QINGDAO ZEYU WIND POWER GENERATOR CO.,LTD.

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ZEYU WIND POWER

User's Manual

(FD 300W-2KW)

Please read carefully this manual before using

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Thank you for purchasing the FD series small-sized wind-turbine. Before installation, please carefully read through the user's manual for useful tips and facts about the product, product waranty, product safety features, and how to optimize its performance. We sincerely hope you enjoy the FD series wind-turbine.

This is the handbook for the FD series small wind-turbine only.

A. Outline

FD2.6-300W, FD2.8-600W, FD3.2-1KW, FD4.0－2KW.

This wind-turbine harnesses the wind to create mechanical energy. The mechanical energy is then changed into electricity via generator found in the turbine. This method of gathering energy is not only clean, but can also be stored using a 220V or 380v 50Hz alternating power supply. This low-noise turbine is suitable for on-grid or off-grid use, and can supply energy for refrigerators, washing machines, lighting, televisions, search lights, various video and communication devices, various electrical equipment, etc.

B. Wind turbine technical parameters

Power	300W	600W	1KW	2KW
Wind wheel diameter (m)	2.2	2.8	3.2	4.0
Number of blade	3			
Blade material	FRP			
Orientation of the rotor	clockwis			
Surface covered (㎡)	3.8	6.2	8	12.56
Rated Rotated speed(r/m)	350	350	350	350
Rated wind speed (m/s)	7.5	7.5	7.5	8
Type of generator	Permanent magnet generator			
Speed control method	Yaw + Electromagnetic			
Stop method	By manual			
Rated power(w)	300	600	1000	2000
Max power(w)	450	750	1500	3000
Output voltage(v)	24	24	48	96/48
Start up wind speed(m/s)	2.5	2.5	2.5	2.5
Operating wind speed(m/s)	3-25			
Security wind speed(m/s)	40			
Height of tower (m)	6	6	6	6
ControllerParameter	DC24V	DC24V	DC48V	DC96V/48V
Inverter Parameter	AC 220V sine wave			

C. Product composition

ZY series wind generators composed of wind wheel , generator, revolving body, tail, tower, charge controller, batteries and inverter, etc.

1.Wind wheel : 3 blades, streamline airfoil design, high lift drag ratio and excellent performance. Blade selection of glass fiber, with internal damping strong， dynamic characteristic of good toughness, corrosion resistance and reliable without distortion. Wind wheel and generator with flexible connections, run smoothly without vibration, low noise.

2.Generator : Super available waterproof bearing, long - lasting lubrication without maintenance. Rotor is made of permanent magnet (neodymium iron boron), the impeller revolving drive the generator rotor rotating which produces electricity energy, wind power generators are different from general motors, It is the low speed motor, reached 100--350 RPM that is able to achieve design power.

3.Revolving body : Body of revolution is a carrier of wind power generator key component of wind wheel, generator and tail , is a bearing structures on the top of tower. Body of revolution makes the wind turbine's main body around the tower's vertical axis of 360 degrees horizontally free rotation. Body of revolution and tail are necessary components in order to turn direction and aim the wind.

4.Tail:Tail is made of tail rod and tail plate. Tail plays a important role in adjusting direction and speed.

