

# USER' S MANUAL



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## Model & Parameter List

Model	FD2.1-200-8L	FD2.1-200-8H	FD2.5-300-8L	FD2.5-300-8H
Rated power(W)	200W		300W	300W
Rated voltage (V)	24		24V	24V
Rotor diameter(M)	2.2	1.8	2.5	2.0
Start-up wind speed(m/s)	3		2.5	2.5
Rated wind speed ( m/s )	6	12	7	12
Security wind speed(m/s)	16	35	16	35
Rated rotating rate ( r/m )	450		400	400
Blade material	glass fiber	glass fiber	glass fiber	Glass fiber
Blade quantity	3		3	3

Model	FD2.7-500-10L	FD2.7-500-10H	FD3.0-1000-10L	FD3.0-1000-10H
Rated power(W)	500W		1KW	
Rated voltage (V)	24		48	
Rotor diameter(M)	2.5	2.1	2.7	2.3
Start-up wind speed(m/s)	2		2	
Rated wind speed ( m/s )	8	12	9	12
Security wind speed(m/s)	16	35	16	35
Rated rotating rate ( r/m )	400		400	
Blade material	glass fiber	glass fiber	glass fiber	glass fiber
Blade quantity	3		3	

Model	FD3.6-2000-10L	FD3.6-2000-10H	FD5.0-3000-16L	FD5.0-3000-16H
Rated power(W)	2000W		3000W	
Rated voltage (V)	120		240	
Rotor diameter(M)	3.2	2.5	4.5	3.6
Start-up wind speed(m/s)	2		2	
Rated wind speed ( m/s )	9	12	10	12
Security wind speed(m/s)	16	35	25	45
Rated rotating rate ( r/m )	400		220	
Blade material	glass fiber	glass fiber	glass fiber	glass fiber
Blade quantity	3		3	

Model	FD6.4-5000-16L	FD6.4-5000-16H	FD8.0-10K-20L	FD8.0-10K-20H
Rated power(W)	5000W		10000W	
Rated voltage (V)	240		240	
Rotor diameter(M)	6.4	4.5	8.0	6.4
Start-up wind speed(m/s)	2		2	
Rated wind speed ( m/s )	10	12	10	12
Security wind speed(m/s)	25	45	25	45
Rated rotating rate ( r/m )	200		180	
Blade material	glass fiber	glass fiber	glass fiber	glass fiber
Blade quantity	3		3	

Model	FD10.0-20K-40H
Rated power(W)	20000W
Rated voltage (V)	360
Rotor diameter(M)	10.0
Start-up wind speed(m/s)	2
Rated wind speed ( m/s )	12
Security wind speed(m/s)	45
Rated rotating rate ( r/m )	90
Blade material	glass fiber
Blade quantity	3

## Installation Specification of Guyed Tower

### Step 1: Choosing Installation Sites

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 & Anchor (as shown in the following tables)

Model	200W	300W	500W	1000W	2000W
Semi diameter ( m )	2.0	3.0	3.0	3.0	4.0
Size of central base(m) (long*wide*deep)	0.4*0.4*0.3		0.5*0.5*0.4		0.6*0.6*0.5
Size of side base (m) (long*wide*deep)	0.3*0.3*0.3		0.4*0.4*0.3		0.5*0.5*0.4

Model	3000W	5000W	10KW	20KW
Semi diameter (m)	4.0	6.0	6.0	8.0
Size of central base (m) (long*wide*deep)	0.8*0.8*0.8		1.0*1.0*1.0	
Size of side base (m) (long*wide*deep)	0.6*0.6*0.6		1.0*1.0*1.0	

