



# WINDMAX Green Energy



## Wind Turbine Guidebook

For HYenergy HY-400, HY-600, HY-1000,  
HY-2000, HY-3000 Off-grid Models



**Please write the serial number of your wind turbine on the front of this document before installation. Serial number is located on the wind generator neck.**

## **Disclaimer**

This document is not intended to serve as installation manual. Approved professional installation is required for all HYenergy/WindMax wind turbines. This document is only meant to provide general product information and installation guidelines for HYenergy wind turbines.

All wind turbines must be installed following the guidelines established by state and local regulations. Consult a local electrical contractor or the local planning and zoning office for details and regulations.

Properly sized fuses or circuit breakers are required for ALL CONNECTIONS (wind turbine to controller, controller to battery) to minimize the risk of fire and/or wind turbine/electrical failure.

WindMax Green Energy Corp. / Applied Magnets shall not be responsible for any consequential damages that any person or property might suffer as a result of wind turbine malfunctions, defects and failures.

The end user of information and products by WindMax Green Energy Corp. / Applied Magnets products assumes full responsibility and risk.

All specifications and content of this document are subject to change without notice.

**Properly grounding is required to protect wind turbine.**

NO warranty for self-installed wind turbines.

## Introduction

HYenergy wind turbine features:

- ✓ ISO certified. CE and ETL listed. (HY-400, HY-1000 and HY-2000 models are ETL listed)
- ✓ Hybrid Solar/Wind Dual Output Capability to take advantage of both solar energy and wind energy at the same time, highly efficient.
- ✓ Features Electromagnetic speed limitation and blade over-speed braking, no problematic mechanical furling is needed. Combination of Electromagnetic braking and aerodynamic braking maximizes energy capture by extending HYenergy turbine's operating speed range into higher speed winds and lower speed winds which are missed by the old style wind turbines.
- ✓ Patented aerofoil blade design makes the system run much more efficient, rotor blades are made with the latest advanced thermoplastic engineering and precision injection molding technology.
- ✓ Innovative maintenance-free two-moving-part system design. HYenergy adopted Innovative over-speed control so it improves the reliability by eliminating the moving parts for mechanical over-speed protection and minimizing the moving parts to only two.
- ✓ The blades have exceptional consistency and aerodynamic outline with a mass distribution that ensures the rotors operate with nearly no noise and minimal vibration.
- ✓ Wind/Solar hybrid controller to work with both wind turbine and solar panels.
- ✓ Low Start-up and cut-in speed. 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.
- ✓ The generator is built using high-performance permanent magnets, so the alternator is compact and lightweight with a high power generating efficiency. The unique winding and multi pole design reduces the start-up torque of the alternator that assures the HYENERGY can generate electricity at low wind speed.
- ✓ Generator housing is made with precision cast technology from high strength aluminum to assure a high quality finish. It is designed for various working conditions such as severe climate, sand and salt corrosive environments and marine usage.
- ✓ Exquisite set with unmatched power generating performance. It is a great green power source for the modern living environment.

The system is easy to install; however, it is important that you read this guidebook thoroughly prior to installation to assure proper performance and safety.

