

Dongguan Sheng Yang Industrial Co., Ltd.



SY-GWV300/500W Grid Tie Inverter User Manual



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Product pictures



System Function

- **Power line carrier-current communication**(Follow-up perfect)

By using electric power as a carrier of AC alternating current, can modulate high-frequency software-processable (60KHz) in AC wire transmission and can achieve the communication/ newsletter between inverters or between inverter and computer. And it can transfer the power data and the brightness date of the sunshine in the real-time. Also monitor all functions of inverter.

 - 1、 Carrier frequency: 60KHZ (Frequency customizable)
 - 2、 Interface way: TTL level serial interface
 - 3、 Carrier rate: 300BPS
 - 4、 Serial rate: 9600BPS (Can customize according to customer's request)
 - 5、 Modulation mode: FSK+DSSS
 - 6、 Newsletter distance: 2Km
- **Display function**
 - 1、 AC voltage display
 - 2、 Outage display
 - 3、 Power shows
 - 4、 AC frequency display
 - 5、 DC over-voltage display

6、 DC under- voltage display

7、 Power adjust display

- **12-grade power search**

In overcast weather, the solar battery's output current is extremely tiny, then inverter will automatic open 12-grade power search function.

1、 The program can automatically open power adjustment for 12 times.

2、 The current direction can adjust from the maximum to the minimum.

3、 In automatic adjustment process, we will see the LOW light flashing. And the power will keep as a starting point, from 0 to the maximum output power, and it will restart at most for 12 times, then locked in the maximum power, the ST lamp long bright.

4、 It need 10 minutes for 12-grade power search.

- **Wide voltage input(15-60VDC)**

Achieve wide voltage input.

1、 DC voltage input: 15-60VDC

2、 Second level power variable voltage conversion

- **High-frequency two-way and one-way grid function**

1、 High frequency direct modulation, AC half wave synthesis

2、 Two-way grid means: Load consume directly. And can reverse AC current transmission.

3、 One-way grid means: Load consume directly. And banned reverse AC current transmission.

- **Kinds of frequency output function.**

It can apply to 50Hz and 60Hz frequency of AC.

Frequency range: 45Hz ~ 63Hz

- **directly connected to the solar panels (do not need to connect the battery)**

Using precise Dynamic differential pressure type MPPT function, APL functions, the inverter automatically adjust the solar panels of maximum output power, simply connect the solar panel to the grid inverters. Do not need to connect the battery.

1、 Differential pressure type MPPT: 0.1 V accuracy

2、 Power lock: 10W (AC output)

- **AC 0 angle with high precision auto-detection**

AC phase angle of 0 through isolation amplifier then input to the MCU for high-precision detection and analysis. The phase shift rate is less than 1%, thus achieve high-precision with phase modulation AC output together.

1、 AC phase shift: < 1%

2、 Over-zero protection: 0.2 VAC

3、 AC switching: 50Hz / 60Hz

Synchronous High-frequency Modulation

In the process of the grid, usually adapt the same phase angle in parallel. (ie, When the two-phase alternating current total is equal to 0. Use switch to combination the two AC fusion) and the product is rectified AC half-frequency AC to 100Hz first, then the machine use the high frequency current in the circuit and semi-100Hz frequency alternating current generated combination, to achieve high-frequency modulation.

1、 Modulation synthesis: half wave and full-bridge modulation synthesis (100Hz / 120Hz)

2、 Synthetic way: MOSFET full-bridge

3、 High frequency: 50KHz

Pure Sine Wave Output

Use SPWM directly to make pure sine wave output.

1、 Output waveform: Adopt complementary PWM to push-pull pure sine wave.

2、 Generate means: enhancement-mode SPWM

- **Automatic Sensing Function Solar Luminosity**

Use the latest luminosity perception operation technology. The different illuminate angle and intensity of the solar panel will produce different current output. Use advanced CPU to operate the different illuminance and the data can be directly displayed on the LCD. Then you can visually see the sense of the strength of the sun unit. Used more convenient.

- 1、 Luminosity sampling point : power sampling point
- 2、 High precision AD sampling: integral AD sampling method

- **Power Automatically Locked (APL)**

In different current fluctuations, we should use the MPPT function. When the MPPT function adjusted to the maximum power point, the product automatically powers locked in maximum power point, then made the output power more stable.

- 1、 Power lock: The biggest sampling point of MPPT.

