



Low Wind High Yields Series

Wind Turbines

USER'S MANUAL





Introduction

Low Wind High Yields Series rotor blades apply the latest advanced thermoplastic engineering and are manufactured by precision injection molding. The blades are of exceptional consistency and aerodynamic outline with a mass distribution that ensures the rotors operate with nearly no noise and minimal vibration. The **Low Wind High Yields Series** has very low start-up/cut-in wind speed and a high coefficient of productivity and is specially designed to prevent the blades from feathering post stall.

Low Wind High Yields Series has adopted a high-quality permanent magnet, so the alternator is compact with a high power generating efficiency. The unique winding and multi pole design reduces the start-up torque of the alternator that assures the **Low Wind High Yields Series** can generate electricity at low wind speed.

The **Low Wind High Yields Series** Turbines housing is precision cast from high strength aluminum to assure a high quality finish. The **Low Wind High Yields Series** designed for various working conditions such as severe climate, sand and salt corrosive environments, Roof top and marine usage.

The **Low Wind High Yields Series** an exquisite set with unmatched power generating performance. It is a clean power source for the modern living environment.

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We believe that you will find your **Low Wind High Yields Series** simple to install; however, it is important that you read this manual thoroughly prior to installation to assure proper performance and safety.

1. Package Contents

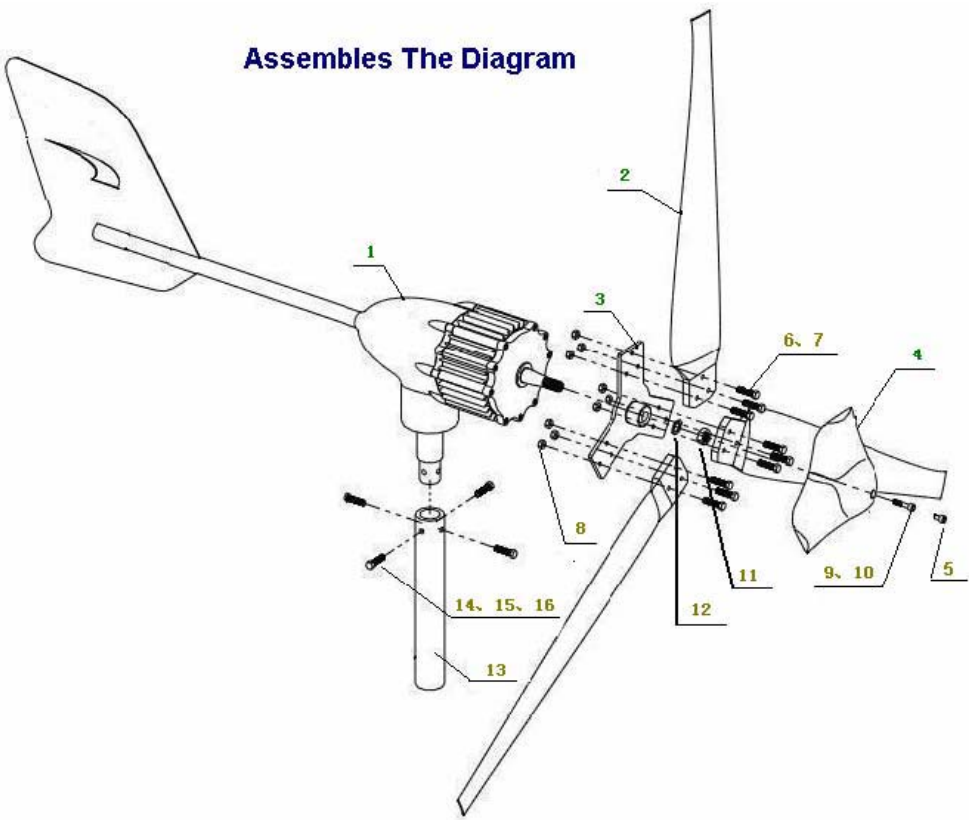
The first please compare the parts listed below with the contents of the box to make sure that you have everything needed for assembly.

Content		Quantity
Generator assembly		1
Rotor blade		3
Rotor hub		1
Front cover		1
Front cover Stopper		1
Hardware	Bolt M8*30	9
	Flat Washer M8	9
	Nylock Nut M8	9
	Bolt M6*35	1
	Flat washer M6	1
	Nut M16*1.5	1
	Lock Washer M16	1
	Connecting Rod	1
	Bolt M8*16	4
	Flat Washer M8	4

	Lock Washer M8	4
Included Simple Tools	M5 Socket Head Wrench	1
	M8 Wrench	1
	M24 Wrench	1
User's Manual		1

2. Assembling

Assemble Low wind High Yield Series referring to following figures.