## 1. Package Contents

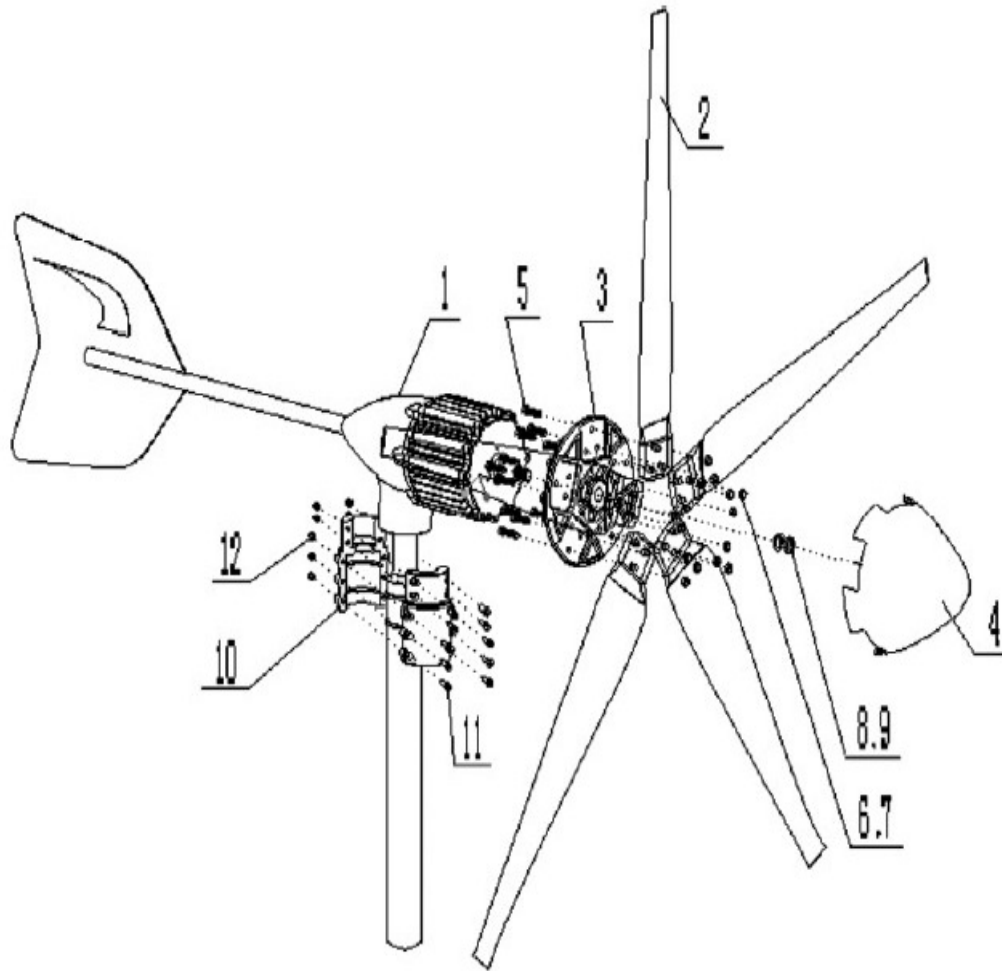
Check the parts listed below with the contents of the box to make sure that you have everything needed for assembly.



**Note: 5 blades models will have 5 blades/hub instead of 3 blades/hub.**

## 2. Assembly

Assemble HYENERGY wind turbine referring to following figures.



### WIND TURBINE ASSEMBLY (3 BLADES AND HUB CONNECTION)

Blades are in front of the rotor hub with the flat side facing upwind. Insert bolts in holes on the hub. Place flat washers on the end of bolts, thread and tighten nylock self-locking nut. Nuts should be tightened to 8-12 Nm.



1、 OPEN CARTON TO INSPECT ALL PARTS COMPLETE. 2、 TAKE OUT THE HUB FROM CARTON



3、 TAKE OUT THE BLADE FROM CARTON

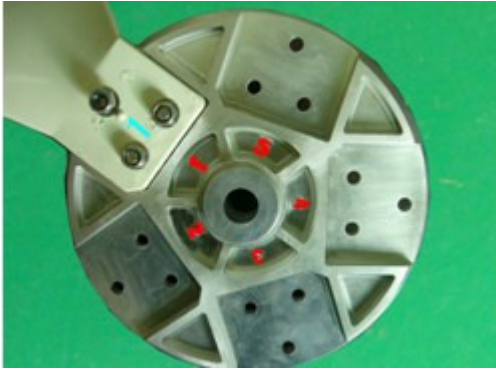
4、 FASTERN THE BLADES ON HUB WITH STUD & NUTS

