



**STEALTH**  
ENERGY

# User Manual

ST-INV-S Series  
PV Energy Storage Grid-  
connected Inverter





# User Manual

## About this manual

S T E A L T H

This manual mainly introduces the product information, installation, operation and maintenance guidelines of the inverter, and does not include all the information of the photovoltaic system. You can log on to [www.stealthenergy.cn](http://www.stealthenergy.cn) or the website of the equipment manufacturer for more information.

### Scope of application

This manual is applicable to the following models of low-power string photovoltaic grid-connected inverters:

- ST-INV-S3.0
- ST-INV-S3.68
- ST-INV-S4.0
- ST-INV-S5.0

Unless otherwise specified, hereinafter referred to as "inverter".

### To the reader

This manual is intended for professional technicians who install, operate and maintain the inverter, as well as end users who need to view inverter information.

### Manual use

Please read the manual carefully before using the product, and keep the manual in a place where it is easily accessible.

The contents of the manual and the pictures, logos, symbols, etc. used are owned by Suzhou Stealth Energy Technology Co., Ltd. Persons who are not staff of the company are not allowed to publicly reproduce all or part of the content without written authorization.

The content of the manual will be continuously updated and revised, and users can obtain the latest version of the manual via [www.stealthenergy.cn](http://www.stealthenergy.cn) or through their sales channels.

## Change history

Below are the historical changes from previous versions of the manual. The latest document contains all changes made in previous versions.

### V1.2 (2023-02-20)

- Update 9.2 technical data.

PV input: maximum input current (Ad.c.) and maximum short-circuit current (Ad.c.)

### V1.1 (2021-10-20)

This version is the first formal version.

## Symbol use

In order to ensure the personal and property safety of users when using the product, and to use the product more efficiently and optimally, the manual provides relevant safety information, which is highlighted by the following symbols.

Please take careful note of the meaning of the warning symbols so that you can minimize all risks.

| Symbol                                                                            | Description                                                                                                                  |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
|   | High potential risk which, if not avoided, will result in death or serious injury.                                           |
|   | Moderate potential risk which, if not avoided, could result in death or serious injury.                                      |
|   | Low potential risk which, if not avoided, could result in moderate or minor injury.                                          |
|   | Potential risk which, if not avoided, could result in failure of the equipment in normal operation or property damage.       |
|  | It emphasizes and complements content, or provides tips on using the product that can help you solve a problem or save time. |

## Table of contents

|                                                          |           |
|----------------------------------------------------------|-----------|
| <b>1 Safety instruction</b>                              | <b>1</b>  |
| 1.1 General safety instruction                           | 1         |
| 1.2 Inverter                                             | 2         |
| 1.3 Skill requirements for professional technicians      | 3         |
| <b>2 Product description</b>                             | <b>4</b>  |
| 2.1 PV energy storage grid-connected system              | 4         |
| 2.2 Product introduction                                 | 5         |
| 2.2.1 Model description                                  | 5         |
| 2.2.2 Product appearance                                 | 5         |
| 2.2.3 Dimension and weight                               | 6         |
| 2.2.4 LED indicator                                      | 6         |
| 2.3 Function description                                 | 7         |
| 2.4 Working mode                                         | 8         |
| <b>3 Unpacking and storage</b>                           | <b>11</b> |
| 3.1 Unpacking inspection                                 | 11        |
| 3.2 Identifying inverter                                 | 11        |
| 3.3 Shipping list                                        | 12        |
| 3.4 Inverter storage                                     | 12        |
| <b>4 Mechanical installation</b>                         | <b>13</b> |
| 4.1 Installation precautions                             | 13        |
| 4.2 Choose the installation site                         | 13        |
| 4.3 Installation tools and parts                         | 16        |
| 4.4 Installation of inverter                             | 17        |
| <b>5 Electrical connection</b>                           | <b>19</b> |
| 5.1 Terminal introduction                                | 20        |
| 5.2 Overview of electrical connection                    | 21        |
| 5.3 Ground connection                                    | 22        |
| 5.4 Grid and Back-up connection                          | 23        |
| 5.4.1 AC side requirements                               | 23        |
| 5.4.2 Assembling the cable to the AC & Back-up connector | 24        |
| 5.4.3 Installation of AC connector                       | 25        |

|                                                   |           |
|---------------------------------------------------|-----------|
| 5.5 PV string connection                          | 27        |
| 5.5.1 PV input device                             | 27        |
| 5.5.2 Assembling the cable to the PV connector    | 29        |
| 5.5.3 Installing the PV connector                 | 30        |
| 5.6 Battery cable connection                      | 31        |
| 5.6.1 Requirements on the battery side            | 31        |
| 5.6.2 Assembling the cable to the Bat connector   | 32        |
| 5.6.3 Installing the Bat connector                | 33        |
| 5.7 WIFI communication connection                 | 34        |
| 5.8 Meter connection                              | 34        |
| 5.9 DRED connection                               | 36        |
| 5.10 BMS connection                               | 37        |
| <b>6 Test run</b>                                 | <b>38</b> |
| 6.1 Inspection before test run                    | 38        |
| 6.2 Test run steps                                | 38        |
| <b>7 Decommissioning, removing and discarding</b> | <b>39</b> |
| 7.1 Decommissioning inverter                      | 39        |
| 7.2 Removing inverter                             | 40        |
| 7.3 Discarding inverter                           | 40        |
| <b>8 Troubleshooting and maintenance</b>          | <b>41</b> |
| 8.1 Troubleshooting                               | 41        |
| 8.1.1 Troubleshooting displayed in APP            | 41        |
| 8.2 Daily maintenance                             | 44        |
| <b>9 Appendix</b>                                 | <b>45</b> |
| 9.1 Confirmation before contact                   | 45        |
| 9.2 Technical data                                | 45        |
| 9.3 Quality assurance                             | 48        |



# 1 Safety instruction

The inverter is strictly designed and tested in accordance with relevant international safety standards. As a piece of electrical and electronic equipment, it is necessary to comply with relevant safety specifications during installation, testing, operation and maintenance. Unreasonable use or maloperation may result in:

- Danger to life and personal safety of the operator or third party
- Damage to the inverter or other property belonging to the operator/third party

In order to avoid casualties, damage to the inverter or other equipment, please strictly adhere to the following safety precautions. The specific precautions during the operation will be explained in the corresponding chapters.

## 1.1 General safety instruction

PV panel

Please follow the various instructions for PV panels.



### DANGER

Fatal voltage danger!

Exposure of PV strings to sunlight will generate dangerous voltages.

Since the energy storage battery system may cause the danger of electric shock and short circuit, in order to avoid possible accidents, all electrical connections must be completed only by professional technicians.

Utility grid

Please follow the connection rules of local grid.

### NOTICE

All electrical connections must meet local and national electrical codes.

The inverter can only be connected to the grid with permission from the local electric power department.

## 1.2 Inverter

The warning signs and descriptions on the inverter are shown in the table below:



CE certified.



TUV certified.



RCM certified



Watch out! Potential danger, please do not operate powered on!



After the inverter is disconnected from all external power sources, wait at least 5 minutes before touching live devices.



The surface is hot, be careful of burns! To avoid burns, do not touch the surface of the machine while it is running.



Danger of high voltage!

Installation and operation can only be performed by qualified professionals.



Please read the manual before performing any operation on the inverter.



The inverter cannot be disposed of together with the household waste. Disposal information can be found in the enclosed documentation.

**DANGER**

**Danger of electric shock!**

Only the intact and closed enclosure can protect the safety of people and property. Do not open the enclosure of the inverter when it is working or powered on, otherwise Stealth Energy will not be held responsible.

**WARNING**

**Danger of damage to the inverter or personal injury!**

When the inverter is working, it is forbidden to plug or unplug the PV connector, AC connector and Bat connector.

All safety signs, warning labels and nameplates on the inverter must be clearly visible and cannot be removed or covered.

**Caution**

**Danger of burns!**

When the inverter is running, only touch the LED indicator and the DC switch. It is strictly forbidden to touch the hot parts (such as radiator, etc.) of the equipment during operation.

**Notice**

Country selection and protection parameters of the inverter must be set by professional technicians according to local power grid standards. The wrong country setting may affect the normal operation of the inverter, causing the inverter to be inconsistent with the certification in the country.

Touching printed circuit boards or other static-sensitive components may cause damage to the device.

- Avoid unnecessary circuit board contact.
- Comply with electrostatic protection regulations and wear anti-static wristbands.

### 1.3 Skill requirements for professional technicians

All installations must be performed only by professional technicians. Professional technicians must:

- Receive special training;
- Read this manual completely and master the operation-related safety matters;
- Be familiar with local standards and relevant safety codes for electrical systems.



| No. | Name            | Description                                                                                            |
|-----|-----------------|--------------------------------------------------------------------------------------------------------|
| A   | PV string       | Monocrystalline silicon, polycrystalline silicon, thin-film batteries that do not need to be grounded. |
| B   | Inverter        | ST-INV-S5.0                                                                                            |
| C   | Metering device | Standard metering tool for inverter output energy.                                                     |
| D   | Grid            | Grounding type: TT, TN.                                                                                |
| E   | Household loads | Household appliances that consume electrical energy.                                                   |
| F   | Important loads | Important loads that cannot be suddenly cut off.                                                       |
| G   | Battery system  | Battery and BMS system components.                                                                     |

### Notice

For TT-type grids, the neutral-to-ground voltage must be less than 30V.

Do not connect local loads, such as household appliances, lighting and motor loads, between the inverter and the AC circuit breaker.

## 2.2 Product introduction

### 2.2.1 Model description

Take ST-INV-S5.0 for example:

ST - INV - S 5.0

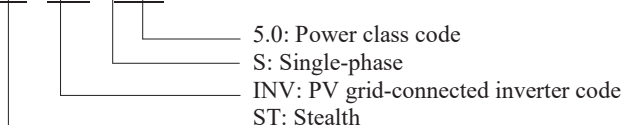


Table 2-1 Power description

| Model        | Rated output | Rated grid voltage |
|--------------|--------------|--------------------|
| ST-INV-S3.0  | 3000VA       | 230V a.c.          |
| ST-INV-S3.68 | 3680VA       |                    |
| ST-INV-S4.0  | 4000VA       |                    |
| ST-INV-S5.0  | 4991VA       |                    |

### 2.2.2 Product appearance

The following illustrations are for reference only, please refer to the actual product!



