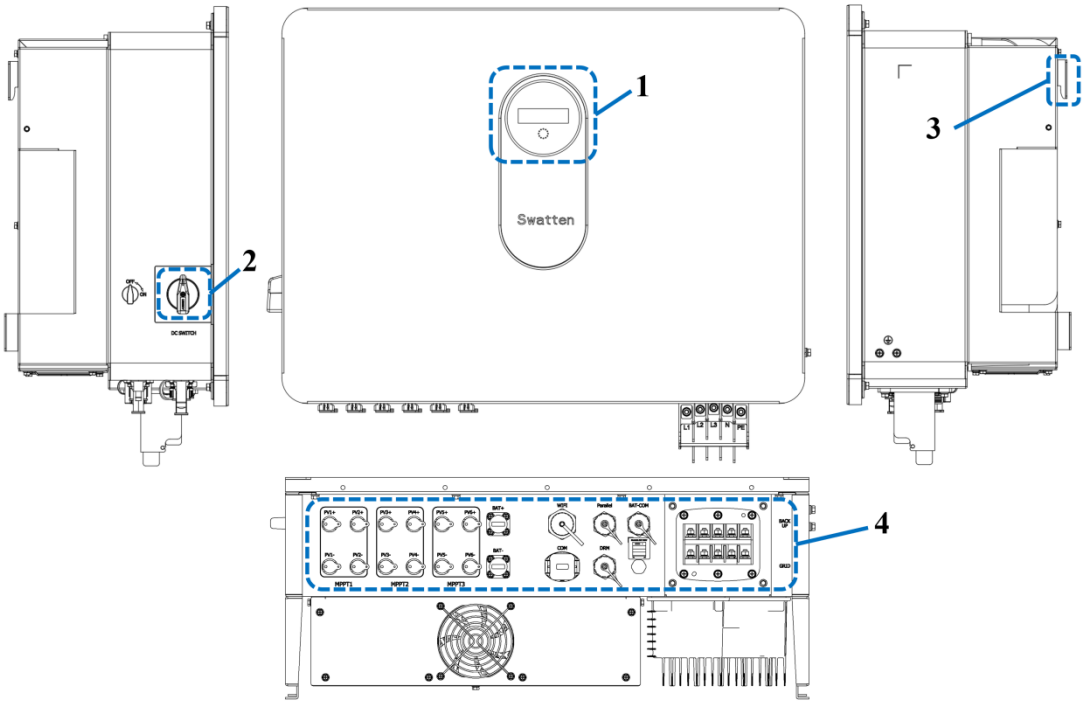



**figure 2-1** Inverter Appearance

| No. | Name | Description |
|---|---|---|
| 1 | LED indicator panel | Indicates the current operating state of the inverter. |
| 2 | DC switch | Used to disconnect PV- only when there is no PV |
| 3 | Hanger | Used to hang the inverter on the wall-mounting bracket. |
| 4 | Electrical connection area | Includes DC terminals, AC terminals, battery terminals, communication terminals and additional grounding terminal. |

**Dimensions**

The following figure shows the dimensions of the inverter.

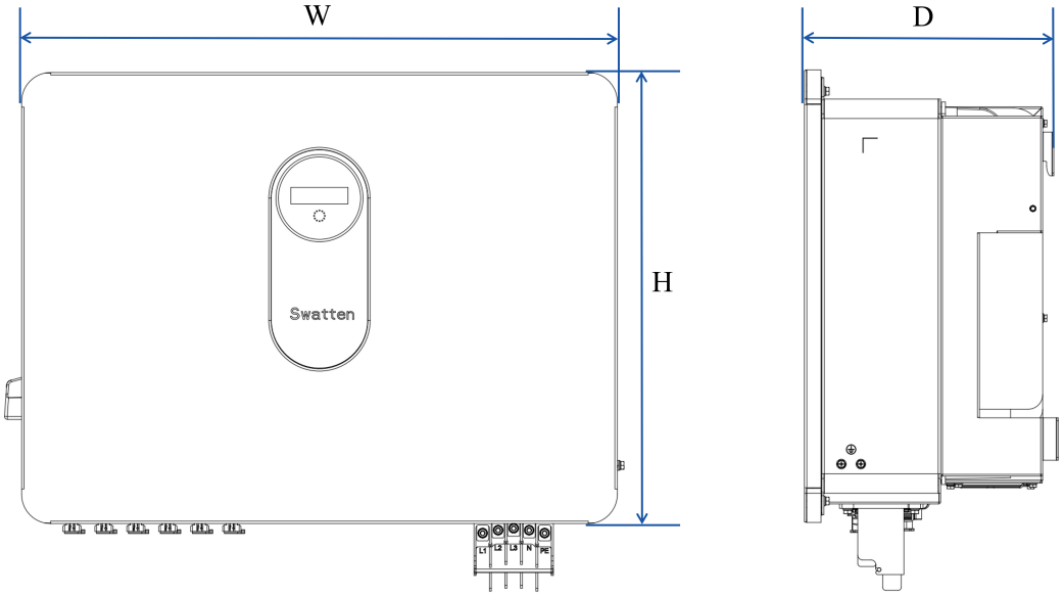
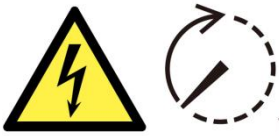



**figure 2-2** Dimensions of the Inverter

| Inverter | W(mm) | H(mm) | D(mm) | Weight(kg) |
|---|---|---|---|---|
| **SiH-9.9/10kW-TH-PRO** | 615 | 465 | 255 | 34 |
| **SiH-14.9/15kW-TH** | | | | |
| **SiH-19.9/20kW-TH** | | | | 36.5 |
| **SiH-25/29.9/30kW-TH** | | | | 38 |
| **SiH-40/50kW-TH** | | | | 39.5 |

## 2.3 Symbols on the Product

| Symbol | Explanation |
|---|---|
| PV | Parameters on the PV side. |
| BAT | Parameters on the Battery side. |
| AC-Grid | Parameters on the AC on-grid side. |
| AC-Backup | Parameters on the AC Backup side. |
|  | Danger to life due to high voltages!<br>Do not touch live parts for 10 minutes after disconnection from the power sources.<br>Only qualified personnel can open and maintain the inverter. |
|  | Read the user manual before maintenance! |
|  | There is a deadly high pressure danger!<br>Only professional and qualified personnel are allowed to install and operate! |
|  | RoHS mark of conformity. |
|  | Regulatory compliance mark. |
|  | UKCA mark of conformity. |

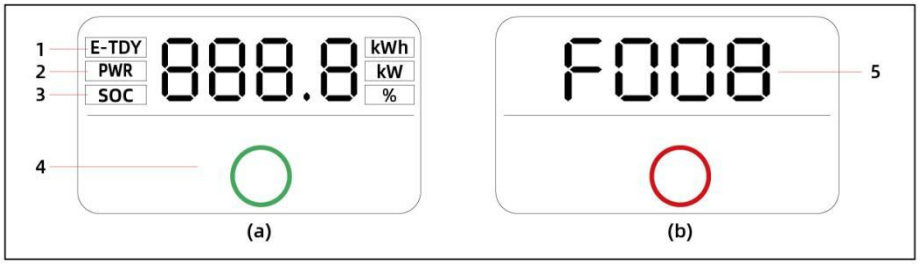
CE mark of conformity.

Do not dispose of the inverter together with household waste.

TÜV mark of conformity.

## 2.4 LED Panel

The LED panel with a display screen and an indicator is on the front of the inverter.



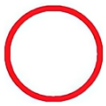

(a) Normal state (b) Error state

**Figure 2-3** LED Panel

| No. | Name | Description |
|---|---|---|
| **1** | E-day | Today's energy yield |
| **2** | PWR | Real-time AC output power |
| **3** | SOC | Battery SOC (State of Charge) |
| **4** | LED indicator | To indicate the working state of the inverter. Touch it to switch the information in normal state or view multiple error codes in error state. |
| **5** | Error code | The error code in the figure is just an example. |

- In normal operation, the LED indicator will alternate the display of E-day, Pac, and SOC information. Additionally, users have the option to switch between the displayed information by simply touching the LED indicator.
- During an error state, touching the LED indicator will provide access to multiple error codes for easy viewing and troubleshooting.
- In the event of no user activity for 5 minutes, the display screen will automatically turn off to conserve power. Users can reactivate the display screen by simply touching the LED indicator.

The following chart description of the LED indicator

| LED Color | State | Definition |
|---|---|---|
|  **Green** | ON | The inverter is operating normally. |
| | Flashing | The inverter is at standby or startup state (without on/off-grid operation). |
|  **Red** | ON | A system fault has occured. |
|  **Grey** | OFF | Both the AC and DC sides are powered down. |

WARNING

Voltage may still be present in AC side circuits after the indicator is off. Pay atten tion to the electricity safety when operating.

## 2.5 DC Switch

The DC switch serves as a means to safely disconnect the DC circuit whenever required. To initiate the inverter's operation, it automatically functions when the input and output requirements are met. However, in the event of a fault or when there is a need to halt the inverter, rotating the DC switch to the "OFF" position will stop its operation.

> Note:
> Turn the DC switch to the "ON" position before restarting the inverter.

## 2.6 PV Energy Storage System (PV ESS)

### 2.6.1 PV Energy Storage System (PV ESS)

The following figure shows inverter application in a PV energy storage system.

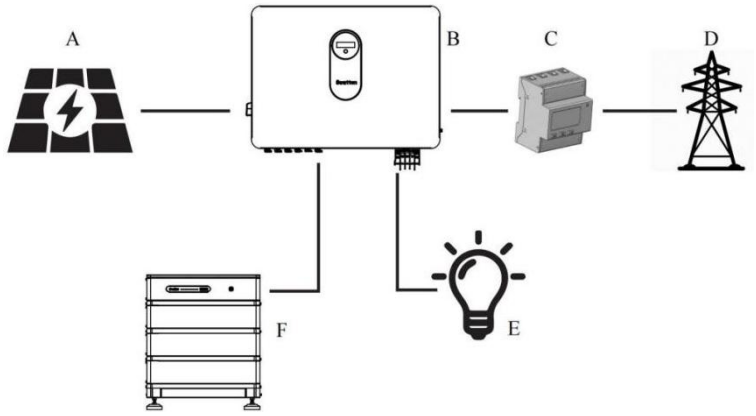
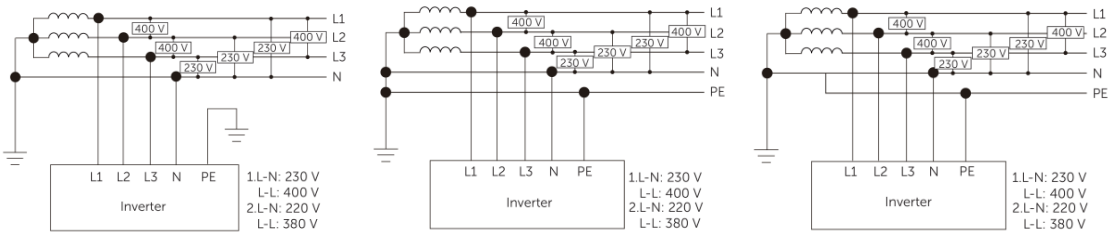



**figure 2-4** PV Energy Storage System

| Item | Description | Note |
|---|---|---|
| A | PV strings | Compatible with monocrystalline silicon, polycrystalline silicon, and thin-film modules without grounding. |
| B | Inverter | SiH-9.9/10kW-TH-PRO SiH-12~50kW-TH |
| C | Metering device | Meter cupboard with power distribution system via the RS485 port. |
| D | Utility grid | Grid grounding system types: TT, TN, TN-C-S, TN-S, TN-C. |
| E | Backup loads | Loads, connected to inverter Backup port, which need uninterrupted power supply. |
| F | Battery (optional) | A Li-ion battery. |

The following figure grid-TT/TN-S/TN-C-S shows the common grid configurations.




### 2.6.2 Declaration For Backup Function

DANGER

This product is not suitable for supplying power to life-sustaining medical devices since power outages may result in danger to life.

The following statements outline Swatten's general policies concerning the hybrid inverters described in this document:

1 For hybrid inverters, the electrical installation typically involves connecting the inverter to both PV modules and batteries. In Backup mode, if there is no available power from batteries or PV modules, the Backup power supply will be automatically terminated. Swatten bears no responsibility for any consequences resulting from failure to comply with this instruction.

2 Normally, the switching time for activating the Backup mode is less than 10 ms. However, certain external factors may cause the system to fail in Backup mode. Therefore, users must be aware of the following conditions and adhere to the instructions:

- Do not connect loads that require a stable energy supply for reliable operation.
- Do not connect loads whose total capacity exceeds the maximum Backup capacity.
- Do not connect loads that may cause high start-up current surges, such as air conditioners, high-power pumps, vacuum cleaners, and hair dryers.
- Battery current may be limited due to factors including temperature and weather conditions.

**Declaration For Backup Overload Protection**

In the event of overload protection, the inverter will automatically restart. If overload protection is repeatedly triggered, the restart time may increase. To avoid this, reduce the power of the Backup load to remain within the specified limits or remove loads that may cause high start-up current surges.

### 2.6.3 Energy Management

The battery discharges to provide energy to loads. If the battery is empty or there is not enough power from the battery system, the grid shall supply power to both Backup loads and normal loads.

When the grid is available, the hybrid inverter activates the bypass function. This allows the Backup loads to be directly connected to the grid via the integrated bypass switch in the inverter.

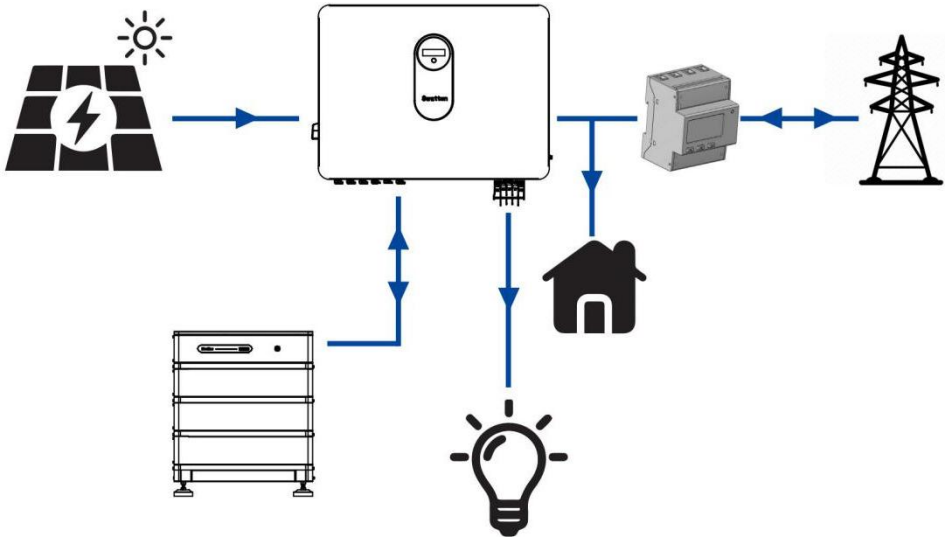
When the grid is not available, the bypass function is disabled.

If the Smart Energy Meter is either not present or experiencing abnormalities, the inverter will continue to operate normally. However, the battery will only be allowed to charge and not discharge. In this scenario, the feed-in power setting becomes ineffective, and the DO function for optimized mode will be disabled.

**Energy Management during Daytime**

The energy management system (EMS) defaults to self-consumption mode. The following scenarios illustrate the energy management process:

- Scenario 1: PV power generation > Load power consumption
  - First, PV power is prioritized for the Backup loads first, followed by normal loads and then the battery.
  - If the battery is fully charged, any excess power will be fed back to the grid. The feed-in power will not exceed the feed-in limitation value set in the initial settings.
- Scenario 2: PV power generation < Load power consumption
  - First, battery will discharge and provide the energy missing.
  - If the combined power from the PV and battery is still insufficient to meet the load power demand, the inverter will draw power from the mains (grid) to make up for the deficit.



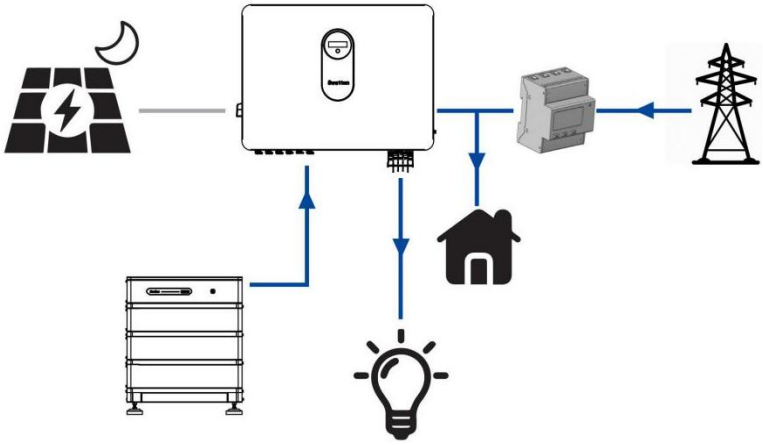
With current No current

**Energy Management during Night**

During the nighttime period, energy management operates as follows:

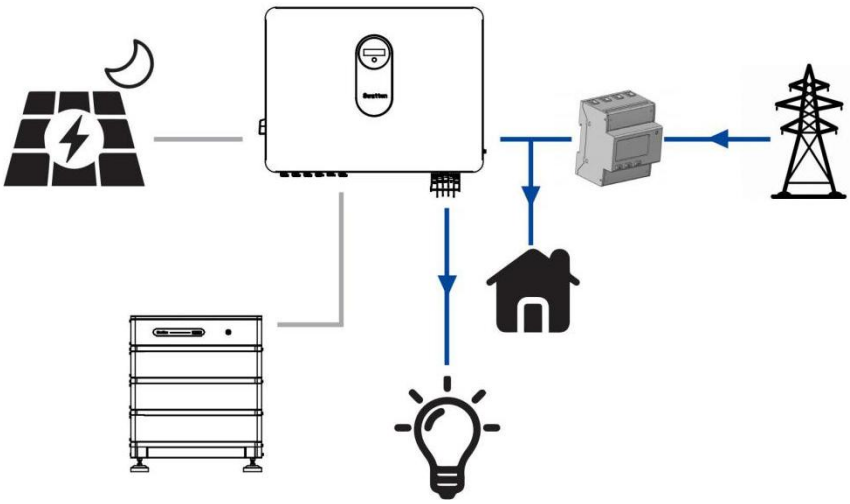
- Battery Discharge: With available energy, the battery will discharge to provide power for the loads. It acts as the primary source of power during this time.
- Grid Power Supply: If the discharge power of the battery is insufficient to meet the load requirements, the grid will automatically supply power to the loads. This ensures a continuous and uninterrupted power supply, even if the battery capacity is depleted or unable to sustain the load demand.

By combining the discharge capability of the battery and the Backup power from the grid, the system ensures reliable and continuous power supply during nighttime operations.



With current No current

During night, when the battery is empty, it will enter into standby mode. In this case, the grid will supply all power for loads.



With current No current

## 2.7 Retrofitting the Existing PV system

The hybrid inverter is designed to be compatible with any three-phase PV grid-connected inverters. By adding the hybrid inverter to an existing PV system, it can be transformed into a PV Energy Storage System (ESS). In this configuration, the power generated by the existing PV inverter will first supply the loads and then charge

the battery. The energy management function of the hybrid inverter allows for significant improvement in self-consumption of the new system.

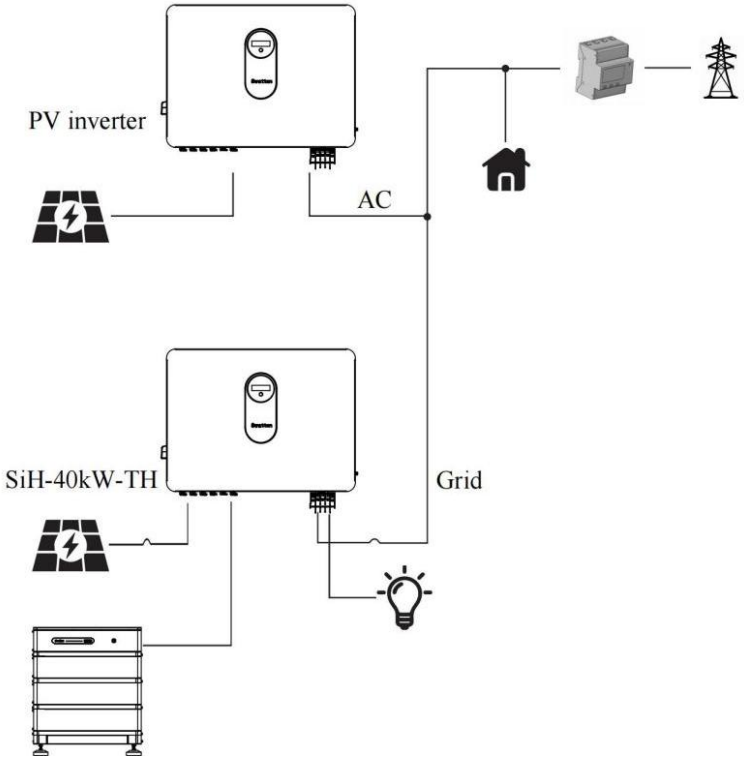



**figure 2-5** On-grid Port to Retrofit the Existing PV System

The AC terminal of the PV inverter and the GRID terminal of the hybrid inverter are interconnected in parallel.

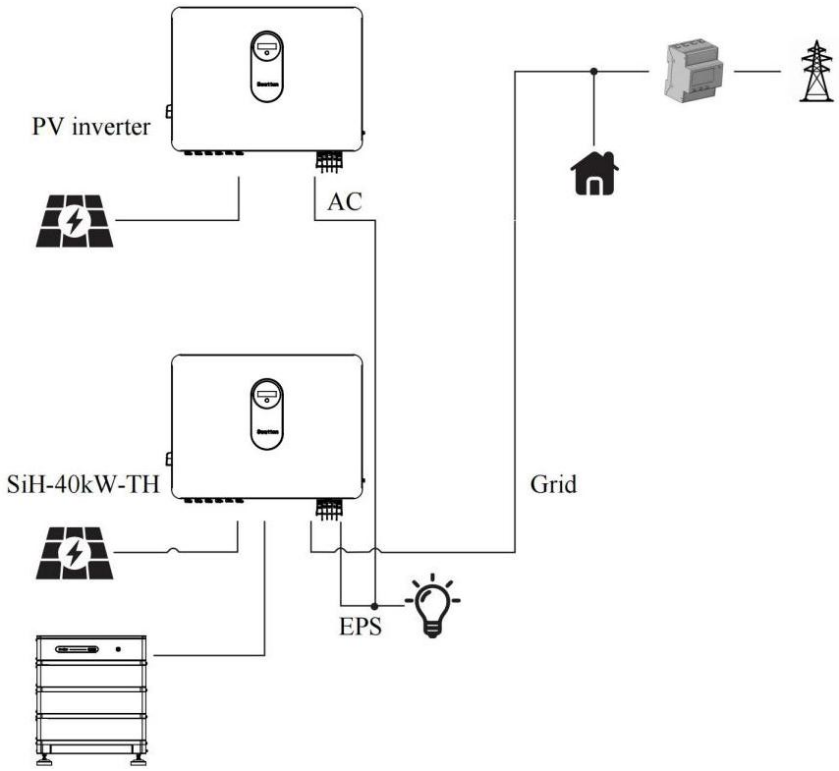



**figure 2-6** Backup terminal to Retrofit the Existing PV System

To optimize the utilization of PV energy and enable the PV inverter to operate even when off-grid, the Backup

terminal is utilized to retrofit the existing PV system.

In this setup, the AC terminal of the PV inverter is connected in parallel with the Backup terminal of the hybrid inverter. However, please note that this option is not available in the European region.

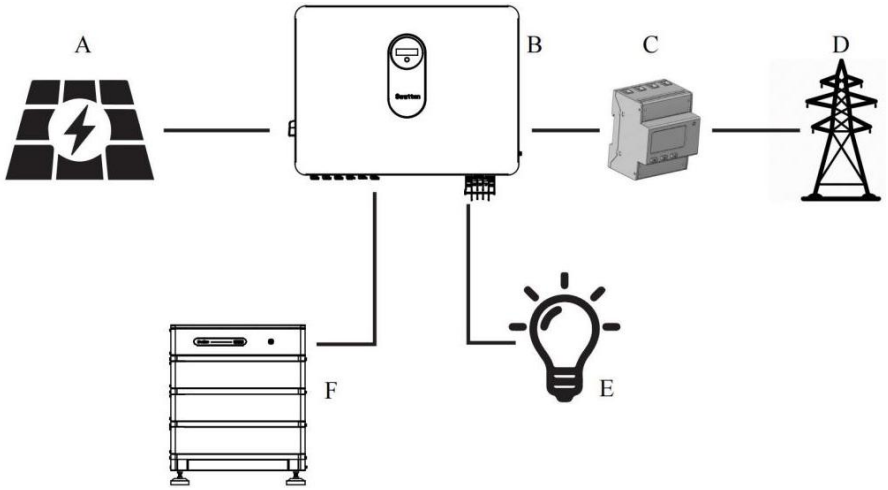
It is important to ensure that the power output of the PV inverter does not exceed the nominal power of the hybrid inverter. In the case of a single-phase PV inverter, the power output should not exceed the single-phase nominal power of the three-phase hybrid inverter.

Note:

1. In a zero-export scenario, the hybrid inverter can prevent power from being exported to the grid, but it cannot guarantee zero export for the PV inverter itself. If you require a zero-export solution for the PV inverter, please contact the manufacturer of the PV inverter for their specific zero-export solution.
2. The use of PV modules with the hybrid inverter is optional.

## 2.8 Whole Home Backup

In this scenario, all the household loads are connected to the Backup terminal of the hybrid inverter. The energy supplied to the load does not come directly from the grid. If a grid failure happens, the household loads are still supplied with energy from PV or battery.

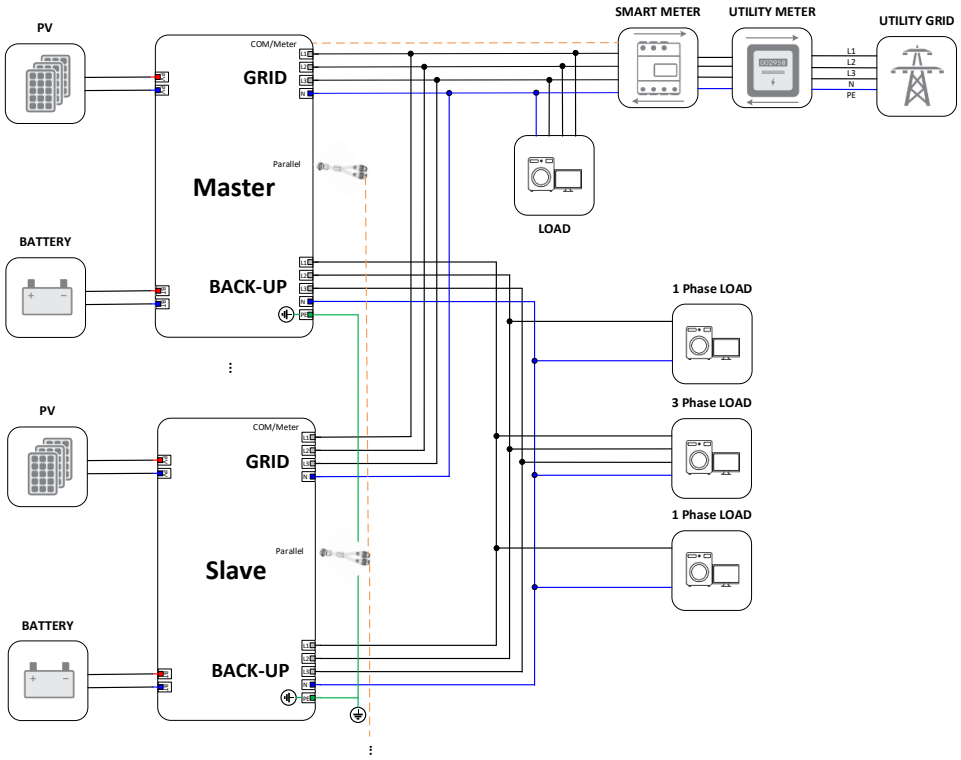



| Item | Description | Note |
|---|---|---|
| A | PV strings | Compatible with monocrystalline silicon, polycrystalline silicon, and thin-film modules without grounding. |
| B | Inverter | SiH-9.9/10kW-TH-PRO SiH-12~50kW-TH |
| C | Metering device | Meter cupboard with power distribution system via the RS485 port. |
| D | Utility grid | Grid grounding system types: TT, TN-C-S, TN-S. |
| E | Backup loads | Household loads, connected to inverter Backup terminal |
| F | Battery (optional) | A Li-ion battery. |

Note:

1. In this scenario, the household load should be connected to the Backup terminal.
2. The power of household loads connected should not exceed the maximum backup output of the inverter.

## 2.9 Parallel System




Parallel connection function are constantly being upgraded, so be sure to consult your supplier if you have parallel requirements.

One inverter will be set as the “Master inverter” to control the other "Slave inverters" in the system. The maximum number of direct parallel-connected inverters as shown above picture is 4 pcs.

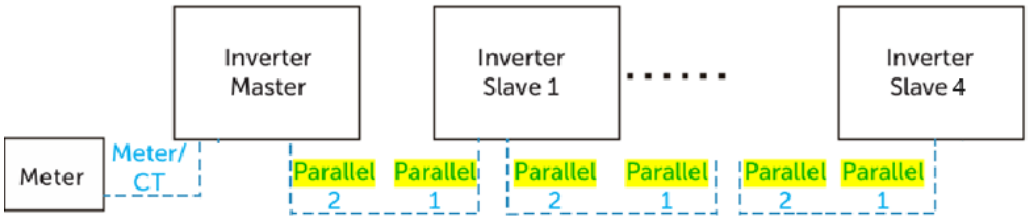
WARNING

This H1 hybrid inverter series have not been tested in accordance with Section 5 of AS/NZS 4777.2:2020 for applications involving multiple inverter combinations.

The parallel system is extremely complex and a large amounts cables need to be connected, therefore it is strongly required that every cable must be connected according to correct line sequence (L1-L1, L2-L2, L3-L3, N-N), otherwise any small mis-operation may cause the system running failed.

NOTICE

BACKUP terminal L1/2/3/N should keep the line length the same，that the way to maintain parallel performance.



# 3 Function Description

## 3.1 Safety Function

### 3.1.1 Protection

The inverter incorporates multiple protective features, encompassing safeguards against short circuits, monitoring of grounding insulation resistance, protection against residual currents, anti-islanding measures, as well as safeguards for DC over-voltage and over-current conditions, and more.

### 3.1.2 Earth Fault Alarm

The device is equipped with a grounding fault alarm system. In the event of inadequate or nonexistent grounding on the AC side, an audible alarm will sound and the LED indicator will illuminate in red.

The inverter also supports PV input and battery input fault detection ,AS/NZS 5033 for PV input, AS/NZS 5139 for battery input.

## 3.2 Energy Conversion and Management

The inverter efficiently transforms the DC power derived from either the PV array or the battery into AC power that meets the specifications of the grid. Additionally, it facilitates the transfer of DC power from the PV panel to the battery.

Incorporating a bidirectional converter, the inverter has the capability to both charge and discharge the battery, ensuring optimal utilization of energy.

To maximize the power output from PV strings that may have varying orientations, tilts, or module structures, the inverter employs multiple string Maximum Power Point (MPP) trackers. These trackers enable the inverter to extract the maximum available power from each PV string, thereby enhancing overall system efficiency.

### 3.2.1 Power Derating

Power derating is implemented as a protective measure to safeguard the inverter against potential overload or faults. Moreover, the derating function can be activated in accordance with the requirements specified by the utility grid. Various situations that may necessitate inverter power derating include:

- Over-temperature conditions, which encompass both ambient temperature and module temperature.
- High input voltage levels.
- Grid under-voltage occurrences.
- Grid over-frequency events.
- Power factor deviations from the rated values.
- High altitude environments.

For seamless integration with demand response capabilities, the inverter is equipped with a terminal block designed to connect to a demand response enabling device (DRED). This DRED facilitates the activation of demand response modes (DRMs). When triggered, the inverter promptly detects and initiates a response to all supported demand response commands within a swift 2-second timeframe.

### 3.2.2 Regular Operational Voltage Range

The inverters are designed to operate effectively within the allowable voltage range for a specified observation time. The specific conditions for setting these voltage range parameters depend on whether the connection is for

a normal operational start-up or an automatic re-connection following a tripping event triggered by interface protection.

If the voltage level deviates from the defined operational levels, the inverter will disconnect from the grid within the protection time frame. In the event of a short-lived disturbance that lasts for a duration shorter than the required protection time, the inverter can automatically reconnect to the grid once the voltage level returns to normal operating levels after the disturbance subsides.

### 3.2.3 Regular Operational Frequency Range

The inverter is designed to operate within its specified frequency range for a minimum observation time. The specific conditions for setting these frequency range parameters depend on whether the connection is for a normal operational start-up or an automatic re-connection following a tripping event triggered by interface protection..

If the frequency level falls outside the defined operational range, the inverter will disconnect from the grid. In the case of a temporary disturbance that lasts for a duration shorter than the required protection time, the inverter can automatically reconnect to the grid once the frequency level returns to normal operating levels after the disturbance subsides.

### 3.2.4 Reactive Power Regulation

The inverter offers reactive power regulation modes to provide grid support. The specific reactive power regulation mode can be configured and adjusted through the Solarman Smart App.

### 3.2.5 DRM (“AU”/“NZ”)

The inverter provides a terminal block for connecting to a external demand response enabling device (DRED). The DRED asserts demand response modes (DRMs). The inverter detects and initiates a response to all supported demand response commands within 2s.

Note: User need to purchase an external DRED to achieve DRM function.

The following table lists the DRMs supported by the inverter.

| Mode | Requirement |
|---|---|
| DRM 0 | The inverter is in the state of “Turn off”. |
| DRM 1 | The import power from the grid is 0. |
| DRM 2 | The import power from the grid is no more than 50 % of the rated power. |
| DRM 3 | The import power from the grid is no more than 75 % of the rated power. |
| DRM 4 | The import power from the grid is 100 % of the rated power, but subject to the constraints from other active DRMs. |
| DRM 5 | The feed-in power to the grid is 0. |
| DRM 6 | The feed-in power to the grid is no more than 50 % of the rated power. |
| DRM 7 | The feed-in power to the grid is no more than 75 % of the rated power. |
| DRM 8 | The feed-in power to the grid is 100 % of the rated power, but subject to the constraints from other active DRMs. |

The DRED may assert more than one DRM at a time. The following shows the priority order in response to multiple DRMs.

| Multiple Modes | Priority Order |
|---|---|
| DRM 0…DRM4 | DRM1 > DRM2 > DRM3 > DRM4 |
| DRM 5…DRM8 | DRM5 > DRM6 > DRM7 > DRM8 |

## 3.3 Communication and Configuration

The inverter offers RS485, Ethernet, WLAN, and CAN ports for device and system monitoring. These ports allow configuration of parameters for optimal operation. Inverter information is accessible through the Solarman Smart App.

The import power refers to the total power obtained from the grid, which encompasses the power used to charge the battery from the grid through the inverter, the power consumed by local loads, and the power supplied to loads connected to the inverter's Backup port from the grid. To comply with local regulations, it is necessary to calculate the maximum allowable system power based on the wire size and circuit breaker required for the selected model. This value can be configured as the Import Power Limit, which can be conveniently adjusted using the Solarman Smart App.

## 3.4 Battery Management

To optimize battery lifespan, the inverter will conduct battery charging, discharging, and maintenance activities based on the battery status information received from the Battery Management System (BMS).

NOTICE

If the battery has remained unused or has not been fully charged for an extended period of time, it is advisable to manually perform a full charge every 15 days. This practice helps to maintain the battery's lifespan and optimal performance.

### 3.4.1 Charge Management

**Backup Charge Management**

The purpose of the emergency charge management function is to safeguard the battery against damage resulting from prolonged excessive discharge. During emergency charging, the inverter is unable to respond to discharge commands. The table below outlines the emergency charge conditions for different types of Li-ion batteries.

table 3-1: Backup Charge Management for Li-ion Battery

| Status | Conditions |
|---|---|
| Trigger | Either of the following conditions is met:<br>- A battery under-voltage warning is triggered.<br>- An emergency charge command is reported to the inverter. |
| Finish | All the following conditions are met:<br>- The battery under-voltage warning is cleared.<br>- The emergency charge command reported to the inverter is cleared. |

table 3-2 Default SOC Conditions for Li-ion Battery Backup Charge

| Type | Trigger SOC | Finishing SOC |
|---|---|---|
| SiB-H-F | SOC = 0% | SOC > 10% |

**Normal Charge Management**

During normal operation, when the battery voltage is within the acceptable range, the inverter is capable of charging the battery if the PV power exceeds the load power. It ensures that the battery is not overcharged.