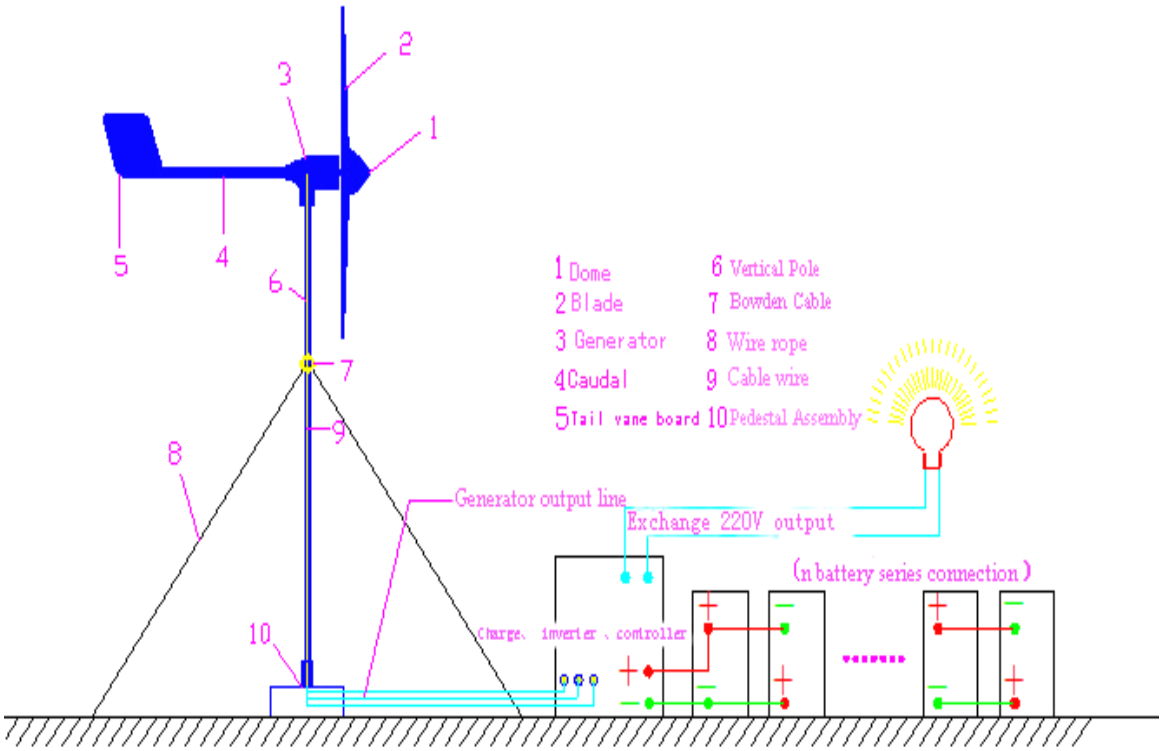
5.Tower : The tower is made of tower tube, the base, wires and fastening parts.Tower supports the wind turbine's main bady in a certain height of air,the wind wheel can catch enough wind energy, Periodic inspect the tensity of wire .using adjustment bolt makes all wires in accord,and keeps the tower is perpendicular to ground surface..

Wind speed increases along with increasing of height, the small growth of wind speed can lead to much growth of power. Using high tower in order to reduce the impact of obstacles. according to the actual situation to change the height of tower.

6.Charge controller: Charge controller connects with generator and battery,and supplys electricity to electric equipment. Its function is to rectify ,that is,turning the three-phase alternating current into direct current.

7. Inverter: Wind generator are direct current through the battery output ， can only be used for the direct current electrical use, using AC appliances must be configured inverter to direct current into alternating current ,the inverter role and rectifier role is just contrary, is the direct current into alternating current.

8.Battery: ① Due to the wind intermittent, wind generators have the time of generate electricity and the time of non-power generation, for the time of non-power generation， in particular, is a continuous period of no valid wind, must configure the storage battery to be used to prepare an urgent need; ② Since the instability of the wind - wind sometimes is big, sometimes small, the wind generator output voltage and current are sometimes big, sometimes small, this poor "quality" electricity for electrical is not used directly. Thus, regulators must play the role of the battery,transform the poor quality of electricity into stable electricity to supply for electrical to use.



D. Open-case inspection

Before installation, please compare the packing list with the contents in the box to insure all components are present.

Assembly Name	Quantity
Generator assembly	1
Wheel boss assembly	1
Pedestal assembly	1
Blade	3
Turbine tail bar	1
Tail vane board	1
Rotor hub	1
Electric cable wire	1 x 15m

Steel rope		2 x 15m
Ground anchor		4
Cable tightener		4
Inverter & Controller		1
Vertical pole		2（2×3 M）
Accessories	Blade Bolt	Matched set
	Tail vane bolt	Matched set
	Bowden cable ring	1
Accessories	Latch	4
	Rope cappel	10
	Slip-spring（only for 300W）	1
	Vertical shaft（only for 300W）	1
	Thrust bearing（only for 300W）	1
User's manual		1
Installation CD		1

E. Selecting an installation location

The siting of wind turbines is a very complex issue, the siting of large wind turbines are often need to understand the many years of meteorological data, and after several years of measurement, the other a combination of factors to consider in order to finalize the installation of wind turbine sites .

