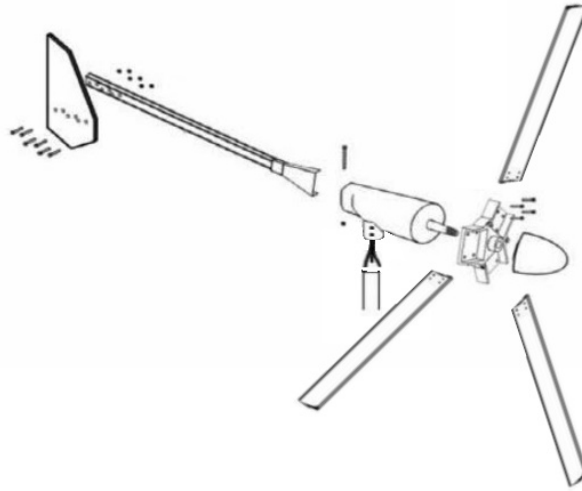


WIND TURBINE GENERATOR FD2.1-200

User' s Manual





1. Executive standards

Q/321088JFJ1-2004
GB/T10760.1-2003
CE certificate

2. Circumstance

Temperature: $-40 \sim +60$ Celsius degree
Humidity: less than 95%

3. General data

Protection Level	IP54
Insulation Level	B
Cooling Mode	IC0041
Drive Mode	Direct driven by wheel
Adjust Speed Method	Automatic
Adjust Direction Method	Automatic

4. Model & Parameter

Model	FD2.1-200	
Rated power (W)	200W	200W
Rated voltage (V)	12	24
Rotor diameter(M)	2.2	2.2
Start-up wind speed(m/s)	3	3
Rated wind speed(ms)	6	6
Security wind speed(m/s)	12	12
Rated rotating rate(r/m)	450	450
Blade material	Fiber glass	Fiber glass
Blade quantity	3	3

5. Controller

Model	FD2. 1-200	
Dump loader power(W)	400W	400W
Batteries rated voltage(V)	12	24
Float charge voltage(V)	15	30
Over voltage(V)	15	30
Over charge resume voltage(V)	14	28
Under voltage(V)	10.5	21
Under charge resume voltage(V)	12	24
Net weight(kg)	2	2
Working	Continuous and intelligent	
Circumstance	Temperature: -10~40 Celsius degree; Humidity: less than 85%	

6. Guy Cable Tower

Height(m)	4.5
Diameter (mm)	60
Thickness	2.5

7. Electric wire

Length(m)	15
Cross-Section area(mm ²)	1.5

8. Suggested batteries specification

Model	200W12V	200W24V
Battery voltage(V)	12	12
Capacity (AH)	100	100
Quantity	1	2
Charging time(h)	15	15

9. Concrete base for guy cable tower

Radius(m)	2.0
Center base dimension(m) (L*W*D)	0.8*0.8*0.6
Side base dimension(m) (L*W*D)	0.6*0.6*0.6

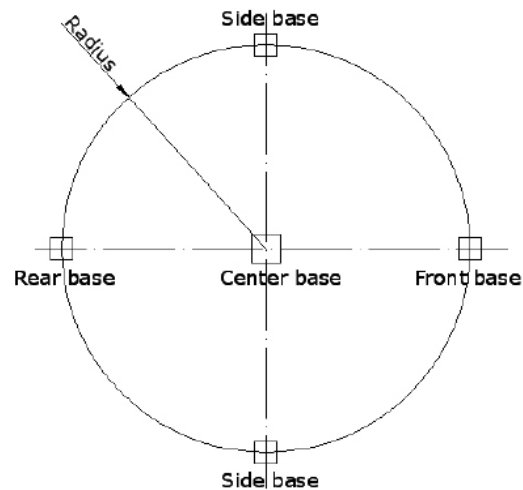


Figure 1: layout of concrete base

Special attention should be paid to the following when laying out the base and anchor:

1. Connecting line of two side anchors should be in parallel with the connection of two pinholes on the tail edge.
2. Make sure the side of tail edge with screw thread face the anchor.
3. The height of anchor should be consistent with the height of tower base. Therefore, the pulling force between fixed cable wires should be balanced for the sake of easy adjustment. Otherwise, too tight or too loose fastening pull will lead to the curvature or even breakdown of tower while erecting the tower.

