



**DONGGUAN SHENGYANG INDUSTRIAL CO., LTD**



## **SY-GWV Smart Grid Tie Microinverter**

### **User Manual**

Thanks for choosing Smart Microinverters of Shengyang Industrial Co., Ltd. Read the following instruction carefully before installation and operating, install and operate as specified by this user manual strictly to ensure your safe and benefit.

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## Smart Microinverter Introduction

Smart grid tie inverter is a compact unit, which directly converts direct current into alternating current for powering appliances and/or office equipments and connecting to utility grid. The AC output from Smart Microinverter is synchronized and in-phase with the utility grid. It is a key device of power generation systems such as PV power generation system, wind turbine power generation system. Shengyang Smart Microinverter specially optimized design to work with modularization of DC power supplies which includes the mainstream solar modules, 18V (36 cells), 24V (60 cells) and 36V (72 cells) monocrystal and/or Polycrystalline solar panels, wind turbines and batteries. Shengyang Smart Microinverters are stabilization, reliable and high conversion efficiency items. It is the best choice for PV power generation systems.

Shengyang Smart Microinverter can be easily placed and attached to the rack underneath of PV module. No need spaces for independent installation and low voltage DC wire connects from the PV module to Smart Microinverter can eliminate the risk of high DC voltage. Distributed modularization design philosophy for Shengyang Smart Microinverter insures the productiveness of the whole system and will not affect by a single point of failure. Each Smart Microinverter is individually connected to each PV module in the array. This unique configuration means that an individual Maximum Peak Power Point Tracker (MPPT) controls each PV modules and insures that the maximum power available from each PV module is exported to the utility grid regardless of the performance of the other PV modules in the array which may be affected by shading, soiling, orientation or mismatch, etc. Smart Microinverter insures top performance for maximizing energy production from the whole PV system and gets return on investment in less time.

## Advantages of Smart Microinverter

1. Unique circuit design, choice of import industrial electronic components, higher efficiency, more stable performance.
2. Creative MPPT technology, efficiency more than 99%, faster and more sensitive reaction, more reliable.
3. Parallel type design for DC input and modularization design for inverter, small volume, distributed installation, easy for system configuration, flexible for combination, strong expansibility of system.
4. Adopting high-frequency isolation transformer type, high efficiency, and high security.
5. Perfect electrical protection function.
6. Aluminum alloy housing, not rust, heat-resisting and cold-resistant as well as anti-corrosion.
7. Getting electronic circuit design, appearance design and other core technology patents.
8. Wide input voltage (22-60VDC), suit for different DC power supply.

## Important Safety Information

### Read this First

This manual contains important instructions for use during installation and maintenance of the Smart Microinverter. To reduce the risk of electrical shock, and to ensure the safe installation and operation of the Smart Microinverter, the following safety symbols appear throughout this document to indicate dangerous conditions and important safety instructions.



**DANGER!** This indicates a hazardous situation, which if not avoided, will result in death or serious injury.



**WARNING!** This indicates a situation where failure to follow instructions may be a safety hazard or cause equipment malfunction. Use extreme caution and follow instructions carefully.



**NOTE:** This indicates information particularly important for optimal system operation.

Follow instruction closely.

## Safety Instruction

- Do not use Smart microinverter in a manner not specified by the manufacturer. Doing so may cause death or injury to persons, or damage to equipment.
- Perform all electrical installations in accordance with all applicable local electrical codes.
- Be aware that only qualified personnel should disassemble and repair the Smart Microinverters and non-qualified personnel should not install and/or repair.
- Do not attempt to repair the Smart Microinverter; it contains no user-serviceable parts. If it fails, contact customer service to claim a return merchandise authorization and start the replacement process. Tampering with or opening the Smart Microinverter will void the warranty.
- If the AC cable connector on the microinverter is damaged or broken, do not install the unit.
- Before installing or using the Smart Microinverter, read all instructions and cautionary markings in the technical description and on the Smart Microinverter System and the PV equipment.
- Connect the Smart Microinverter to the utility grid only after you have completed all installation procedures and after receiving prior approval from the local electrical utility company.
- Be aware that the body of the Smart Microinverter is the heat sink. Under normal operating conditions, the temperature is 15°C above ambient, but under extreme conditions the microinverter can reach a temperature of 65-70°C. To reduce risk of burns, use caution when working with microinverters.
- Do NOT disconnect the PV module from the Smart Microinverter without first removing AC power when microinverter still working. The better disconnect AC terminal first and then disconnect DC terminal so as it help prevent components damaged and protect the security of the human body.
- Keep away from children, no touching, no playing so as not to electric shock when using.
- Please installed in place of low humidity and well-ventilated so as to avoid inverter overheating, as well as clear around the inflammable and explosive materials.