The maximum charge current is restricted to the lower value between the following:

- The maximum charge current specified by the inverter.
- The maximum/recommended charge current recommended by the battery manufacturer.

As a result, the battery charge power may not reach the nominal power level.

### 3.4.2 Discharge Management

**Discharge Management**

Discharge management is implemented to prevent deep discharging of the battery, ensuring its protection. The maximum allowable discharge current is limited to the lower value between the following:

- The maximum discharge current specified by the inverter.
- The maximum/recommended discharge current recommended by the battery manufacturer.

As a result, the battery discharge power may not reach the nominal power level.

# 4 Unpacking and Storage

## 4.1 Unpacking and Inspection

The product undergoes comprehensive testing and rigorous inspection prior to shipment. However, there is still a possibility of damage occurring during transit. Therefore, it is essential to conduct a thorough inspection upon receiving the product. Please follow these steps:

- Examine the packaging case for any visible signs of damage.
- Verify the contents of the delivery to ensure completeness, referring to the packing list.
- After unpacking, carefully inspect the inner contents for any signs of damage.

If any damage or incompleteness is detected, promptly contact Swatten or the transport company. It is advisable to provide photographs of the damage to facilitate the resolution process. It is important not to discard the original packaging case. When decommissioning the product, it is recommended to store it in the original packaging case for safekeeping.

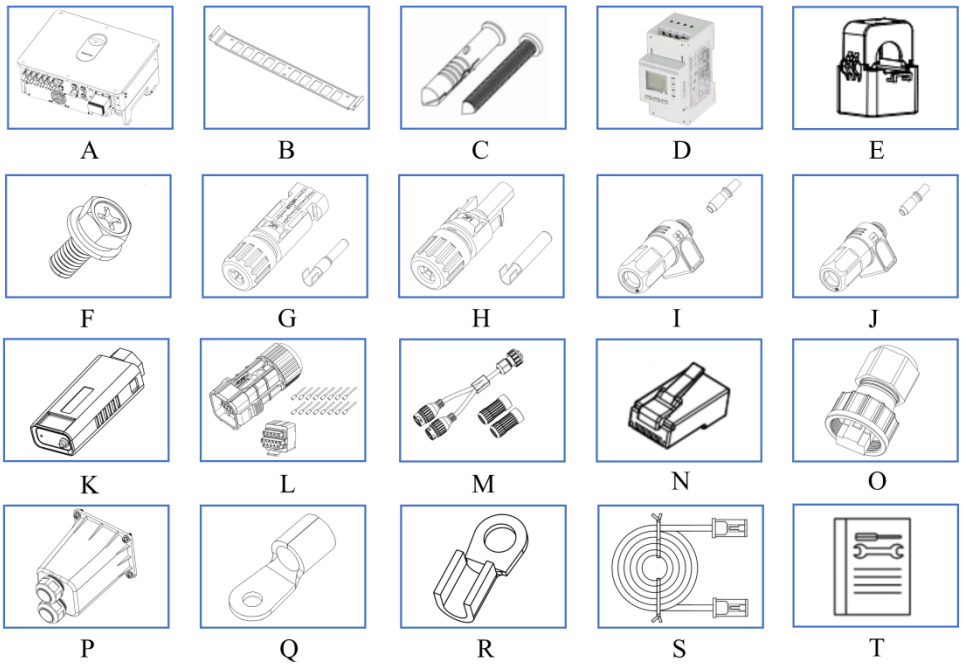
NOTICE

Upon receiving the product, it is important to conduct a thorough inspection to ensure its integrity and avoid any potential damage. Please follow these steps:

- Examine the appearance and structural parts of the device for any signs of damage.
- Verify that the contents of the package match the items listed on the packing list. Ensure that you have received the correct product.
- If any issues or discrepancies are found during the inspection, refrain from installing the device and immediately contact your distributor for assistance. If the problem persists or your distributor is unable to resolve the issue, promptly reach out to Swatten for further support.

When unpacking the product, exercise caution to avoid causing any damage, especially if using tools. Take care to handle the product with care and ensure that no unintentional harm is inflicted upon it.

## 4.2 Scope of Delivery




| Item | Name | Quantity |
|---|---|---|
| A | Inverter | 1 |
| B | Wall-mounting bracket * | 1 |
| C | Expansion plug set | 4 |
| D | Smart Energy Meter | 1 |
| E | Current Transformer (CT)* | 3 |
| F | M5 screws and washers | 5 |
| G | MC4 connector negative terminal | 4~6** |
| H | MC4 connector positive terminal | 4~6** |
| I | BAT connector set (positive terminal) | 1 |
| J | BAT connector set (negative terminal) | 1 |
| K | WiFi logger | 1 |
| L | COM connector | 1 |
| M | Parallel connection cable*** | 1 |
| N | Parallel Connection RJ45*** | 2 |
| O | DRM Connection Cover | 1 |
| P | AC Connector Cover* | 1 |
| Q | Cable Terminal | 11 |
| R | Ground Terminal | 3 |
| S | RJ45 communication cable | 2 |
| T | Documents | 1 |

* All materials except B,D,E and Q are in the Accessory box.
** 4 terminals for SiH-10PRO/15kW-TH, 5 terminals for SiH-20kW-TH, 6 terminals for SiH-25/30/40/50kW-TH.
*** For inverter parallel connection use ONLY. Standard-equipped in SiH-25/30/40/50kW-TH.

## 4.3 Inverter Storage

To ensure the proper storage of the inverter when it is not immediately installed, please adhere to the following guidelines:

- Store the inverter in its original packing case, ensuring the desiccant is kept inside.

- Maintain a storage temperature between -30°C and +70°C at all times.
- Maintain a storage relative humidity between 0% and 95%, ensuring it is non-condensing.
- If stacking storage is necessary, ensure that the number of stacking layers does not exceed the limit indicated on the outer side of the packing case.
- Keep the packing case upright during storage.
- If the inverter needs to be transported again, ensure it is properly packed before loading and transporting.
- Avoid storing the inverter in areas susceptible to direct sunlight, rain, or strong electric fields.
- Avoid placing the inverter near items that may affect or damage it.
- Store the inverter in a clean and dry location to prevent dust and water vapor from causing erosion.
- Avoid storing the inverter in areas with corrosive substances or at risk of being accessed by rodents and insects.
- Conduct periodic inspections, at least once every six months.
- If any signs of insect or rodent bites are detected, promptly replace the packaging materials.
- If the inverter has been stored for more than a year, it is necessary to have it inspected and tested by professionals before putting it into operation.

NOTICE

It is crucial to store the inverter in accordance with the specified storage requirements. Failure to meet these requirements may result in product damage, and it's important to note that such damage caused by improper storage is not covered by the warranty. To ensure the safekeeping of the inverter and maintain warranty coverage, please adhere to the storage guidelines provided.

# 5 Mechanical Mounting

WARNING

Respect all local standards and requirements during mechanical installation.

## 5.1 Safety during Mounting

DANGER

Prior to installation, ensure that there are no active electrical connections. Take precautionary measures to avoid drilling near water or electrical wiring within the walls.

WARNING

The performance of the system can be affected by an inadequate installation environment. To optimize system performance, please consider the following:

- Install the inverter in a well-ventilated area to promote proper airflow and heat dissipation.
- Ensure that the heat dissipation system or vents of the inverter are not obstructed by objects or debris.
- Avoid installing the inverter in environments where flammable or explosive materials are present, as well as areas prone to smoke accumulation.

CAUTION

Improper handling may cause personal injury!

- When moving the inverter, be aware of its weight and keep the balance to prevent it from tilting or falling.
- Wear proper protective equipment before performing operations on the inverter.
- The bottom terminals and interfaces of the inverter cannot directly contact the ground or other supports. The inverter cannot be directly placed on the ground.

By following these guidelines, you can help maintain an optimal installation environment and ensure the reliable performance of the inverter.

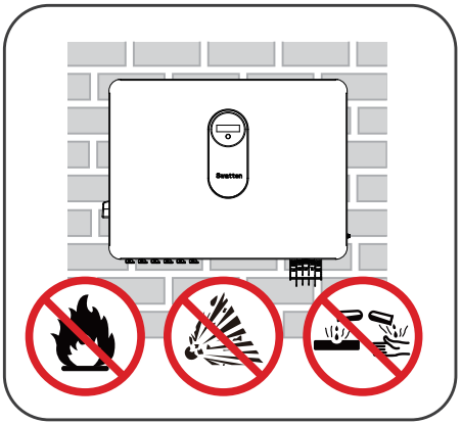
## 5.2 Location Requirements

To ensure safe operation, long service life, and expected performance, it is important to select an optimal mounting location for the inverter. Consider the following guidelines:

- The inverter, if it has a protection rating of IP66, can be installed both indoors and outdoors, providing flexibility in choosing the mounting location.
- Install the inverter in a location that allows for easy electrical connection, operation, and maintenance. This will facilitate access to the inverter for any necessary maintenance or troubleshooting tasks.

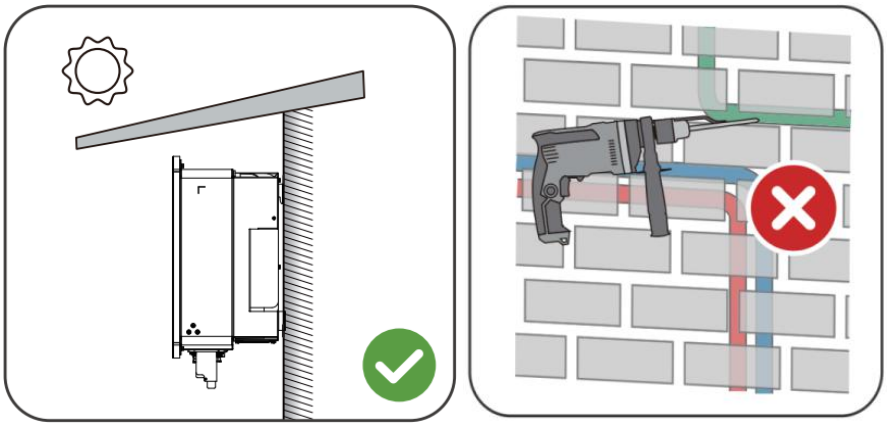
### 5.2.1 Environment Requirements

- Ensure an installation environment free from flammable or explosive materials.

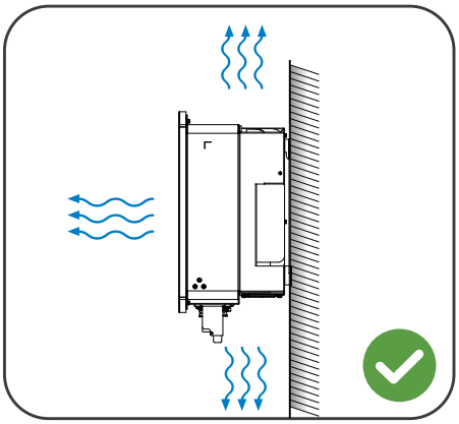


- Choose a location that is not accessible to children to ensure their safety.


- Ensure that the ambient temperature and relative humidity of the installation site meet the specified requirements.
- To prolong the service life of the inverters, avoid direct exposure to sunlight, rain, and snow. Consider installing them in sheltered areas to provide protection from these elements.



- Ensure proper ventilation for the inverter with adequate air circulation.



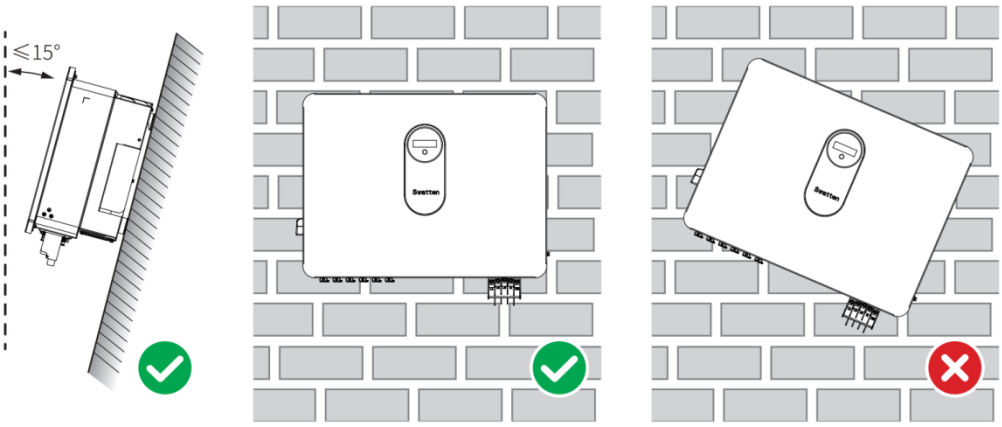
- Due to operational noise, it is not recommended to install the inverter in living areas.

### 5.2.2 Carrier Requirements

The mounting structure for the inverter must adhere to local/national standards and guidelines. The installation surface should be sufficiently sturdy to support four times the weight of the inverter and be suitable for its dimensions (e.g., cement walls, plasterboard walls, etc.).

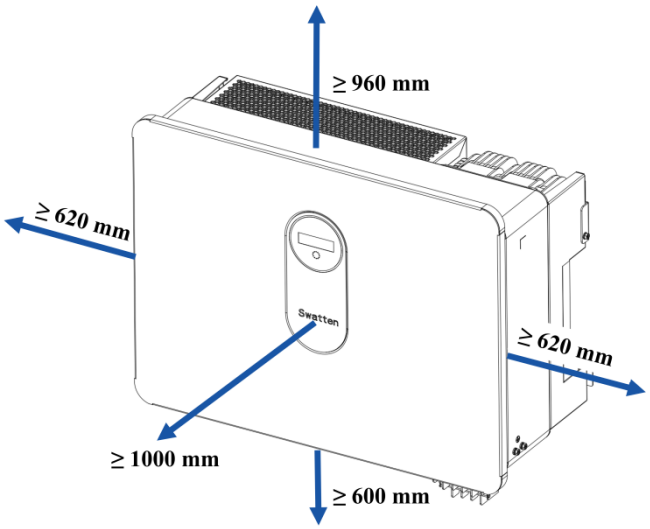
### 5.2.3 Angle Requirements

The inverter should be installed in a vertical position. It should never be installed horizontally, tilted forward or backward, or upside down.

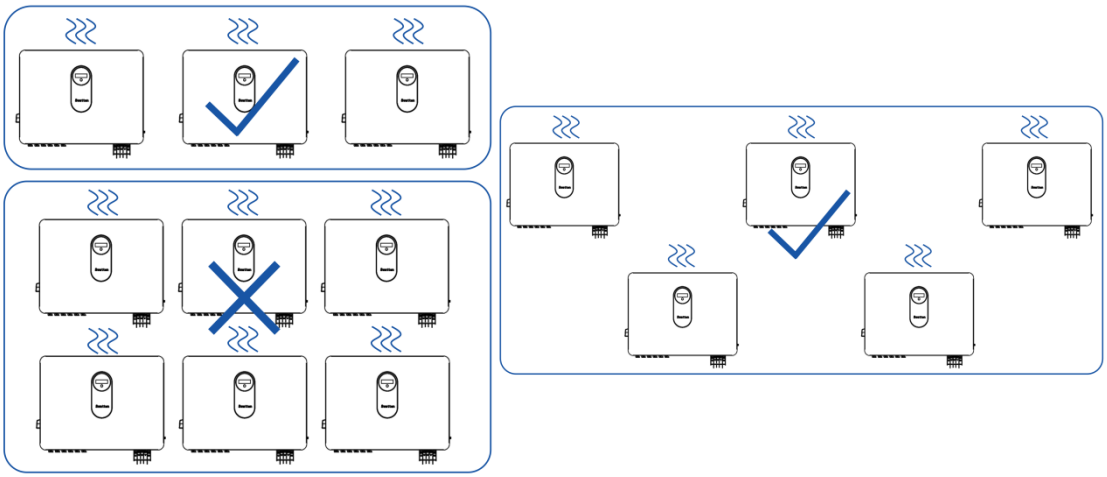


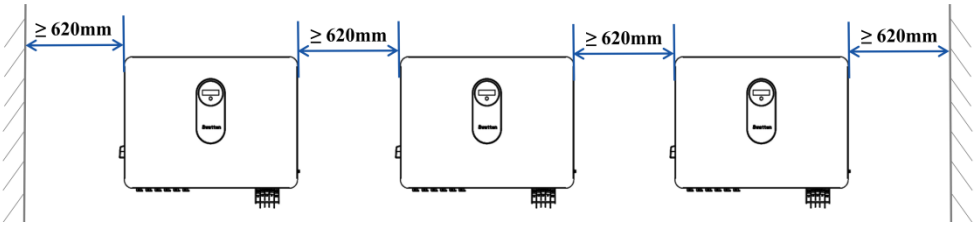

### 5.2.4 Clearance Requirements

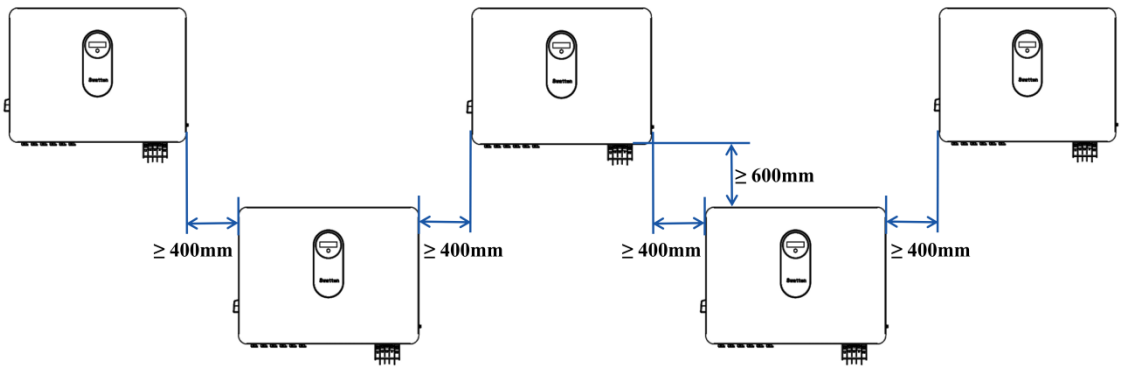
Allow ample clearance around the inverter to ensure proper heat dissipation. Install the inverter at a suitable height for convenient viewing of the LED indicator and easy access to the operating switch(es).




In case of multiple inverters, reserve specific clearance between the inverters.

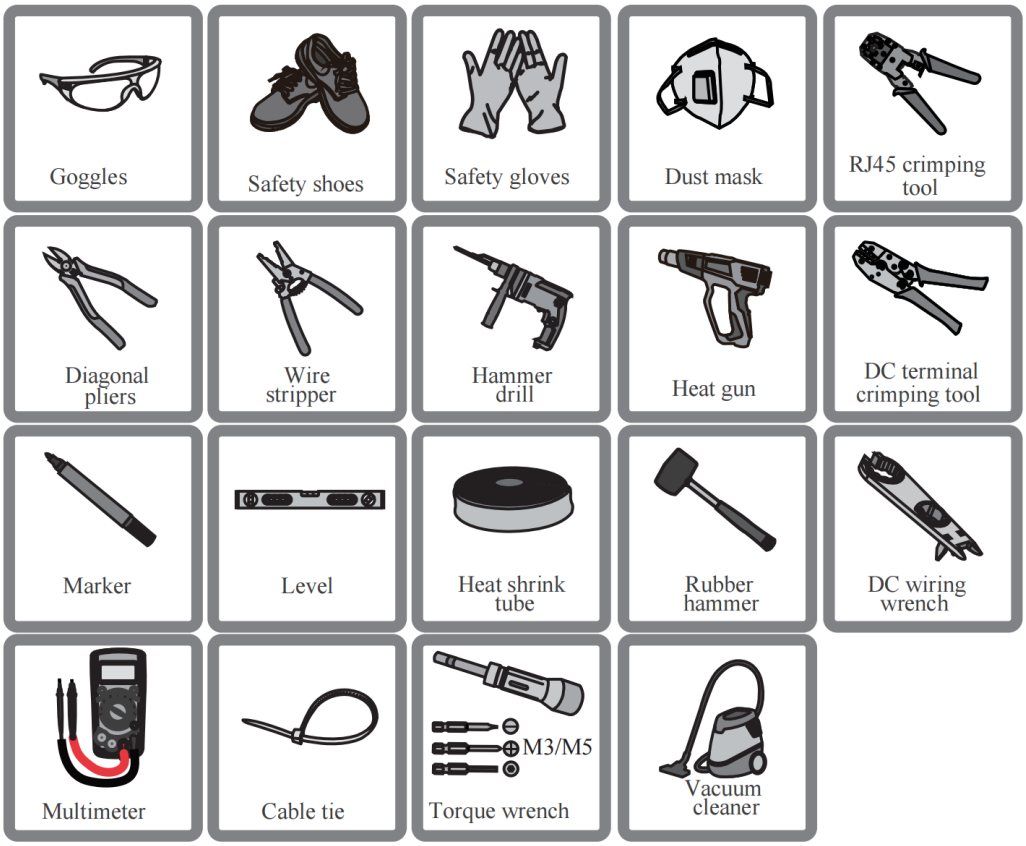




## 5.3 Installation Tools

Installation tools include but are not limited to the following recommended ones. If necessary, use other auxiliary tools on site




## 5.4 Moving the Inverter

When transferring the inverter to the installation location, please adhere to the subsequent guidelines:

- Maintain constant awareness of the inverter's weight.
- Employ the handles situated on both sides of the inverter to lift it.
- Mobilize the inverter with the assistance of one or two individuals or with the aid of an appropriate transportation device.
- Ensure that the equipment is securely fastened before releasing it.

CAUTION

Please exercise caution to prevent personal injuries while handling the inverter. Adhere to the following guidelines:

- Ensure an adequate number of personnel are assigned to carry the inverter based on its weight, and installation personnel should wear appropriate protective gear like impact-resistant shoes and gloves.
- Take note of the inverter's center of gravity to prevent tilting during handling.
- Avoid placing the inverter directly on a hard surface, as it may damage the metal enclosure. Instead, use protective materials such as a sponge pad or foam cushion underneath the inverter.
- When moving the inverter, hold it by the designated handles and avoid gripping the terminals for transportation.

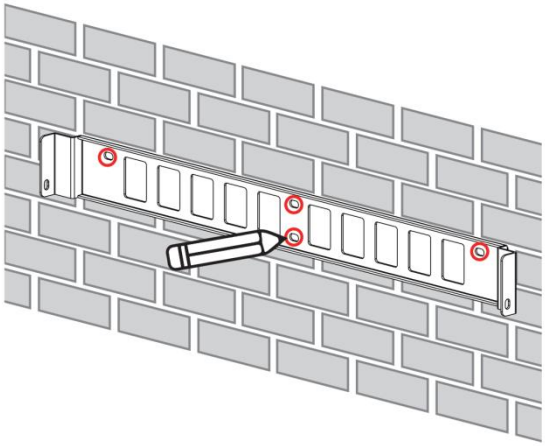
## 5.5 Installing the Inverter

Mount the inverter securely on the wall using the supplied wall-mounting bracket and expansion plug sets. We recommend using the provided expansion plug set, as illustrated below, for the installation.

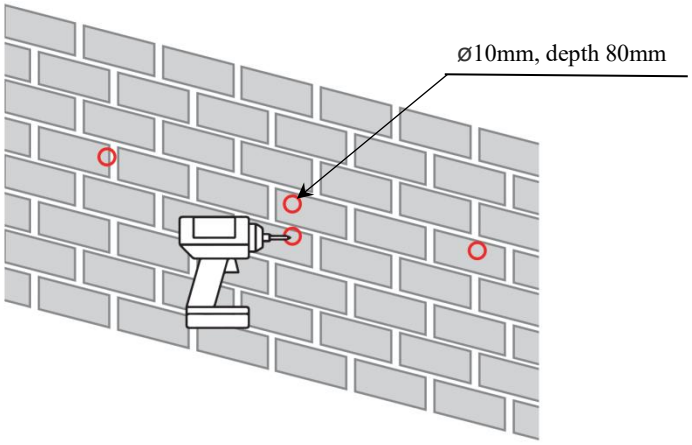
(1) (2) (3) (4)

(1) Self-tapping screw M6 (2) Expansion tube (3) Fender washer (4) Spring washer

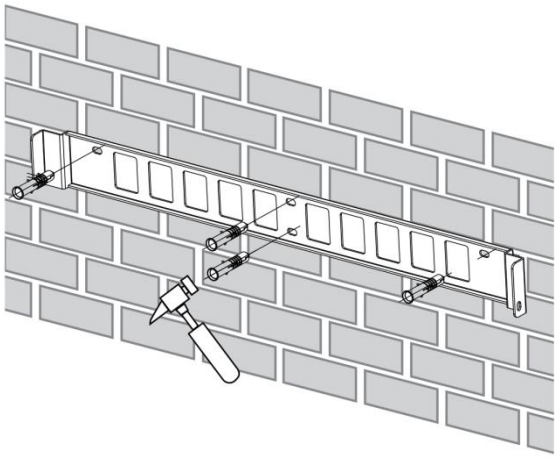
Step 1 Place the mounting plate horizontally against the wall and mark the positions where the holes will be drilled.



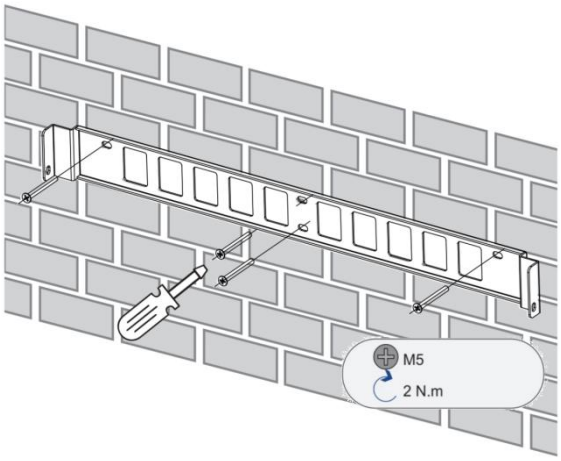
Step 2 Use a hammer drill with a 10mm diameter drill bit to drill holes into the wall to a depth of 80mm.



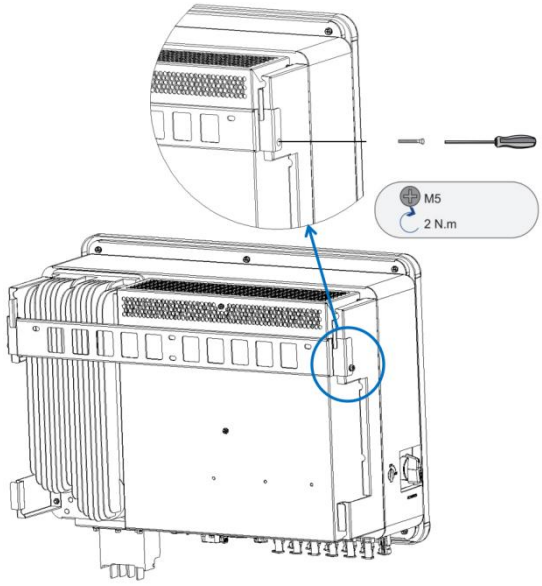

Step 3 Insert the expansion bolts into the drilled holes and secure the mounting plate firmly against the wall.



Step 4 Attach the inverter onto the mounted plate, ensuring it aligns with the holes on the plate.




Step 5 Use nuts to securely fasten the mounting plate and the inverter together, ensuring they are tightly connected.




NOTICE

Check the level of the mounting bracket and make adjustments as necessary until the bubble in the level is

positioned in the middle.

Ensure that the holes drilled into the wall have a depth of approximately 70mm.

# 6 Electrical Connection

## 6.1 Safety Instructions

DANGER

The PV string produces extremely high voltage when exposed to sunlight, which can be lethal.

Operators must wear appropriate personal protective equipment during electrical connections.

Before touching any DC cables, ensure that they are voltage-free using a measuring instrument.

Follow all safety instructions provided in the relevant documents regarding PV strings.

DANGER

- Prior to electrical connections, ensure that the inverter switch and all switches connected to the inverter are set to the "OFF" position to avoid the risk of electric shock.
- Verify that the inverter is undamaged and all cables are voltage-free before performing any electrical work.
- Do not close the AC circuit breaker until the electrical connection is complete.

WARNING

Product damage resulting from incorrect wiring is not covered by the warranty.

- Electrical connections should only be carried out by professionals.
- Operators must wear proper personal protective equipment during electrical connections.
- All cables used in the PV generation system must be securely attached, adequately insulated, and correctly sized.

NOTICE

All electrical connections must adhere to local and national/regional electrical standards.

- Cables used by the user must comply with the requirements of local laws and regulations.
- Connection of the inverter to the grid requires permission from the national/regional grid department.

NOTICE

- All unused terminals must be covered with waterproof covers to maintain the protection rating.
- After completing the wiring, seal the cable inlet and outlet holes with fireproof/waterproof materials such as fireproof mud to prevent the entry of foreign matter or moisture, which may affect the long-term operation of the inverter.
- Adhere to the safety instructions related to PV strings and the regulations concerning the utility grid.

Note:
The cable colors shown in the figures in this manual are for reference only. Select cables according to the local cable standards.

## 6.2 Terminal Description

All electrical terminals are located at the bottom of the inverter.

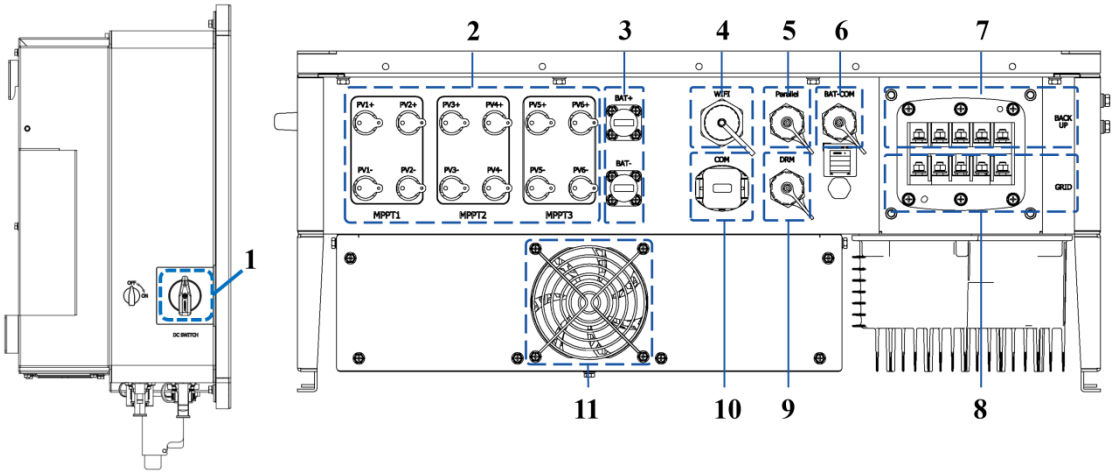



**figure 6-1** Terminals

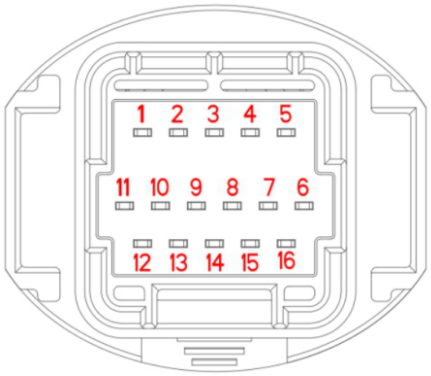
All electrical terminals on the inverter are positioned at the bottom.

It's important to note that the image provided is for reference purposes only and the actual product received may vary in appearance.

| No. | Name | Description | Decisive Voltage Classification |
|---|---|---|---|
| 1 | DC switch | Used to disconnect PV- only when there is no PV production | Ignore |
| 2 | PV terminals | MC4 terminals for PV input. The terminal number depends on inveter model. | DVC-C |
| 3 | Battery connection | Connectors for the battery power cables | DVC-C |
| 4 | WIFI-RS485 | Communication accessory port to be connected to Solarman Smart communication module. | DVC-A |
| 5 | COM-parallel | Communication port for parallel connection of inverters | DVC-A |
| 6 | BAT COM | Installers can insert standard network cables directly into the BAT-COM and Swatten stackable battery for communication. | DVC-A |
| 7 | BACKUP terminal | AC terminal reserved for Backup loads. Equivalent to the use of EPS/UPS. | DVC-C |
| 8 | GRID terminal | AC terminal for connection to the utility grid | DVC-C |
| 9 | COM-DRM | Communication connection for DRM | DVC-A |
| 10 | COM | Communication connection for Smart Energy Meter, EV Charger, BAT, Logger, DRM, RSD, DO and DI | DVC-A |
| 11 | Fan | Used for inverter heat dissipation. The number of fans varies by product model: Not available for SiH-9.9/10kW-TH-PRO/SiH-14.9~20kW-TH | Ignore |

COM Terminal

COM is used mainly for establishing communication with devices such as meter, EV charg er, and battery. Details about this terminal are shown below:

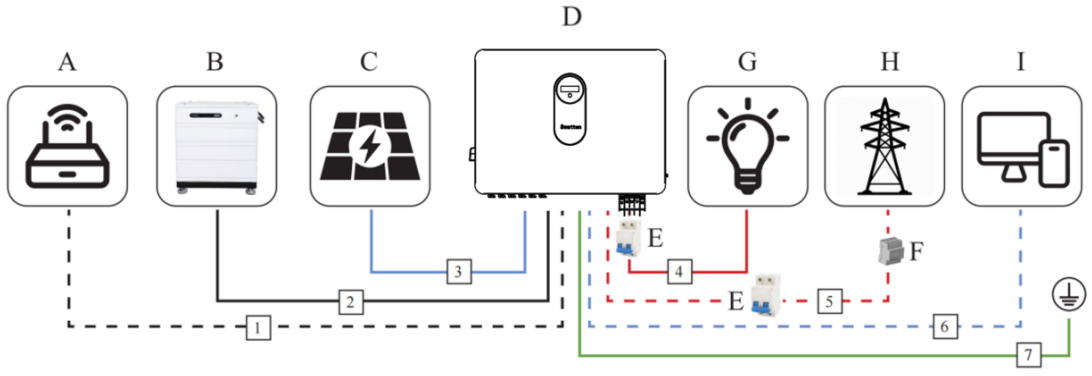



| COM Terminal | | | |
|---|---|---|---|
| 01 | 02 | 03 | 04 |
| DO1_COM | DO1_NO | DO2_COM | DO2_NO |
| 05 | 06 | 07 | 08 |
| DI | METER_A | METER_B | BAT_EN_H |
| 09 | 10 | 11 | 12 |
| BAT_EN_G | BAT_CAN_L | BAT_CAN_H | CHARGER_A |
| 13 | 14 | 15 | 16 |
| CHARGER_B | RSD-1 | RSD-2 | DI_COM |

| Label | Description |
|---|---|
| DO | Multi-functional dry mode |
| Meter (A, B) | Communication between the inverter and the Smart Energy Meter |
| RSD | Rapid Shut Down |
| BAT | BAT(EN_H, EN_G):Enable the battery with a voltage of 12V.BAT<br>BAT(H, L):To enable the communication between the inverter and the Li-ion battery |
| BAT CAN(H，L) | Communication between the inverter and the battery |
| CHARGER(A，B) | Communication between the inverter and charging pile(Reserved) |
| DI | Multi-functional dry node: Diesel generator |

## 6.3 Electrical Connection Overview

System Wiring Diagram




The electrical connection should be realized as follows:

(A) Router (B) Battery (C) PV string

(D) Inverter (E) AC circuit breaker (F) Smart Energy Meter

(G) Backup loads (H) Grid (I) Monitoring device

| No. | Cable | Type | Cable diameter (mm) | Cross section ($mm^2$) |
|---|---|---|---|---|
| 2 | Battery cable | Outdoor multi-core copper wire cable, complying with 1,000V standard | 6.5 ~ 8.5 | 8~10 (8~7AWG) |
| 3 | PV cable | PV cable, complying with 1,000V standard | 6.4 ~ 8.0 | 4 ~ 6 (12~10AWG) |
| 4 | AC cable | Outdoor multi-core copper wire cable | SiH9.9/10kW-TH: 18 ~ 23<br>SiH15~20kW-TH: 21 ~ 26<br>SiH25~50kW-TH: 24 ~ 26 | SiH9.9/10kW-TH: 8~10(8~7AWG)<br>SiH15~20kW-TH: 10~16(7~5AWG)<br>SiH25~50kW-TH: 20~25(4~3AWG) |
| 6 | Communication cable | Shielded twisted pair | 4.8 ~ 6 | 2*(0.5 ~ 1.0) (20~18AWG) |
| | | CAT 6 outdoor shielded network cable | 4.8 ~ 6 | 8 * 0.2 (23~21AWG) |
| 7 | Additional Grounding cable | Outdoor single-core copper wire cable | The same as that of the PE wire in the AC cable | |

NOTICE

In case local regulations impose specific requirements for cables, follow the cable specifications mandated by those regulations.