Fig. 2-2 Inverter appearance (ST-INV-S5.0 shown)

2.2.3 Dimension and weight

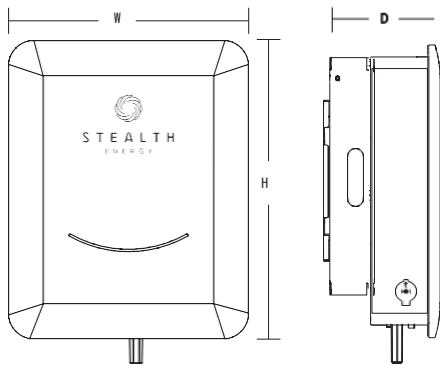


Fig. 2-3 Inverter size marking (unit: mm)

| Model        | Width (mm) | Height (mm) | Depth (mm) | Net weight (kg) |
|--------------|------------|-------------|------------|-----------------|
| ST-INV-S3.0  | 411        | 505         | 195        | 18.6            |
| ST-INV-S3.68 |            |             |            |                 |
| ST-INV-S4.0  |            |             |            |                 |
| ST-INV-S5.0  |            |             |            |                 |

2.2.4 LED indicator

As a human-machine interface, LED indicators are located on the front of the inverter. By observing the flashing color and speed of the indicator, the user can obtain the current working status of the inverter. Please refer to Table 6-1 for the description of indicator status.



Fig. 2-4 LED indicator

## 2.3 Function description

The functions of the inverter can be summarized as follows:

- Inversion

The inverter converts direct current to alternating current that meets the requirements of the grid in the region where the inverter is installed and feeds it into the grid.

- Data storage

The inverter stores system information, such as running information and fault records.

- Parameter configuration

The inverter provides a variety of parameter configurations to meet various demands or to adjust its operating performance to its optimal settings. Users can view the information of inverter through the mobile App. For more professional configuration, please contact Stealth after-sales service.

- Communication interface

It can be connected to the WiFi communication data acquisition module to realize the communication function and connect the monitoring equipment with the entire photovoltaic energy storage system.

- Protection

The inverter has protection functions such as short-circuit protection, insulation resistance grounding monitoring, residual current protection, anti-islanding protection, and DC overvoltage/overcurrent protection.

## 2.4 Working mode

Stealth ST-INV-S3.0, ST-INV-S3.68, ST-INV-S4.0 and ST-INV-S5.0 series, also known as hybrid or bidirectional solar inverters, are suitable for solar systems with PV, battery, load and grid systems for energy management. The energy generated by the photovoltaic system is first used to provide the load, the excess power can be used to charge the battery, and the remaining power can be used for grid connection. When the PV power is insufficient to meet the requirements, the battery should be discharged to support the load consumption. If both photovoltaic power and battery power are insufficient, the system will use grid power to support the load.

### Notice

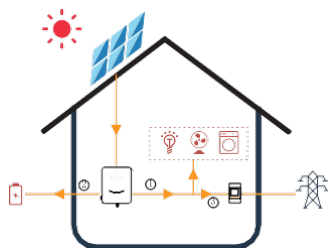
The above introduction describes the general working mode of a photovoltaic system. The operation mode can be adjusted according to the system layout on the Stealth Cloud App. The followings are the general operation modes of photovoltaic energy storage systems.

### Operation Mode Introduction

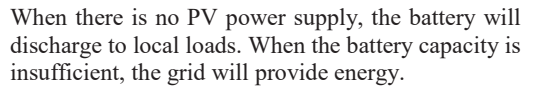
Depending on your configuration and layout conditions, PV energy storage systems generally have the following modes of operation:

#### MODE \_ I Self Use

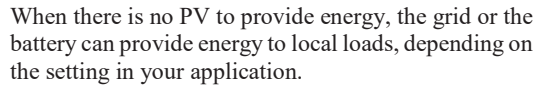
The energy of the PV system will be first used for local loads (self-consumption). Excess energy will be used to charge the battery, and the remaining energy will be outputted to the grid.

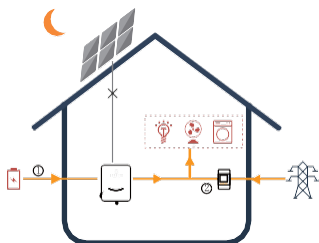


# STEALTH



The energy of the PV system will be first used for local loads, and then exported to public grid. Excess power will be used to charge the battery.





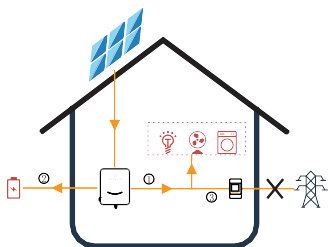
### MODE\_III Backup mode

The battery can be charged by the grid, and the charging time/power can be set flexibly on the application.

---

### MODE\_IV Off-grid mode

When the grid is off, the system will provide energy to important loads through PV or battery. (Battery is required in EPS mode.)



## Notice

In the case of grid connection, all working modes work normally when the battery SOC > 10%. When the battery SOC < 10%, the PV or Grid will first charge the battery to SOC 15%, and then return to the working mode selected by the user.

### 3.1 Unpacking inspection

- Check the packing box for damage.
- According to the packing list, check whether the goods are complete and in accordance with the order.
- Unpack and check whether the internal equipment is in good condition.

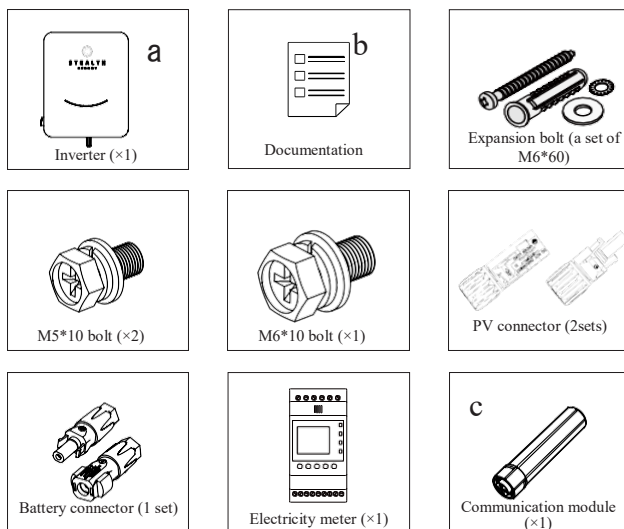
Do not discard the original packaging of the inverter. It is best to store the inverter in the original box after it is out of service and removed.

The nameplate of the inverter is attached to the side of the body.

| Icon                                                                                                                                                                | Description                                                                                                               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
|                                                                                    | Watch out for danger, please do not operate with electricity!                                                             |
|   | After the inverter is disconnected from all external power sources, wait at least 5 minutes before touching live devices. |
|                                                                                    | The surface is hot, be careful of burns! To avoid burns, do not touch the surface of the machine while it is running.     |
|                                                                                   | Please read the instructions before performing any operation on the inverter.                                             |
|                                                                                  | The inverter cannot be disposed of together with the household waste.                                                     |
|                                                                                  | CE certified                                                                                                              |
|                                                                                  | TÜV certified                                                                                                             |

Table 3-1 Description of nameplate

## 3.3 Shipping list



### 3-3 Shipping list

- Unless otherwise specified, the inverter diagrams in this document are illustrations for ST-INV-S5.0.
- Documentation includes quick use manual, certificate of conformity, packing list and product test report.
- The WiFi communication module may be standard or optional, subject to the actual delivery.

## 3.4 Inverter storage

If the inverter is not immediately put into operation, the inverter needs to be stored in specific environmental conditions:

- Repack in the original box, keep the desiccant.
- Storage temperature range: -25°C~60°C, relative humidity range: 0~100%, no condensation.
- The maximum number of stacked layers of multiple inverters does not exceed 8.
- The packing box cannot be tilted or inverted.

## 4 Mechanical installation

### 4.1 Installation precautions



#### Danger

Before installing the inverter, make sure that the inverter has no electrical connection. Before drilling, make sure to keep away from the water and electricity wiring in the wall to avoid danger!



#### Caution

Improper handling may result in personal injury!

The instructions in the manual must be followed when handling and placing the equipment. Poor ventilation in the installation environment will affect system performance!

- It is necessary to ensure good ventilation during the operation of the equipment.
- The equipment must be kept upright and the radiator uncovered to ensure adequate cooling inside the equipment.

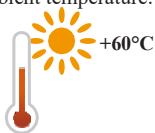
### 4.2 Choose the installation site

The inverter is IP65 rated and can be installed indoors or outdoors.

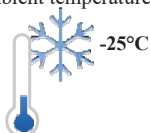
Choosing the best installation site for the inverter plays a very important role in its safe operation, life assurance, and performance assurance.

- The installation wall must have the ability to support at least 4 times the weight of the inverter.
- The installation site should be easy for electrical connection, operation and maintenance.
- Do not install the inverter in the living area. The operation of the inverter generates certain noise, which may affect daily life.
- Do not install the inverter at a place where children can reach.
- The installation environment must meet the following conditions:

Max ambient temperature:



Min ambient temperature:



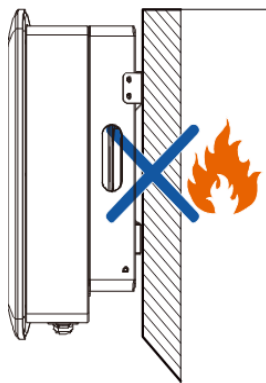
Max relative humidity:



- The installation wall must have fire resistance, and there must be no flammable materials or flammable gases in the installation space.

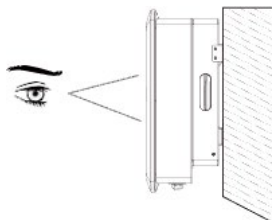


Wall material is flammable



Flammable materials or gases are found near the installation site

- The installation height should be easy for observing the LED indicator. Install vertically for better heat dissipation.



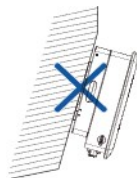
- Do not install obliquely, horizontally or inversely.

