



User Manual

TSOL-MP3000

TSOL-MP2250

TSOL-MS3000

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Product information is subject to change without notice. User documentation is updated frequently; Check www.tsun-ess.com for the latest information. To ensure optimal reliability and to meet warranty requirements, the TSUN Microinverter must be installed according to the instructions in this manual. For warranty text refer to www.tsun-ess.com.

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Audience

This manual is intended for use by professional installation and maintenance personnel.

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Read This First

Dear customer, thank you for choosing the TITAN series microinverter from TSUN. We hope you will find our products meet your needs for renewable energy. Meantime, we appreciate your feedback regarding our products.

A solar microinverter, or simply microinverter, is a plug-and-play device used in photovoltaics, that converts direct current (DC) generated by a single solar module to alternating current (AC). The main advantage is that small amounts of shading, debris or snow lines on any single solar module, or even a complete module failure, do not disproportionately reduce the output of the entire array. Each microinverter harvests optimum power by performing maximum power point tracking (MPPT) for its connected module. Simplicity in system design, lower amperage wires, simplified stock management, and added safety are other factors introduced with the microinverter solution.



This manual contains important instructions for TSOL-MP3000/MP2250/MS3000 microinverters and must be read in its entirety before installing or commissioning the equipment. For safety, only qualified technicians, who have received training or have demonstrated skills can install and maintain this microinverter under the guide of this document.

Important Safety Information

During installation, testing and inspection, adherence to all the handling and safety instructions is mandatory. Failure to do so may result in injury or loss of life and damage to the equipment.

Product Label











The following safety symbols are used in this document. Familiarize yourself with the symbols and their meaning before installing or operating the system.

 DANGER
· DANGER indicates a hazardous situation that can result in deadly electric shock hazards, other serious physical injury, or fire hazards.
 WARNING
· WARNING indicates directions which must be fully understood and followed in their entirety in order to avoid potential safety hazards including equipment damage or personal injury.

 **CAUTION**

· CAUTION indicates that the described operation must not be carried out. The reader should stop use and fully understand the operations explained before proceeding.

The symbols on the microinverter are list below and illustrated in detail.

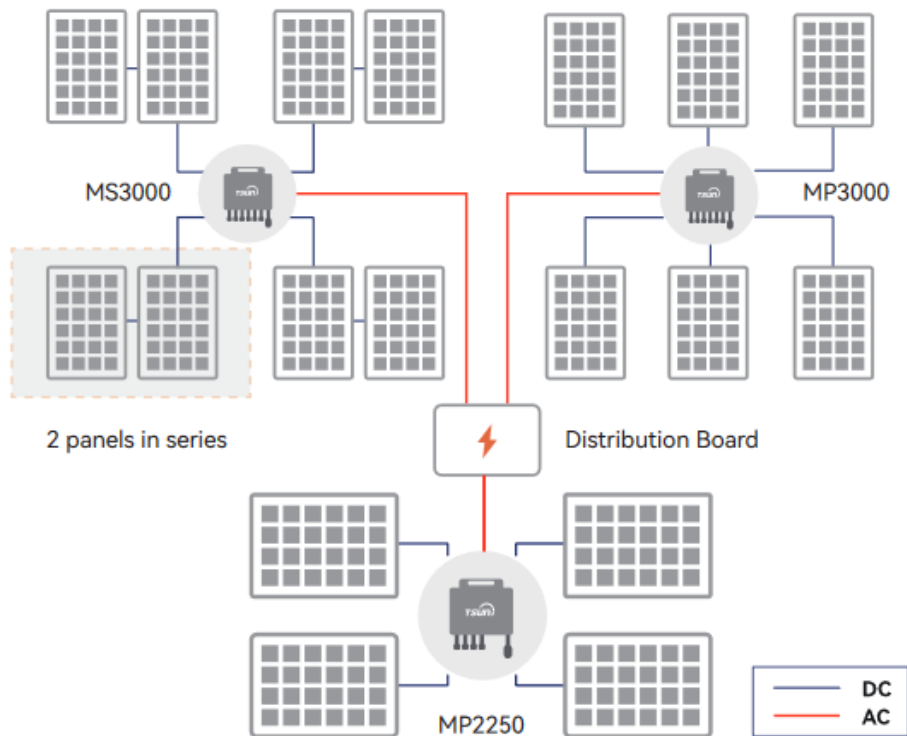
Symbol	Description
	This device is directly connected to public grid, thus all work to the inverter shall only be carried out by qualified personnel.
	The components inside the inverter will release a lot of heat during operation. Do not touch metal plate housing during operating.
	Please read the installation manual first before installation, operation and maintenance.
	This device SHALL NOT be disposed of in residential waste.
	This device needs to be disconnected and left to stand for at least 5 minutes before opening the cover.
	This device does not use transformer for the isolation function.
	This device fulfills the requirements of Radio Equipment Directive.
	This device complies the RoHS Directive.
	This inverter fulfills the requirements of INMETRO.
	This inverter fulfills the requirements of ANATEL, the certificate number is 11057-23-15833.

