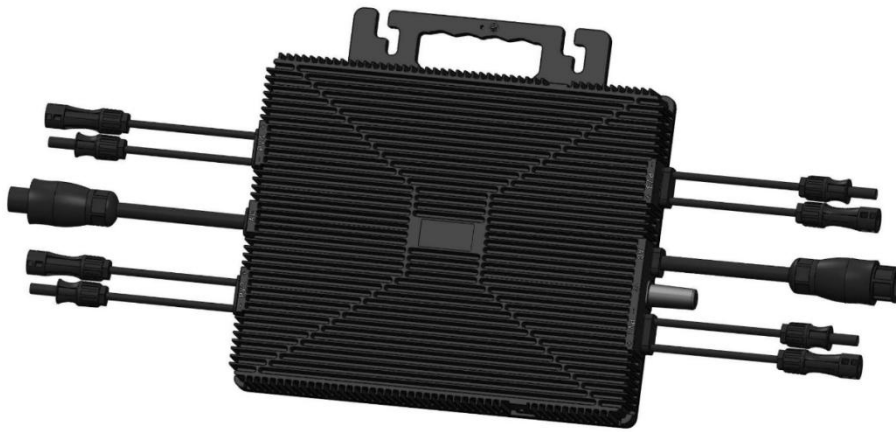


Microinverter User's Manual

V 1.0



Microinverter
Model

SPD-1600M
SPD-1800M
SPD-2000M

Before using this product, read this document carefully to understand and use it correctly.

Keep this document in a safe place for future reference.

Improper operation may cause injury or damage.

By using this product, you agree to the terms and conditions in this document.

The Company is not liable for damages due to improper use.

The Company has the final interpretation of this document and related documents.

Check the official website for updates to this document.

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1. Important notes

1.1. Product Scope

This manual describes the assembly, installation, commissioning, maintenance and troubleshooting of the following models of microinverter.

1.2. Important safety instructions

- ① Before installing, using or servicing this product, please read all documentation carefully, which may have changed due to product updates or other reasons.
- ② All operations, including transportation, installation, startup and maintenance, must be performed by trained and qualified personnel.
- ③ Before installation, check the packaging and appearance of the unit to ensure that it has not been damaged during transportation.
- ④ Before connecting, make sure all cables and plugs are intact and dry to avoid electric shock.
- ⑤ Before the end of the installation, you should make sure that the solar PV panels, microinverter is disconnected from the home power supply.
- ⑥ Personal protective equipment such as gloves and goggles must be used during installation.
- ⑦ Do not install or operate the equipment under extreme weather conditions, such as lightning, snow, heavy rain, strong winds.
- ⑧ The warning signs on the equipment must not be damaged, painted or torn off.
- ⑨ After installation, remove any remnants of the installation, such as cut cable ties, torn insulation, etc.
- ⑩ Do not attempt to repair the microinverter, if a malfunction occurs, contact our customer support department and initiate the replacement process. Private repair or opening the microinverter will void the warranty policy.
- ⑪ Understand the components and functions of the grid-connected PV system and make sure that all electrical connections, as well as the voltage and frequency of the equipment, comply with local electrical standards.
- ⑫ Use extreme caution whenever disconnecting the inverter from the utility grid, as certain components may retain enough electrical charge to create an electrical shock hazard. Danger of electric shock.

- ⑬ Make sure that the microinverter is securely mounted to prevent accidents or damage to the product from falling.
- ⑭ For safety reasons, the device should use original or authorized cables, we are not responsible for damage to the device caused by the use of third-party accessories.

1.3. Environmental requirements

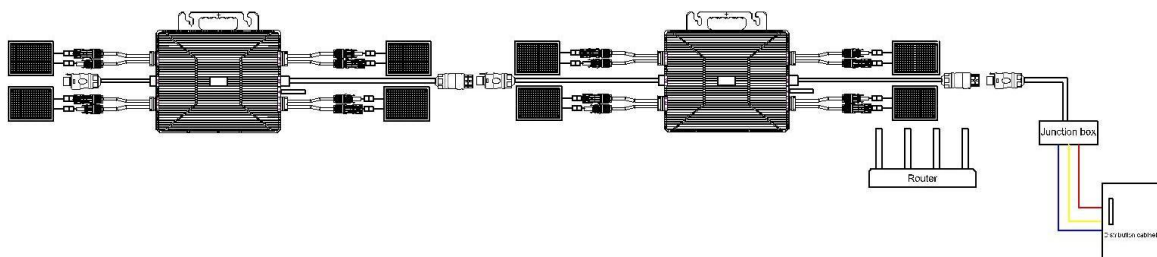
- ① Make sure the equipment is installed, operated or stored in a well-ventilated area; inadequate ventilation can cause permanent damage to the equipment.
- ② Do not install or place the equipment in a strong electrical and magnetic field environment to avoid radio interference.
- ③ Do not install the equipment in flammable, explosive, corrosive, extremely hot, cold and humid environments.
- ④ Do not install the device where children and pets can touch it.