Table 1

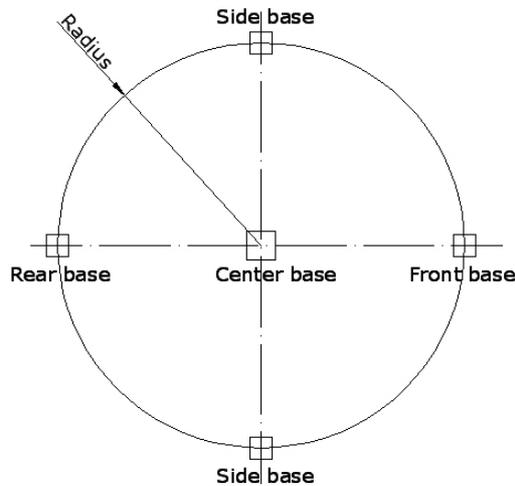


Figure 1: layout of concrete base

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

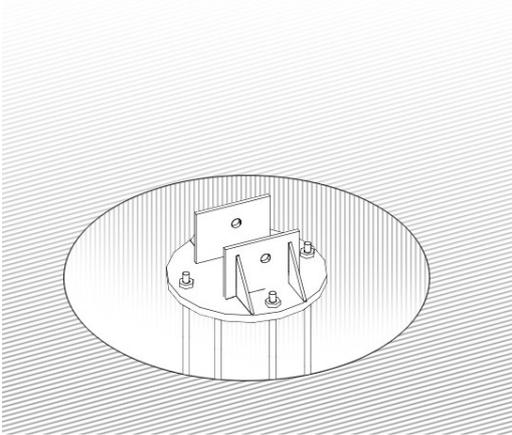
1. Connecting line of two side anchors should be in parallel with the connection of two pinholes on the tail edge.
2. Make sure the side of tail edge with screw thread face the anchor.
3. The height of anchor should be consistent with the height of tower base.

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

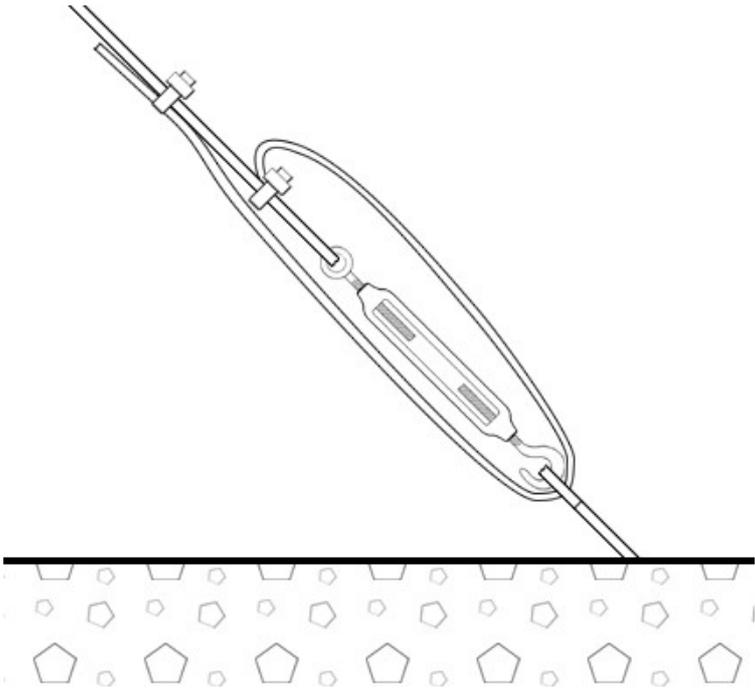
1. Follow the layout of the above step, dig the concrete construction holes. Please refer to the chart one above for the size of the holes.
2. C25 concrete should be available. Four anchor bolts will be installed according to the holes on the base. Attention to make sure they are consistent with base holes. Fix the base with

bolts on the cement done before (as shown in the graph 2).



Graph 2

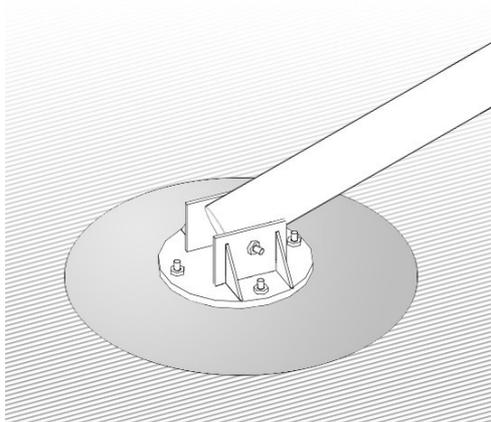
3. Annular anchors need to be deposited 60°to 80°along the base direction and check the distance between the four hooks of the anchors and the center of the base. Four anchors should be horizontal (as shown in the graph 3).