### WIND TURBINE ASSEMBLY (5 BLADES AND HUB CONNECTION)

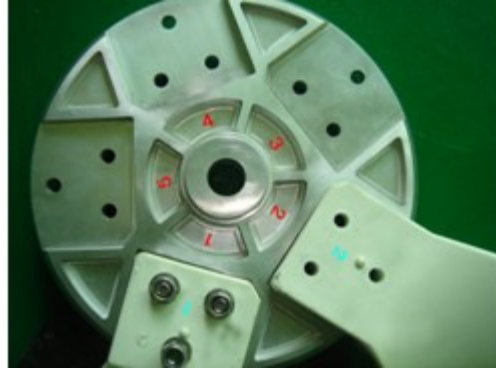


1、 TAKE OUT THE FIVE BLADES FROM CARTON

2、 TAKE OUT THE HUB FROM CARTON



3、 MATCH NO. ON BLADE AND THE NO. ON HUB  
 —— FASTERN THE BLADE AND HUB WITH NUTS



4、 SAME AS STEP THREE, ASSURE THE BLADE NO. AND HUB NO. MATCH.



5、 SAME AS STEP THREE, ASSURE THE BLADE NO. AND HUB NO. MATCH.



6、 FINISH ASSAMBLE FINAL PRODUCT DIAGRAM

### WIND TURBINE ASSEMBLY (Weld-on Flange Connection)



1、 TAKE OUT THE WIND TURBINE FROM CARTON



2、 PULL OUT THE CABLE COVER AND CONEECT THE CABLE'S THREE FAHSE WIRE WITH WIND TURBINE THREE PHASE WIRE



3、 ATTACH THE CABLE COVER



4、 LAY THE CABLE THROUGH THE TOWER



5、 ATTACHED THE FLANGE AND TOWER WITH LOCKNUTS



6、 FINISH ASSAMBLE, ERECT THE POLE

### WIND TURBINE ASSEMBLY (Bolt-on Pole Connection)



1、 CONECTTHE THREE FAHSE WIRE WITH WIND TURBINE THREE PHASE WIRE



2、 TAKE OUT THE REDUCING JOINT AND ATTACH IT WITH WIND TURBINE ALXE





3、 ATTACH THE UPPER COVER AND REDUCING JOINT THEN FASTERN BY NUTS



4、 ATTACH THE LOWER COVER AND REDUCING JOINT THEN FASTERN BY NUTS



5、 LAY THE CABLE THROUGH THE TOWER



6、 TIGHTERN THE COVER BY LOCKNUTS FINNALLY

## WIND TURBINE ASSEMBLY (HUB, GENERATOR, FRONT COVER)

Remove the nut lock washer and flat washer from the alternator shaft. Slide the rotor hub onto the alternator shaft and place the flat washer and lock washer, Thread and tighten the nut. The nut should be tightened to 70-85 Nm.



1、 TAKE OUT THE FRONT COVER FROM CARTON.



2、 ATTACH THE HUB (WITH BLADES) AND WIND TURBINE

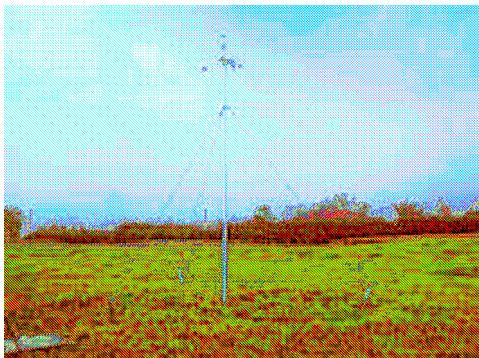


3、 TIGHTERN THE HUB WITH NUTS AND SPRING WASHER



4、 ATTACH THE FRONT COVER ON HUB (BY AVERAGE FORCE)

## 3. Siting



Siting is an important but complicated issue for wind turbine 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 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 HYENERGY wind turbine generate. 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 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 HYENERGY is 27 feet or higher above any obstacle within 500 feet radius.
- 3 Obstructions (trees, buildings, etc.) will reduce the wind speed and therefore degrade wind turbine performance.