2. Overview

2.1. Introduction to the SPD series microinverter

The SPD series microinverter SPD-1600M, SPD-1800M, SPD-2000M solar energy system are designed for grid-tied applications, as shown in the system diagram below. It consists of: SPD series microinverter, Wi-Fi Router, Monitoring and Analysis Cloud Platform.

The SPD series microinverter enhances system power generation, improves safety, increases system reliability and simplifies the design, installation, maintenance and management of solar energy system



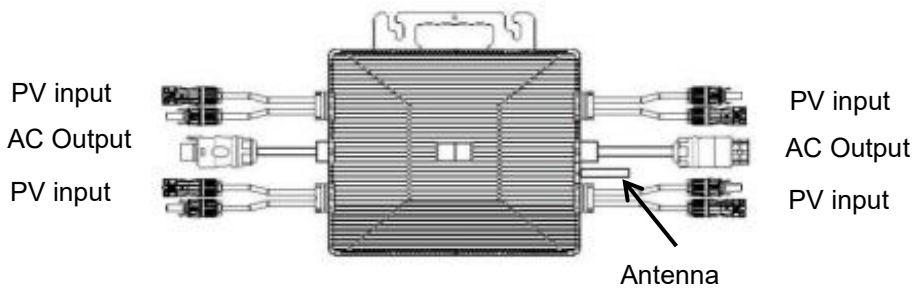
2.2. Microinverter Overview

SPD series microinverter including SPD-1600M, SPD-1800M, SPD-2000M, they are able to cater today's mainstream solar modules. The inverter is an isolated inverter with an internal isolation transformer (reinforced insulation). Innovation and rigorous design have maximized energy production. The product is full potted by silicone glue to reduce stress on electronic components, one hand enhance heat dissipation, other hand improve waterproofing and ensure reliability through stringent testing methods. System monitoring is available around the clock via an app or web portal, facilitating convenient operation and maintenance.

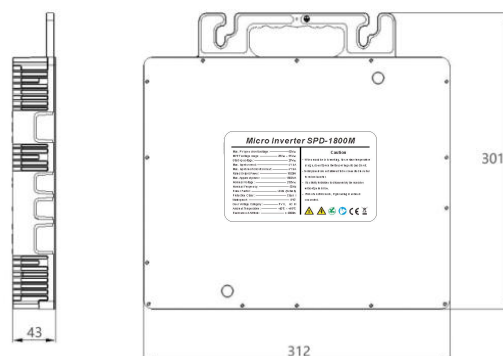
Main features of the SPD series microinverters:

- Accommodates 4 solar panels per unit ($V_{oc} < 60 V_{DC}$)
- IP67-rated for high-level protection
- Wi-Fi communication capabilities
- Built-in safety protection relay
- Compatible with crystalline silicon modules

2.3. Functionality



2.4. Dimension



2.5. System monitoring

The microinverter is connected to the Internet through a broadband router, and after following the operating instructions to connect to the system platform, the platform will display current and historical performance trends and informs the status of the PV system in real time.

3. Installation

The installation of microinverter solar system is user-friendly. The microinverter can be easily mounted on the module rack. Installation must comply with local regulations and technical standards.

Special Note: We recommend installing a residual-current device only as required by local electrical codes.

Warning

- ① Adhere to local electrical codes for installation.
- ② Only qualified professionals should perform the installation and replacement of the microinverter.
- ③ Ensure reliable grounding of the solar modules and racks used with the microinverter.
- ④ Before installing and using the microinverter, read all instructions and warnings in this manual, as well as the labels on the microinverter and solar modules.