Corresponding Number	Discreteness	Quantity	Correlation Connect
1	Generator Assembly	1	Mostly Discreteness
2	Rotor Blade	3	
3	Rotor Hub	1	
4	Front Cover	1	
5	Front Cover Stopper	1	Fittings
6	Bolt M8*30	9	Rotor Blade
7	Flat washer M8	9	

8	Nylock Nut M8	9	
9	Bolt M6*35	1	Front Cover
10	Flat washer M6	1	
11	Nut M16*1.5	1	Generator Assembly
12	Lock Washer M16	1	
13	Connecting Rod	1	Fittings
14	Bolt M8*16	4	Connecting Rod
15	Flat Washer M8	4	
16	Lock Washer M8	4	

2.1 Mounting the rotor hub

1. 2.1.1 Remove the nut lock washer and flat washer from the alternator shaft;
2. 2.1.2 Slide the rotor hub onto the alternator shaft and place the flat washer and lock washer;
3. 2.1.3 Thread and tighten the nut. The nut should be tightened to 70-85 Nm.

2.2 Mounting rotor blades

1. 2.2.1 Blades are in front of the rotor hub with the flat side facing upwind .
2. 2.2.2 insert three bolts in holes on the hub and blade. Place flat washers on the end of bolts, thread and tighten Nylock self-locking nut. Nuts should be tightened to 8-12 Nm.

2.3 Attaching the spinner

Place the spinner over the center of the hub. Thread the M6*35bolt with lock washer and flat washer into the screw hole on the alternator shaft and tighten by hex key.

1. 2.4 Mounting the yaw pole
2. 3. Sitting

Slide the yaw pole onto the yaw shaft of the head assembly and fastened by four bolts M8/15 with flat washers and lock washers.



Fig.1 Drill through the tower tube to the electric wire



Fig.2 Attach the wind turbine head assembly



Fig.3 Assemble the wind turbine rotor hub



Fig.4 Attach the wind turbine rotor blades



Fig.5 Attach the wind turbine front cover



Fig.5 Secure the wind turbine screw cover

Sitting is an important but complicated issue for wind power installation. Consulting a wind energy specialist is recommended if the user is not familiar with wind systems.

Four general rules are listed as below for consideration:

1. **3.1** There are two basic requirements for a good site: high average wind speed and low wind turbulence. The higher the average wind speed, the more the power will be generate by the **Low Wind High Yields Series** wind turbines. The power available in the wind goes up with the cube of the wind speed. For example, the power available in the wind of 5mps speed is nearly twice as of 4mps. The lower the wind turbulence, the lower the stress the wind turbine will have to endure. Lower turbulence also results in more power .The zone with high wind speed but high turbulence is not a desirable site.
2. **3.2 Install the wind turbine as high as you can.** The higher the tower, the higher the wind speed and the lower the turbulence .The recommended tower height for the **Low Wind High Yields Series** Turbines 8 m above ground level without barriers.
3. **3.3** Barriers (trees, buildings, etc.) to the flow of wind will produce wakes that may extend far down wind of the barrier and to a height considerably above the barrier. These wakes are areas decreased wind speed and potentially damaging turbulence.

Three rules of thumb:

One: A tower immediately downwind of a building should be at least twice of the height of the building. **Two:** A tower should be at least 30ft higher than the highest barrier within 492 feet of turbine. **Three:** recommend minimal spacing 4

times blades diameter side to side. Stop prop wash turbulence.

3.4 The local and national codes and requirements should be complied with.



4. Tower

1. **4.1** The **Low Wind High Yields Series** Turbines flanged to the tower. Dimensions of the adapter are shown in figure.
2. **4.2** The **Low Wind High Yields Series** Turbines designed to withstand a maximum horizontal direction force of 500N mounted on the tower. The tower must be capable of withstanding the wind load.
3. **4.3** A guyed steel pipe tower is the most economical method to install a turbine. 1 1/2 inch or 2 inch SCH 40 steel pipe is recommended for the **Low Wind High Yields Series** guyed tower.
4. **4.4** The tower should be properly electrically grounded.
5. **4.5** Recommended method of installing the tower

Guyed Tower

Suitable Foundation:

The Construction Method for the tower base is according to the soil conditions at your tower site.