Two rules of thumb:

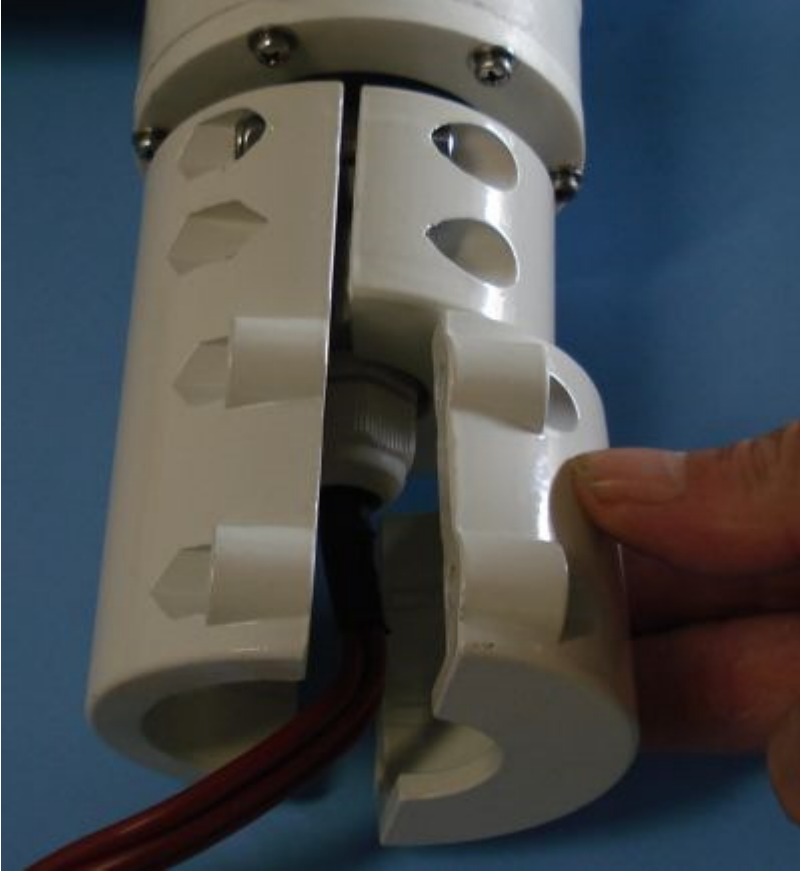
- a. A tower immediately downwind of a building should be at least twice of the height of the building.
- b. A tower should be at least 27 feet higher than any obstacle (such as treetops) within 150m (500 feet) radius.

#### 4. Pole Connectors

There are two different pole connectors available for H5, H8 and H12, bolt-on connector and weld-on connector. The bolt-on pole connector fits 2 inch SCH 40 steel pipe that is widely available in US, no welding needed for bolt-on connector. Weld-on pole connector is made of stainless steel and welding is needed to attach the flange ring to the pole.

##### 1. Bolt-on pole connector





2. Weld-on pole connector (custom order only)





## **5. Tower Recommendations (HY-400, HY-600, HY-1000 only)**

Wind turbine must be installed 27 feet or higher above any obstacle (such as treetop) within 500 feet radius. Wind turbine is extremely sensitive to wind speed. Tower that is not 27 feet above obstructions within 500 feet radius may dramatically reduce performance, taller tower is recommended and can result in better performance.

A guyed steel pipe tower is the most economical method to install a turbine.

The tower should be properly electrically grounded.

We recommend SCH40 2-inch steel pipe for guy wire tower, we have the guy wire tower kit available in our store.

