
# On-Grid PV Inverter

☐ 7 kW ☐ 8 kW ☐ 9 kW ☐ 10 kW

YINERGY

**User Manual**

Version 1.0

# Statement



## Trademarks

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## Notice

Due to product version upgrades or other reasons, the content of the document may be subject to periodic updates, unless otherwise agreed, the document content cannot replace the safety precautions in the product label or user manual.

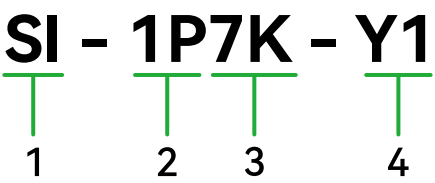
All descriptions in the documentation are intended solely as guidelines for usage.

## Scope of Validity

This manual describes the installation, commissioning, operation and maintenance of the following on-grid PV inverters produced by Yinergy:

- SI-1P7K-Y1
- SI-1P8K-Y1
- SI-1P9K-Y1
- SI-1P10K-Y1

### Model Description




| | | |
|---|---|---|
| 1 | **Product Type** | "SI" refers to String Inverter. |
| 2 | **Grid Type** | "1P" refers to Single Phase. |
| 3 | **Rated Power** | "7K" refers to the rated output power of 7 kW. |
| 4 | **Version Number** | "Y1" refers to the first version. |

## Target Group

Only for professionals who are familiar with local regulations, standards and electrical systems, and who have received professional training and knowledge of this product.

## Symbol Description

Different levels of warning messages in this manual are defined as follows:

**DANGER!**

Indicates a high-level hazard that, if not avoided, will result in death or serious injury.

**WARNING!**

EIndicates a medium-level hazard that, if not avoided, could result in death or serious injury.

**CAUTION!**

Indicates a low-level hazard that, if not avoided, could result in minor or moderate injury.

**NOTICE**

Highlight and supplement the texts. Or some skills and methods to solve product-related problems to save time.

## Change History

Version 1.0 (30/10/2024)

Initial release

# Table of Contents

Make Life Better

## 1.1 Safety Precautions

1. All work on the inverter must be carried out by qualified electricians.
2. The device may only be operated with PV panels.
3. The PV panels and inverter must be connected to the ground.
4. Do not touch the inverter cover until 5 minutes after disconnecting both DC and AC power supply.
5. Do not touch the inverter enclosure when operating, keep away from materials that may be affected by high temperatures.
6. Please ensure that the used device and any relevant accessories are disposed of in accordance with applicable regulations.
7. Yinergy inverter should be placed upwards and handled with care in delivery. Pay attention to waterproof. Do not expose the inverter directly to water, rain, snow or spray.
8. Alternative uses, modifications to the inverter not recommended. The warranty can become void if the inverter was tampered with or if the installation is not in accordance with the relevant installation instructions.

## 1.2 Explanations of Symbols

Yinergy inverter strictly comply with relevant safety standards. Please read and follow all the instructions and cautions during installation, operation and maintenance.

Table 1-1 Symbols

| Symbol | Description |
|---|---|
|  | Danger of electric shock<br>The inverter contains fatal DC and AC power. All work on the inverter must be carried out by qualified personnel only. |
|  | Beware of hot surface<br>The inverter's housing may reach uncomfortably hot 60 ℃ (140 ℉) under high power operation. Do not touch the inverter enclosure when operation. |
|  | Residual power discharge<br>Do not open the inverter cover until 5 minutes after disconnection both DC and AC power supply. |
|  | Do not dispose of this device with the normal domestic waste. |
|  | Without transformer<br>This inverter does not use transformer for the isolation function. |

CE mark

The inverter complies with the requirements of the applicable CE guidelines.

Refer to manual before service.

## 1.3 System Diagram

The typical connection diagram for the entire PV system is on-grid.

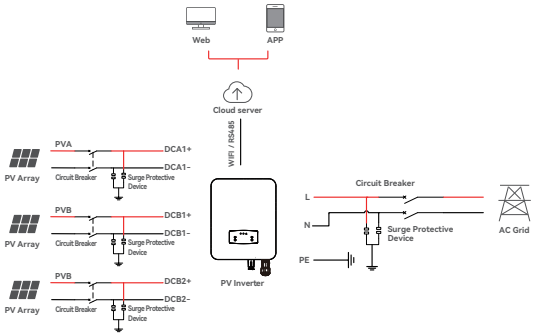



Figure 1-1 System Diagram-1

### Circuit Breaker Recommendation

Table 1-2 Circuit Breaker Lists

| Model | Max AC Current (A) | Rated current of AC breaker (A) |
|---|---|---|
| SI-1P7K-Y1 | 33.6 | 63 |
| SI-1P8K-Y1 | 38.3 | 63 |
| SI-1P9K-Y1 | 45 | 100 |
| SI-1P10K-Y1 | 50 | 100 |

- SPD: Lightning protection system, refer to the following options:
- AC side, nominal discharge current 20 kA, second grade lightning protection, protection voltage 2.5 kV
- DC side, nominal discharge current 20 kA, second grade lightning protection, protection voltage 3.2 kV

**NOTICE**

The Inverter can be only connected to low-voltage grid. (380 / 400 / 415 Vac, 50 / 60 Hz).

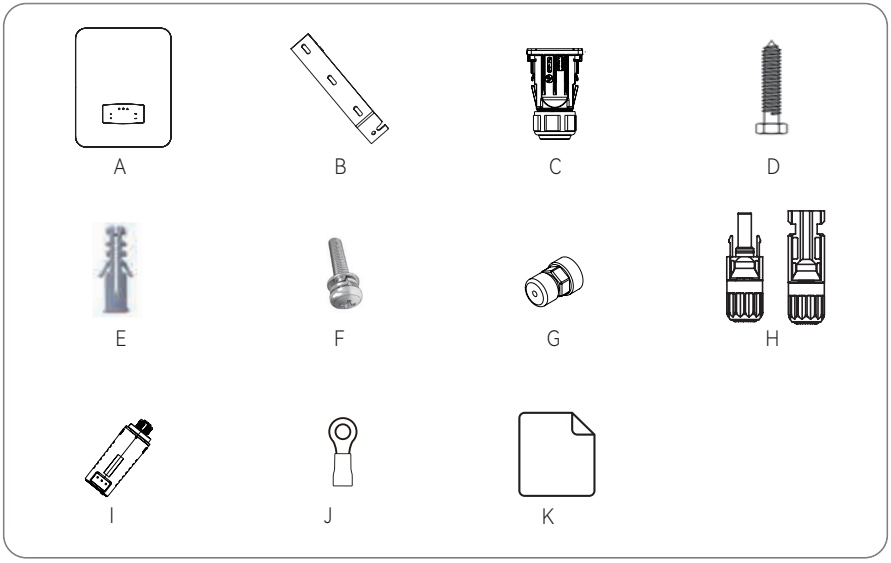
## 2.1 Pre-installation

### 2.1.1 Unpacking & Package List

**Unpacking**

On receiving the inverter, please check to make sure the packing and all components are not missing or damaged. Please contact your dealer directly for supports if there is any damage or missing components.

