QINGDAO XIANGHONG EXPORT&IMPORT CO. LTD.

XIANG YUN

Add: NO.385 Changjiang Road, E&T Developing Zone, Qingdao, Shandong, China. Tel: 086-158-98874886

www.china-windsolar.com Email:info@china-windsolar.com 086-158-20037061

# 5kw wind turbine

- **Parameter**

**blade diameter: 5.5m**
**number of blades: 3**
**blade material: fiber glass**
**rated wind speed: 9m/s**
**start wind speed: 3m/s**
**working wind speed: 3-25m/s**
**security wind speed: 55m/s**
**rated output power: 5kw**
**max output power: 7kw**
**rated speed: 220r/min**
**type of generator: permanent-magnets- 3 phase A.C.**
**speed regulation: yaw& magnetic resistance**
**output voltage : AC220V**
**tower type: pull wire tubular tower**
**normal tower height: 9m**
**weight of top section: 250kg**
**Necessary battery: 12V 100AH 18 pieces**
**can load : light, fan, charger, TV, pump, washer, refrigerator, electric cooker, air conditioner**
**can supply power for: air-condition, refrigerator, washing machine , water pump ,electric pan, color TV, lighter, fanner, charger**

## Our wind turbine characteristics:

*Generator housing is aluminium ally,Precision stainless steel rotor,made from high-quality rare earth permanent magnets material ,more ligher ,smaller with high-efficiency;
*Blade made of reinforced nylon glass-fiber material, Scientifically and Nice design,low wind start up ,low noise;
*Tail Vane made of new advanced design,adjust flexbility and reliablity with Vairety wind speed;
*Contoller LCD display,perfect protection,High charge efficiency(especially optional:low voltage charge);
*Inverter LCD display,perfect protection,High efficiency transformer,Pure sine wave;
*Tower make of steel plate, thickness, hot galanized,rust-proof;
* Easy Installation,Easy operation;
* Long term use,Duability with Free of maintenance; National stardar parts:
*Long Lifespan: Over 20years, CE certificate; Warranty:3years,Delivery date:15 to 20days
*Most reasonable price, best-cost performance ratio

## We welcome to you and sincerely to be your reliable supplier:

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## 5kw wind turbine off grid system price:

| 5KW Wind turbine | FOB QINGDAO USD |
|---|---|
| Price include:5kw generator, blades, 5kw wind&2kw solar hybrid controller5kw off grid inverter, **Guyed cable tower** | **USD4430.00** |
| Price include:5kw generator, blades, 5kw wind&2kw solar hybrid controller5kw off grid inverter, **free stand tower** | **USD5000.00** |

## 5kw wind turbine on grid system price:

| 5KW Wind turbine | FOB QINGDAO |
|---|---|
| Price include: 5kw generator, blade, 5kw on grid controller,5kw on grid Inverter Guyed cable tower | **USD5540.00** |
| Price include: 5kw generator, blade, 5kw on grid controller,5kw on grid Inverter Free stand tower | **USD6110.00** |

## 5kw wind&2kw solar hybrid off grid system price:

| 5KW Wind&2kw solar | FOB QINGDAO |
|---|---|
| Price include:5kw generator, blades, 5kw wind&2kw solar hybrid controller5kw off grid inverter, 2KW solar panel **Guyed cable tower** | **USD5940.00** |
| Price include:5kw generator, blades, 5kw wind&2kw solar hybrid controller5kw off grid inverter, 2KW solar panel **Free stand tower** | **USD6510.00** |

**Part quote:** 5kw generator USD2370.00 Blade USD420.00

5kw wind&2kw solar off grid Controller USD450.00

High performance 5kw wind&2kw solar off grid Controller USD590.00

5KW off grid inverter output 220/230V 2phase USD780.00(with auto switch USD880.00)

High performance 5KW off grid inverter output 220/230V 2phase USD1140.00(with auto switch USD1240.00)

5kw off grid inverter output 380V 3phase USD1180.00(with auto switchUSD1260.00)

5kw on grid controller USD690.00 5kw on-grid inverter USD1650.00

Cable Tower USD410.00 free stand tower USD980/USD1290.00

**8X250W solar panel (A-grade quality monocrystallion silicon) USD1510.00**

Warm Prompts: Customers can buy battery from the local,our price is:

Lead acid battery 12V 100AH USD90.00/pc , 12V 200AH USD180.00/pc Wooden carton

Gel Battery 12V 100AH USD160.00/pc , 12V 200AH UAS280.00/pc Wooden carton

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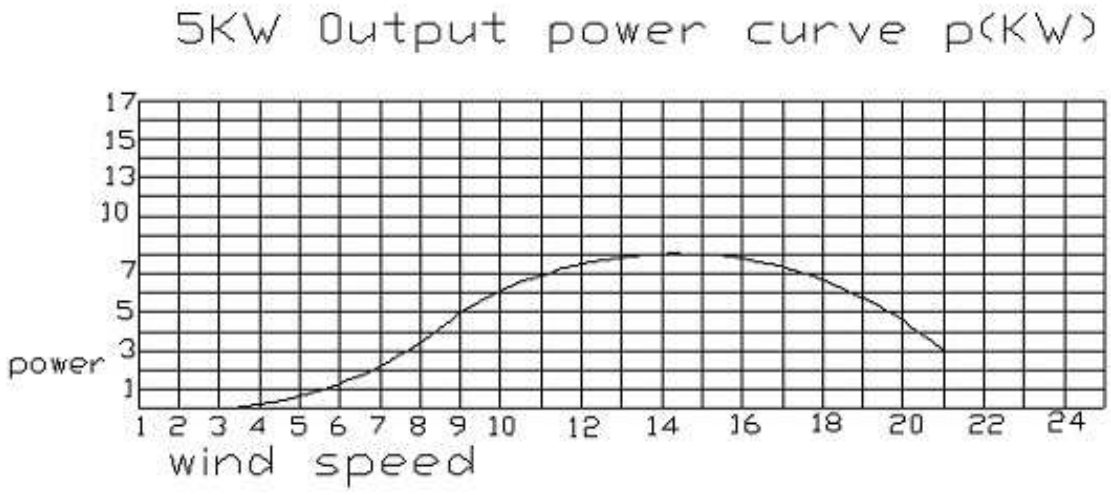
- **Packing list**

| item | net weight（KG） | gross weight(KG) | Measure(cm) | Inner groupware |
|---|---|---|---|---|
| 5000watts wind generator's accessory | 222 | 245 | (92X53X43)x1 | 1 generator， 8 anchors， 1 pull-wire， bolts, clips，1 teardown tool |
| blades and tail vane dome and wheel&press,board, | 110 | 120 | (270X58X36)x1 | blades、4 anchor shackle、cable，tail vane, bolts dome and wheel&press,board, |
| cable tower | 136 | 136 | (450x15.9x15.9)x1 | cablet tower |
| **Free stand tower** | 415 | 415 | 800x60x18=1.05 | **Free stand tower two parts 8meters** |
| inverter | 35 | 41 | (60x60x26)x1 | inverter、compact disc,instruction book |
| base | 53 | 60 | (60x60x14)x1 | base |
| Wind-solar controller&dump load | 41 | | 49×46×26(controller) 82×49×24(dumpload) | 5KWWind-2kwsolar controller&dump load |
| Solar panel | 270 | | 1950X992X50X10 | 200W Solar panel wooden carton |

**Power diagram**



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## 5000W off grid system wind turbine connect method:

1, 5000W wind generator rated output is 240V AC to connect with input of 240V AC controller, then the controller stablize votage output will be 240V DC to charge the 20pcs of 12V 100AH batteries which is connected in series to be 240V,

2,The power from batteries of 240V DC will connect to input of 240V DC of 5000W inverter ,then the inverter will transform 240V DC to be output of AC 220V/230V/380V 50Hz/60Hz for home use.