3.1. Installation tools provided with the microinverter

- AC connector end caps
- Removal tool
- Antenna rod

3.2. Parts and Tools Required by Customer

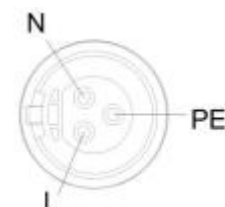
In addition to the solar modules and their related hardware, customers need to prepare:

AC junction box

Hardware suitable for mounting brackets

Socket and wrench for mounting hardware

Multi-meter, safety goggles and other relevant auxiliary tools



3.3. Installation Steps

3.3.1. Step 1: Grid voltage checking

Verify the grid voltage if match the voltage rating on the microinverter's label.

3.3.2. Step 2: Connect the AC connector

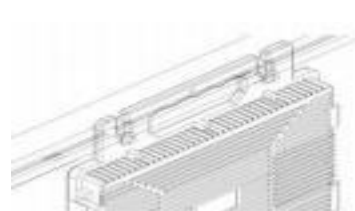
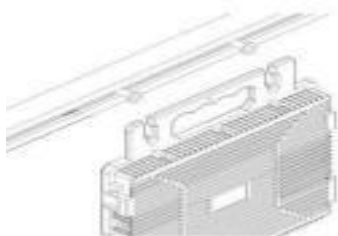
- a. Position the microinverter and AC cable at their appropriate locations.
- b. Connect the AC male port of the microinverter to the combiner box or integrate it into the grid.
- c. Wiring method: Line (L) - brown; Neutral (N) - blue; Protective Earth (PE) - yellow/green.

Warning

- ① Wiring colour may vary by region. Check all the electrical wires before connecting the microinverter to ensure they match. Incorrect wiring can damage the microinverter and is not covered under the warranty. You are advised to use TC-ER12AWG AC cable to connect the microinverter, the diameter of the AC cable must not be smaller than 14AWG.
- ② Do not carry the inverter by the AC cables during transportation.

3.3.3. Step 3: Install the microinverter on the bracket

- a. Mark the position on the bracket where the microinverter will be installed, considering the distance from the solar module's junction box or any other obstructions.
- b. Use the parts and tools recommended by the bracket supplier to secure each microinverter in its designated position. Ensure the grounding clip of the inverter is facing towards the bracket.



Warning

Do not install the microinverter in places directly exposed to sunlight, rain or snow, including the gaps between panels. A fully covered installation point is preferable. Ensure

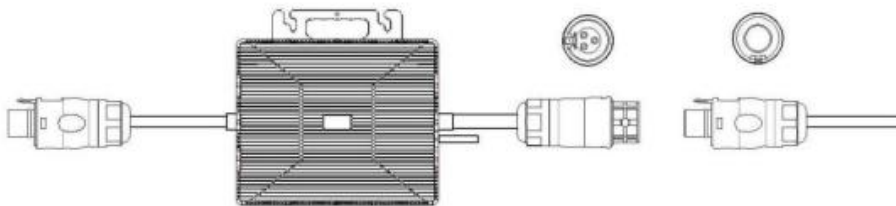
ample ventilation space around the microinverter for cooling. The bracket for the inverter must be reliably grounded.

3.3.4. Step 4: Ground the system

Before connecting the DC input and AC output, the grounding hole provided by the microinverter must be connected to an external ground. The PV modules used to connected to this inverter shall be Class A rating certified according to IEC 61730.

3.3.5. Step 5: Connect the microinverter

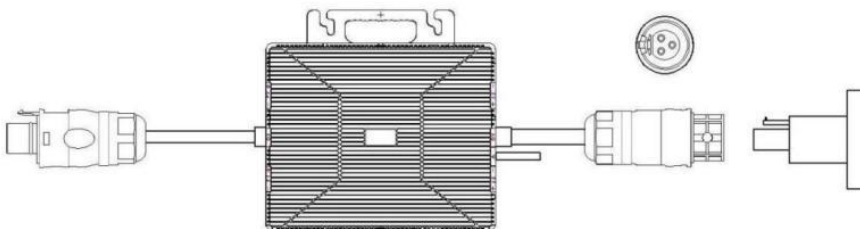
Insert the AC male connector of the microinverter into the AC female connector until a clear 'click' sound is heard.



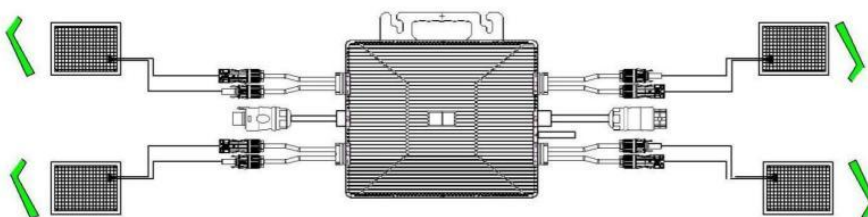
Warning

The maximum number of branches that can be connected cannot exceed 3

3.3.6. Step 6: Install the end cap on the AC cable's female end at the microinverter



3.3.7. Step 7: Connect the microinverter to the solar modules



Warning

The connection cable between the PV and microinverter must be less than 3 meters, the PV module should not be grounded.