### 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)

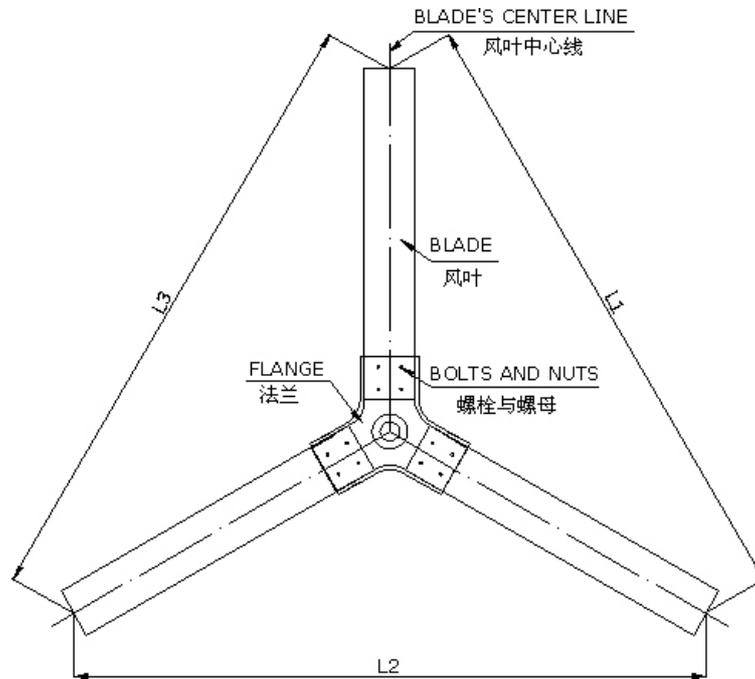


Graph 4

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 5)



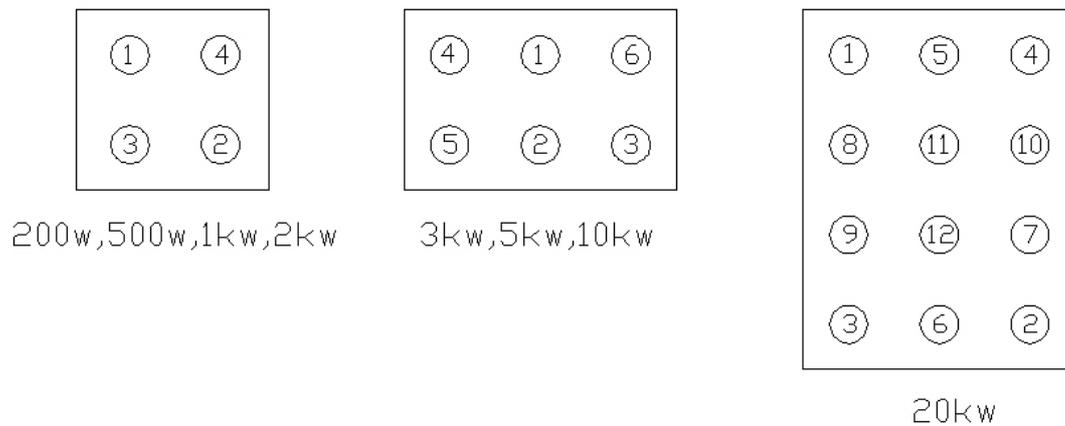
Graph 5

Make sure:  $L1=L2=L3$  (error allowed:  $\pm 5mm$ )

Utilizing spanner for force moment when screwing blades' bolts and achieving the set force moment ( 200w, 300w :  $15Nm\pm 1$  ; 500w, 1kw, 2kw :  $30Nm\pm 1$  ; 3kw, 5kw, 10kw, 20kw :  $50Nm\pm 1$  )

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

6. 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)



Graph 6

7. Cover the dome.

8. (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.

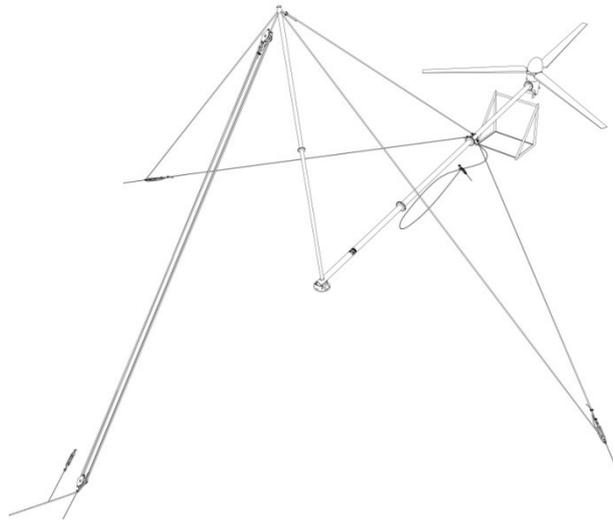
#### Step 5: Preparations before erecting the tower

(For 3kw and above 3kw wind turbine)

1. 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
2. Connecting the two supporting poles.
3. 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.