## 5000W auto switch off grid system wind turbine connect method:

1, 5000W wind generator rated output is 240V AC to connect with input of 240V AC controller, then the controller stablize votage output will be 240V DC to charge the 20pcs of 12V 100AH batteries which is connected in series to be 240V,

2,The power from batteries of 240V DC will connect to input of 240V DC of 5000W inverter ,then the inverter will transform 240V DC to be output of AC 220V/230V/380V 50Hz/60Hz for home use

3,the inverter have AC input to connect the city grid.

**For the auto switch(by pass) function instruction:**

1,First the city grid must connect the input of inverter,the AC load get power from the inverter.

2,when the system working and battery have power, city grid is online, the inverter Will switch to use the battery electricity priority.

3, a),when there have lack of wind,and the AC load using the storage power from battery. If the battery is undervoltage(over discharge), the inverter will intelligently switch to use grid to drive load.

b)when there have wind again,controller will charge the battery, when battery get to the rated voltage,

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the inverter will intelligently switch to use battery power to drive load.

4, a),if the city grid is power cut ,the inverter will automatically switch to use the battery power. If the battery is over discharge meantime,there will no electricity,then you can wait the charging battery get to rated voltage,or wait the city grid is online, the inverter can automatically switch between battery and city grid.


**5KW wind&2KW solar off grid system (with auto switch)connect method**

1, 5KW wind generator rated output voltage is 240V AC to connect controller wind input 240VAC;

2,10pcs of 24V 200W solar panel connect in series is 240V DC to connect controller solar input 240V DC;

3,then the controller stablize votage output will be 240V DC to charge the 20pcs of 12V 100AH batteries which is connected in series to be 240V,

4,The power from batteries of 240V DC will connect to input of 240V DC of 5000W inverter ,then the inverter will transform 240V DC to be output of AC 220V/230V/380V 50Hz/60Hz for home use

5, if add auto switch, the inverter have AC input to connect the city grid.

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## 5000W wind turbine on grid system connect method:

**On grid system suitable for some countries state grid allow individual power to connect it and sell to the state power.**

1,5kw wind generator rated output voltage is 220V AC to connect with input of 5kw on grid controller to stablize voltage output to be 220V DC,it connect 5kw on grid inverter output voltage will be 220V/230V 50Hz/60Hz to connect city grid to sell electricity, there will have watt hour meter to measure how much power the system selling and how much power the household applicants used.

2,when the wind turbine system is working, it means selling electricity, if the household applicants use electricity meantime, that means using the wind turbine system and city grid integrated power, the meter will measure the selling power and using power accurate.

3,please note, this on grid system is different from auto switch of off grid system, the on grid system only can sell electricity, if the city grid cut off, the applicants can not use the power from on grid system directly, the grid inverter will auto cut off meantime.

4,if the wind turbine not on working, grid inverter will auto cut off, applicants use city grid.

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## 5kw Generator

*Type of generator: Permanent-magnet 3-phase A.C.
*Stator: Silicon steel sheet
*Magnet steel: NdFeB
* Wire package: Copper wire
*Brake device： tail spindle brake system
*Generator shell material： aluminium ally,Precision stainless steel rotor,smaller, lighter with high efficiency
*3-phase power transmission slip ring conductive, no twist cable phenomenon

- **Rated speed (rpm):**220
- **Rated wind speed:**9 M/S
- **Starte up wind speed:** 3 M/S
- **Net weight:** 110KG

**Packing weight:**123KG
**Packing size:** 86cm*60cm*60cm

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| | |
|---|---|
|  Blades | *Made of FRP reinforced nylon glass fiber, ultraviolet prevention rosin, plus unidirectional modernization craft vacuum cast technique synthesis.<br>*Advanced thermoplastic engineering and precision injection molding technology for higher strength,flexibility and reliability.<br>*Patented aerofoil aerodynamic design<br>*Ensure rotor matching with generator perfectly<br>*Ensure generator start-up easily in low wind speed<br>*Minimal vibration,Low noise<br>blade diameter: 5.5m |
|  Dome | **Material of dome：FRP**<br>**Number of dome：1PCS** |
|  | tail vane |
|  | **Hub and press board** |

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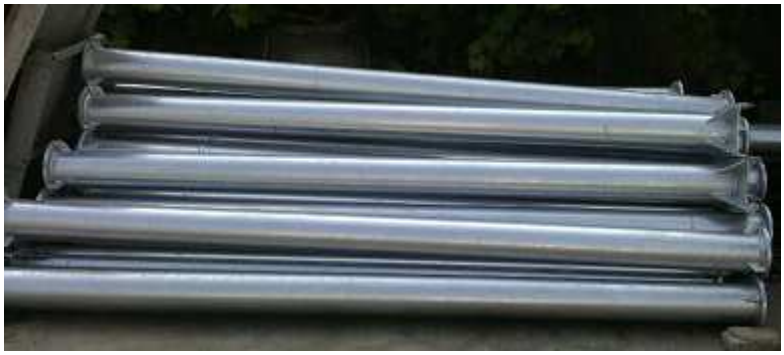
| | |
|---|---|
|  <br>Cables | **Dim (copper): Φ6mm**<br>**Material: copper & PVC** |
|  <br>  <br>**Guy cable tower** | ● **Tower type:** Guy cable tower<br>● **Material:** steel plate<br>● **Height of tower:9**M (=29.7 Feet)<br>● **Thickness:**5 mm Diameter:159mm<br>●**Gross weight:** 160kgs<br>**Sections of tower:（3 parts of vertical pole）**<br>**Material: Steel plate**<br>**Surface treatment: hot galvanized,rust-proof** |
|  | ● **Tower type:** Free standing tower<br>● **Material:** steel plate<br>● **Height of tower:**8 M<br>● **Thickness:**6 mm<br>●**Gross weight:**<br>**Sections of tower：2**<br>**Surface treatment: painting against decaying**<br>The surface of tower and base must be hot galvanized and then paint with plastic |
| Accessories | Base, **wire tighten tool, Anchors of Base, Anchors of Wire ,nut & washer & bolt suitable for installation** |

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## The packings:

## Our new type wind turbine technological superiority

Technical background:

The traditional small horizontal axle wind turbine(adopt tail vane board protection),at the high speed wind the turbine need the tail vane board turn right or left to adjust the blades rotate speed to protect generator. But this weakness is when there have a big wind,the tail vane board have a bluntness phenomeno is affected by length,tail area and tail angle, after the tail vane board turned, it will be buluntness if tail vane board restoration. This buluntness will reduce wind turbine working efficiency,meantime the tail vane board turning perennial,the mechanical will be reduced, or the tail vane abrasion and break off, under the dangerous of tubine burned.

The traditional tail vane board turn right and left wind turbine type,For the structural reasons,genertor can not completely sealed,not be overcome seepage water,prevent sand erosion,greatly reduce the security protection grade.

New type:

Our company invented a new manner working of tail structure for our wind turbine through a long period precise research and practice verification, its working principle is from the aerodynamics, when the blades turning, the back of blades can form a vortex flow pressure, this new type tail vane board turn automatically by

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the tail axle according to the pressure size,then it can reduce blades windward area.then the blades get a reasonable rotate speed automatically,this ratated speed can make sure wind turbine have a high efficient.