3.3.8. Step 8: Connect the microinverter to the grid

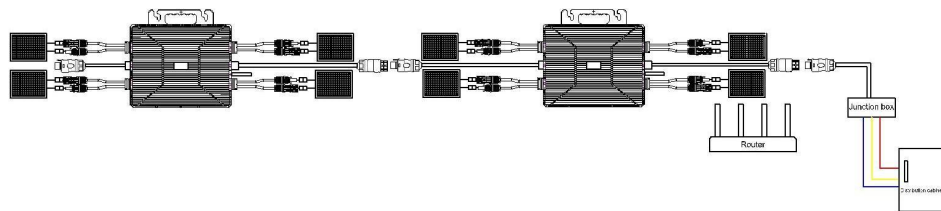
Caution !

Install an AC circuit breaker (air switch) at the grid connection point in accordance with the access capacity or regulatory requirements.

Do not install a residual current device (RCD) for the photovoltaic power system to avoid false triggering of the protection mechanism.

3.3.9. Step 9: Use the AC extension cord.

When the use of an AC extension cord is necessary, users may connect it to the microinverter's AC port. Alternatively, the AC connector (available as an optional purchase) can be used.



3.4. Normal operation of SPD microinverter solar system

To ensure the normal operation of the SPD microinverter solar system:

- Close the AC circuit breaker for each microinverter branch.
- Close the main grid circuit breaker, and the system will start generating electricity after approximately one minute.
- The microinverter's LED behaviour can serve as an indicator of the microinverter's status.

4. Instructions for Monitoring Platform

4.1. Monitoring Platform Download

For residential users of photovoltaic power stations, using the 'Solarman Home' APP is recommended. Scan the QR code below to download the APP or search for 'Solarman Home' in the Google Play Store (Android) or APP Store (iPhone). You can also visit the web version (<https://home.solarmanpv.com>) to view data



Solarman Home

For professionals in the photovoltaic industry, such as dealers, equipment vendors or maintenance service providers, it is recommended to use the 'Solarman Pro' APP. Scan the QR code below to download the APP or search for 'Solarman Pro' in the Google Play Store (Android) or APP Store (iPhone). You can also log in to the web version (<https://pro.solarmanpv.com>) to view data.