Inclined forward

Inclined backward

Horizontal

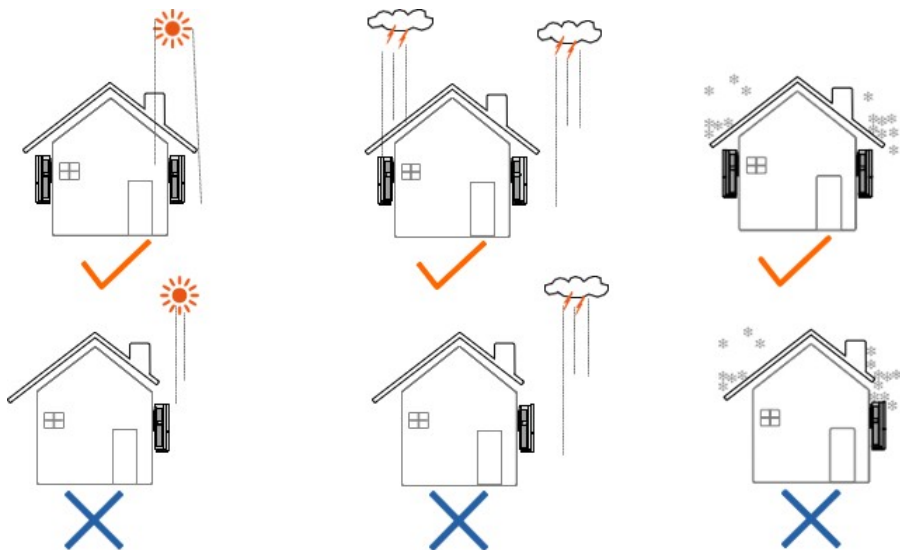
Inverse



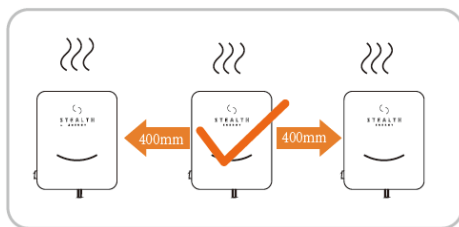
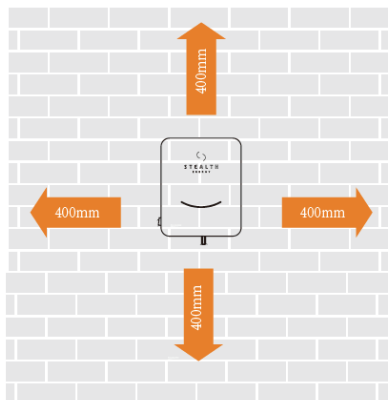
### Notice

The inverter cannot be installed horizontally, otherwise the equipment will be damaged.

- Avoid direct sunlight, rain and snow, and it is best to choose a sheltered installation site, which can prolong the service life of the equipment.



- Reserve enough space during installation to facilitate air convection around the inverter and subsequent maintenance.



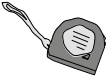
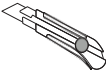
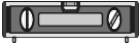
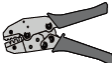
- When multiple rows of inverters are installed, the distance between two adjacent rows is required to be at least 400mm.

## Notice

It is very important to ensure smooth ventilation and heat dissipation of the inverter. Please install the inverter in a ventilated environment. Do not install the inverter in a closed box, otherwise it will affect the power generation of the inverter.

4.3 Installation tools and parts

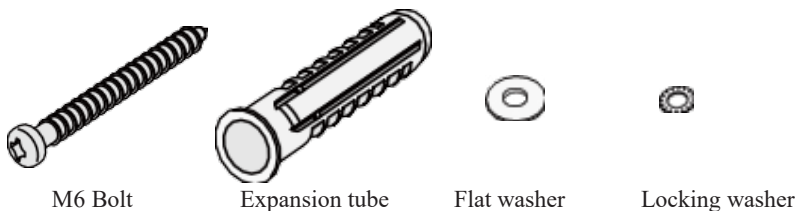
Installation tools include, but are not limited to, the tools recommended below. When necessary, other aids can be used on site.

| Type               | Tools                                                                                                     |                                                                                                                     |                                                                                                                |                                                                                                           |
|--------------------|-----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| General tools      | Tape<br>                 | Marker pen<br>                     | Tape ruler<br>                | Knife<br>                |
|                    | Multimeter (≥ 1100V)<br> | Protective suit<br>                | Anti-static bracelet<br>      | Protective gloves<br>    |
|                    | Dust mask<br>            | Anti-noise earplug<br>             | Safety goggles<br>            | Insulated shoes<br>      |
|                    | Vacuum cleaner<br>       | Spirit level<br>                   |                                                                                                                |                                                                                                           |
|                    |                                                                                                           |                                                                                                                     |                                                                                                                |                                                                                                           |
| Installation tools | Impact drill: φ10<br>    | Rubber hammer<br>                  | Electric screwdriver<br>      | Cross screwdriver<br>    |
|                    | Wire stripper<br>       | Hydraulic clamp<br>               | Crimping pliers 2.5-6mm²<br> | MC4 Terminal wrench<br> |
|                    | Wire cutters<br>       | Crystal head crimping pliers<br> |                                                                                                                |                                                                                                           |

## 4.4 Installation of inverter

After transporting the inverter to the installation site, install the hanging plate onto the wall with expansion bolt assembly and then hang the inverter on the hanging plate.

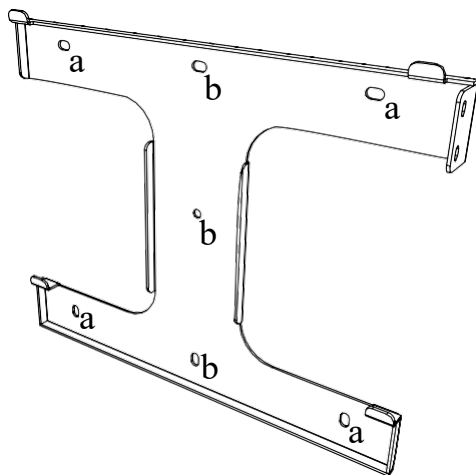
The expansion bolt assembly is shown in the figure below.



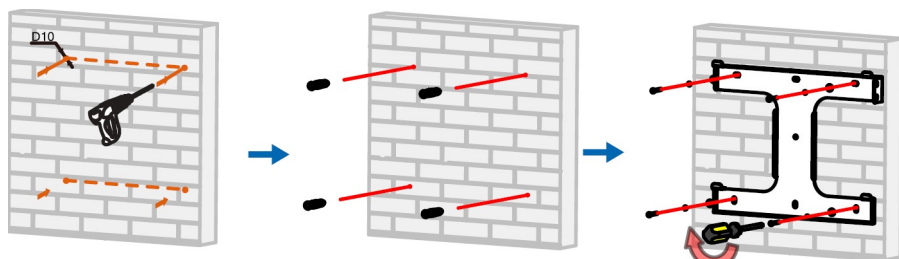
Installation steps:

1. Place the hanging plate on the wall horizontally and mark the positions for drilling holes on the wall with hole a.

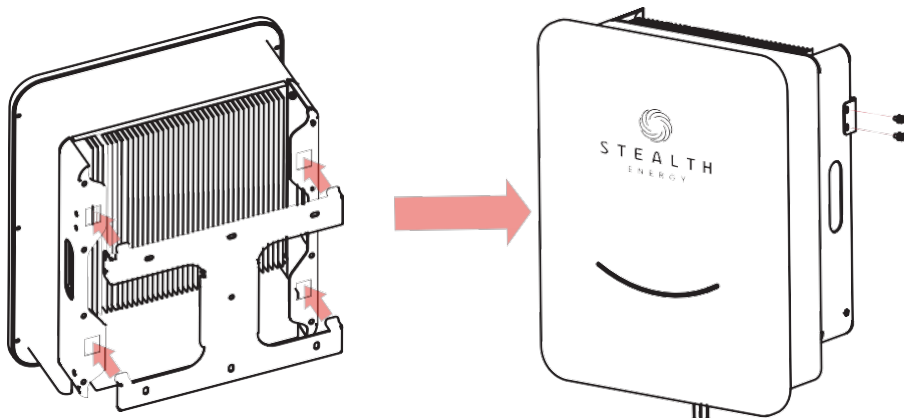
Tip: When installing on the pillar, please use hole b in the vertical direction of the hanging plate.



2. Drill holes (with a depth of about 70mm) and install the hanging plate.



3. Lift up the inverter, hang the hanging loop on the back onto the hanging plate. Use 2 M5x10 screws to fasten the inverter to the hanging plate with a torque of 1.5Nm.



## 5 Electrical connection

Personal protective equipment must be worn when working on electrical wiring.



### Danger

There may be high voltage in the inverter!

Pay attention to safety before making electrical connections. Exposure of PV strings to sunlight will generate dangerous voltages.

Make sure all cables are de-energized before making electrical connections, and do not close the AC circuit breaker until electrical connections are completed.



### Warning

Any improper operation during wiring may result in equipment damage or casualties. Wiring must be done only by professional technicians.

Cables used in photovoltaic power generation systems must be firmly connected, undamaged, well insulated, and of appropriate size.

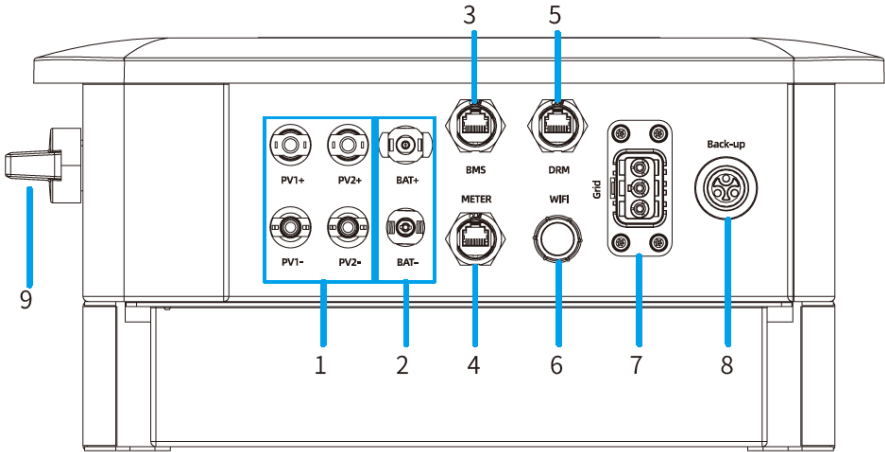
### Notice

The relevant rules of the local power grid and the relevant safety instructions for PV strings and battery systems must be followed. All electrical installations must comply with the electrical standards of the country/region in which they are located.

Connect the inverter to the grid only with permission from the local electric power department.