We can call this new type is Tail Axis Rotation Wind Turbine,the advantage is:

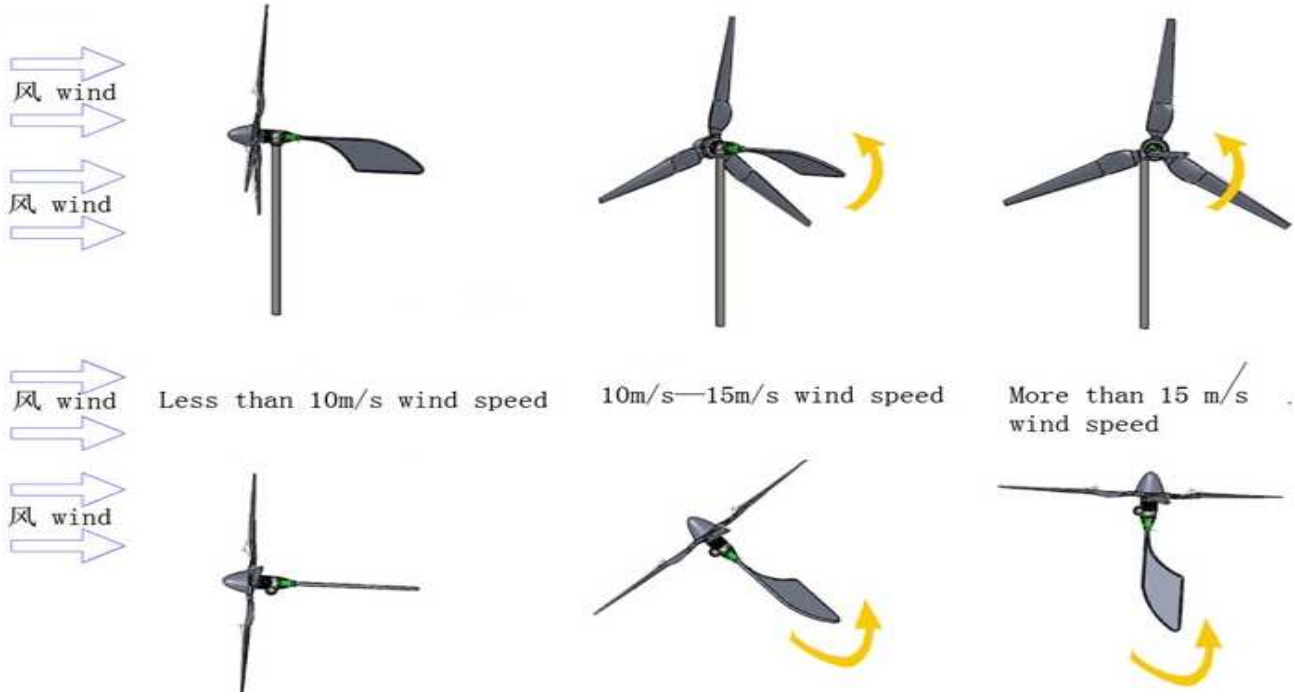
1, The tail van board controlling adopt principle is gravity,when the wind speed exceed the wind turbine woring wind speed,the tail axle will turn to adjust the wind turbine and blades deflexion, this Tail axle work maximum angle is 90°,it can make blades deflexion 90°not face windward absolutely to make sure wind turbine safety.

2,When the controller system loss efficacy,This tail axle can make sure wind turbine not damaged under a big wind.

3,When in the actual work, the acticity of components is just the Tail Axle, the working point of controll will not affect by time,abrasion, improve the reliablity greatly.

Practice verification, Tail Axis Rotation Wind Turbine can be realized to seal completely,internal adopts the mature standard bearing,connection of different parts adopt waterproof sealing ring,it implement thoroughly to seal stop from the dust,water,salt and fog.

Our wind turbine adopt revolved body verical rigid drving mechanism,using good quality bearing,this structure can disslove unstable flow reason of shaking and vibration,to improve the life of generator. wheel hub adopt mature plasma structure,No complicated mechanical devices, free maintenance,lowest failure rate.



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# 5kw controller


## INTRODUCTION:

The wind/solar hybrid controller is an intelligent control device which can control wind turbine and solar panel at the same time, specially designed for high-end wind/solar hybrid system and also suitable for

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wind/solar hybrid power system and wind/solar hybrid monitoring system. It is used to control the wind generator and solar panel to charge the batteries safely and efficiently.

With decent appearance, easy operation, visual LCD display and perfect protection functions, the apparatus has high charge efficiency, low no-load loss.

The wind/solar hybrid controller is the core component of the off-grid power generation system. The performance of the controller will impact the life and the stability of the whole system, especially the lifespan of battery banks.



# Performance Description

✧ **Reliability :** Intelligentized, modularized design, simple mechanism, powerful functions. With industrial range superior components and strict production technology, the controller can be used in relatively bad working environment and has reliable performance and long life-span.

**PWM Stepless Dumpload Mode:** dump residual power with division into thousands of stages. It can dump residual power while charging battery banks, which is benefit to effectively extend battery longevity

✧ **Voltage Limiting and Current Limiting Charge Mode:**

When battery voltage exceeds the pre-set floating voltage point, the controller will adopt PWM voltage limiting charge mode. It dumps the excess energy. When solar panel charging current exceeds pre-set brake current point, the controller will automatically start brake to protect battery banks.

✧ **LCD Display Function:** LCD screen can display system status and parameters via visual digital and graphic form. Such as: battery voltage, PV voltage, PV current, PV power, battery energy status etc.

✧ **Perfect Protection Functions:** Battery over charge protection, Battery over discharge protection, Battery

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anti-reserve connection protection, solar panel current-limiting charge, automatic brake, manual brake; solar anti-reverse charge protection, solar anti-reverse connection protection, lightning protection, etc.

(**Note: Following optional functions are valid only for controllers which have these functions**)

✧ **Optional Remote Communication Function:**

The software can monitor real-time system running status, which contain all the parameters on the LCD screen. Through the software, users can not only set and adjust relevant parameters, but also can control the solar panel and load running status, and alarm while malfunction happens.

✧ **Optional Low Voltage Charge Function:**

Boost module is added in the controller to help solar panel charge battery banks even in lack of solar. User can adjust the admittance value and start charge voltage via software according to different solar panel parameters.

✧ **Optional Dry-contact signal Function:**

When the battery is reaching setting value, the controller will automatically output dry-contact signal.

✧ **Optional Temperature Compensation Function:**

The controller can adjust the unload voltage according to different ambient temperature so that the battery charge is in the best efficiency.

✧ **Optional SD card Function:**

With SD card, controller store system history data when the controller disconnected with PC.

✧ **Optional Wind Speed Detection Function:**

The controller can detect real-time wind speed when it is matched with appointed anemometer. User can read the real-time wind speed via monitoring software.

✧ **Optional Micro-current Charge Function:**

When the solar panel input voltage reaches to the pre-set value, the controller will produce the micro-current charge for the battery.

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✧ **Optional DC Output Function:** DC output offers power for DC load, with various control modes for choice, including: Constant on; Constant off; Constant half-power; light-control on, light-control off; light-control on, time-control off; light-control on, time-control half-power, light-control off; light-control on, time-control half-power, time-control off. Via LCD buttons, users can set three output control modes: constant on; light-control on, light-control off; light-control on, time-control off.

## OPTIONAL FUNCTIONS:

✧ Temperature compensation function.

✧ RS communication function: RS232/RS485/RJ45/GPRS are optional communication ports.

## OPTIONAL ACCESSORIES:

**Ethernet communication module**

CNS311 is a terminal device using the Ethernet data transmission. Embedded Ethernet serial converter module integrated within the TCP / IP protocol, complete the networking of device easily, fast access to the LAN and the Internet. The module is transparent to user, who does not need to know well the complex network and TCP / IP protocol.

**GPRS communication module**

ZSD3110 is a terminal device using the GPRS wireless data transmission. Which supports for PPP, TCP, UDP, ICMP and other complex network protocols and SOCKET standards, providing completely transparent data transmission and users free control transmission .This module supports point-to-point, point-to-multipoint, equipment-to-equipment, equipment-to-center etc different communications modes . Users do not need to worry about complex network protocol, they can have the wireless data transceiver with RS232/485/422 interfaces, So that the device can be access to Internet anytime and anywhere.