## Smart Grid Tie Microinverter Technical Parameters

(Suit for 60 cells solar panel which Vmp is 26-30V as well as Voc is 34-38V.)

(Suit for 72 cells solar panel which Vmp is 35-37V as well as Voc is 44-46V.)

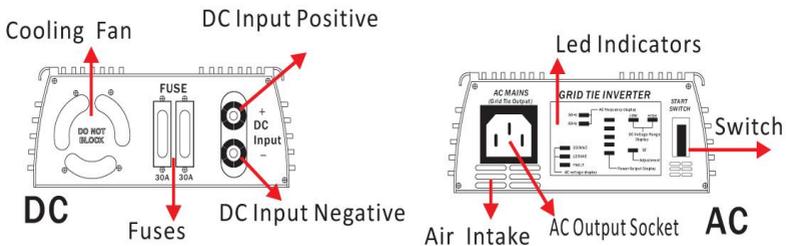
Power	200W	300W	400W	500W	600W
Solar panels	≥200W	≥300W	≥400W	≥500W	≥600W
DC input range	22-60VDC				
MPPT Voltage	24-48V				
DC MAX current	15A	20A	30A	45A	50A
AC MAX output	230W	330W	430W	550W	650W
AC output range	120VAC(90-140VAC) or 230VAC(190-260VAC)				
Frequency range	50Hz/60Hz(Auto control)				
Power Factor	>97.5%				
THD	<5%				
Phase Shift	<2%				
Peak Efficiency/110V	>88%	>88%	>86%	>85%	>85%
Stable Efficiency/110V	>86%	>86%	>85%	>84%	>83%
Peak Efficiency/220V	>90%	>90%	>88%	>88%	>85%
Stable Efficiency/220V	>88%	>88%	>86%	>86%	>84%
Protection	Islanding; Short-circuit; converse connection; Low Voltage; Over Voltage; Over temperature Protection				
Work Temperature	-25°C-65°C				
Work Humidity	0%~90%RH non-condensing				
Grade of Waterproof	Indoor design				
Show	LED				
Cooling	Fan				
Stand-by Power	2-3W				
EMC	EN61000-6-3:2007 EN61000-6-1:2007				
Grid Disturbance	EN 50178+EN 62109-1+VDE0126-1-12				
Grid Detection	DIN VDE 1026 UL1741				
Certificate	CE				
Mounting dimension	16*13CM				

## Packing Specification

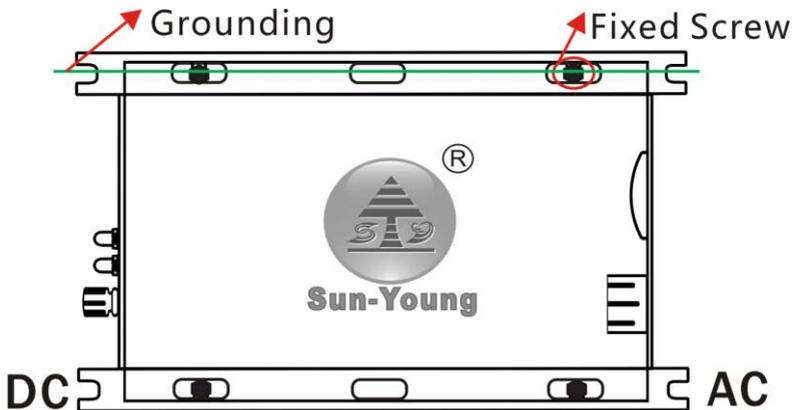
Packing Accessory	Microinverter, AC Cord, User Manual(Warranty Card)
Mechanical Size	21 x 16.5 x 5.3CM
Net Weight/PCS	1.3KGS/PCS
Inner Box (L x W x H)	31 x 21 x 11.5 CM
Carton(L x W x H)	42 x 31.5 x 35.5 CM, 6pcs/CTN, 8/11KGS