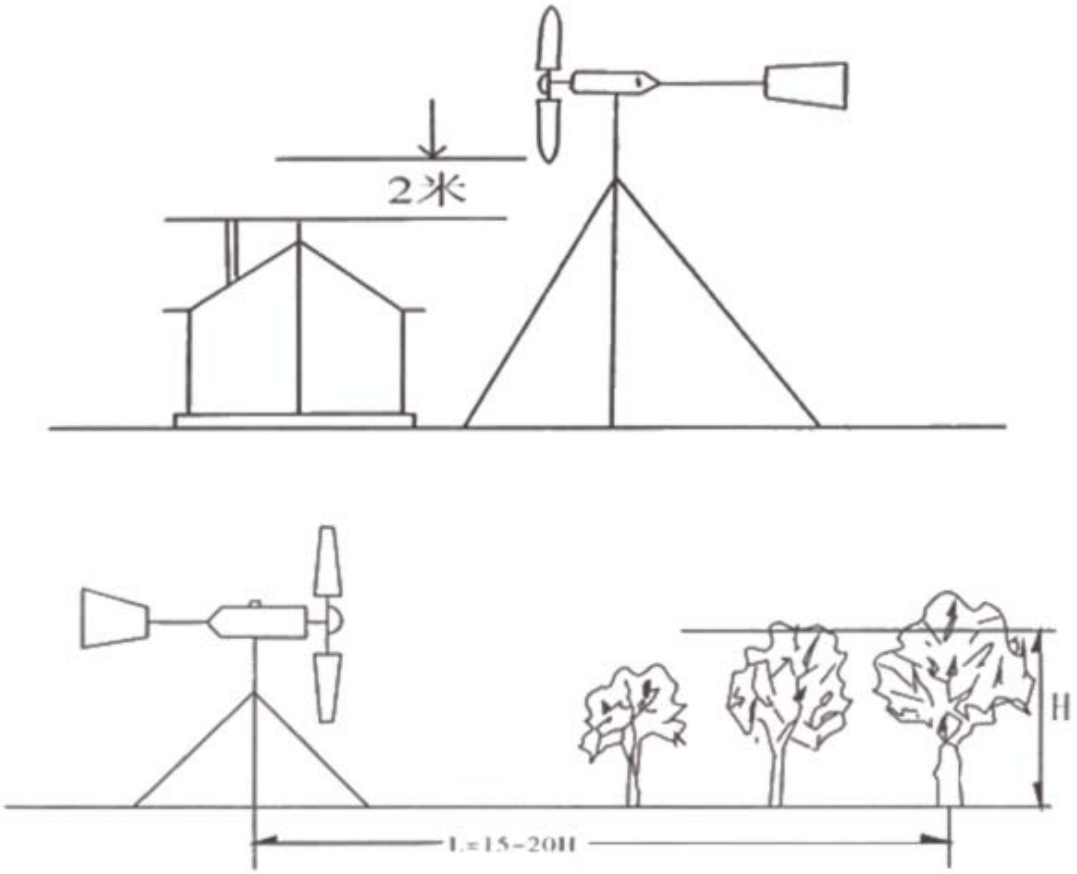
For small wind turbine site selection, often live in housing has been made, and then select the installation of wind turbine, in such conditions choose to install a small wind turbine venues should pay attention to the following points:

1. To determine the local prevailing wind direction, wind generators should be installed in the main wind direction of the upwind direction .Example: A regional prevailing northwest wind, then the wind turbines should be installed in the house north-west direction, in order to reduce the role of housing to block the wind.