**RS485-USB converter**

Universal USB/RS-485 converter, Without external power supply, compatible with USB, RS-422, RS-485 standards, with ability to convert single-ended USB signals to the balanced differential RS-422 or RS-485 signals. Converter with active internal automatic transceiver conversion, unique I / O circuit automatic control data flow direction, dispensing with any handshaking signals (such as RTS, DTR, etc.) and jumper settings to achieve full-duplex (RS-22 ), half-duplex (RS-485) mode switch, plug and play.

**RS485-232 converter**

Compatible with both RS-232 and RS-485, with ability to convert single-ended RS-232 signal to balanced differential RS-485 signal, extended RS232 communication to 1 km away, and no external power supply needed. Half-duplex (RS-485) mode switch, plug and play. Ensure that it meets all existed communications software and interface hardware, dispensing with any software modification which used for previous RS232 working mode.

**RS232-USB converter**

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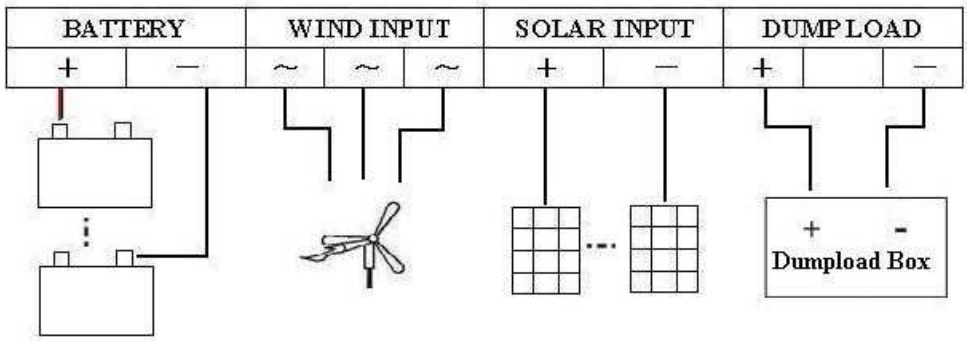
RS232-USB converter is especially for different computer communication series, external devices have the remote data communications between smart devices, a standard serial interface conversion to each other. It is mainly used for the remote communication between the host computers, the host computer and between peripheral point to point. Commonly used in industrial automation and control systems, mobile control communications and power equipments monitoring communications systems.

**APPLICATION AREAS:**

- ✧ Stand alone wind/solar power station
- ✧ Stand alone domestic household photovoltaic power system
- ✧ Coastal islands, remote mountainous, border posts for regions shortage of or without electricity.
- ✧ Government demonstration projects, landscape lighting project, street light project etc.
- ✧ GSM base stations, expressway and other no-residential regions.

# Installation Flow




User should connect and operate all parts according to following procedures after wind turbine, solar panel and external circuit constructions are finished.

**Step 1.** Check the package and then check the controller for damage after unpacking. Damaged controller cannot be installed in the system.

**Step 2.** For controller whose dumpload box is separated, please connect dumpload box to the “DUMP LOAD” terminals of the controller.

**Step 3.** Connect battery positive pole to the positive (+) “BATTERY” terminal, Connect battery negative pole to the negative (-) “BATTERY” terminal with copper core cable.

(**Note: Although the controller has anti-reverse connection protection function, wrong polarity of battery shall be forbidden! Please refer to Appendix I for copper wire over current capability**.)

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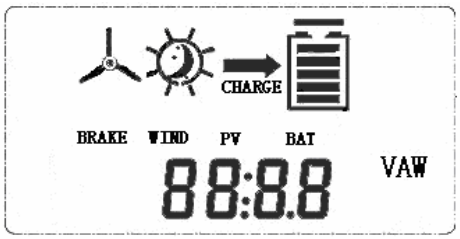
**Step 4.** Connect solar panels to the “SOLAR INPUT” terminals.

**Step 5.** Check all connection is proper and firm or not.

**Step 6.** If the controller has communication function, user can read and set relevant parameters via software.

**Step 7.** User can set relevant parameters through LCD buttons.

## LCD Display Instruction




1) Wind turbine symbol.

2) Day symbol. Night symbol.

3) Battery symbol，inner strip graph indicates the battery power status. Five inner horizontal strips display indicates the battery is full. The symbol shall be flashing when the battery is over-discharge, flashing will not stop until battery voltage recover. The symbol shall be flashing when the battery is over charge, flashing will not stop until battery voltage recover.

4) 88:88 Parameters display symbol. Each system parameters are displayed via visual digit and graph.

5) Press the "Enter" key and "Esc" button at the same time, LCD displays the symbol BRAKE which indicates wind turbine in brake status. Wind turbine will stop rotating or running in low speed under brake status. Press the "Enter" key and "Esc" button at the same time under brake status, the symbol BRAKE will disappear and brake status is released. In normal situation, the wind turbine shall be in running status rather than brake status.

## 5.2 Button Specification

LCD backlight will be on after pressing any button. The backlight will go out to save power if there is no button operation for 10 seconds.

- "↑(+)": Up/ Increase. In browsing status, press ↑(+) to check the previous parameter.

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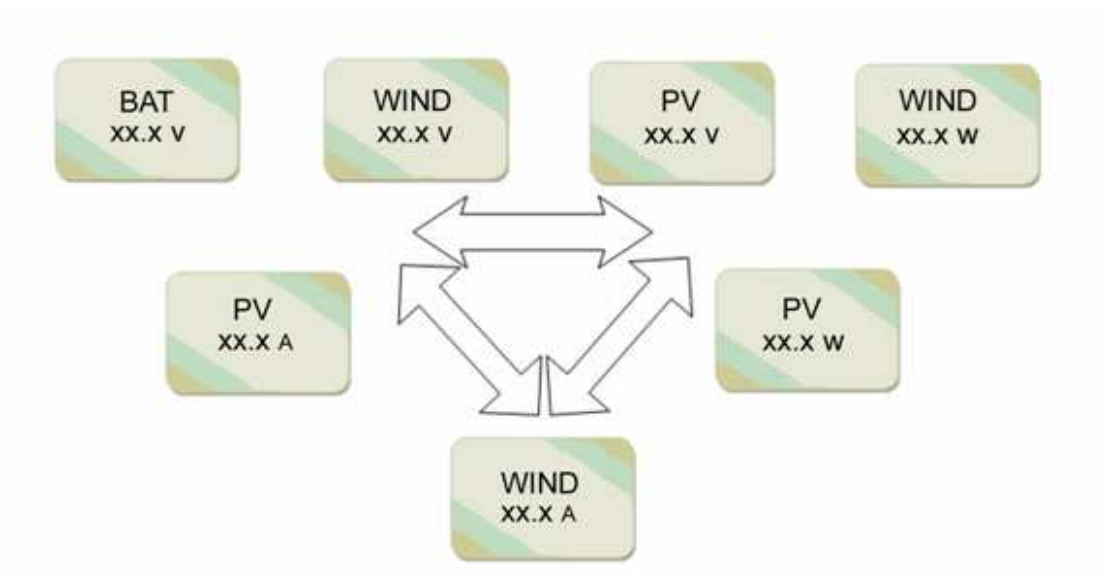
In setting window, press this button to check the next adjustable parameter or increase the value of current parameter.

- "↓(-)": Down/Decrease. In browsing window, press ↓(-) to check the next parameter. In setting window, press this button to check the previous adjustable parameter or decrease the value of current parameter.
- "Enter": Set/Confirm. In browsing window, press "Enter" to access setting window. In setting window, press this button to save parameters and return back to browsing window.
- "Esc": Cancel/Manual reset. In setting window, press "Esc" to return to browsing window without saving the modified parameters.

## 5.3 Parameters Browsing

1）When power is on, the LCD is under browsing window and displays battery voltage: XX.X V;

2）In browsing window, LCD will circularly display the following parameters by pressing "↑(+)" button and "↓(-)" button.




