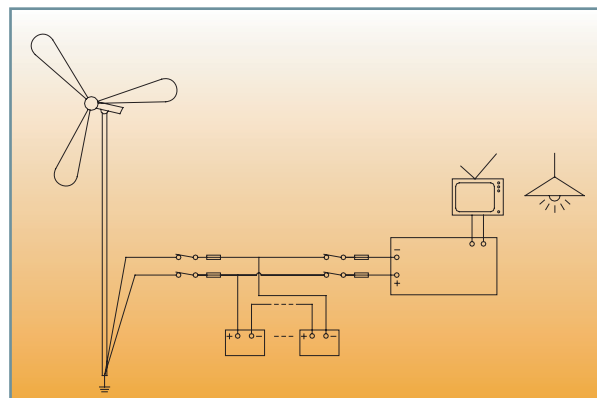


POWER WIND GENERATOR

General information and installation guide



Series EOL Generator



Description

The rotor will circulate under the wind power, then change the wind energy into mechanical energy to blade axle, the generator will work when the rotor axle work and produce electric energy. Whole-digitalized controlling system has been achieved through the appliance of anemoscope and dogvane in wind turbine generator of 3KW, 5KW, 10KW and 20KW developed by our company, the generator has been adopted low –torque starting technique with start-up wind speed at 2m/s.

Model	EOL/300	EOL/500	EOL/1000	EOL/2000	EOL/3000	EOL/5000	EOL/10000	EOL/20000
Rated Power (W)	300	500	1000	2000	3000	5000	10000	20000
Rated Voltage (V)	24	24	48	120	240	240	240	360
Rotor Diameter (m)	1.5	2.5	2.7	3.2	4.5	6.4	8	10
Start-up Wind Speed (m/s)	2.5	2	2	2	2	2	2	2
Rated Wind Speed (m/s)	12	8	9	9	10	10	10	12
Security Wind Speed (m/s)	35	35	35	35	45	45	45	45
Yaw Method	Mechanical	Mechanical	Mechanical	Mechanical	Dynamolectric	Dynamolectric	Dynamolectric	Dynamolectric
Rated Rotate Speed (r/m)	450	400	400	400	220	200	180	90
Outer Material	Nylon	Nylon	Nylon	Nylon	Steel	Steel	Steel	Steel
Blades Material	Carbon Fiber	Carbon Fiber	Fiber Glass	Fiber Glass	Fiber Glass	Fiber Glass	Fiber Glass	Fiber Glass
Number of Blades	3	3	3	3	3	3	3	3
Bracing cord Mast	Mast height (m)	6	6	6	9	9	12	-
	Mast thickness (mm)	2.5	3.25	3.25	3.5	6	6	-
	Mast Diameter (mm)	48	89	114	140	273	273	-
Normal unaided Mast	Mast Height (m)	-	8	8	8	12	12	18
Suggested Batteries & Capacity	12V150AH x2	12V200AH x2	12V200AH x4	12V200AH x10	12V200AH x20	12V300AH x20	12V400AH x20	12V600AH x30
Inverter Type	Modified Wave	Sine Wave	Sine Wave	Sine Wave	Sine Wave	Sine Wave	Sine Wave	Sine Wave



Installation Procedure

If you choose segment tower to erect tower in flat area, please refer to the following steps.