Cable selection should take into consideration factors such as rated current, cable type, routing method, ambient temperature, and maximum expected line loss.

The distance for cabling between the battery and the inverter should not exceed 10 meters, and it is recommended to keep it within 5 meters for optimal performance.

## 6.4 Backup Wiring Diagram

**Backup load requirement**

Note 1: Do not connect sensitive precision instruments or medical equipment to the backup terminal.

Note 2: Ensure that the backup load rated power is within the backup rated output power range. Otherwise, the inverter will report an Overload Fault warning. When Overload Fault occurs, turn off some loads to make sure it is within the backup rated output power range.

Note 3: For inductive load such as fridge, air conditioner, washing machine, etc., ensure that the start power does not exceed the backup peak power.

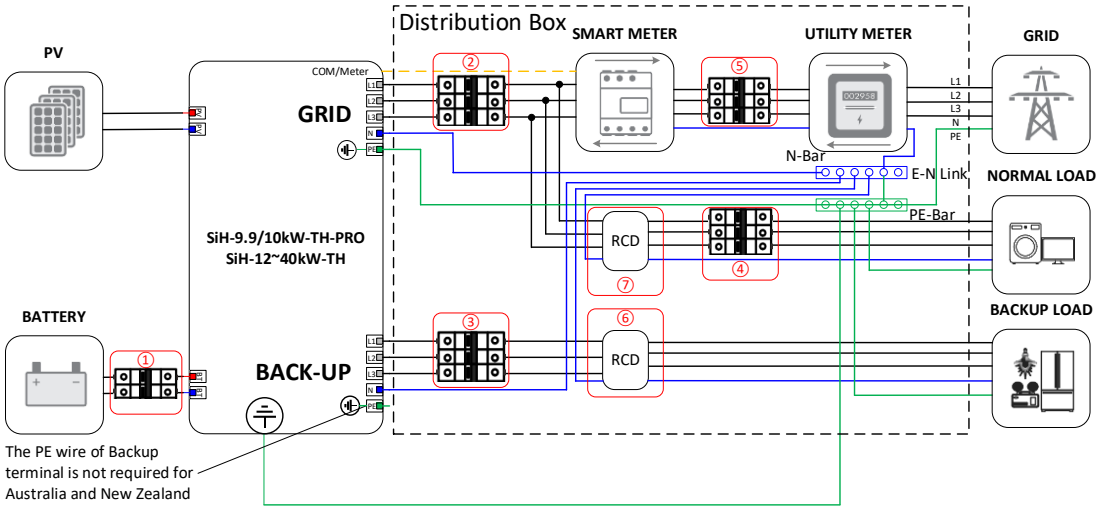
| Type of load | Equipment | Start power |
|---|---|---|
| Resistive load | Lamp | Equal to rated power |
| | Fan | Equal to rated power |
| | Hairdryer | Equal to rated power |
| | Fridge | 3-5 times rated power |

| | | |
|---|---|---|
| Inductive load | Air conditioner | 3-6 times rated power |
| | Washing machine | 3-5 times rated power |
| | Microwave oven | 3-5 times rated power |

Please refer to the nominal current of the equipment for the actual start current.

**Partial backup For Australia and New Zealand**

For Australia and New Zealand and South Africa, the neutral cable of GRID side and Backup side must be connected together. Otherwise Backup function will not work.

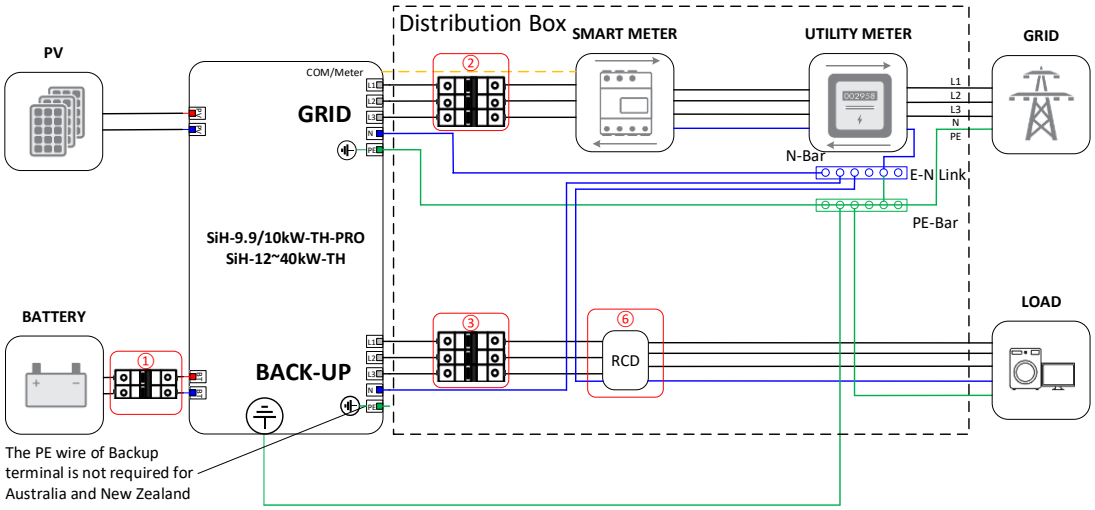



| NO. | SiH-9.9/10kW | SiH-14.9/15kW | SiH-19.9/20kW | SiH-25/29.9/30kW | SiH-40/50kW |
|---|---|---|---|---|---|
| ① | 63A/800V DC breaker* | | | | |
| ② | 32~63A/400V TypeB AC breaker | 40~63A/400V TypeB AC breaker | 63A/400V TypeB AC breaker | 80A/400V TypeB AC breaker | 100A/400V TypeB AC breaker |
| ③ | 32~63A/400V TypeB AC breaker | 40~63A/400V TypeB AC breaker | 63A/400V TypeB AC breaker | 80A/400V TypeB AC breaker | 100A/400V TypeB AC breaker |
| ④ | Depends on normal loads | | | | |
| ⑤ | Depends on household loads and inverter capacity | | | | |
| ⑥⑦ | 300mA Type-A RCD (Comply with local regulation) | | | | |

Note 1: *If the battery already has an accessible internal DC breaker, there is no need for an additional DC breaker.

Note 2: The values provided in the table are recommendations and can be adjusted based on the specific conditions of the installation.

**Whole Backup for Australia and New Zealand**

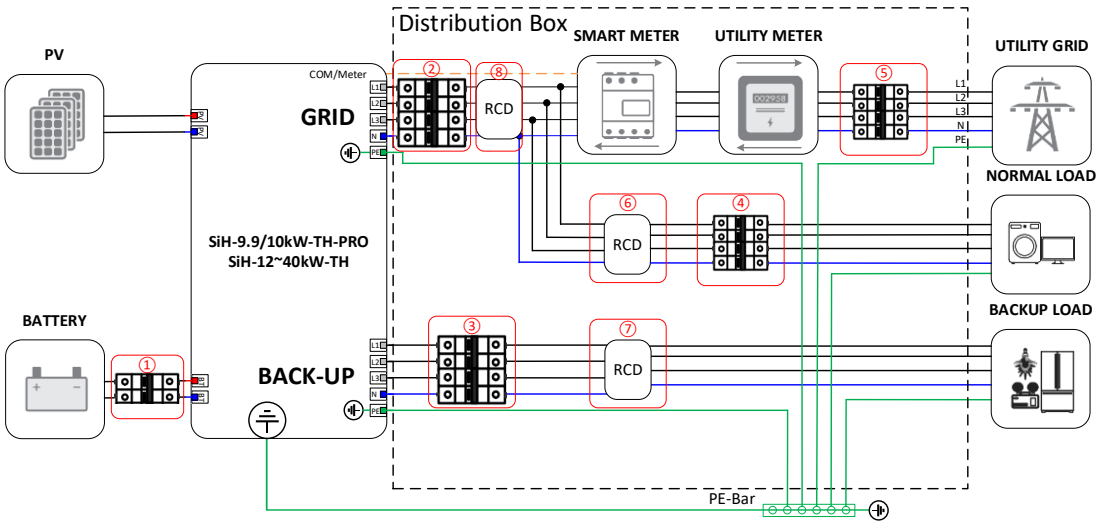



| NO. | SiH-9.9/10kW | SiH-14.9/15kW | SiH-19.9/20kW | SiH-25/29.9/30kW | SiH-40/50kW |
|---|---|---|---|---|---|
| ① | 63A/800V DC breaker* | | | | |
| ② | 63A/400V TypeB AC breaker | | | 80A/400V TypeB AC breaker | 100A/400V TypeB AC breaker |
| ③ | 63A/400V TypeB AC breaker | | | 80A/400V TypeB AC breaker | 100A/400V TypeB AC breaker |
| ⑥ | 300mA Type-A RCD (Comply with local regulation) | | | | |

**Partial backup For other countries include Europe**

For other countries with grid systems that do not have specific requirements for wiring connections, the following diagram serves as an example:

Please note that this diagram is provided as an example and may need to be adjusted based on the specific regulations and standards of the country in which the installation is taking place. It is important to consult local regulations and guidelines to ensure compliance and safety.

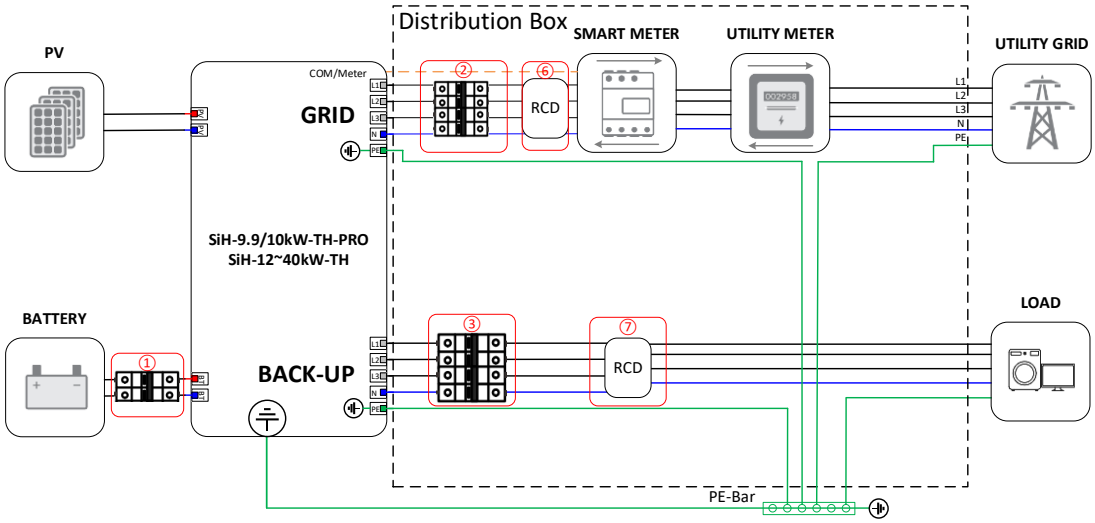


| NO. | SiH-9.9/10kW | SiH-14.9/15kW | SiH-19.9/20kW | SiH-25/29.9/30kW | SiH-40/50kW |
|---|---|---|---|---|---|
| ① | 63A/800V DC breaker* | | | | |
| ② | 32~63A/400V TypeB AC breaker | 40~63A/400V TypeB AC breaker | 63A/400V TypeB AC breaker | 80A/400V TypeB AC breaker | 100A/400V TypeB AC breaker |
| ③ | 32~63A/400V TypeB AC breaker | 40~63A/400V TypeB AC breaker | 63A/400V TypeB AC breaker | 80A/400V TypeB AC breaker | 100A/400V TypeB AC breaker |
| ④ | Depends on normal loads | | | | |
| ⑤ | Depends on household loads and inverter capacity | | | | |
| ⑥⑦ | 300mA RCD (Comply with local regulation) | | | | |
| ⑧ | 300mA RCD(Comply with local regulation) | | | | |

Note 1: *If the battery already has an accessible internal DC breaker, there is no need for an additional DC breaker in the system.

Note 2: The values provided in the table are recommended values, but they can be adjusted to suit the actual conditions of the installation.

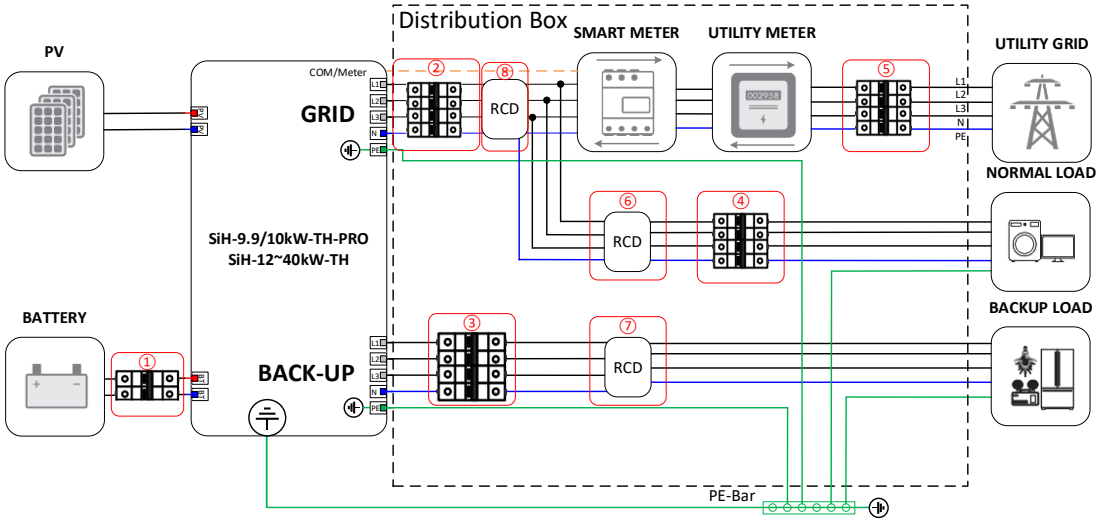
**Whole backup For Other Countries include Europe**




| NO. | SiH-9.9/10kW | SiH-14.9/15kW | SiH-19.9/20kW | SiH-25/29.9/30kW | SiH-40/50kW |
|---|---|---|---|---|---|
| ① | 63A/800V DC breaker* | | | | |
| ② | | 63A/400V TypeB AC breaker | | 80A/400V TypeB AC breaker | 100A/400V TypeB AC breaker |
| ③ | | 63A/400V TypeB AC breaker | | 80A/400V TypeB AC breaker | 100A/400V TypeB AC breaker |
| ⑥ | 300mA RCD(Comply with local regulation) | | | | |
| ⑦ | 300mA RCD (Comply with local regulation) | | | | |

**Partial backup For TT System**

The following diagram is an example for grid systems without special requirement on wiring connection.



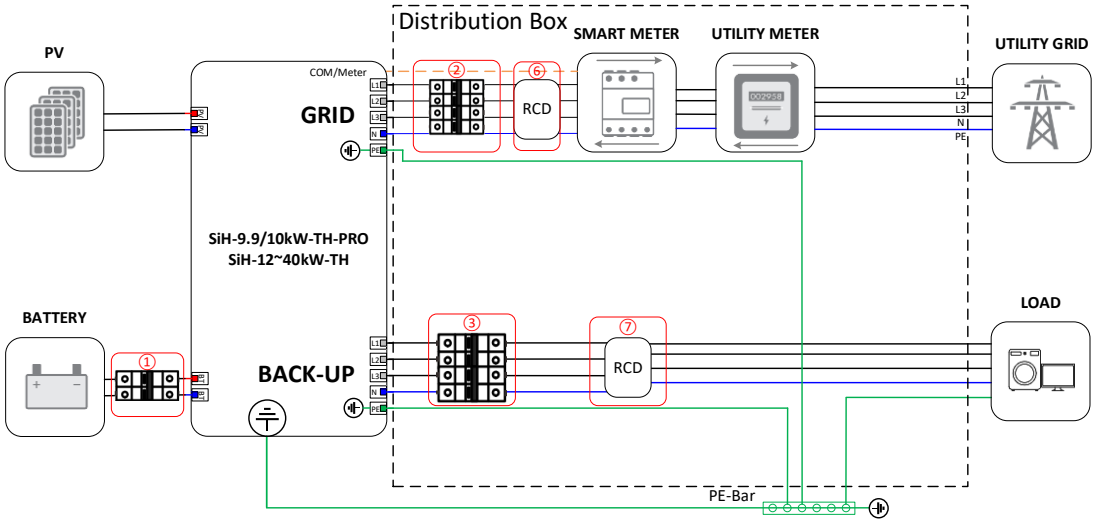

| NO. | SiH-9.9/10kW | SiH-14.9/15kW | SiH-19.9/20kW | SiH-25/29.9/30kW | SiH-40/50kW |
|---|---|---|---|---|---|
| ① | 63A/800V DC breaker* | | | | |
| ② | 32~63A/400V TypeB AC breaker | 40~63A/400V TypeB AC breaker | 63A/400V TypeB AC breaker | 80A/400V TypeB AC breaker | 100A/400V TypeB AC breaker |
| ③ | 32~63A/400V TypeB AC breaker | 40~63A/400V TypeB AC breaker | 63A/400V TypeB AC breaker | 80A/400V TypeB AC breaker | 100A/400V TypeB AC breaker |
| ④ | Depends on loads | | | | |
| ⑤ | Depends on household loads and inverter capacity | | | | |
| ⑥⑦ | 300mA RCD (Comply with local regulation) | | | | |
| ⑧ | 300mA RCD(Comply with local regulation) | | | | |

Note 1: *If the battery already has an accessible internal DC breaker, there is no need for an additional DC breaker in the system.

Note 2: The values provided in the table are recommended values, but they can be adjusted to suit the actual conditions of the installation.

**Whole Backup For TT System**

The following diagram is an example for grid systems without special requirement on wiring connection.




| NO. | SiH-9.9/10kW | SiH-14.9/15kW | SiH-19.9/20kW | SiH-25/29.9/30kW | SiH-40/50kW |
|---|---|---|---|---|---|
| ① | 63A/800V DC breaker* | | | | |
| ② | 63A/400V TypeB AC breaker | | | 80A/400V TypeB AC breaker | 100A/400V TypeB AC breaker |
| ③ | 63A/400V TypeB AC breaker | | | 80A/400V TypeB AC breaker | 100A/400V TypeB AC breaker |
| ⑥ | 300mA RCD(Comply with local regulation) | | | | |
| ⑦ | 300mA RCD (Comply with local regulation) | | | | |

## 6.5 External Protective Grounding Connection

DANGER

Electric shock!

- Ensure a reliable connection of the ground cable to prevent electric shock.

WARNING

- The inverter does not have a transformer, so neither the negative nor positive electrode of the PV string can be grounded. Grounding these electrodes will result in abnormal operation of the inverter.
- Connect the grounding terminal to the external protective grounding point before connecting the AC cable, PV string, and communication cable.

WARNING

The external protective grounding terminal should meet at least one of the following requirements:

- The grounding cable should have a cross-sectional area of not less than $10mm^2$ for copper wire or $16mm^2$ for aluminum wire. It is recommended to have reliable grounding for both the external protective grounding terminal and the AC side grounding terminal.
- If the grounding cable has a cross-sectional area less than $10mm^2$ for copper wire or $16mm^2$ for aluminum wire, ensure reliable grounding for both the external protective grounding terminal and the AC side

grounding terminal.

Grounding connections can be made using other methods that comply with local standards and regulations. Swatten shall not be held liable for any consequences arising from these connections.

### 6.5.1 External Protective Grounding Requirements

All non-current carrying metal parts and device enclosures in the PV power system should be grounded, such as PV module brackets and inverter enclosures.

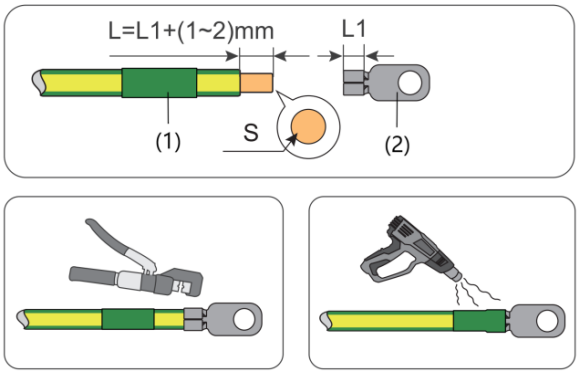
If there is only one inverter in the PV system, connect the external protective grounding cable to a nearby grounding point.

If there are multiple inverters in the PV system, connect the grounding points of all inverters and the PV array frames to an equipotential cable (according to the site conditions) to establish an equipotential connection.

### 6.5.2 Connection Procedure

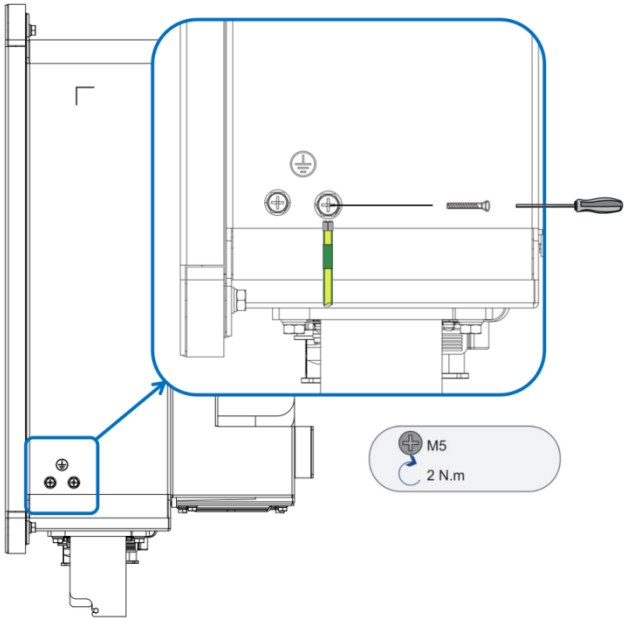
There are two additional grounding terminals available on the bottom and right side of the inverter. You can connect the grounding cable to either one of them. Please note that the external grounding cable needs to be prepared by the customers.

Step 1: Prepare the cable and OT/DT terminal.




(1) Heat shrink tubing (2) OT/DT terminal

Step 2: Remove the screw on the grounding terminal and securely fasten the cable using a screwdriver.




Step 3: Apply paint to the grounding terminal to ensure corrosion resistance.

**--End**

## 6.6 AC Cable Connection

### 6.6.1 AC Side Requirements

Only with the permission of the local grid department, the inverter can be connected to the grid. Before connecting the inverter to the grid, it is important to ensure that the grid voltage and frequency meet the requirements specified in the "Technical Data" section. If there are any discrepancies, it is recommended to contact the electric power company for assistance.

An independent three or four-pole circuit breaker must be installed on the output side of the inverter. This circuit breaker ensures safe disconnection from the grid when needed. It is crucial for maintaining the safety of the system.

| NO. | SiH-9.9/10kW | SiH-15kW | SiH-20kW | SiH-25/30kW | SiH-40/50kW |
|---|---|---|---|---|---|
| | 63A/400V TypeB AC breaker | | | 80A/400V TypeB AC breaker | 100A/400V TypeB AC breaker |

WARNING

To ensure safe disconnection from the grid, AC circuit breakers should be installed on both the output side of the inverter and the grid side.

- Assess the need for an AC circuit breaker with a higher overcurrent capacity based on the specific conditions of the installation.
- Do not connect any local load between the inverter and the AC circuit breaker.
- Each inverter should have its own dedicated AC circuit breaker; multiple inverters cannot share a single AC circuit breaker..

Residual Current Monitoring Device

The inverter is equipped with an integrated universal current-sensitive residual current monitoring unit. It will automatically disconnect from the mains power if a fault current exceeding the limit is detected.

If the use of an external residual current device (RCD) is mandatory by local regulations, verify the type of

RCD required. It is recommended to use a Type-A RCD with a rating of 300 mA unless a lower value is required by the specific local electric codes.

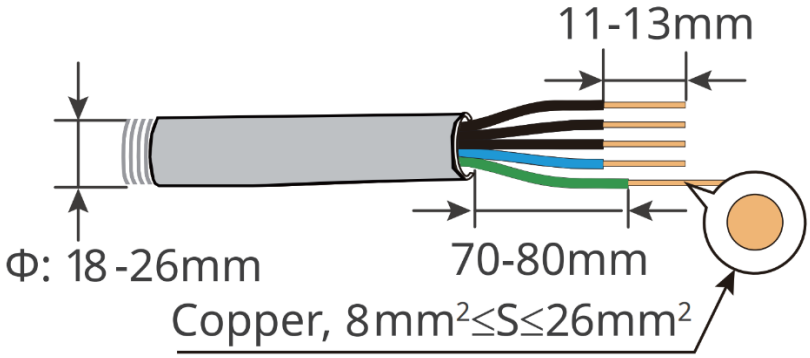
WARNING

In Australia, Type AC RCDs are not permitted for installation.

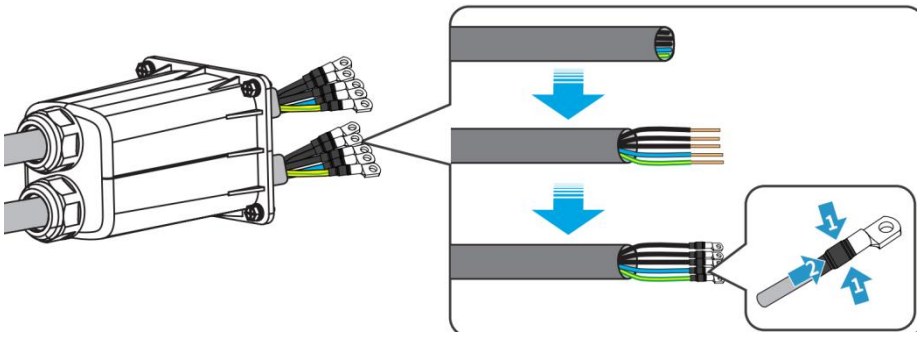
### 6.6.2 Connecting the AC Cable

The GRID terminal block is situated underneath the inverter. The GRID connection involves the three-phase-four-wire grid + PE connection (L1, L2, L3, N, and PE).

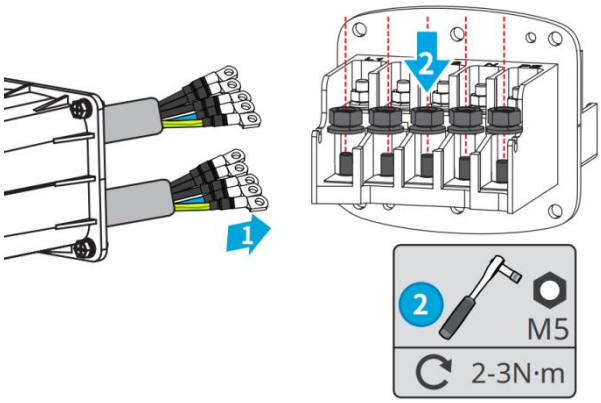
Step 1: Strip 90 mm of the cable jacked and 12 mm(L) of the wire insulation.



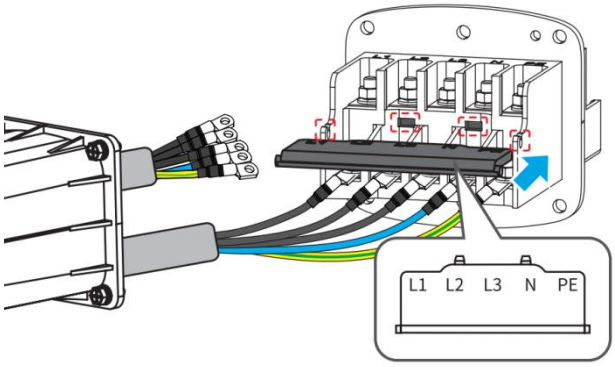

step 2: Insert the cable into the waterproof cover and handle the core to ensure good electrical conductivity.



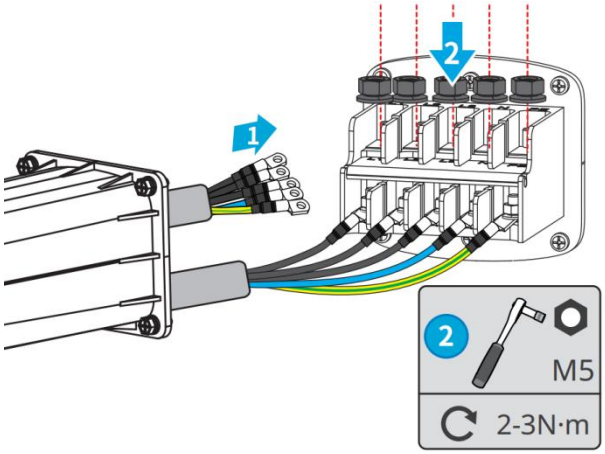

Step 3: Insert the cable core into the corresponding position on the terminal block.and use an M5 screwdriver to tighten the screws on the terminal block to a torque of 2-3N·m.



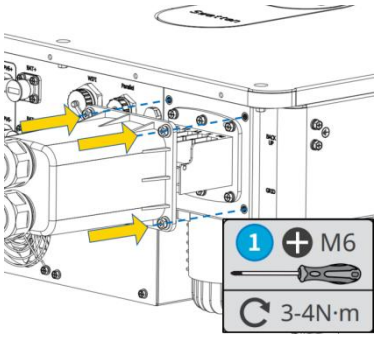

Step 4: Insert the corresponding wire core into the correct position in the terminal block according to the L1, L2, L3, N, and PE markings and make sure that each wire core is tightly secured and in good contact with the terminal block.

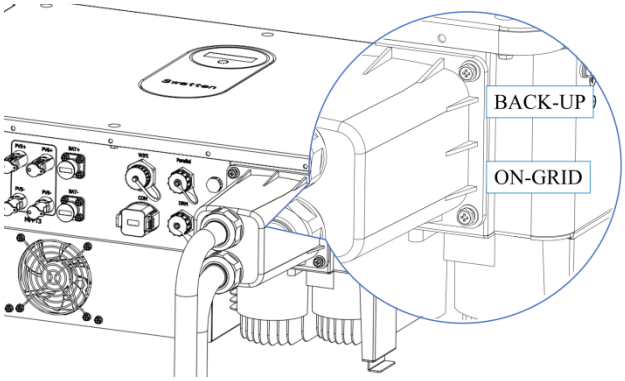



Step 5: Insert the cable wire cores into the correct positions on the terminal block, use an M5 screwdriver to tighten the screws on the terminal block to a torque of 2-3N·m.




Step 6: Cover the wired unit enclosure and secure it using M6 screws, ensure that all screws are tightened, using a Phillips screwdriver, to a torque of 3-4N-m to ensure that the enclosure seals and cables are securely fastened in place.



**--End**

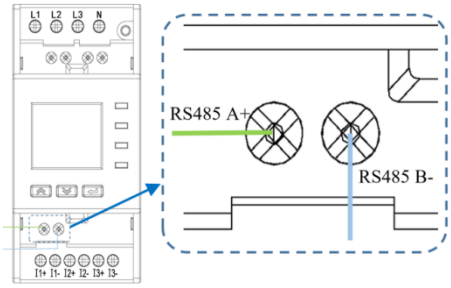
## 6.7 Smart Meter Connection

WARNING

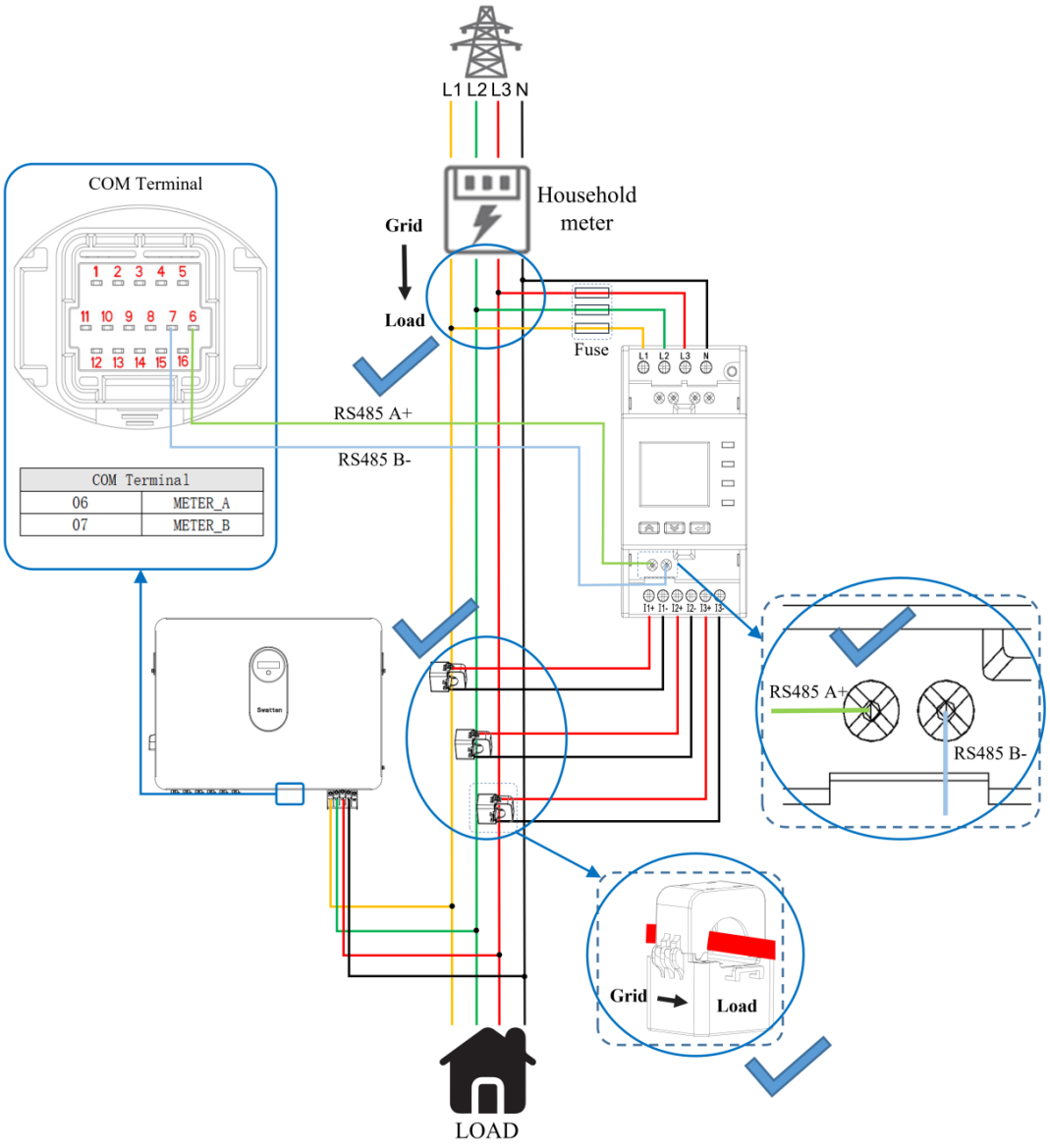
**Wiring must be correct!!!**

Step 1: Turn off the PV panel switch, the load switch, the battery switch and other power switches, and ensure that they cannot be reconnected.

Step 2: Connect terminals 6 and 7 of the inverter's COM port to terminal A and terminal B on the Smart Meter.




Step 3: Connect each wire to the terminals on the Smart Meter.




Step 4: After the meter is connected, it is necessary to carefully inspect the CT direction and cable installation. The arrow on the CT **MUST** always point to the **LOAD** side.