**Packing List**




| Item | Description | Quantity |
|---|---|---|
| A | Solar Inverter | 1 pc |
| B | Wall Mounting Bracket | 1 pc |
| C | AC Waterproof Cover | 1 pc |
| D | Bracket Screw | 3 pcs |

| Item | Description | Quantity |
|---|---|---|
| E | Expansion Tube | 3 pcs |
| F | Security Screw | 1 pc |
| G | Zero-Injection Connector(Optional) | 1 pc |
| H | DC Connector sets | 3 / 4 pcs |
| I | Monitor Module | 1 pc |
| J | Grounding Terminal | 1 pc |
| K | Documents | 4 pcs |

**NOTICE**

DC connectors NO.: 7-8kW 3 pairs, 9-10kW 4 pairs.

### 2.1.2 Product Overview

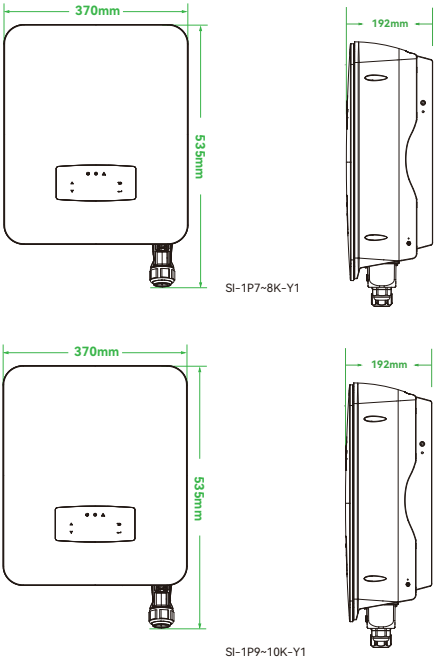
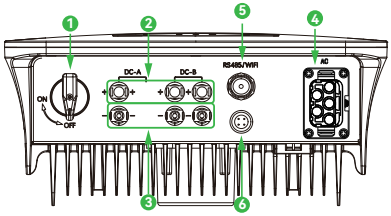


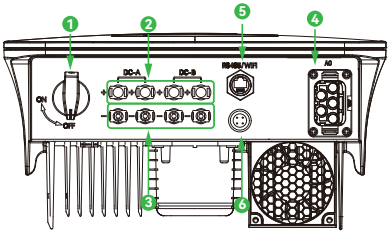

Figure 2-1 Product Overview

## Overview of the Connection Area

**SI-1P7~8K-Y1**




**SI-1P9~10K-Y1**



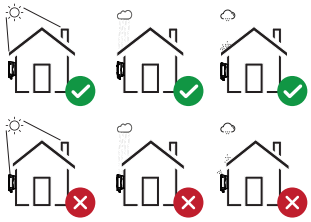

| | | | |
|---|---|---|---|
| 1 | DC Switch | 4 | AC Connector |
| 2 | DC Connectors ( + ) For PV Strings | 5 | Zero-Injection Port (Optional) |
| 3 | DC Connectors ( − ) For PV Strings | 6 | Monitor Module |

Figure 2-2 Inverter Terminals

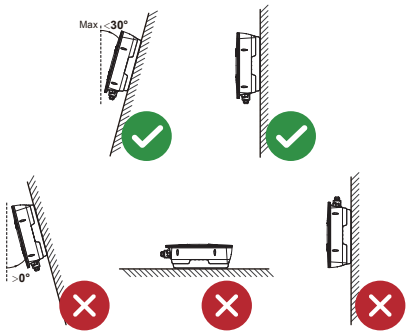
### 2.1.3 Mounting Location

The inverters are designed for indoor and outdoor installation (IP66), to increase the safety, performance and lifespan of the inverter, please select the mounting location carefully based on the following rules:

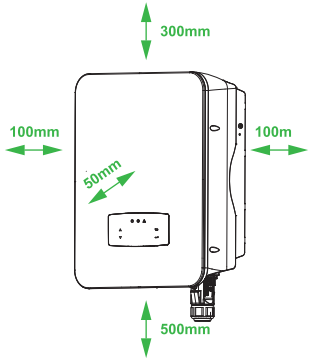
- The inverter should be installed on a solid surface, far from flammable or corrosion materials, where is suitable for inverter's weight and dimensions.
- The ambient temperature should be within -25 ℃ ~ 60 ℃ (between -13 ℉ and 140 ℉).
- The installation of inverter should be protected under shelter. Do not expose the inverter to direct sunlight, water, rain, snow, spray lightning, etc.



- The inverter should be installed vertically on the wall, or lean back on plane with a limited tilted angle. Please refer to below picture.

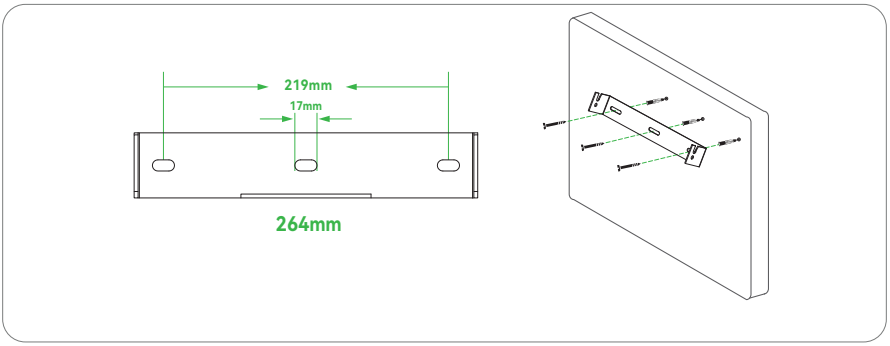



- Leave the enough space around inverter, easy for accessing to the inverter, connection points and maintenance.