- **Automatically Adapt To Different Load Power Factor**

Adapt to any of the power load.

- **Constant Current, Constant Power**

This product is constant current, constant output power, without any overload, over-current phenomenon.

- **Automatically Shut Down When The Power Output Of a Fault**

When the city power system is in failure, the inverter will automatically turn off the output.

- **Current Limit Protection**

Current limit

- **Stack Multiple Machines**

- Multiple small power inverters in parallel can achieve large output power.

- **High-Frequency High Conversion Rate**

Adapt high frequency converter, the output more efficient.

- **Maximum Power Point Tracking (MPPT)**

Because the current intensity and the voltage changes at any time, if there is no power point tracking, there will be a lot of problems. In the past time, usually adopt a solar controller, but this product uses high-precision MPPT operation power, automatic and immediate adjust the solar panels output power at the maximum output point, then achieve a stable output purposes.

MPPT is for short of " Maximum Power Point Tracking". It means the controller can sense the voltage of the solar panels on time, and can track the highest voltage and current (VI).Then made the inverter discharge to power grid with the highest efficiency.

The peak voltage (Vpp) of the solar panels is about 19.5V when it in factory. And the environment temperature is 25 ° C. The reason of setting this temperature(interestingly, different from the subjective imagination, we ordinary people the conclusion may let us surprised) is that when the weather is very hot, solar panels' peak voltage will fall to about 17.5 V while in cold weather, the peak voltage can achieve 20.8 V.

Now we back to contrast the difference of MPPT solar energy grid inverter and traditional inverter. The traditional solar inverter is a bit like the manual gearbox. When the engine speed increase, while the gearbox gear don't increase at the same time, it will definitely affect the speed of the car. For traditional inverter speaking, the parameter output power is been set in factory. It likes a car have been fixed set on fixed 1 gears, no matter how powerfully you trample accelerator, the speed of a car is limited. While have the MPPT function it will be different, it is automatically. It will automatically adjust the gears according to the engine' speed, so it can make cars in the most gears in a reasonable efficiency standard operation. It means the MPPT controller can track the maximum power point of solar panels in real-time then express the biggest efficiency of solar panels. The higher the voltage, the more power can be output through the MPPT. Thus improve the charging efficiency. Theoretically speaking, using MPPT, the efficiency can be increased by 50% compared with the traditional inverter. But due to environmental impact and various around energy loss, the ultimate efficiency can improve

20%-30% according to our actual testing.

Parameter Table

KD-WVC Grid-series models	300Watt	500Watt
Recommend use solar panels	400Wp	600Wp
DC MAX input current	20A	40A
AC MAX output power	300Watt	500Watt
DC MAX Open-circuit input-voltage	100VDC	
DC input voltage range	15~60VDC	
MAX output power factor	0.99	
DC input Reverse voltage protection	FUSE	
AC output voltage range	(120V versions: 90~160VAC) (230V versions: 190~260VAC)	
AC frequency range	45~63Hz	
Output current total harmonic distortion	THDIAC <5%	
AC Phase	<0.5%	
Islanding protection	VAC; f AC	
Output short circuit protection	Current-limiting	
Show	LED mode: power instruction; voltage instruction; AC frequency instruction; over-voltage instruction	
Communication way	60KHz modulation, power line carrier-current communication	
Standby Power	<1W	
Night Power	<1W	
Ambient temperature range	-25 °C~60°C	
Humidity	0~99%(Indoor Type Design)	
Waterproof	Indoor Type Design	
Electromagnetic Compatibility	EN50081.part1 EN50082.part1	
Power System Disturbance	EN61000-3-2 EN62109	
Network test	DIN VDE 1026	
Certificate	CE	