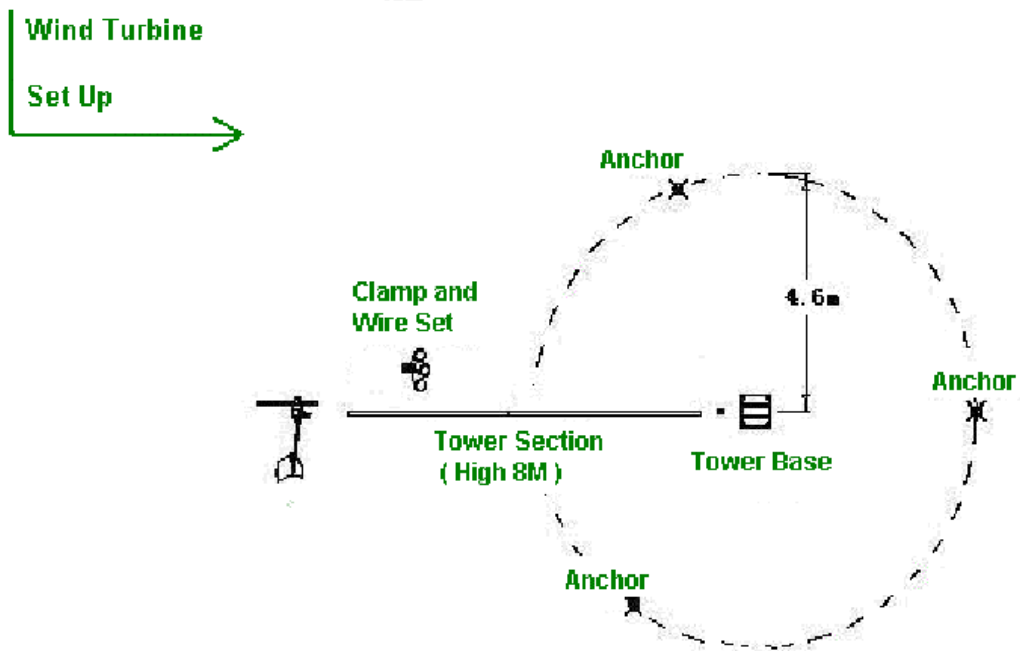
### **Suitable Foundation:**

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

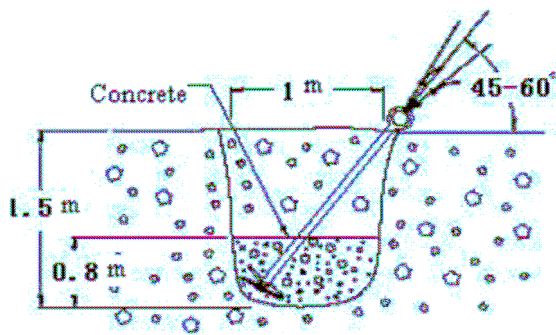
If the tower site is located on solid rock, it just needs to level off.

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.

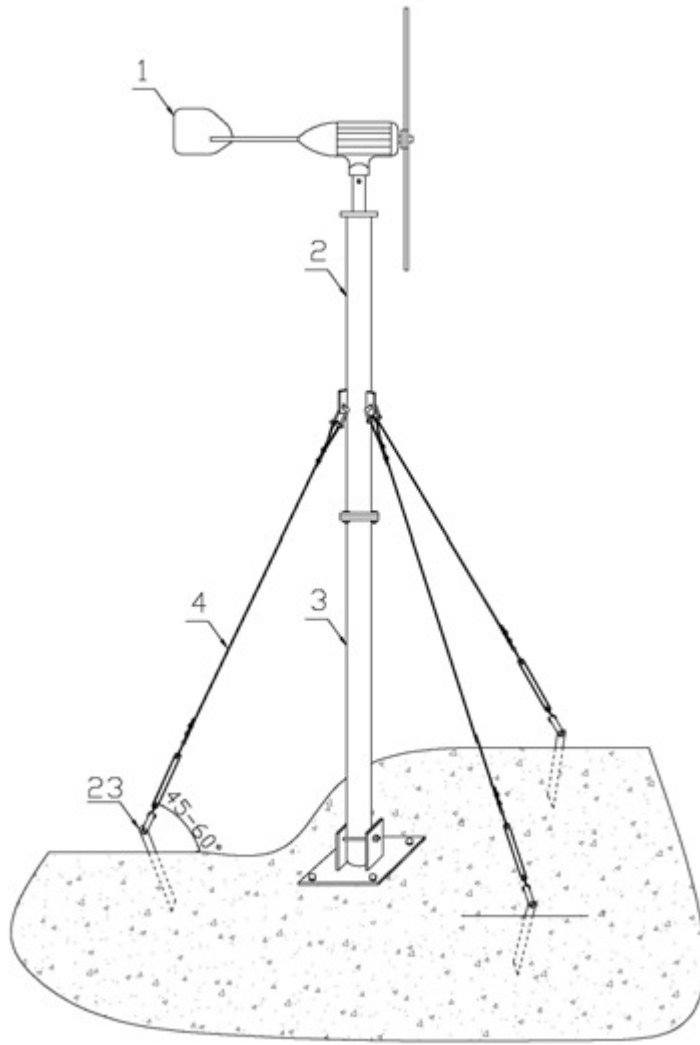
If the tower site is located on the loose sand, it needs to dig a hole 0.8m in diameter and 1.5m deep, and then bury a clay pan 60cm deep and tamp the clay pan, and cover concrete of 20cm deep on the clay pan. Once the concrete has set it should be buried before use.