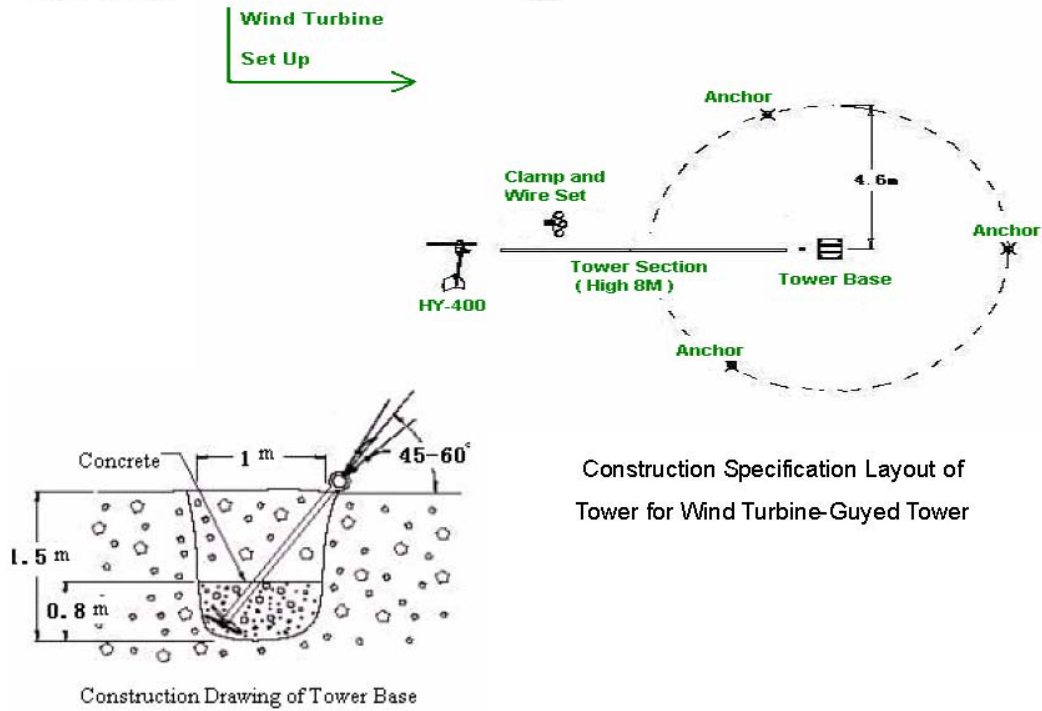
If the tower site is located on solid rock, it just needs to level off.

If the tower site is located on the soft soil, the ground of 0.8m in diameter must need to tamp and it can prevent the foundation from caving in.

If the tower site is located on the loose sand, it needs to dig a hole 0.8m in diameter and 1.5m deep, and then bury a clay pan 60cm deep and tamp the clay-pan, and cover concrete of 20cm deep on the clay pan. Once the concrete has set it should be buried before use.

Construction Specification Layout of
Tower for Wind Turbine-Guyed
Tower

before use.



Construction Specification Layout of
Tower for Wind Turbine-Guyed Tower

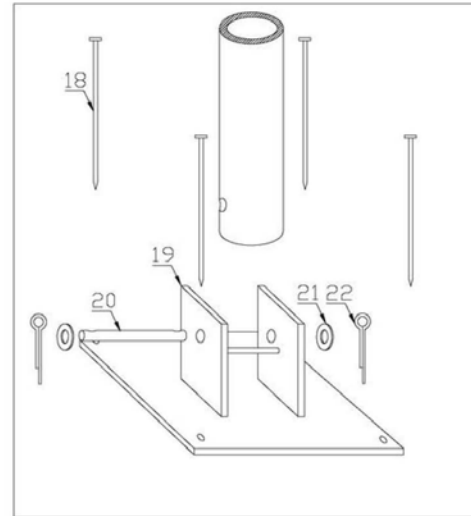
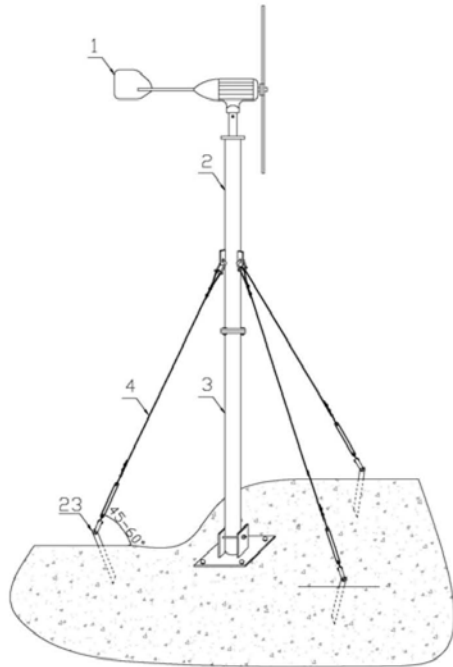