System Introduction

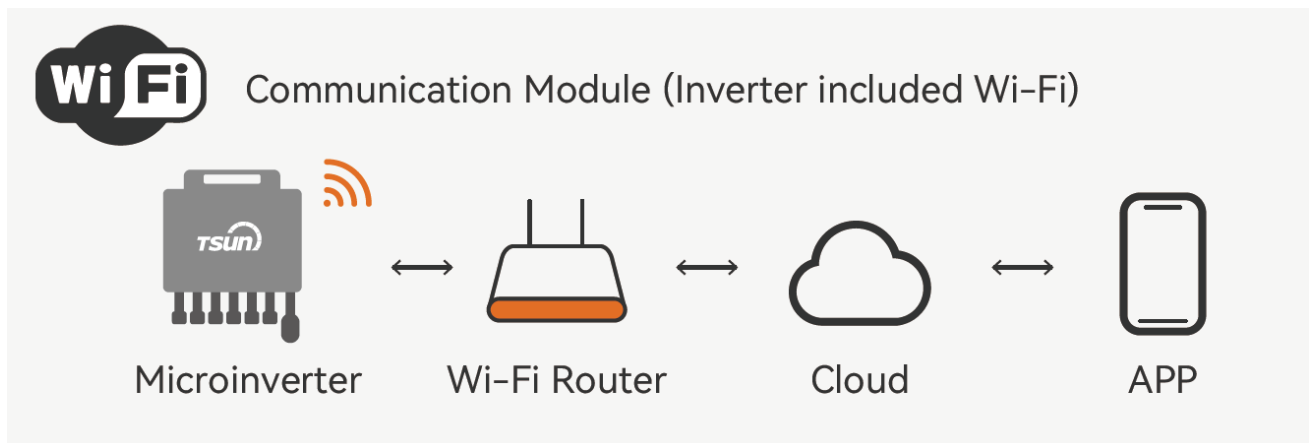
The TSOL-MP3000/MP2250/MS3000 microinverter is used in grid-tied applications, comprised of two key elements:

- TSOL-MP3000/MP2250/MS3000 Microinverter.
- Talent monitoring system.

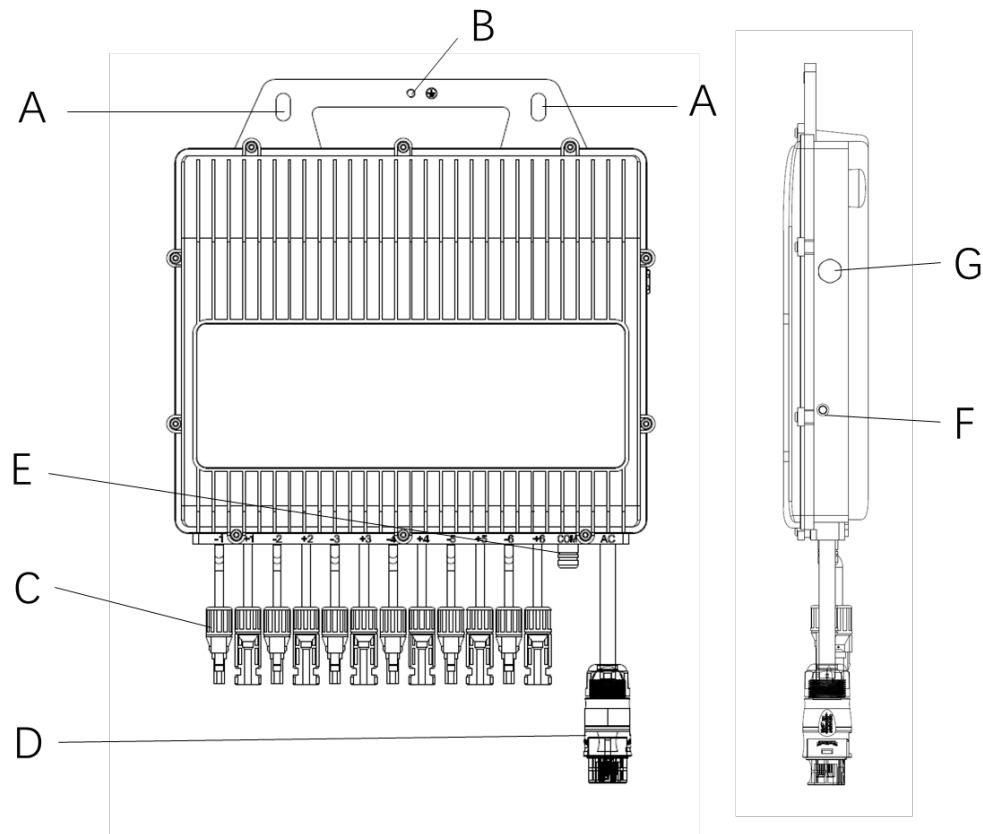
The microinverter converts the DC electricity generated by solar panels into AC electricity which is in accordance with the requirements of public grid and send the AC into the grid, reduce the load pressure of the grid.



The microinverter is integrated with Wi-Fi module and connect to the home Wi-Fi router directly. User can monitor the power generation of the system by Talent monitoring App.



