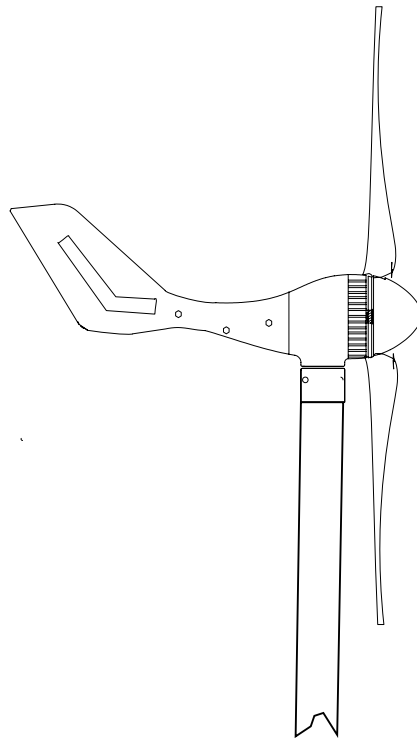




BOLIY POWER



Type: Air Boliy400

**The New 400 watt turbine!**

***Owner's Manual***

Wind Turbine Serial Number \_\_\_\_\_

**NOTICES :**

- This information is believed to be reliable ; however, ZHONGGU MOULD CO., LTD . assumes no responsibility for inaccuracies or omissions .**The user of this information and product assumes full responsibility and risk .**
- All specifications are subject to change without notice .
- Wind generators , like other sources of electrical power , 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 .
- For your convenience and protection write the serial number of your wind turbine on the front of this manual . Store your purchase invoice with this manual as well . You will need this information in the event of a warranty claim . It also helps the customer service department at SUZHOU ZHONGGU MOULD CO., LTD when you have questions about your specific turbine .

TAHNK YOU!

**CONGRATULATIONS !**

You have just purchased the most advanced battery charging wind turbine in the world !  
We believe you will find it easy to install your ; however , it is important that you read this entire manual thoroughly prior to installation to assure proper performance and safety .

If you have any questions after thoroughly reading the manual , please contact your authorized distributor /dealer or BOLIY POWER .

Enjoy .

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## 1. SAFETY PRECAUTIONS

The BOLIY 400W wind turbine has been designed with your safety in mind. However, there are inherent dangers involved with any electrical and/or mechanical equipment.

**Safety must be the primary concern as you plan the location, installation and operation of the turbine. At all times be aware of electrical, mechanical and rotor blade hazards.**

### 1.1 Mechanical Hazard

Rotating blades present the most serious mechanical hazard. The AIR X's rotor blades are made of very strong thermoplastic. At the tip, the blades may be moving at velocities over 275 miles per hour (440 km/hr). At this speed, the tip of a blade is nearly invisible and can cause serious injury. Under no circumstances should you install the turbine where a person could come in contact with moving rotor blades.

**CAUTION: DO NOT INSTALL THE TURBINE WHERE ANYONE CAN APPROACH THE PATH OF THE BLADES.**

### 1.2 Electrical Hazards

The BOLIY 400W wind turbine is equipped with sophisticated electronics designed to provide protection from overcurrent electrical dangers. The internal electronics of the BOLIY 400W wind turbine prevent open circuit voltages from rising above 20 volts for 12-volt systems or above 40 volts for 24-volt systems. Please note that the inherent personal dangers from electrical current still exist, therefore caution should always be used when connecting this and other electrical devices. Heat in wiring systems is often a result of too much current flowing through an undersized wire or through a bad connection.

Batteries can deliver a dangerous amount of current. If a short occurs in the wiring from the batteries, a fire can result. In order to avoid this threat, a properly sized fuse or circuit breaker is required in the lines connecting to the battery.

### 1.3 Installation

CAUTION: INSTALLATION PROCEDURES SHOULD BE PERFORMED AT GROUND LEVEL.

CAUTION: MAKE SURE THAT ALL BATTERIES ARE DISCONNECTED THROUGHOUT THE INSTALLATION PROCESS.

CAUTION: NEVER INSTALL THE BOLIY 400W wind generator UPSIDE DOWN.