# Monitoring Software (Optional)

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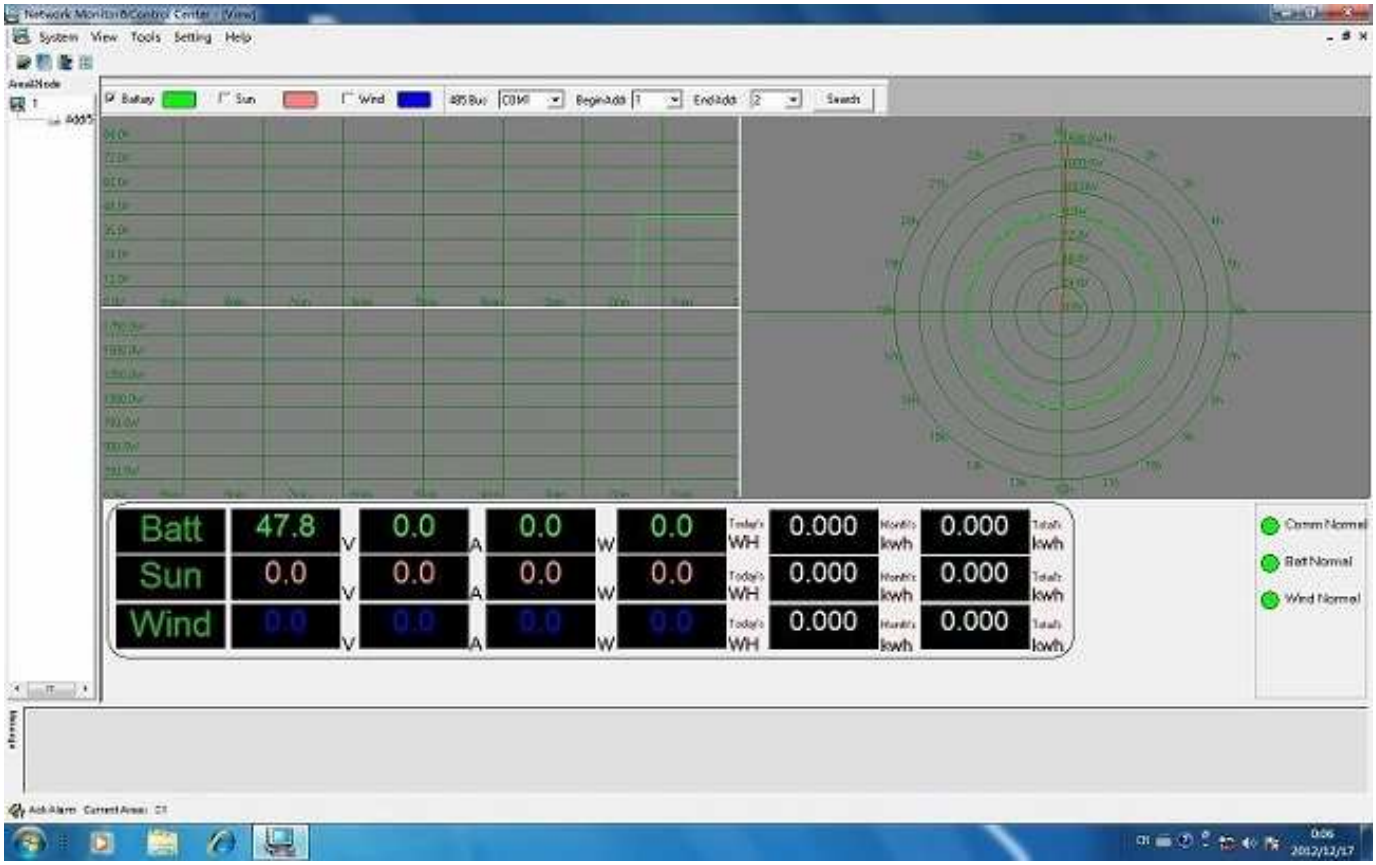


The monitoring software is specially developed for the controllers that we produced, the following are the part functions which can be realized via the software, more information please refer to our software user manual.

a) Remote monitoring and parameters configuration for different controller models.
b) Big database system capacity.
c) The controller can network according to RS482 bus, GPRS, Ethernet.
d) History data inquiry.

# Troubleshooting

If your phenomenon is out of following descriptions or should you have any problems about these products, please contact manufacturer in time.

| Phenomenon | Troubleshooting |
|---|---|
| The symbol flashing, without charge or discharge | Battery is over-voltage, check battery voltage, and whether the cables are well-connected or not, re-connect all components. |

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| | | |
|---|---|---|
| LCD display “BRAKE” all the time | a) Firstly, open the software “parameter”-“control”, please check if the setting is “BRAKE”. If yes, please cancel it.<br>b) Secondly, Disconnect wind turbine, battery with controller successively. Reconnect them a few minutes later, then check if it comes back to normal. | |

## TECHNICAL PARAMETERS:

| | | | |
|---|---|---|---|
| Rated Wind Turbine Power | 5kW | | |
| Rated Battery Voltage | 120V | 220V | 240V |
| Wind Turbine Maximum Input Current | 80A | 45A | 40A |
| Wind Turbine Maximum Input Power | 10kW | | |
| Unload Voltage（factory default） | 140V | 252 V | 280 V |
| Unload Current（factory default） | 40A | 25A | 25A |
| Control Mode | PWM | | |
| Display Mode | LCD | | |
| Display Parameters | Wind Turbine Power, Wind Turbine Voltage, Wind Turbine Current , PV Voltage,<br>PV Charge Current, PV Power, Battery Voltage | | |
| Working Temperature &Humidity | -20~+50℃/35~85%RH（Without Condensation） | | |
| Temperature Compensation (Optional） | 4mV/℃/2V ,–35℃--+80℃, Precision：±1℃ | | |
| Communication Mode（optional） | RS232、RS485、RJ45、GPRS. Etc | | |
| Protection Function | Battery over charge protection ,Battery reverse connection protection,<br>Lightning protection, Wind turbine current limiting,<br>Wind turbine automatic brake and manual brake. | | |
| Optional Function | **Optional Function 1** : RS Communication and Matched Software . Install the matched software to computer and connect controller with Computer Via software. User can adjust parameters from software by themselves. User can know the state of whole system Via software. All data will be stocked into excel files from software. | | |
| | **Optional Function 2:** Low Voltage Charge Function. With this function Controller can start charging battery when wind turbine voltage is lower than battery bank voltage , For example ,Controller can start charging battery from | | |

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| | |
|---|---|
| | 20V if runs in 120V battery bank |
| FOB Qingdao | USD590.00 Without Optional Function 1 and Without Optional Function 2 |
| | USD630.00 With Optional Function 1 and Without Optional 2 |
| | USD880.00 With Optional Function 1 and With Optional Function 2 |

# 5kw pure sine wave inverter


## Product Introduction

Off-grid pure sine wave inverter is intelligent equipment which can transform the direct current to stable

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alternating current. The apparatus is used to supply for Traffic inconvenience, the harsh environment of the mountain area, a pasturing area, border, islands and other areas without electricity.

The apparatus has decent appearance, easy operation, and visual indication of LCD, with the perfect protection function, high charging efficiency, and low no-load loss.

## Performance Description

✧ **Reliability:** Intelligentized, modularized, simple structure design with powerful function and stable performance; the high-quality components and the strict production process make the inverter suitable for severe environment. It also has reliable performance and long lifespan.

✧ **Pure Sine Wave Output:** Compared with square wave and modified sine wave, the inverter has stronger apacity. The apparatus can drive inductive load and any other AC load within the required power.

✧ **LCD Display:** The LCD display battery voltage, AC output voltage and status parameters.(**Remark:** If er output capacity ≤1kVA, AC output voltage will not display )

✧ **High Efficiency Transformer Isolation:** Power frequency toroidal transformer, which ensures high ncy and low no-load loss of the inverter.

✧ **Perfect Protection Function:** Battery over voltage, over discharge, anti-reverse protection; output over hort circuit, over temperature protection; lightning protection etc.