## Installation

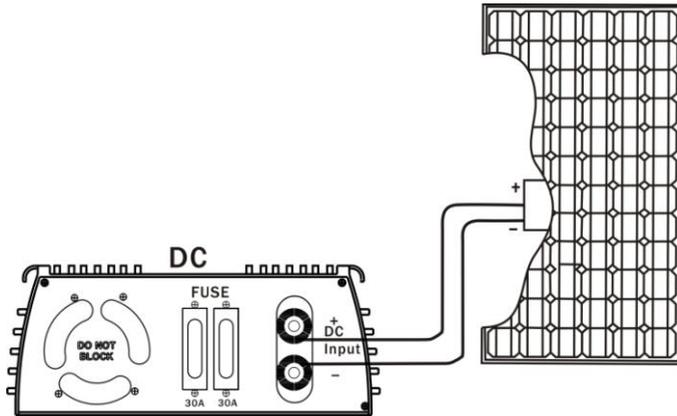
1. Diagrammatize DC input and AC output terminals,



2. Attach the Smart Microinverter to the racking or fix onto the wall,

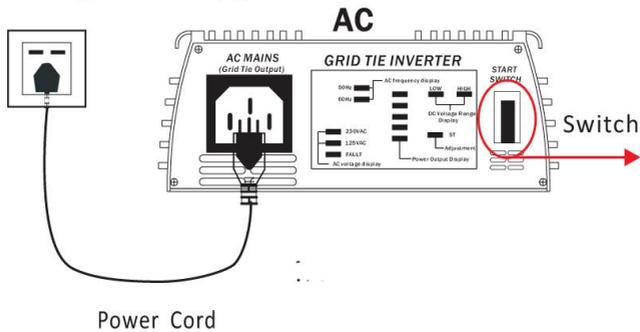


3. Properly connect the positive and negative of solar panel and Smart Microinverter,



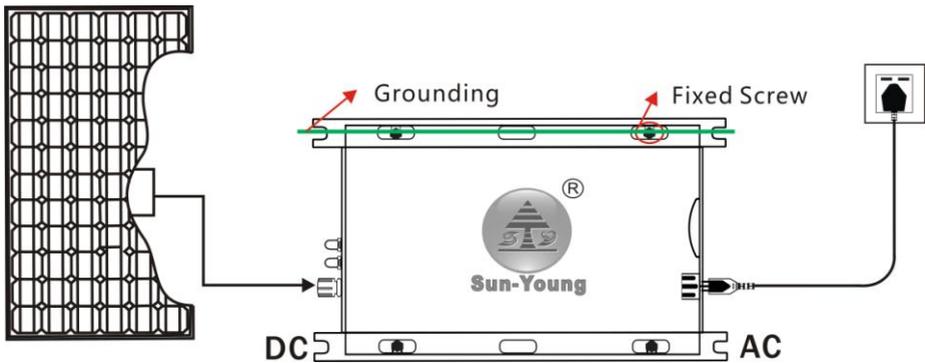
- AC power cable connects with Smart Microinverter and residential power grid which refers to low voltage civilian single-phase power grid.

Connecting with family grid

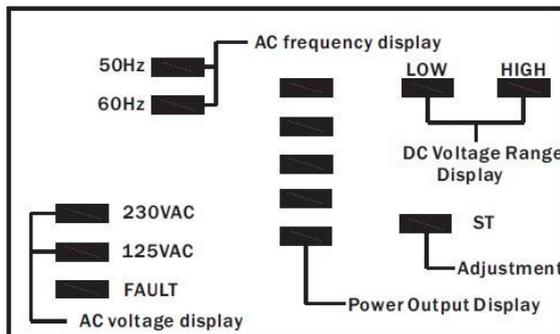


- Switch on power grid after check for input and output connections are correct and then switch on the Smart Microinverter. At such time, LED indicator light up from left to right, it is operating for LED indicators checking. Then operation will enter into DC voltage range checking as per reference line of 4 of section of LED Indicators introduction. After such checking, LED will off from right to left one by one, and then in standby operation. When DC and AC connect properly, AC LED and AC frequency LED will light up accordingly. And then Fault red LED off, blue ST LED and Power output display Red LED light up and flash. It is indicate that inverter is working. When LED flash slowly, it is indicate that MPPT operating. When blue LED

long light and it is indicate that MPPT locking in. At the same time, Power output display red LED indicators start to run from bottom to top as per reference line of 5 of section of LED Indicators introduction.