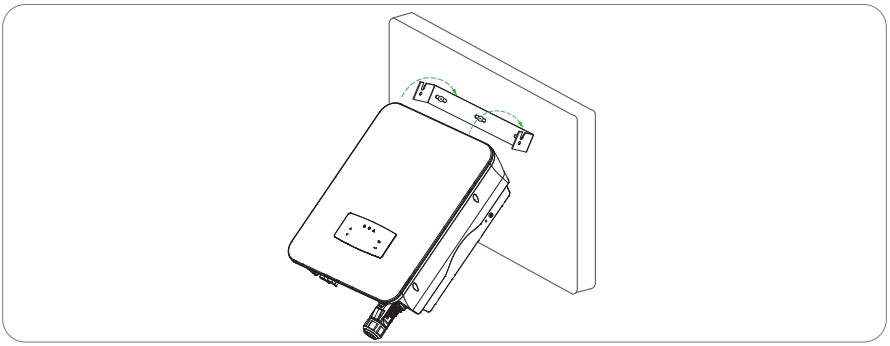


## 2.2 Mounting

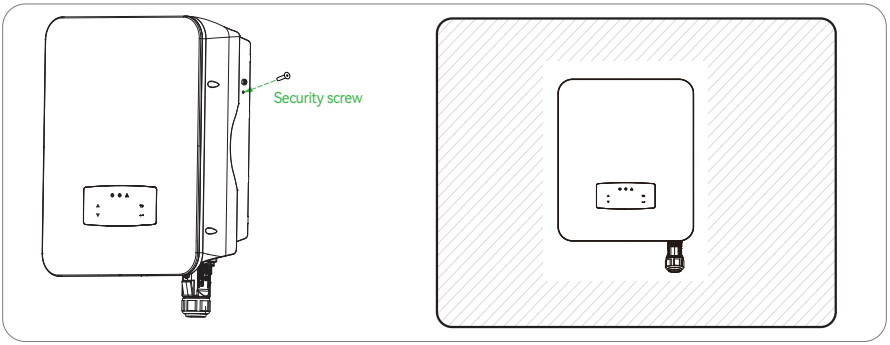
Step 1




Step 2



Step 3



## 3.1 PV Connection

SI-1P7K-Y1 and SI-1P8K-Y1 inverters have dual MPPT channels, channel A includes 1 PV string input, and channel B includes 2 PV string inputs. For the best results, please ensure that each pair of photovoltaic input terminals is connected to a photovoltaic string separately. Otherwise, the inverter will trigger the voltage or current protection automatically. Please make sure below requirements are followed:.

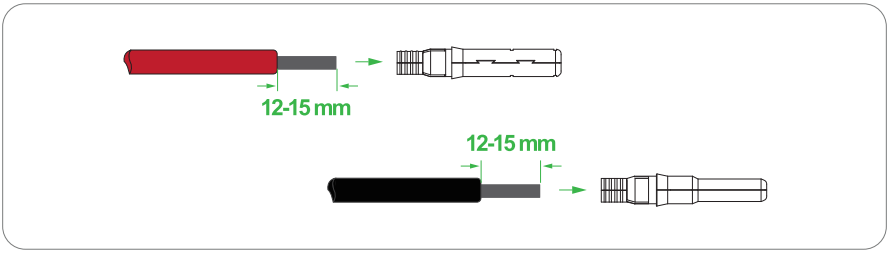
- The open-circuit voltage and short-circuit current of PV string should not exceed the reasonable range of the inverters.
- The isolation resistance between PV string and ground must exceed 10 kΩ.
- The polarity of PV strings are correct.
- Use the DC plugs in the accessory.
- The lightning protector should be equipped between PV string and inverter.
- Disconnect all of the PV (DC) switch during wiring.

**WARNING!**

The fatal high voltage may on the DC side, please comply with electric safety when connecting.

Please make sure the correct polarity of the cable connected with inverter, otherwise inverter could be damaged.

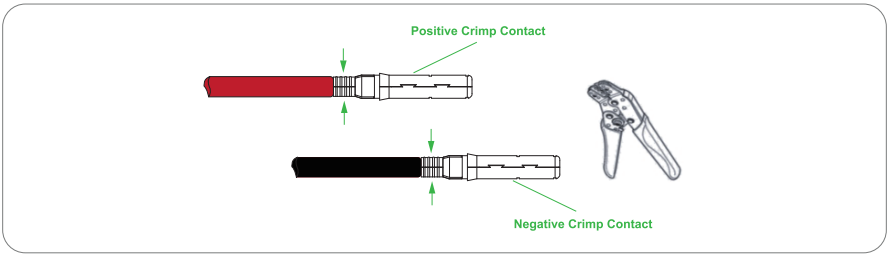
Step 1




**NOTICE**

PV cable suggestion, Cross-section: 4mm².

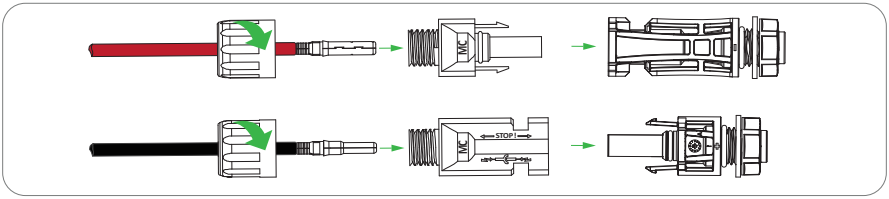
Step 2




## NOTICE

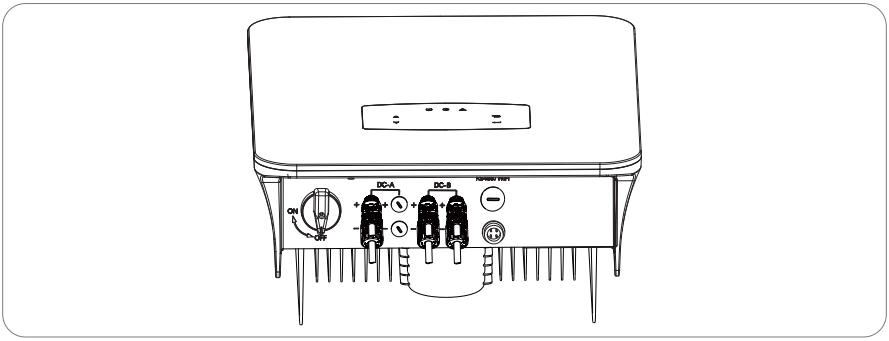
Please use PV connector crimper to pinch the point of the arrow.

Step 3



## NOTICE

You'll hear click sound when the connector assembly is correct.




## NOTICE

PV string suggestion: SI-1P7~8K-Y1 connect 2 PV strings, SI-1P9~10K-Y1 connect 2 or 3 PV strings. We are recommend you use dual MPPTS, Solar panels use voltage both 300-500V , not exceed 500V to MPPT.