Construction Specification Layout of Tower for Wind Turbine-Guyed Tower



Construction Drawing of Tower Base



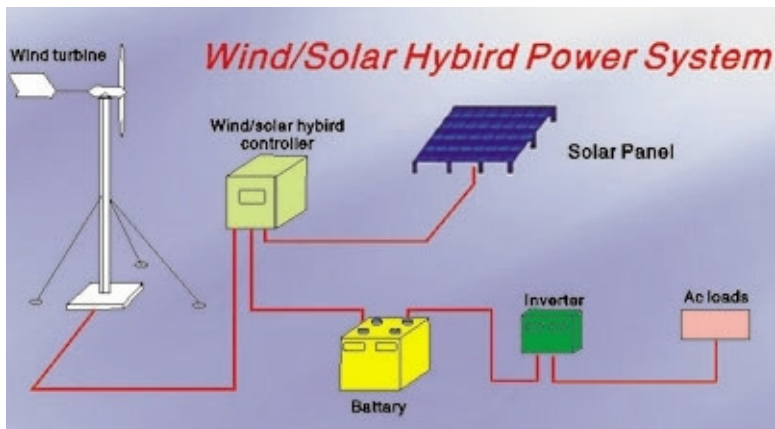
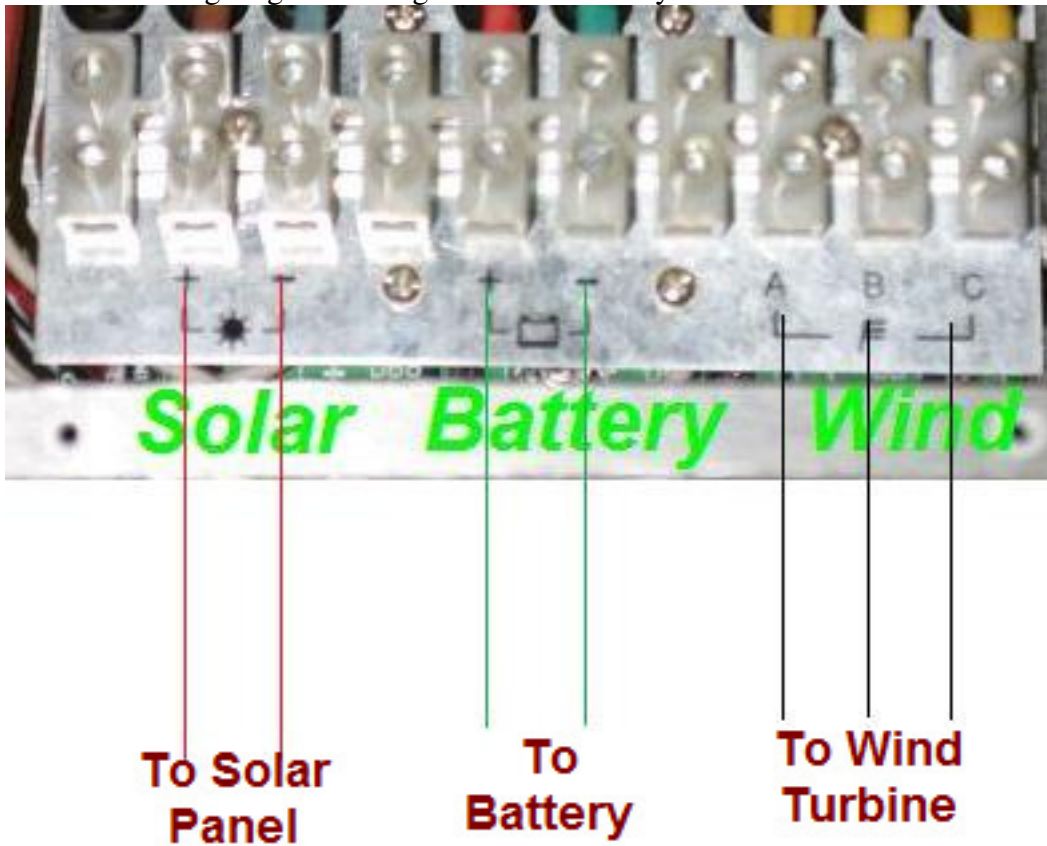
The tower base pad layout