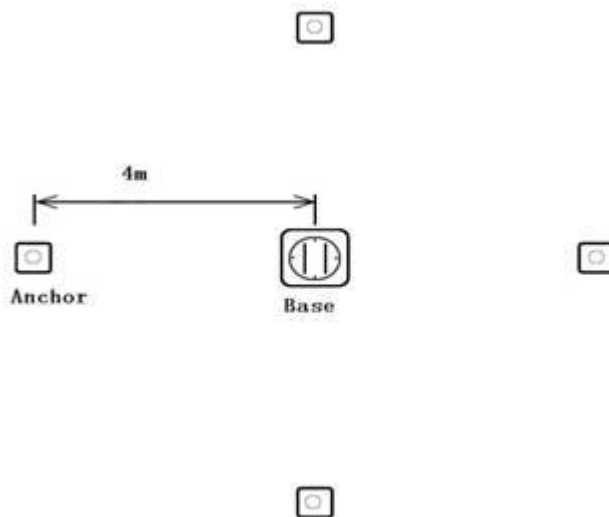
Step1: To choose installing location

The wind turbine should be erected high and far away from obstacles as possible in order to get relatively high wind speed. Meanwhile soil quality of installation location should be taken into consideration. Loose sands, uneven or easily influenced by weather condition areas should be excluded from installing the wind turbine. When selecting the locations, it's necessary to consider the distance between generator and pile. The shorter the distance is, the less cable would be used. As a result, less energy waste would be produced during the transmission. While under the circumstances of longer distance, it's better to use much thicker standard cable for the transmission.

Step 2: Layout of tower, base and anchor showed in following chart

Following remarks should be paid attention to when layout base and anchor:

1. The line between two anchors should be parallel the line between two holes on the grounding feet.
2. The height of anchor and the tower base should be in consistent. Any action against above rules will cause the bad results, such as too tight or too loose fastening pull, while over tight pull will incurvate the tower or even break it down.



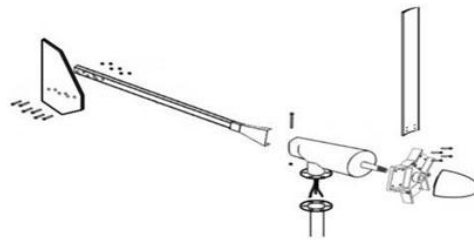
Step3: Concrete the Foundation of Base and Anchor as well as Install Tower Base

1. Dig the holes according to the last step layout. 0.8M×0.8M×1.6M for central base and 0.8x0.8x1.0M for four anchors
2. C25 concrete should be used. Four anchor bolts will be installed according to the holes on the base. Fixing the base with bolts on the cement done before
3. Four annular anchors need to be deposited 60°to 80°along the base direction and check the distance between the four hooks of the anchors and the center of the base (6M) and four anchors should be horizontal.

Installation Procedure

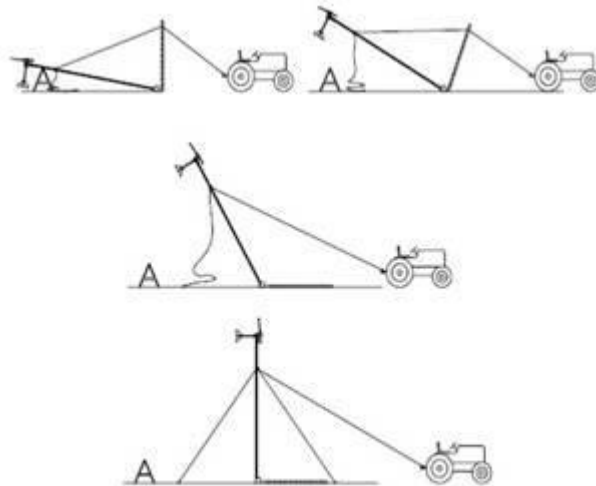
Step4: Assembly of tower and wind turbine

1. First, assemble the tower and place it on sawbuck
2. Draw out pivoted bolts under tower base and insert the main tower into base
3. Insert the pivoted bolts one by one into base hole of main tower and screw nuts to degree of neither too loose nor too tight
4. Fetch out the cable of wind turbine from tail edge after ripping the cable into the pole. Connect cable with conducting wire of generator and bind up the joint by insulated tape in case of short circuit.
5. Fix flange of wind turbine and pole's flange by using bolts.
6. Assembly of blades and tail rod (consulting the following chart)