Fig 1 Connections of base seat

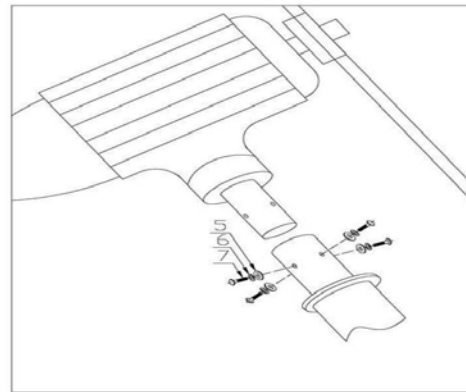
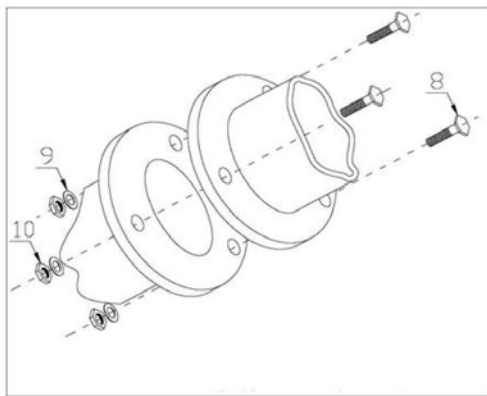
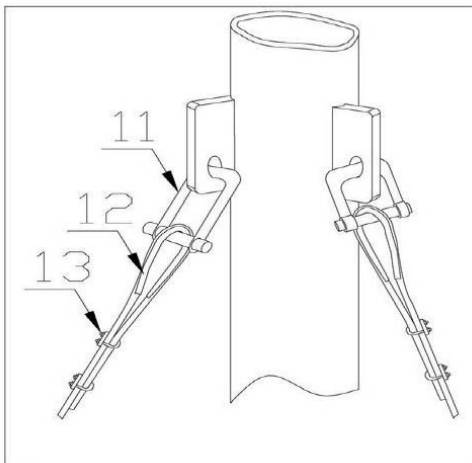


Fig 2 Connections of flange Fig 3 Connections of power head to tower



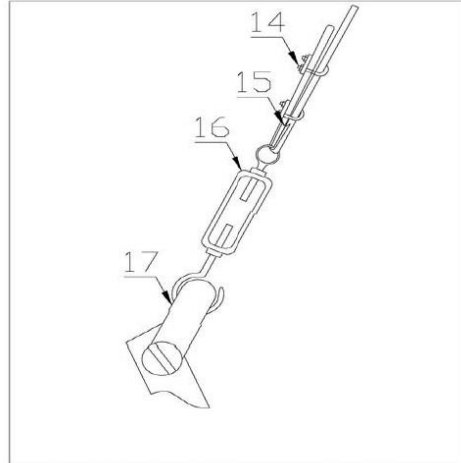


Fig 4 Top end connections of rope Fig 5 Lower end connections of rope
Installation procedure

1. Put the tilting base (19) in place, and fix four base anchors (18) as shown in figure 1.
2. Connect flange as shown in figure 2.
3. Connect wind turbine power head (1) to upper tower (2) as shown in figure 3.
4. Connect lower tower (3) to tilting base by pin (20).
5. Fix three rope anchors in place.
6. Connect three ropes (4) to upper tower by shackle (11), thimble (12), and clamp (13) as shown in figure (4).
7. Connect two ropes to rope anchor by clamp (14), thimble (15), turnbuckle (16), and shackle (17) as shown in figure (5).
8. Erect tower.
9. Connect third rope-to-rope anchor.
10. Turn turnbuckles to and make sure that ropes are tightened properly and the tower is plumb.