✧ **Optional by-pass function:** When the battery is over discharge, the inverter will intelligently switch to grid to drive load.

✧ **Optional light control and time control function:** According to illumination intensity, the inverter can l output without manual operation. This function is available with our matched controller.

## OPTIONAL FUNCTIONS:

✧ By-pass function: It will switch to the city grid automatically when the battery is under-voltage or something ith the inverter, which ensures the continuity and stability of system.

## APPLICATION AREAS:

✧ Stand alone wind power station, photovoltaic power station and wind/solar hybrid power station.

✧ Stand alone domestic household wind/solar hybrid power system, wind power system .photovoltaic power n.

✧ GSM base stations, expressway and other no-residential regions.

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✧ Coastal islands, remote mountainous, border posts for regions shortage of or without electricity.

✧ Government demonstration projects, landscape lighting project, street light project etc.

## Connection

**Selecting A Suitable Location.**

For safe and optimum performance, install the inverter in a location that is …

✧ ***Dry.*** Do not expose to water drip or spray.

✧ ***Cool.*** Operate only in ambient temperatures between $32^{O}F(-20^{O}C)$ and $104^{O}F(50^{O}C)$. Keep away from furnace heating vents or other heat producing equipment.

✧ ***Well ventilated.*** Allow at least 4 inches (10 cm) clearance above and on all sides of the unit for proper cooling.

✧ ***Safe.*** Do not install the inverter in a compartment with flammable liquids, such as gasoline, or explosive vapors.

✧ ***Clean and free of dust and dirt.*** This is especially important if the controller is used in a work environment.

## Installation Flow

**tep 1.** Check the package and then check the controller for damage after unpacking. Damaged inverter be installed in the system.

（**Note: Wire connection diagram, please refer to Appendix.**）

**tep 2.** Make sure the “IVT SWITCH” in the position of “OFF”.

**tep 3.** Connect battery to “BATTERY” terminals with copper wire. Connect the battery’s positive pole to the e (+) ‘battery’ terminal on the inverter , and connect the battery’s negative pole to the negative(-) ‘battery’ al on the inverter . Be sure that the polarity is connected properly! Then tighten the nut on each ‘battery ’ al by hand until it is snug. Do not over tighten.,**Though the inverter has anti-reverse connection protection on, but wrong polarity of battery shall be forbidden!**

(**Note:** Copper wire diameter, please refer to Appendix I.)

**tep 4.** Connect load to “AC OUTPUT” socket or terminals.

**tep 5.** Turn on “IVT switch” if necessary and AC load works, the green “IVT” LED light will turn on. Then erters work and supply alternating current to the “AC OUTPUT”.

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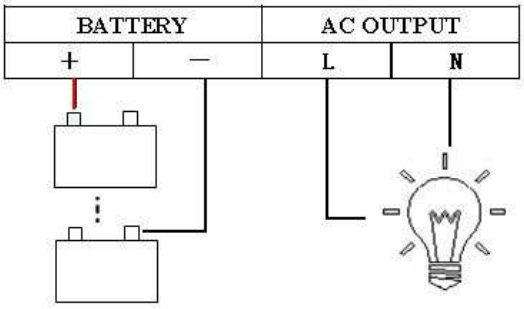
**Step 6.** If the inverter has the by-pass function, connect Utility grid to “AC INPUT” socket or terminals of the er. When battery is over discharge, the inverter will intelligently switch to utility grid and supply power for g load.

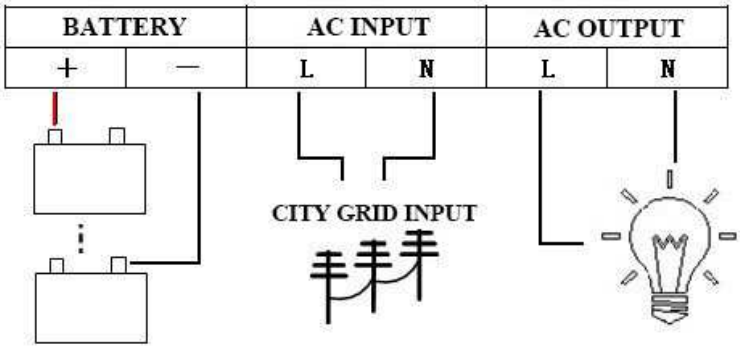
**Step 7.** Check all the connections to be correct and firm.

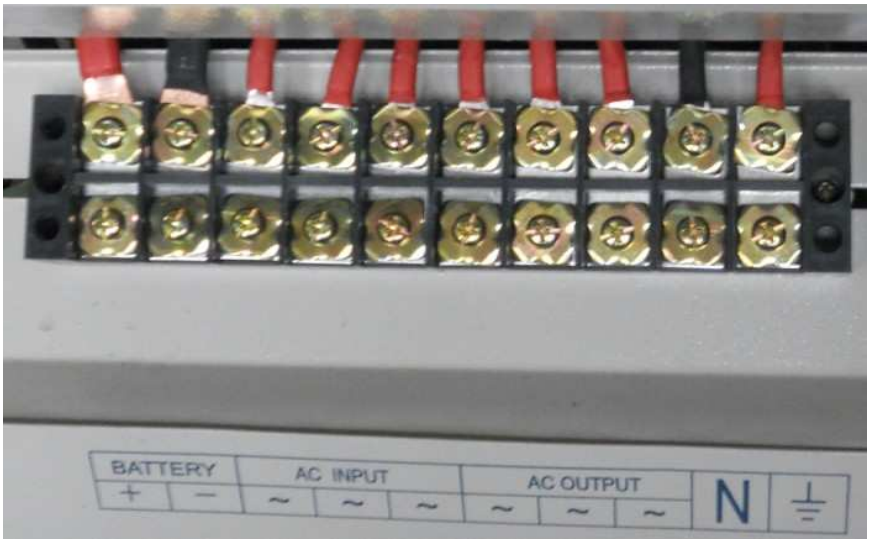
For inverter with rated output capacity 5KVA:





For inverter with rated output capacity 5KVA auto switch (by-pass function):



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# Appendix

**Appendix I Copper Wire Over Current Capacity**

| Wire Diameter ($mm^2$) | Over current Capacity (A) | Wire Diameter ($mm^2$) | Over current Capacity (A) |
|---|---|---|---|
| 4 | ≤20 | 16 | ≤90 |
| 6 | ≤30 | 25 | ≤125 |
| 10 | ≤50 | | |

## Operation

**1.** If the " IVT switch" on front panel is turn on, the green "IVT" LED lamp will become bright to display the AC power is on. As a result, the inverter work and supply pure sine wave power to the " AC OUTPUT" terminal on back panel.

**2.** The inverter is capable of continuously powering AC products that use rated watts or less. Because the power, or 'wattage', rating of AC products is the average power they use, they initial starting power may much excess the rated power. Such as TVs, monitors, and electric motors are examples of products that have high 'surge' requirements at starting up. Although the inverter can supply momentary surge power as high as twice watts, occasionally some products rated less than rated watts may exceed its surge capabilities and trigger its safety overload shutdown feature. If this problem occurs when attempting to operate several AC products at the same time, try first switching on the inverter with all AC products switched off, then one by one switch each on, starting with the high surge product first.

## Notice:

1) **Battery reverse connection is forbidden.**

2) **Connection to utility is forbidden, the inverter must be separately wiring.**

3) Battery virtual connection or damage is one main factor of malfunction. Please check battery voltage and connection status weekly, clear rust on positive, negative terminal in time; use lead terminal if available.

4) If the apparatus alarms, should identify the reasons and repair before re-use. Immediate restarting shall be forbidden.

5) In order to ensure the safe and normal work, the total power of load should not exceed the rated output capacity. If the load is inductive load, such as refrigerator, generator, washer, water pump, etc, user should use inverter capacity 5 ~ 6 times as load power and load should be switched on one by one. **Do not switch them on frequently.**

6) **Three-phase inverter can not connect to single-phase load.**

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7) If the malfunction is not easy to eliminate or reason unclear, please write down the phenomenon in detailed record, and contact manufacturer for help in time.