Please follow these precautions during the installation process:

- Choose a calm day.
- THINK SAFETY! Have someone available to help during the installation process.
- Disconnect batteries from turbine wiring.
- Prior to attaching the wires to the battery, tie the wind turbine output lead wires (*positive = red; negative = black*) together near the battery to be sure that the rotor will not spin-up during installation.

NOTE: Do not install the blade assembly until the turbine is mounted on the tower.

### 1.4 Operation

Check support structures, blades, and electrical systems on a regular basis.

- The rotor blades are very strong; however, if they come in contact with a solid object, they can break. Use common sense about safety when locating the turbine.
- When performing periodic inspections, or at anytime when you must approach the path of the blades, disconnect the power leads from the battery and tie the wind turbine output leads together to stop (*slow down*) the blades from rotating. The turbine can also be shut down through the use of a stop switch.

- Please note that there is a short break-in period with new turbines. The bearings in both the turbine yaw and the turbine rotor will require approximately 60-100 hours of operation in normal wind speeds (approximately 18 – 20 mph, 8 – 9 m/s) before they are running at peak efficiency. During this break-in period, the turbine operation might appear sluggish.

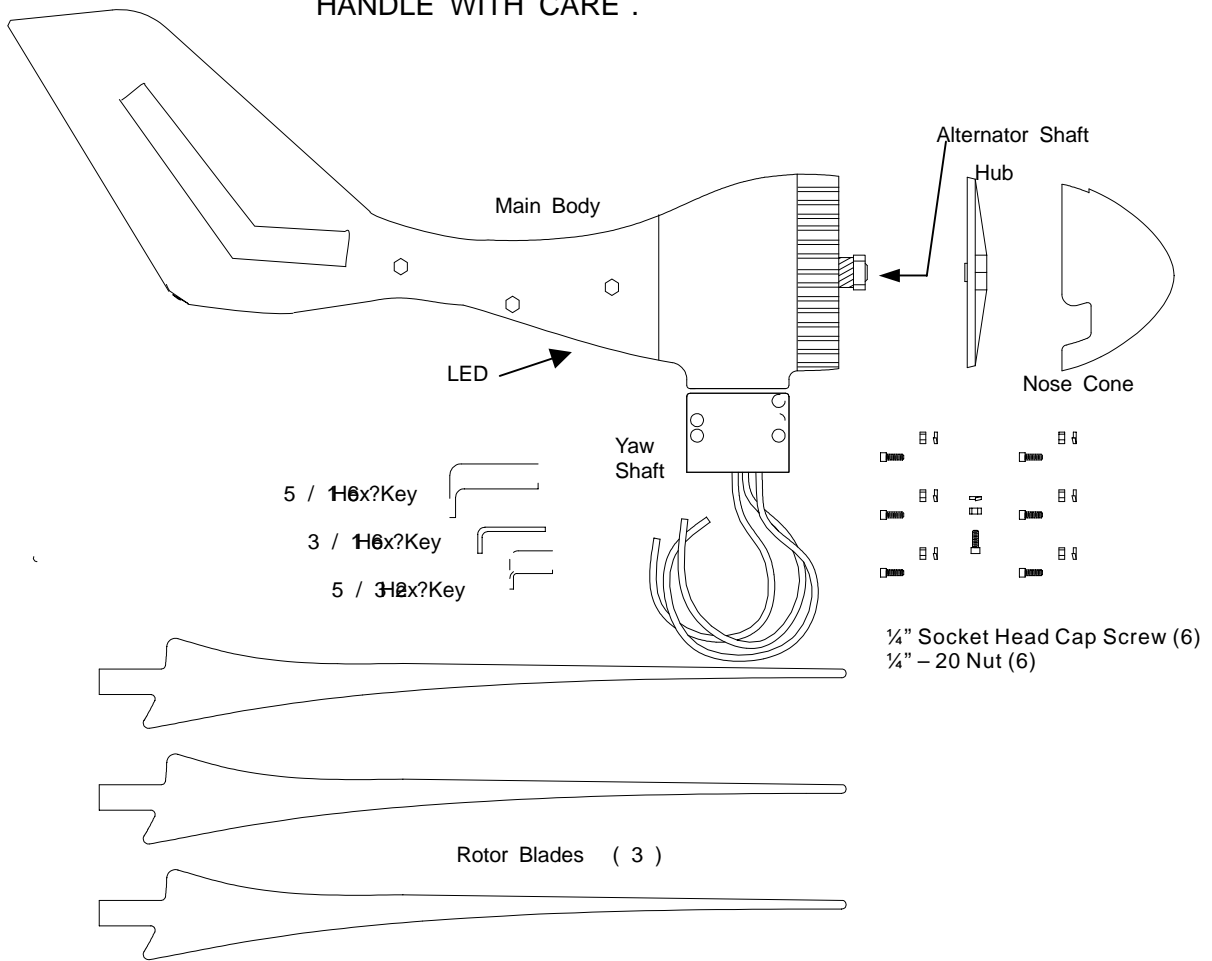
CAUTION: NEVER APPROACH THE TURBINE DURING OPERATION.