**After the meter is connected, it is necessary to check the following items:**

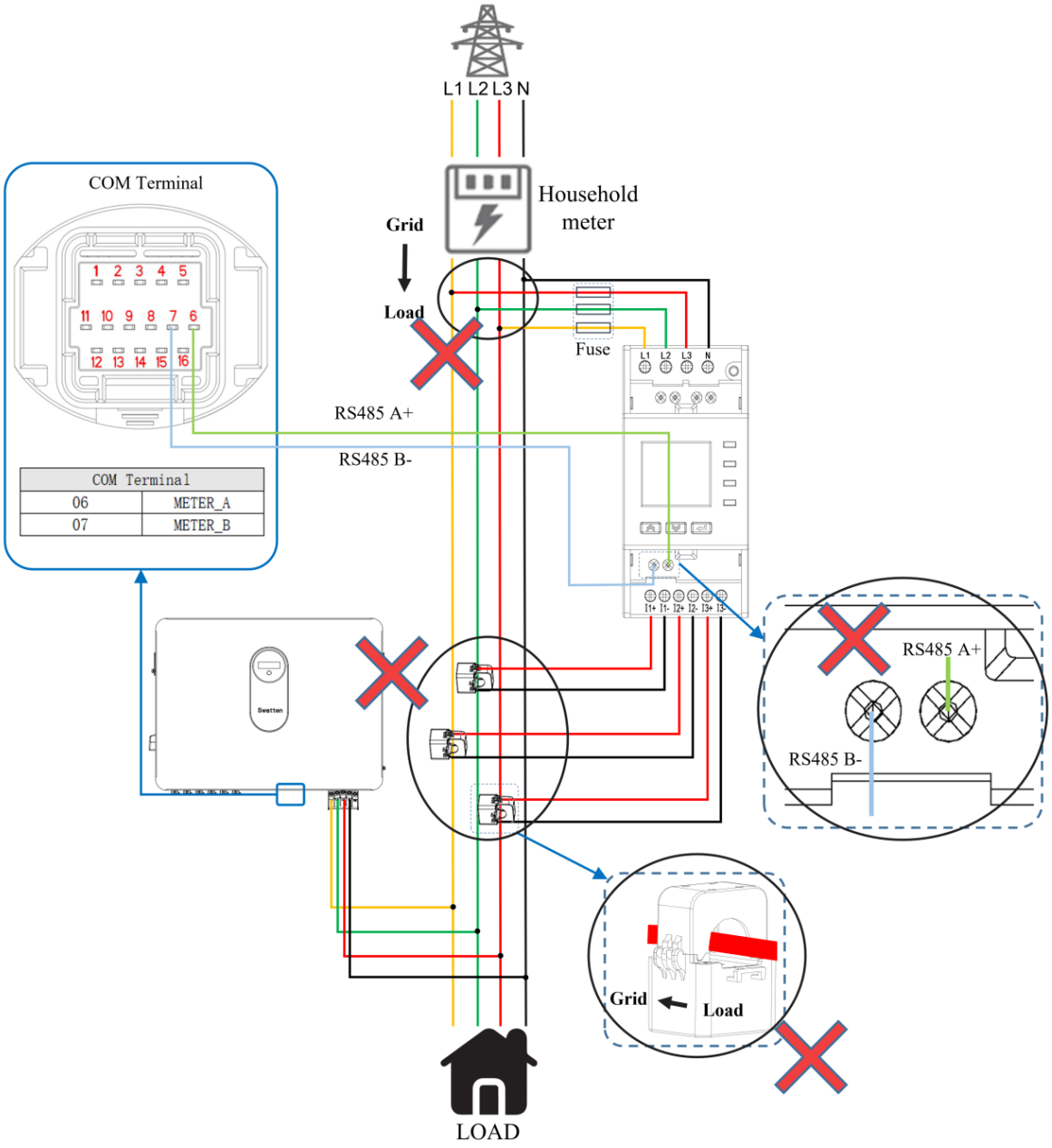
1. The arrow on the CT should be directed towards the **LOAD** side.
2. The CT corresponding to I1+ and I1- should be connected to cable L1.

The CT corresponding to I2+ and I2- should be connected to cable L2.

The CT corresponding to I3+ and I3- should be connected to cable L3.

3. The cables connected to the L1, L2, L3, and N terminals of the meter are correct.
4. Ensure that the clips are perfectly engaged without any deviation. Otherwise, the measurement of current may not be accurate.

Carefully check whether the wiring sequence of the Smart Meters and CTs are correct.



## 6.8 DC Cable Connection (PV & Battery cable)

DANGER

The PV string produces dangerous high voltage when exposed to sunlight.

- Adhere to all safety instructions provided in the relevant documents regarding PV strings.

WARNING

- Make sure the PV array is well insulated to ground before connecting it to the inverter.
- Make sure the maximum DC voltage and the maximum short circuit current of any string never exceed inverter permitted values specified in "Technical Data".
- Check the positive and negative polarity of the PV strings, and connect the PV connectors to corresponding terminals only after ensuring polarity correctness.
- During the installation and operation of the inverter, please ensure that the positive or negative electrodes of PV strings do not short-circuit to the ground. Otherwise, an AC or DC short-circuit may occur, resulting in equipment damage. The damage caused by this is not covered by the warranty.
- Electric arc or cont-actor over-temperature may occur if the PV connectors are not firmly in place, and Swatten shall not be held liable for any damage caused.
- If the DC input cables are reversely connected or the positive and negative terminals of different MPPT are shorted to ground at the same time, while the DC switch is in the "ON" position, do not operate immediately. Otherwise, the inverter may be damaged. Please turn the DC switch to "OFF" and remove the DC connector to adjust the polarity of the strings when the string current is lower than 0.5A.

WARNING

Before connecting the PV array to the inverter, ensure that the resistance between the positive terminals of the PV string and earth, as well as between the negative terminals of the PV string and earth, is greater than 1 M Ohm.

NOTICE

The following requirements regarding PV string connection must be adhered to. Failure to comply may result in irreversible damage to the inverter, and such damage will not be covered by the warranty.

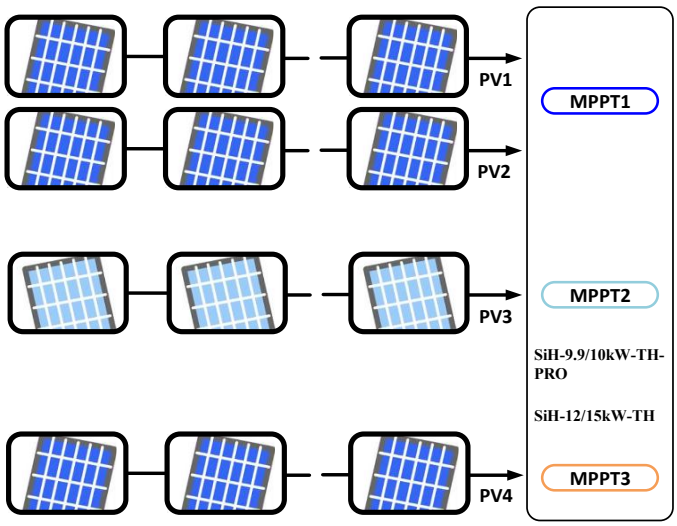
- Avoid mixing different brands or models of PV modules within one MPPT circuit, as well as using PV modules with different orientations or angles within a string. While this may not directly damage the inverter, it will negatively impact the performance of the system!

### 6.8.1 PV Input Configuration

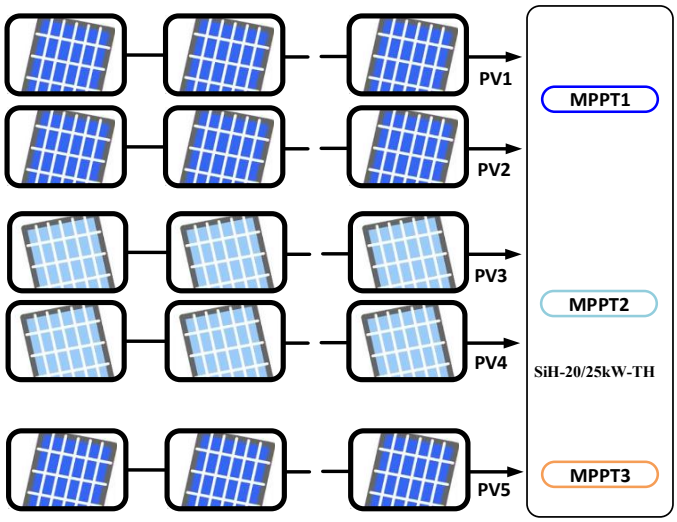
NOTICE

The output voltage of strings should all exceed the lower limit of the full load MPPT voltage range.

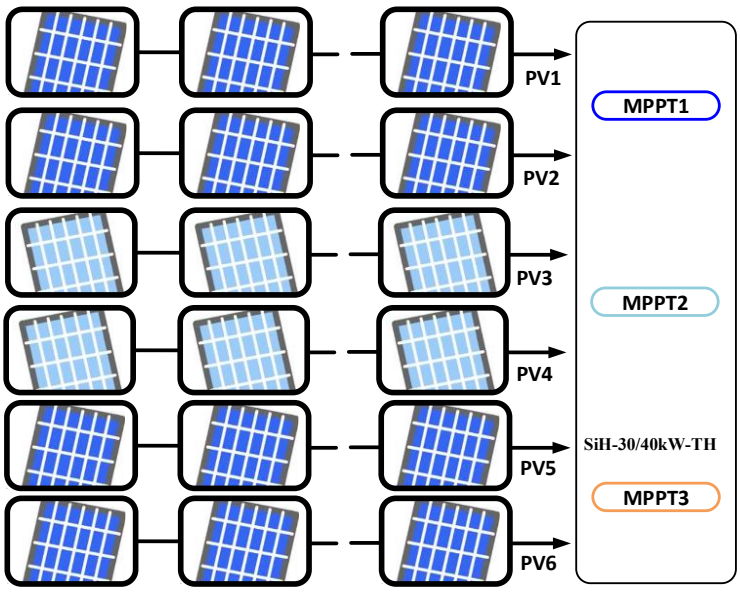
For SiH-9.9/10kW-TH-PRO & SiH-14.9/15kW-TH, each pair of PV terminals is corresponding to an independent PV string. PV input PV1, PV2 connect to MPPT1, PV3 connect to MPPT2, and PV4 connect to MPPT3. For the best use of PV power, PV1 and PV2 should be the same in PV string structure, including the type, number, tilt, and orientation of the PV modules.




For SiH-20/25kW-TH, each pair of PV terminals is corresponding to an independent PV string. PV input PV1, PV2 connect to MPPT1, PV3, PV4 connect to MPPT2 and PV5 connect to MPPT3. For the best use of PV power, PV1 and PV2, PV3 and PV4 should be the same in PV string structure, including the type, number, tilt, and orientation of the PV modules.




For SiH-30/50kW-TH, each pair of PV terminals is corresponding to an independent PV string. PV input PV1, PV2 connect to MPPT1, PV3, PV4 connect to MPPT2 and PV5, PV6 connect to MPPT3. For the best use of PV power, PV1 and PV2, PV3 and PV4, PV5 and PV6, should be the same in PV string structure, including the type, number, tilt, and orientation of the PV modules.




Before connecting the inverter to the PV inputs, it is necessary to simultaneously meet the following electrical requirements.

| Model | Open circuit Voltage Limit | Max. Current for Input Connector |
|---|---|---|
| **SiH-9.9/10kW-TH-PRO**<br>**SiH-14.9~50kW-TH** | 1000V | 32A |

NOTICE

Take the **SiH-40kW-TH** inverter for example:

1.Each MPPT works independently and when string operating voltage exceed 280V, it can get full load capacity of its MPPT.

2.When the string operating voltage is between 280V and 800V, there is no derating in normal case but higher heat could be generated under the situation of prolonged , high-temperature operation which may cause over-heated rating.

3.When the string operating voltage is between 150V and 280V, PV input current will be derated with the voltage drop.

4.It is strongly suggested that the voltage difference between the strings be less than 300V which could make inverter achieve the best performance in high-temperature.

### 6.8.2 Assembling the MC4 Connectors

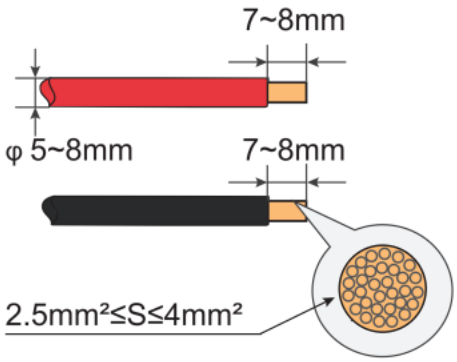
DANGER

High voltage precautions:

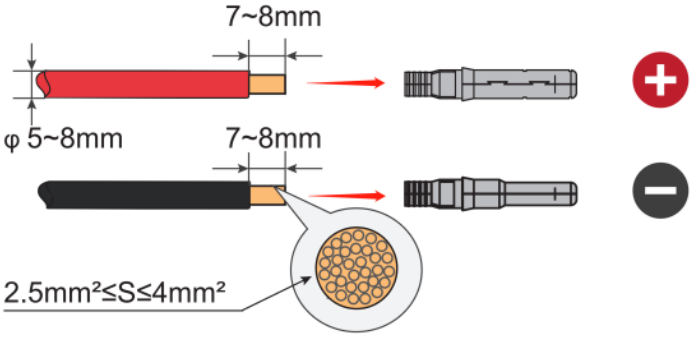
- Prior to conducting any electrical operations, ensure that all cables are free of voltage.
- Do not connect the DC switch and AC circuit breaker until the electrical connections are completed.

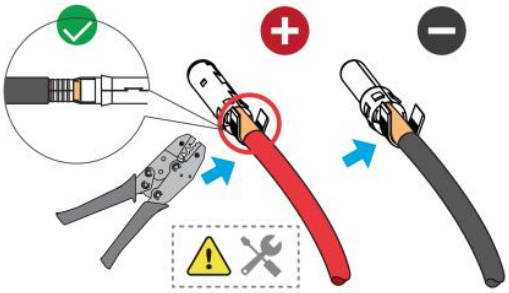
To maintain IP66 protection, only use the provided connector.

Step 1: Strip the insulation from each DC cable by approximately 7 mm to 8 mm.

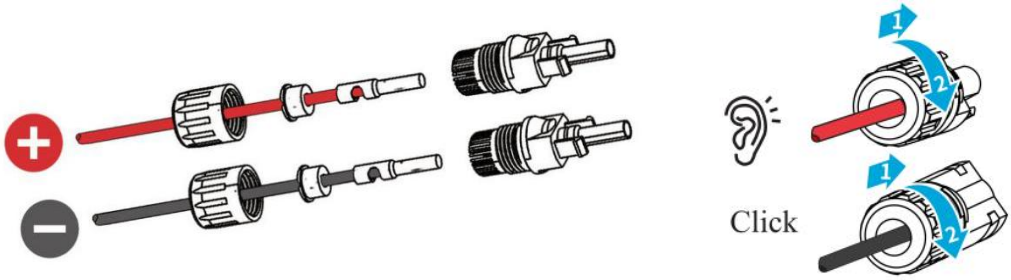



Step 2: Assembling the Crimp contact and cable, use the crimping pliers to securely assemble the cable ends.



Step 3: Lead the cable through the cable gland and insert the crimp contact into the insulator until it audibly snaps into place. Pull the cable gently backward to ensure a firm connection. Tighten the cable gland and insulator using a torque of 2.5 N.m to 3 N.m.




Step 4: Verify the polarity correctness.

NOTICE

Reversing the polarity can result in a fault or alarm state in the inverter, causing it to operate abnormally.

**--End**

### 6.8.3 Installing the PV and Battery Connector

This section primarily focuses on the cable connections on the inverter side. For the connections on the battery side and configuration, please refer to the instructions provided by the battery manufacturer.

WARNING

Inserting PV1/PV2/PV3 into the BAT terminal is strictly prohibited as it can cause permanent damage to the inverter.

WARNING

Use only properly insulated tools to prevent accidental electric shock or short circuits. If insulated tools are not available, cover all exposed metal surfaces of the tools, except their tips, with electrical tape.

WARNING

The plug connector should only be connected by trained electricians.

WARNING

Do not disconnect the battery connectors while under load!

Ensure that the inverter is completely shut down and in a no load state before disconnecting the battery connectors.

WARNING

During the installation and operation of the inverter, ensure that the positive or negative polarities of the batteries do not short-circuit to the ground. Failure to do so may result in AC or DC short circuits, leading to equipment damage. Such damage is not covered by the warranty.

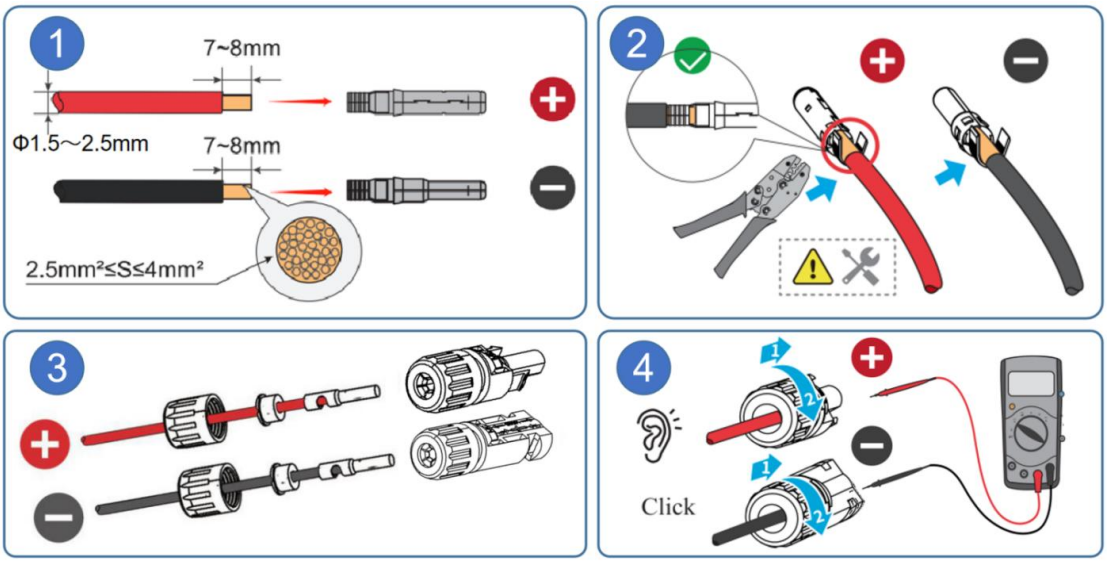
| Please note that off-grid mode is not recommended if the hybrid inverter is not connected to the battery. |
|---|

All power cables are equipped with waterproof direct plug-in connectors that match the battery terminals located at the bottom of the inverter.

## 6.8.3.1 Installing the PV Connector

Step 1: Turn the DC switch to the "OFF" position.

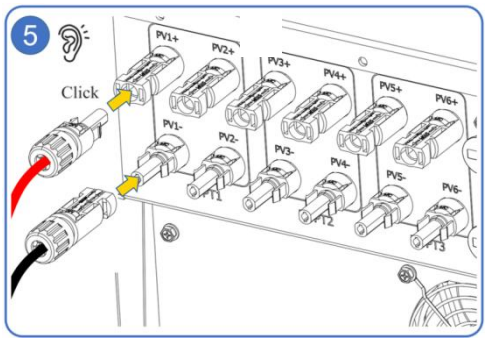
Step 2: Verify the polarity correctness of the PV string cable connections and ensure that the open circuit voltage does not exceed the inverter's input limit of 1,000V.




Step 3: Connect the connectors to their respective terminals, the PV panel cable to the PV terminal until an audible click is heard.

NOTICE

Only connect these connectors with other MC4 connectors. When making the connections, always adhere to the specifications for nominal voltage and nominal current. The smallest common value is acceptable.




(1) PV cable connection

Step 4: Repeat the previous steps to connect the PV connectors of other PV strings.

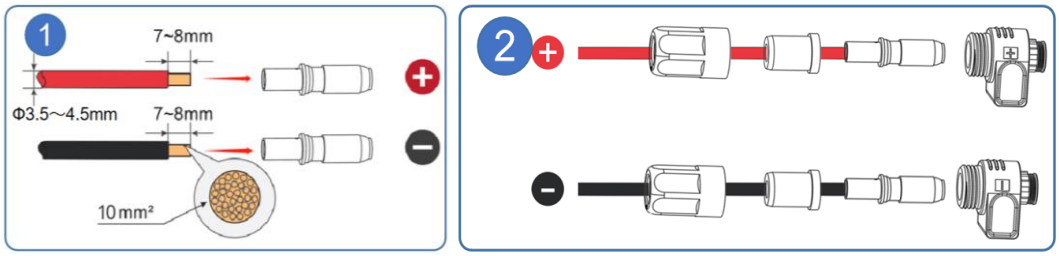
Step 5: Use a terminal cap to seal any unused PV and battery terminals. connections and ensure that the polarity of the optimizer cables is correct.

Step 6: Verify that the connectors are firmly and securely in place.

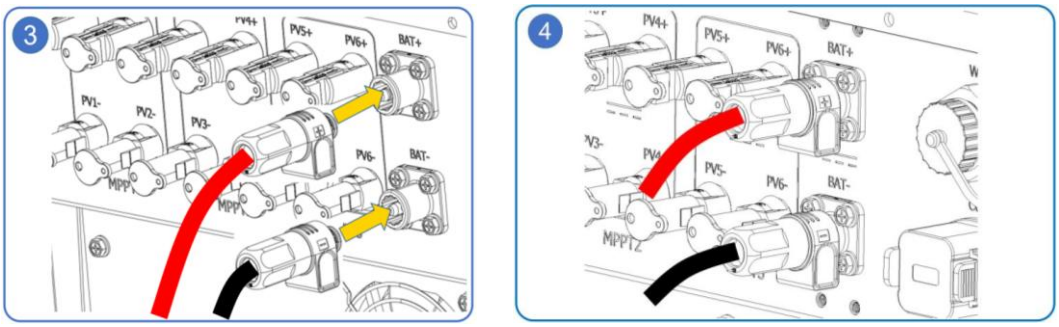
## s6.8.3.2 Installing the Battery Connector

Step 1: Turn the Battery switch to the "OFF" position.

Step 2: Verify the polarity correctness of the battery cable connections and ensure that the open circuit voltage does not exceed the inverter's input limit of 800V.




Step 3: Connect the connectors to their respective terminals, the Battery panel cable to the Battery terminal until an audible click is heard.

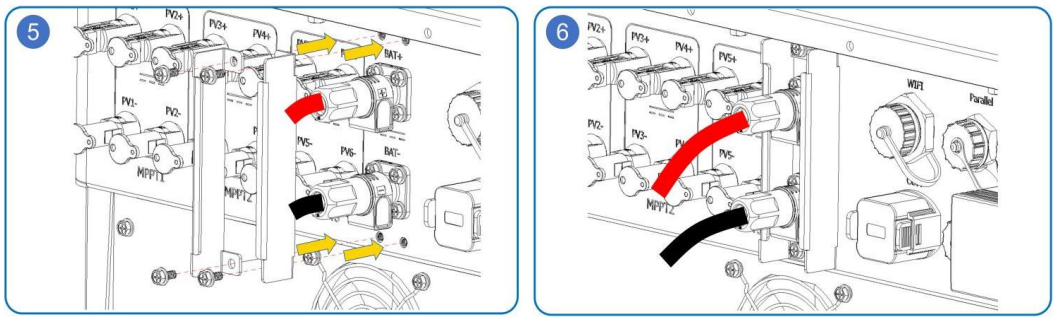



(2) Battery cable connection

Step 4: Verify that the connectors are firmly and securely in place.

NOTICE

For users in Australia/New Zealand, after the battery terminals are assembled, an anti-manual disassembly baffle must be installed. This is as shown in the figure below



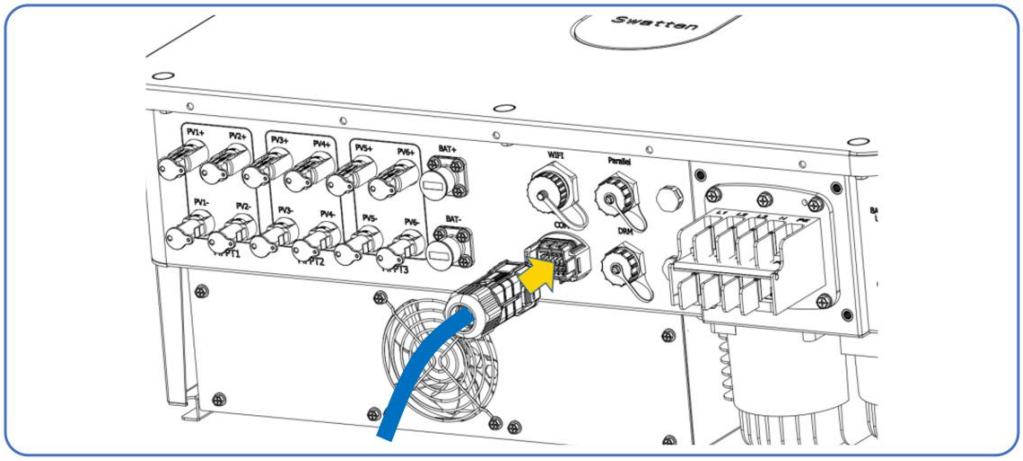

(3) Battery baffle installation

**--End**

# 6.9 Communication Connection

### 6.9.1 COM Connection

step 1 COM Connection

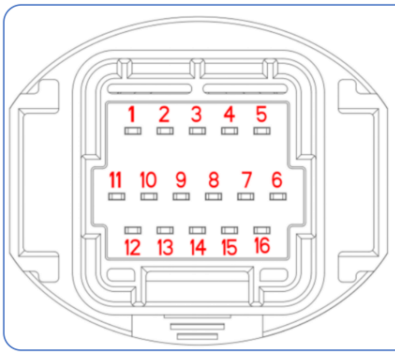


Step 2: The network cable connections for COM are illustrated in the following diagram:

Pin 6/7 is connected correspondingly to the RS485 port of the Electric Meter.

Pin 8/9/10/11 is connected to the corresponding port of the Battery.

Pin 12/13 is connected correspondingly to the RS485 port of the AC Charger.



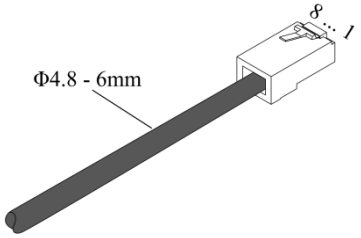

| COM Terminal | | | |
|---|---|---|---|
| 01 | 02 | 03 | 04 |
| DO1_COM | DO1_NO | DO2_COM | DO2_NO |
| 05 | 06 | 07 | 08 |
| DI | METER_A | METER_B | BAT_EN_H |
| 09 | 10 | 11 | 12 |
| BAT_EN_G | BAT_CAN_L | BAT_CAN_H | CHARGER_A |
| 13 | 14 | 15 | 16 |
| CHARGER_B | RSD-1 | RSD-2 | DI_COM |

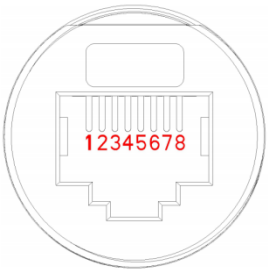
### 6.9.2 Parallel Connection

*For parallel connection requirements, please contact Swatten for support.

**To ensure the normal operation of parallel connection, the maximum distance between two parallel-connected inverters shall not exceed 10 meters.

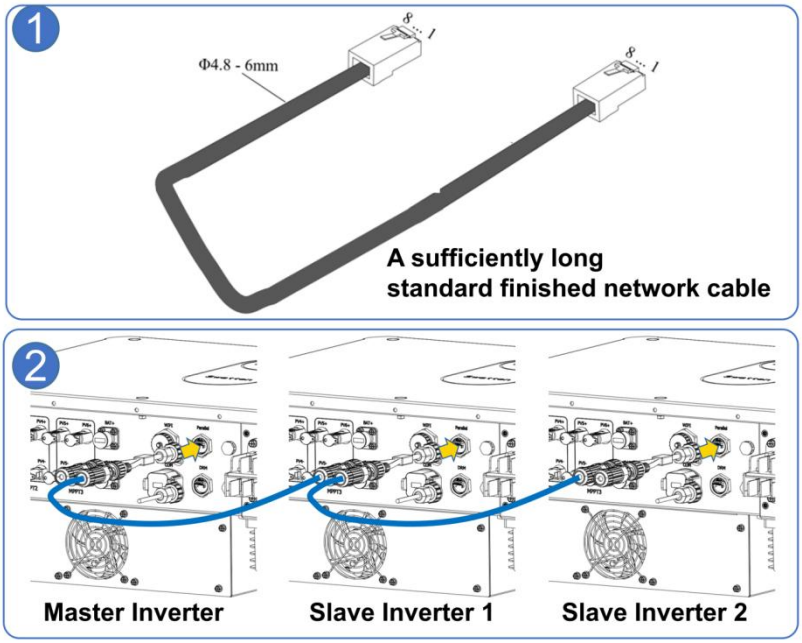
Step 1 Obtain an Ethernet cable. Refer to the provided diagram to correctly connect the network cable to the Parallel port as specified.






| Parallel Terminal | | | |
|---|---|---|---|
| 01 | 02 | 03 | 04 |
| B | A | SYN2- | SYN2+ |
| 05 | 06 | 07 | 08 |
| SYN1+ | SYN1- | L | H |

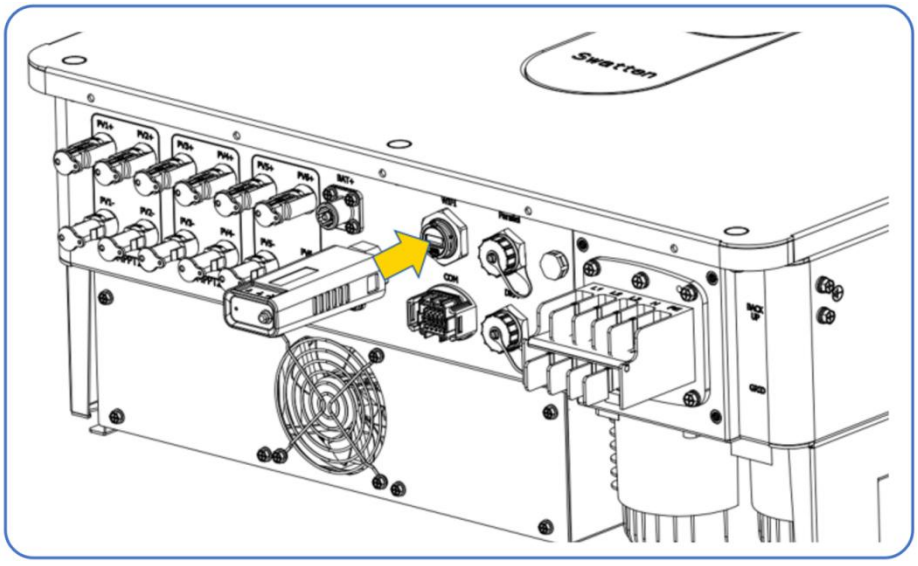
Step 2: Connect one end of the network cable to the corresponding port on the inverter.




**-End**

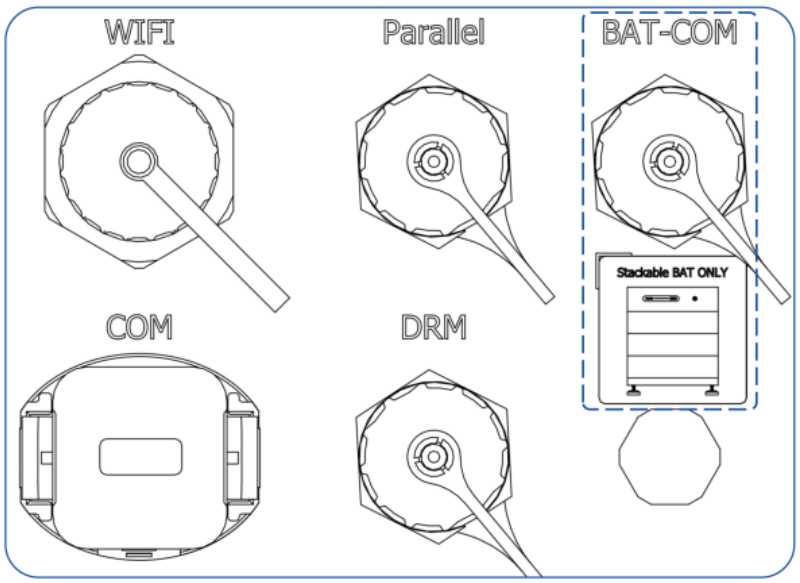
### 6.9.3 WiFi Logger Connection

The WLAN-RS485 module allows the uploading of inverter's operational information to the corresponding app, enabling users to monitor the inverter's status in real-time. The following diagram illustrates the recommended connection mode for the WLAN-RS485 module.



### 6.9.4 BAT-COM Connection

For Swatten stackable battery (SieB-H-F), Installers can insert standard network cables directly into the BAT-COM and Swatten stackable BMS for communication.




### 6.9.5 DRM Connection ("AU"/"NZ")

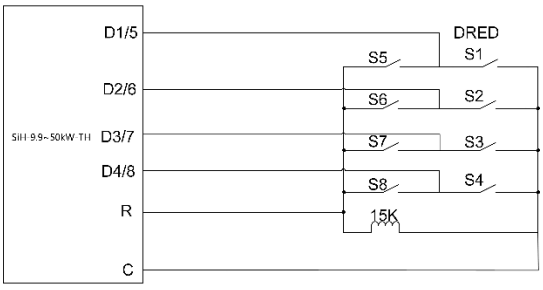
The inverter supports the demand response modes as specified in the standard AS/NZS 4777. The inverter has integrated a terminal block for connecting to a DRED.

After the connection, the DRED assert DRMs by shorting together terminals as specified in the table below.

**table 1**: Method of Asserting DRMs

| Mode | Asserted by Shorting Terminals |
|---|---|
| DRM 0 | R & C |
| DRM 1 | D1/5 & C |
| DRM 2 | D2/6 & C |
| DRM 3 | D3/7 & C |
| DRM 4 | D4/8 & C |
| DRM 5 | D1/5 & R |
| DRM 6 | D2/6 & R |
| DRM 7 | D3/7 & R |
| DRM 8 | D4/8 & R |

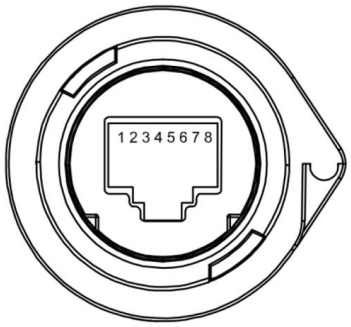
Wiring between the inverter and the DRED is as follows.




The switches that need to be closed in the state of DRM0 ~ DRM8 are shown in the table below.

| Demand Response Mode | Operational Instruction | Switch state |
|---|---|---|
| DRM 0 | OI0 | Close S1 and S5 |
| DRM 1 | OI1 | Close S1 |
| DRM 2 | OI2 | Close S2 |
| DRM 3 | OI3 | Close S3 |
| DRM 4 | OI4 | Close S4 |
| DRM 5 | OI5 | Close S5 |
| DRM 6 | OI6 | Close S6 |
| DRM 7 | OI7 | Close S7 |
| DRM 8 | OI8 | Close S8 |

Step 1: The network cable for DRM-COM follows the specifications outlined in the provided diagram.

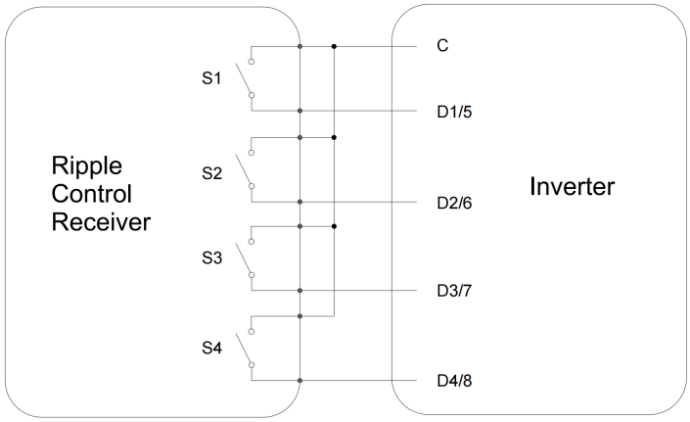



| RJ45 Pin | DRM Function |
|---|---|
| 1 | |
| 2 | |
| 3 | C |
| 4 | R |
| 5 | DRM4/8 |
| 6 | DRM3/7 |
| 7 | DRM2/6 |
| 8 | DRM1/5 |

**6.9.6 Ripple Control**

In Germany, Grid company uses the Ripple Control Receiver to convert the grid dispatching signal into dry contact signal for transmission

The wiring configuration of the ripple control receiver dry contact cables is shown in the figure below:




Inverter will connect with one of 4 relays for EnWG §14a.

Inverter will connect with the other use 3 relays for EEG power control RRCR.