5.1 Terminal introduction

The external wiring terminals are located at the bottom of the inverter, as shown in the figure below. The picture is for reference only, please refer to the actual product!



| No. | Wiring terminal              | Description                                               |
|-----|------------------------------|-----------------------------------------------------------|
| 1   | PV terminal                  | Used to connect PV strings, with 2 pairs of PV terminals. |
| 2   | BAT terminal                 | Used to connect energy storage battery.                   |
| 3   | BMS communication terminal   | Used to connect battery management system.                |
| 4   | METER communication terminal | Used to connect electricity meter.                        |
| 5   | DRM terminal                 | Electricity demand response mode function                 |
| 6   | WIFI terminal                | Used to connect WiFi module.                              |
| 7   | AC terminal                  | Connected to grid.                                        |
| 8   | EPS terminal                 | Connected to key load.                                    |
| 9   | PV switch                    | Control on/off of PV.                                     |

Notice

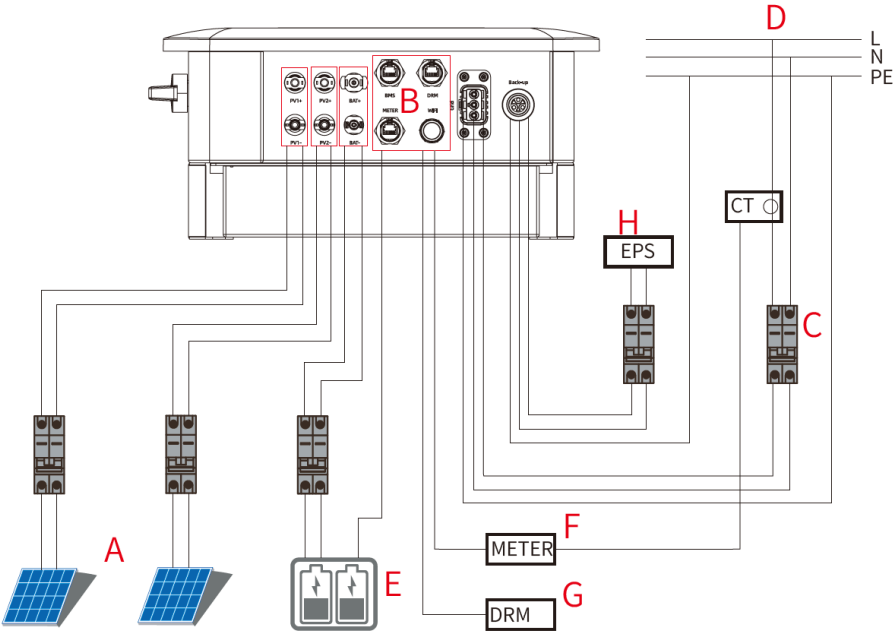
The inverters sold to Australia and New Zealand are not provided with PV switch. External isolation equipment of the PV array port shall conform to the requirements of the additional external circuit breaker specified in AS/NZS 4777.1.

5.2 Overview of electrical connection

The connection of inverter to PV energy storage system includes: grid connection, photovoltaic string connection, battery connection, WiFi module connection and RJ45 terminal connection.

When multiple inverters are connected to the grid in parallel, the number of parallel machines on each phase and the grid impedance requirements are as follows.

| Model        | No. of single-phase parallel machines | Power grid impedance requirements | Remarks                                                                                              |
|--------------|---------------------------------------|-----------------------------------|------------------------------------------------------------------------------------------------------|
| ST-INV-S3.0  | $\leq 30$                             | $< 49\text{m}\Omega$              | If the number of parallel machines exceeds 8, please contact Stealth technical staff for evaluation. |
| ST-INV-S3.68 | $\leq 30$                             | $< 49\text{m}\Omega$              |                                                                                                      |
| ST-INV-S4.0  | $\leq 30$                             | $< 49\text{m}\Omega$              |                                                                                                      |
| ST-INV-S5.0  | $\leq 30$                             | $< 29\text{m}\Omega$              |                                                                                                      |



| No. | Name                                   | Remarks                                                                              |
|-----|----------------------------------------|--------------------------------------------------------------------------------------|
| A   | PV strings                             | ST-INV-S3.0, ST-INV-S3.68, ST-INV-S4.0 and ST-INV-S5.0, with 2 pairs of PV terminals |
| B   | Communication module                   | Ethernet port and WIFI module.                                                       |
| C   | AC circuit breaker                     | Electrical connection protection device (not included in the shipping list)          |
| D   | Grid                                   | Rated voltage is 230Vac.                                                             |
| E   | External energy storage battery system | Include batteries and BMS.                                                           |
| F   | Electricity meter                      | Used for electric energy management.                                                 |
| G   | DRM                                    | The demand of Australian grid.                                                       |
| H   | EPS                                    | Connect important loads.                                                             |

### 5.3 Ground connection



#### Warning

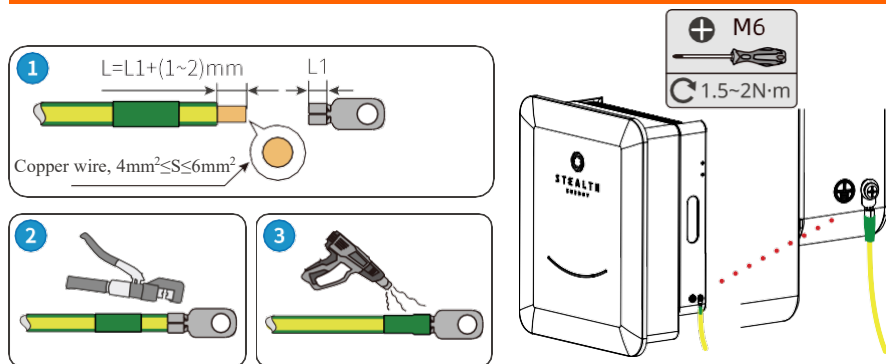
The protective grounding of the machine enclosure cannot replace the protective grounding wire of the AC output port. When wiring, ensure that the protective grounding wires at the two places are reliably connected.

When there are multiple inverters, ensure that the protective grounding points of enclosures of all inverters are done with equipotential connection.

To improve the corrosion resistance of the terminal, it is recommended to apply silicone or paint to the outside of the grounding terminal for protection after the protective grounding wire connection is completed.

Please prepare protective grounding wires of the following recommended specifications:

- Type: Outdoor single-core copper wire
- Conductor cross-sectional area:  $4\text{mm}^2 \leq S \leq 6\text{mm}^2$



## 5.4 Grid and Back-up connection

The inverter is connected to the power grid through “L” (live wire), “N” (neutral wire) and “PE” (grounding wire).

### 5.4.1 AC side requirements

#### AC circuit breaker

In order to ensure that the inverter can be safely disconnected under load, an independent two-pole AC circuit breaker must be configured for each inverter as a protective device.

The specifications of recommended AC circuit breaker for different models of inverters are shown in the table below.

| Model        | Recommended specification |
|--------------|---------------------------|
| ST-INV-S3.0  | 32A                       |
| ST-INV-S3.68 | 32A                       |
| ST-INV-S4.0  | 32A                       |
| ST-INV-S5.0  | 50A                       |

#### Leakage current protector

There is an integrated leakage current monitoring unit inside the inverter. When the inverter detects a leakage current greater than the allowable value, it will quickly disconnect from the grid.

If a type-A RCD (Leakage Current Device) or a leakage current switch is installed externally, its operating current must be  $\geq 300\text{mA}$ .

#### AC cable requirements

The recommended specifications of the AC cables are shown in the table below.

| Model        | Recommended cable model                   |
|--------------|-------------------------------------------|
| ST-INV-S3.0  | 10awg, withstand voltage of 600V and over |
| ST-INV-S3.68 |                                           |
| ST-INV-S4.0  |                                           |
| ST-INV-S5.0  | 8awg, withstand voltage of 600V and over  |

### Notice

Multiple inverters cannot share one AC circuit breaker.

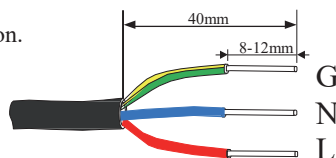
A load cannot be connected between the inverter and the AC circuit breaker.

## 5.4.2 Assembling the cable to the AC &amp; Back-up connector

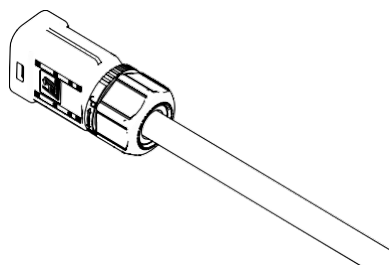


Please refer to the local cable color standard and choose core wires of different colors to distinguish L wire (live wire), N wire (neutral wire), and PE wire (grounding wire).

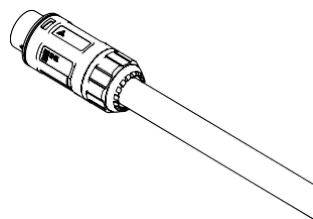
Step 1: Strip the cable jacket and core wire insulation.



Step 2: Install the grid connection cable into the 65A connector according to the corresponding color.



Step 3: Install the EPS connection cable into the 42A connector according to the corresponding color.

**Notice**

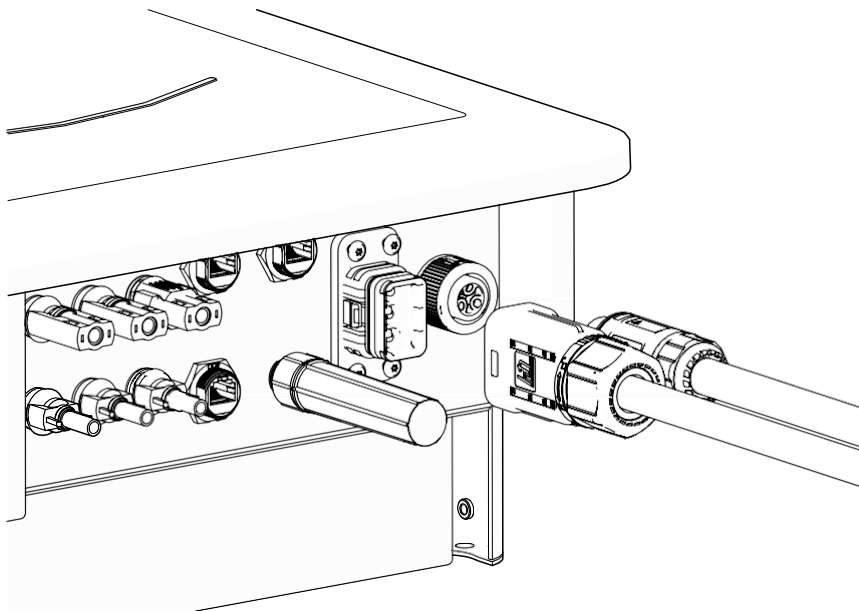
Pay attention to the wiring layout of the AC terminals. Do not connect live wire to PE terminal. Otherwise, the inverter may not operate normally, and the resulting loss has nothing to do with Stealth.

### 5.4.3 Installation of AC connector

Step 1: Disconnect the AC side circuit breaker and prevent its accidental reconnection.

Step 2: Measure the voltage and frequency of the grid connection point to ensure that they meet the grid connection specification of the inverter.

Step 3: Plug the connector into the corresponding socket at the bottom of the inverter.



Step 4: Connect the "PE" (grounding) wire at the other end of the AC cable to the grounding rod, and the "L" (live wire) and "N" (neutral wire) wires to the AC circuit breaker.

Step 5: Connect the other end of the AC circuit breaker to the grid and check that all cables are securely connected.