USE COMMON SENSE AND PLEASE BE CAREFUL

## 2 .PACKAGE CONTENTS

Compare the parts shown in Figure 1 to ensure that the contents of the box contain all necessary parts.

**CAUTION :** THE EDGES OF THE ROTOR BLADES ARE SHARP . PLEASE HANDLE WITH CARE .



**Figure 1**

### 3. WIRING AND INSTALLATION PROCEDURES

Your BOLIY 400W Wind generator is shipped partially disassembled. Refer to Figure 7 on page 19 for assembly

instructions. Please completely read all procedures before beginning installation.

NOTE: Do not install the blade/hub assembly until the turbine is mounted on the tower

Required Tools:

- 5/16" hex key wrench (*included*)
- 3/16" hex key wrench (*included*)
- 5/32" hex key wrench (*included*)
- Torque wrench with 5/16", 3/16", and 5/32" hex drives (optional)
- Soldering iron or propane torch
- Rosin core solder
- Electrical tape or 1/4" (6-7mm) heat shrink
- Wire strippers
- Wire crimpers

#### a) Each Turbine Wired Directly To Battery

Each turbine operates as an independent system separate from other solar panels, gas generators or any other battery charging sources. If the turbine has its own fuse, stop switch (*optional*), and wires, the turbine is able to individually communicate and charge the battery.

#### 3.1.1 System Wiring Diagrams

Before deciding how to wire your BOLIY 400W wind generator it is important to understand how your existing system is wired and how the BOLIY 400W wind generator's internal regulator operates. Refer to the General regulator.

The recommended way to connect the turbine to your battery bank is to wire the turbine directly to the battery bank to its own set of battery posts. This will allow the turbine to operate independently. The BOLIY 400W wind generator's internal regulator will independently monitor the battery and charge as necessary. You can wire the BOLIY 400W wind generator through most "power centers". However, if you experience interference or pre-regulation, you must bypass it and wire the turbine directly to the battery bank.

Some external charging sources (*i.e. solar panels, fuel-powered generators, additional wind generators etc.*) can interfere with the turbines electronics and cause pre-regulation. If there is external interference, it will not harm the turbine: it will just cause the turbine to spin slowly as if "braked" or in the stop position. If this occurs, test the possible interference by disconnecting the other charge sources to determine the possible interference source.

**NOTE: Do NOT accidentally connect the turbine "backwards" to the battery for even a second (i.e. turbine positive to battery negative and turbine negative to battery positive). Doing this will damage the circuit inside the turbine and void your warranty.**



### 3.1.2 A. Single wind generator

Choose the appropriate suggested wiring diagram below for proper wiring information .