LIST

Item	Equipment	Type/Spec	QTY.
1	Power head	WIND - 400	1
2	Upper tower	3M	1
3	Lower tower	3M	1
4	Rope	D 6*19	1
5	Flat washer 8mm	Ø8	4
6	Lock washer 8mm	Ø8	4
7	BoltM8×	M8×	4

8	BoltM10×	M10×	3
9	Flat washer 10mm	Ø10	3
10	Nut M10	M10	3
11	Shackle	0.5	3
12	Thimble 0.6	0.6	3
13	Clamp	Yz-8	6
14	Clamp	Yz-8	6
15	Thimble 0.6	0.6	3
16	Turnbuckle	C-O 0.3	3
17	Shackle	0.5	3
18	Base anchor		4
19	Tilting base		1
20	Pin	Ø16	1
21	Flat washer 16mm	Ø16	2
22	Cotter pin	Ø5×50	2
23	Rope anchor		3

Example

Fig.3.1 The tower base pad layout



Fig.1
Secure the tower base



Fig.2
Attach the tower bolt



Fig.3
Connect the tower tube



Fig.4
Attach wires and clamp



Fig.5 Install malleable
clamp



Fig.6
Pull to raise tower

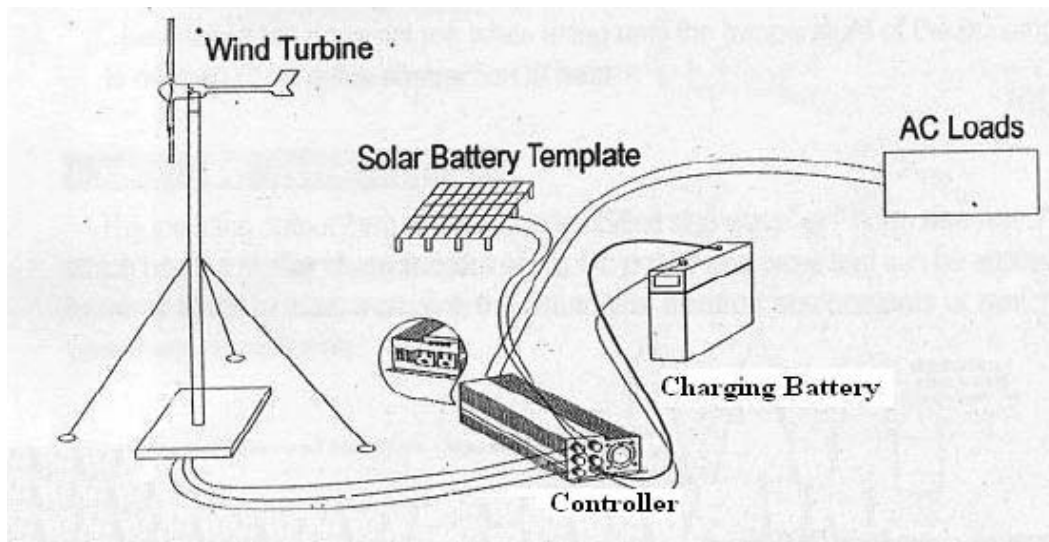
Fig.4 Attach wires and clamp

Warning

1. The turnbuckle is easily turned as the steel guy wire rope remains loose. So the turnbuckles must be guarded by the ∞ shape safety wires.
2. Since the wind turbine generator is quite heavy several people should be available for erection unless it is erected by a mechanical winch.

5. Cable Wiring

1. **5.1** The fundamental wiring diagram of single LOW WIND HIGH YEILD SERIES TURBINE system is as shown.
2. **5.2** The regulator is shown as following.



Before erecting the LOW WIND HIGH YEILD SERIES TURBINE tower, connect the LOW WIND HIGH YEILD SERIES TURBINE to the regulator, and turn the breaker switch on the regulator to the closed position. After erecting, make sure that batteries are connected tightly and correctly with the regulator, and then turn the breaker switch to open position.

1. **5.2.1** the electric circuit breaker on the regulator protects the batteries in case of

accidental shorts.

2. **5.3 Low Wind High Yields Series** system supplied with solar & wind hybrid controller.
3. **5.4** The battery capacity is subject to client's requirement, but a 100-150AH/12V battery is recommended for a single **Low Wind High Yields Series** System.
4. **5.5** Undersized cables will cause energy loss (voltage drop) to the system. The larger the cable size, the smaller the energy loss. However, larger size cables will be more costly. The following cable sizes are recommended for the **Low Wind High Yields Series** system:
5. **5.6** The negative pole of the battery should be properly grounded.

Distance from LOW WIND HIGH YEILD SERIES TURBINE to battery (m)	< 50	50-100	100-150
Cable size (mm ²)	4	6	10

6. Maintenance

The **Low Wind High Yields Series** is a very reliable set and is designed to run for long periods at severe conditions without any maintenance. But routine checking of system tower and cable wiring system is suggested to maintain the reliability and performance of the system.