## Installation Environment

1) The inverter should be put indoor where is well-ventilated.

2) Avoid exposing the apparatus under direct sunshine, exposure, rain, moist, acid mist and dust.

3) Allow at least 20 inches (0.5 m) distance from battery.

4) Ambient Temperature is -20～+55℃; Ambient Humidity is 35～85%RH, no condensing.

5) If the apparatus is used in the area of altitude higher than 1000m, output power should be lower 5% for usage accordingly with every 1000m increasing.

6) ⚠**Do not install the equipment in a compartment with flammable liquids, such as gasoline, or explosive vapors. Be ware of flame and spark.**

## Security

**1.**Please contact the local agent before installation, which should be guided by professional.

**2.**Prevent any liquid from spattering on inverter. Do not clean the inverter with wet cloth.

**3.**Keep children and incapacity person away from inverter.

**4.**Keep inverter away from electrical heater, warmer and other source of heat; avoid inverterunder sun.

**5.**Please check the rated voltage of battery before connection. The rated voltages should be accord.

**6.**Pay more attention to connect the positive and negative pole among battery correctly.

**7.**The diameter of connecting cable could not be smaller, which should be suit to the current.

**8.**Tight and good connection among components.

**9.**The voltage on bare parts of the inverter. may cause lethal shock.**Keep away from children !**

## Maintenance

⚠ ***De-Energize The System Before Doing Any Repair Or Maintenance Actions.***

In order to keep the electric equipment in the best conditions and to preserve its performance, we recommend to do an inspection every 6 months, by following these instructions:

✧ Remove dust and dirt from the controller and inverter unit.

✧ Check for any color changes or deformations of cable sheaths and components.

✧ Check for loosening of termination screws and slack between connectors and wires.

Check for loosening of screws champing different parts of the module

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# Troubleshooting

| Problem | Possible Cause | Solution |
|---|---|---|
| LCD has no display | Battery wire connection loose | Check connection, reconnect battery cables firmly. |
| | Battery voltage is lower than inverter working voltage | 1. Check battery voltage until battery voltage reaches to inverter working voltage. |
| | | 2. Check battery connection, please reconnect correctly or increase battery banks. |
| | Fuse is burnt | Open box, then change fuse. |
| | LCD wiring connection loose | Open inverter box, reconnect LCD wiring. |
| Input over voltage protection | Battery is over voltage | LCD display" HIGH BATTERY", please disconnect all the wirings first and then re-connect them. |
| Battery over discharge protection | Battery is under-voltage | LCD displays "LOW BATTERY". After battery voltage rises up to the 'over discharge recovery voltage', the inverter will recover automatically. |
| Over load protection | Load power exceeds inverter rated output capacity | LCD displays "OVER LOAD" constantly. Turn off the inverter and check the load, deduce some loads, then restart the inverter again. |
| Load short-circuit | Short-circuit on the AC LOAD | LCD displays "OVER LOAD" flashing. Turn off the inverter, check load and wiring, remove the short-circuit hazard or damaged load, then restart the inverter again. |
| Over temperature protection | Improper installation | Installation should be in well-ventilated areas. |
| | The vents are blocked. | Make the area around fan-cover clean. |
| | Something wrong with the fan | Contact manufacturer. |
| No AC output | Inverter switch is in "OFF" position. | Turn on the inverter. |
| | LCD displays HIGH BATTERY, LOWBATTERY,OVER LOAD,HIGH TEMPERATURE | Please refer to the above corresponding solution. |

## TECHNICAL PARAMETERS:

| Rated Output Capacity | 5kVA | | |
|---|---|---|---|
| Rated Battery Voltage | $120V_{DC}$ | $216V_{DC}$ | $240V_{DC}$ |
| Over Voltage Shutoff | $170V_{DC}$ | $306V_{DC}$ | $340V_{DC}$ |

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| | | | |
|---|---|---|---|
| Over Voltage Recovery | $165V_{DC}$ | $297V_{DC}$ | $330V_{DC}$ |
| Under Voltage Shutoff | $105V_{DC}$ | $189V_{DC}$ | $210V_{DC}$ |
| Under Voltage Recovery | $120V_{DC}$ | $216V_{DC}$ | $240V_{DC}$ |
| No Load Loss | 0.14A | 0.1A | 0.09A |
| Output Wave Form | Pure Sine Wave | | |
| Display Mode | LCD | | |
| Display Parameters | Battery Voltage, Output Voltage, Status parameters | | |
| Cooling Mode | Fan | | |
| Rated Output Voltage | $110/120/220/230/240V_{AC}$ | | |
| Wave Distortion | ≤4% | | |
| Output Frequency | 50/60 Hz±0.05Hz | | |
| Dynamic Response | 5% | | |
| Overload Capacity | 120% 1min,150% 10s | | |
| Inverter Efficiency | Maximum 90% | | |
| Noise（1m） | ≤40dB | | |
| Insulating Strength | $1500V_{AC}$,1min | | |
| Protection Function | Battery over voltage protection, Battery under voltage protection, Battery reverse connection protection, Output overload protection, Output short circuit protection, Overheating protection. | | |
| Working Ambient Temperature | -20～50℃ | | |
| Working Altitude | ≤4000m | | |
| Working Ambient Humidity | 0~90%, no condensing | | |

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# 5KW on grid controller

Grid connection wind turbine controller can be manufactured by our company according to users' technical requirements and referring to the relevant state standard.

This system has perfect protection functions:

1. When the grid-connected inverter breaks down or the electricity network is lost, the braking protection of the wind turbine can start automatically.
2. In a strong wind, the controller can automatically stabilize the voltage through PWM toward the wind turbine and the power is continuously supplied to the grid-connected inverter.
3. After the PWM is 100% unloaded, if the DC voltage value is still higher than the required value, the controller can automatically brake the wind turbine and the power supply to the grid-connected inverter is cut down.
4. After the wind turbine is braked, the controller can automatically operate the wind turbine to be restored to the normal operation after 12-20 minutes time delay. Press the brake elimination button on the front panel, the wind turbine can be restored to the normal operation, too.
5. The user can use the manual brake switch on the controller according to different conditions. When using this switch, mandatory brake of the wind turbine can be realized.
6. The controller has emergency stop switch. In case of emergency, press the emergency stop button on the front panel, all the power supply of the controller can be cut down and the wind turbine can be braked immediately.
7. Comprehensive indicators. There are wind indicator, unload indicator, stopping delay indicator, low voltage indicator, electricity network indicator and output DC voltage indicator on the front panel.

**Operation Steps**

The controller should be strictly operated in accordance with the following operation steps by professionals.