## 3.2 Grid Connection

The on-grid PV inverters work with grid (220/230/240 Vac, 50/60 Hz).

The external AC switch should be installed between inverter and grid to isolate from grid. Please make sure below requirements are followed before connecting AC cable to the inverter.

- The AC (grid) voltage should not exceed the reasonable range of the inverters.
- The phase-line from AC distribution box are correctly connected.
- Use the AC plugs in the accessory.
- The surge protector should be equipped between grid and inverter.
- Disconnect the AC (grid) switch during wiring.

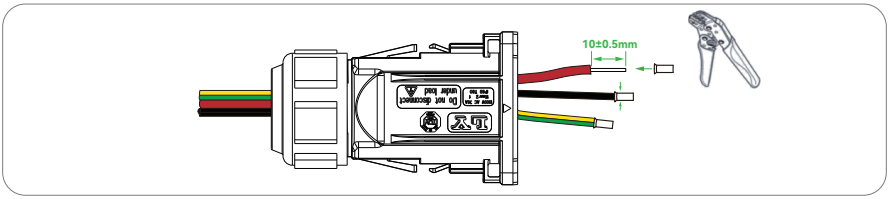
**WARNING!**

The fatal high voltage may on the AC side, please comply with electric safety when connecting.

Please make sure the right line of AC grid connected with inverter, otherwise inverter could be damaged.

Step 1

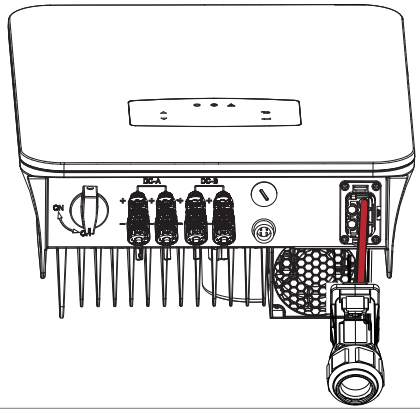
Like picture shown below, pass the AC cable (cross section for 7-8kW ≥ 6mm²(copper) / 9-10kW≥10mm² (copper) or 16mm² (aluminum) ) through the junction box wth a stripped length of 10±0.5mm, use crimping pliers to crimp the stripped wire harness to the terminal, wrap the joint position with insulation tape.




**NOTICE**

The wiring terminals should be wrapped with insulation tape, otherwise it will cause a short circuit and damage the inverter.

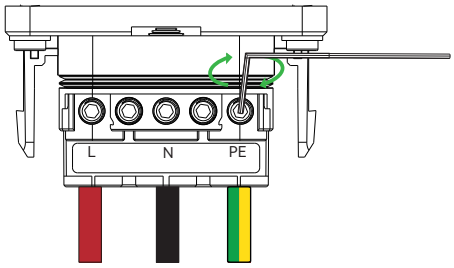
Step 2

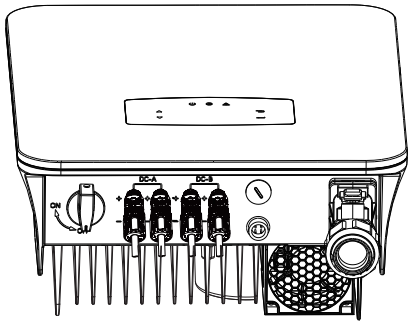



U=AC L=Live line, W=AC N=Neutral line.

Unscrew the row of screws, insert the wire harness into the U,W,PE caps one by one, and tighten the screws.

Step 3



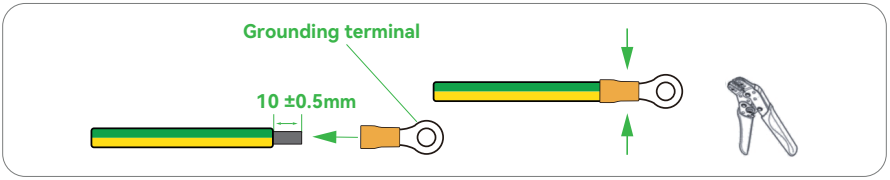



## 3.3 Earth Connection

**NOTICE**

The user must connect a protective earth (PE) terminal to prevent electric shock. And make sure this PE terminal is properly grounded.

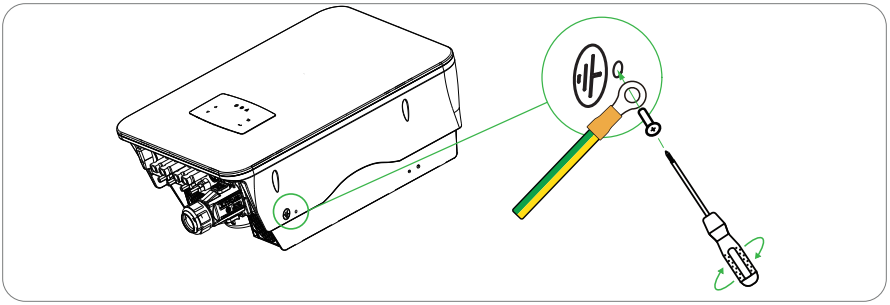
Step 1




**NOTICE**

Copper cable or aluminum cable Cable diameter ≥ 6mm$^2$ / 10 AWG

Step 2



Fix the yellow-green PE wire to the ground hole on the lower right side of the inverter with screws, make sure that the PE terminal is properly grounded.

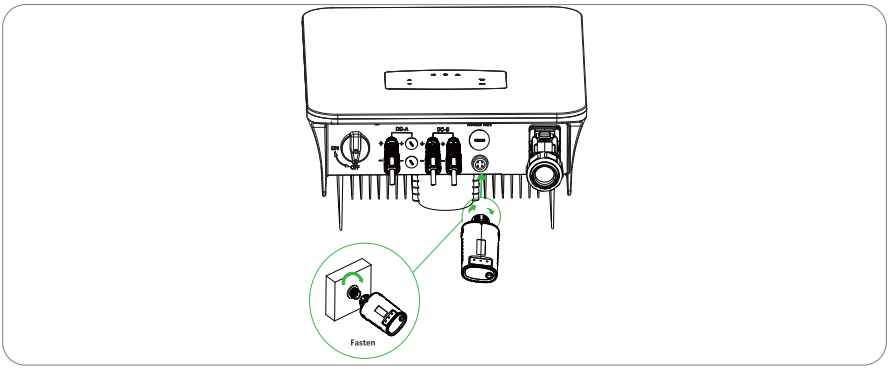
## 3.4 Communication Connection

The monitoring module could transmit the data to the cloud server, and display the data on the PC, tablet and smart-phone.