**Table:** Method of Asserting Ripple Control

| S1 | S2 | S3 | S4 | Switch Operation on External RCR | Output power (in% of the Rated AC output power) |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | None | 100% (configurable according to need) |
| 1 | 0 | 0 | 0 | Close S1 | EnWG §14a |
| 0 | 1 | 0 | 0 | Close S2 | 60% |
| 0 | 0 | 1 | 0 | Close S3 | 30% |
| 0 | 0 | 0 | 1 | Close S4 | 0% (disconnect from grid) |

# 7 Commissioning

## 7.1 Inspection before Commissioning

Before starting the inverter, please ensure the following checklist items are checked:

- Confirm that all equipment has been installed securely and in accordance with the manufacturer's instructions.
- Verify that the DC switch(es) and AC circuit breaker are in the "OFF" position.
- Ensure that the ground cable is properly and securely connected.
- Check that the AC cable is correctly and reliably connected.
- Verify that the DC cable is properly and securely connected.
- Confirm that the communication cable is properly and securely connected.
- Seal any vacant terminals to prevent dust or moisture ingress.
- Ensure that no foreign items, such as tools, are left on top of the machine or inside the junction box (if applicable).
- Verify that the AC circuit breaker is selected according to the requirements specified in the manual and local standards.
- Check that all warning signs and labels on the inverter are intact and legible.

It is essential to complete these checks before starting the inverter to ensure safe and reliable operation.e.

## 7.2 Powering on the System

If all the checklist items have been verified and meet the requirements, follow these steps to start up the inverter for the first time:

Step 1: Turn on the AC circuit breaker located between the inverter and the grid.

Step 2: Turn on the AC circuit breaker located between the backup port and the load.

Step 3 (Optional): If a battery is connected, connect the external DC circuit breaker between the inverter and the battery pack.

Step 4: (Optional): If a battery is connected, manually power on the battery pack.

Step 5: Rotate the DC switch to the "ON" position.

Step 6: If the irradiation and grid conditions meet the requirements, the inverter will start operating normally. Observe the LED indicator on the inverter to ensure it is functioning properly. Refer to the "2.4 LED Panel" section of the manual for an introduction to the LED screen and its indicator definitions.

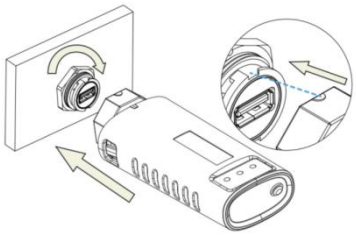
Step 7: If using the SOLARMAN Business system, refer to the quick guide for its indicator definitions.

By following these steps, you can safely start up the inverter and begin its normal operation..

**--End**

## 7.3 Stick Logger Installation

Assemble the logger to the inverter communication interface according to the diagram provided..



## 7.4 Download App

If you are a retailer/installer user, please scan the QR code provided below to download the SOLARMAN Business app. Alternatively, you can visit the website https://pro.solarmanpv.com/login to access the app.

SOLARMAN Business

If you are a residential user, please scan the QR code provided below to download the SOLARMAN Smart app. Alternatively, you can visit the website https://home.solarmanpv.com to access the app.

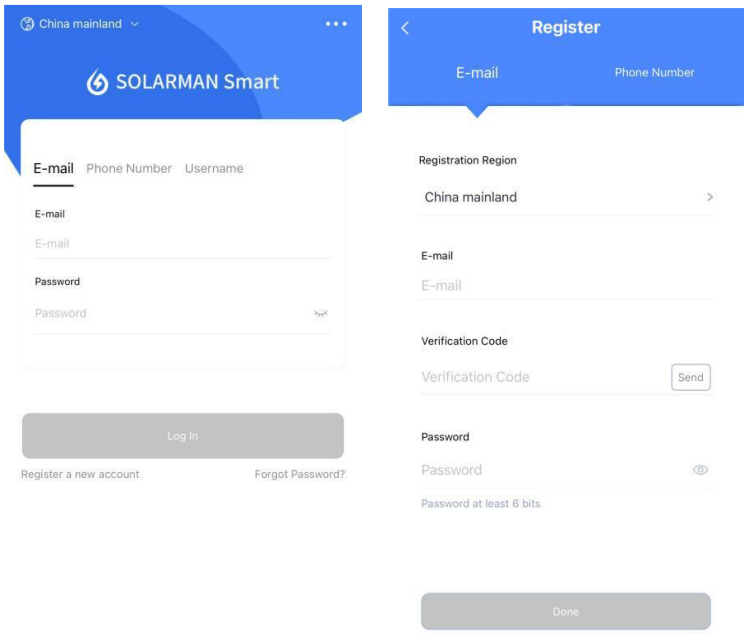
SOLARMAN Smart

## 7.5 Registration

### 7.5.1 SOLARMAN Smart

Go to SOLARMAN Smart and sign up.

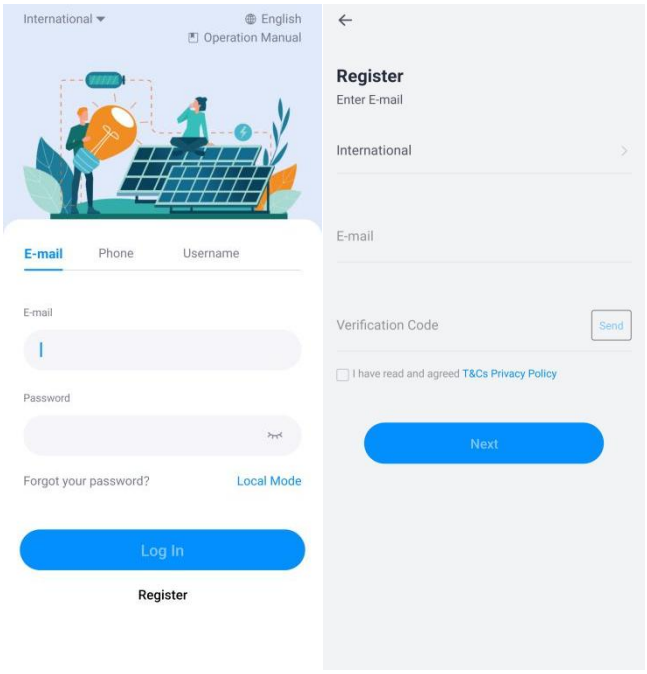
Click on "Sign up" and create your account here. Please note that use an email address to register for an account.




### 7.5.2 SOLARMAN Business

Go to SOLARMAN Business and sign up.

Click on "Register" and create your account here. Please note that use an email address to register for an account.

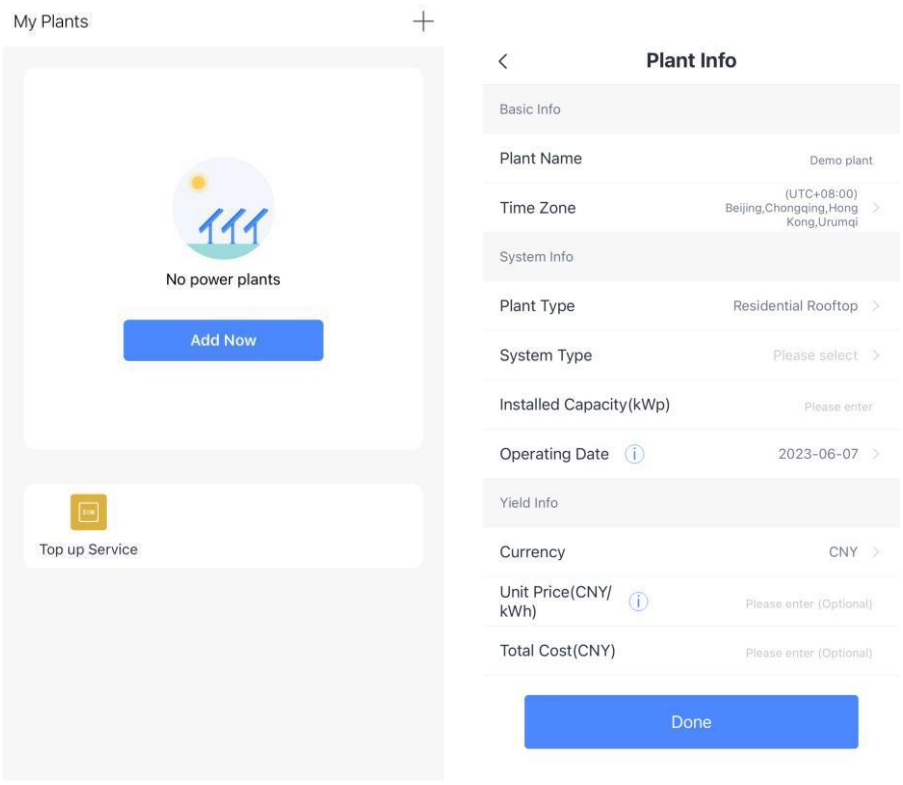



## 7.6 Create a Plant

### 7.6.1 SOLARMAN Smart

Click "Add Now" to create your solar installation.

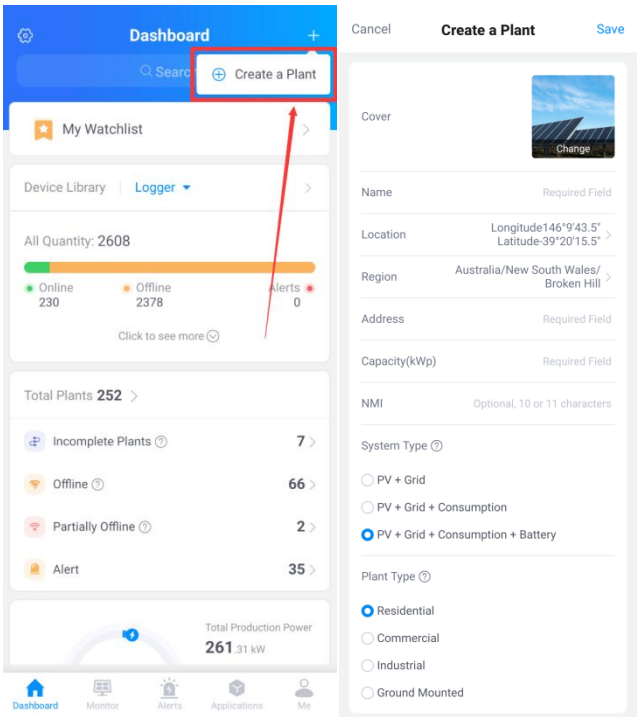
Please provide the necessary information about your solar plant, including basic details and any additional relevant information.




### 7.6.2 SOLARMAN Business

Click "Create a Plant" at the right corner to create your solar installation.

Please provide the necessary information about your solar plant, including basic details and any additional relevant information. Select the System Type according to the actual installation situation.



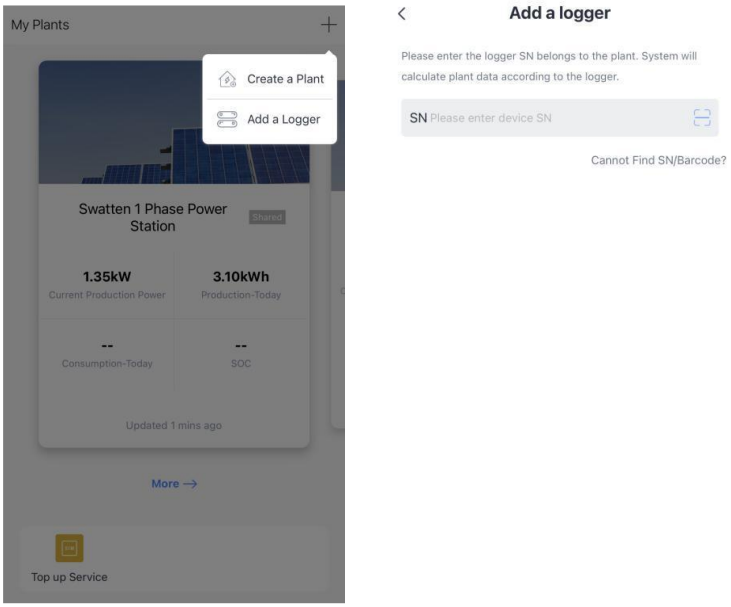
# 7.7 Add a Logger

### 7.7.1 SOLARMAN Smart

Step 1 Manually enter the serial number (SN) of the logger.

Step 2 Click on the icon located on the right side and scan the barcod code on the logger to added.

You can locate the logger serial number on the external packaging or on the body of the logger itself.

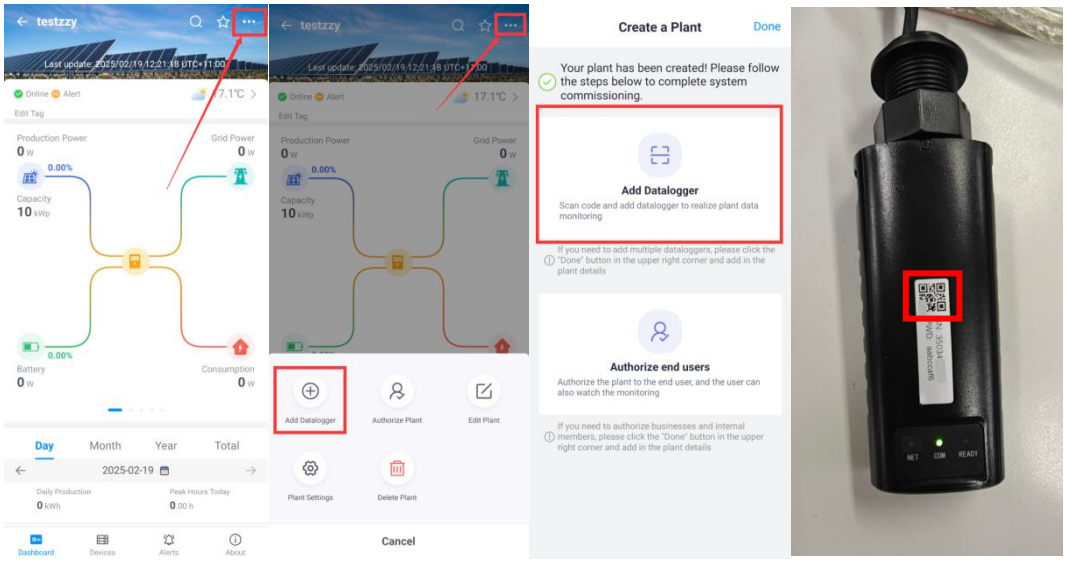



### 7.7.2 SOLARMAN Business

Step 1 Manually enter the serial number (SN) of the logger.

Step 2 Click on the icon located on the right side and scan the QR code on the logger to added.

You can locate the logger serial number on the external packaging or on the body of the logger itself.

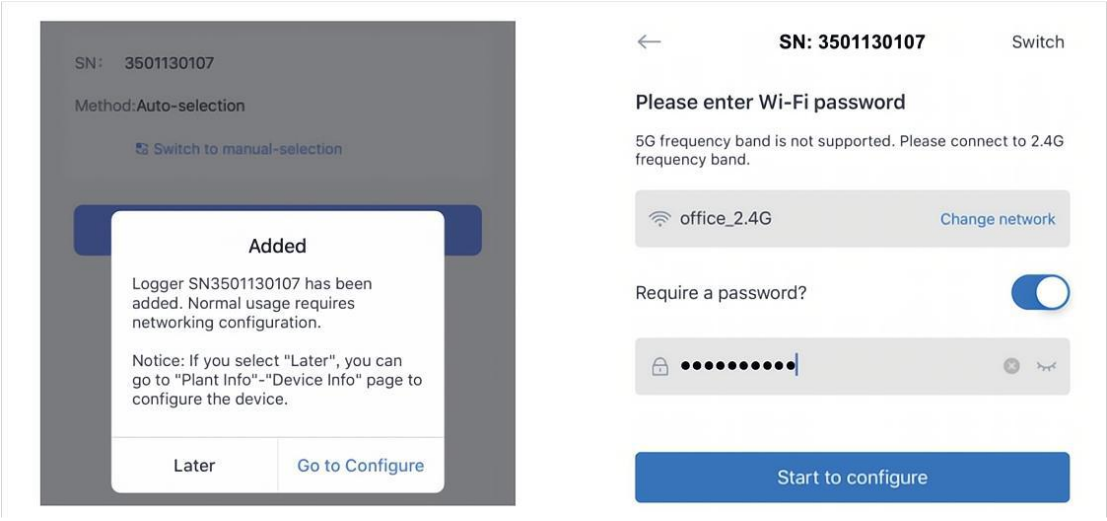


# 7.8 Network Configuration

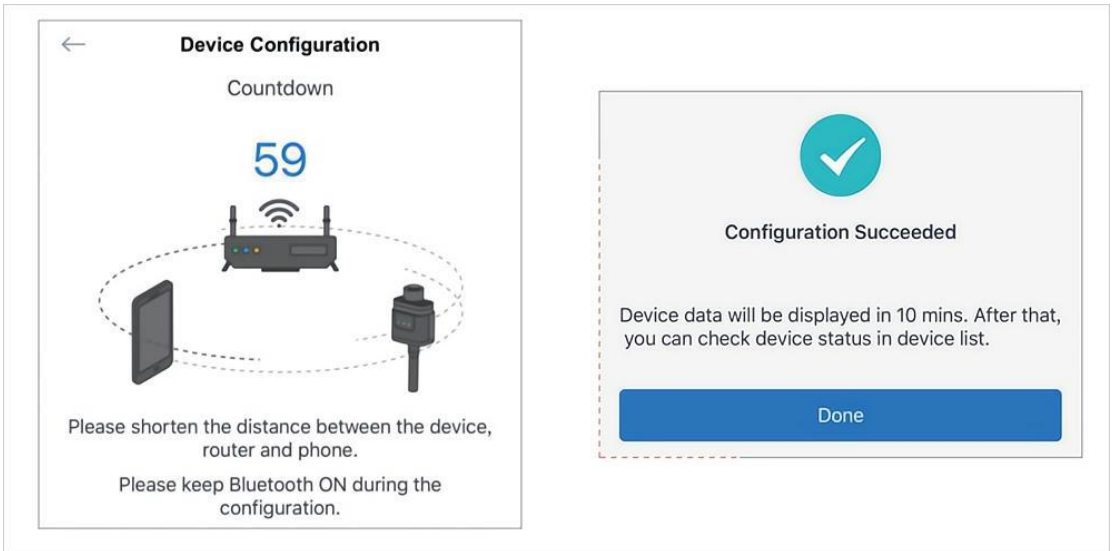
### 7.8.1 SOLARMAN Smart

Step 1: Click on "Go to Configure" to access the network settings.

(Ensure that Bluetooth and WiFi are turned ON.)




Step 2: Please wait for a few minutes. Afterward, click on "Done" to complete the setup and view the plant data.




NOTICE

5G WIFI is not supported

If the configuration process fails, please check the following reasons and attempt the setup again:

(1) Ensure that WLAN (Wireless Local Area Network) is turned on.

(2) Verify that your WiFi connection is functioning properly.

(3) Confirm that the wireless router does not have any restrictions in place, such as a white-black list.

(4) Remove any special characters from the Wi-Fi network name (SSID) or password.

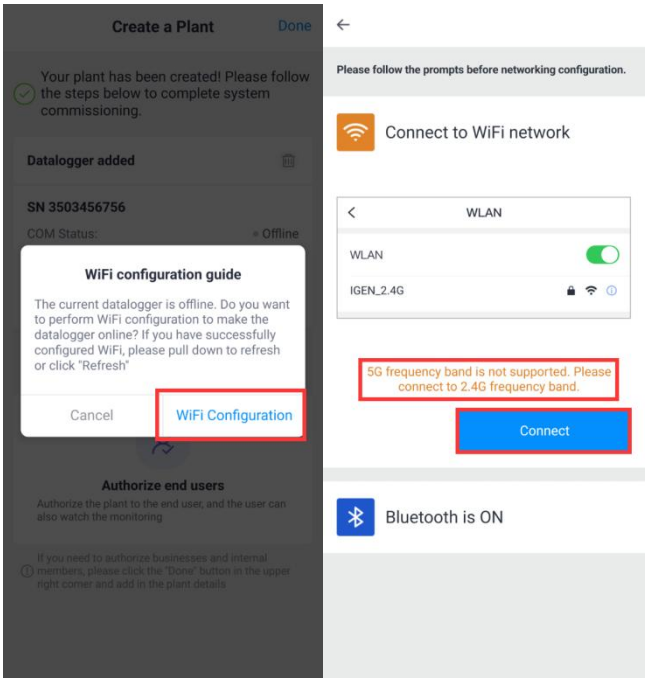
(5) Reduce the distance between your phone and the device during the configuration process.

(6) Try connecting to a different Wi-Fi network if available.

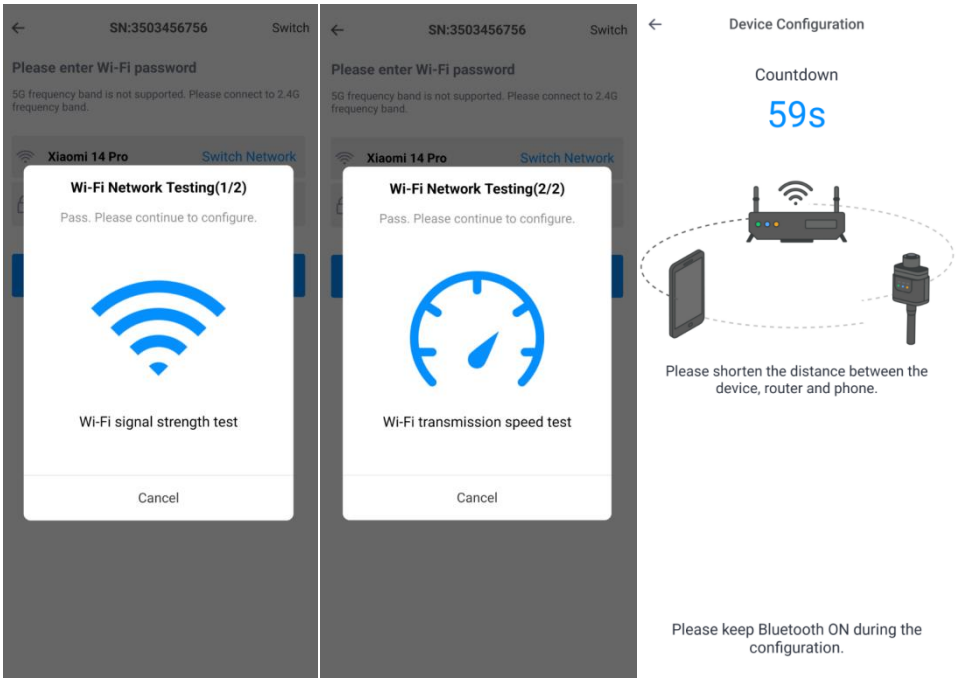
### 7.8.2 SOLARMAN Business

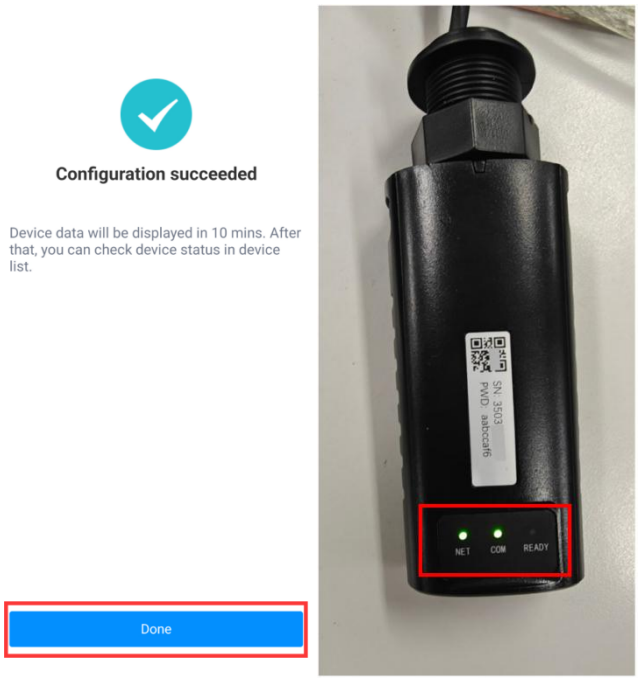
Step 1: Click on "WiFi Configure" to access the network settings.

(Ensure that Bluetooth and WiFi are turned ON.)




Step 2: Please wait for a few minutes. Afterward, click on "Done" to complete the setup and view the plant data.






NOTICE

5G WIFI is not supported

After completing the WiFi connection, The NET and COM indicators will be constantly on, The READY indicator will be flashing.

If the configuration process fails, please check the following reasons and attempt the setup again:

(1) Ensure that WLAN (Wireless Local Area Network) is turned on.

(2) Verify that your WiFi connection is functioning properly.

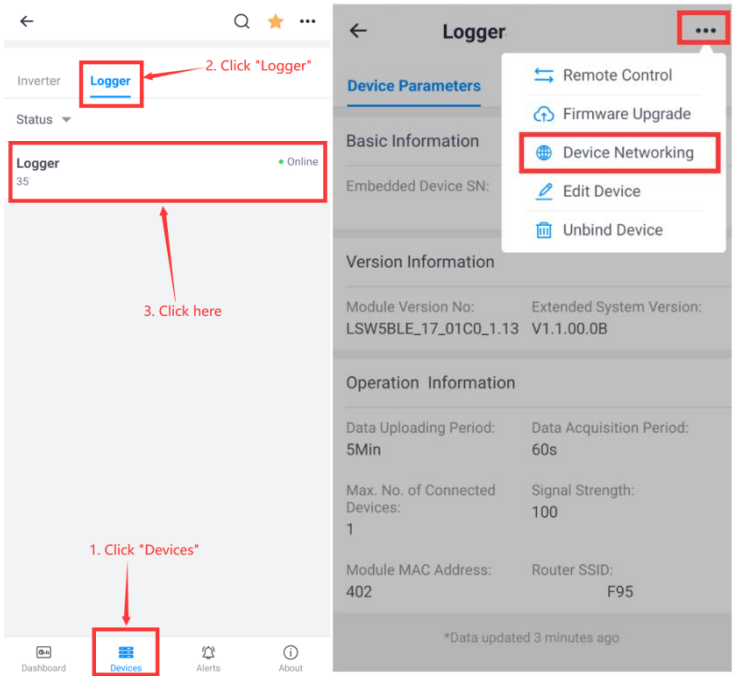
(3) Confirm that the wireless router does not have any restrictions in place, such as a white-black list.

(4) Remove any special characters from the Wi-Fi network name (SSID) or password.

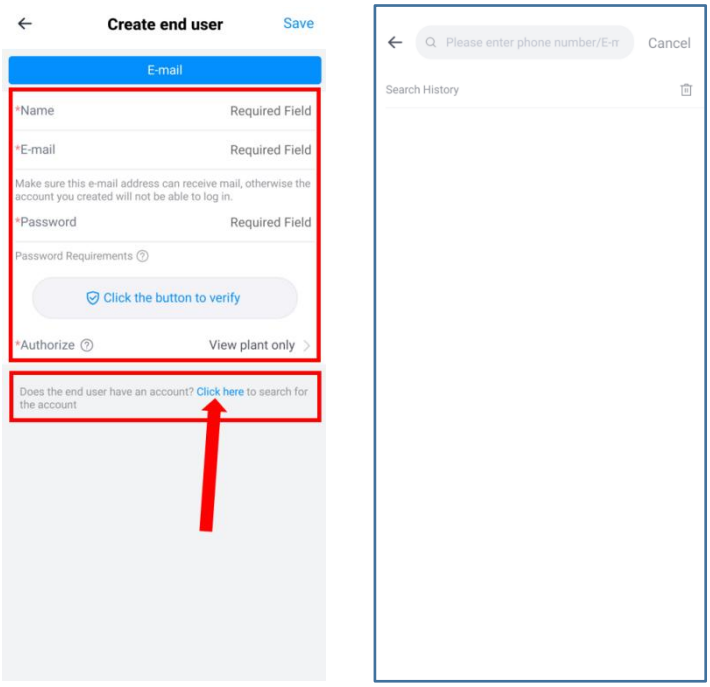
(5) Reduce the distance between your phone and the device during the configuration process.

(6) Try connecting to a different Wi-Fi network if available.

If need to switch the WiFi network or reconnect to the WiFi, please follow the steps below:




## 7.9 Authorization




Fill in the information for the residential user, and invite the residential user to download the SOLARMAN Business App from the app store. Residential user can log in using the email address and password that installer have filled in as residential user's account credentials.

If the residential user has already registered for SOLARMAN Smart, please search for the residential user's email address through the "Click here" option below to complete the authorization process.

## 7.10 Logger Status

| Lights | Implication | Status Description (All lights are single green lights.) |
|---|---|---|
| NET | Communication with router | 1. Light off: Connection to the router failed.<br>2. On 1s/Off 1s (Slow flash): Connection to the router succeeded.<br>3. Light keeps on: Connection to the server succeeded.<br>4. On 100ms/Off 100ms (Fast flash): Distributing network fast. |
| COM | Communication with inverter | 1. Light keeps on: Logger connected to the inverter.<br>2. Light off: Connection to the inverter failed.<br>3. On 1s/Off 1s (Slow flash): Communicating with inverter. |
| READY | Logger running status | 1. Light off: Running abnormally.<br>2. On 1s/Off 1s (Slow flash): Running normally.<br>3. On 100ms/Off 100ms (Fast flash): Restore factory settings. |

When the router is connected to the network normally, the stick logger should exhibit the following normal operation status:

1. Connection to the server succeeded: The NET light will remain illuminated after the logger is powered on.
2. Logger running normally: The READY light will flash intermittently.
3. Connection to the inverter succeeded: The COM light will remain illuminated..

## 7.11 Abnormal State Processing

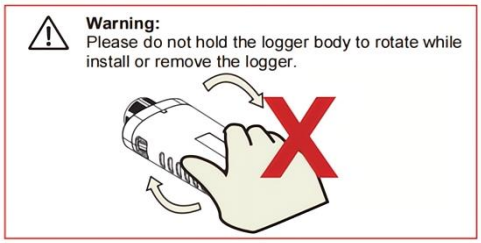
If you encounter abnormal data on the platform while the stick logger is running, please refer to the following table and use the status of the indicator lights to perform basic troubleshooting. If the issue persists or if the indicator lights' status is not listed in the table, please contact Customer Support for assistance.

(Note: Use the table below after the stick logger has been powered on for at least 2 minutes.)

Warning: Before leaving the site, it is crucial to ensure that the stick logger is functioning correctly. If you notice any abnormal behavior or issues, please refrain from leaving the site and immediately contact customer service. You can reach customer service at the following number: 400-181-0512

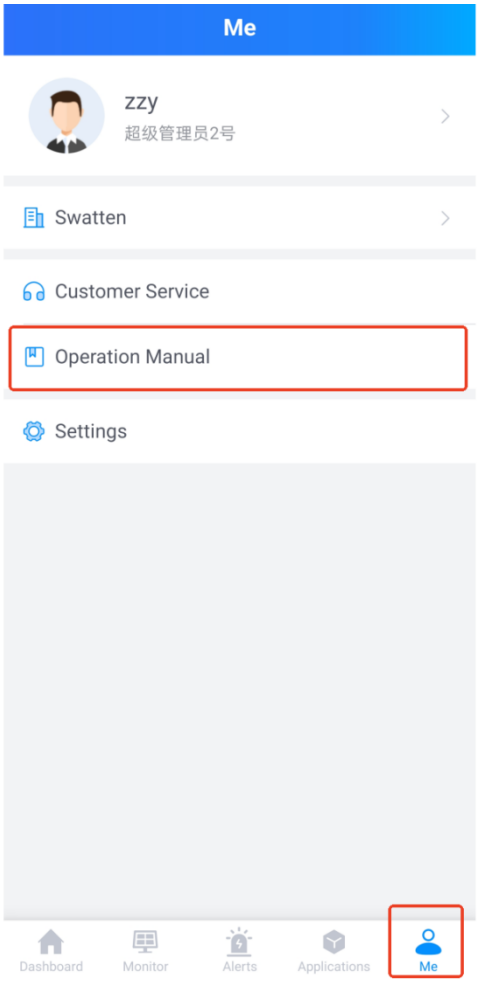
| NET | COM | READY | Fault Description | Fault Cause | Solution |
|---|---|---|---|---|---|
| Any state | OFF | Slow flash | Communicate with inverter abnormally | 1. Connection between stick logger and inverter loosen.<br>2. Inverter does not match with stick logger's communication rate | 1. Check the connection between stick logger and inverter. Remove the stick logger and install again.<br>2. Check inverter's communication rate to see if it matches with stick logger's.<br>3. Long press Reset button for 5s, reboot stick logger. |
| OFF | ON | Slow flash | Connection between logger and router abnormal | 1. Stick logger does not have a network.<br>2. Router WiFi signal | 1. Check if the wireless network configured.<br>2. Enhance router WiFi signal |

| | | | | | |
|---|---|---|---|---|---|
| | | | | strength weak. | Strength. |
| Slow flash | ON | Slow flash | Connection between logger and router normal, connection between logger and remote server abnormal | 1. Router networking abnormal.<br>2. The server point of logger is modified.<br>3. Network limitation, server cannot be connected. | 1. Check if the router has access to the network.<br>2. Check the router's setting, if the connection is limited.<br>3. Contact our customer service. |
| OFF | OFF | OFF | Power supply abnormal | 1. Connection between stick logger and inverter lossen or abnormal.<br>2. Inverter power insufficient.<br>3. Stick Logger abnormal. | 1. Check the connection, remove the stick logger and install again.<br>2. Check inverter output power.<br>3. Contact our customer service. |
| Fast flash | Any state | Any state | Networking status | Normal | 1. Exit automatically after 2mins.<br>2. Long press Reset button for 5s, reboot stick logger.<br>3. Long press Reset button for 10s, restore factory settings. |
| Any state | Any state | Fast flash | Restore factory settings | Normal | 1. Exit automatically after 1mins.<br>2. Long press Reset button for 5s, reboot stick logger.<br>3. Long press Reset button for 10s, restore factory settings. |





For more details, please click "Me" and refer to the Operation Manual for assistance.




## 7.12 SOLARMAN App

### 7.12.1 Brief Introduction

The SOLARMAN App can establish communication connection to the inverter via the WLAN, providing remote monitoring, data logging and near-end maintenance on the inverter. Users can also view inverter information and set parameters through the App.

*To achieve direct login via WLAN, the wireless communication module developed and manufactrured by SWATTEN is required. The SOLARMAN App can also establish communication connection to the inverter vis Ethernet connection.

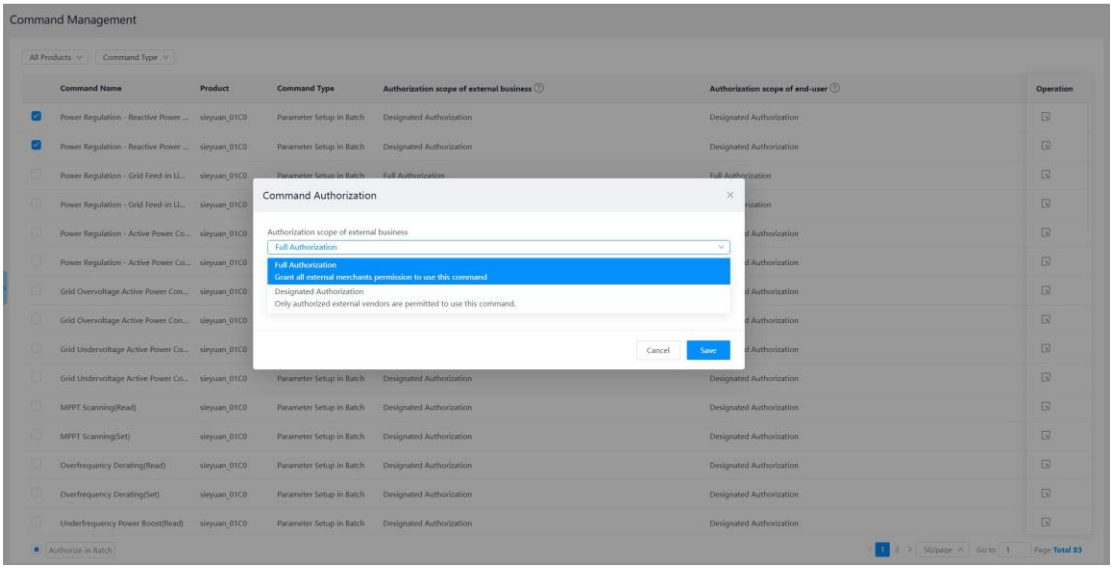
### 7.12.2 Installing App

There are two versions of the SOLARMAN App shown as below. SOLARMAN SMART for owners and SOLARMAN BUSINESS for retailer/installer and SWATTEN.