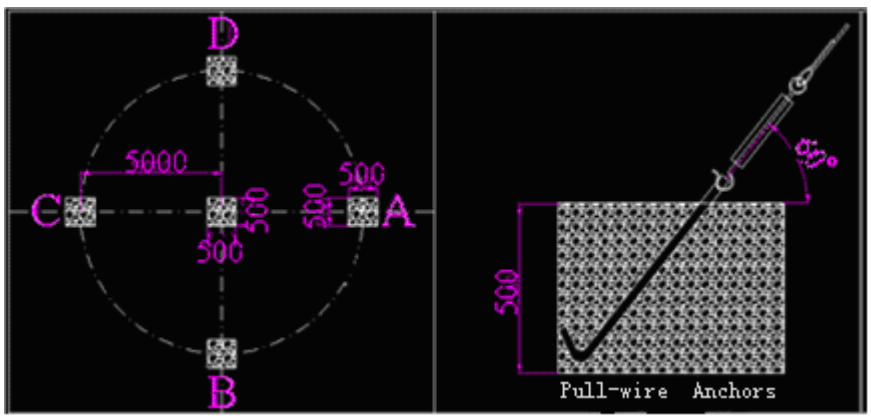
2. Requires the upwind direction on the wind turbines as far as possible no other obstacles exists such as houses or trees.

3. Try to avoid the effects of wind turbulence, turbulence is the wind flowing through the rough surface or obstructions lead to wind speed and wind direction rapid changes to cause. Turbulence caused wind turbine power output decreases and breed wind turbine vibration, create noise and impact of service life. In order to avoid the impact of tangled turbulence, wind generators should be installed in a relatively wide without shelter where a certain distance from houses.

4. Wind turbines within the scope of the wind wheel a high degree of wind speed vertical shear to be small, the wind speed vertical shear refers to the height of the direction of the wind speed difference at all levels, which is due to the topography and surface roughness caused， the vertical shear make the wind wheel blades come under role of unevenly distributed force , likely to cause damage to the wind wheel. In order to avoid wind speed vertical shear to the impact of the wind wheel, should choose a suitable wind turbine installation height.where there more barriers and more closer to the barrier，wind turbines must be installed away from the location of housing close, should consider increasing the height of wind turbine installation height. (See Figure)



F. Ground construction instructions



1. Dig a 500mm× 500mm× 500mm square hole to form the center.

2. From the center, measure a distance of 5000mm from the center and mark into four spots consisting of A, B, C, and D. Once marked, dig a 500mm × 500mm square hole in each of these locations. Please be advised that the A-C and B-D diagonal connections will connect to the tower at the center hole.

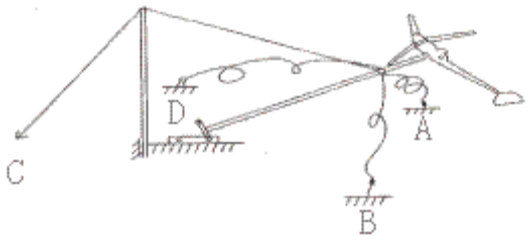
3. Be sure to install one ground anchor in each of the four anchor blocks. Next, connect the turnbuckle to the corresponding ground anchor, and then connect the turnbuckle to the cable (shown around 20mm from the bottom of the bolts), using the pin hole axis at B, D (or A, C), or 40-50mm above the ground. The below information is based on a concrete mixture using concrete, sand, and gravel, represented at a ratio of 1:2:3.

4. Attach the cable along the lateral side of the square hole to anchor the pole or tower. At that bottom of each anchor hole, lay a 2-5kg rock or stone on the bottom. Next cast the concrete and fill the hole until the hole is filled with the concrete, sand, gravel mixture. Once the hole has been filled, insert the ground anchor at 60 degree angle (from ground level).

5. Please make sure that only the top ring of the ground anchor is above ground.

6. The concrete slabs normally cure around 100 hours. During the curing stage, installation of the wind turbine is not recommended.

G. Unit installment



1. Please install the wind-turbine during calm or no wind periods (wind speed less lower than 2 level situations, <1.5m/s).

2. Adjust the base onto level setting, place gaskets on the anchor bolts, and tighten the corresponding nuts. Attach the pole pieces and the base plug together, then place the pole into its respective hole (see diagram left).

3. At the connecting point of the pole pieces, loop the cable around and through the cable ring as shown in the diagram (right). From the bottom half pull the cable through the crown, wrap it around the pole, and then pull the cable out through the bottom of the crown on the opposite side of the pole. Next adjust the length of the support cables (guy wires) using the latch, lock it into place. Slowly unscrew the latch and pull the pole to the vertical position. After vertical, adjust the wires using the turnbuckles until the turbine is at a balanced vertical position. *Note: Guy wires do not need to be directly tied to the thimble, this will prevent any unforeseen accidents.