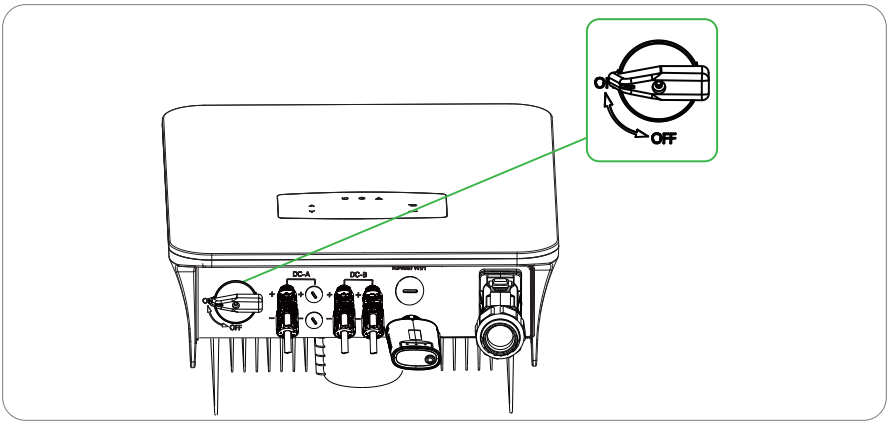
### Install the WIFI / Ethernet / GPRS / RS485 Communication

WIFI / Ethernet / GPRS / RS485 communication is applicable to the inverter. Please refer to "Communication Configuration Instruction" for detailed instruction.

Step 1




Step 2

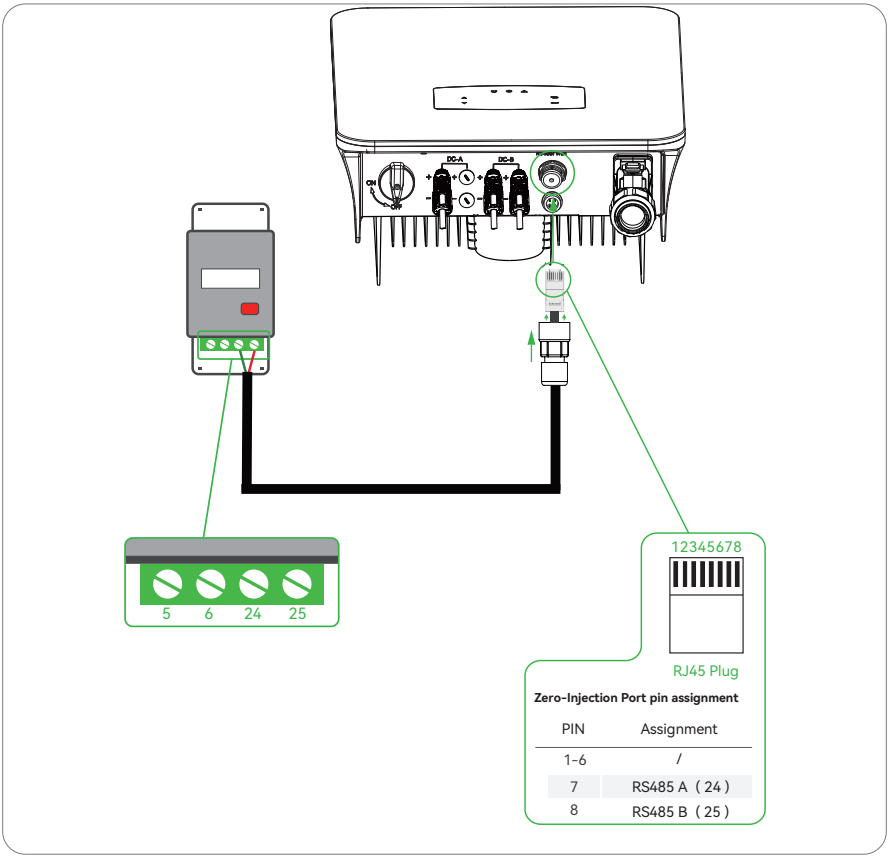



Connect AC connection and turn on AC breaker, wait till the LED indicators on WiFi module flashing.

## 3.5 Zero-injection Smart Meter (Optional)

Smart meter is an intelligent control equipment which is used for on-grid inverters. Its main function is to measure the forward and reverse power on the grid-connected side, and transmit data to the inverter through RS485 communication to ensure that the power of the inverter is less than or equal to the user's home load, and no current flows into the grid.