## LED Indicators



### 1. Red Led

1.1 Red FAULT LED indicator lights up under any conditions as listed below:

- a) Low-voltage protection(DC input voltage lower than 22V Min. input voltage of inverters)
- b) Over-voltage protection(DC input voltage higher than 60V Max. input voltage of inverters)
- c) Over-temperature protection (inverters will be shut down for power output when the temperature of body of inverters higher than 60-65°C.) And inverter will be automatically restart up when the temperature of

body of the inverter down to 40-50°C

- d) Power grid fault protection (when 110VAC or 220VAC grid power outage and/or tripped)
- e) Islanding protection: inverter will be automatically shut down for power output when disconnect with power grid

1.2 Red LOW indicator: DC input voltage lower than 37VDC

1.3 Red High indicator: DC input voltage higher than 37VDC

1.4 Red Power LED indicator: starting up DC voltage checking and output power LED status display

## 2. **Blue ST LED**

- a) Blue LED flash: adjusting for power output, MPPT operating for tracking
- b) Blue LED long light: indicates inverter locking-in Max. output power operation status

## 3. **Green LED**

a) 120VAC/230VAC Indicators: associated LED lights up when run for power grid voltage detection

b) 50/60Hz Indicators: associated LED lights up when run for frequency detection

## 4. **Start Up DC Voltage Detection Indicator(Power Output Display)**

- a) Within 10-20V DC input voltage range, one LED indicator flash
- b) Within 20-30V DC input voltage range, two LED indicators flash
- c) Within 30-40V DC input voltage range, three LED indicators flash
- d) Within 40-50V DC input voltage range, four LED indicators flash
- e) Within 50-60V DC input voltage range, five LED indicators flash

Remark: LED indicators run from bottom to top and flash, and detecting time is 10 times, 0.5s/time

## 5. **Output Power LED Indicators(Power output display)**

- a) Output power within 10-100W, one LED indicator flash
- b) Output power within 100-200W, two LED indicators flash
- c) Output power within 200-300W, three LED indicators flash
- d) Output power within 300-400W, four LED indicators flash
- e) Output power within 400-500W, five LED indicators flash

Remark: LED indicators run from bottom to top and flash.

## 6. **Please note that above operations only run at grid-connected status.**

# Troubleshooting a non-operating Smart microinverter

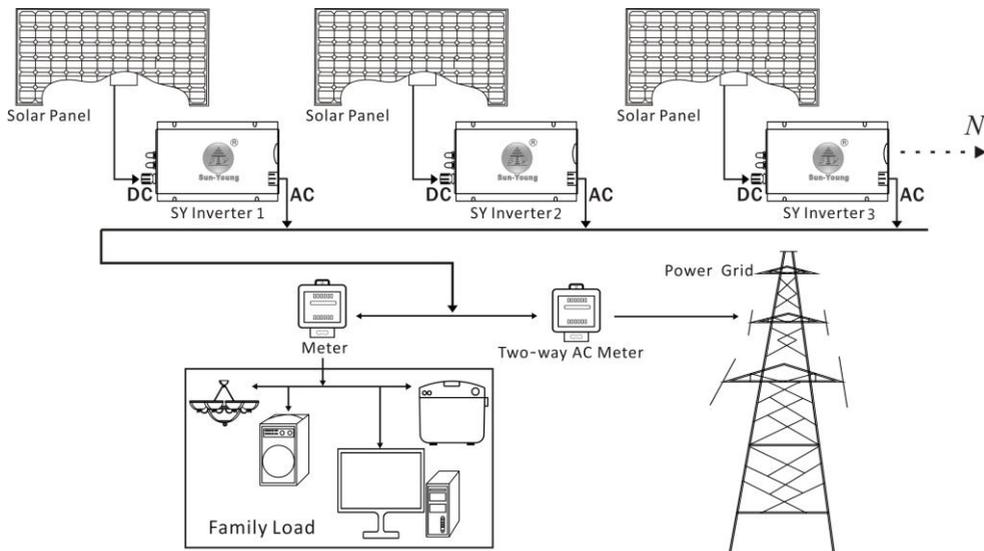
## **1. System halted and /or without power output**