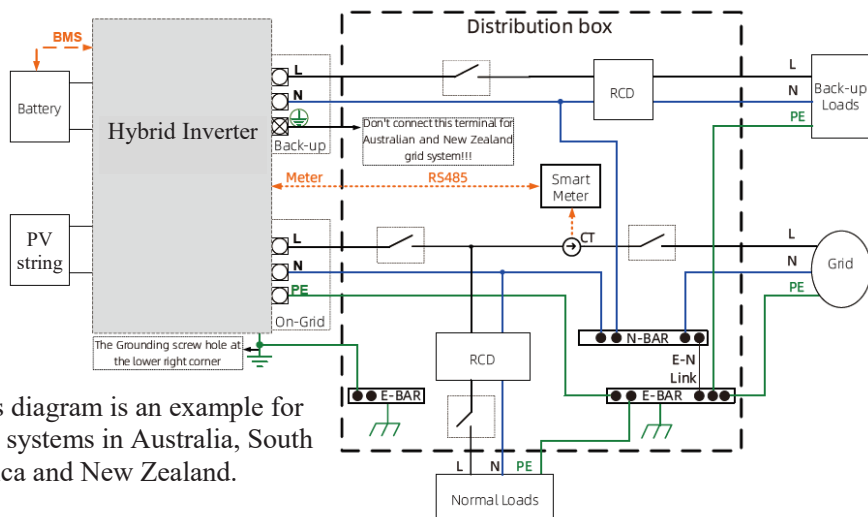
### Notice

The following requirements must be met when connecting PV strings; otherwise, the inverter may suffer irreversible damage and the resulting damage will not be covered by the warranty.

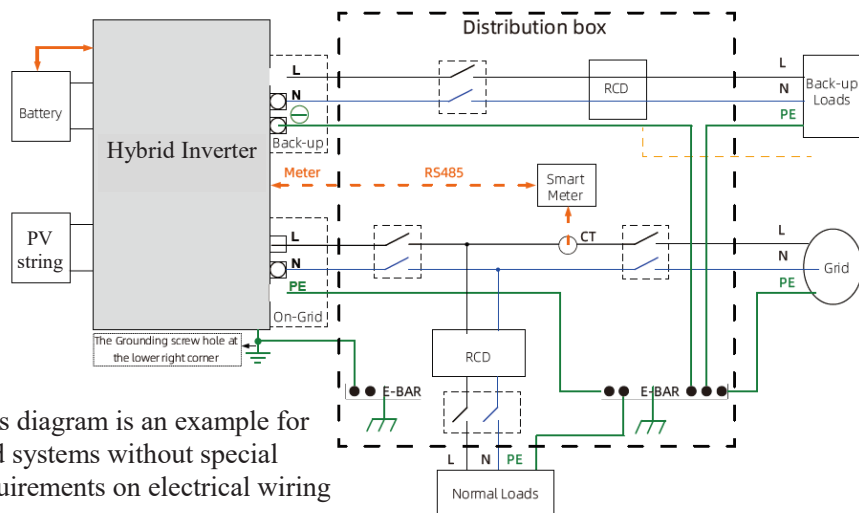
- Ensure that the voltage of each PV string does not exceed 550V under any circumstance.
- Ensure that the maximum short-circuit current on the PV side is within the allowable range of the inverter.
- Ensure that the PV string is well insulated from ground under any circumstances.

## Notice

For Australian safety requirements, the neutral wires on the grid-connected side and EPS side must be connected together, otherwise EPS function will not work.



This diagram is an example for grid systems in Australia, South Africa and New Zealand.



This diagram is an example for grid systems without special requirements on electrical wiring

## Notice

The back-up PE wire and machine grounding hole must be grounded properly and effectively. Otherwise, EPS function may be abnormal when the grid fails.

## 5.5 PV string connection

### 5.5.1 PV input device

ST-INV-S3.0, ST-INV-S3.68, ST-INV-S4.0 and ST-INV-S5.0 have two inputs of PV1 and PV2, and each input has a pair of PV terminals. The two PV inputs, each with independent MPPT, can be configured in independent mode or parallel mode.

- Independent mode

In the independent mode, the two PV string inputs operate independently, and the two strings can be different from each other, including: different panel types, different numbers of panels forming a string, different inclination angles, and different azimuth angles.

As shown in the figure below, the inclination angles of the input panels of the two PV strings are different, and the inverter shall select the independent mode.

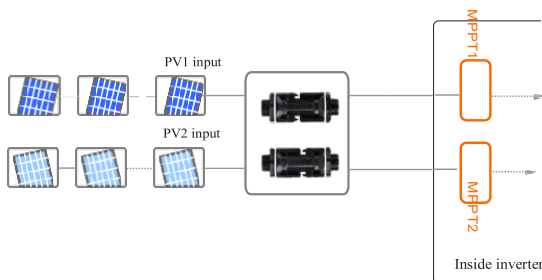


Fig. 5-4 Independent mode

| Model        | Total power limit for PV input | Open circuit voltage limit for each input (DC1/DC2) | Short-circuit current limit for each input (DC1/DC2) |
|--------------|--------------------------------|-----------------------------------------------------|------------------------------------------------------|
| ST-INV-S3.0  | 4000W                          | 550V/550V                                           | 20A/20A                                              |
| ST-INV-S3.68 | 4600W                          | 550V/550V                                           | 20A/20A                                              |
| ST-INV-S4.0  | 5000W                          | 550V/550V                                           | 20A/20A                                              |
| ST-INV-S5.0  | 6000W                          | 550V/550V                                           | 20A/20A                                              |

• Parallel mode

In parallel mode, all PV strings connected to the inverter must have exactly the same characteristics, including: the same model, the same number of panels, the same inclination angle, and the same azimuth angle.



In order to avoid the unbalance of the two input powers, or even the input load limit, the two PV input cables are required to be of the same model.

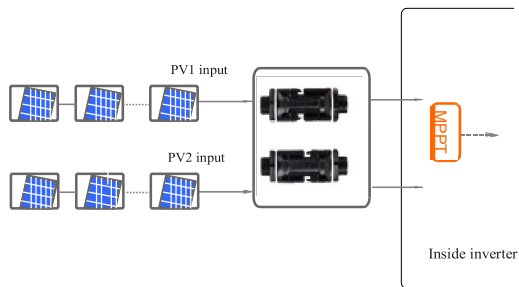


Fig. 5-6 Parallel mode

| Model        | Total power limit for PV input | Open circuit voltage limit | Short-circuit current limit |
|--------------|--------------------------------|----------------------------|-----------------------------|
| ST-INV-S3.0  | 4000W                          | 550V/550V                  | 20A/20A                     |
| ST-INV-S3.68 | 4600W                          | 550V/550V                  | 20A/20A                     |
| ST-INV-S4.0  | 5000W                          | 550V/550V                  | 20A/20A                     |
| ST-INV-S5.0  | 6000W                          | 550V/550V                  | 20A/20A                     |

## 5.5.2 Assembling the cable to the PV connector

Assemble the DC cable to the plug-in PV connector that mates with the PV terminals at the bottom of the inverter. The specifications of the DC cables are shown in the table below.

### Notice

The DC cable must be multi-core.

To ensure the IP65 protection of the inverter, only use the supplied connectors or products with the same degree of protection.

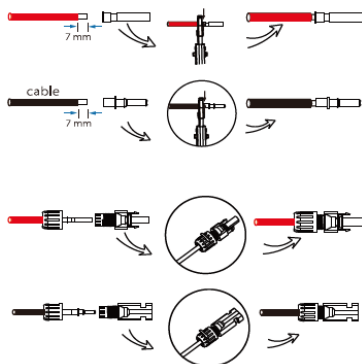
| Cross-sectional area range         | Cable O.D. | Max. withstand voltage | Max. withstand current |
|------------------------------------|------------|------------------------|------------------------|
| 4mm <sup>2</sup> ~6mm <sup>2</sup> | 4mm~6mm    | 600V                   | 25A                    |

Step 1: Strip all DC cable insulation by about 7mm.

Step 2: Use crimping pliers to attach the wiring terminals to the cable ends.

Step 3: Pass the cable through the cable gland and insert the insulating sleeve until it snaps shut. Pull lightly the cable to make sure it is securely connected. Tighten the cable gland and insulating sleeve with a force of 2.5~3Nm.

Step 4 Check that the polarities of the cables connecting the PV strings are correct.



### Notice

If the PV input polarity is reversed, the inverter will not operate normally.

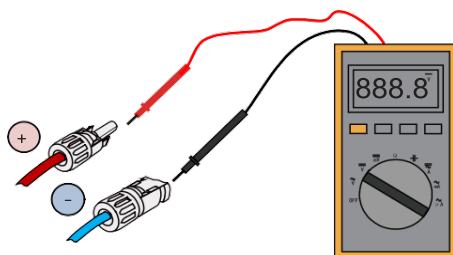
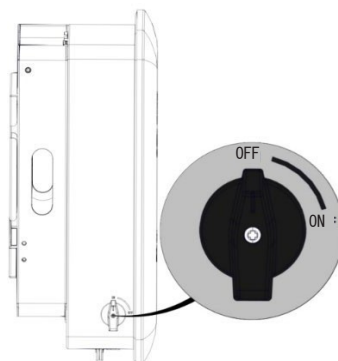
If the PV connector is not properly assembled, it may cause arcing or overheating in the connector, and the loss caused therefrom will not be covered by the warranty.

### 5.5.3 Installing the PV connector

Installation steps:

Step 1: Manually turn the DC switch on the bottom left to "OFF".

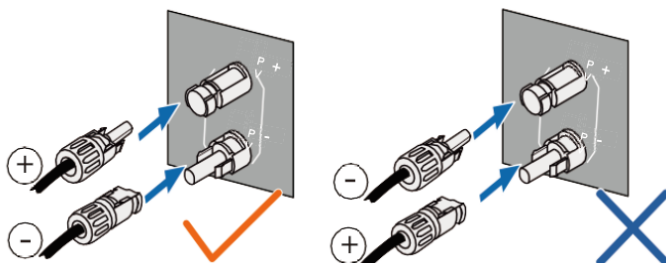
Step 2: Check whether the polarities of the cables connecting the PV strings are correct, and ensure that the open-circuit voltage does not exceed the upper input limit of the inverter of 550V under any circumstance.



#### Notice

Before connecting the PV connector to the inverter, check the positive and negative polarities of the panel, and then insert the PV connector into the corresponding PV terminal after confirmation.

Step 3: Insert the PV connector into the corresponding PV terminal until a "click" is heard.



## 5.6 Battery cable connection

### Notice

Since the battery is inflammable and explosive, the following requirements must be met when connecting the battery.

- Ensure that the battery box is free from bulging, peculiar smell and other special conditions.
- Ensure that the battery voltage does not exceed the upper and lower voltage limits that the battery can withstand under any circumstance.
- Ensure that the battery box is kept away from fire sources.

### 5.6.1 Requirements on the battery side

#### DC circuit breaker

In order to ensure that the inverter can be safely disconnected under load, an independent two-pole DC circuit breaker must be configured for each inverter as a protective device. If the battery box used with the inverter already has a circuit breaker, no additional one is required.