Step5: Erecting the tower

1. Put ends of all four tight wires into hole of grip ring on the front part of pole and pin it tightly with the tight wire pin. Except the tight wire corresponding to the farthest anchor, the other end of all other tight wire should pin to the anchor but not pin tightly, which sets stage for adapting pull after erecting the turbine.
2. Connect the last tight wire to an at least 16m rope or cable, one end of which is linked with windlass or tractor.
3. Make the last tight wire and other tight wires through one side of a 2*4or 2*5 ladder, which serves as an assistant suspender.
4. Drive the tractor slowly and the tower will stand up along the moving wire. Stop at each rising 15° and examine the tight wire's tensile force on both sides. Any over tight or loose wire should be regulated by putting down the tower slowly and adjusting the length of tight wire.



Installation Procedure

5. Go on pulling the wire until the tower stands upright. Put the rest wires through its anchor and fix it up.
6. Inspect and adjust the tension on each fixed tight wire. Over tight force may bend the tower while over loose force may cause the tower unstable and shakable. The perfect force is neither too loose nor too tight and can be adjusted through circum rotating the bolt. The appreciably flabby strain would be much safer than the over tight force.

2. Maintenance

Wind turbine may be operated under extremely harsh environment, or meet various complicated weather. Therefore, fix-date examination and maintenance are necessary in order to keep the system operate rightly.

Do the following check every three months;

1. Check the tight wire is too loose or too tight, and adjust them, in particular in initial stage of installation and post-gale.
2. Check whether or not the wire is damaged or loose. The joints are loose and rusted or not in order to secure electrical safety.
3. Before storm, it is better to lay down the tower for escaping from unpredictable loss.

Inverter

The inverter is designed for the conversion of DC voltage from the wind turbine (permanent magnet generator) into AC voltage for feeding into the public mains supply. The inverter is endowed with the function of over/under voltage protection.

1. Explanation of Symbols

To reduce the risk of electrical shock, and to ensure the safe installation and operation of the inverter, the following safety symbols are used to indicate dangerous conditions and important safety instructions.



WARNING: This indicates a fact or feature very important for the safety of the user and/or which can cause serious hardware damage if not applied appropriately.
Caution when performing this task.

NOTE: This indicates a feature that is important either for optimal and efficient use or optimal system operation.

Important Safety Instructions

- Please read the instructions of this manual carefully before installing the inverter.
- Always disconnect the inverter from the grid first.
- It is unnecessary and not advised to open any other parts of the inverter but the connection terminals by the qualified personnel.
- All electrical installations shall be done in accordance with the local and national electrical codes.