- a) Check if switch of Smart Microinverter is turn on or not,
- b) Check if the DC connections to Smart Microinverter are correct or not,
- c) Check if any reverse DC connections for positive or negative or not,
- d) Check if DC input voltage is within the range of the Smart Microinverter's not,
- e) Check if the utility grid voltage and frequency are fit in with the serviceable range of Smart Microinverte or not,
- f) Check if fuses of DC side are fusing or not,
- g) Check if utility grid voltage properly connecting to Smart Microinverters or not,

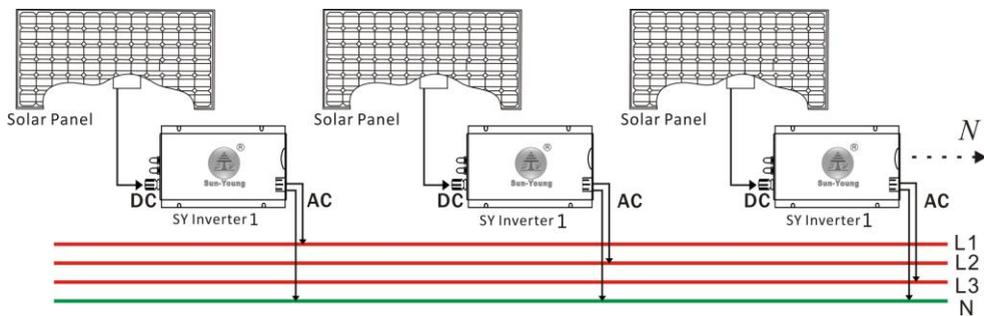
## **2. DC power supply is normal but no power output:**

- a) Check if utility grid voltage is connecting to Smart Microinverter or not,
- b) Check if utility grid voltage is fit in with the serviceable range of Smart Microinverte or not,
- c) Please visual inspection for the LED operation status, red LED will turn off and green LED will flash or run when inverter connecting with DC power source which input voltage is fit in with the range as specified and power grid properly. If still no power output when green LED flash or run, probably internal components are damaged, in such case, please turn the defective inverter back for further analyze.
- d) Please visual inspection for the LED operation status, red LED still turn on and green LED without any flash or run when inverter connecting with DC power source which input voltage is fit in with the range as specified and power grid properly, probably internal components are damaged, in such case, please turn the defective inverter back for further analyze.

## Smart Microinverter Stack Wiring Diagram



## Smart Microinverter Three Phase output Wiring Diagram



# Warranty

## Warranty Conditions

Warranty Period: 15-year limited warranty period.

Warranty Evidence: The B/L, Tracking no, and a completed warranty card.

Grants from \_\_date\_\_ month \_\_year to \_\_date\_\_ month \_\_year.

If your device has a defect or malfunction during the warranty period, please contact your retailer or installer.

Warranty claims are excluded for:

- Alterations or repairs to the unit without prior authorization
- Improper use or operation of device
- Improper and non-standard installation
- operating the equipment with defective safety devices
- Impact of foreign objects and force majeure (lightning, surge, storm, fire)
- Inadequate or nonexistent ventilation of the device
- disregarding of safety regulations
- shipping damage
- The Product has been improperly stored or was damaged while in possession of the Dealer or end user;



**WARNING!** Only qualified electrical professionals can do the trouble shooting of the Smart Microinverter system.



**WARNING!** Do not disconnect the microinverter from its PV module when the inverter is still operating. Disconnect the inverter from the PV module during running may damage the microinverter and bring electrical hazard to the person nearby.



**WARNING!** Disconnect the AC grid first before disconnecting the inverter from the PV module.



**WARNING:** Do not attempt to repair the Smart Microinverter. This may bring electrical hazard to the person and it will also void the Microinverter warranty. If troubleshooting methods fail, please contact customer support to return the Microinverter and initiate for replacement process.