The recommended specifications of DC circuit breaker for different models of inverters are shown in the table below.

| Model        | Recommended specifications |
|--------------|----------------------------|
| ST-INV-S3.0  | 40A, 500Vdc                |
| ST-INV-S3.68 | 40A, 500Vdc                |
| ST-INV-S4.0  | 40A, 500Vdc                |
| ST-INV-S5.0  | 40A, 500Vdc                |

Table 5-1 Recommended specifications of DC circuit breaker

### 5.6.2 Assembling the cable to the Bat connector

The connection of the battery is the same as that of the PV, but different connectors are used to distinguish it from the PV connector. Assemble the DC cable to the plug-in Bat connector that mates with the Bat terminal at the bottom of the inverter.

The specifications of battery cables are shown in the table below.

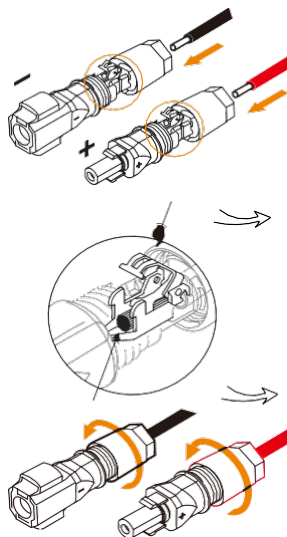
| Cross-sectional area range         | Cable O.D. | Max. withstand voltage | Max. withstand current |
|------------------------------------|------------|------------------------|------------------------|
| 4mm <sup>2</sup> ~6mm <sup>2</sup> | 5.5mm~8mm  | 600V                   | 25A                    |

Step 1: Strip all DC cable insulation by about 7mm, and then insert the cable end into the orange part of the terminal in the figure.

Step 2: Press the spring until a "click" is heard. Gently pull the cable to ensure firm connection.

Step 3: Tighten the cable gland and insulating sleeve with a force of 2.5~3Nm.

Step 4: Check that the polarities of the battery connecting cables are correct.



#### Notice

If the Bat input polarity is reversed, the inverter will not operate normally.  
If the Bat connector is not properly assembled, it may cause arcing or overheating in the connector, and the loss caused therefrom will not be covered by the warranty.

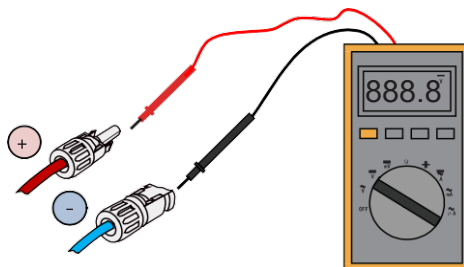
# User Manual

## STEALTH

### 5.6.3 Installing the Bat connector

Step 1: Disconnect the DC circuit breaker.

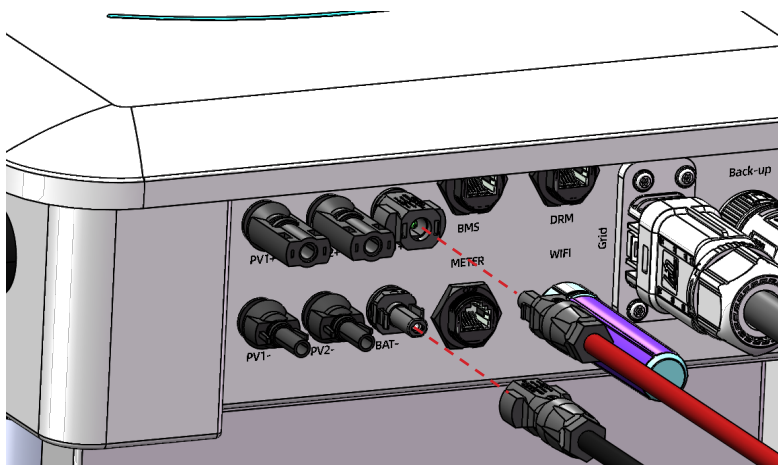
Step 2: Check whether the polarities of the battery connecting cables are correct, and make sure that the open-circuit voltage does not exceed the upper input limit of the inverter under any circumstance.



#### Notice

Before connecting the Bat connector to the inverter, check the positive and negative polarities of the battery, and then insert the Bat connector into the corresponding Bat terminal after confirmation.

Step 3: Insert the Bat connector into the corresponding Bat terminal until a "click" is heard.



## 5.7 WIFI communication connection

The inverter provides a monitoring port to collect data from the inverter and transmit the data to a monitoring website through an external monitoring data collector. Stealth can provide WiFi data collectors (WiFi modules).

The communication interface is located at the bottom of the inverter and is used to connect the WiFi communication module.

WiFi module: A communication connection can be established between the inverter and mobile phones and devices through the WiFi module. The country where the inverter is located and the local power grid protection parameters can be set via mobile App. For details, see the user manual delivered with the module.

### Notice

Stealth Energy is not responsible for any problem caused by failure to wire as required or improper waterproofing.

## 5.8 Meter connection

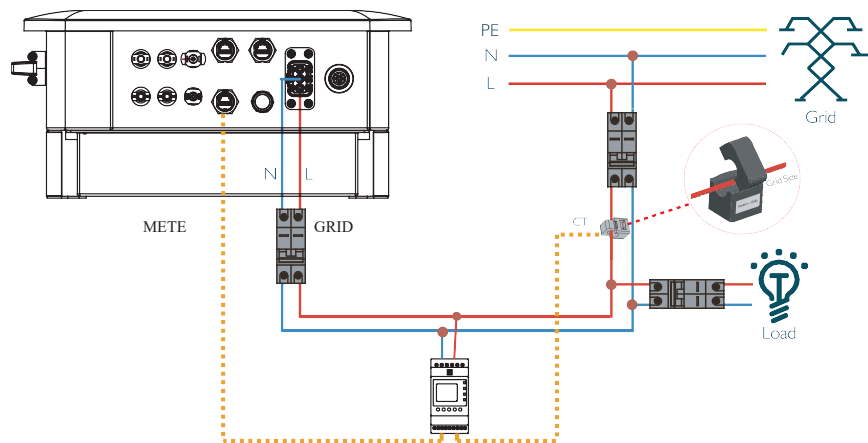
### Notice

Before connecting the smart meter and CT, make sure that the AC cable is completely isolated from the AC grid.

Smart meters must be authorized by Stealth; any third-party's or unauthorized meters may not be compatible with the inverter. Stealth will not be liable if the meter is not working.

ST-INV-S3.0, ST-INV-S3.68, ST-INV-S4.0 and ST-INV-S5.0 adopt Acrel's smart meter with CT, which is used to detect the grid voltage, current direction and magnitude, and further indicate the operation status of the grid. The meter must be connected to the inverter when installing the inverter, otherwise the inverter will shut down with a "meter failure" alarm. It is a mandatory product for inverter installation, and communicates with the inverter through RS485. The CT must be installed on the live wire, and make sure that the arrow on the CT points to the grid side.

- Smart meter and CT are configured correctly, please do not change any settings on the smart meter.
- One smart meter can only be used for one inverter.
- CT must be connected in the same direction as the indicated CT.

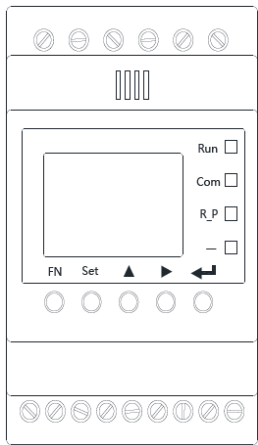


The CT line is default to be 3m, and can be extended up to 5m.  
The smart meter communication cable (RJ45) is attached to the inverter (cable "connected to smart meter"), can be extended up to 100m and must use a standard RJ45 cable and plug as shown below



| 1  | 2  | 3  | 4  | 5  | 6  | 7    | 8    |
|----|----|----|----|----|----|------|------|
| NC | NC | NC | NC | NC | NC | 485B | 485A |

## Smart Meter LED indication



|                |                   |                    |                    |
|----------------|-------------------|--------------------|--------------------|
|                | OFF               | Normally on        | Flashing           |
| Run<br>(Green) | Not operating     | /                  | Operating normally |
| Com<br>(Red)   | Not communicating | /                  | Communicating      |
| R_P<br>(Red)   | Power is positive | Power is negative  | /                  |
| -<br>(Red)     | /                 | Negative indicator | /                  |

## 5.9 DRED connection

The inverter provides DRM to support various demand response modes by issuing control signals as follows.

| Mode | Demand                                                                                      |
|------|---------------------------------------------------------------------------------------------|
| DRM0 | Operate the disconnecting device                                                            |
| DRM1 | No power consumption                                                                        |
| DRM2 | Power consumption does not exceed 50% of rated power                                        |
| DRM3 | Power consumption is no more than 75% of rated power and provide reactive power if possible |
| DRM4 | Increase power consumption (subject to other DRM constraints)                               |
| DRM5 | No power generated                                                                          |
| DRM6 | Generated power does not exceed 50% of rated power                                          |
| DRM7 | Generated power is no more than 75% of rated power and absorb reactive power if possible    |
| DRM8 | Increase power generation (subject to other DRM constraints)                                |

The DRM communication cable (RJ45) is attached to the inverter (cable "connected to peripheral DRED device"), and must use a standard RJ45 cable and plug as shown below



| 1      | 2      | 3      | 4      | 5         | 6    | 7         | 8       |
|--------|--------|--------|--------|-----------|------|-----------|---------|
| DRM1/5 | DRM2/6 | DRM3/7 | DRM4/8 | +3.3V_COM | DRM0 | +3.3V_COM | GND_COM |

5.10 BMS connection

The communication interface between the inverter and the battery is a RJ45 connector with CAN.



| PIN        | 1  | 2  | 3  | 4    | 5    | 6  | 7  | 8  |
|------------|----|----|----|------|------|----|----|----|
| Definition | NC | NC | NC | CANH | CANL | NC | NC | NC |

Battery communication only works if the battery BMS and inverter are compatible.

## 6 Test run

### 6.1 Inspection before test run

Before turning on the inverter for the first time, the following inspections shall be made.

1. Check whether the inverter is firmly installed and whether the installation position is convenient for operation and maintenance.
2. No external objects or parts are left on the top of the inverter.
3. The inverter and accessories are connected correctly, the cables are reasonably distributed and well protected, and there is no mechanical damage.
4. Appropriate selection of AC circuit breakers.
5. Unoccupied terminals are sealed.
6. All safety signs and warning labels on the inverter are firmly pasted and clearly visible.

### 6.2 Test run steps

Step 1 Make sure that the above inspection items meet the requirements.

Step 2 Close the AC circuit breaker.

Step 3 Rotate the DC switch on the left side of the inverter to “ON”.