Product Description



A	Mounting Hole	E	Antenna
B	Grounding Hole	F	Status Light
C	DC Cables	G	Vent Valve
D	AC Cable		

Datasheet

Model	MP2250	MP3000	MS3000
Input Data (DC)			
Quantity of Input	4 Connectors 4 Panels	6 Connectors 5 - 6 Panels	4 Connectors 7 - 8 Panels
Recommended Module Power (W)	480 ~ 700+	480 ~ 700+	440 ~ 600+
Start-up Voltage per Input (V)	22	22	24
Rated Input Voltage (V)	42	42	84
MPPT Voltage Range per Input (V)	18~60	18~60	22~120
Max. Input Voltage per Input (V)	60	60	120
Max. Short-circuit Current per Input (A)	20	20	16
Max. Input Current per Input (A)	18.5	18.5	15
Quantity of MPPT	4	6	4
Max. Inverter Back-feed Current to the Array (A)	0	0	0
Output Data (AC)			

Max. Output Power (VA)	2250	3000	3000
Nominal Continuous Output Power (W)	2250	3000	3000
Nominal Output Current (A)	10.2	13.6	13.6
Max. Output Current (A)	11	14	14
Inrush Current (A)	20	25	25
Max. Output Fault Current (A)	45	50	50
Max. Output Overcurrent Protection (A)	27	27	27
Nominal Output Voltage/Range (V)*	220/230/240, 175 – 265, L/N/PE		
Nominal Frequency (Hz)*	50/60		
Power Factor	>0.99 default, 0.8 leading ... 0.8 lagging		
Output Current Harmonic Distortion	<3%		
Efficiency			
Peak Inverter Efficiency	97.0%	97.1%	97.2%
CEC Weighted Efficiency	96.5%	96.6%	96.7%
Nominal Mppt Efficiency	99.9%	99.9%	99.9%
Nighttime Power Consumption	<1W	<1W	<1W
Protection			
Anti-Islanding protection	Integrated		
Insulation monitoring	Integrated		
AC surge protection	TYPE II		
Residual current monitoring	Integrated		
AC overcurrent protection	Integrated		
AC short-circuit protection	Integrated		
AC overvoltage protection	Integrated		
Over-heat protection	Integrated		
Mechanical Data			
Dimensions (W×H×D mm)	355 * 342 * 58		
Weight [kg]	6.4	6.8	6.4
General Data			
Display	LED indicators; TSUN APP+WEB		
Communication	built-in WiFi module		
Type of Isolation	Transformerless		
Type of Enclosure	IP67		
Cooling	Natural convection		
Operating Ambient Temperature Range	-25 ~ +65 (derating of over 50°C Ambient Temperature)		
Relative Humidity	100%		
Max. Operating Altitude Without Derating [m]	2000		

※ The AC voltage and frequency range may vary depending on specific country grid.

TSUNESS Co., Ltd declares that the radio equipment (Micro inverter) is in compliance with Directive 2014/53/EU. The full text of the EU declaration of conformity is available at the following internet address: <https://www.tsun-ess.com/File/2023-05-09-003741-zjB5to@P>

OPERATING FREQUENCY (the maximum transmitted power)

2412MHz—2472MHz(EIRP <20dBm)

2402MHz—2480MHz(EIRP <10dBm)

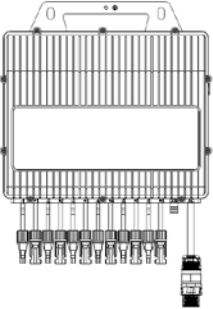
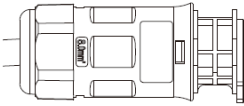

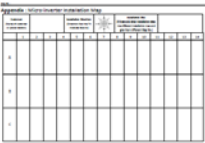


Microinverter Installation

Pre-installation Check

Check the Package

Although TSUN's microinverters have surpassed stringent testing and are checked before they leave the factory, it is uncertain that the microinverters may suffer damages during transportation. Please check the package for any obvious signs of damage, and if such evidence is present, do not open the package and contact your dealer as soon as possible.

The package list is shown as below:

		
Microinverter	AC connector	SN label
		
Installation Map	Quick Installation Guide	Bracket (optional)

Check the Installation Environment and Position


When choosing the position of installation, comply with the following conditions:

- ◆ To avoid unwanted power derating due to an increase in the internal temperature of the inverter, do not expose it to direct sunlight.
- ◆ To avoid overheating, always make sure the flow of air around the inverter is not blocked.
- ◆ Do not install in places where gasses or flammable substances may be present.
- ◆ Avoid electromagnetic interference that can compromise the correct operation of electronic




equipment.

- ◆ It's recommended to install microinverter on structures underneath the photovoltaic modules so that they work in the shade without touching the rooftop.