Packing and weight

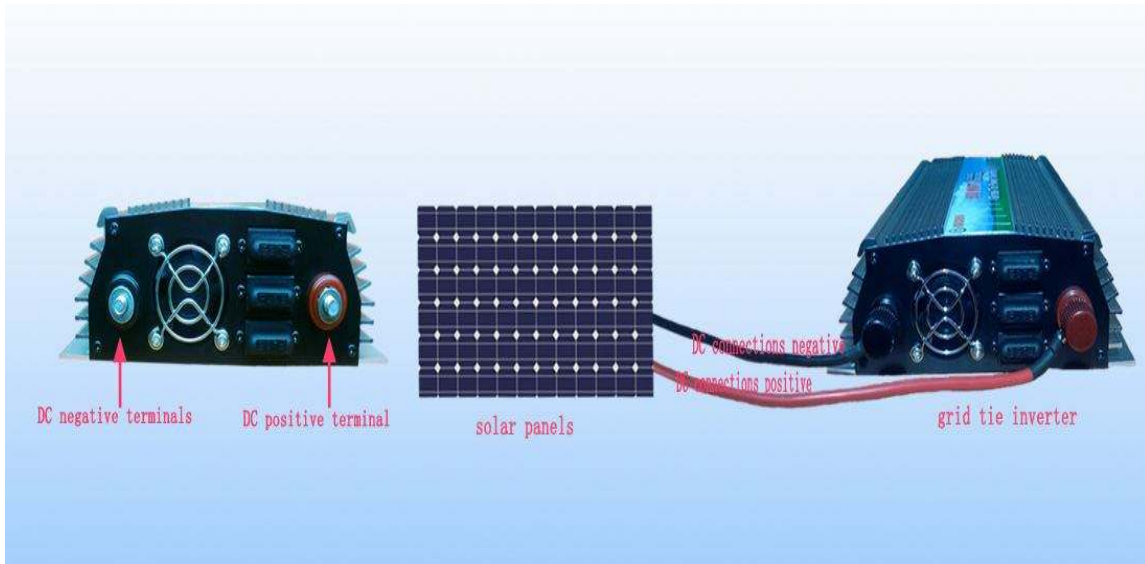
Net weight	1.3kg (200—600W)	2.0kg(800—1000W)
G weight	2.0kg (200—600W)	2.7kg(800—1000W)
Size (L x W x H)	21 x 16.5 x5.3cm	31 x 16.5 x5.5cm
Package (L x W x H)	Inner box:34x25x15.5CM Big box:51x37x33CM	Inner box :43x25x15.5C Big box:52x45x33CM
Installation	Wall hanging	
AC power cord length	1.8m	
Cooling	Fan	

User Guide

1、 Installation Connection

1、 Red terminal: Connect DC positive, black terminal: Connect DC negative. Show in Figure 1.

Figure 1



2、 AC socket: Connect to the mains. Put the side of the AC cord which has holes into the inverter with 3 foot outlet and the other side of the AC cord to home 3PIN AC outlet. Show in Figure 2.

Figure 2

Figure 3



3、 Switch: Connect the connections in right way, then turn on the switch. The inverter starts to work.



2、 Grid tied inverter used in the wind and solar street lights.

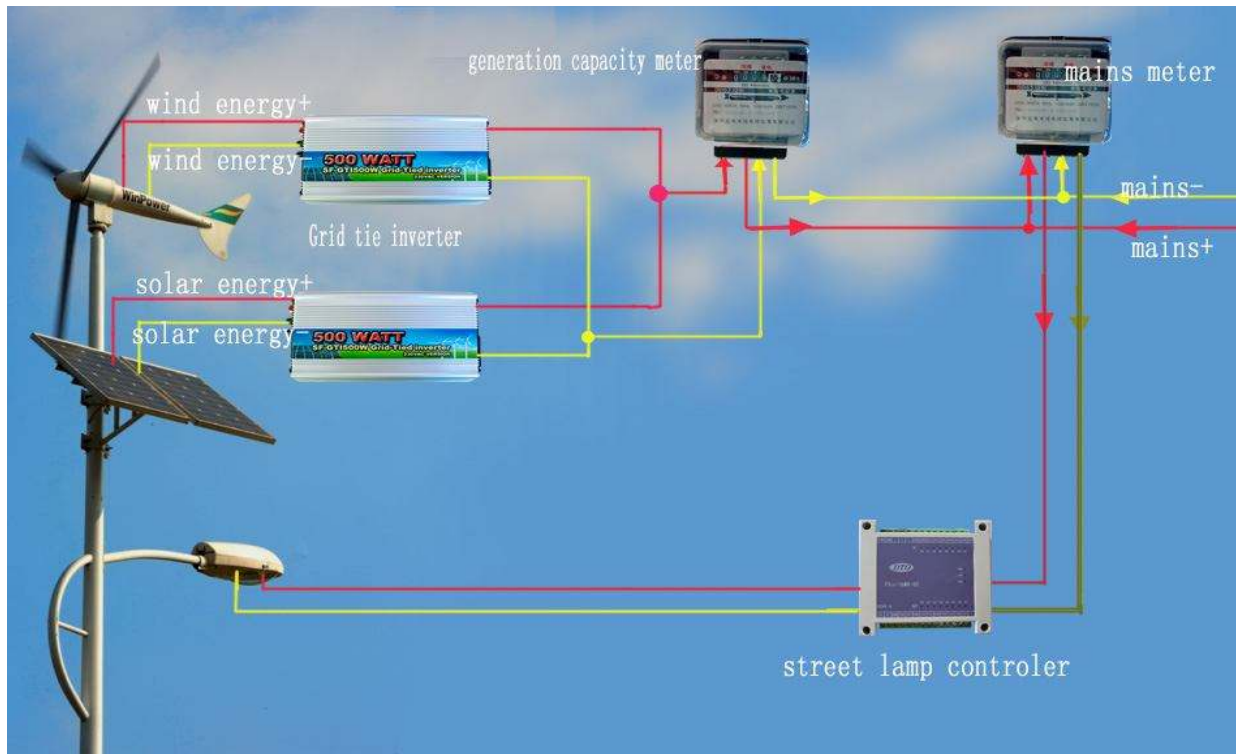
Use this product, do not need to add solar panel controller, battery.