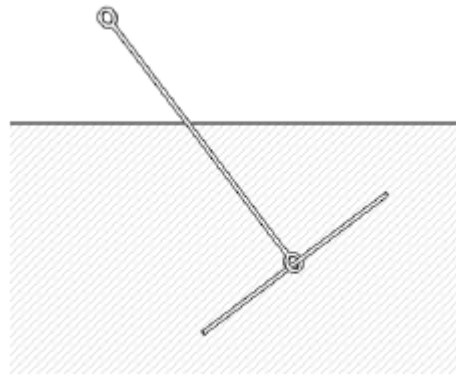
Step 3 Concrete the Foundation of Base as well as Anchor and Install Tower Base

1. Follow the layout of the above step, dig the concrete construction holes. Please refer to the chart one above for the size of the holes.
2. Concrete should be available. Four anchor bolts will be installed according to the holes on the base. Attention to make sure they are consistent with base holes. Fix the base with bolts on the cement done before (as shown in the graph 2).



Graph 2

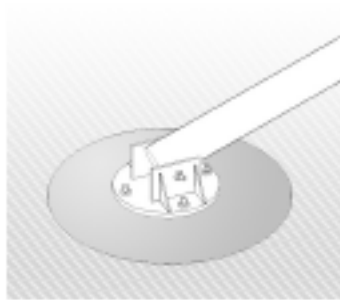
3. Annular anchors need to be deposited 60° to 80° along the base direction and check the distance between the four hooks of the anchors and the center of the base. Four anchors should be horizontal (as shown in the graph 3).



Graph 3

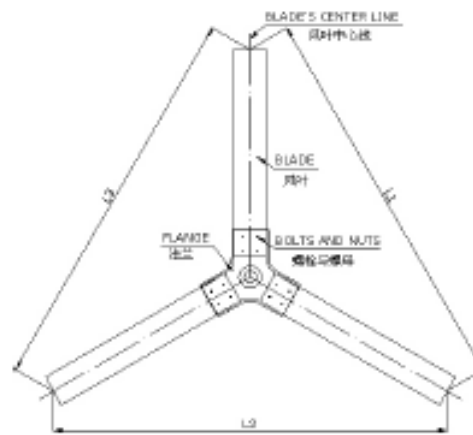
Step 4 Assembly of the tower and wind turbine

1. First, insert the main section of tower into base, then insert the axis pin into base and insert the split pin. (As shown in the graph 4)



Graph 4

2. Connect each section of tower one by one, place the tower on the supporting stand after assembly.
3. Rip the generator and dogvane cables into the tower, and elicit the cables from the main section of tower, near the tail edge.
4. Fix the running flange and tower flange by bolts. Hoist it by equipments such as pulleys, chain block etc. Pay attention that the generator axis should be faced upward in order to install the blades.
5. Install the blades and cover the pressure pad (300W wind turbine having no pressure pad), then screw the bolts. Keep the balance of blades when install them. First, do not screw the bolts too tight, adjusting the distance between two blades' tips to be equal after screwing all the bolts. (as shown in the graph

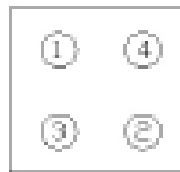


Graph 5

Make sure: $L1=L2=L3$ (error allowed: $\pm 5\text{mm}$) Utilizing spanner for force moment when screwing blades' bolts and achieving the set force Moment (200w、300w: $15\text{Nm}\pm 1$; 500w、1kw、2kw: $30\text{Nm}\pm 1$; 3kw、5kw、10kw、20kw: $50\text{Nm}\pm 1$)

Note: Please keep to the above make-sure. If not, we are not responsible for any possibility of breaking down the blades or flange.

- After adjusting the equal distance between the blades' tips, screw down the bolts according to the order as shown in the graph 6 (300W having three blade bolts, screwing them down one by one)



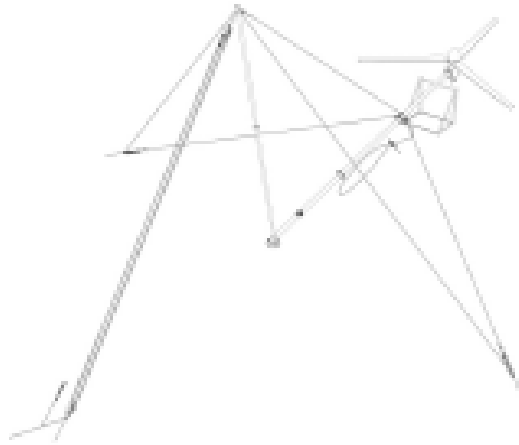
200w,500w,1kw,2kw

- Cover the dome.
- For 3kw and above 3kw wind turbine) infix the aviation plug on the generator into the socket of dogvane, and then install the dogvane. Special attention should be paid to the direction of dogvane. All the five holes must be face-to-face.