Step 4 Close the battery breaker or open the battery system.

Step 5 When the lighting is normal and the grid conditions meet the grid connection requirements, wait for 60 seconds and the inverter will run normally.

Step 6 Observe the status of the LED indicator on the inverter.

Table 6-1 Description of the LED indicator status

| LED status    | Description                          |
|---------------|--------------------------------------|
| No light      | Inverter PV and battery switched off |
| Flashing blue | Inverter power-on self-test          |
| Blue light on | Inverter running                     |
| Red light on  | Errors occur on the inverter         |

\* Please refer to the manual delivered with the module for the meanings of the indicator lights of the communication module. If the test run fails, please refer to "8.1 Troubleshooting" for troubleshooting.

## 7 Decommissioning, removing and discarding inverter

### 7.1 Decommissioning inverter

It is not necessary to shut down the inverter under normal circumstances, but when maintenance or repair work is required, the inverter needs to be shut down. Please follow the following steps to disconnect the inverter from AC, DC power, and batteries; otherwise, casualties or equipment damage may be caused.

Step 1 Disconnect the Bat circuit breaker or turn off the battery system.

Step 2 Disconnect the external AC circuit breaker and prevent it from being reconnected due to misoperation.

Step 3 Disconnect the front-end DC circuit breaker, and turn the DC switch to "OFF".

#### Notice

Please strictly follow the above steps, otherwise the inverter will not work normally.

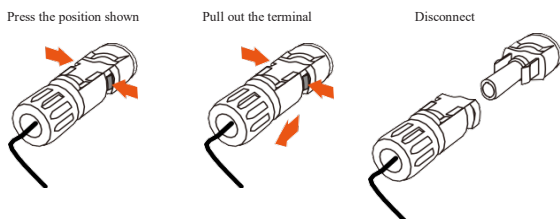
Step 4 Wait at least 5 minutes until the internal capacitors are fully discharged.

Step 5 Test with a multimeter to ensure that the AC output side, DC side and battery side of the inverter are completely powered off.

Step 6 Use tools to press down the locking part between the Bat connector and Bat terminal to remove the Bat connector.

Step 7 Remove the AC wires & Back-up wires from the AC junction box and AC barrier terminals.

Step 8 Release the locking part between the PV connector and PV terminal to remove the PV connector.



For detailed steps, visit the equipment manufacturer's website.

## 7.2 Removing inverter

Refer to "5 Electrical connection" and "4 Mechanical installation", and follow the reverse steps to remove the inverter.



### Caution

Danger of burns and electric shock!

The inverter must be disconnected from the power grid for at least 5 minutes before maintenance or repair operations inside the equipment can be performed.

### Notice

If the inverter will be put into use in the future, please refer to "3.4 Inverter storage" to properly store the inverter.

## 7.3 Discarding inverter

For the inverter that will no longer be put into operation in the future, the user is responsible for proper disposal.

### Notice

The modules and other components included in the inverter may pollute the environment, so please dispose of them according to relevant regulations.

## 8 Troubleshooting and maintenance

### 8.1 Troubleshooting

#### 8.1.1 Troubleshooting displayed in APP

After the monitoring module is connected, once the inverter fails, the fault information can be displayed on the mobile App interface. The fault codes and troubleshooting methods are shown in the table below.

| Fault code | Fault description     | Elimination method                                                                                                                                                                                                                                                                     |
|------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1          | Hardware fault        | 1. Disconnect PV+, PV-, Bat and Grid, and restart the inverter;<br>2. If the fault still exists, please contact the Stealth customer service center.                                                                                                                                   |
| 2          | Network disconnected  | 1. Check the grid voltage and frequency;<br>2. If the grid voltage and frequency are within the allowable range, please contact the Stealth customer service center.                                                                                                                   |
| 3          | Grid voltage fault    | 1. Check the grid voltage;<br>2. If the grid voltage exceeds the allowable range, please seek solutions from the local electric power company;<br>3. If the grid voltage is within the allowable range, please contact the Stealth customer service center.                            |
| 4          | Grid frequency fault  | 1. Check the grid frequency;<br>2. If the grid frequency exceeds the allowable range, please seek solutions from the local electric power company;<br>3. If the grid frequency is within the allowable range, please contact the Stealth customer service center.                      |
| 5          | PV voltage fault      | 1. Check whether the output voltage of the solar panel is within the allowable range;<br>2. If it is not within the allowable range, disconnect PV+, PV-, Bat and Grid, and restart the inverter;<br>3. If the fault still exists, please contact the Stealth customer service center. |
| 6          | Bus voltage fault     | 1. Disconnect PV+, PV-, Bat and Grid, and restart the inverter;<br>2. If the fault still exists, please contact the Stealth customer service center.                                                                                                                                   |
| 7          | Battery voltage fault | 1. Check whether the battery input voltage is within the allowable range;<br>2. If it is not within the allowable range, disconnect PV+, PV-, Bat and Grid, and restart the inverter;<br>3. If the fault still exists, please contact the Stealth customer service center.             |

|    |                                      |                                                                                                                                                                                                                                                                                                                                                                                               |
|----|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 8  | Grid voltage 10-minute average fault | <ol style="list-style-type: none"> <li>1. Check in the country setting of the inverter whether it is set to the current country;</li> <li>2. If the country setting is correct, wait for the inverter to return to normal or seek solutions from the local electric power company;</li> <li>3. If the fault occurs repeatedly, please contact the Stealth customer service center.</li> </ol> |
| 9  | Inverter current DC component fault  | <ol style="list-style-type: none"> <li>1. Disconnect PV+, PV-, Bat and Grid, and restart the inverter;</li> <li>2. If the fault still exists, please contact the Stealth customer service center.</li> </ol>                                                                                                                                                                                  |
| 10 | Eps voltage DC component fault       | <ol style="list-style-type: none"> <li>1. Disconnect PV+, PV-, Bat and Grid, and restart the inverter;</li> <li>2. If the fault still exists, please contact the Stealth customer service center.</li> </ol>                                                                                                                                                                                  |
| 11 | Overcurrent fault                    | <ol style="list-style-type: none"> <li>1. Disconnect PV+, PV-, Bat and Grid, and restart the inverter;</li> <li>2. If the fault still exists, please contact the Stealth customer service center.</li> </ol>                                                                                                                                                                                  |
| 12 | Leakage current fault                | <ol style="list-style-type: none"> <li>1. Check whether the impedance of DC input and AC output is normal;</li> <li>2. Wait for the inverter to return to normal;</li> <li>3. If the fault still exists, please contact the Stealth customer service center.</li> </ol>                                                                                                                       |
| 13 | Insulation fault                     | <ol style="list-style-type: none"> <li>1. Please check whether the insulation of the wire is damaged;</li> <li>2. Wait for the inverter to return to normal;</li> <li>3. If the fault still exists, please contact the Stealth customer service center.</li> </ol>                                                                                                                            |
| 14 | Over temperature fault               | <ol style="list-style-type: none"> <li>1. Check whether the ambient temperature is too high;</li> <li>2. When the temperature is too high, wait for the inverter to recover;</li> <li>3. If the fault still exists, please contact the Stealth customer service center.</li> </ol>                                                                                                            |
| 15 | Battery reverse connection fault     | <ol style="list-style-type: none"> <li>1. Check whether the string output is reversed or short-circuited;</li> <li>2. Wait for the inverter to return to normal</li> <li>3. If the fault still exists, please contact the Stealth customer service center.</li> </ol>                                                                                                                         |
| 16 | Sampling consistency fault           | <ol style="list-style-type: none"> <li>1. Disconnect PV+, PV-, Bat and Grid, and restart the inverter;</li> <li>2. If the fault still exists, please contact the Stealth customer service center.</li> </ol>                                                                                                                                                                                  |
| 17 | Eps overload fault                   | <ol style="list-style-type: none"> <li>1. Confirm that the PV current, battery current and output current are within the allowable range;</li> <li>2. Check if there is a nonlinear load connected to the EPS. Remove the load to see whether the inverter returns to normal;</li> <li>3. If the fault still exists, please contact the Stealth customer service center.</li> </ol>           |
| 18 | Overload fault                       | <ol style="list-style-type: none"> <li>1. Confirm that the load power is within the EPS output power range;</li> <li>2. Check if there is a nonlinear load connected to the EPS. Remove the load to see whether the inverter returns to normal;</li> <li>3. If the fault still exists, please contact the Stealth customer service center.</li> </ol>                                         |

|    |                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 20 | Battery level fault          | <ol style="list-style-type: none"> <li>1. Check whether the battery input voltage is lower than the lower limit;</li> <li>2. Check whether the battery SOC is less than 10% or the set minimum SOC, if so, forcibly charge the battery to confirm whether the fault can be solved;</li> <li>3. If the battery voltage is within the normal range and SOC is normal, disconnect PV+, PV-, Bat and Grid, and restart the inverter;</li> <li>4. If the fault still exists, please contact the Stealth customer service center.</li> </ol> |
| 21 | Hybrid_I relay fault         | <ol style="list-style-type: none"> <li>1. Disconnect PV+, PV-, Bat and Grid, and restart the inverter;</li> <li>2. If the fault still exists, please contact the Stealth customer service center.</li> </ol>                                                                                                                                                                                                                                                                                                                           |
| 24 | Battery loss                 | <ol style="list-style-type: none"> <li>1. Check whether the air switch of battery is on, start button of battery is pressed and communication wire is loose;</li> <li>2. If the fault still exists, please contact the Stealth customer service center.</li> </ol>                                                                                                                                                                                                                                                                     |
| 25 | Internal communication fault | <ol style="list-style-type: none"> <li>1. Disconnect PV+, PV-, Bat and Grid, and restart the inverter;</li> <li>2. If the fault still exists, please contact the Stealth customer service center.</li> </ol>                                                                                                                                                                                                                                                                                                                           |
| 28 | EEPROM fault                 | <ol style="list-style-type: none"> <li>1. Disconnect PV+, PV-, Bat and Grid, and restart the inverter;</li> <li>2. If the fault still exists, please contact the Stealth customer service center.</li> </ol>                                                                                                                                                                                                                                                                                                                           |
| 29 | Leakage current drive fault  | <ol style="list-style-type: none"> <li>1. Check whether the impedance of DC input and AC output is normal;</li> <li>2. Disconnect PV+, PV-, Bat and Grid, and restart the inverter;</li> <li>3. If the fault still exists, please contact the Stealth customer service center.</li> </ol>                                                                                                                                                                                                                                              |
| 30 | Eps relay fault              | <ol style="list-style-type: none"> <li>1. Disconnect PV+, PV-, Bat and Grid, and restart the inverter;</li> <li>2. If the fault still exists, please contact the Stealth customer service center.</li> </ol>                                                                                                                                                                                                                                                                                                                           |
| 31 | Grid-connected relay fault   | <ol style="list-style-type: none"> <li>1. Disconnect PV+, PV-, Bat and Grid, and restart the inverter;</li> <li>2. If the fault still exists, please contact the Stealth customer service center.</li> </ol>                                                                                                                                                                                                                                                                                                                           |
| 32 | Other equipment fault        | <ol style="list-style-type: none"> <li>1. Disconnect PV+, PV-, Bat and Grid, and restart the inverter;</li> <li>2. If the fault still exists, please contact the Stealth customer service center.</li> </ol>                                                                                                                                                                                                                                                                                                                           |

8.2 Daily maintenance

 **DANGER**

Improper maintenance operations can result in personal injury or equipment damage! Before performing any maintenance operation, the following steps must be followed: First disconnect the DC switch and battery, and then disconnect the AC circuit breaker on the grid side.