Recommended Tower Specifications

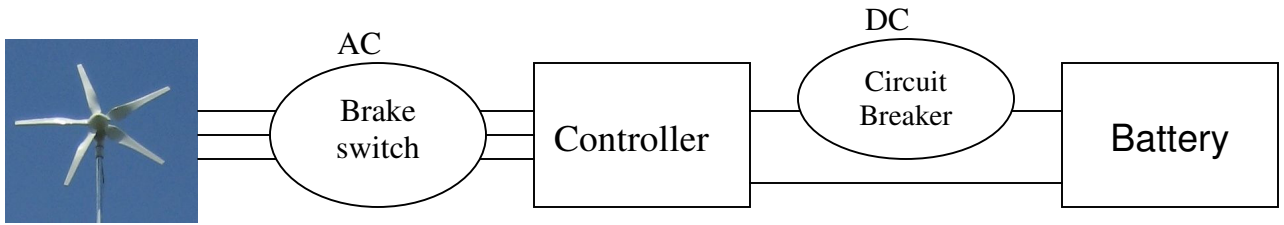
Height of Tower	Diameter HY-400	Diameter HY-600/HY-1000	Wall Thickness	Radius of Guy Wire
8 Meter (27 feet)	80 mm	100 mm	3.5 mm	4.6 M
Dimension of Tower Base	800 mm x 800mm x 200 mm			

## 6. Installation Guidelines

The basic wiring diagram of single HYENERGY system is as shown.







We recommend the following guidelines for installation; these guidelines should not be served as installation procedures, professional installation is required for all HYenergy wind turbines:

1. All wind turbines must be installed following the guidelines established by state and local regulations. Consult a local electrical contractor with wind turbine installation experiences or the local planning and zoning office for details and regulations.
2. AC Brake switch with minimum 50 amps capacity is recommended between generator 3-phase AC wires and controller in order to protect the controller and wind generator in 50 mph or higher extreme winds (HY-400, HY-600 and HY-1000 models only). Brake switch should be turned on BEFORE high winds at 50 mph or higher occur (wind generator is short-circuited by crossing out 3 AC wires using the brake switch when it is turned on). AC brake switch is for controller protection during high wind. It should not be turned on under normal wind condition.
3. Properly sized DC circuit breakers are required for controller to battery connection to minimize the risk of fire and/or wind turbine/electrical failure. If undersized circuit breaker trips, wind turbine will be in freewheeling condition with no load, wind turbine freewheeling may cause generator damage and/or controller failure, which are not covered by warranty. Breaker sizes should be a lot larger than maximum current wind turbine will produce. Here are the minimum circuit breaker sizes required by HYenergy turbines. 150 amps circuit breaker is available in our online store.

<b>Model/Voltage</b>	<b>Breaker Size</b>
HY-400/12V	150 amp/42v
HY-400/24V	100 amp/42v
HY-600/24V	100 amp/42v
HY-1000/24V	150 amp/42v
HY-1000/48V	100 amp/70v
HY-2000/48V	200 amp/70v
HY-3000/48V	200 amp/70v

4. Under no circumstances, a running wind turbine should be disconnected from load. Wind turbine should be always connected to the battery through a working