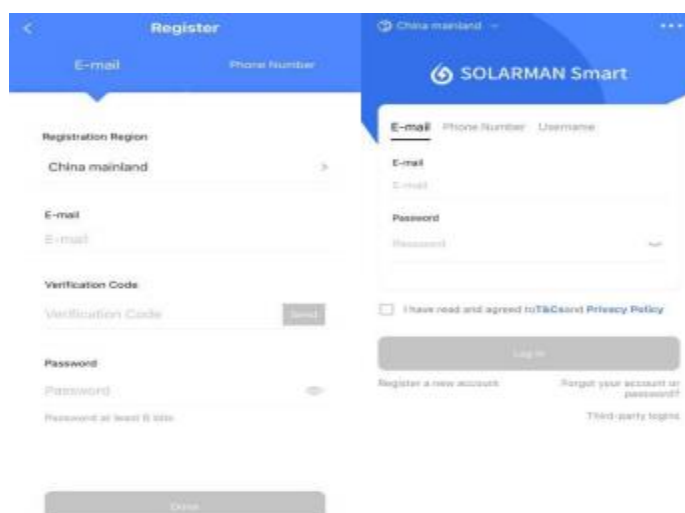


Solarman Pro

4.2. Account Registration (Solarman Home)

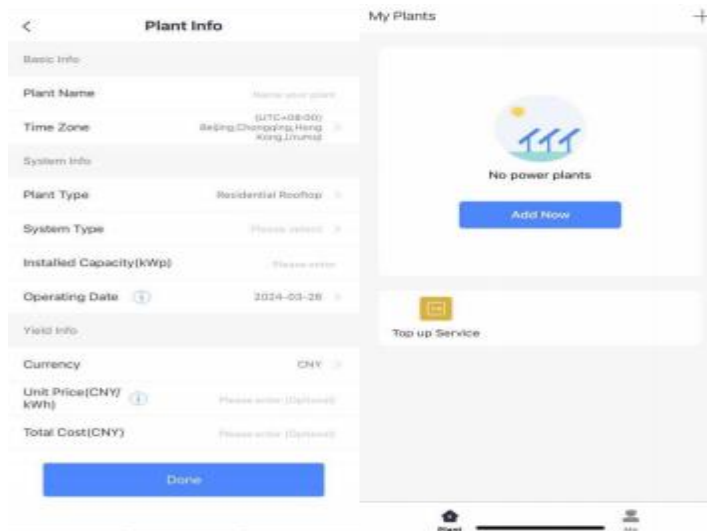
4.2.1. Register New Account

Open the Solarman Home APP and click 'Register New Account' to create an account.



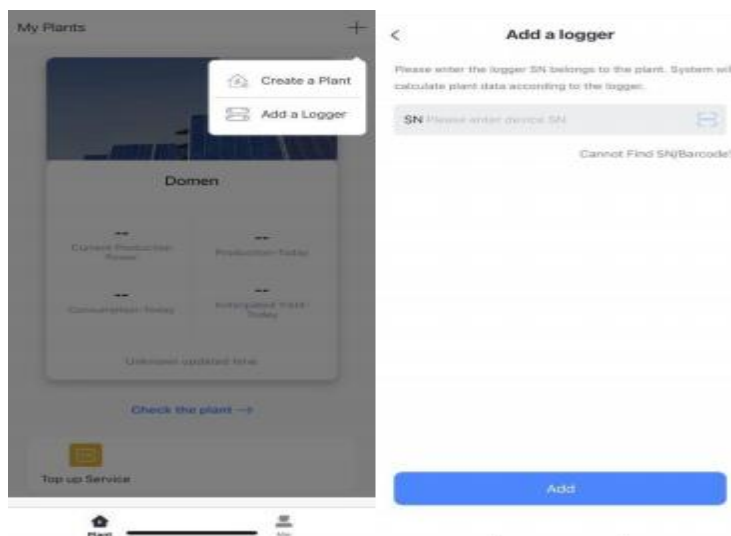
4.2.2. Create a power station

Click 'Add Now' and fill in the basic information.



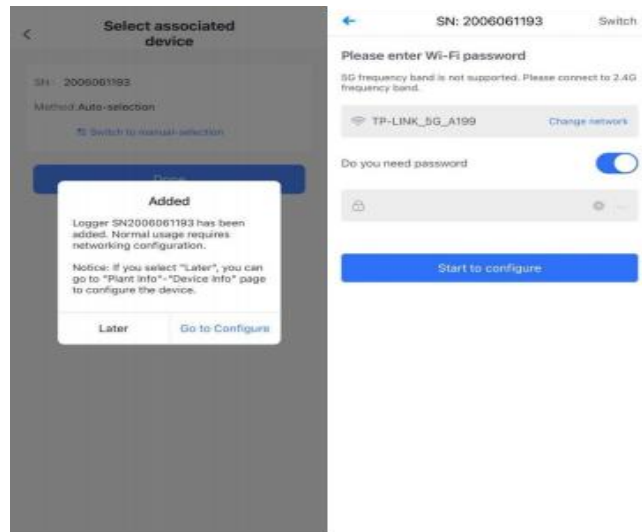
4.2.3. Add a collector

Click '+' in the top right corner, then click 'Add Collector' and manually enter the SN number or scan the QR code.

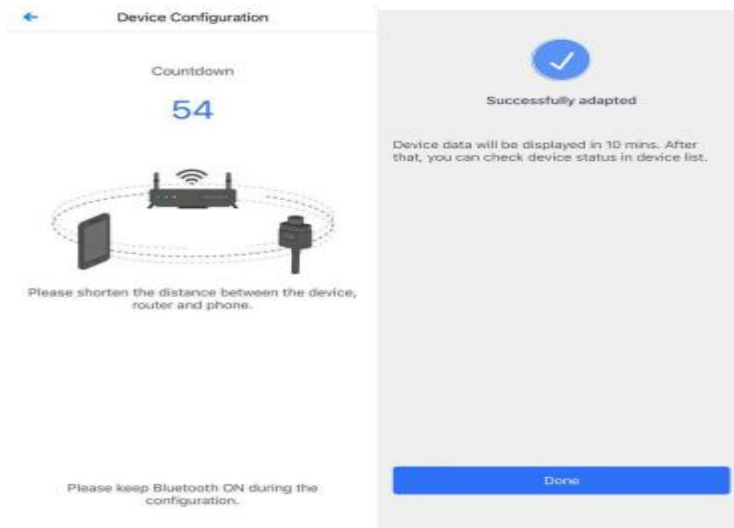


4.2.4. Configuring the network

Click 'Proceed to Configure' to set up the network and select 2.4G because 5G is not supported. (Ensure your phone's Wi-Fi and Bluetooth are enabled.)