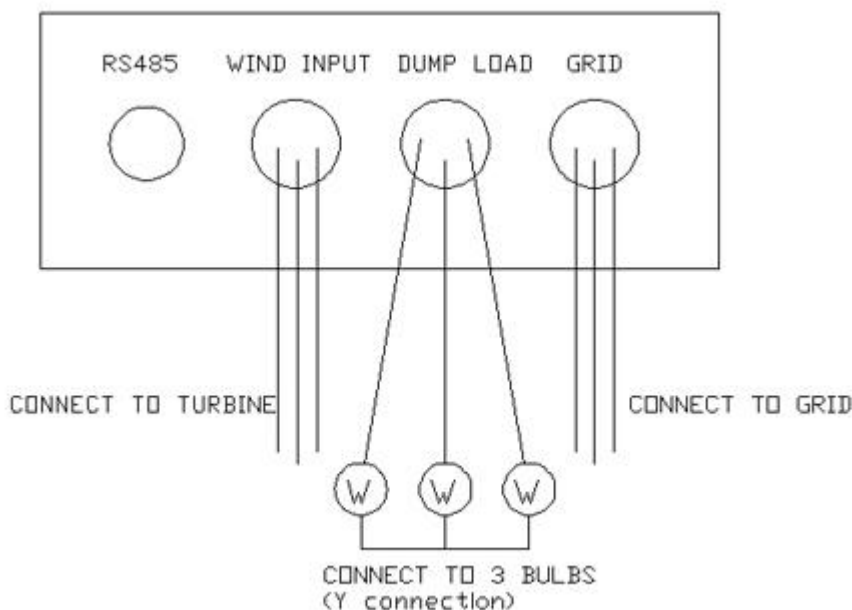
Installation Procedure

- Connection of the inverter to the electric utility grid must be done after receiving prior approval from the utility company and performed only by qualified personnel.
- Completely disconnect the output with wind generator before wiring them or use other methods to ensure safety from shock hazard. Because when there is wind, the wind turbine may rotate, and the wind generator may generate power.

2. Characteristics:

- Full Featured Inverter Display and Communications:
- Liquid Crystal Display (LCD) provides instantaneous power, total power, information of system, fault messages, and the control of the system.
- The key allows the press of a finger to turn backlight on and display screen cycling.
- Bright LED indicators provide system status at a glance.
- Integrated RS485 communication ports.
- PC software for remote monitoring and system trouble shooting

3. Wiring diagram



This part (three Ws above) is three electric resistances

- 1: The RS485 communication terminal (A,B)
- 2: The three wires drawn out from wind turbine are connected to the Wind Input;
- 3: The Dump Load control terminal (12V+,12V-). Three resistances (eg, bulbs) can be connected in this part to achieve the dump load;
- 4: Connecting to the grid.

Connecting to the Grid

When the DC input voltage from the wind turbine reaches 70 Volts, the inverter will wait 10 seconds, and then start to connect to the grid. If the voltage remains above 70Vdc, the inverter will synchronize with the utility and begin exporting power. When the DC voltage reaches 120Vdc, inverter will output 1500 Watts AC to the utility. And the inverter will

Installation Procedure

remain output 1500 Watts AC as specified by the <Pmax> parameter setting. If the voltage continues to increase, inverter will continue to output 1500 Watts AC. If the wind slows down such that the DC voltage falls below 70 Volts, the inverter will continue to operate at zero power output for 180 seconds. If the DC voltage increases above 300 Volts, the stop timer will reset and inverter will process power according to the power curve. If the DC voltage remains below 70 Volts for 180 seconds, the inverter will stop processing power and stand by. If the DC voltage is over 70V, the inverter will output immediately.

5. Disconnecting from the Grid

If wind power is insufficient to generate power for the grid (when internal inverter power consumption is more or less equal to the available wind power), the inverter disconnects from the grid and goes into stand-by mode. The inverter continues to monitor the wind power available. If the wind power becomes available again within 5 minutes, a new grid connection procedure is initiated. If no wind power is available after 5 minutes, the inverter goes into stand-by mode to save power.

Conditions that cause the inverter to be disconnected from the grid:

- Grid voltage

The grid voltage may be within a range of -15% and $+10\%$ of the nominal grid voltage. Once the grid voltage exceeds third range, the inverter will be disconnected from the grid within 0.2s.

- Grid frequency

The grid frequency may be within a range of $50\pm 1\text{Hz}$ of the nominal grid frequency. Once the grid frequency exceeds third range the inverter is disconnected from the grid with 0.2s.

6. Monitoring and Diagnosis

The inverter normally operates automatically without users' interaction and without any maintenance. The inverter automatically turns itself off when grid feeding is not possible. The inverter automatically starts its grid feeding once the wind power is high enough. But when the wind power is too strong, the inverter goes into dumping load mode. The inverter goes to stand-by mode if the wind power and the resulting electric input energy is too low and is therefore always ready for operation. Each time the inverter starts up it runs a number of self tests and safety procedures.

But sometimes our users want to monitor the wind power system and get some useful dates of the wind plant, we have provided the following ways to help our users to manage the wind plant.