Wait at least 5 minutes until the internal energy storage element has been completely discharged before performing maintenance or repair operations inside the equipment. Use a test device to verify that there are no voltage and current.

 **CAUTION**

When performing electrical connection and maintenance work, temporary warning signs must be posted or barriers must be set up to prevent irrelevant personnel from entering the electrical connection or maintenance area.

**NOTICE**

Restart the inverter only after troubleshooting of the fault that affects the safety performance of the inverter. The inverter does not contain maintenance parts, please do not replace the internal components of the inverter without authorization.

If any repair service is required, please contact the Stealth Energy After-sales Service Center. Otherwise, Stealth Energy will not bear any warranty and joint liability for the resulting losses.

| Inspection content | Inspection method                                                                                                 | Maintenance period                                                                           |
|--------------------|-------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| System cleaning    | Check the humidity and dust around the inverter, and clean the radiator at the back of the inverter if necessary. | Once every six months to one year (depending on the dust content of the service environment) |

## 9 Appendix

### 9.1 Confirmation before contact

If you have any questions about this product, please contact us. In order to provide you with faster and better after-sales service, we need your assistance to inform us of the following information:

- Equipment model
- Equipment serial number
- Fault code/name
- Brief description of the fault

### 9.2 Technical data

| PV input                                    |             |              |             |             |
|---------------------------------------------|-------------|--------------|-------------|-------------|
| Model                                       | ST-INV-S3.0 | ST-INV-S3.68 | ST-INV-S4.0 | ST-INV-S5.0 |
| Max. input power (W)                        | 4000        | 4600         | 5000        | 6000        |
| Max. input voltage (Vd.c.)                  | 550         |              |             |             |
| MPPT voltage range (Vd.c.)                  | 125-530     |              |             |             |
| Rated input voltage (Vd.c.)                 | 360         |              |             |             |
| Max. input current per line (Ad.c.)         | 16/16A      |              |             |             |
| Max. short-circuit current per line (Ad.c.) | 20/20A      |              |             |             |
| PV array Max. back-feed current (A)         | 0           |              |             |             |

| Battery output/input                  |             |              |             |             |
|---------------------------------------|-------------|--------------|-------------|-------------|
| Model                                 | ST-INV-S3.0 | ST-INV-S3.68 | ST-INV-S4.0 | ST-INV-S5.0 |
| Battery type                          | LFP         |              |             |             |
| Battery voltage range (Vd.c.)         | 160-480V    |              |             |             |
| Max. charge/discharge current (Ad.c.) | 25          |              |             |             |

## Grid-connected output/input

### Grid-connected output

| Model                                   | ST-INV-S3.0 | ST-INV-S3.68 | ST-INV-S4.0 | ST-INV-S5.0 |
|-----------------------------------------|-------------|--------------|-------------|-------------|
| Rated apparent power (W)                | 3000        | 3680         | 4000        | 4991        |
| Max. apparent power (VA)                | 3000        | 3680         | 4000        | 4991        |
| Rated voltage (V.a.c.)                  | 230         |              |             |             |
| Rated frequency (Hz)                    | 50/60       |              |             |             |
| Rated current                           | 13.1Aa.c.   | 16Aa.c.      | 17.4Aa.c.   | 21.7Aa.c.   |
| Surge current (peak value and duration) | 30A/500μs   | 35A/500μs    | 40A/500μs   | 45A/500μs   |
| Max. current (A)                        | 13.1Aa.c.   | 16Aa.c.      | 17.4Aa.c.   | 21.7Aa.c.   |

### Grid-connected input

|                        |         |         |         |         |
|------------------------|---------|---------|---------|---------|
| Rated voltage (V.a.c.) | 230     |         |         |         |
| Rated frequency (Hz)   | 50/60   |         |         |         |
| Max. current           | 25Aa.c. | 25Aa.c. | 25Aa.c. | 40Aa.c. |
| Max. power (VA)        | 5750    | 5750    | 5750    | 9200    |

## Off-grid output

| Model                                   | ST-INV-S3.0 | ST-INV-S3.68 | ST-INV-S4.0 | ST-INV-S5.0 |
|-----------------------------------------|-------------|--------------|-------------|-------------|
| Rated voltage (V.a.c.)                  | 230         |              |             |             |
| Rated frequency (Hz)                    | 50/60       |              |             |             |
| Rated output current                    | 12.6Aa.c.   | 15.3Aa.c.    | 16.6Aa.c.   | 20Aa.c.     |
| Max. apparent power (VA)                | 2900        | 3500         | 3800        | 4600        |
| Surge current (peak value and duration) | 37.8A/200μs | 45.9A/200μs  | 49.8A/200μs | 60A/200μs   |
| Max. output overcurrent protection      | 12.6Aa.c.   | 15.3Aa.c.    | 16.6Aa.c.   | 20Aa.c.     |

| General data                        |                                    |              |             |             |
|-------------------------------------|------------------------------------|--------------|-------------|-------------|
| Model                               | ST-INV-S3.0                        | ST-INV-S3.68 | ST-INV-S4.0 | ST-INV-S5.0 |
| Dimension (W/H/D) [mm]              | 411*505*195                        |              |             |             |
| Weight (kg)                         | 19.3                               |              |             |             |
| Installation method                 | Wall-mounted                       |              |             |             |
| Power factor (range)                | 0.8leading-0.8lagging              |              |             |             |
| Operating temperature range (°C)    | -25~60                             |              |             |             |
| Storage temperature (°C)            | -25~60                             |              |             |             |
| Storage/Operating relative humidity | 0%~100%                            |              |             |             |
| Altitude (m)                        | 2000                               |              |             |             |
| Ingress Protection                  | IP65                               |              |             |             |
| Cooling method                      | Passive                            |              |             |             |
| Communication interface             | Meter, WIFI, DRM, BMS              |              |             |             |
| Buzzer                              | Built-in (off-grid & ground fault) |              |             |             |
| Protection class                    | I                                  |              |             |             |
| Over voltage category               | DC II, AC III                      |              |             |             |
| Inverter topology                   | Non-isolated                       |              |             |             |
| Anti-islanding method               | Frequency shift                    |              |             |             |

| Battery breaker                 |             |              |             |             |
|---------------------------------|-------------|--------------|-------------|-------------|
| Model                           | ST-INV-S3.0 | ST-INV-S3.68 | ST-INV-S4.0 | ST-INV-S5.0 |
| Rated voltage [d.c.V]           | 500         |              |             |             |
| Rated current [d.c.A]           | 40          |              |             |             |
| Rated insulation voltage[d.c.V] | 1000        |              |             |             |
| Rated impulse voltage[d.c.V]    | 6000        |              |             |             |
| Icu [kA]                        | 6           |              |             |             |
| Ics [kA]                        | 6           |              |             |             |
| Operating temperature (°C)      | -30~70      |              |             |             |

### 9.3 Quality assurance

Suzhou Stealth Energy Technology Co., Ltd. (hereinafter referred to as the company) will repair or replace it with a new product free of charge for any product that fails during the warranty period.

#### Evidence

During the warranty period, the company requires customers to present the invoice and date of purchase of the product. At the same time, the trademark on the product should be clearly visible, otherwise it has the right to not give quality assurance.

#### Condition

- Replaced unqualified products should be disposed of by the company
- The customer should reserve a reasonable time for the company to repair the faulty equipment.

#### Disclaimer

The ST-INV-S Series Hybrid inverter is transported, used and operated under environmental and electrical conditions. Stealth reserves the right to not provide after-sales service or assistance in the following situations:

- The inverter is damaged during transportation.
- The warranty period for the inverter has expired and an extended warranty has not been purchased.
- Installation, modification, or operation of the inverter in an incorrect manner without authorization from Stealth.
- Installation or use of the inverter under improper environmental or technical conditions mentioned in this user manual without authorization from Stealth.
- The installation or configuration of the inverter does not meet the requirements mentioned in this user manual.
- The installation or operation of the inverter is in violation of the requirements or warnings mentioned in this user manual.
- Force majeure such as lightning, earthquake, fire, storm and volcanic eruption cause breakdown or damage to the inverter.

- Disassembly, change or update of the software or hardware of the inverter without authorization from Stealth.
- The installation, use or operation of the inverter does not comply with any relevant item in international or local policies or regulations.
- Any incompatible batteries, loads or other equipment are connected to the PV energy storage system.

Note: Stealth reserves the right to interpret all content in this user manual.

In order to ensure IP65, the inverter must be well sealed, please install the inverter within one day after unpacking, otherwise please seal all unused terminals/ holes, do not allow any terminal/hole to be opened, and confirm that there is no risk of water and dust entering.

The inverter requires regular maintenance, and the details are as follows:

- Before servicing, ensure that the inverter is completely isolated from all DC and AC power sources for at least 5 minutes.
- Radiator: Please clean the radiator with a clean towel once a year.
- Torque: Please use a torque wrench to tighten the AC and DC cables once a year.
- DC circuit breaker: Check the DC circuit breaker regularly and activate the DC circuit breaker 10 times once per year in a row.
- Operating the DC circuit breaker will clean the contacts and extend the service life of the DC circuit breaker.
- Waterproof cover: Check whether the waterproof cover covers RS485 and other parts once a year.

In case of product failure caused by the above situations, the customer may require repair services. After being judged by the company's service organization, paid repair services can be provided.



If the product size and parameters are changed, the latest information of the company shall prevail without prior notice.

## Software licensing

- It is forbidden to use part or all of the data in the firmware or software developed by the company for commercial purposes in any way.
- It is forbidden to decompile, decrypt or otherwise destroy the original programming of the software developed by the company.

Suzhou Stealth Energy Technology Co., Ltd.

[www.stealthenergy.cn](http://www.stealthenergy.cn)

TEL: +86 0512-66720026 Mail: Sales@stealthenergy.cn

E-mail: Sales@stealthenergy.cn

Add: 8F, No. 198, Jinfeng Road, Huqiu District,  
Suzhou, Jiangsu Province, China