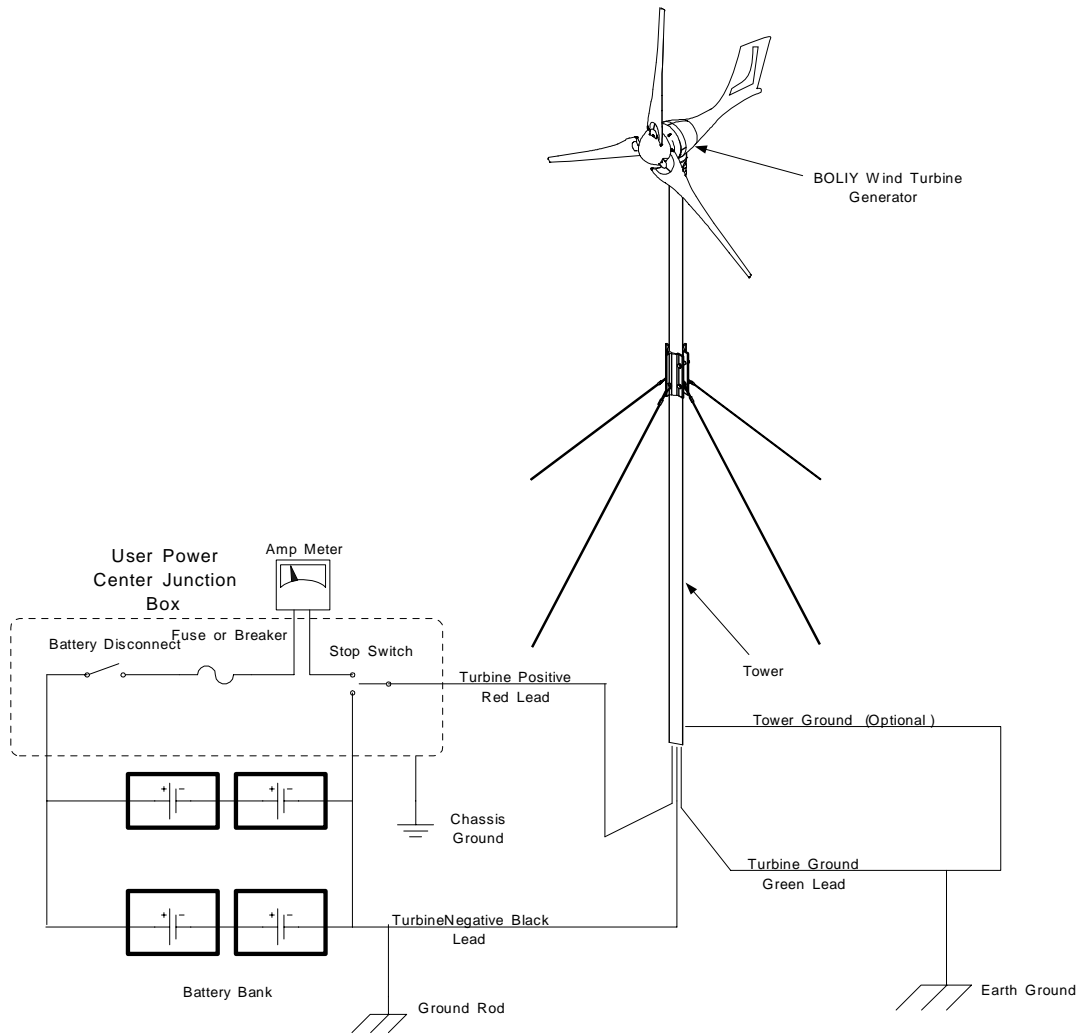
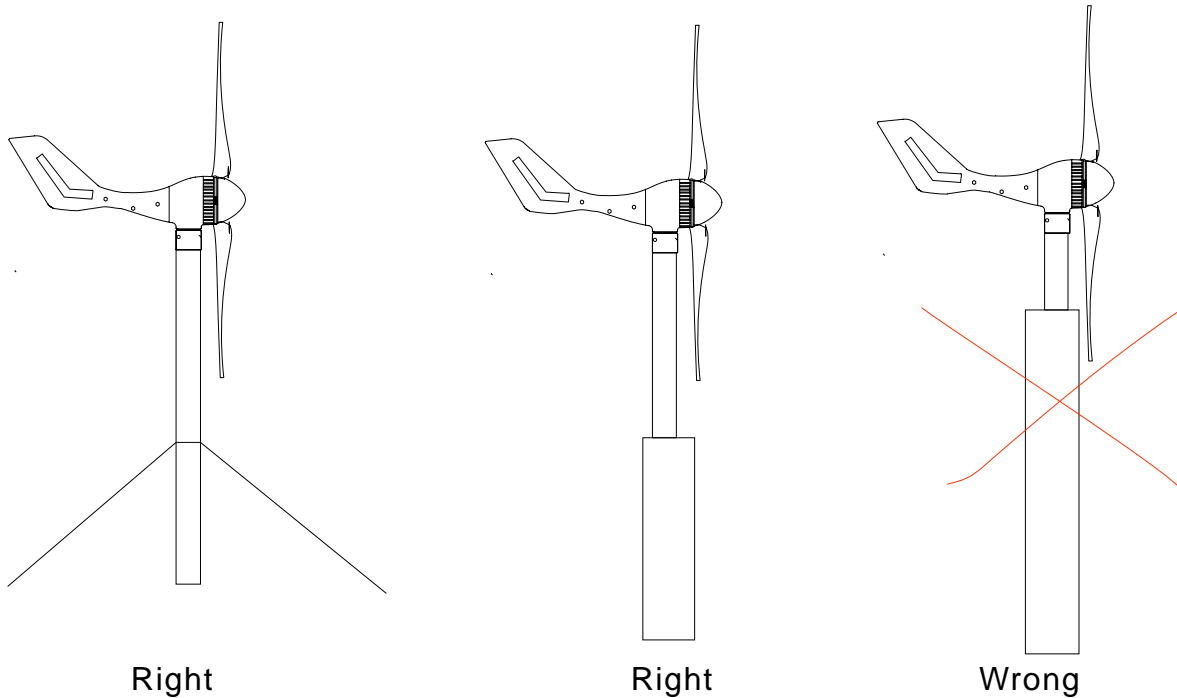