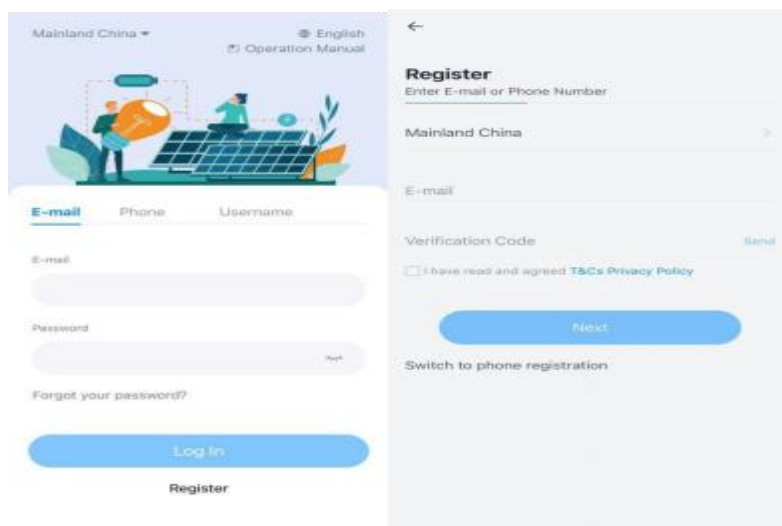
Wait a few minutes, then click 'Finish' to view the power station data.



4.3. Account Registration (Solarman Pro)

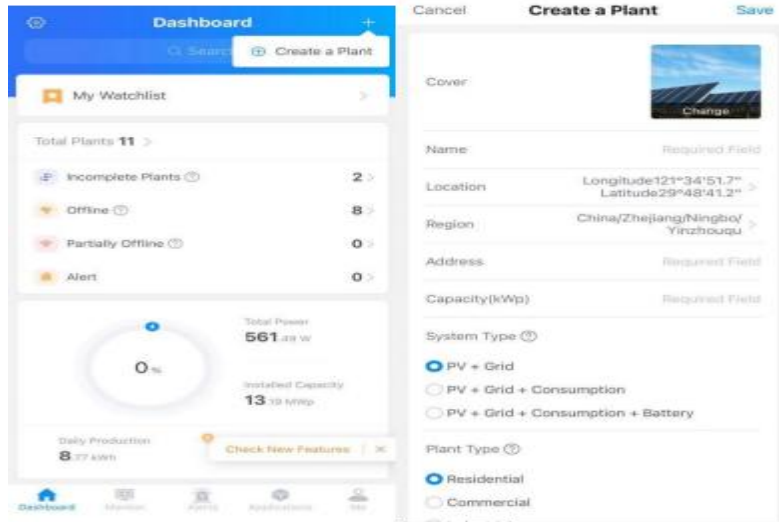
4.3.1. Register New Account

Open the Solarman Pro app and click 'Register' to create an account.



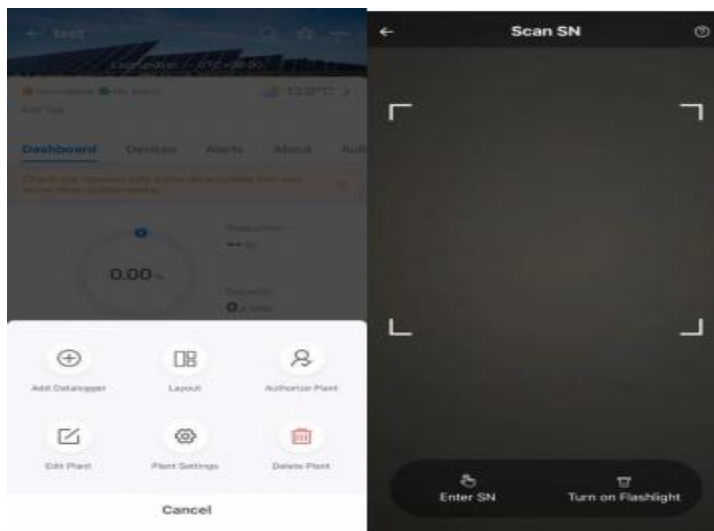
4.3.2. Create a power station

Click the '+' icon in the top right corner, then click 'Power Station' and fill in the basic information.