4. 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

(For 2kw & above 2kw)

1. Connect the last fixed wire cable to the one which is at least 16 meters. Tie one end to the winch or tractor.
2. Drill the wire cable or bracing cord through one end of the ladder (2\*4 or 2\*5), which will be served as support pole

#### Step 6: Erecting the tower

1. Drive the winch or tractor slowly and the tower will stand up along the moving of the cord. Stop at each rising 15° and check the tensile force of wire cable on both sides. Any over tight or loose wire should be regulated by putting down the tower slowly and adjusting the length of wire cable.
2. Go on pulling the bracing cord until the tower stands upright. Separate the working cord and fix it on its anchor.
3. Check and adjust the strain of each fixed wire cable. 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 circumrotating the bolt.

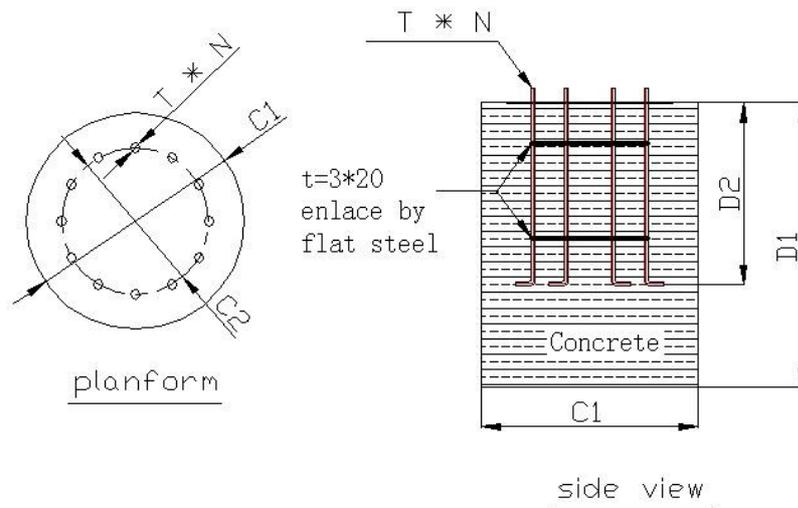
### **Installation specification of taper tower**

#### 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

Model	Code in the graph 8	1000W	2000W	3000W	5000W	10KW	20KW
Ground depth(m)	( D1)	1.2	1.5	1.5	1.6	2.0	3.0
Ground diameter(m)	( C1)	1.0	1.0	1.2	1.5	1.8	2.5
Burial depth of cotter bolt (m)	( D2)	0.8	1.2	1.2	1.2	1.6	2.0
Layout diameter of cotter bolt (mm)	( C2)	450	600	700	800	1000	1200
Specification of cotter bolt	( T)	M18	M18	M20	M24	M24	M30
Quantity of cotter bolt	( N)	12	12	12	12	16	16

Table 2

### 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.

### 4. Suggested battery capacity for various model (as shown in the table 3)

Model	200 W	300W	500W	1000W	2000W	3000W	5000W	10KW	20KW
Voltage of single battery (V)	12								
Capacity of single battery(AH)	100	200	200	200	150	100	200	400	800
Quantity in series	2	2	2	4	10	20	20	20	30

Table 3

### 5. Charged parameter of batteries (as shown in the table 4)

Battery voltage(V)	12	24	36	48	120	240	360
Float charge voltage ( V)	14.5	30	45	60	150	300	450
Overvoltage ( V)	14.5	30	45	60	150	300	450
Over charge resume voltage ( V)	14	28	42	56	140	280	420
Undervoltage ( V)	10.5	21	32	42	105	210	315
Under charge resume voltage ( V)	12	24	36	48	120	240	360

Table 4

## 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.

(Special attention to 3kw & above 3kw)

- a. 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.
- b. The anemoscope should be installed on house roof or open areas, and must be vertical against the ground. One end of the matched cable of anemoscope should be inserted into the socket under the anemoscope with the other end inserted into the socket accordingly.
- c. Please refer to annex 2 for controller specification

### 2. On-grid electric wiring

All the models can be applied to on-grid environment. But it is approved by local regulations. What is more, on-grid controller and inverter need to be purchased additionally.

## 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 have 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.
- How to lay down the generator?