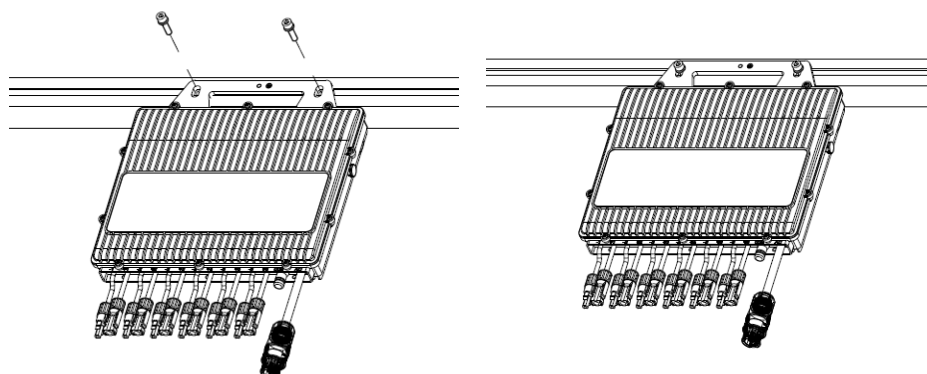
Installation Steps

 DANGER
<ul style="list-style-type: none"> · Only qualified personnel should install, troubleshoot, or replace TITAN micro inverters or the cable and accessories. · Before installation, check the unit to ensure absence of any transport or handling damage, which could affect insulation integrity or safety clearances. · Unauthorized removal of necessary protections, improper use, incorrect installation and operation may lead to serious safety and shock hazards or equipment damage. · Be aware that installation of this equipment includes risk of electric shock.

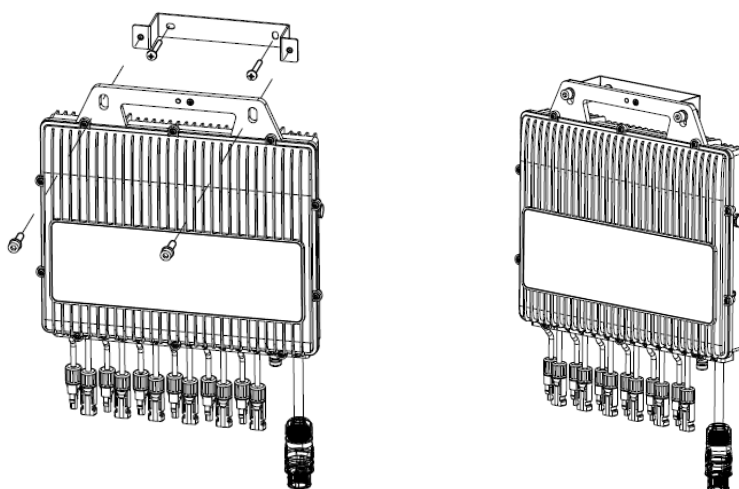
Step 1. Fix the microinverter.

 DANGER
<ul style="list-style-type: none"> · Do not install the equipment in adverse environment conditions such as flammable, explosive, corrosive, extreme high or low temperature, and humid.
 WARNING
<ul style="list-style-type: none"> · Choose installation location carefully and adhere to specified cooling requirements. Micro-inverter should be installed in a suitable position with good ventilation and no directly sunshine.
 CAUTION
<ul style="list-style-type: none"> · There are no screws and nuts in the package.

Choose the best installation position. Use two pairs of screws and nuts to fix the microinverter on the frame. Make sure that the label of microinverter should be upside.



The micro inverter can also be mounted on the wall (vertically) using the optional support. In this case, first fix the bracket to the wall with a pair of screws and then fix the micro inverter to the bracket with one pair of nut screws.

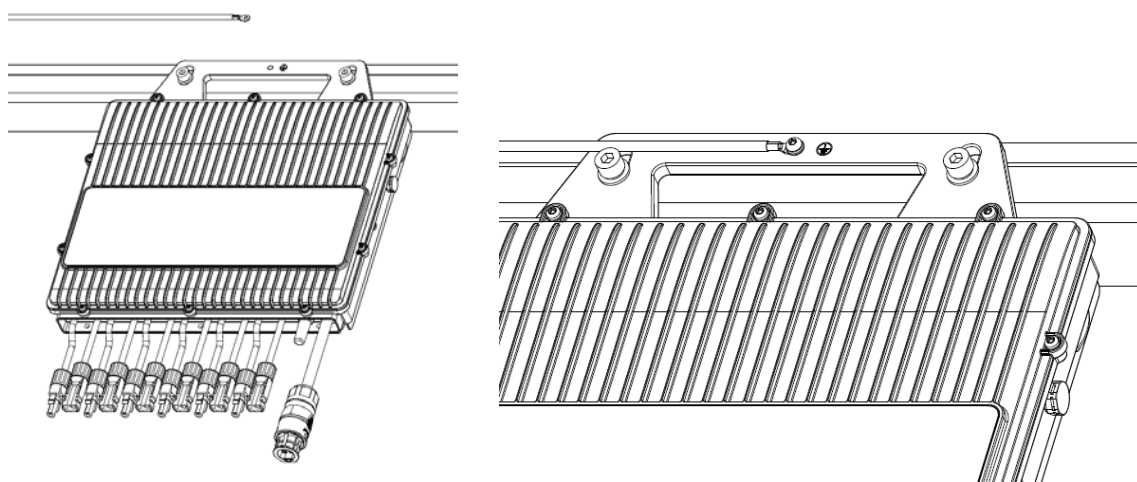


Step 2. Connect the ground cable

WARNING

- Ensure that all the microinverters are well grounded.
- Use $\phi 6$ screw for the ground port.

Connect the ground cable to the enclosure of the microinverter.



Step 3. Connect the AC cable

DANGER

- Do not install the AC junction box without first removing AC power from the system.
- To prevent electrical hazards, make sure the micro-inverter system is disconnected from the home distribution network and the AC breaker is open.