7. The processing of start-up

a. When the dc input voltage over 70 V, the RUN LED (green) is blinking: the system in the state of grid inspect. The inverter judges the working condition required and processes the grid voltage frequency tracking. This process needs about 200 seconds.

b. The RUN LED (green) keeps on: the inverter starts converter the solar energy to the AC power offer to the grid. (optional)

8. The wrong states of the inverter

- DC input wrong

The Fault LED (red) blinks one time and off three second and blinks again

Installation Procedure

The main reason: the dc input voltage is over the nominal dc voltage.

Solution: disconnect DC input from the inverter!

- **The grid wrong**

The Fault LED (red) blinks two times and off three second and blinks again. The possibility reason:

- grid under-voltage
- grid over-voltage
- The frequency of the grid voltage is too low
- The frequency of the grid voltage is too high
- The frequency changing of the grid voltage is too faster
- The grid is out of power or AC breaker is disconnected

9. Inverter fault

The Fault LED (red) blinks three times and off three seconds and blink again.

The possibility reason: over-current, over-voltage, under-voltage of the inverter and so on.

The following are the fault information of the inverter:

- If the inverter has no fault then the this screen may display “OK”;
- If the input voltage of inverter is too high then this screen may display “DC Over Voltage”;
- If the input voltage of inverter is too low then this screen may display “Low-Wind”;
- If the output voltage of inverter is too high this screen may display “AC Over Voltage”;
- If the output voltage of inverter is too low then this screen may display “AC Under Voltage”;
- If the output current of inverter is too high then this screen may display “AC Over Current”;
- If the output frequency of inverter is too high compared with 50HZ then this screen may display “AC Over Freq.”;
- If the output frequency of inverter is too low compared with 50HZ then this screen may display “AC Under Freq.”;
- If there is no grid when the inverter is running in the system then this screen may display “Islanding”;
- If the temperature of inverter is too high or too low then this screen may display “Over Temp.”;
- If there is a fault of the DSP then the this screen may display “DSP Fault”;
- If there is a fault of the EARTH then this screen may display “Earth Fault”;
- If there is a fault of the IPM module then this screen may display “Module Fault”;
- If there is a fault of the communication of system then this screen may display “COM. Fault”.

Installation Procedure

10. Installation and Mounting

This document gives short installation instructions for electricians. It helps to swiftly and correctly install and commission a SPS inverter.

- **Checking for Shipping Damage**

The inverter is thoroughly checked and tested rigorously before they are shipped. Even though they are delivered in a rugged, heavy cardboard box, the inverters can be damaged in shipping which typically is the shipping company's fault. So you should check the inverter before installation.

Please inspect the inverter thoroughly after it is delivered. If any damage is seen please immediately notify the shipping company. A photo of the damage may be helpful.

Do not accept unit if visibly damaged or note visible damage when signing shipping company receipt. Report the damage immediately to shipping company. Do not remove the unit from packaging.

b. Basic Installation requirements

It is a complicated electronic device and is therefore sensitive to humidity within the case. There are several requirements that should be kept in mind when installing an inverter. A list of these requirements is shown below:

- It is advised not to install the inverter in living quarters, since the inverter may produce some operating noise (< 32 dBA).



- Avoid installing the inverter in a location subject to vibrations.
- The LED and display should always be legible (there is an optimum angle at which the LED and display can be read).
- The ambient temperature should remain within the specified temperature range (-25°C to 60°C).
- Direct Sunlight on the inverter must be avoided. It should be protected from sunlight by mounting a shading screen in front of the device.