Figure 2

### 3.2.1 Attaching to Pole

While attaching the turbine to the tower, be careful not to pinch the yaw wires. Slide the yaw all the way down over the end of pole. After the yaw is seated on the pole, move it back up a 1/8th inch (2mm) to prevent the bottom of the yaw from contacting the top of the pole. This way the only contact between the tower and yaw is through the rubber pad, which will reduce noise transmission. Tighten all mounting fasteners to 3 - 5 foot lbs. (4.1-6.8 N.m.). Make sure that your tower allows for proper clearance of the blades. A minimum 2-inch (20 mm) clearance must be given between the blade tips and any obstructions.



**Figure Proper Blade to Tower Clearances**

### 3.2.2 Step-By-Step Instructions

The following Step-By-Step-Installation-Procedures provides you with an outline of the Boliy 400W wind generator

installation process. This consolidated reference should only be used as an outline during installation. Refer to the appropriate sections for further details.

1) Run the wires from the battery (do not connect to the battery), through the pole to the top of the tower. **Be sure not to connect the wires to the battery until everything else has been completed.**

2) Strip the insulation back from each set of wires.

3) Mark both ends of all the wires with tape to identify which is negative, positive and earth ground.

<b>Wire</b>	color -codes :
RED	Positive
BLACK	Negative
GREEN	Ground .

4) Connect the wires from the **BOLIY 400W wind generator** to the wires running to the battery.

5) Insulate the connections using either heat shrink tubing or a quality electrical tape.

BOLIY 400W wind generator's ELECTRONICS. (IF YOU ARE UNCERTAIN OF THE POLARITY OF THE WIRES, SIMPLY SPIN THE ROTOR SHAFT AND MEASURE THE VOLTAGE DIRECTION WITH A VOLT METER).

6) Once the wires are attached to the BOLIY 400W wind generator, gently pull the wires down through the tower sliding the yaw shaft over the 1 1/2", Schedule 40 steel pipe (Actual OD 1.875 inches, 48mm). Do not use plastic pipe.

7) Slide the yaw shaft all the way down over the end of pole being careful not to pinch the yaw wires. Be sure to leave enough slack in the wires so that if necessary, the turbine can be removed.

8) After the yaw is all the way onto the pole, move it back up 1/8th inch (2 mm) to prevent the bottom of the yaw from contacting the top of the pole. The only contact between the tower and yaw is through the rubber pad which will reduce the transmission of noise down the tower.

9) Once the yaw shaft is on the tower, firmly tighten the yaw clamp screws with the 5/32 hex key to 3 – 5 foot pounds (4.1 - 6.8 Nm). The BOLIY 400W wind generator should yaw freely without restrictions.