1. **6.1** Check guy rope tension and tighten if needed, especially after storms. During first three months after erecting the tower, periodic inspection should be carried out.
2. **6.2** Check all electrical connections to make sure they are properly connected, tightened and free from corrosion.
3. **6.3** Maintain batteries according to battery manual.

7. Safety Precautions

The **Low Wind High Yields Series** designed with your personal safety as the first priority. However, there are still some inherent dangers involved in the electrical/mechanical equipment. Safety must be the priority concern during installation of the system.

1. **7.1** Choose a calm day to erect the tower.
2. **7.2** Undersized wires or bad connections should be avoided as they will often result in overheating and potentially cause electrical fire.
3. **7.3** Never approach an operating turbine during strong wind s or during thunderstorms.

1. 8. Technical specifications

2. **9. Power curve Low Wind High Yield 600 - 400 Power Evidence Plots**

Type Wind - **400,12V**

Rotor diameter	1.4m
Start up wind speed	2.3m/s
Cut-in wind speed	3.0 m/s
Rated wind speed	12 m/s
Turbine Rated output	400W, DC12V
Survival wind speed	60 m/s
Solar energy input	12V _{DC} , 100W
Battery Voltage	12V _{DC}

Type Wind - **400,24V**

Rotor diameter	1.4m
Start up wind speed	2.3m/s
Cut-in wind speed	3.0 m/s
Rated wind speed	12 m/s
Turbine Rated output	400W, DC24V
Survival wind speed	60 m/s
Solar energy input	24V _{DC} , 100W
Battery Voltage	24V _{DC}

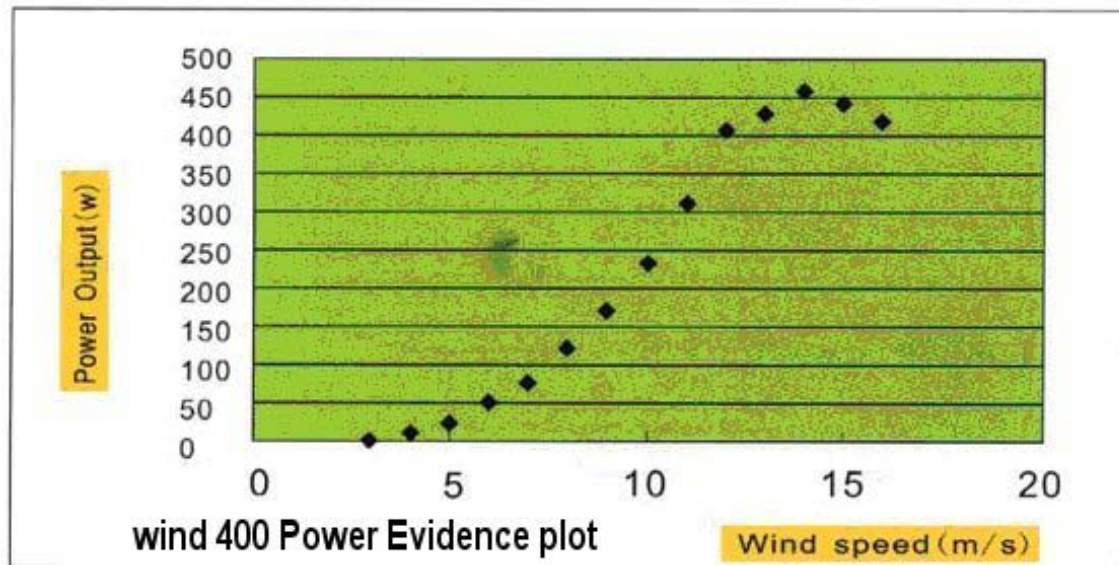
Type Wind - **600,24V**

Rotor diameter	1.4m
Start up wind speed	2.3m/s
Cut-in wind speed	3.0 m/s
Rated wind speed	12 m/s
Turbine Rated output	600W, DC24V
Survival wind speed	60 m/s
Solar energy input	24V _{DC} , 300W
Battery Voltage	24V _{DC}

Type Wind - **600,48V**

Rotor diameter	1.4m
Start up wind speed	2.3m/s
Cut-in wind speed	3.0 m/s
Rated wind speed	12 m/s

Turbine Rated output	600W, DC48V
Survival wind speed	60 m/s
Solar energy input	48V _{DC} , 300W
Battery Voltage	48V _{DC}



600 Power Evidence Plot