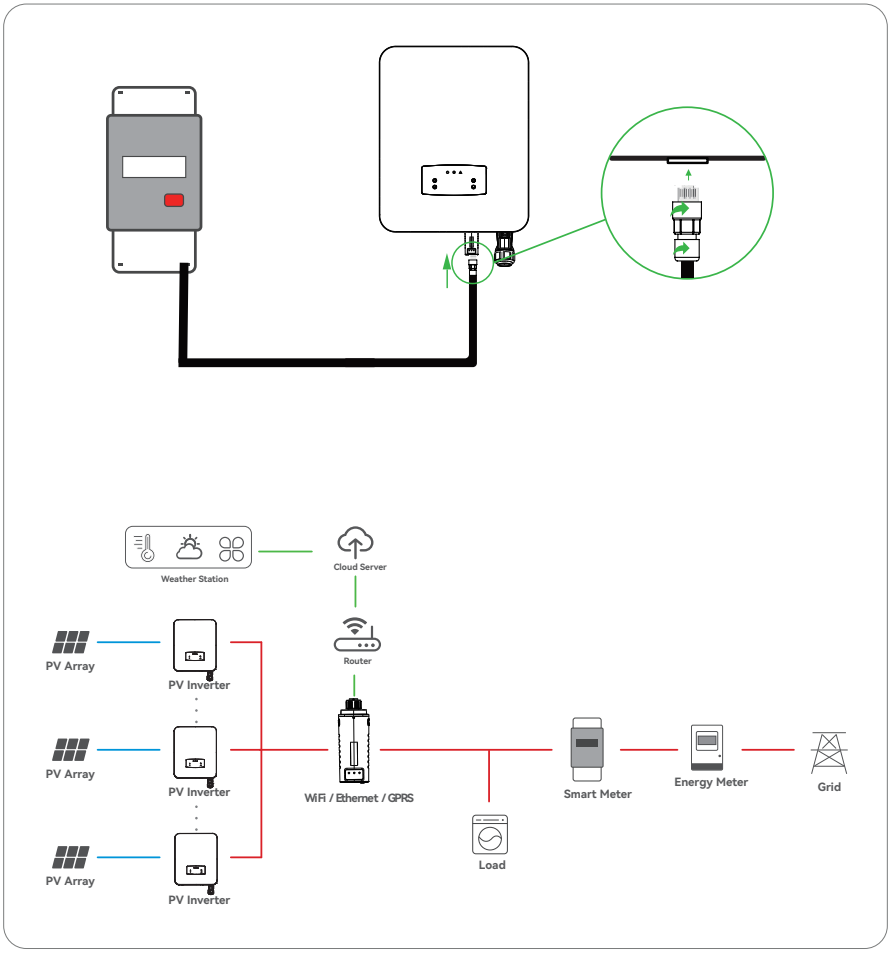
Step 1




**Zero-Injection Port pin assignment**

| PIN | Assignment |
|---|---|
| 1-6 | / |
| 7 | RS485 A（24） |
| 8 | RS485 B（25） |

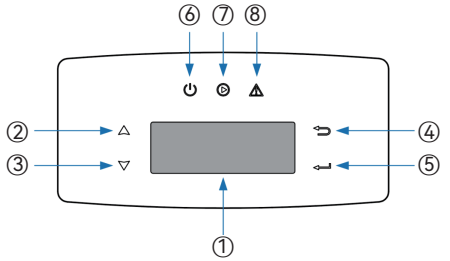
Step 2




## NOTICE

The Inverter could be connected in parallel with Smart Meter, make sure the total load power not exceed Smart Mater's limitation.

## 4.1 Control Panel



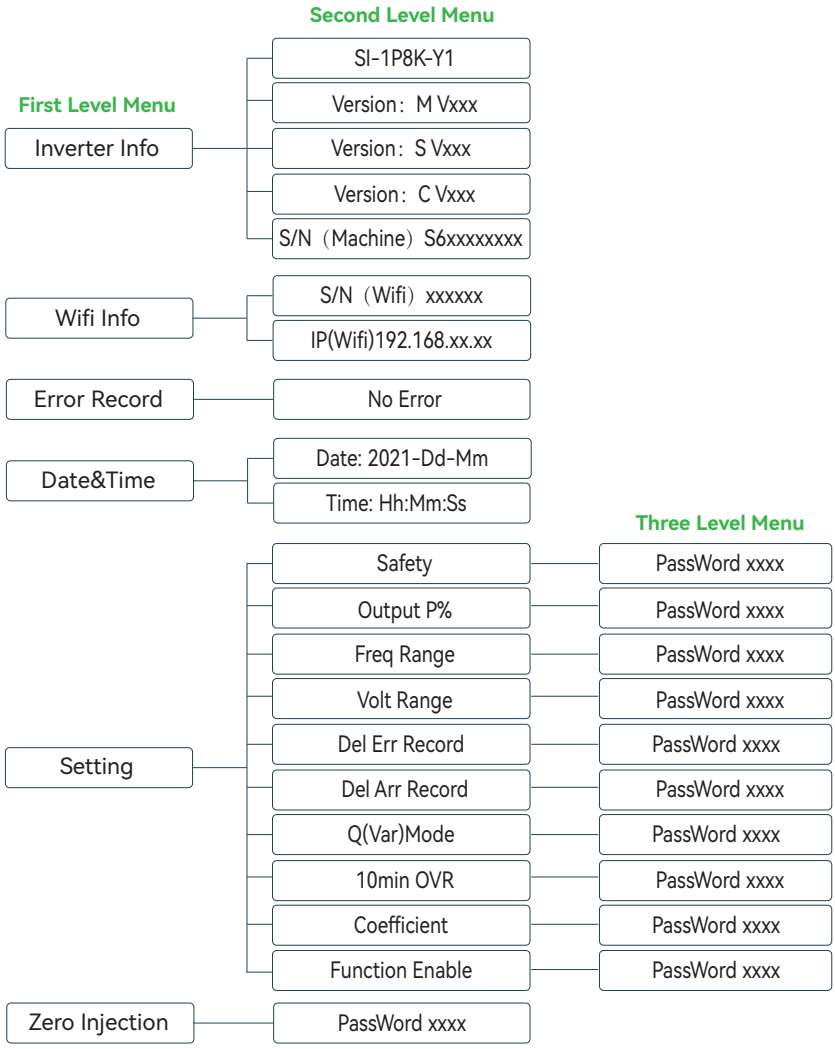

| | | | |
|---|---|---|---|
| ① | LCD Display | ⑤ | ENT Touch Button |
| ② | UP Touch Button | ⑥ | POWER LED Indicator |
| ③ | DOWN Touch Button | ⑦ | GRID LED Indicator |
| ④ | ESC Touch Button | ⑧ | FAULT LED Indicator |

Figure 4-1 Control Panel

Table 4-1 LED Description

| Sign | Power | Color | Explanation |
|---|---|---|---|
| POWER | ON | Green | The inverter is stand-by |
| | OFF | | The inverter is power off |
| GRID | ON | Green | The inverter is feeding power |
| | OFF | | The inverter is not feeding power |
| FAULT | ON | Red | Fault occurred |
| | OFF | | No fault |

## 4.2 Menu Structure

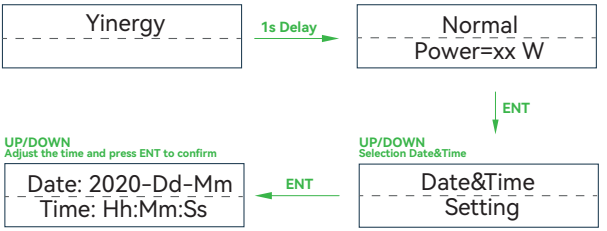


### Explanation of LCD Display Content

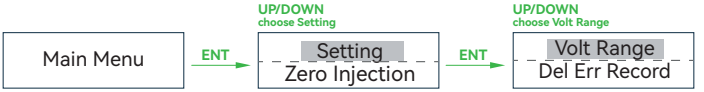
| Nouns | Explanation |
|---|---|
| Inverter Info | Display the serial number and firmware version of inverter |
| Error Record | Check the inverter's fault records with date and time |
| Wifi Info | Display the WIFI serial number and assigned IP address |
| Date & Time | Set date and time of the inverter |
| Setting | Set the protection parameters of inverter |
| Function Enable | Countercurrent power switch |
| Zero Injection | Meter switch |