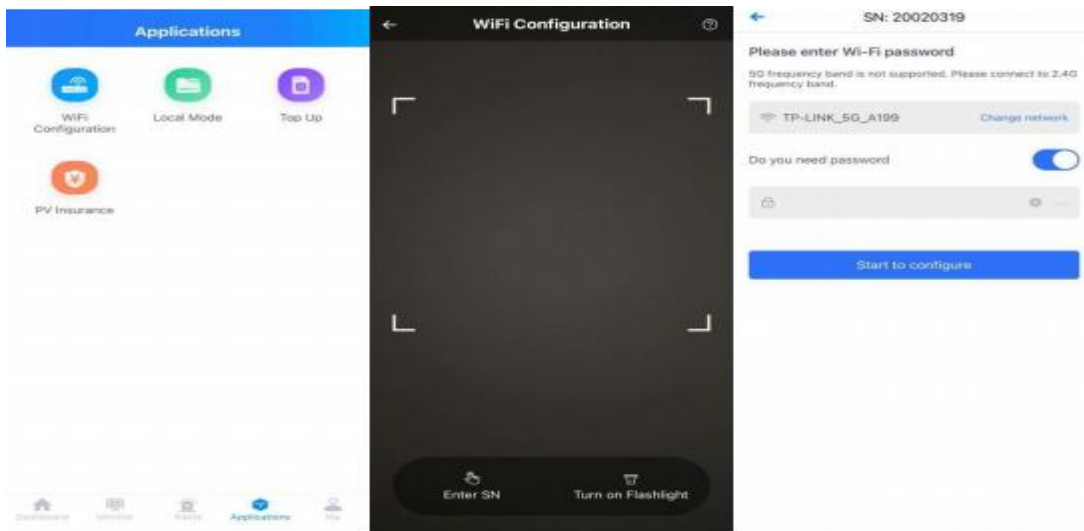
4.3.3. Adding a Collector

Click '+', then 'Add New Gateway/Collector' and either scan the QR code or manually enter the SN number.

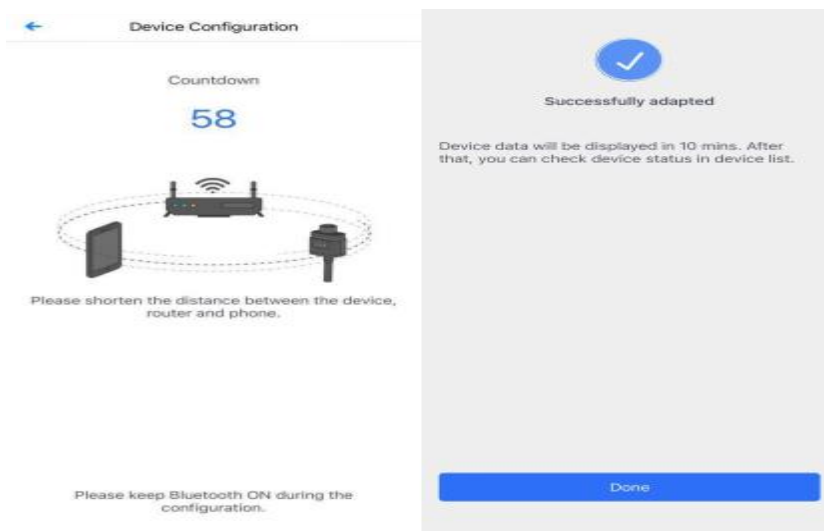


4.3.4. Network Configuration

Click 'Application' > 'Wi-Fi Configuration', then scan the QR code or manually enter the SN number. Choose 2.4 G because 5 G is not supported.



Wait a few minutes, then click 'Finish' to view the power station data.



5. Troubleshooting and Maintenance Instructions

Only qualified professionals should perform the following troubleshooting actions when the microinverter solar system is not working correctly.

5.1. Status Indicators and Error Reporting

- If the LED is off, check the DC side wiring or contact your local dealer.
- If the red light is continuously on, check whether both DC inputs are connected correctly.