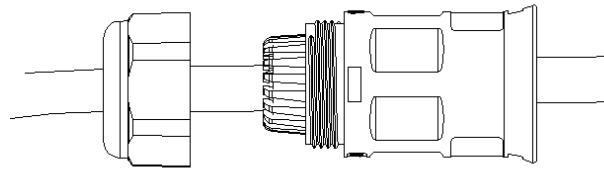
⚠ WARNING

- Ensure that all AC cables are correctly wired and that none of the wires are pinched or damaged.
- Use AWG 12 (4 mm²) cable for AC end cable.

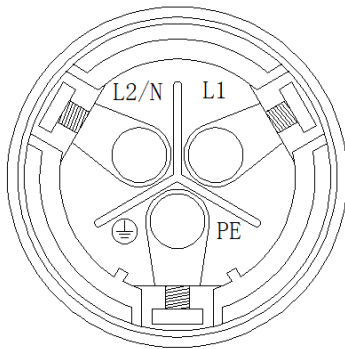
⚠ CAUTION

- The installation technician is responsible for selecting a kind of AC cable and connecting the micro-inverter system into the home distribution network correctly.
- The AC connectors may be provided by different suppliers. The port definitions are subject to actual objects.

Take out the AC connector from the package. Get the AC cable through the shell of AC connector and connect the cable to the right port.

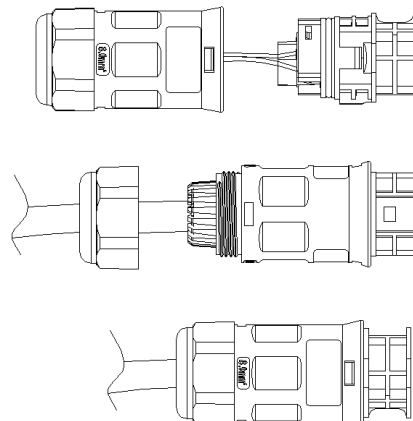


The definition of the port is shown below:

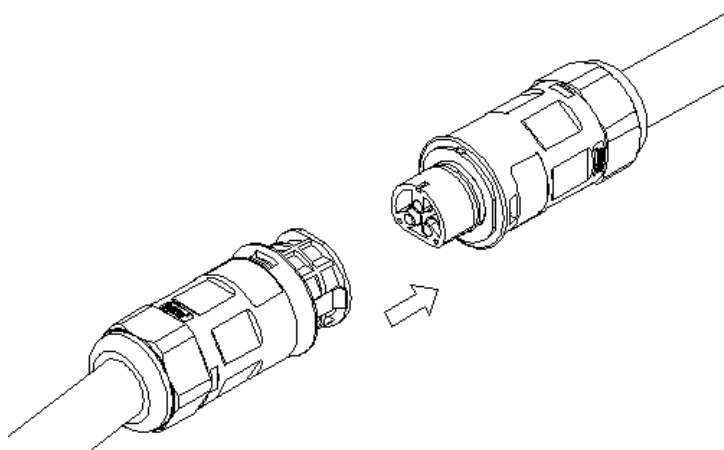


L:	Live	(Brown/Red)
N:	Neutral	(Blue/Black)
PE:	Ground	(Yellow-Green)

Reassemble the AC connector as shown below.



Plug the AC connector into the microinverter and connect the AC cable to the AC distribution box.



Step 4. Connect the DC cable

DANGER

·When photovoltaic panels are exposed to light, it provides a DC voltage to the inverter.

WARNING

·Ensure that all DC cables are correctly wired and that none of the wires are pinched or damaged.

·The maximum open circuit voltage of the PV module must not exceed the specified maximum input DC voltage of the micro inverter.

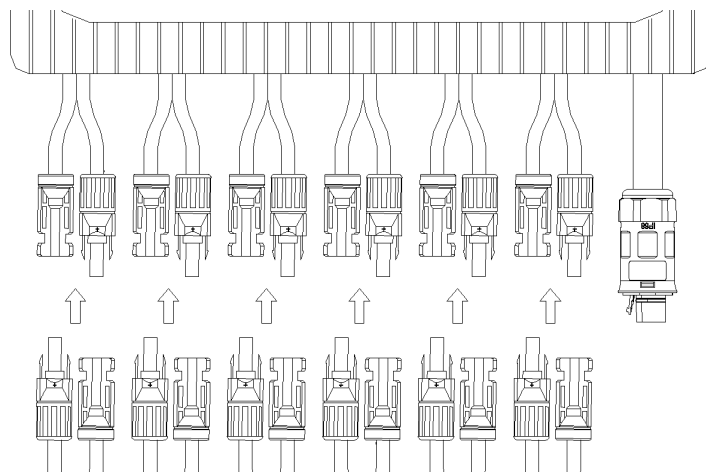
CAUTION

·If the DC cable is too short for installation, use a DC Extension Cable to connect PV modules to the microinverter.

·Use MC4 compatible DC connectors in the inverter side of DC extension cable, or get the DC connectors form TSUN.