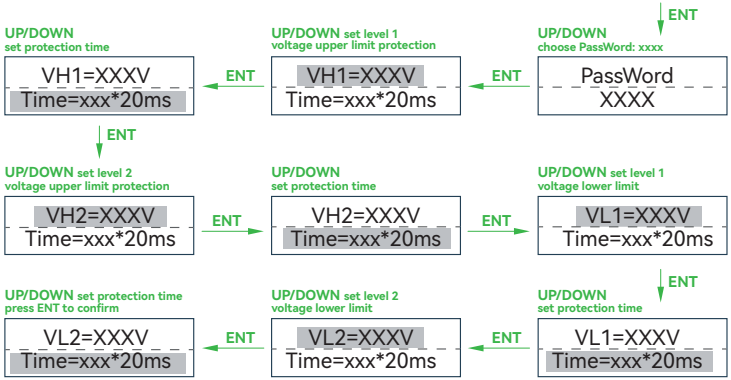
## 4.3 Setting

### 4.3.1 Startup

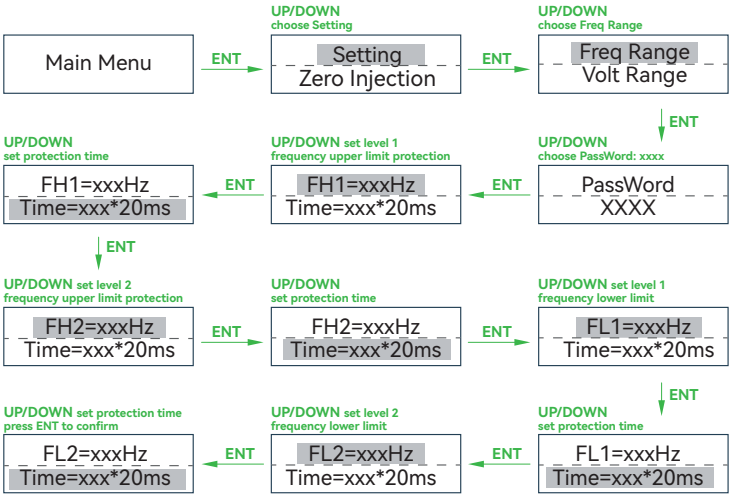



### 4.3.2 Voltage Range






### 4.3.3 Frequency Range




**NOTICE**

The parameters setting only works after the inverter is restarted.

# 5 Commissioning



Before starting up commissioning at site, please make sure below procedures and requirements are fully meet.

- Mounting location is meet the requirements.
- All of the electrical wiring is firmly connected, including PV wiring, Grid wiring and Earth wiring.
- The inverter setting has been finished accordingly to local standards or regulations.

### Commissioning Procedures

- Turn on the AC switch between inverter output and the public grid;
- Turn on the DC switch on the inverter;
- Turn on the PV switch of the system.

## 6.1 Shut Down

- Turn off the DC switch on the inverter.
- Turn off the DC switch between PV panels and the inverter (if any).
- Close the AC switch between the inverter and the public grid.

**NOTICE**

The inverter will be operable after minimum 5 minutes.

## 6.2 Restart

- Shut down the inverter according to Chapter 6.1.
- Start-up the inverter according to Chapter 5.

## 7.1 Maintenance

Periodically maintenance are necessary, please follow steps as below.

PV connection: twice a year

AC connection: twice a year

Earth connection: twice a year

Heat sink: clean with dry towel once a year.

## 7.2 Troubleshooting

Fault messages will be displayed when fault occurs, please according to troubleshooting table find related solutions.

### Troubleshooting List

| Type of Fault | Name | Description | Recomm end Solution |
|---|---|---|---|
| PV Fault | Isolation Fault | The impedance between ground and PV (+) & PV (-) is too low, beyond the reasonable range. | • Check whether the battery and wiring are immersed in water and whether the insulation layer is damaged, and then make corrections.<br>• If the fault occurs continuously and frequently, please ask help for local distributors. |
| | PV Volt Low | The DC input voltage from PV strings is below the minimum reasonable value. | • Reconfigure the PV strings by increasing the number of PV strings to increase DC input voltage.<br>• Contact local distributors for suggestions and solutions. |
| | PV Volt High | The DC input voltage from PV strings is exceeding the maximum reasonable value. | • Reconfigure the PV strings by reducing the number of PV strings to decrease DC input voltage.<br>• Contact local distributors for suggestions and solutions. |
| | PV1 Over Current | PV1 current is too high, protection is triggered. | • Power off, then restart (Ref. Chapter 6)<br>• If fault still occurs continuously and frequently, please ask help for local distributors. |
| | PV2 Over Current | PV2 current is too high, protection is triggered. | |

| Type of Fault | Name | Description | Recomm end Solution |
|---|---|---|---|
| Grid Fault | Island Fault | The public grid is outage or the grid is disconnected to the inverter. | • The fault will disappear automatically when the public grid go back to normal.<br>• Contact the local distributor or grid company to adjust the voltage protection parameters. |
| | 10min Over Volt | The 10-minute average value of the grid voltage is abnormal and beyond the protection range. | • Power off, then restart (Ref. Chapter 6)<br>• If fault still occurs continuously and frequently, please ask help for local distributors. |
| | Grid Volt Fault | Grid voltage is abnormal, beyond the protection range. | • The fault will disappear automatically when the grid voltage is back to normal.<br>• If fault still occurs continuously and frequently, please ask help for local distributors. |
| | Grid Freq Fault | Grid frequency is abnormal, beyond the protection range. | • The fault will disappear automatically when the grid frequency is back to normal.<br>• If fault still occurs continuously and frequently, please ask help for local distributors. |
| DC Fault | Bus Low Fault | When inverter is running, bus voltage is lower than the normal value beyond the protection range. | • Power off, then restart (Ref. Chapter 6)<br>• If fault still occurs continuously and frequently, please ask help for local distributors. |
| | Bus High Volt | Bus voltage is too high and beyond the protection range | |
| | Bus Unbalance | Bus voltage unbalanced, beyond the protection range. | |
| | DC Offset Fault | The DC component of grid-connected current is too high that beyond the reasonable range. | |
| AC Fault | Ground I Fault | The ground current of AC output is too high that beyond the reasonable range. | • Check whether the PV panel has good ground insulation and the ground wire connection is good, if not, repair them.<br>• Power off, then restart (Ref. Chapter6)<br>• If fault still occurs continuously and frequently, please ask help for local distributors. |
| | Relay Fault | The relay could not be disconnected or connected. | |
| | Inv Over Current | Inverter current is high that beyond the reasonable range. | • Power off, then restart (Ref. Chapter 6)<br>• If fault still occurs continuously and frequently, please ask help for local distributors. |