10) Check your BOLIY 400W wind generator to be sure that it is securely attached to the mounts. Remember that this attachment will have to hold in high winds.

11) Remove the nut on the rotor shaft, and carefully attach the assembled hub and blades to the rotor shaft without pushing the rotor shaft into the turbine.

12) Run all wires from the turbine to the battery (do not connect wires to the battery). Be sure to crimp and solder the connections using the appropriate sized connectors.

13) Attach your positive (RED) wire to a fuse.

14) Make sure that your system is properly grounded before proceeding.

**IMPORTANT: SEVERE UNIT DAMAGE MAY RESULT FROM IMPROPER GROUNDING. FAILURE TO PROPERLY GROUND THE TURBINE WILL VOID YOUR WARRANTY.**

15) Before attaching the wiring to the battery, make sure that:

- All circuit breakers are in the off position
- The stop switch is in the "stop" or shorted position (if installed)

16) Attach wires to the battery. Red wire to positive, Black wire to Negative.

17) Turn on the circuit breakers and or stop switch.

18) When the BOLIY 400W wind generator is first connected to the battery bank, the microprocessor will blink the LED twice to indicate that the control circuit is running correctly. Once the blades reach 500 RPM, the turbine will begin charging and the LED will turn on. The LED can be difficult to see during the day.

19) You have now completed the installation process.

#### 4. WARRANTY POLICY

##### What Is Covered And For How Long

For turbines that are three years old or less from date of original purchase or three years and three months from date of build, any defective part will be replaced at no charge. Either a BOLIY POWER technician or an Authorized Service Center determines a defective part.

##### What Is Not Covered

- Damage due to lightning
- Damage due to extreme winds (110 MPH+; 60 m/s)
- Damage due to improper installation (including to but not limited to poor tower design & inverted hanging)
- Damage due to improperly wiring to batteries
- Blade damage resulting from contact with flying debris

##### Limitations And Exclusions

- 1) No one has the authority to add to or vary this limited warranty, or to create any other obligation in connection to BOLIY POWER and its products.
- 2) ANY IMPLIED WARRANTY APPLICABLE TO BOLIY POWER'S PRODUCTS IS LIMITED IN DURATION TO THE SAME PERIOD OF TIME AS THIS WRITTEN WARRANTY.
- 3) BOLIY POWER SHALL NOT BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL, SPECIAL, OR CONTINGENT DAMAGES THAT ANY PERSON OR PROPERTY MIGHT SUFFER AS A RESULT OF ITS BREACH TO THIS WRITTEN AND OR IMPLIED WARRANTY.
- 4) This warranty applies to the original purchaser and may be transferred.

##### The Customer's Responsibilities

All of BOLIY POWER's products must be installed and operated in accordance to the owner's manual and local codes. Any modifications to the turbine design will void the warranty and compromise the safety of the machine.

You should keep a copy of the invoice or canceled check to verify the purchase date.

You will be responsible for shipping the turbine to the repair center if necessary.

**5. SPECIFICATIONS**

**5.1 TECHNICAL SPECIFICATIONS**

Rotor Diameter: 1.2 meters

Weight: 5.8kg

Start up wind speed: 2.4 m/s

Rated Power: 400 watts at 8.3 m/s

Controller: Microprocessor-based smart internal regulator with Peak Power Tracking

Blades: Carbon Fiber Composite

Body: Cast aluminum ( Marine type is powder coated for corrosion protection)

Warranty: 3 Year Limited Warranty

Survival Wind speed: 110 mph (49.2 m/s)