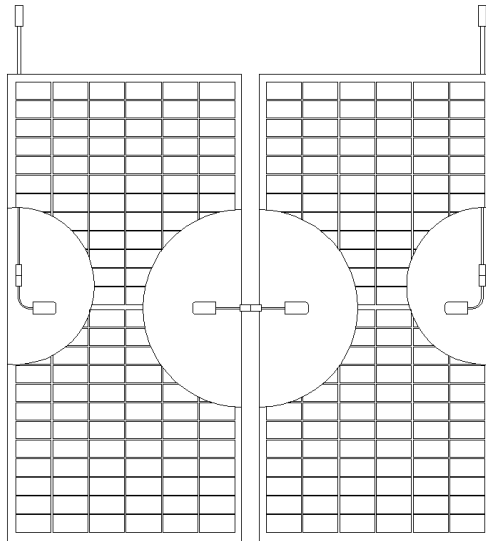
·Contact PV module manufacturers for the requirements of DC connectors in the module side of DC extension cable.

Install the PV modules and connect the DC cable to the microinverter.




While using TSOL-MS3000 microinverter, each DC input of microinverter can connect two PV



modules in series.





Step 5. Make an installation map

 CAUTION	
<p>·If there are more than one installation site, please make the installation map separately and give a clear description about the installation site.</p> <p>·The row of the table corresponds the shorter side of PV module and the column of the table corresponds the longer side of PV module. The direction on the upper left corner means the actual installation orientation.</p>	

Take out the SN labels and installation map from the package. Paste the SN labels on the installation map as below and complete the information of the solar plant.

	1	2	3	4	5
A					
B					

	1	2	3	4	5
A					
B					

Step 6. Start the System

 DANGER

·Only qualified personnel should connect this system to the utility grid.



CAUTION

·Do not connect the microinverter(s) to the grid, nor energize the AC circuit(s) until you have completed all installation procedures and have received prior approval from the electricity utility company.

While installation is all finished, turn on the main utility-grid AC circuit breaker. Your system will start producing power after about a two-minute wait time.

The LED will flash green and red on startup. The LED definition is shown below:

Status	Indicates
Solid Green	Standby/Waiting/Checking Status
Flashing Green (1s)	Working normally
Flashing Red (1s)	Working abnormally
Solid Red	Fault

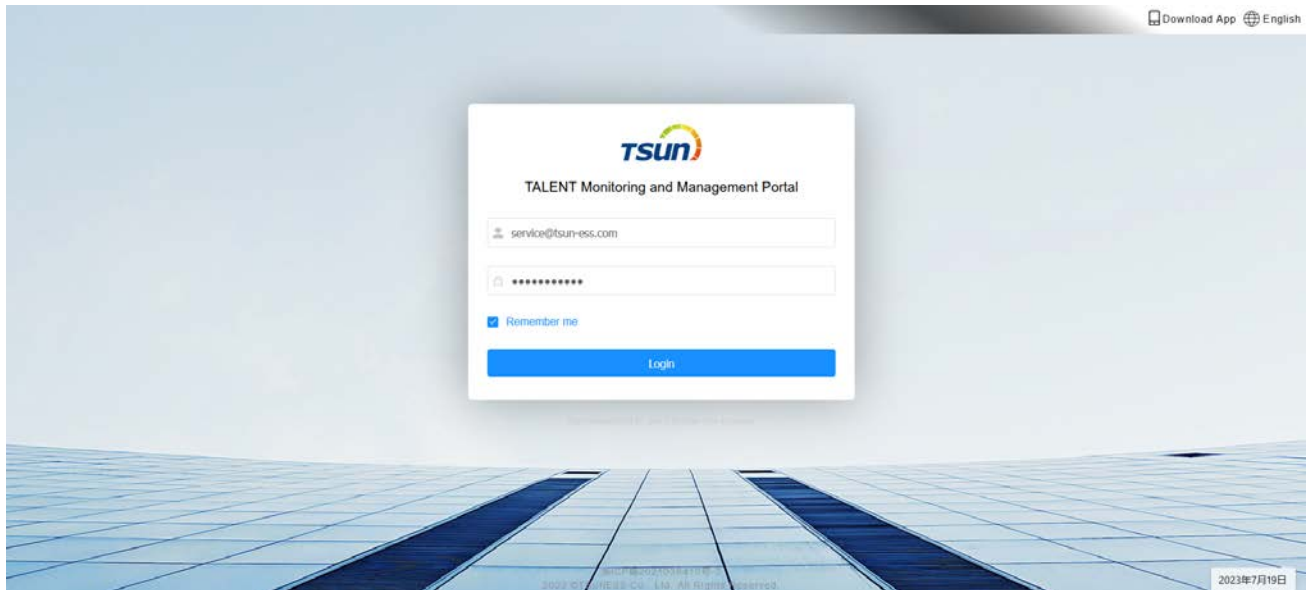
Talent Monitoring System

TITAN series microinverter has integrated monitoring module inside. The microinverter will directly connect the router (Wi-Fi Version). Users can use the Talent APP or enter the Talent website to monitor the microinverter.

Installer

Ask for an installer account from the distributor or TSUN.

Visit www.talent-monitoring.com to find the Talent Portal monitoring platform.



Visit “Google Play” or “Apple Store” and “**Talent Pro**”. Download and install it in the mobile phone.



Talent Pro

Visit <https://www.tsun-ess.com/File/2023-04-19-025439-@an-a4kS> or Scan the QR code below to find the latest User Guidance of Talent monitoring system.



User Guidance of Talent monitoring system

End User

Visit “Google Play” or “Apple Store” and “**Talent Home**”. Download and install it in the mobile phone.