Through SOLARMAN SMART, the owners can create the plant, view the plant information, share the plant to retailer/installer or SWATTEN, perform basic operations on the plant in compliance with standard requirements, etc. More parameter setting instructions must be authorized from SWATTEN.

Through SOLARMAN BUSINESS, the retailer/installer can help the owners to create, manage, install, or maintain plants shared from owners, and manager users and organizations.
Ther retailer/installer can set and read the parameters from the plants shard from owners, and all the parameters setting instructions for retailer/installer are authorized from SWATTEN.

Through SOLARMAN BUSINESS,SWATTEN can help the owners or retailer/installer to manage, maintain plants shared from owners. Only the SWATTEN can authorize instructions(also named Command) to retailer/installer for setting and viewing parameters for plants shared from owners.
Instructions authorization showed as below.




The SOLARMAN App can be Downloaded from phone App stores:

1) Android App store
2) Apple App store for iOS

### 7.12.3 SOLARMAN SMART App Login And Operations

## 7.12.3.1 App Login

STEP1:The following requirements should be met, Ther WIFI WLAN is enable.
STEP2:Open the SOLARMAN SMART App to enter the login screen, shown in the Figure7-12-1.
STEP3:Enter the account and password, and select International, enter the home page.

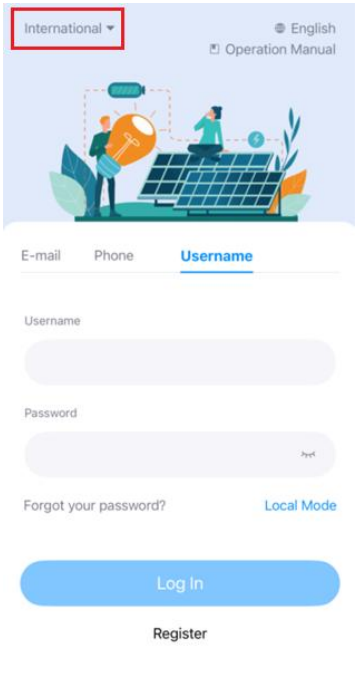



Figure7-12-1

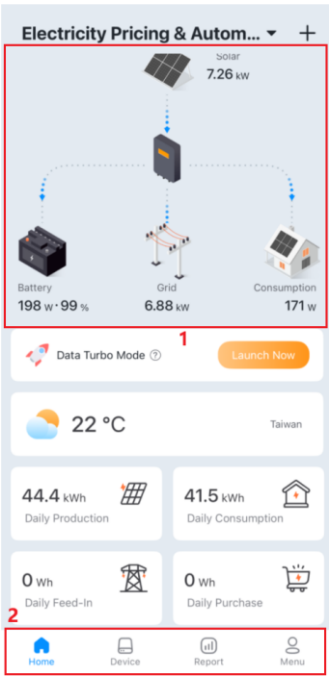



Figure7-12-2

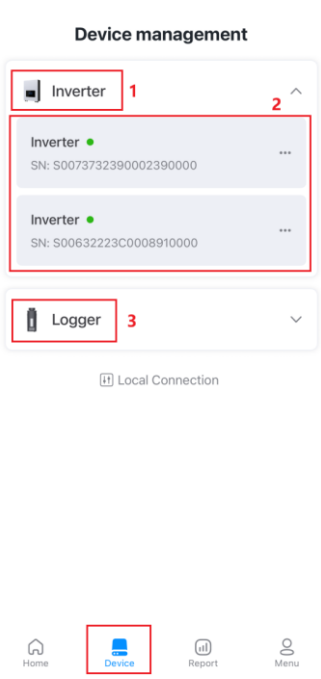



Figure7-12-3

## 7.12.3.2 App Home Page

Table 7-12-1 Description of Home page in Figure7-12-2.

| No. | Name | Description |
|---|---|---|
| 1 | Load flow chart | Shows the PV power generation power, feed-in power, etc. The line with an arrow indicates energy flow between connected devices, and the arrow pointing indicates energy flow direction. |
| 2 | Navigation bar | Includes menus of Home, Device, Report, Menu |

Table 7-12-1

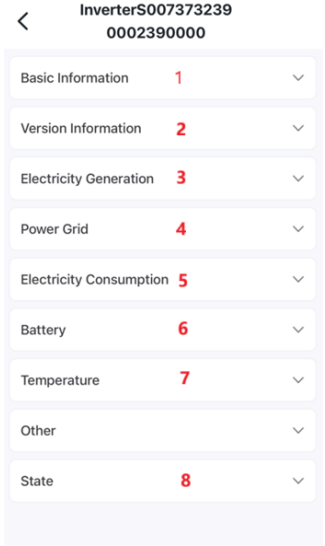
## 7.12.3.3 App Device Page

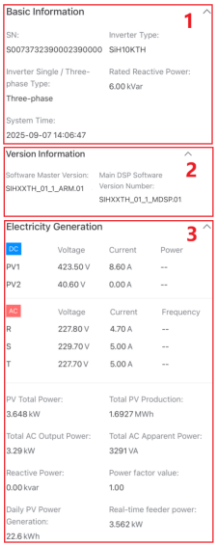
Table 7-12-3-1 Description of Home page in Figure7-12-2.

| No. | Name | Description |
|---|---|---|
| 1 | Inverter | View the total number of all inverters in the plant.<br>View the running data of one of the inverters. |
| 2 | Logger | View the state of Logger |

Table 7-12-3-1

Select the “2” in Figure7-12-3, enter the page of inverter, owners can view all the running data of the inverter. Select the **More device information (2)** to view more information of the inverter, shown in Figure7-12-5, Figure7-12-6, Figure7-12-7.

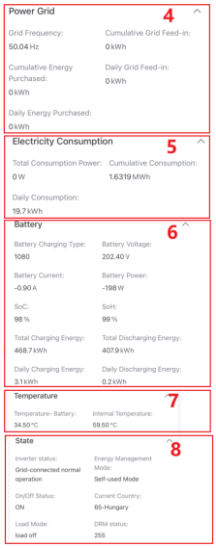




Figure7-12-3-1 Figure7-12-3-2 Figure7-12-3-3 Figure7-12-3-4

Table 7-12-3-2 Description of More device information in Figure7-12-3-4.

| No. | Name | Description |
|---|---|---|
| 1 | Basic information | View the Basic information of the inverter, such as SN, Inverter Type, Rated Power, etc. |
| 2 | Version Information | View the software version of the inverter |
| 3 | Electricity Grid | View the PV voltage and current, AC voltage and current, power generation, etc. |
| 4 | Power Grid | View the Grid voltage, frequency, current, etc. |
| 5 | Electricity Consumption | View user load consumption |
| 6 | Battery | View the battery running information, such as voltage, current, battery type, etc. |
| 7 | Temperature | View the running temperature of the inverter. |
| 8 | State | View the state of the inverter, such as Mode, on/off status, Country, DRM status, etc. |

Table 7-12-3-2

In below Figure, Owners can select **Remote Control (1)** to setting the inverter, such as the grid setting, grid code setting and Battery Information, etc.

Note: Owners is only authorized review the grid settings and cannot change the setting.

**Read Country Setting**

Setting path: **Device> Inverter> …> Remote Control> Country Setting**

Read the country grid code, refer to Figure7-12-3-6.

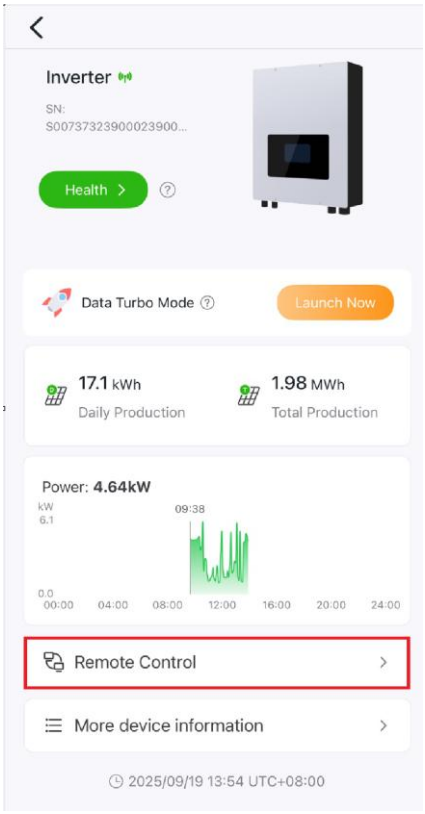



Figure7-12-3-5

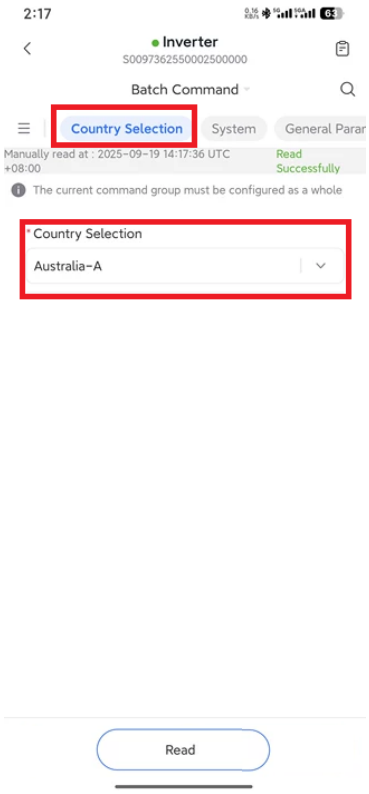



Figure7-12-3-6

**Read Grid Protection Setting**

Setting path: **Device> Inverter> …> Remote Control> Parameters Group as table 7-12-3-2 shown**

Read the **Grid Protection Setting** , refer to Figure7-12-3-7/8/9/10/11.

| Parameters Group | Parameters |
|---|---|
| Power Regulation Reactive Power Control | Reactive Power Save on Power Loss |
| | Reactive Power Control Mode |
| | Reactive Power Ratio |
| | Power Factor Setting |
| Power Regulation Grid Feed in Limit | Grid Feed in Power Limit Enable |
| | Feed in Power Limit (%) |
| | External Generation Power |
| Power Regulation Active Power Control | Fault Active Power Soft Start Enable |
| | Fault Active Ramp Up Time |
| | Active Power Rate Control Enable |
| | Active Power Ramp Down Rate |
| | Active Power Ramp Up Rate |
| | Active Power Save on Power Loss |
| Grid Overvoltage Active Power Control | Overvoltage derating enable |
| | Overvoltage derating voltage 1 |
| | Overvoltage derating voltage 2 |
| | Overvoltage derating voltage 3 |
| | Overvoltage derating voltage 4 |
| | Overvoltage derating Power 1 |
| | Overvoltage derating Power 2 |
| | Overvoltage derating Power 3 |
| | Overvoltage derating Power 4 |
| | Overvoltage derating time |
| Grid Undervoltage Active Power Control | Under voltage derating enable |
| | Undervoltage derating voltage 1 |
| | Undervoltage derating voltage 2 |
| | Undervoltage derating voltage 3 |
| | Undervoltage derating voltage 4 |
| | Undervoltage derating Power 1 |
| | Undervoltage derating Power 2 |
| | Undervoltage derating Power 3 |
| | Undervoltage derating Power 4 |
| | Undervoltage derating time |

Table 7-12-3-2

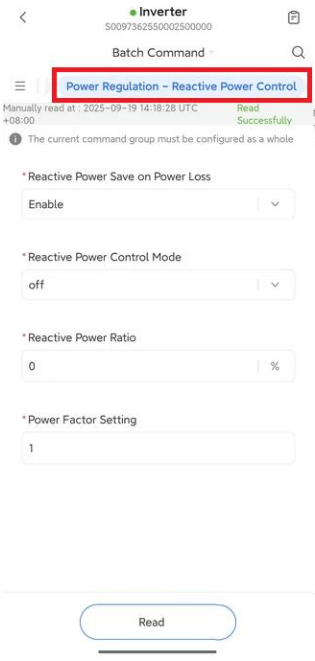



Figure7-12-3-7

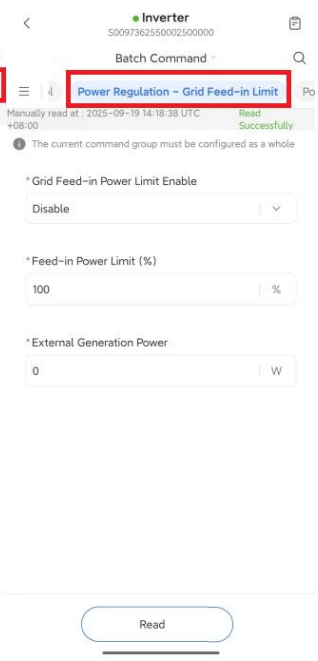



Figure7-12-3-8

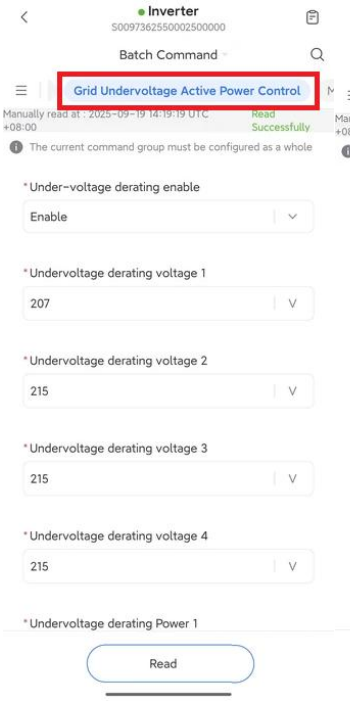



Figure7-12-3-9

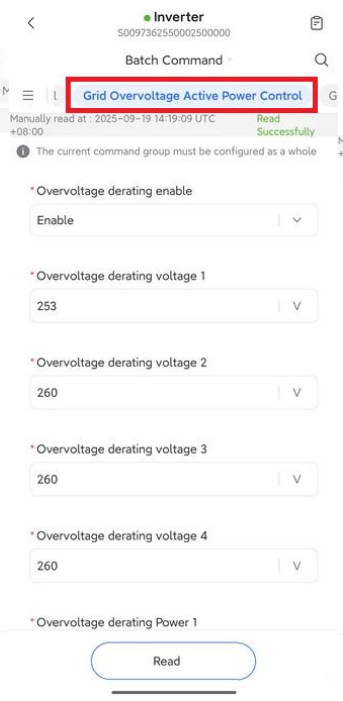



Figure7-12-3-10

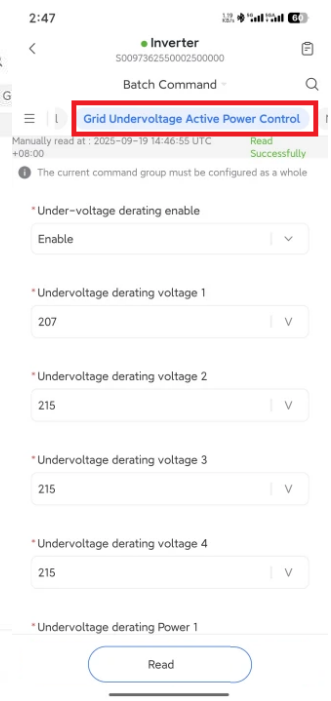



Figure7-12-3-11

**Read Power Quality Setting**

Setting path: **Device> Inverter> …> Remote Control> Parameters Group as table 7-12-3-3 shown**

Read the **Power Quality Setting**, refer to Figure7-12-3-12，Figure7-12-3-13.

| Parameters Group | Parameters |
|---|---|
| Q(U)&Q(P) | Reactive Response Enable |
| | Reactive Response Time |
| | Q(U) Curve selection |
| | qu_hysteresis |
| | Grid Voltage U1(QU) |
| | Reactive Power Q1(QU) |
| | Grid Voltage U2(QU) |
| | Reactive Power Q2(QU) |
| | Grid Voltage U3(QU) |
| | Reactive Power Q3(QU) |
| | Grid Voltage U4(QU) |
| | Reactive Power Q4(QU) |
| | Power In(QU) |
| | Power out(QU) |
| | QU No Condiction Enable |
| | Pf(QU) |
| | Q(P) Curve selection |
| | Active Power Percentage(QP)1 |
| | Active Power Percentage(QP)2 |
| | Active Power Percentage(QP)3 |
| | Active Power Percentage(QP)4 |
| | Reactive Power Q1(QP) |
| | Reactive Power Q2(QP) |
| | Reactive Power Q3(QP) |
| | Reactive Power Q4(QP) |
| | Voltage In(QP) |
| | Voltage Out(QP) |
| | Power out(QP) |
| | QP No Condiction Enable |
| Protection Parameters Ground Fault Detection | Ground Detection Enable |
| | Ground Detection Alarm Threshold |

Table 7-12-3-3

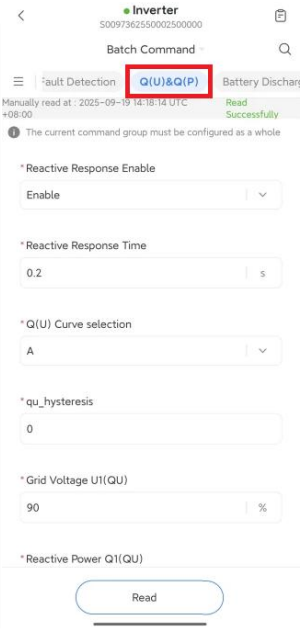



Figure7-12-3-12

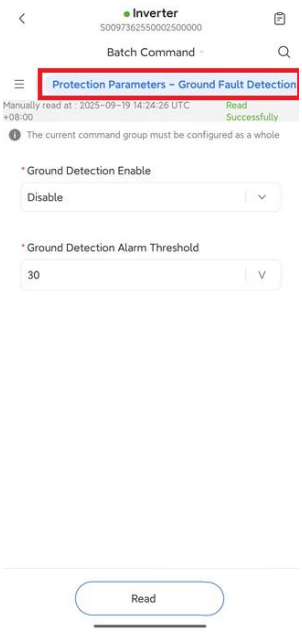



Figure7-12-3-13

## 7.12.3.4 App Report Page

Report page of the App is shown in Figure7-12-8.Through this page, owners can view the report chart.

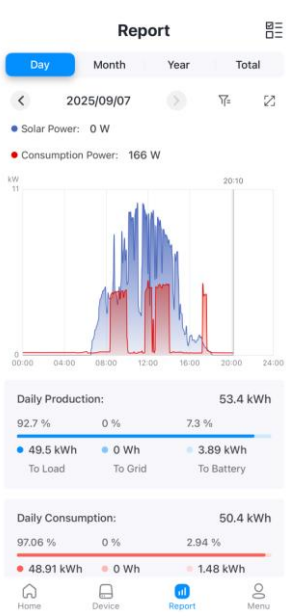



Figure7-12-8

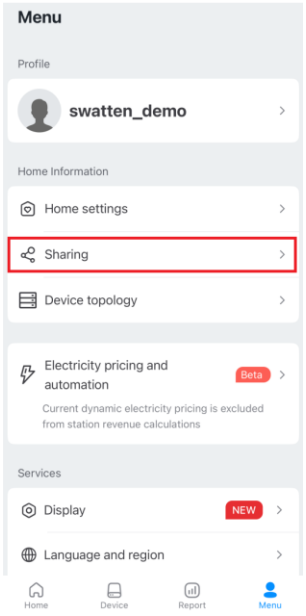



Figure7-12-9

## 7.12.3.5 App Menu Page

Menu page of the App is shown in Figure7-12-9. Through this page, owners can select the app language and region, and select **Sharing** to share the plant to retailer/installer or SWATTEN.

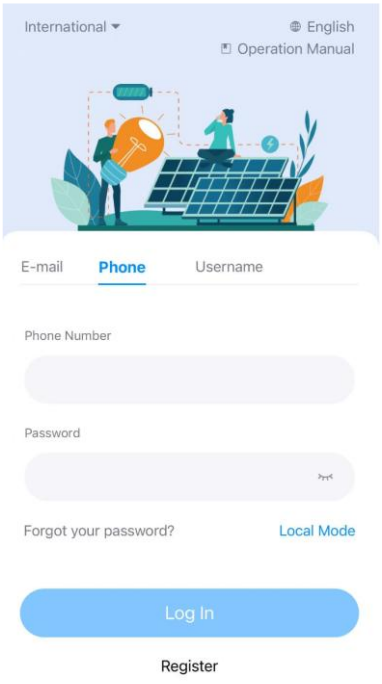
### 7.12.4 SOLARMAN BUSINESS App Login And Operations

## 7.12.4.1 App Login

STEP1:The following requirements should be met, Ther WIFI WLAN is enable.

STEP2:Open the SOLARMAN SMART App to enter the login screen, shown in the Figure7-12-1.

STEP3:Enter the account and password, and select International, enter the home page.





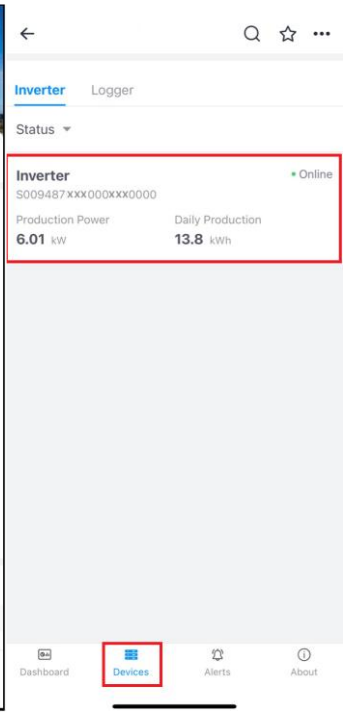



Figure7-12-10 Figure7-12-11 Figure7-12-12

## 7.12.4.2 App Home Page (Dashboard)

Table 7-12-4 Description of Home page in Figure7-12-11.

| No. | Name | Description |
|---|---|---|
| 1 | Load flow chart | Shows the PV power generation power, feed-in power, etc. The line with an arrow indicates energy flow between connected devices, and the arrow pointing indicates energy flow direction. |
| 2 | Navigation bar | Includes menus of Home(Dashboard), Device, Alerts, About |

Table 7-12-1

## 7.12.4.3 Device Parameters Information View

Tap Device on the navigation bar to enter the Device Parameters Information screen, as shown in Figure7-12-12,Figure7-12-13.

The Device Parameters information includes the PV information, inverter information, input, output, grid information, load information, battery information, and software version, shown in Figure7-12-14,Figure7-12-15, Fugure7-12-16.

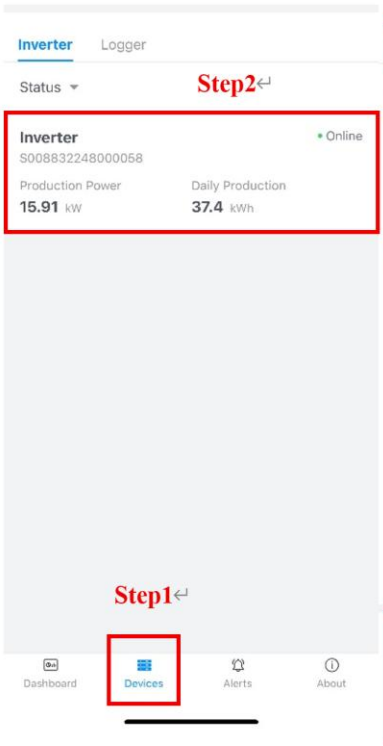



Figure7-12-13

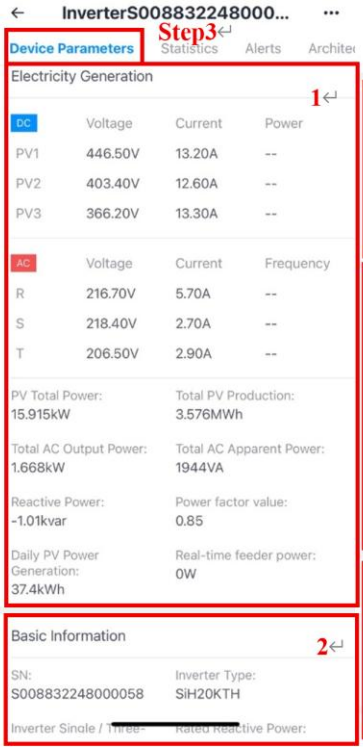



Figure7-12-14

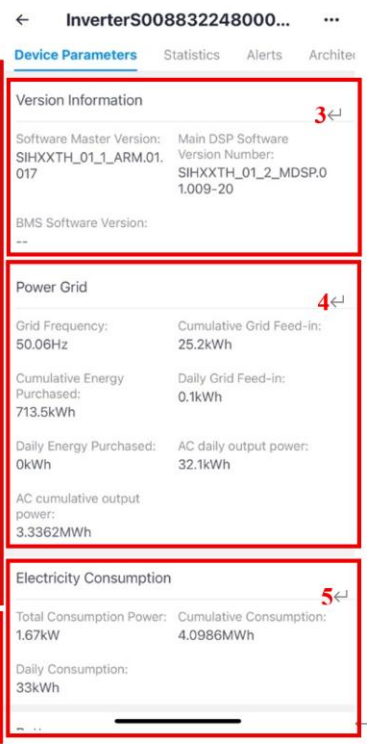



Figure7-12-15

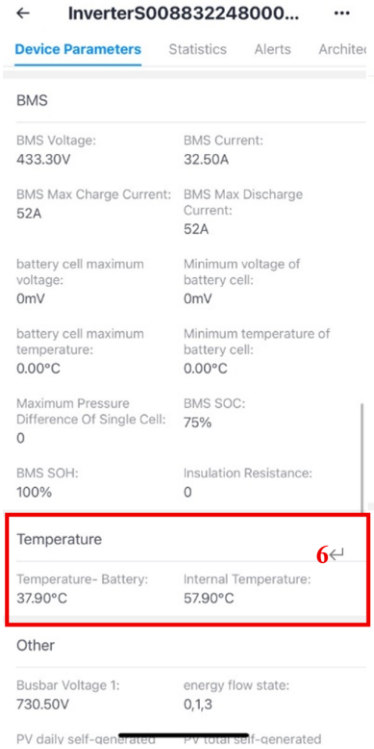



Figure7-12-16

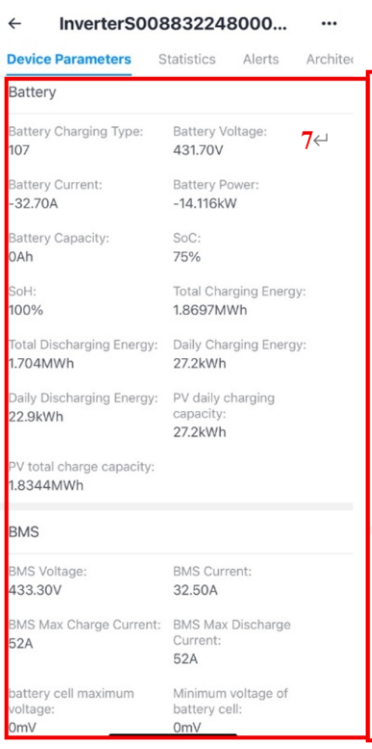



Figure7-12-17

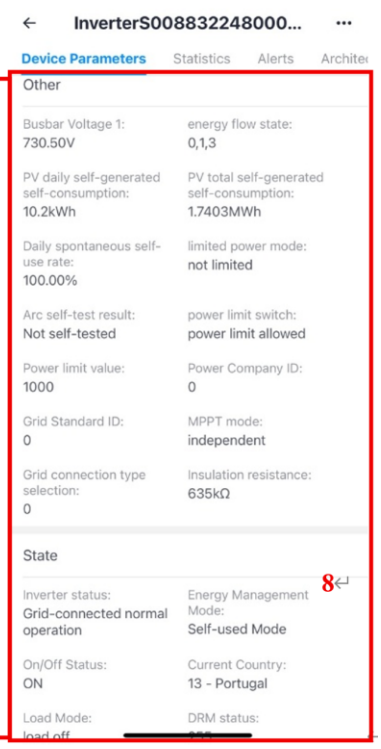



Figure7-12-18

Table 7-12-5 Description of Home page in Figure7-12-13, Figure7-12-14, Figure7-12-15, Figure7-12-16, Figure7-12-17, Figure7-12-18.

| No. | Name | Description |
|---|---|---|
| 1 | Electricity Generaion | View the PV voltage and current, AC voltage and current, power generation, etc. |

| | | |
|---|---|---|
| 2 | Basic Information | View the Basic information of the inverter, such as SN, Inverter Type, Rated Power, etc. |
| 3 | Version Information | View the software version of the inverter. |
| 4 | Power Grid | View the Grid voltage, frequency, current, etc. |
| 5 | Electricity Consumption | View user load consumption |
| 7 | Temperature | View the running temperature of the inverter. |
| | Battery | View the battery running & BMS information, such as voltage, current, battery type, etc. |
| 8 | State | View the state of the inverter, such as Mode, on/off status, Country, DRM status, etc. |

Table 7-12-15

Tap **Statistics** on the right of **Device Parameters** tap in Figure7-12-19, can be used to view the inverter report chart, through **Select Parameters** tap to view the chart of the parameters.

Tap Alerts on the right of **Statistics** tap in Figure7-12-20, in the page, all the alerts can be checked.


Figure7-12-20

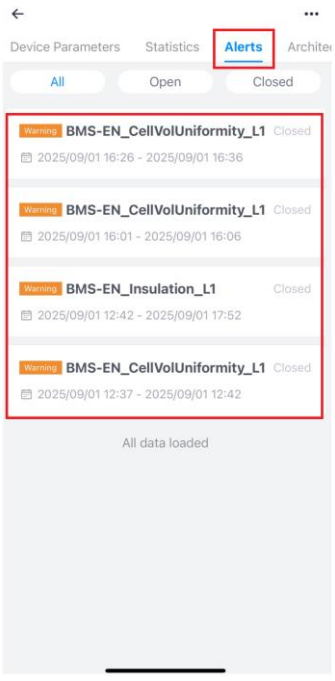



Figure 7-12-21

## 7.12.4.4 Device Parameters Setting View

Through Step1 to Step5, Tap Device> Inverter>…> Remote Control to enter the Devices Parameters Setting and view page(also named Batch Command page)，shown in Figure7-12-21, Figure7-12-22, Figure7-12-23, Figure7-12-24


Figure7-12-21

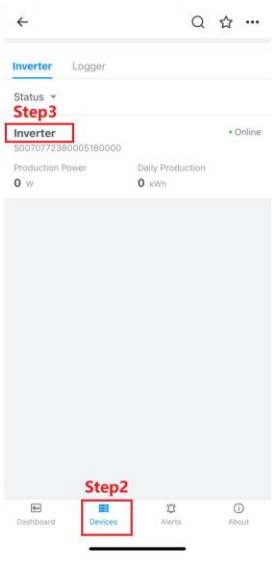



Figure7-12-22


Figure7-12-23


Figure7-12-24

In the Batch Command page, in Step6 the user can select the parameters group, in Step7 select the parameters to be set and read.

In Step8 the user can use the **read** to read and view the value of the parameters, and check if the parameters are set correctly.

In Step9 the user can use the **set** to set the parameters.

In the Batch Command page, all the Parameters Groups and Parameters is shown in Table 7-12-6, Table 7-12-7, Table 7-12-8, Table 7-12-9.

| Parameters Group | Parameters |
|---|---|
| Country Selection | Country Selection |
| System | Forced AC Bypass |
| | Power output Smoothing Enable |
| | Grid Unbalance Control Enable |
| | Frequency Regulation Load Shedding Enable |
| | Frequency Regulation Test Enable |
| | Startup Waiting Time |
| | PV Installed Power |
| | Statistics Storage Period |
| | Frequency Regulation Setting |
| General Parameters | Battery Selection |
| | Energy Management Mode |
| | Battery Charge/Discharge Command |
| | Battery Charge/Discharge Power |
| | Off grid Enable |
| | Battery Off grid Reserve Power |
| | MPPT Mode |
| | Max Grid Draw Power |
| | DRM Enable |
| Protection Parameters Pre grid Check | Grid Detection Switch Before Grid Connection |
| | Grid connected Frequency Lower Limit |
| | Grid connected Frequency Upper Limit |
| | Grid connected Voltage Lower Limit |
| | Grid connected Voltage Upper Limit |
| | Grid connected Self test Time |
| | Grid Connected Active Power Rise Speed |
| 10 Minute Overvoltage Protection | Overvoltage protection enabled for 10 minutes |
| | 10 minutes Protection value |
| | 10 minutes Restore value |
| On/Off Settings | On/Off Settings |
| Reboot | Reboot |
| Restore Default setting | Restore Default |
| Protection Parameter Voltage Detection for Fault Restart | Fault Recovery Time |
| | Overvoltage recovery value |
| | Undervoltage recovery value |
| | Overfrequency recovery value |
| | Underfrequency recovery value |
| | Grid Detection Switch for Fault Restart |
| | Active Power Ramp up Rate for Fault Restart |

Table7-12-6

| Parameters Group | Parameters |
|---|---|
| Q(U)&Q(P) | Reactive Response Enable |
| | Reactive Response Time |
| | Q(U) Curve selection |
| | qu_hysteresis |
| | Grid Voltage U1(QU) |
| | Reactive Power Q1(QU) |
| | Grid Voltage U2(QU) |
| | Reactive Power Q2(QU) |
| | Grid Voltage U3(QU) |
| | Reactive Power Q3(QU) |
| | Grid Voltage U4(QU) |
| | Reactive Power Q4(QU) |
| | Power In(QU) |
| | Power out(QU) |
| | QU No Condiction Enable |
| | Pf(QU) |
| | Q(P) Curve selection |
| | Active Power Percentage(QP)1 |
| | Active Power Percentage(QP)2 |
| | Active Power Percentage(QP)3 |
| | Active Power Percentage(QP)4 |
| | Reactive Power Q1(QP) |
| | Reactive Power Q2(QP) |
| | Reactive Power Q3(QP) |
| | Reactive Power Q4(QP) |
| | Voltage In(QP) |
| | Voltage Out(QP) |
| | Power out(QP) |
| | QP No Condiction Enable |
| Protection Parameters Ground Fault Detection | Ground Detection Enable |
| | Ground Detection Alarm Threshold |

Table7-12-7

| Parameters Group | Parameters |
|---|---|
| Power Regulation Reactive Power Control | Reactive Power Save on Power Loss |
| | Reactive Power Control Mode |
| | Reactive Power Ratio |
| | Power Factor Setting |
| Power Regulation Grid Feed in Limit | Grid Feed in Power Limit Enable |
| | Feed in Power Limit (%) |
| | External Generation Power |
| Power Regulation Active Power Control | Fault Active Power Soft Start Enable |
| | Fault Active Ramp Up Time |
| | Active Power Rate Control Enable |
| | Active Power Ramp Down Rate |
| | Active Power Ramp Up Rate |
| | Active Power Save on Power Loss |
| Grid Overvoltage Active Power Control | Overvoltage derating enable |
| | Overvoltage derating voltage 1 |
| | Overvoltage derating voltage 2 |
| | Overvoltage derating voltage 3 |
| | Overvoltage derating voltage 4 |
| | Overvoltage derating Power 1 |
| | Overvoltage derating Power 2 |
| | Overvoltage derating Power 3 |
| | Overvoltage derating Power 4 |
| | Overvoltage derating time |
| Grid Undervoltage Active Power Control | Under voltage derating enable |
| | Undervoltage derating voltage 1 |
| | Undervoltage derating voltage 2 |
| | Undervoltage derating voltage 3 |
| | Undervoltage derating voltage 4 |
| | Undervoltage derating Power 1 |
| | Undervoltage derating Power 2 |
| | Undervoltage derating Power 3 |
| | Undervoltage derating Power 4 |
| | Undervoltage derating time |

Table7-12-8

| Parameters Group | Parameters |
|---|---|
| Overfrequency Derating | Over frequency derating enable |
| | Overfrequency Derating Frequency 1 |
| | Overfrequency Derating Frequency 2 |
| | Overfrequency Derating Frequency 3 |
| | Overfrequency Derating Frequency 4 |
| | Overfrequency Derating Power 1 |
| | Overfrequency Derating Power 2 |
| | Overfrequency Derating Power 3 |
| | Overfrequency Derating Power 4 |
| | Overfrequency recovery point |
| | Overfrequency derating curve |
| | Overfrequency derating curve |
| | Waiting time for recovery after overfrequency reduction |
| | Active power recovery rate after overfrequency derating |
| | Response time of overfrequency derating |
| | Overfrequency derating power base |
| | Overfrequency derating power base 2 |
| | Overfrequency Derating Droop Coefficient |
| Underfrequency Power Boost | The underfrequency uptick was enabled |
| | Underfrequency uptick frequency 1 |
| | Underfrequency uptick frequency 2 |
| | Underfrequency uptick frequency 3 |
| | Underfrequency uptick frequency 4 |
| | Underfrequency uptick power 1 |
| | Underfrequency uptick power 2 |
| | Underfrequency uptick power 3 |
| | Underfrequency uptick power 4 |
| | Underfrequency uptick frequency recovery point |
| | Underfrequency boost Power rise curve |
| | Underfrequency boost Power increase rate |
| | Recovery time of underfrequency uptick |
| | Underfrequency rise recovery rate |
| | Underfrequency uptick response time |
| | Underfrequency uptick power reference |
| | Underfrequency uptick power reference 2 |
| | Underfrequency Boost Droop Coefficient |

Table7-12-9

**Select Country**

Setting path: **Device> Inverter> …> Remote Control> Country Selection**

Set the country grid code, and read the value of the code, refer to Figure7-12-25 and Figure7-12-26.