5.2. Troubleshooting Guide

Before going on-site for troubleshooting, installers can remotely check all information via their installer account, either on the web or using the mobile APP. Accessing module data (DC, AC, voltage and current) can offer an initial understanding of potential issues.

Professional installers can also refer to our troubleshooting guide for a comprehensive approach to diagnosing and fixing issues with photovoltaic installations powered by the microinverter.

Warning

- ① Do not attempt to repair the microinverter by yourself. If troubleshooting efforts fail, return the unit to the manufacturer for replacement.
- ② Only qualified professionals are allowed to perform troubleshooting procedures on the microinverter.
- ③ Do not disconnect the DC side of the inverter while it is still operational. Ensure there is no current flow before disconnecting the DC side.
- ④ When disconnecting the microinverter from the solar modules, disconnect from the AC grid first, and ensure that the grounding hole provided by the microinverter remains grounded at all times.
- ⑤ microinverter is powered via the DC side of the solar modules.

6. Microinverter Replacement

Follow the steps below to replace a faulty microinverter:

- a. Disconnect the microinverter and the solar modules in the following sequence:
 - ① Turn off the branch AC circuit breaker.
 - ② Disconnect the AC connector of the microinverter.
 - ③ Disconnect the DC connector between the solar modules and the microinverter.
 - ④ Remove the microinverter from the photovoltaic rack.
- b. Install the replacement microinverter onto the rack. When connecting the DC wires to the new microinverter, observe the indicator light's behaviour.
- c. Connect the AC connector of the replaced microinverter.

- d. Close the branch circuit breaker and verify the operational status of the replacement microinverter.

7. Technical Data

Warning

- ① Ensure that the output current and voltage of the solar modules match those of the microinverter.
- ② The DC operating voltage range of the solar modules must fall within the input voltage range of the microinverter.
- ③ The maximum open-circuit voltage of the solar modules must not exceed the maximum input voltage of the microinverter.

Model	SPD-1600M	SPD-1800M	SPD-2000M
Input Data (DC)			
Recommended PV Power	280W~550W	280W~600W	280W~650W
Start-up Voltage	28V _{DC}		
MPPT Voltage Range	28V _{DC} ~55V _{DC}		
Full load voltage range	36V _{DC} ~55V _{DC}	38V _{DC} ~55V _{DC}	39V _{DC} ~55V _{DC}
Max. Input Voltage	60V _{DC}		
Max. Input Current	4*13A	4*14A	4*15A
Max. Short Circuit Current	4*19A		
Number of MPPT	4		
Output Data (AC)			
Rated Output Power	1600W	1800W	2000W
Apparent Power	1600VA	1800VA	2000VA
Max. Output Power	1600W	1800W	2000W
Nominal Output Voltage	230V _{AC} (Single phase)		
Output Voltage Range	184V _{AC} ~253V _{AC}		
Nominal Output Current	7A	7.8A	8.7A
Max. Output Current	7.7A	8.7A	9.7A
Nominal Frequency/Range	50Hz/45Hz ~ 55Hz		
Power Factor	>0.99 (Default)		
THD	<3%		
Max.Units Per Branch	3		
Efficiency			
Peak Efficiency	96%		
CEC Efficiency	95.5%		
Static MPPT Efficiency	99.5%		
Night Power Consumption	<50mW		

Mechanical Data	
Ambient Temperature	-40°C ~ +65°C
Dimensions(WxHxD)	312*301*43mm
Weight	7kg
Enclosure Rating	IP67
Cooling	Natural Convection - No Fan
Type of Isolation	High Frequency Transformer
Monitoring & Communication	
Communication	WiFi
Energy Management	Solarman Online Platform
Certifications & Warranty	
Overvoltage category	II (PV), III (Mains)
Inverter topology	Isolated
Compliance	EN IEC 61000-6-2: 2019; EN IEC 61000-6-4: 2019; EN IEC 61000-3-2:2019/A1: 2021; EN 61000-3-3:2013/A2: 2021; EN IEC 62109-1 :2010; EN IEC 62109-2:2011; VDE-AR-N 4105:2018; VDE V 0126-1-1:2013; VDE V 0124-100:2020; ETSI EN 301 489-1 V2.2.3:2019; ETSI EN 301 489-17 V3.2.4:2020; ETSI EN 300 328 V2.2.2:2019; EN 50665:2017; EN IEC 62311:2020
Warranty	10 Years Standard

8. Wiring Diagram for Reference