4. Place the 1m high bracket around concrete slab A, then appropriate a cable length of around 50mm of the tighteners on slabs B and D. Slowly pulling on the "A" cable, using the support cables to help control the ascent.

5. Installation of the wind-turbine:

a. Place a thrust bearing under vertical shaft, spreading lubricants in sleeve of vertical shaft and generator.

b. Place the generator onto the vertical shaft (pay special attention that the hole and the generator are not fitted upside-down). Lock the snap spring into place, and put on the vertical shaft caps. DO NOT place the cables from the vertical shaft cap with the three connecting output cables, as this will cause a short-circuit.

c. The cable thread that is exposed to the sunlight should be wrapped up so that it is no longer exposed. Placing it above the vertical scroll cap will prevent a short circuit. *NOTE: If there is no slip ring, there is no need for steps a-c, but special attention must be paid to wiring placement.

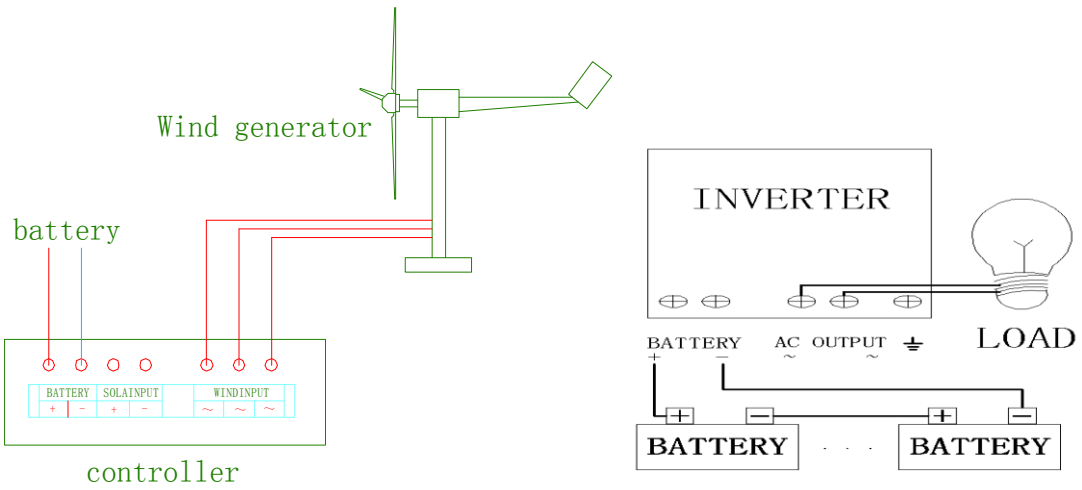
d. Connect the rudder plate to the tail bar , then connect the head end of the tail rod placed in tail of the turbine. Finally, insert the pin and tighten the bolts.

e. In order to assemble the rotor hub, place the concave surface of the blade to face the wind. DO NOT let the protruding part of the blades face the turbine. Next fit the blades onto the generator axle, using the M20 screws and washers to screw the fan blades into place. Rotate the blade around the rotor to confirm that the blade was installed correctly. After all the blades are installed, attach the rotor hub.

f. Connect the red wire terminal of electrical box with the "+" pole of battery, then connect the "-" pole to the black wire terminal. DO NOT mistake them. (Note: the battery voltage must fit with inverter and the voltage of the turbine. The wiring terminal connections should be solid. In order to prevent battery corrosion, the wiring terminal can be coated with a layer of grease or vaseline).

g. Once the wind turbine has been properly assembled, re-check all the bolts and connection spots. Finally pull up the wind turbine into position. (Before placing the wind turbine on its pole, it is possible to connect the three output cables).

Equipments connection diagram refer to the following:



H. Special Attention items

1) If the wind turbine is shaking or making unusual sounds, please shut the turbine down and preform an immediate maintenance check.
2) Please keep a suitable distance away from the wind turbine during operation. This is to prevent any unforeseen injuries.
3) The battery should be kept in a dry and clean place. This will prevent short circuiting the battery. Putting metal articles on the battery pack is strictly forbidden.
4) The electrical box and single anode ground circuits should not be placed together, as to avoid a short circuit. Please refer to the inverter operation manual in regards to the operation specifications of the inverter.
5) If after a strong wind the cables becomes loose, re-tighten them.