Step 5: Preparations before erecting the tower
(For 3kw and above 3kw wind turbine)

- Fix the fixed cable wire on the tower. The cable wire (both right and left sides) should be directly connected to side anchor through turnbuckle. Cable wire behind should be fixed on back anchor according to the same length. Make sure there is no twist among the three cable wires
- Connecting the two supporting poles.
- Fix the two relative thin cable wires on the two ears of supporting pole, and then make the cable wire before the tower drill through the two ears, and fix them after putting into the upper pulley.
- Insert the supporting pole into the tower. The cable wire on the two ears should be fixed on the two side anchors, and then fixed by tighter.

5. Fix the lower pulley on the front anchor. Fix one side of the longest thin cable wire on the pulley of supporting pole. Make sure the other side drill through the pulley, and then drill through the upper and lower pulley. Finally, fix it on a hoist or tractor (as shown in the graph 7).



Graph 7

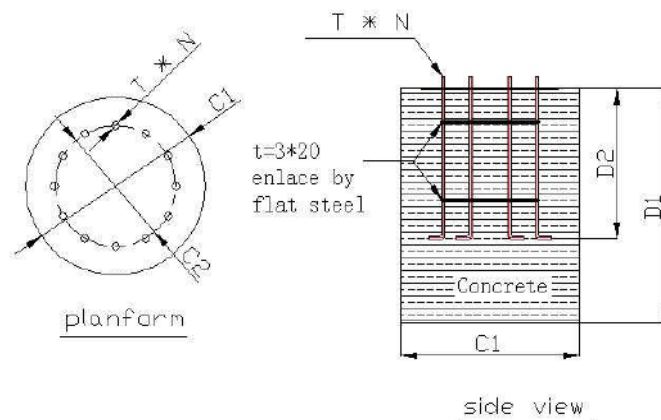
Installation specification of taper tower

Step 1: Choosing installation sites

Please refer to the installation specification of guyed tower (Step 1)

Step 2: Concrete the base

Refer to the following graphs according to the different product model. Special attention should be paid to the consistent between anchor and the opening of tower base.



Graph 8

Step 3: Assembly of tower and generator

Please refer to the installation specification of guyed tower (Step 4)

Step 4: Hoisting the tower

A hoist is needed while installing the guyed tower, which will be proceeded by professional personnel. Non-working people should be far away from the site when hoisting.

1. Utilized by supporter on the upper side of pole and hoist gradually.
2. When the tower has been erected, face the open hole on tower base to the cotter bolt and screw down the bolt nut.

Configuration Specification of Batteries

1. Batteries should be placed inside buildings under dry and constant temperature. After finalizing the quantity of batteries in series, it is necessary to have a design to place the batteries, controller and inverter.
2. Connect the batteries in series. The concrete way is to connect the anode of first battery to cathode of the second one.
3. Make the joints greased. Install the fuse on the positive electrode of battery. The distance of conducting wire between batteries and controller should be less than 3m.

Electric Wiring

1. Off-grid electric wiring (annex 1)

To ensure the safety and easy maintenance, please install the switch and fuse according to the diagram. Make sure there are consistent among the output voltages of generator, battery voltage and input voltage of inverter. A wire-connecting mistake will lead to burn down the generator, batteries and inverter.

There are two cables elicited from the generator head. One is the cable of wind direction signal with aviation plug on cable head. You need to insert it into the socket. The other cable is for the output of generator power and controlling signal. There are five lines with three relative thick ones for generator output and the other two relative thin ones for controlling signal, which is classified as positive electrode and negative one. All should be connected to the connecting poles at the back of controller accordingly.

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. Maintain the batteries following the battery manual.
4. Before storm, it is better to lay down the tower for escaping from unpredictable loss

FAQS

- Why does not my electro-equipment work after connected to inverter?
 - Check the dump energy. If the energy is not enough, the system will not operate normally; if the energy is enough, please check the connecting wire between batteries and inverter is correct.

- Why can not the batteries be charged?
 - Check whether or not the rotor is rolling, the generator has no output at too high or too low wind speed. If the rotor is normal, disconnect the generator's wire from batteries and controller (if there is an individual controller); check the output voltage of generator by a multi-meter. If the voltage is normal please check the batteries is ok, otherwise check the wire of generator.

- Why does not the rotor roll at a normal wind speed?
 - If the output wire of generator is short, the rotor will not roll. Check the generator's wire after disconnected from batteries.

- Can I enlarge the batteries' capability to extend the available time for electrical appliance?
 - Enlarge the capability of batteries we suggested would make the batteries on half full state and short the life.

www.engineo.co.th