Installation Procedure



- It is important to have air freely circulating around the inverter; therefore keep an area within 30 centimeters of the inverter free from obstacles. Please make sure there is a sufficient space for heat dissipation! In a normal environment the following clearance should be provided for the inverter.
- The inverter should be mounted in a well-ventilated area.
- Avoid mounting the inverter in a dusty area

11.Mechanical Mounting

a. Safety Mounting Instructions

As with any electrical system, touching live components can be hazardous to life and limb. This device contains direct currents of up to 450V and the network alternating voltage of 230V



Caution: Before opening the device, it is absolutely essential to disconnect the inverter from direct current and alternating current. Even after disconnection, hazardous voltage is still present on the device for a longer period of time. This is due to a residual charge in the internal capacitors



WARNING: Only a qualified electrician may work on the open inverter. This work is only permissible if the AC and DC power supply are safely disconnected from the inverter. The inverter must be disconnected from the grid and secured against accident reconnection.

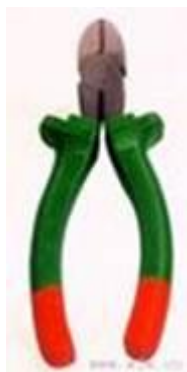


WARNING: When this has been done, always waiting for approx. 5 minutes so that the capacitors in the inverter can be discharged. Only then may the lid be opened and the safe isolation from power supply checked.

Installation Procedure

b. Mounting Requirements

Mounting Tools



Criteria for device mounting

- Because the inverter is in an IP42 sealed enclosure, the inverter could not be mounted outdoors.
- The very longest life for the inverter can be achieved by mounting it in a clean, dry and cool location even given the unit's robust construction and design for efficient cooling.
- For optimal electrical efficiency, use the shortest possible AC and DC cables and use the maximum allowable cable size.
- Avoid installation in close proximity to people or animals, as there is a small amount of high-frequency switching noise.
- Install the inverter in an accessible location following local codes.
- Although not required, installation at eye-height allows easy reading of the indicator LEDs display.
- For optimal inverter life and performance, do not mount the inverter in hot climates, although the inverter is designed to function at full power continuously in up to 104°F (40°C) ambient temperatures. Following these guidelines can help prevent the unit from going automatic into derating due to excessively high inverter case temperature.
- The housing and heat sink can reach 70°C (158°F) and must be mounted on an appropriate material for this temperature. The inverter should not be mounted where people are likely to touch the case or heat sink due to the high potential temperature.

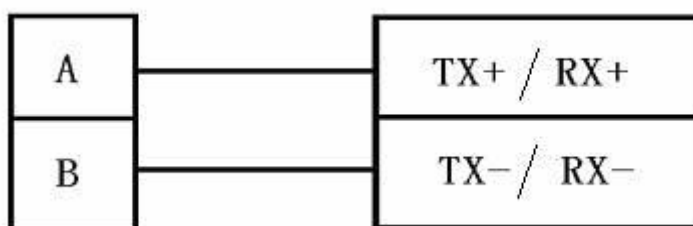


Caution: Please follow these guidelines:

- The inverter weight is about 11kg. Be sure about the method used for fastening the unit to the wall is able to hold this weight.
- The ambient temperature must be between **-20 °C and +40 °C** for full power, continuous operation. (The inverter will automatically reduce power or shut down to protect itself if ambient air temperature rises above **40 °C**.)
- Some country's electric codes require that the inverter be connected to a dedicated AC circuit and no other AC outlets or device may be connected to this circuit.
- The cooling air enters at the bottom and exhausts at the top of the unit.

Installation Procedure

- A minimum distance of 30mm must be clear above and below the inverter for ventilation.
- The inverter must be mounted directly on a flat (wall) surface. (Do not mount to open studs or any horizontal or vertical beams or struts as this can hinder proper cooling performance). The inverter must be mounted vertically
- If you are installing the inverter in a utility vault or electrical closet, the air circulation must be sufficient for heat dissipation – provide external ventilation, to maintain an ambient condition of less than 40°C (104°F).



- * The color of photographs may be different from real objects.
- * No notification if the manual modified.
- *The guarantee of turbine is 2 years, and the inverter is 1 year since the date of purchase (non-done by man)

Safety Energy saving Environmental protection



All specifications subject to change without notice
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Reseller's seal