- 

(For 3KW & above 3KW)

1. Firstly we should stop the generator. Change control manner to "manual", and then hold on the "reverse" or "turn" to make the generator turn a 90 angle with wind direction.
2. After the blades stop rolling, shortcut three line of generator.
3. Hold on the "reverse" or "turn" to make the generator's end face to the direction of putting.
4. Do the reverse steps of installation to put down the generator.

(For 2KW & above 2KW)

1. Disconnect the generator and controller. Make the three output lines be short circuit to prevent the blades from further running.
  2. Do the reverse steps of installation to put down the generator.
- 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.
  - Wind turbine (3kw & above 3kw) can not trace wind direction automatically.
  - 1. Check whether the anemoscope is broken or not. The concrete way is to examine whether

there is wind-speed indicator on controller;

2. Check whether the dogvane is broken or not. The concrete way is to unplug the plug of dogvane from controller, and you will see there are three line on dogvane with marks ①、②、③. Measure the resistance between ① and ② by multi meter, the resistance should be appropriately  $1000\Omega$ , and then measure the resistance between ① and ③, along with ② and ③. The resistance figure of these two(① and ③+② and ③) should be equal to the resistance figure between ① and ②.

3. If no problem exist the ahead two procedures, check whether the controller board has been set on "auto" . Otherwise, it can not trace the wind direction automatically. If you can not trace the wind direction, the reason causing this is mostly for low wind speed. Only when the wind speed is larger than 3m/s staying more than 30seconds, can you trace wind speed and change windward angle.

○ How long is the generator's lifespan?

●It' s 15 years under normal care.

If you have more questions, please contact us by phone or E-mail.

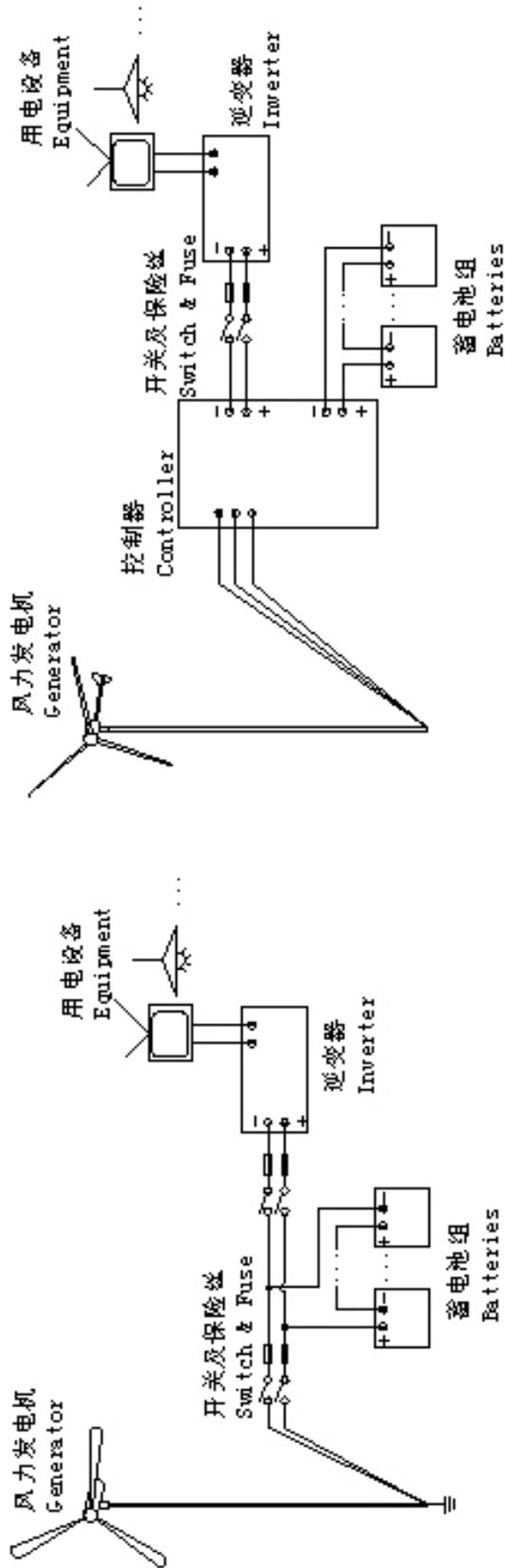
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\* The color of photographs may be different from real objects.

\* No notification if the manual modified.

\*The guarantee of turbine and controller is 2 years, and the inverter is 6months from the date of purchasing (non-done by man or majeure)

### **Annex 1: Off-grid electric wiring**



200W、500W、1KW、2KW