1. Place the electricity network switch and the brake switch of the wind turbine on Brake and make sure that the fuse is in open circuit state. Install the connections under the conditions that the wind turbine is on brake and the electricity network is disconnected.
2. Connect the wind turbine with the three-phase terminal of the controller; connect the AC230V electricity network with the electric terminal of the controller; connect the grid-connected inverter with the output +, - terminals on the controller; connect the dump load terminal on the unloader with the dump load terminal on the

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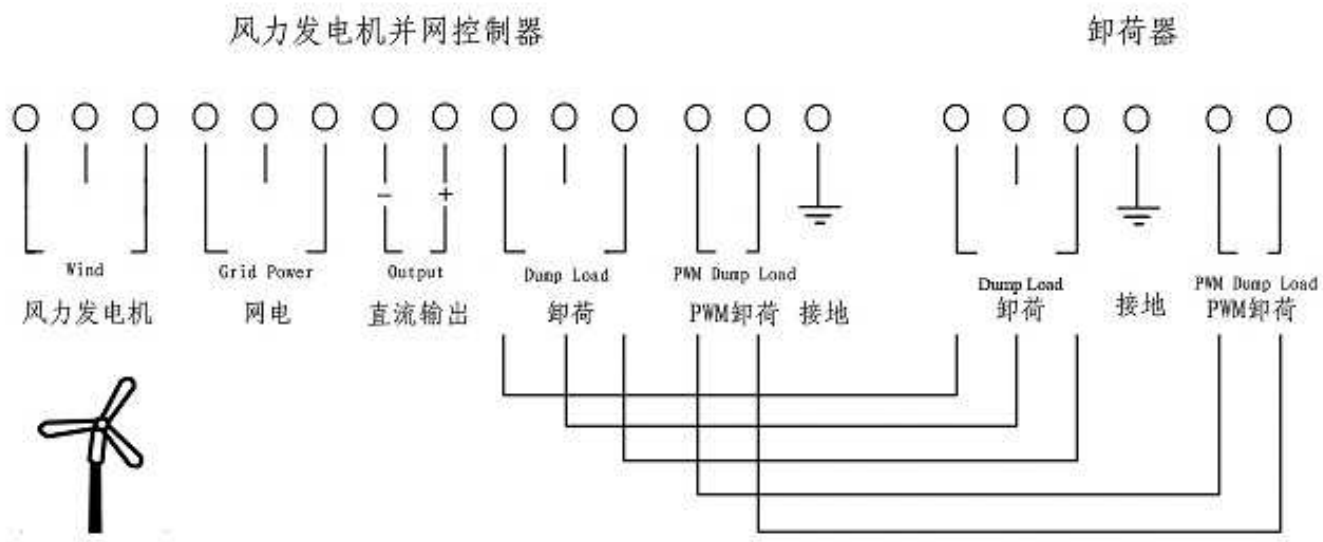
controller, the Brake Resistors on the unloader with the Brake Resistors terminal on the controller (connect them in accordance with the wiring diagram strictly).

3. Connect the ground wire with the ground terminal on the controller and the ground terminal on the loader with the ground wire. **The grounding must be reliable and good.**

PWM grid connection controller connections Unloader connections




4. After the connections are finished and checking it carefully without any fault, start the machine in accordance with the following operation steps.

① Close the fuse to get good contact.

② Place the grid connection switch on RUN.

③ Place the brake switch of the wind turbine on RUN.

**Attentions**

1. The electricity network for the controller is 230V. In the use, the controller will stop running and the wind turbine is in brake state if the electricity network fails or is cut down.

**2.** In the use of the controller, when the output voltage is higher than DC410V, the wind turbine will brake. At this time you should carefully find out the reasons for over voltage. If the fault needs to be eliminated, the wind turbine should be in the brake state through the manual switch. After the fault is eliminated, the wind turbine can run again.

3. The dump load wires of the controller should be firmly connected with that of the unloader. Miss-connection and dismantlement in the use is forbidden! If not, the over-high voltage can cause accidents endangering personal safety!! Damaging this controller may cause loss of control on the wind turbine and damage to the wind turbine.

**4.** Owing to the unloader equipped on this machine can produce high temperature in working , please put it in the place with better ventilation and heat dispersion and where the man or livestock can not reach. Covering with other objects or using it under the flammable or explosive gas environment is forbidden to prevent fire.

5. If the output wires of the inverter or DC voltage need to be connected or arranged, the switches of electricity network and wind turbine must be in Brake state. The DC fuse should be in open circuit state or taken out, to avoid that the capacitor discharge injury the personnel.

6. The controller is equipped with emergency stop switch. In cases of emergency, press the emergency stop button on the front panel, so the power supply of the controller can be cut off to stop running and the wind turbine brakes.

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Rotating the button in accordance with the marked direction can re-start this controller.

**7.** The machine should be managed by professionals for your safety. It should be grounded reliably to resist electric shock. The ground resistance should be less than 1Ω and the connecting wire should be larger than $10^2$mm.

8. When the machine is not in use or the wind is too strong, loof the wind turbine, then place the switch of the wind turbine on STOP and make the wind turbine in brake state.

**Indicator Description**

Wind- wind indicator. When the wind turbine runs normally, this indicator is on. When the wind turbine is not connected, the indicator is off.

Grid power- electricity network indicator. After the electricity network is running, the indicator is on, if there is no electricity network, the indicator is off.

Low Voltage- low voltage indicator. When the voltage generated by the wind turbine is too low and there is no output, the indicator is on. When the voltage generated by the wind turbine is higher than 200V, the indicator is off.

Over Voltage- over voltage indicator. When there is strong wind and the voltage generated by the wind turbine is higher than 410V, the indicator is on.

Brake- brake delay indicator. When there is strong wind and the voltage generated by the wind turbine is higher than 410V, the grid connection controller brakes and the indicator is on in the process of the brake delay.

Dump Load-PWM voltage stabilizing indicator. When the voltage of the wind turbine is higher than 380V, PWM unloader automatically stabilizes the voltage to380V and the indicator is on.

## Technical Parameters of the Small Wind Turbine Grid Connection Controller

| | |
|---|---|
| Power of the equipped wind turbine (W) | 5K |
| Operating mode | Continuous |
| Function | Commutation, control |
| Operating environment | Temperature -10～40℃, humidity≤80% |
| PWM unloading voltage （DCV） | ≥380V |
| Brake voltage （DCV） | 410±5V |
| Stop delay time （min） | 10-20 minutes |
| Low voltage indicator （V） | ≤200V |
| PWM unloading fuse (A) | 16A |
| DC output fuse (A) | 20A |

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# 5KW on-grid inverter

**General Descriptions:**

it is using low-frequency isolation transformer for protection purpose for outdoor applications. The direct plug-in terminal port provides easy, safe and reliable cable connection under any circumstances. It is the ideal product used for string-connected small PV power station, or individually for a small house.

**product advantages:**

1. using IPM from Mitsubishi company as the power components.
2. using American ATEMEL company microprocessor as figure controller.
3. perfect protection and warning functions.
4. MPPT (Maximum Power Point Tracking )technology.
5. circuit frame compact,Max. Efficiency≥94%
6. Outdoor stainless steel casing, entire sealed installation
7. input voltage range wide,MAX. can be 1150VDC
8. RS232/485 communication,multi communication interface can be selected
9. pure sine wave output,automatically synchronized with the grid tracking,power factor close to 1, Current low harmonic content, non-polluting power grid, no impact
10. Inverter current closed-loop control, power controllable

big-screen Chinese LCD, perfect display, interface-friendly.

**Safety:**

·Full protection functions: over-voltage protection, short-circuit protection, islanding protection, over-heat protection

·Over-load protection

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| | |
|---|---|
| rated capacity | 5 KVA |
| Rated AC output power | 5KVA |
| Max. AC output power | 6KVA |
| insulate mode | Low frequency transformer |
| Recommended PV array power | 6KVA |
| Max. open circuit voltage | 780VDC |
| MPPT range | 200~780VDC |
| Max. input current | 25A |
| connecting mode of battery board | water-proof direct-plug terminals |
| Max. efficiency | 94% |
| Europe efficiency | 92% |
| operating range utility voltage(single phase) | 180~265VAC |
| operating range utility frequency | 50HZ±2%&60HZ±2% |
| Total Harmonic Distortion(THD) | <3% |
| power factor | ≥0.99 |
| Zero power consumpt at night | <10W |
| communication Interfaces | RS485/RS232 |
| Electrical insulation properties | 1500Vac，1 minute |
| operation surroundings Temperature | -25~+60℃ |
| opreation surroundings Humidity | 0~100% |
| Protection | Protection for input connecting contrary, input lack of voltage, output over load, output short circuit and over heat. |
| cooling mode | windy |
| noisy | <40dB |
| waterproof and Dustproof Class | IP20（indoor）、IP65（outdoor） |
| Size(L×W×Hmm) | 400*250*500 |
| Weight（kg） | 60 |