- charge controller. Wind turbine/controller could get damaged when wind turbine is running under no load (wind turbine running without load is called “freewheeling”). If controller experiences failure, you must short-circuit the wind generator immediately by crossing out 3 AC wires using a breaker switch to prevent freewheeling. We don't provide warranty for damaged wind generator due to freewheeling under any circumstances including freewheeling caused by controller failure.
5. Wind turbine must be installed 27 feet or higher above any obstacle (such as treetop) within 500 feet radius. Wind turbine is extremely sensitive to wind speed. Tower that is not 27 feet above obstructions within 500 feet radius may dramatically reduce performance, taller tower is recommended and can result in better performance.
  6. Controllers are for battery charging only. Controllers for HYenergy wind turbines can only directly connect to battery. **You should never connect controller directly to any other devices such as inverters.** Connecting controller to inverters or other devices may pose risk of fire hazard and have wind turbine/electrical failure.
  7. Controller to battery connection: Controller must be correctly connected to the battery bank **BEFORE CONNECTING WIND GENERATOR TO CONTROLLER.** Otherwise controller will be damaged because the wind generator and solar panel voltage can be very high when there is no load.
  8. Controller to wind generator and solar Connection: Before erecting the tower, connect the 3 conductor cable wire from HYENERGY wind turbine to the controller, 3 wires can be connected to wind turbine terminals (A, B and C terminals) in any order, and turn the breaker switch on the controller to the stop position. After erecting, make sure that batteries are connected tightly and correctly with the controller, and then turn the breaker switch to open position.
  9. The battery capacity is subject to client’s requirement, but a minimum 200AH/12V deep cycle AGM battery is recommended for a single HYENERGY 12V System.
  10. Correct sizing wires are important for both safety and energy efficiency. Undersized wires will cause energy loss (voltage drop) to the system, undersized wires will also create overheat condition and increase the risk of fire. The larger the wire size, the smaller the energy loss. However, larger size cables will be more costly.
  11. The wind turbine output, test data and other data provided in this document are based on the factory's testing using factory specific off-grid battery charging configuration only. Grid tie configuration with battery backup is not tested by factory and results may vary. None of HYenergy off-grid wind turbines can be

grid tied without battery. Please don't try to connect controller to inverter directly. Connecting controller to inverters may pose risk of fire hazard and have wind turbine/electrical failure.

12. For HY-3000/HY2000 grid tie with battery backup configuration, Minimum 400 AH 48V deep cycle AGM battery bank is required. Inverter must be configured properly to feed power to the grid. If inverter is configured incorrectly or battery capacity is too small, controller may brake frequently and may malfunction. Output will be limited because of wrong inverter configuration or small battery capacity.
13. Controllers are for battery charging only. Controllers for HYenergy wind turbines can only directly connect to battery. You should never connect controller directly to any other devices such as inverters. Connecting controller to inverters or other devices than battery may pose risk of fire hazard and have wind turbine/electrical failure.

The following cable sizes are recommended for the HYENERGY systems:

Wire sizes for HY-400, HY-600, HY-1000, HY-2000 and HY-3000

Wind Turbine Models	Distance from generator to controller	
	< 150 feet	150 feet to 300 feet
HY-400/12V	8 AWG	6 AWG
HY-400/24V	10 AWG	8 AWG
HY-600/26V	10 AWG	8 AWG
HY-1000/24V	8 AWG	6 AWG
HY-1000/48V	10 AWG	10 AWG
HY-2000/HY-3000/48V	4 AWG	2 AWG

## 7. Maintenance

Routine checking of system tower and cable wiring system is suggested to maintain the reliability and performance of the system.

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. Check all electrical connections to make sure they are properly connected, tightened and free from corrosion.
3. Maintain batteries according to battery manual.

## **8. Safety Precautions**

The HYENERGY wind turbine is designed with your personal safety as the first priority. However, there are still some inherent dangers involved in the electrical/mechanical equipment.

Safety should be the top priority during installation of the system.

**7.1** Choose a calm day to erect the tower.

**7.2** Undersized wires or bad connections should be avoided as they will often result in overheating and potentially cause electrical fire.

**7.3** Never approach an operating turbine during strong winds or during thunderstorms.

## **9. Working Environments**

Wind turbine working temperature range is from -15 °C to 40 °C. (Before March 2010)

Wind turbine working temperature range is from -40 °C to 40 °C. (After March 2010)

Humidity must be less than 80%.

Sea level requirement is lower than 2000 meters.

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