Talent Home



·End User can also use Talent Portal or Talent Pro, but we recommend Talent Home as it is easy to navigate.

Register a new account in **Talent Home**.

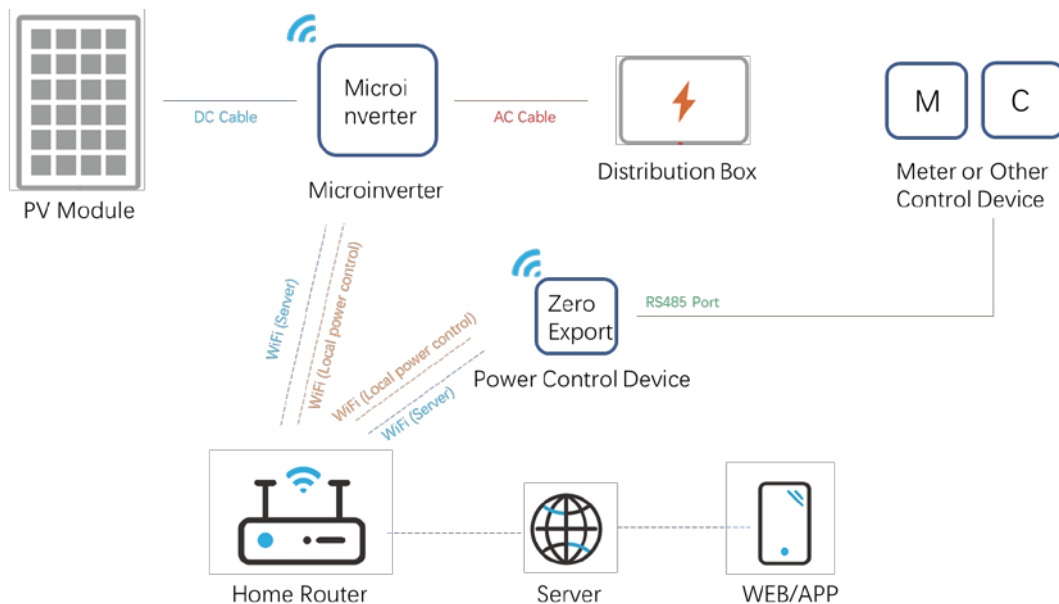
Visit [https://www.tsun-ess.com/File/2023-04-11-062134-9@Bx_ \\$\\$\\$](https://www.tsun-ess.com/File/2023-04-11-062134-9@Bx_$$$) or Scan the QR code below to find the latest User Guidance of Talent Home.



User Guidance of Talent Home

Remote Active Power Control

In some countries, it might be required that the generating plants should be equipped with a logic interface (input port) to cease the output of active power or limit active power to a regulated level. This logic input can be the RS485 port, Ethernet port, and so on. TSUN microinverter provide a extra power control device which contains a RS485 port for this remote active power control. For more information, refer to the “User manual of TSUN power control device”.



Self-Test Function for Italy

TSUN microinverter and Talent monitoring system provide a Self-test function for Italy market. For more information, refer to the “User Guidance of Self-test Function”.

Fault Code and Troubleshooting

Code	Fault Information	Troubleshooting
1	IsoFault	<p>Check the PV module's insulation to ground and make sure that the insulation resistance to ground is greater than 200K Ω.</p> <p>Make sure the grounding connection of the inverter is reliable.</p> <p>If this fault appears continuously, please contact the TSUN service.</p>
2	PV1VoltOver_Fault	<p>Check the voltage of PV module and make sure that the voltage is below the maximum DC input voltage of the microinverter.</p> <p>If this fault appears continuously, please contact the TSUN service.</p>
3	PV2VoltOver_Fault	
4	PV3VoltOver_Fault	
5	PV4VoltOver_Fault	
6	PV5VoltOver_Fault	
7	PV6VoltOver_Fault	
8	PV1VoltLow_Fault	<p>This warning mostly appears in the morning or at dusk. It's normal and will disappear automatically.</p> <p>If this warning appears in the daytime, please check the connection of PV module.</p> <p>If this fault appears continuously, please contact the TSUN service.</p>
9	PV2VoltLow_Fault	
10	PV3VoltLow_Fault	
11	PV4VoltLow_Fault	
12	PV5VoltLow_Fault	
13	PV6VoltLow_Fault	
14	GridVoltOverRating	<p>The AC power grid is abnormal. This fault will disappear automatically when the AC power grid is normal.</p> <p>If this fault appears continuously, please contact the TSUN service.</p>
15	GridVoltUnderRating	
16	GridFreqOverRating	
17	GridFreqUnderRating	
18	GridCurrOverRating	<p>This is an internal fault. Disconnect the AC power to restart the microinverter.</p> <p>If this fault appears continuously, please contact the TSUN service.</p>
19	OverTemp	<p>Check the installation of microinverter. Make sure the microinverter has a good heat dissipation.</p> <p>If this fault appears continuously, please contact the TSUN service.</p>
20	GFCIOver30mAFault	<p>This is an internal fault. Disconnect the AC power to restart the microinverter.</p> <p>If this fault appears continuously, please contact the TSUN service.</p>
21	GFCIOver60mAFault	
22	GFCIOver150mAFault	

23	GFCIOver300mAFault	
24-25	Fault24 - 25	This is an internal fault. Disconnect the AC power to restart the microinverter. If this fault appears continuously, please contact the TSUN service.
26-27	Fault26 - 27	Check the open-circuit voltages of the module and make sure it is below the maximum DC input voltage of the inverter. If this fault appears continuously, please contact the TSUN service.
28-67	Fault28 - 67	This is an internal fault. Disconnect the AC power to restart the microinverter. If this fault appears continuously, please contact the TSUN service.