Connection Method 1 (Figure 4 below):

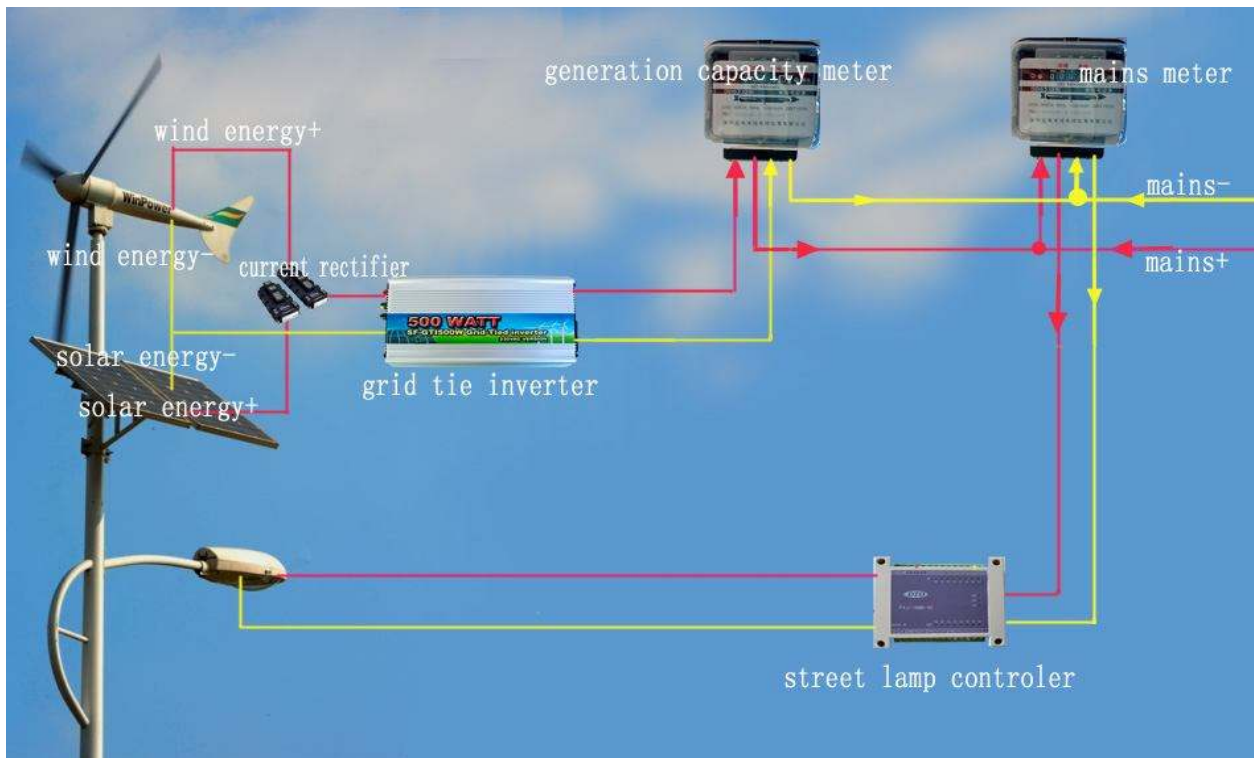
Figure 4

Connection method 2 (Figure 5 below):