6) The wind turbine wiring should be separate, and should not mixed with other lines. The inverter output power can be set to AC power, but it is recommended using DC power for lighting and other household appliances. (Inverters and the inverter output lines cannot be parallel. Also, the inverter output line and the city electric-line cannot connected directly).
7) When connecting wires to the electrical box, first connect the battery, then connect output line. This method will prevent short circuits.
8) The electrical box stop switch is located near the power switch. In case of an impending natural disaster, it is recommended that you use the stop switch and turn off the power as soon as possible in order to prevent short circuits and/or harm to the wind turbine.

I. Routine maintenance

The FD series wind turbine is highly reliability and does not need routine maintenance checks. However, It is recommended that a timely inspection of the wind turbine and its output circuitry be carried out in order to ensure the wind turbine system is working to its maximum potential.
1. During the first three months after installation, a thorough and routine check of the support cables (guy wires) should be done, in order to ensure the wind turbine tower has adequate support. After the occurrence of strong winds, it is recommended that a check of the support cables (guy wires) be done. In the event the cables have become loose, readjust and tighten them.
2. Inspect the electrical output cables in various parts in order to check for sturdiness and corrosion.
3. A periodic inspection for corrosion of the electric cables is recommended.
4.Please follow the procedures found in the battery guide when caring out battery checks.
5. In the case of a predictable natural occurrences (i.e. Hurricanes or typhoons), a complete dismantling of the wind turbine beforehand is recommended.

J. Problem solving

After proper installation, the FD series wind turbine should not experience any problems. If problems do occur, please consult the list for commonly identified problems and their solutions.

Problem	Possible reason	Solution
The wind turbine vibrates	1. Support cables (guy wires) are loose 2. Blade bolt is loose 3.The turbine blade is damaged 4. The turbine blade has ice build-up	1. Re-tighten the support cables 2. Re-tighten the blade bolt 3. Replace the turbine blade and make sure the rotor is balanced 4. De-ice the wind turbine
The wind turbine is making unusual sounds	1. The turbine has a loose bolt or support cable 2. Turbine has a bearing failure 3. The rotor is encountering too much friction	1. Take down the wind turbine and check for any loose bolts 2. Replace the bearing 3. Inspect the rotor for any foreign objects causing friction
The wind turbine rotor's speed has dramatically been reduced	1. The turbine's stator and rotor are rubbing 2. The turbine's stator wires, or output wires have been cut and have caused a short circuit 3. Controller's switch in the engine is set to the "OFF" position	1. Replace the bearings 2. Find and replace the shorted circuit, then insulate the problem area 3. Flip the control switch to the “ON” position
Wind turbine's electrical output voltage is low	1.Generator's rotational speed is low 2.The stator three-phase wires have a short circuit 3.The controller has short circuit 4. The electric wire is too long, or the wire line has become too thin	1. Inspect the turbine for any foreign parts that may interfere with the rotor 2. Find the short circuit, replace it, and insulate the fixed area 3. Replace and insulate the shorted area 4. Reduces the line's length or add mass to the thinned electrical wire
Battery's electricity output capacity is insufficient	1. Wind turbine's output voltage is too low 2. Battery's wiring column has a bad connection or is corroded 3. Battery's expiration date has past	1. See the "Wind turbine's electrical output is low" section 2. Find the corroded wire or bad connection, change out the wire, and cover in grease for corrosion protection. 3. Replace the battery

K. Product warranty

1).Generator, inverter, controller all have a 1 year replacement warranty.
2).Only three valid replacements will be honored under the warranty period. The warranty begins on the date of purchase.
3). The following situations are not covered under the product warranty:
a. Incorrect installation of the wind turbine that results in equipment damage.
b. The equipment was destroyed by a natural disaster.
c. Equipment was damaged by a fall.
d. Unauthorized modifications done to the equipment.

Explained above are subject to change without notice.

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