| Type of Fault | Name | Description | Recomm end Solution |
|---|---|---|---|
| System Fault | Over Temperature | The temperature of the installation environment is too high or too low, beyond the reasonable range.<br>The temperature of the cooling device is high or low thet beyond the protection range.<br>The temperature of the CPU is high that beyond the protection range. | • Improve or change the installation environment to adjust the inverter installation environment temperature to normal range.<br>• Power off, then restart.<br>• If fault still occurs continuously and frequently, please ask help for local distributors. |
| | Auto Test Fail | Automatic test failed. | • Power off the inverter to check the AC connection, then restart.<br>• If fault still occurs continuously and frequently, please ask help for local distributors. |
| | No Utility | No continuous utility | |
| | Grid Volt AD | Grid voltage AD value deviation is too high, beyond the protection range. | • Power off, then restart.<br>• If fault still occurs continuously and frequently, please ask help for local distributors. |
| | Self Lock | Inverter is locked at the waiting interface. | |
| | Consistent Fault | The detection results of the two CPUs for the same voltage and frequency are different. | |
| | Device Fault | Grounding is abnormal or the ground wire is disconnected. | • Check whether the ground wire of the inverter is properly connected and the ground impedance is too high, if it is, make corrections.<br>• Power off, then restart (Ref. Chapter 6)<br>• If fault still occurs continuously and frequently, please ask help for local distributors. |
| Inner Warnning | Fan Fault | The fan can not work when is started up. | • Check if there is objects which blockingthe fan rotation and remove it. |
| | Eeprom Fault | Eeprom abnormal | • Power off, then restart.<br>• If fault still occurs continuously and frequently, please ask help for local distributors. |
| | Communication Lose | CPU to Flash abnormal<br>CPU to Eeprom abnormal<br>Main CPU to auxiliary abnormal<br>Main CPU to HMI abnormal | |

- PV Input

| Model | SI-1P7K-Y1 | SI-1P8K-Y1 | SI-1P9K-Y1 | SI-1P10K-Y1 |
|---|---|---|---|---|
| Max. DC Power ( W ) | 9800 | 11200 | 12600 | 14000 |
| Max. DC Voltage ( V ) | 600 | | | |
| MPPT Voltage Range ( V ) | 70 -550 | | | |
| MPPT Full Power Voltage Range ( V ) | 220 - 550 | | | |
| Rated Input Voltage ( V ) | 360 | | | |
| Start-up Voltage ( V ) | 70 | | | |
| Max. Input Current ( A ) | 14 + 26 | | 26 + 26 | |
| Max. Short Current ( A ) | 18 + 35 | | 35 + 35 | |
| No. of MPP Tracker / No. of PV String | 2 / 3 | | 2 / 4 | |
| Input Connector Type | MC4 | | | |

- AC Output

| Model | SI-1P7K-Y1 | SI-1P8K-Y1 | SI-1P9K-Y1 | SI-1P10K-Y1 |
|---|---|---|---|---|
| Max. Output Power ( W ) | 7700 | 8800 | 9900 | 11000 |
| Nominal Output Power ( W ) | 7000 | 8000 | 9000 | 10000 |
| Max. Output Current ( A ) | 33.6 | 38.3 | 45 | 50 |
| Nominal Output Voltage ( V ) | L / N / PE, 220 Vac, 230 Vac, 240 Vac | | | |
| Grid Voltage Range | 180 Vac - 276 Vac (according to local standard) | | | |
| Nominal Output Frequency ( Hz ) | 50 / 60 | | | |
| Grid Frequency Range | 45 - 55 Hz / 54 - 66 Hz (according to local standard) | | | |
| Output Power Factor | 1 default (adjustable from 0.8 leading to 0.8 lagging) | | | |
| Output Current THD | < 3% | | | |

- Efficiency

| Model | SI-1P7K-Y1 | SI-1P8K-Y1 | SI-1P9K-Y1 | SI-1P10K-Y1 |
|---|---|---|---|---|
| Max. Efficiency | 98.20% | | 98.32% | 98.40% |
| Euro Efficiency | 97.95% | 98.00% | | 98.10% |

- Protection

| Model | SI-1P7K-Y1 | SI-1P8K-Y1 | SI-1P9K-Y1 | SI-1P10K-Y1 |
|---|---|---|---|---|
| PV Reverse Polarity Protection | Yes | | | |
| PV Insulation Resistance Detection | Yes | | | |
| AC Short Circuit Protection | Yes | | | |
| AC Over Current Protection | Yes | | | |
| AC Over Voltage Protection | Yes | | | |
| Anti-Islanding Protection | Yes | | | |
| Residual Current Detection | Yes | | | |
| Over Temperature Protection | Yes | | | |
| Integrated DC switch | Yes | | | |
| Surge Protection | Integrated (Type II) | | | |
| Smart IV Curve Scaning | Yes | | | |
| Quick Arc Fault Circuit Interruption | Optional | | | |

- General Data

| Model | SI-1P7K-Y1 | SI-1P8K-Y1 | SI-1P9K-Y1 | SI-1P10K-Y1 |
|---|---|---|---|---|
| Dimensions (W x H x D, mm) | 370 x 510 x 192 | | 370 x 535 x 192 | |
| Weight ( kg ) | 17 | | 18 | |
| Protection Degree | IP66 | | | |
| Enclosure Material | Aluminum | | | |
| Ambient Temperature Range (℃) | -25 ~ +60 ℃ | | | |
| Humidity Range | 0 -100% | | | |
| Topology | Transformerless | | | |
| Communication Interface | RS485 / WiFi / Wire Ethernet / GPRS (optional) | | | |
| Cooling Concept | Convection | | | |
| Noise Emission ( db ) | < 40 | | | |
| Night Power Consumption ( W ) | < 1 | | | |
| Max. Operation Altitude ( m ) | 4000 | | | |

- Certifications and Standards

| Model | SI-1P7K-Y1 | SI-1P8K-Y1 | SI-1P9K-Y1 | SI-1P10K-Y1 |
|---|---|---|---|---|
| EMC Standard | EN/IEC 61000-6-2, EN/IEC 61000-6-3, EN61000-3-2, EN61000-3-3, EN61000-3-11, EN61000-3-12 | | | |
| Safety Regulation | IEC 60068, UL1741, EN62109 | | | |
| Grid-connection | IEEE1547, CSA C22, EN50549, VDE4105, VDE0126, RD1699, ABNT NBR16149 & 16150, AS4777.2, NB/T32004, G98/G99, IEC61727 | | | |

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