## Product Warranty Card (Invalid Duplicate)

Customer Feedback:

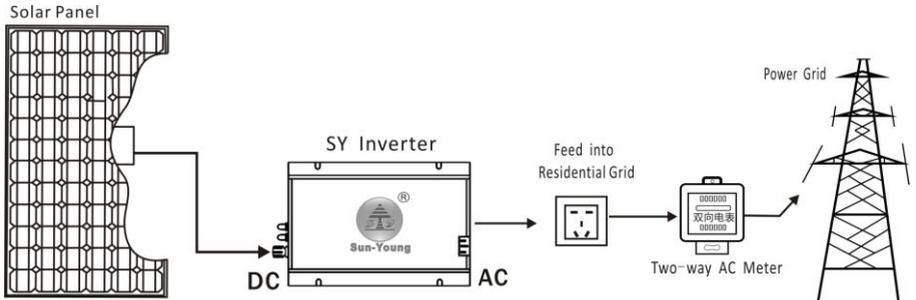
Name	
Country and/or Territory	
Telephone	
Email	
Purchase Channels and/or Sources	
Models	
Date of Purchase	
Date of Installation	
Time of Using	
Brief Fault Description	
Improvement Suggestions	

### Distributor and/or Sales Representative

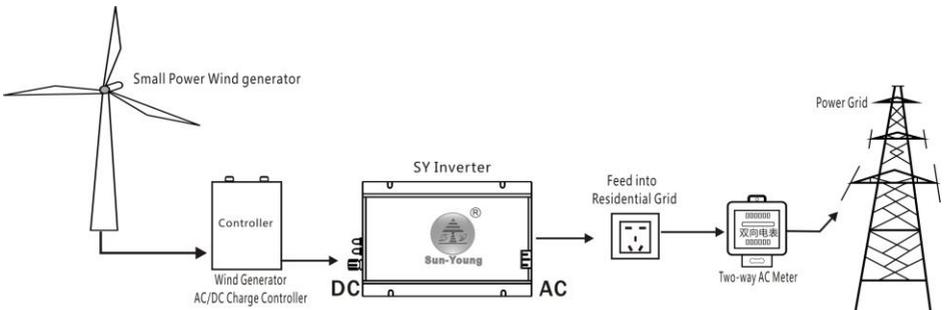
Distributor Name			
Telephone and/or Email			
Sales Representative		Date of Customer Feedback	
Date of finish Disposal		Disposal	
Shengyang QC		Technician	
Others			

# Explore Application Diagram

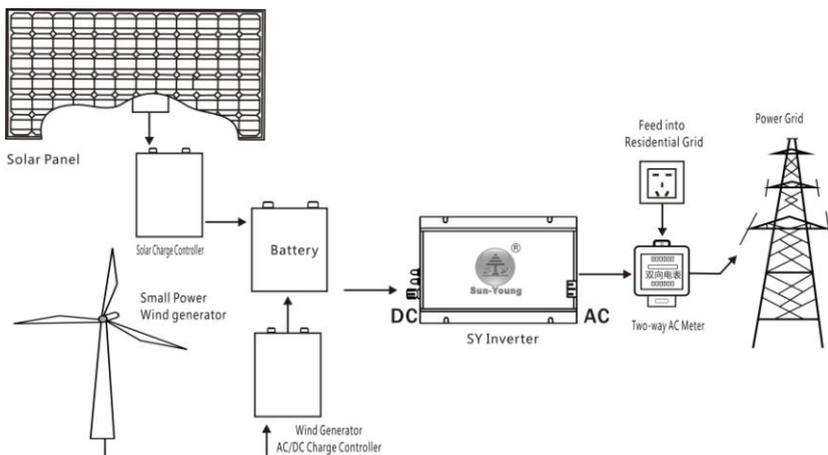
## 1. Compatible with solar panel as specified in parameter table



## 2. Work with wind turbine, if the wind turbine do not build in wind charge controller, need add wind charge controller(24V/36V)



## 3. Work with battery, PV module and wind turbine charging the battery and battery discharging to inverter for converting AC power which will feed into power grid.





**Sun-Young**

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