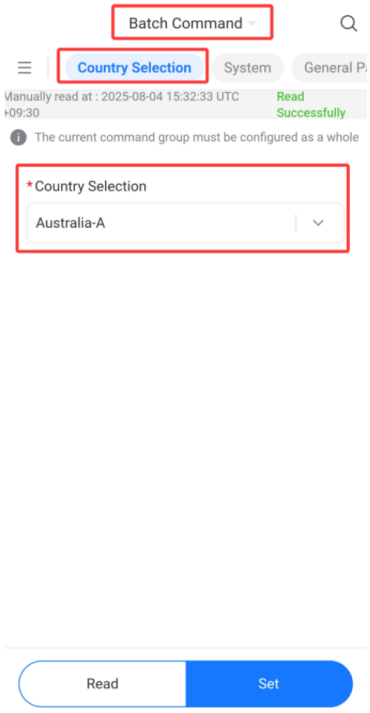



Figure7-12-25

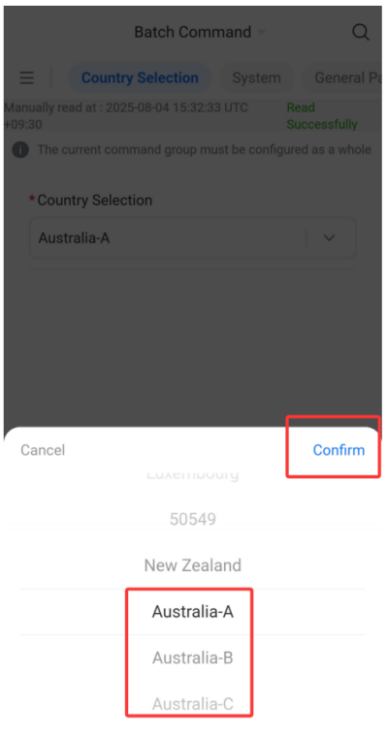



Figure7-12-26

**Shutdown or Starup**

Setting path: **Device> Inverter> …> Remote Control> On/off Settings**

Set On/Off command to shutdown or startup the inverter refer to Figure7-12-26.

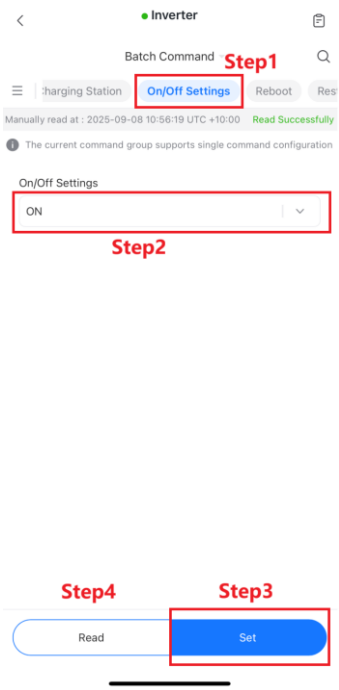



Figure7-12-27

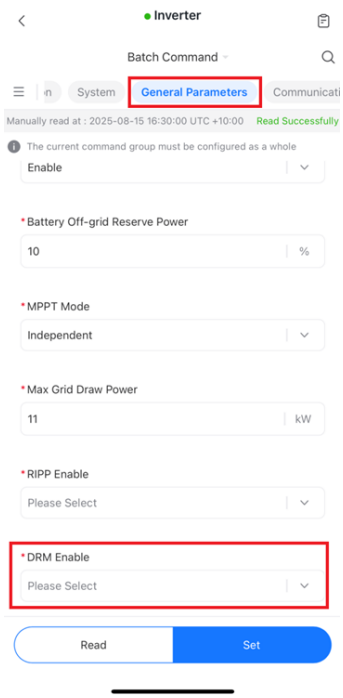



Figure7-12-28

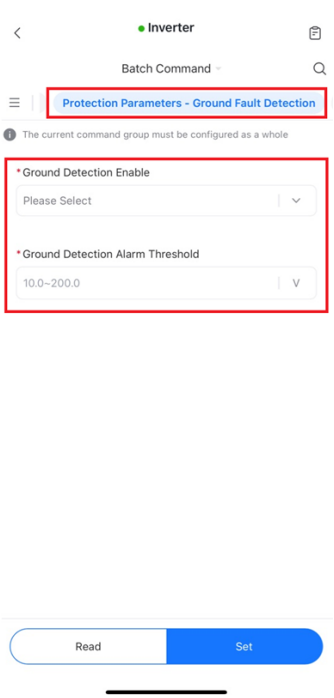



Figure7-12-29

**Setting DRMs function (Applicable to AS/NZS 4777.2)**

Setting path: **Device> Inverter> …> Remote Control> General Parameters**

The DRMs Function is a demand response method required by the AS/NZS 4777.2 standard and is only applicable to Australia and New Zealand.

The function is enabled by default.

Set the DRMs enable, and read the value of DRMs, refer to Figure 7-12-28.

**Grounding Detection**

Setting path: **Device > Inverter > ... > Remote Control > Protection Parameters - Ground Fault Detection**

Set the Earth Fault alarm enable， and read the value of enable, refer to Figure7-11-29.

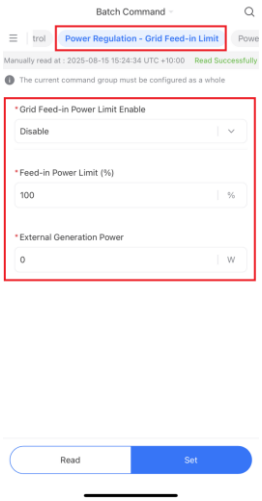
If the grounding detection is enabled, and if the value exceeds the grounding detection alarm value. The buzzer inside the inverter will beep.

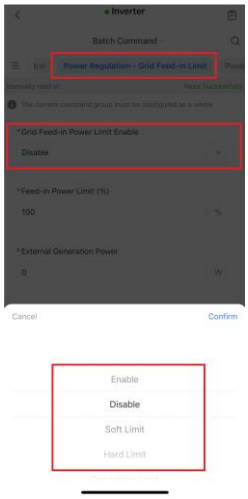
**Grid Feed-in Limitation (Export limitation)**

Setting path: **Device > Inverter > ... > Remote Control > Power Regulation - Grid Feed-in Limit**

The function of the feed-in limitation is to control the amount of power injected in the grid by the plant. In some situations， this function is also called as Export limitation or Zero export. The feed-in limitation function requires the using of Smart Energy Meter. Without the Smart Energy Meter, the feed-in limitation function will be unavailable.

Setting the Grid Feed-in limitation, refer to Figure7-11-30, Figure7-11-31. The description of the parameters refer to Table 7-12-10.



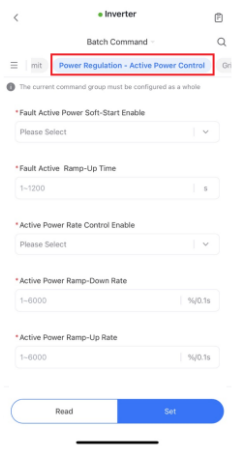

| Parameters Group | Parameters | Value | Description |
|---|---|---|---|
| Power Regulation Grid Feed in Limit | Grid Feed in Power Limit Enable | Enable | Enable the Feed in function |
| | | Disable | Disable the Feed in function |
| | | Soft Limit | Control the output value to grid within the set Limit Value |
| | | Hard Limit | If the actual output value reaches the set Limit Value, the system will automatically disconnect from grid and prompt error. |
| | Feed in Power Limit (%) | 0 100% | 0 100% rated AC output power |
| | External Generation Power | | Depends on inverter power of other companies |

Figure7-12-30 Figure7-12-31 Table7-12-10

**Active Power Regulation**

Setting path: **Device > Inverter > ... > Remote Control > Power Regulation - Active Power Control**

Setting the Active Power Regulation, refer to Figure7-12-32. The description of the parameters refer to Table 7-12-11.



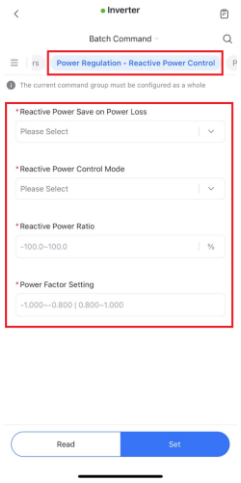

| Parameters | Parameters | Description | Value |
|---|---|---|---|
| Power Regulation Active Power Control | Fault Active Power Soft Start Enable | Switch for activating/deactivating the function of active power | ON/OFF |
| | Fault Active Ramp Up Time | The soft start time required for raising active | 1s 1200s |
| | Active Power Rate Control Enable | Set whether to enable active | ON/OFF |
| | Active Power Ramp Down Rate | Decline gradient of inverter active | 1%/min 6000%/min |
| | Active Power Ramp Up Rate | Rising gradient of inverter active | 1%/min 6000%/min |
| | Active Power Limit Enale | Switch for limiting active power | ON/OFF |
| | Active Power Limit Ratio | The ratio of active power limit to rated power in | 0 100% |

Figure7-12-32 Table7-12-11

**Reactive Power Regulation**

Setting path: **Device > Inverter > ... > Remote Control > Power Regulation - Reactive Power Control**

Setting the Reactive Power Regulation, refer to Figure7-12-33. The description of the parameters refer to Table 7-12-12.




| Parameters | Parameters | Value | Description |
|---|---|---|---|
| Power Regulation - Reactive Power Control | Reactive Power Control Mode | Off | The PF is fixed at +1.000 |
| | | PF | The reactive power can be regulated by the parameter PF (Power Factor). |
| | | Q ratio | The reactive power can be regulated by the parameter Q Var limits (in %). |
| | | Q(P) Curve | The PF changes with the output power of the inverter. |
| | | Q(U) Curve | The reactive power changes with the grid voltage. |
| | Reactive Power Ratio | [−100%. . . 100%] | |
| | Power Factor Setting | [−0. 8. . . +0. 8] | |

Figure7-12-35 Table7-12-12

**“Off” Mode**

The reactive power regulation function is disabled. The PF is limited to +1.000.

**“PF” Mode**

The power factor is fixed and reactive power setpoint is calculated according to the current power.

The PF ranges from 0.8 leading to 0.8 lagging.

Leading: The inverter supplies reactive power to the grid.

Lagging: The inverter absorbs reactive power from the grid.

**“Qt” Mode**

In the"Qt"mode, system rated reactive power is fixed, and the system injects reactive power according to the delivered reactive power ratio. The **Reactive Power Ratio** is set through the App. The setting range of the reactive power ratio is 0~100% or 0~-100%, corresponding to the ranges of inductive and capacitive reactive power regulation respectively.

**“Q(P)” Mode**

Parameters of "Q(P)" Mode Setting path: **Device > Inverter > ... > Remote Control > Q(U)&Q(P)**

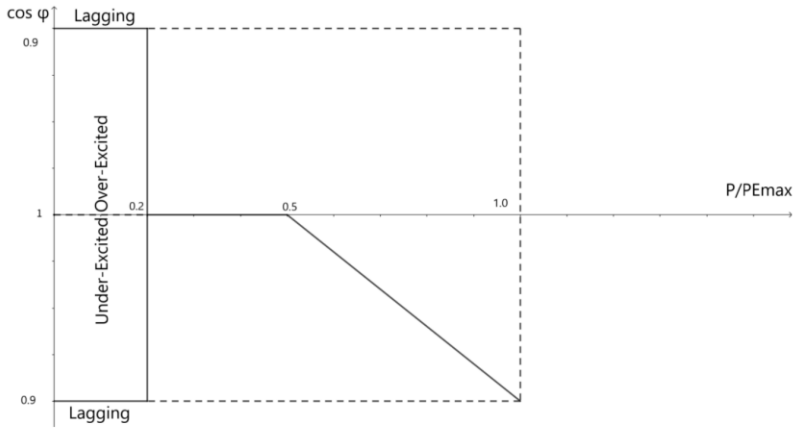
The PF of the inverter output varies in response to the output power of the inverter.

Parameters of the "Q(P)" Mode refer to Table7-12-13.

| Parameter | Explanation | Range |
|---|---|---|
| | from the grid. | |
| Q(P) Curve selection | Select corresponding curve according to local regulations | A,B,C |
| Active Power Percentage(QP)1 | Output power at P1 on the Q(P) mode curve (in percentage) | 0%~100% |
| Active Power Percentage(QP)2 | Output power at P2 on the Q(P) mode curve (in percentage) | 20%~100% |
| Active Power Percentage(QP)3 | Output power at P3 on the Q(P) mode curve (in percentage) | 20%~100% |
| Active Power Percentage(QP)4 | Output power at P4 on the Q(P) mode curve (in percentage) | 20%~100% |
| Reactive Power Q1(QP) | Power factor at P1 on the Q(P) mode curve | Curve A/C: 80%~100%<br>Curve B: - 60% ~ 60% |
| Reactive Power Q2(QP) | Power factor at P1 on the Q(P) mode curve | |
| Reactive Power Q3(QP) | Power factor at P1 on the Q(P) mode curve | |
| Reactive Power Q4(QP) | Power factor at P1 on the Q(P) mode curve | |
| Voltage In(QP) | Voltage percentage for Q(P) function activation | 100%~110% |
| Voltage Out(QP) | Voltage percentage for Q(P) function deactivation | 90%~1005 |
| Power out(QP) | Power percentage for Q(P) function deactivation | 1%~100% |
| QP No Condiction Enable | Unconditional activation/deactivation of Q(P) function | Enable,Disable |

* Curve C is reserved and consistent with Curve A currently

Table7-12-13




**"Q(P)" Curve A**

**"Q(U)" Mode**

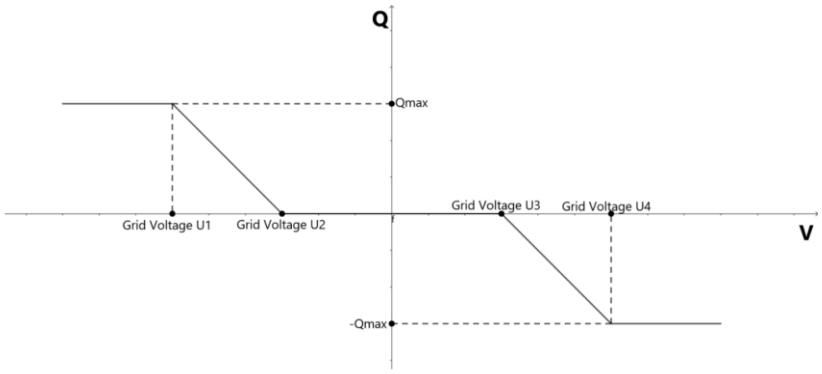
Parameters of "Q(U)" Mode Setting path: Device > Inverter > ... > Remote Control > Q(U)&Q(P)

The reactive power output of the inverter will vary in response to the grid voltage.

Parameters of the "Q(U)" Mode refer to Table7-12-14

| Parameter | Explanation | Range |
|---|---|---|
| Reactive Response Enable | | Enable,Disable |
| Reactive Response Time | | 0.1~600.0S |
| Q(U) Curve selection | Select corresponding curve according to local regulations | A,B,C |
| qu_hysteresis | Voltage hysteresis ratio on the Q(U) mode curve | 0%~5% |
| Grid Voltage U1(QU) | Grid voltage limit at P1 on the Q(U) mode curve | 80%~100% |
| Reactive Power Q1(QU) | Value of Q/Sn at P1 on the Q(U) mode curve | 30%~60% |
| Grid Voltage U2(QU) | Grid voltage limit at P2 on the Q(U) mode curve | 80~100% |
| Reactive Power Q2(QU) | Value of Q/Sn at P2 on the Q(U) mode curve | -60%~60% |
| Grid Voltage U3(QU) | Grid voltage limit at P3 on the Q(U) mode curve | 100%~120% |
| Reactive Power Q3(QU) | Value of Q/Sn at P3 on the Q(U) mode curve | -60%~60% |
| Grid Voltage U4(QU) | Grid voltage limit at P4 on the Q(U) mode curve | 100%~120% |
| Reactive Power Q4(QU) | Value of Q/Sn at P4 on the Q(U) mode curve | -30%~60% |
| Power In(QU) | Active power for Q(U) function activation | 20%~100% |
| Power out(QU) | Active power for Q(U) function deactivation | 1~20% |
| QU No Condiction Enable | Unconditional activation/deactivation of Q(U) function | Enable,Disable |
| Pf(QU) | The power factor is fixed and reactive power setpoint is calculated according to the current power. The PF ranges from 1 leading to 1 lagging.<br>Leading: The inverter supplies reactive power to the grid.<br>Lagging: The inverter absorbs reactive power | -1.000~1.000 |

Table7-12-14




"Q(U)" Curve A

**Setting Off -grid Parameters**

Setting path: **Device > Inverter > ... > Remote Control > General Parameters**

Set the Off -grid Mode enable and the Battery Off-grid Reserve Power， and read the value, refer to Figure7-12-34.

-- Off-grid Enable, Switch for activating/deactivating the function.

-- Battery Off-grid Reserve Power, Setting the Battery minimum SOC used for Off-grid mode.

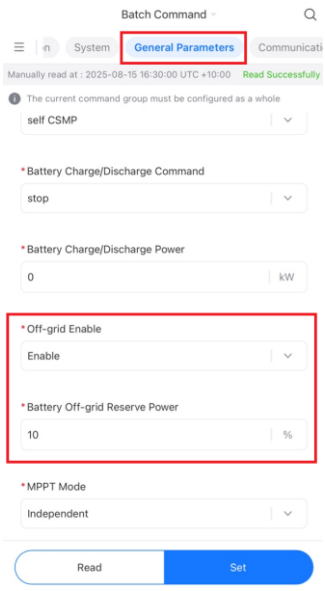



Figure 7-12-34

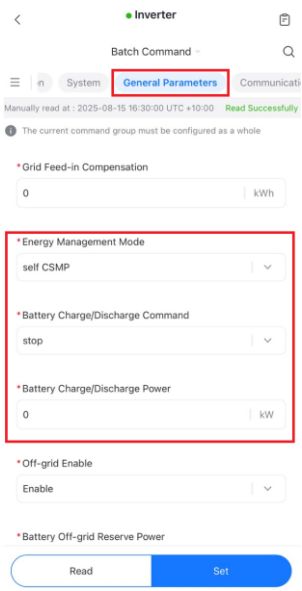



Figure 7-12-35

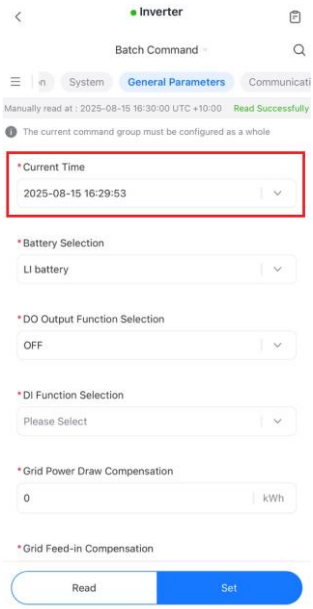



Figure 7-12-36

**Setting EMS Mode**

Setting path: **Device > Inverter > ... > Remote Control > General Parameters**

Set the EMS mode, refer to Figure7-12-35. The description of the parameters refer to Table7-12-15.

| Parameters Group | Parameters | Description | Value |
|---|---|---|---|
| General Parameters | Energy Management Mode | **self CSMP** use for self use,is default setting. | self CSMP |
| | | **Force Mode** use for battery force charge or discharge mode. | Force Mode |
| | Battery Charge/Discharge Command | when setting Force Mode, here can set the battery whether charge or discharge. | stop, charge, discharge |
| | Battery Charge/Discharge Power | setting the battery charge/discharge power in Force Mode. | 0-10KW |

Table 7-12-15

**Date Setting/Time setting**

Setting path: Device > Inverter > ... > Remote Control > General Parameters

Setting time, refer to Figure7-12-36.

**Setting Battery Discharge Time**

Setting path: **Device > Inverter > ... > Remote Control > Battery Discharge Settings**

Setting battery discharge time, refer to Figure7-11-37.

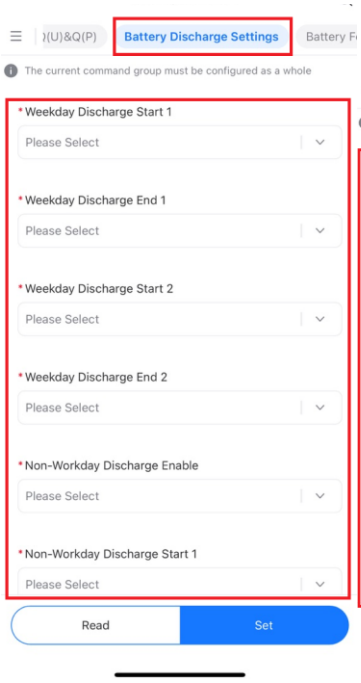



Figure 7-12-37

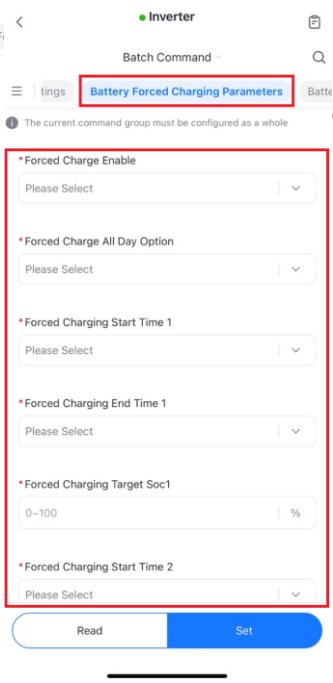



Figure 7-12-38

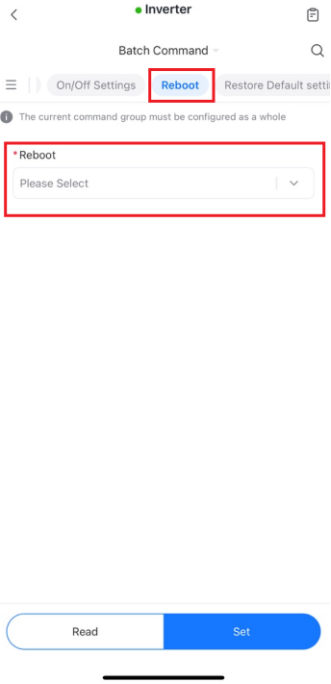



Figure 7-12-39

**Setting Battery Forced Charge Time**

Setting path: **Device > Inverter > ... > Remote Control > Battery Forced Charging Parameters**

Setting battery force charge time, refer to Figure7-12-38.

**Setting Reboot**

Setting path: **Device > Inverter > ... > Remote Control > Reboot**

Setting the inverter reboot, refer to Figure7-12-39.

**Setting Overfrequency Derating**

Setting path: **Device > Inverter > ... > Remote Control > Overfrequency Derating**

Setting Overfrequency Derating, refer to Figure7-12-40.

**Setting Underfrequency Boost**

Setting path: **Device > Inverter > ... > Remote Control > Underfrequency Boost**

Setting the Underfrequency Boost, refer to Figure7-12-41.

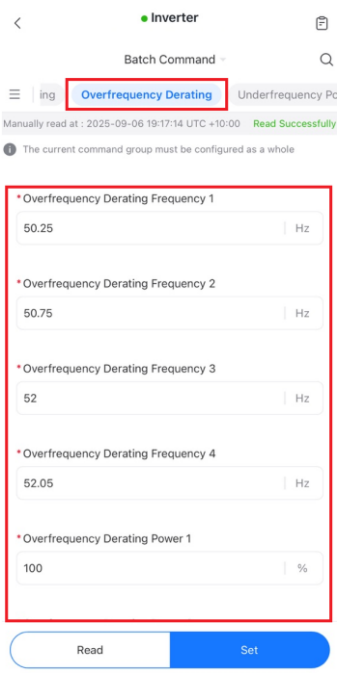



Figure 7-12-40

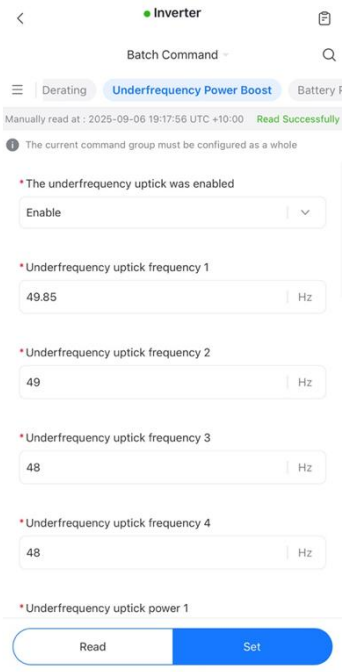


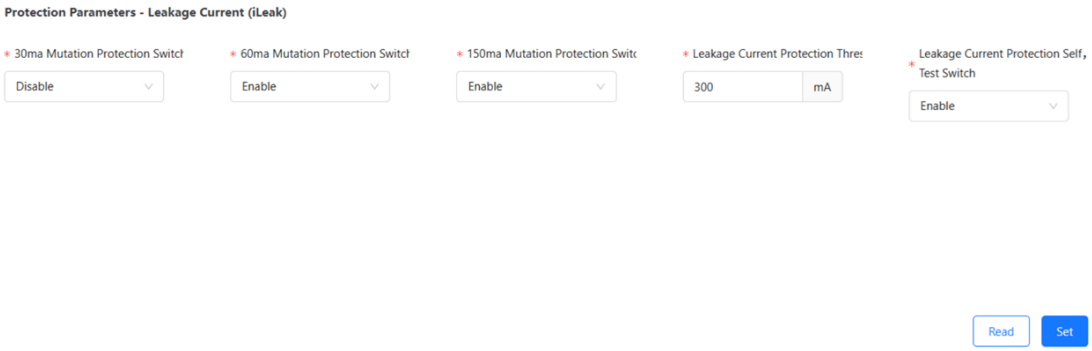

Figure 7-12-41

Setting Grid protection

**Select the correct country or region, such as Australia Region A/B/C.**

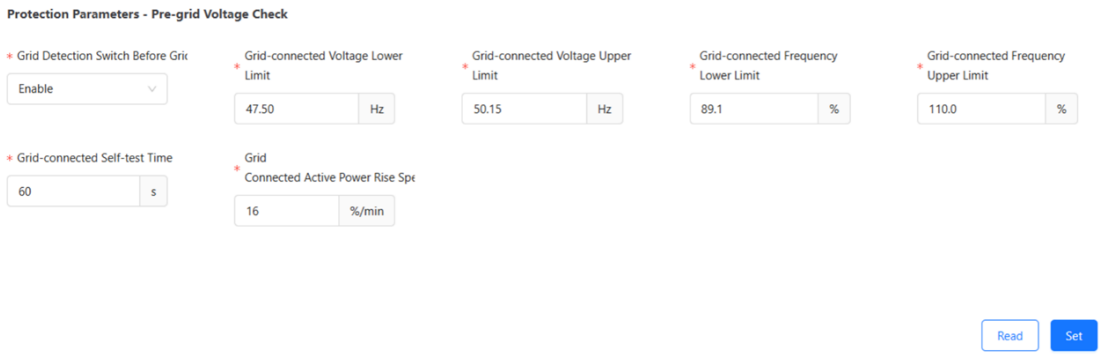
Protection Parameters - Leakage Current (iLeak)

Setting path: **Device > Inverter > ... > Remote Control > Protection Parameters - Leakage Current (iLeak)**



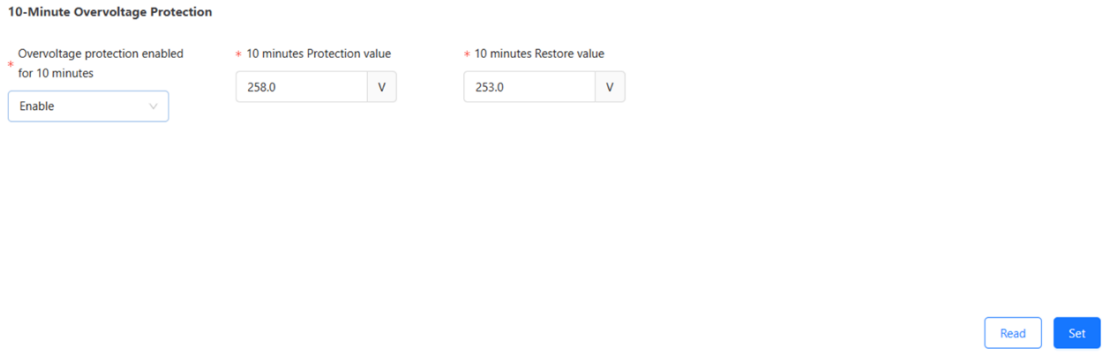

**Protection Parameters - Pre-grid Voltage Check**

Setting path: **Device > Inverter > ... > Remote Control > Protection Parameters - Pre-grid Voltage Check**



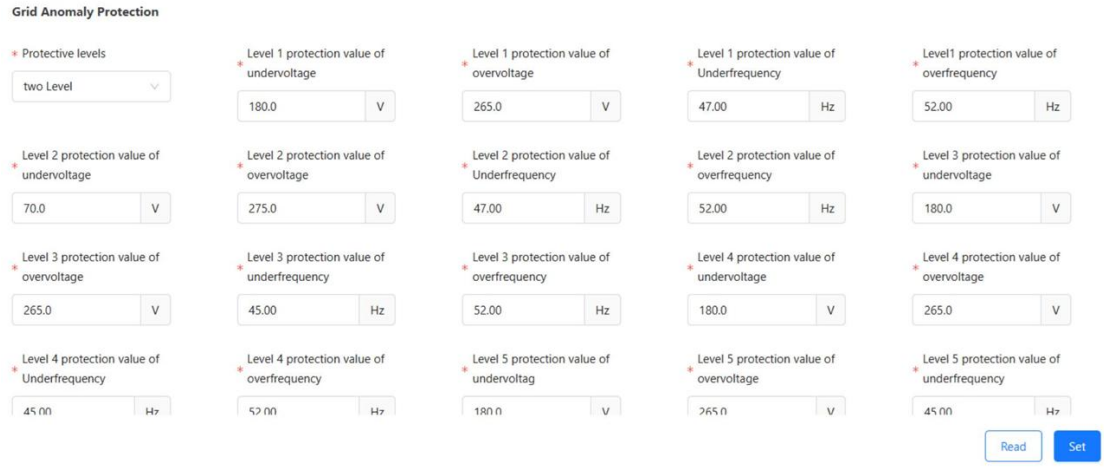

### 10-Minute Overvoltage Protection

Setting path: Device > Inverter > ... > Remote Control > 10-Minute Overvoltage Protection




### Grid Anomaly Protection

Setting path: **Device > Inverter > ... > Remote Control > Grid Anomaly Protection**

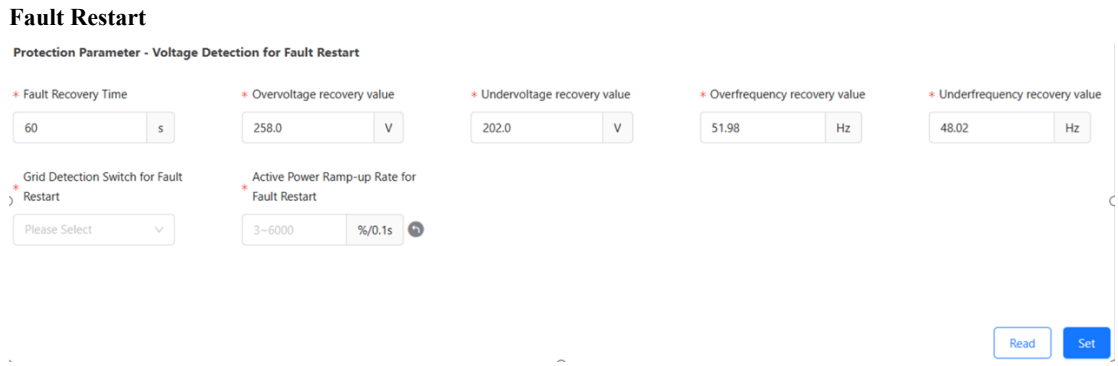



### Protection Parameters - Transient Overvoltage

Setting path: **Device > Inverter > ... > Remote Control > Protection Parameters - Transient Overvoltage**


### Protection Parameter - Voltage Detection for Fault Restart

Setting path: **Device > Inverter > ... > Remote Control > Protection Parameters - Voltage Detection for**




# 8 System Decommissioning

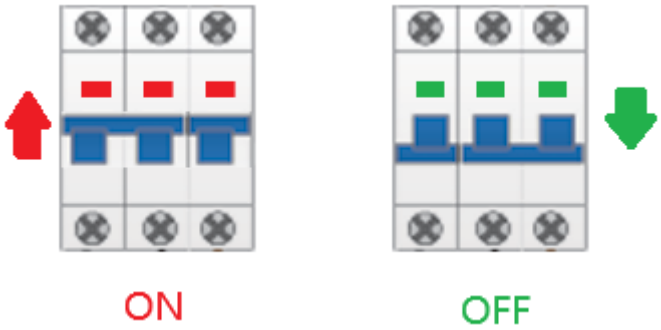
## 8.1 Disconnecting the Inverter

### 8.1.1 Disconnecting the Inverter

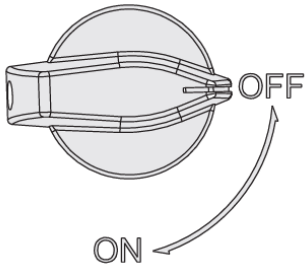
CAUTION

To ensure safety and prevent the risk of burns, it is important to follow proper procedures when operating or performing maintenance on the inverter. Please adhere to the following steps to disconnect the inverter from the AC and DC power sources:

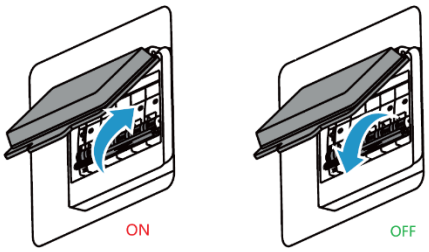
Step 1: Disconnect the external AC circuit breaker that connected to the inverter AC port, including GRID and BACKUP ports. Make sure to secure it against accidental reconnection.




Step 2: Rotate the DC switch to the "OFF" position to disconnect all PV string inputs from the inverter.




Step 3: Disconnect all the external DC circuit breakers connected to the battery and the built-in breaker of the battery.




Step 4: Wait for approximately 10 minutes to allow the capacitors inside the inverter to completely discharge. This step is crucial to ensure that no residual electrical charge remains.

Step 5: Use a current clamp to verify that the DC cable is free from any electrical current. This is an important safety measure to prevent any potential shocks or hazards.

Please remember to wear protective gloves when operating the inverter, even after it has been shut down and allowed to cool down. In addition, always follow safety guidelines and refer to the manufacturer's instructions for specific procedures and precautions related to maintenance and service work on the inverter.

**--End**

### 8.1.2 Dismantling the Inverter

CAUTION

Risk of burn injuries and electric shock!

Do not come into contact with any internal live components until at least 10 minutes have elapsed after disconnecting the inverter from the utility grid and PV input.

| |
|---|
| Before disassembling the inverter, ensure that both AC and DC connections are disconnected. |

Step 1: Disconnect all cables from the inverter in reverse order as described in the "Electrical Connection" section.

Step 2: Disassemble the inverter following the reverse steps outlined in the "Mechanical Mounting" section.

Step 3: If needed, remove the wall-mounting bracket from the wall.

Step 4: If the inverter will be stored for future use, please refer to the "Inverter Storage" section for proper conservation guidelines.

**--End**

### 8.1.3 Disposal of the Inverter

Users are solely responsible for the proper disposal of the inverter.

WARNING

Please ensure that the inverter is disposed of in accordance with the relevant local regulations and standards to prevent any property losses or casualties.

NOTICE

Certain components of the inverter may pose a risk of environmental pollution. Please adhere to the disposal regulations for electronic waste that are applicable at your installation site when disposing of these components.

## 8.2 Decommissioning the Battery

To decommission a Li-ion battery after the inverter has been decommissioned, follow these steps:

Step 1: Disconnect the DC circuit breaker located between the battery and the inverter.