Maintenance Guide

Routine Maintenance

- ◆ Only authorized personnel are allowed to carry out the maintenance operations and are responsible for reporting any anomalies.
- ◆ Always use the personal protective equipment provided by the employer when carrying out maintenance.
- ◆ During normal operation, check that the environmental and logistic conditions are appropriate. Make sure that the conditions have not changed over time and that the equipment is not exposed to adverse weather conditions and has not been covered with foreign bodies.
- ◆ DO NOT use the equipment if any problems are found, and restore the normal conditions after the fault has been corrected.
- ◆ Conduct an annual inspection on various components, and clean the equipment with a vacuum cleaner or special brushes.
- ◆ Firmware version can be checked by using the monitoring system.
- ◆ Always de-energize the AC branch circuit before servicing.
- ◆ Do not attempt to dismantle the Micro-inverter or make any internal repairs! In order to preserving the integrity of safety and insulation, the Micro inverters are not designed to allow internal repairs!
- ◆ Maintenance operations must be carried out with the equipment disconnected from the grid (AC power switch off) and the photovoltaic modules shaded or isolated, unless otherwise indicated.
- ◆ For cleaning, DO NOT use rags made of filamentary material or corrosive products that may corrode parts of the equipment or generate electrostatic charges.
- ◆ Avoid temporary repairs. All repairs should be carried out using only genuine spare parts.

Storage and Dismantling

- ◆ If the equipment is not used immediately or is stored for long periods, check whether it is correctly packed. The equipment must be stored in well-ventilated indoor areas that do not have characteristics that might damage the components of the equipment.
- ◆ Take a complete inspection when restarting after a long time or prolonged stop.
- ◆ Please dispose the equipment properly after scrapping, as component parts are potentially harmful to the environment, in accordance with the regulations in force in the country of installation.

Recycling and Disposal

This device should not be disposed as residential waste. An Microinverter that has reached the end of its life is not required to be returned to the dealer. Users must find an approved collection and recycling facility in the area.

Warranty Service

This Warranty is subject to the following conditions:

- ◆ The products must have been installed and correctly commissioned by an authorized and licensed installer. Proof may be required of correct commissioning of the Product (such as certificate of compliance). Claims for failures due to incorrect installation or commissioning are not covered under this Warranty.
- ◆ Where a Product or part thereof is replaced or repaired under this Warranty, the balance of the original Warranty period will apply. The replacement product or part(s) do not carry a new voluntary warranty.
- ◆ The product must have its original serial number and rating labels intact and readable.
- ◆ This Warranty does not extend to any product that has been completely or partially disassembled or modified, except where such disassembly is carried out by TSUNESS
- ◆ The terms of this Warranty cannot be amended except in writing by one of our authorized officers.
- ◆ There must have been a commissioning report signed by the end-user and the installer for product commissioning and handling instructions.

Exclusions

- (a) TSUNESS makes no warranties, either expressed or implied, orally, or in writing, with respect to any other warranty coverage except those expressly stated in this limited Factory Warranty.
- (b) The Factory Warranty does not cover damages that occur due to:
 - Transport damage;
 - Installation or commissioning through any person who is not an Authorized, Certified Dealer;
 - Failure to observe the user manual, maintenance regulations and intervals;
 - Modifications, changes, or attempted repairs, except as conducted by an Authorized Dealer;
 - Incorrect use or inappropriate operation;
 - Insufficient ventilation of the Covered Product;
 - Failure to observe the applicable safety regulations;
 - Force majeure.
- (c) This factory warranty does not cover cosmetic defects which do not directly influence energy production, or degrade form, fit, and function.
- (d) Claims that go beyond the scope of this limited Factory Warranty, in particular claims for

compensation for direct or indirect damages arising from the defective device, for compensation for costs arising from disassembly and installation, or loss of profits, are expressly NOT covered by this Factory Warranty.

(e) In no event will TSUNESS Co., Ltd be held responsible or liable for any personal injuries resulting from the use of the system, or for any other damages, whether direct, indirect, incidental, or consequential; even if TSUNESS Co., Ltd has been advised of such damages.

Distributor Responsibility


In the event of an equipment failure or fault, it is the Distributor's responsibility to work directly with TSUNESS Service Centre in order to limit the return of non-faulty equipment. TSUNESS Service Centre will work with the Distributor to rectify the fault or fault message through telephone support or with direct PC links. Note: In order to qualify for further compensation and a replacement unit, the distributor/installer must first contact TSUNESS and fulfil the distributor's /installer's responsibilities under instruction.

Within warranty period of the microinverter, the invoice and date of purchase are required for the service. Besides, the trademark on the product should be clearly visible, otherwise warranty is not available.


More information can be found in TSUN Warranty Policy.



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