Figure 5



Connection Method 1: Wind energy, solar energy can supply to the grid at the same time, then achieve the highest efficiency. First consider this connection method. Figure 5

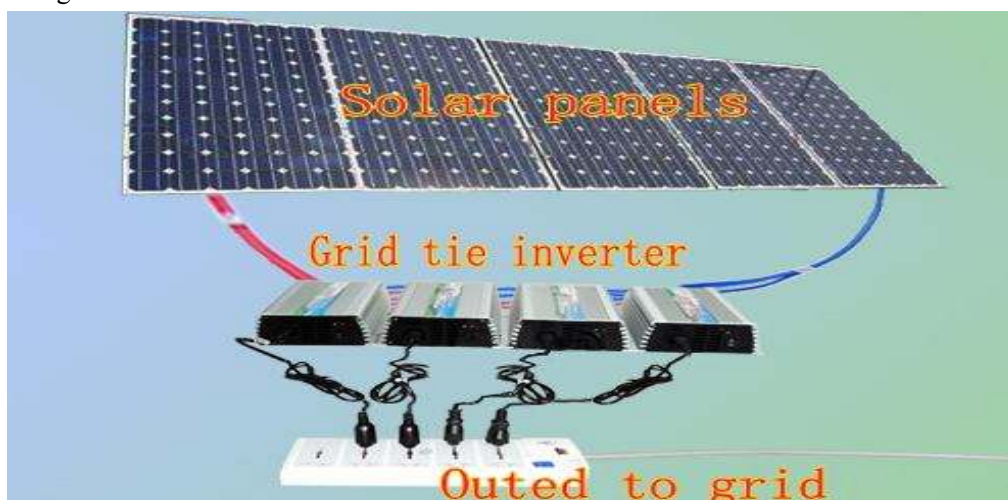


Connection method 2: Use a large power generation capacity first. The other capacity is in added. Wind and solar capacity complement each other with moderate efficiency.

3、 Stack using

In order to achieve higher power use requirements, this product can be stacked, such as: 4 grid inverter1000W stacking can achieve 4000W.And the number of the stacking is unlimited. Used as shown in Figure 6:

Figure 6



4、 Input and output

1、 DC input limit

- ◇ Input voltage range: 14V to 60V

Solar Panel: Recommend using the power more than 30W and the standard voltage of 36V PV panels.

Recommend using multiple solar panels. Solar panel in series will result in high-input voltage which will exceed the working voltage range of the inverter.

Wind turbine system: Rated voltage 24VDC, maximum voltage 48VDC.

2、 AC output:

- ◇ Voltage range of the inverter whose output is 220V AC.: 170V - 260V, 50HZ
- ◇ Voltage range of the inverter whose output is 110V AC.: 90V - 160V, 60HZ

5、 LED Indicator:

1、 Red LED:

- 1、 Low-voltage protection (input DC voltage is less than 14VDC).
- 2、 Over-voltage protection (Input DC voltage is greater than 60VDC).
- 3、 Over-temperature protection (when the chassis temperature is above 75°C, the temperature dropped about 2-10 minutes to restart automatically after cooling).
- 4、 Fault Protection (when 110VAC or 220VAC power outage or shutdown).
- 5、 Islanding protection: When the electric supply stop, the inverter automatically shut down output.

2、 Green LED:

- 1、 Green LED flashing: The inverter is adjusting power output. MPPT is in working condition.
- 2、 Green LED long in time: The inverter is in working condition with the maximum output power.

Notes

- Non-professionals do not disassemble. Only qualified personnel may repair this product.
- Please install inverter in the low humidity and well-ventilated place to avoid the inverter over-heating, and clear around the inflammable and explosive materials.
- When using this product, avoid children touching, playing, to avoid electric shock.
- Recommended Maximum DC input 4AWG cable capable of handling more than 50A of the cable size.
- Optimal length of the DC input line 8M or less, long cable will allow solar panels to the inverter DC voltage drop caused by wear and tear.

---Connected to a power outlet to provide AC.

---Connected solar panels, battery or wind generators DC input DC power supply cable.

---Proposed wind power plant with its own charge controller and load dump.

Accessories for product

One standard AC wire

One warranty card

One user manual

One certificate of quality