Step 2: Disconnect the communication cable that connects the battery to the inverter.

Step 3: Wait for approximately 1 minute to allow for any residual voltage to dissipate. Then, use a multimeter to measure the voltage at the battery ports.

Step 4: If the battery port voltage is zero, proceed to disconnect the power cables from the battery module.

Note: It is important to exercise caution and follow proper safety procedures when handling and decommissioning batteries.

**--End**

Swatten does not assume liability for the disposal of the battery. The responsibility for proper battery disposal rests with the user. Please ensure that the battery is disposed of in accordance with applicable local regulations and standards to avoid any property damage or harm.

# 9 Troubleshooting and Maintenance

## 9.1 Troubleshooting

Note:
Please consult the charger user manual for information regarding the fault codes of the charger. The manual will provide detailed explanations of the fault codes and their corresponding troubleshooting steps.

When an alarm is triggered, you can view the alarm information through the dedicated App. Here are the Alarm ID codes and their respective corrective measures:

| Alarm ID | Alarm Name | Corrective Measure |
|---|---|---|
| 112<br>100<br>101<br><br>102 | Grid Overvoltage<br><br>Grid Undervoltage | 1. Measure the actual grid voltage. If the grid voltage is higher than the set value, please contact the local power company for a solution.<br>2. Check the protection parameters through the Solarman Smart App. With approval from the local power operator, modify the voltage protection value.<br>3. Verify the secure connection of the Grid port wiring.<br>4. If the fault still persists, please contact Swatten." |
| 106<br><br><br><br>107 | Grid Overfrequency<br><br><br><br>Grid Underfrequency | 1. Measure the actual grid frequency. If the grid frequency is higher than the set value, please contact the local power company for a solution.<br>2. Check the protection parameters through the Solarman Smart App. With approval from the local power operator, modify the frequency protection value.<br>3. Verify the secure connection of the Grid port wiring.<br>4. If the fault still persists, please contact Swatten. |
| 1<br>108<br>109<br>111<br>116<br>123<br>200<br>201<br>205<br>206<br>216<br>218<br>227<br>300<br>301<br>305<br>312<br>316<br>320 | System Fault | 1. Wait for the inverter to recover normal operation.<br>2. Disconnect the AC and DC switches, and if there is a battery, disconnect the battery-side switch. After 10 minutes, turn off the AC and DC switches in rotation and restart the system.<br>3. If the fault still persists, please contact Swatten. |

| | | |
|---|---|---|
| 400<br>401<br>403<br>404<br>479<br>481<br>502<br>505<br>507<br>512<br>700<br>701<br>702<br>703<br>818<br>819<br>820<br>821<br>822<br>825<br>829 | System Fault | 1. Wait for the inverter to recover normal operation.<br>2. Disconnect the AC and DC switches, and if there is a battery, disconnect the battery-side switch. After 10 minutes, turn off the AC and DC switches in rotation and restart the system.<br>3. If the fault still persists, please contact Swatten. |
| 110 | Leakage Current Fault | 1. This alarm may be caused by insufficient sunlight or a humid environment. Once the environment improves, the inverter will reconnect to the grid.<br>2. If the environment is normal, check if the AC and DC cables are well-insulated.<br>3. If the alarm continues to exist, please contact Swatten. |
| 122 | Ground Fault | 1. Check if the AC cable is connected correctly.<br>2. Check the insulation between the grounding cable and live wires.<br>3. If the fault still persists, please contact Swatten." |
| 129 | Backup Load Overload | 1. Reduce the power of loads connected to the Off-grid port or remove some loads.<br>2. If the alarm continues to exist, please contact Swatten. |
| 209<br>210 | Photovoltaic Reverse Connection Fault | 1. Check if the corresponding PV string is connected in reverse polarity. If it is, disconnect the DC switch and adjust the polarity when the string current is below 0.5 A.<br>2. If the fault still persists, please contact Swatten. *Code 209 corresponds to PV1, and 210 corresponds to PV2 and PV3. |
| 501 | Environmental Overtemperature | Typically, the inverter will resume operation when the internal or module temperature returns to normal. If the fault still persists:<br><br>Check if the inverter's ambient temperature is too high.<br>Check if the inverter is placed in a well-ventilated area.<br>Check if the inverter is exposed to direct sunlight. If so, avoid direct sunlight.<br>Check if the fan is operating properly. If not, replace the fan. |

| | | |
|---|---|---|
| | | If the fault still persists, please contact Swatten. |
| 503 | Insulation Fault | Wait for the inverter to recover normal operation. If the fault repeatedly occurs:<br><br>Check if the ISO resistance protection value is set too high and ensure compliance with local regulations, with approval from the local power operator.<br>Check the grounding resistance of the ground and DC cables. Take corrective measures if there is a short circuit or insulation layer damage.<br>If the cables are functioning correctly and the fault occurs during rainy weather, recheck when the weather improves.<br>If there is a battery, check if the battery cables are damaged and if the terminal connections are loose or poor. If so, replace the damaged cables and secure the terminals to ensure reliable connections.<br>If the fault still persists, please contact Swatten. |
| 516<br>528<br>529<br>530<br>531 | Off-grid Abnormality | 1. Confirm if the off-grid is overloaded. If it is, reduce the load to below 50%. If the fault still persists,<br>2. If the alarm continues to exist, please contact Swatten. |
| 603<br>611<br>612<br>615<br>616 | Battery Abnormality | 1. If the battery voltage is abnormal, check for any abnormalities in the battery power cable connections, such as reverse connection or looseness. If found, please correct the battery power cable connection.<br>2. When the battery power line is correctly connected, check if the real-time battery voltage is abnormal. If so, please contact the battery manufacturer. If not, please contact Swatten.<br>3. If the fault still persists, please contact the battery manufacturer. |
| 805 | Parallel Communication Abnormality | 1. Check if the communication line for parallel operation is abnormal, including wiring errors or loose connections.<br>2. Check if the parallel operation settings are correct.<br>3. If the fault still persists, please contact Swatten. |
| 830 | Meter Communication Abnormality | 1. Check if the communication line for the energy meter is abnormal, including wiring errors or loose connections.<br>2. Check if the grid voltage is normal.<br>3. If the fault still persists, please contact Swatten. |
| 831 | BMS Communication Abnormality | 1. Check if the communication line for the BMS (Battery Management System) is abnormal, including wiring errors or loose connections.<br>2. Check if the battery voltage is normal. If abnormal, please contact the battery manufacturer. If not, continue to check if the BMS has issued any alarms. If there are alarms, please contact the battery manufacturer. If there are no alarms, please contact Swatten.<br>3. If the fault still persists, please contact Swatten.<br>Please perform the appropriate checks and maintenance procedures based on the specific situation, and if necessary, contact the relevant manufacturers or |

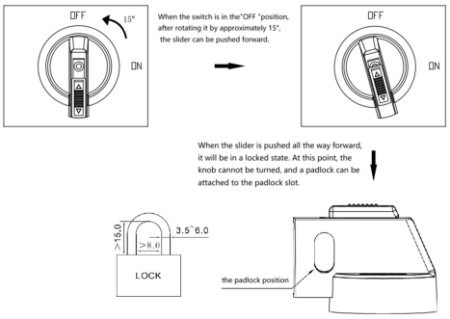
| | | |
|---|---|---|
| | | Swatten for further support and solutions. |

Note:
If you have implemented the suggested troubleshooting steps and the issue persists, please get in touch with the distributor. In the event that the distributor is unable to resolve the problem, contact Swatten directly for further assistance.

## 9.2 Maintenance

### 9.2.1 Maintenance Notices

The DC switch can be locked in the OFF position or a position beyond OFF to ensure safety (applicable to "AU" and "NZ" countries). The instructions on how to lock the DC isolator during maintenance are shown as below Figure 9-2-1 shown . Also during maintenance, the breaker of battery terminal in the disconnected state with it pulled down as Figure 9-2-2 shown.



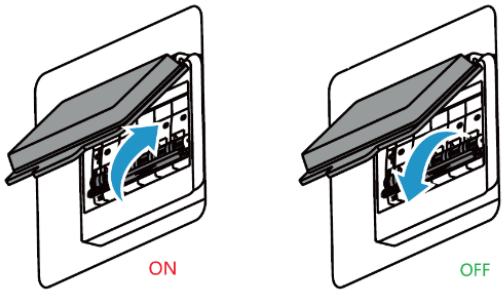




Figure 9-2-1 operation of DC isolator Figure 9-2-2 operation of battery breaker

For the AC breaker disconnection operation of the GRID and BACKUP port, please refer to the figure below: pull it down to the green indicator position, which means the disconnected state.

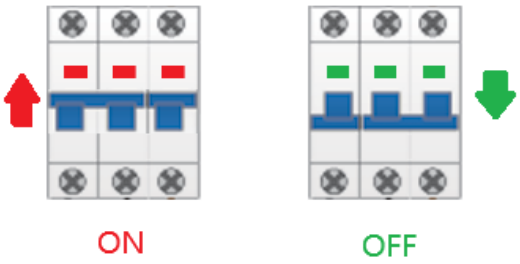



Figure 9-2-3 operation of GRID and BACKUP port breaker

DANGER

There is a risk of inverter damage or personal injury due to incorrect service.

- Always use special insulation tools when performing high-voltage operations to ensure safety.
- Before starting any service work, disconnect the AC circuit breaker on the grid side and check the inverter status. If the inverter indicator is off, it is recommended to wait until nighttime before disconnecting the DC switch. If the inverter indicator is on, you can directly disconnect the DC switch.
- After the inverter has been powered off for at least 10 minutes, use professional instruments to measure the voltage and current. Only when there is no voltage or current present, and when operators are wearing appropriate protective equipment, should they proceed with operating and maintaining the inverter.
- Even when the inverter is shut down, it may still retain heat and cause burns. Always wear protective gloves when handling the inverter after it has cooled down.

CAUTION

To prevent misuse or accidents caused by unauthorized individuals: Display noticeable caution signs or mark safety warning zones around the inverter to avoid accidents resulting from improper handling.

NOTICE

Restart the inverter only after resolving any faults that compromise its safety performance. Since the inverter does not have serviceable components, never open the enclosure or attempt to replace any internal parts. To mitigate the risk of electric shock, refrain from performing any maintenance tasks beyond those outlined in this manual. If needed, reach out to your distributor for assistance. If the issue persists, contact Swatten. Failure to follow these guidelines may result in warranty voidance and associated losses.

NOTICE

Handling the PCB (Printed Circuit Board) or other components sensitive to static electricity can lead to device damage.

- Avoid unnecessary contact with the circuit board.
- Adhere to regulations for protecting against electrostatic discharge and use an anti-static wrist strap..

**9.2.2 Routine Maintenance**

| Item | Method | Period |
|---|---|---|
| System clean | Check the temperature and dust of the inverter. Clean the inverter enclosure if necessary. | Six months to a year (depending on the dust con-Tents in air) |
| Electrical connection | Check whether all cable are firmly connected in place.<br>Check whether there is damage to the cables, especially the surface in contact with metal. | 6 months after commissioning And then once or twice a year. |
| General status of the system | - Visual check for any damage or deformation of the inverter.<br>- Check any abnormal noise during the operation.<br>- Check each operation parameter.<br>Be sure that nothing covers the heat sink of the inverter. | Every 6 months |

# **Contact Details**

For any inquiries regarding this product, please get in touch with us. To ensure we provide the best possible assistance, kindly provide the following information:

- Device model
- Device serial number
- Fault code/name
- Brief description of the issue or phenomenon

For detailed contact information, please visit: https://www.swatten.com/list-18.html

# 10 Appendix

## 10.1 Technical Data

| Type designation | SiH-9.9kW-TH-PRO | SiH-10kW-TH-PRO | SiH-12kW-TH- |
|---|---|---|---|
| **PV Input** | | | |
| Max. recommended PV array power | 20000 Wp | | 24000 Wp |
| Max. PV voltage | 1000V | | |
| Rated PV voltage | 650 V | | |
| Start-up input voltage | 150 V | | |
| MPP voltage range | 150 V- 950 V | | |
| No. of MPPT / Strings per MPPT | 3 (2/1/1) | | |
| Max. PV current | 64A (32A / 16A / 16 A) | | |
| Max. short-circuit current | 80A (40A / 20A / 20A) | | |
| Max. inverter backfeed current to the array[A] | 0 | | |
| **Battery(input/output)** | | | |
| Battery type | Lithium - ion | | |
| Battery voltage range | 100 V - 800 V | | |
| Max charge / discharge current | 50 A / 50 A * | | |
| Max charge / discharge power | 15000 W / 9999 W | 15000 W / 10000 W | 15000 W / 12000 W |
| **Grid(input/output)** | | | |
| Max. AC power from grid | 43000 W / 43000 VA | | |
| Rated AC output power | 9999 VA | 10000 VA | 12000 VA |
| Max. AC output power | 9999 VA | 10000 VA | 12000 VA |
| Max. AC output current | 15.2 A | | 18.2 A |
| Inrush current [a.c.A] | 35A Peak, ≤50us | | |
| Maximum output fault current [a.c.A] | 70A Peak, ≤1ms | | |
| Rated AC voltage | 3 / N / PE, 220 / 380 Va.c; 230 / 400 Va.c; 240 / 415 Va.c | | |
| AC voltage range | 270 V - 480 V | | |
| Rated grid frequency | 50 Hz / 60 Hz | | |
| Grid frequency range | 45 Hz - 55 Hz / 55 Hz - 65 Hz | | |
| Total harmonic distortion (THDi, rated power) | < 3% (of rated power) | | |
| Power factor at Rated power / Adjustable power factor | > 0.99 / 0.8 leading to 0.8 lagging | | |
| **Backup(output)** | | | |
| Rated voltage | 3 / N / PE, 220 / 380 Va.c; 230 / 400 Va.c; 240 / 415 Va.c (± 2 %) | | |
| Rated current | 15.2A | | 18.2A |
| Inrush current [a.c.A] | 35A Peak, ≤50us | | |
| Maximum output fault current [a.c.A] | 70A Peak, ≤1ms | | |
| Frequency range | 50Hz / 60Hz | | |
| Total harmonic distortion (THDv, | 2% | | |

| | | | |
|---|---|---|---|
| rated power, Linear load) | | | |
| Back-up switching time | < 10 ms | | |
| Rated output power (off-grid mode) | 9999 VA | 10000 VA | 12000 VA |
| Peak output power (off-grid mode) ** | 16800 W / 168000 VA<br>10s | | |
| Max. output power (on-grid mode) | 43000 W / 43000 VA | | |
| Max. output current (on-grid mode) | 3*63A | | |
| **Efficiency** | | | |
| Max. / European efficiency | 98.0 % / 97.5 % | | |
| **Protection & Function** | | | |
| Parallel | Master-slave mode | | |
| Surge Protection | Type II , DC and AC | | |
| Overvoltage Category | II DC and III AC | | |
| Insulation monitoring | Yes | | |
| Grid monitoring | Yes | | |
| DC reverse polarity protection | Yes | | |
| AC short-circuit protection | Yes | | |
| Residual current protection | Yes | | |
| DC switch (PV) | Yes | | |
| Battery input reverse polarity protection | Yes | | |
| Over-heat protection | Yes | | |
| AFCI | OPT | | |
| Active anti-islanding method | Frequency shift | | |
| **General Data** | | | |
| Topology (PV / battery) | Transformerless / Transformerless | | |
| Degree of protection | IP66 | | |
| Dimensions (W * H * D) | 615 mm * 465 mm * 255 mm | | |
| Weight | 35 kg | | |
| Mounting method | Wall-mounting bracket | | |
| Operating ambient temperature range | -25 ℃ - 60 ℃（Derating above 45 ℃） | | |
| Allowable relative humidity range(Non-condensing) | 0% - 100% | | |
| Cooling method | Natural convection | | |
| Max. operating altitude | 2000m | | |
| Noise(Typical) | 35 dB ( A ) | | |
| Display | LED | | |
| Communication | 2 ×RS485, WLAN, 2 × CAN | | |
| DI / DO | 4 × DI, 2 × DO, DRM0 | | |
| DC connection type | MC4 ( PV，Max.6mm² )<br>Plug and play connector ( battery，Max.10mm² ) | | |
| AC connection type | OT Terminals (grid / backup，Max.26mm²) | | |
| **STANDARD** | | | |

| | |
|---|---|
| Safety | EN / IEC62109 - 1 / - 2 |
| EMC | EN61000 - 6 - 1 / 2 / 3 / 4 |
| Certification | VDE4105 / EN50549 / TOR / CEI0-21 / AS4777 |
| Country of manufacture | China |
| * Depending on the connected battery | |
| ** Can be reached only if PV and battery power is sufficient | |

| Type designation | SiH-14.9kW-TH | SiH-15kW-TH |
|---|---|---|
| **PV Input** | | |
| Max. recommended PV array power | 30000 Wp | |
| Max. PV voltage | 1000V | |
| Rated PV voltage | 650 V | |
| Start-up input voltage | 150 V | |
| MPP voltage range | 150 V- 950 V | |
| No. of MPPT / Strings per MPPT | 3 (2/1/1) | |
| Max. PV current | 64A (32A / 16A / 16 A) | |
| Max. short-circuit current | 80A (40A / 20A / 20A) | |
| Max. inverter backfeed current to the array[A] | 0 | |
| **Battery(input/output)** | | |
| Battery type | Lithium - ion | |
| Battery voltage range | 100 V - 800 V | |
| Max charge / discharge current | 50 A / 50 A * | |
| Max charge / discharge power | 30000 W / 14999 W | 30000 W / 15000 W |
| **Grid(input/output)** | | |
| Max. AC power from grid | 43000 W / 43000 VA | |
| Rated AC output power | 14999 VA | 15000 VA |
| Max. AC output power | 14999 VA | 15000 VA |
| Max. AC output current | 22.8 A | |
| Inrush current[a.c.A] | 35A Peak, ≤50us | |
| Maximum output fault current[a.c.A] | 70A Peak, ≤1ms | |
| Rated AC voltage | 3 / N / PE, 220 / 380 Va.c; 230 / 400 Va.c; 240 / 415 Va.c | |
| AC voltage range | 270 V - 480 V | |
| Rated grid frequency | 50 Hz / 60 Hz | |
| Grid frequency range | 45 Hz - 55 Hz / 55 Hz - 65 Hz | |
| Total harmonic distortion (THDi, rated power) | < 3% (of rated power) | |
| Power factor at Rated power / Adjustable power factor | > 0.99 / 0.8 leading to 0.8 lagging | |
| **Backup(output)** | | |
| Rated voltage | 3 / N / PE, 220 / 380 Va.c; 230 / 400 Va.c; 240 / 415 Va.c (± 2 %) | |
| Rated current | 22.8 A | |
| Inrush current[a.c.A] | 35A Peak, ≤50us | |

| | | |
|---|---|---|
| Maximum output fault current[a.c.A] | 70A Peak, ≤1ms | |
| Frequency range | 50Hz / 60Hz | |
| Total harmonic distortion (THDv, rated power, Linear load) | 2% | |
| Back-up switching time | < 10 ms | |
| Rated output power (off-grid mode) | 14999 VA | 15000 VA |
| Peak output power (off-grid mode) ** | 25500 W / 25500 VA<br>10s | |
| Max. output power (on-grid mode) | 43000 W / 43000 VA | |
| Max. output current (on-grid mode) | 3*63A | |
| **Efficiency** | | |
| Max. / European efficiency | 98.1 % / 97.6 % | |
| **Protection & Function** | | |
| Parallel | Master-slave mode | |
| Surge Protection | Type II , DC and AC | |
| Overvoltage Category | II DC and III AC | |
| Insulation monitoring | Yes | |
| Grid monitoring | Yes | |
| DC reverse polarity protection | Yes | |
| AC short-circuit protection | Yes | |
| Residual current protection | Yes | |
| DC switch (PV) | Yes | |
| Battery input reverse polarity protection | Yes | |
| Over-heat protection | Yes | |
| AFCI | OPT | |
| Active anti-islanding method | Frequency shift | |
| **General Data** | | |
| Topology (PV / battery) | Transformerless / Transformerless | |
| Degree of protection | IP66 | |
| Dimensions (W * H * D) | 615 mm * 465 mm * 255 mm | |
| Weight | 35 kg | |
| Mounting method | Wall-mounting bracket | |
| Operating ambient temperature range | -25 ℃ - 60 ℃（Derating above 45 ℃） | |
| Allowable relative humidity range(Non-condensing) | 0% - 100% | |
| Cooling method | Natural convection | |
| Max. operating altitude | 2000m | |
| Noise(Typical) | 35 dB ( A ) | |
| Display | LED | |
| Communication | 2 ×RS485, WLAN, 2 × CAN | |
| DI / DO | 4 × DI, 2 × DO, DRM0 | |
| DC connection type | MC4 ( PV， Max.6mm² ) | |

| | |
|---|---|
| | Plug and play connector ( battery，Max.10mm² ) |
| AC connection type | OT Terminals (grid / backup，Max.26mm²) |
| **STANDARD** | |
| Safety | EN / IEC62109 - 1 / - 2 |
| EMC | EN61000 - 6 - 1 / 2 / 3 / 4 |
| Certification | VDE4105 / EN50549 / TOR / CEI0-21 / AS4777 |
| Country of manufacture | China |
| * Depending on the connected battery | |
| ** Can be reached only if PV and battery power is sufficient | |

| Type designation | SiH-19.9kW-TH | SiH-20kW-TH | SiH-25kW-TH |
|---|---|---|---|
| **PV Input** | | | |
| Max. recommended PV array power | 40000 Wp | | 50000 Wp |
| Max. PV voltage | 1000V | | |
| Rated PV voltage | 650 V | | |
| Start-up input voltage | 150 V | | |
| MPP voltage range | 150 V- 950 V | | |
| No. of MPPT / Strings per MPPT | 3 (2/2/1) | | 3 (2/2/2) |
| Max. PV current | 80A (32A / 32A / 16A) | | 96A (32A / 32A / 32A) |
| Max. short-circuit current | 100A (40A / 40A / 20A) | | 120A (40A / 40A / 40A) |
| Max. inverter backfeed current to the array[A] | 0 | | |
| **Battery(input/output)** | | | |
| Battery type | Lithium - ion | | |
| Battery voltage range | 100 V - 800 V | | |
| Max charge / discharge current | 50 A / 50 A * | | 60 A / 60 A * |
| Max charge / discharge power | 30000 W / 19999 W | 30000 W / 20000 W | 30000 W / 25000 W |
| **Grid(input/output)** | | | |
| Max. AC power from grid | 43000 W / 43000 VA | | 55000 W / 55000 VA |
| Rated AC output power | 19999 VA | 20000 VA | 25000 VA |
| Max. AC output power | 19999 VA | 20000 VA | 25000 VA |
| Inrush current[a.c.A] | 70A Peak, ≤50us | | |
| Maximum output fault current[a.c.A] | 95A Peak, ≤1ms | | |
| Max. AC output current | 30.3 A | | 37.9 A |
| Rated AC voltage | 3 / N / PE, 220 / 380 Va.c; 230 / 400 Va.c; 240 / 415 Va.c | | |
| AC voltage range | 270 V - 480 V | | |
| Rated grid frequency | 50 Hz / 60 Hz | | |
| Grid frequency range | 45 Hz - 55 Hz / 55 Hz - 65 Hz | | |
| Total harmonic distortion (THDi, rated power) | < 3% (of rated power) | | |
| Power factor at Rated power / Adjustable power factor | > 0.99 / 0.8 leading to 0.8 lagging | | |

| | | | |
|---|---|---|---|
| **Backup(output)** | | | |
| Rated voltage | 3 / N / PE, 220 / 380 Va.c; 230 / 400 Va.c; 240 / 415 Va.c (± 2 %) | | |
| Rated current | 30.3 | | 37.9 |
| Inrush current[a.c.A] | 70A Peak, ≤50us | | |
| Maximum output fault current[a.c.A] | 95A Peak, ≤1ms | | |
| Frequency range | 50Hz / 60Hz | | |
| Total harmonic distortion (THDv, rated power, Linear load) | 2% | | |
| Back-up switching time | < 10 ms | | |
| Rated output power (off-grid mode) | 19999 VA | 20000 VA | 25000 VA |
| Peak output power (off-grid mode) ** | 32000 W / 32000 VA 10s | | 36500 W / 36500 VA 10s |
| Max. output power (on-grid mode) | 43000 W / 43000 VA | | 55000 W / 55000 VA |
| Max. output current (on-grid mode) | 3*63A | | 3*80A |
| **Efficiency** | | | |
| Max. / European efficiency | 98.1 % / 97.6 % | | 98.2 % / 97.8 % |
| **Protection & Function** | | | |
| Parallel | Master-slave mode | | |
| Surge Protection | Type II , DC and AC | | |
| Overvoltage Category | II DC and III AC | | |
| Insulation monitoring | Yes | | |
| Grid monitoring | Yes | | |
| DC reverse polarity protection | Yes | | |
| AC short-circuit protection | Yes | | |
| Residual current protection | Yes | | |
| DC switch (PV) | Yes | | |
| Battery input reverse polarity protection | Yes | | |
| Over-heat protection | Yes | | |
| AFCI | OPT | | |
| Active anti-islanding method | Frequency shift | | |
| **General Data** | | | |
| Topology (PV / battery) | Transformerless / Transformerless | | |
| Degree of protection | IP66 | | |
| Dimensions (W * H * D) | 615 mm * 465 mm * 255 mm | | |
| Weight | 36.5 kg | | 38 kg |
| Mounting method | Wall-mounting bracket | | |
| Operating ambient temperature range | -25 ℃ - 60 ℃（Derating above 45 ℃） | | |
| Allowable relative humidity range(Non-condensing) | 0% - 100% | | |
| Cooling method | Natural convection | | Fan cooling |
| Max. operating altitude | 2000m | | |
| Noise(Typical) | 35 dB ( A ) | | 55 dB ( A ) |

| | | | |
|---|---|---|---|
| Display | LED | | |
| Communication | 2 ×RS485, WLAN, 2 × CAN | | |
| DI / DO | 4 × DI, 2 × DO, DRM0 | | |
| DC connection type | MC4 ( PV， Max.6mm² )<br>Plug and play connector ( battery， Max.10mm² ) | | |
| AC connection type | OT Terminals (grid / backup， Max.26mm²) | | |
| **STANDARD** | | | |
| Safety | EN / IEC62109 - 1 / - 2 | | |
| EMC | EN61000 - 6 - 1 / 2 / 3 / 4 | | |
| Certification | VDE4105 / EN50549 / TOR / CEI0-21 / AS4777 | | |
| Country of manufacture | China | | |
| * Depending on the connected battery | | | |
| ** Can be reached only if PV and battery power is sufficient | | | |
| | | | |
| **Type designation** | **SiH-29.9kW-TH** | **SiH-30kW-TH** | |
| **PV Input** | | | |
| Max. recommended PV array power | 60000 Wp | | |
| Max. PV voltage | 1000V | | |
| Rated PV voltage | 650 V | | |
| Start-up input voltage | 150 V | | |
| MPP voltage range | 150 V- 950 V | | |
| No. of MPPT / Strings per MPPT | 3 (2/2/2) | | |
| Max. PV current | 96A (32A / 32A / 32A) | | |
| Max. short-circuit current | 120A (40A / 40A / 40A) | | |
| Max. inverter backfeed current to the array[A] | 0 | | |
| **Battery(input/output)** | | | |
| Battery type | Lithium - ion | | |
| Battery voltage range | 100 V - 800 V | | |
| Max charge / discharge current | 60 A / 60 A * | | |
| Max charge / discharge power | 30000 W / 29999 W | 30000 W / 30000 W | |
| **Grid(input/output)** | | | |
| Max. AC power from grid | 55000 W / 55000 VA | | |
| Rated AC output power | 29999 VA | 30000 VA | |
| Max. AC output power | 29999 VA | 30000 VA | |
| Max. AC output current | 45.5 A | | |
| Inrush current[a.c.A] | 70A Peak, ≤50us | | |
| Maximum output fault current[a.c.A] | 95A Peak, ≤1ms | | |
| Rated AC voltage | 3 / N / PE, 220 / 380 Va.c; 230 / 400 Va.c; 240 / 415 Va.c | | |
| AC voltage range | 270 V - 480 V | | |
| Rated grid frequency | 50 Hz / 60 Hz | | |
| Grid frequency range | 45 Hz - 55 Hz / 55 Hz - 65 Hz | | |
| Total harmonic distortion (THDi, | < 3% (of rated power) | | |

| | | | |
|---|---|---|---|
| rated power) | | | |
| Power factor at Rated power / Adjustable power factor | > 0.99 / 0.8 leading to 0.8 lagging | | |
| **Backup(output)** | | | |
| Rated voltage | 3 / N / PE, 220 / 380 Va.c; 230 / 400 Va.c; 240 / 415 Va.c (± 2 %) | | |
| Rated current | 45.5 A | | |
| Inrush current[a.c.A] | 70A Peak, ≤50us | | |
| Maximum output fault current[a.c.A] | 95A Peak, ≤1ms | | |
| Frequency range | 50Hz / 60Hz | | |
| Total harmonic distortion (THDv, rated power, Linear load) | 2% | | |
| Back-up switching time | < 10 ms | | |
| Rated output power (off-grid mode) | 29999 VA | 30000 VA | |
| Peak output power (off-grid mode) ** | 45000 W / 45000 VA 10s | | |
| Max. output power (on-grid mode) | 55000 W / 55000 VA | | |
| Max. output current (on-grid mode) | 3*80A | | |
| **Efficiency** | | | |
| Max. / European efficiency | 98.2 % / 97.8 % | | |
| **Protection & Function** | | | |
| Parallel | Master-slave mode | | |
| Surge Protection | Type II , DC and AC | | |
| Overvoltage Category | II DC and III AC | | |
| Insulation monitoring | Yes | | |
| Grid monitoring | Yes | | |
| DC reverse polarity protection | Yes | | |
| AC short-circuit protection | Yes | | |
| Residual current protection | Yes | | |
| DC switch (PV) | Yes | | |
| Battery input reverse polarity protection | Yes | | |
| Over-heat protection | Yes | | |
| AFCI | OPT | | |
| Active anti-islanding method | Frequency shift | | |
| **General Data** | | | |
| Topology (PV / battery) | Transformerless / Transformerless | | |
| Degree of protection | IP66 | | |
| Dimensions (W * H * D) | 615 mm * 465 mm * 255 mm | | |
| Weight | 38 kg | | |
| Mounting method | Wall-mounting bracket | | |
| Operating ambient temperature range | -25 ℃ - 60 ℃（Derating above 45 ℃） | | |
| Allowable relative humidity range (Non-condensing) | 0% - 100% | | |

| | | | |
|---|---|---|---|
| Cooling method | Fan cooling | | |
| Max. operating altitude | 2000m | | |
| Noise(Typical) | 55 dB ( A ) | | |
| Display | LED | | |
| Communication | 2 ×RS485, WLAN, 2 × CAN | | |
| DI / DO | 4 × DI, 2 × DO, DRM0 | | |
| DC connection type | MC4 ( PV， Max.6mm² )<br>Plug and play connector ( battery， Max.10mm² ) | | |
| AC connection type | OT Terminals (grid / backup， Max.26mm²) | | |
| **STANDARD** | | | |
| Safety | EN / IEC62109 - 1 / - 2 | | |
| EMC | EN61000 - 6 - 1 / 2 / 3 / 4 | | |
| Certification | VDE4105 / EN50549 / TOR / CEI0-21 / AS4777 | | |
| Country of manufacture | China | | |
| * Depending on the connected battery | | | |
| ** Can be reached only if PV and battery power is sufficient | | | |
| | | | |
| **Type designation** | **SiH-40kW-TH** | **SiH-50kW-TH** | |
| **PV Input** | | | |
| Max. recommended PV array power | 60000 Wp | | |
| Max. PV voltage | 1000V | | |
| Rated PV voltage | 650 V | | |
| Start-up input voltage | 150 | | |
| MPP voltage range | 150 V- 950 V | | |
| No. of MPPT / Strings per MPPT | 3 (2/2/2) | | |
| Max. PV current | 96A (32A / 32A / 32A) | | |
| Max. short-circuit current | 120A (40A / 40A / 40A) | | |
| Max. inverter backfeed current to the array[A] | 0 | | |
| **Battery(input/output)** | | | |
| Battery type | Lithium - ion | | |
| Battery voltage range | 100 V - 800 V | | |
| Max charge / discharge current | 60 A / 60 A * | 65 A / 65 A * | |
| Max charge / discharge power | 40000 W / 40000 W | 50000 W / 50000 W | |
| **Grid(input/output)** | | | |
| Max. AC power from grid | 55000 W / 55000 VA | | |
| Rated AC output power | 40000 VA | 50000 VA | |
| Max. AC output power | 40000 VA | 50000 VA | |
| Max. AC output current | 60.6 A | 75.8A | |
| Inrush current[a.c.A] | 115A Peak, ≤50us | | |
| Maximum output fault current[a.c.A] | 160A Peak, ≤1ms | | |
| Rated AC voltage | 3 / N / PE, 220 / 380 Va.c; 230 / 400 Va.c; 240 / 415 Va.c | | |
| AC voltage range | 270 V - 480 V | | |

| | | | |
|---|---|---|---|
| Rated grid frequency | 50 Hz / 60 Hz | | |
| Grid frequency range | 45 Hz - 55 Hz / 55 Hz - 65 Hz | | |
| Total harmonic distortion (THDi, rated power) | < 3% (of rated power) | | |
| Power factor at Rated power / Adjustable power factor | > 0.99 / 0.8 leading to 0.8 lagging | | |
| **Backup(output)** | | | |
| Rated voltage | 3 / N / PE, 220 / 380 Va.c; 230 / 400 Va.c; 240 / 415 Va.c (± 2 %) | | |
| Rated current | 60.6 | 75.8 | |
| Inrush current[a.c.A] | 115A Peak, ≤50us | | |
| Maximum output fault current[a.c.A] | 160A Peak, ≤1ms | | |
| Frequency range | 50Hz / 60Hz | | |
| Total harmonic distortion (THDv, rated power, Linear load) | 2% | | |
| Back-up switching time | < 10 ms | | |
| Rated output power (off-grid mode) | 40000 VA | 50000 VA | |
| Peak output power (off-grid mode) ** | 60000 W / 60000 VA | 70000 W / 70000 VA | |
| Max. output power (on-grid mode) | 55000 W / 55000 VA | | |
| Max. output current (on-grid mode) | 3*80A | | |
| **Efficiency** | | | |
| Max. / European efficiency | 98.2 % / 97.9 % | | |
| **Protection & Function** | | | |
| Parallel | Master-slave mode | | |
| Surge Protection | Type II , DC and AC | | |
| Overvoltage Category | II DC and III AC | | |
| Insulation monitoring | Yes | | |
| Grid monitoring | Yes | | |
| DC reverse polarity protection | Yes | | |
| AC short-circuit protection | Yes | | |
| Residual current protection | Yes | | |
| DC switch (PV) | Yes | | |
| Battery input reverse polarity protection | Yes | | |
| Over-heat protection | Yes | | |
| AFCI | OPT | | |
| Active anti-islanding m | Frequency shift | | |
| **General Data** | | | |
| Topology (PV / battery) | Transformerless / Transformerless | | |
| Degree of protection | IP66 | | |
| Dimensions (W * H * D) | 615 mm * 465 mm * 255 mm | | |
| Weight | 39.5 kg | 39.8 kg | |
| Mounting method | Wall-mounting bracket | | |

| | | | |
|---|---|---|---|
| Operating ambient temperature range | -25 ℃ - 60 ℃（Derating above 45 ℃） | | |
| Allowable relative humidity range (Non-condensing) | 0% - 100% | | |
| Cooling method | Fan cooling | | |
| Max. operating altitude | 2000m | | |
| Noise(Typical) | 55 dB ( A ) | 60 dB ( A ) | |
| Display | LED | | |
| Communication | 2 ×RS485, WLAN, 2 × CAN | | |
| DI / DO | 4 × DI, 2 × DO, DRM0 | | |
| DC connection type | MC4 ( PV，Max.6mm² )<br>Plug and play connector ( battery，Max.10mm² ) | | |
| AC connection type | OT Terminals (grid / backup，Max.26mm²) | | |
| **STANDARD** | | | |
| Safety | EN / IEC62109 - 1 / - 2 | | |
| EMC | EN61000 - 6 - 1 / 2 / 3 / 4 | | |
| Certification | VDE4105 / EN50549 / TOR / CEI0-21 / AS4777 | | |
| Country of manufacture | China | | |
| * Depending on the connected battery | | | |
| ** Can be reached only if PV and battery power is sufficient | | | |