Over-speed Protection: Electronic torque control

Regulator Set Range: 12v 13.6V – 17.0V preset to 14.1v

24v 27.2V – 34.0V preset to 28.2v

Recommended Fuse Size: 12v - 50 amps slow-blow

24v - 30 amps slow-blow

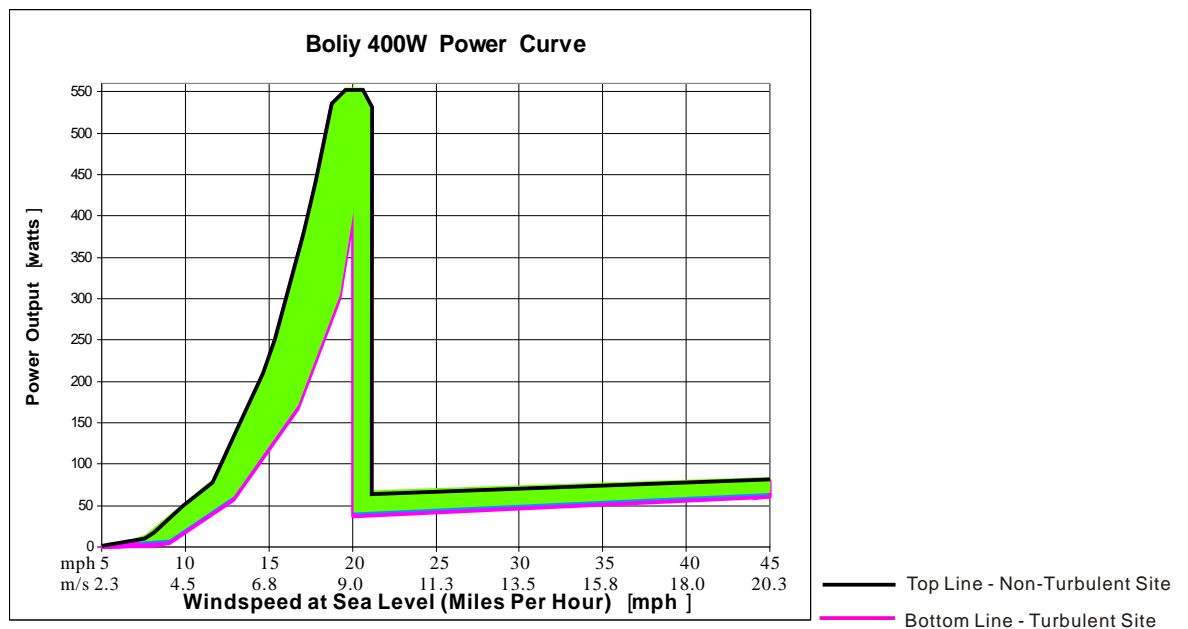
Yaw Wire Size: #10 AWG (*American Wire Gage*) stranded.

Pole Dimensions: 1½ Schedule 40 pipe (*outside diameter 1.875 inch, 48mm*)

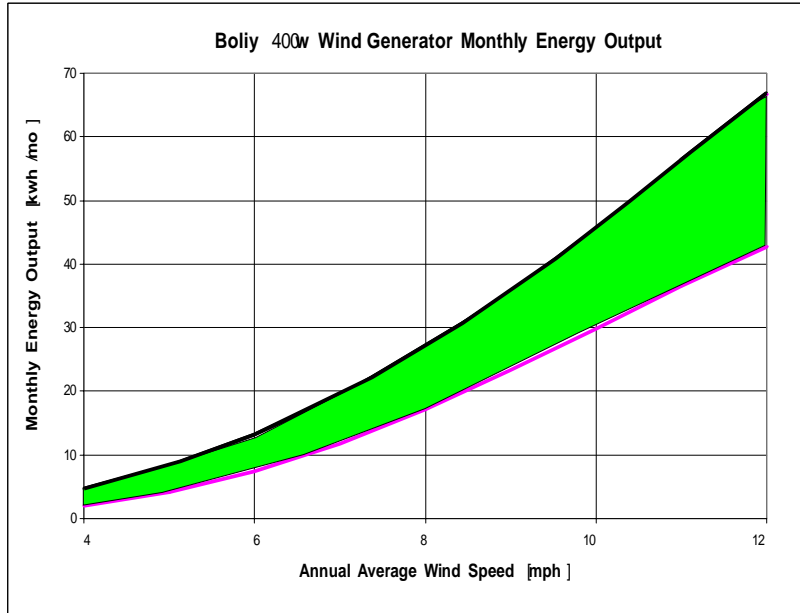
5.1.1 Performance Curve

To convert between power [watts] and current [amps] use the following formula :

$$\text{POWER} = \text{VOLTAGE} * \text{AMPS}$$



The power curve band-width shown above gives the range of monthly energy production shown below. The energy calculations were done with standard statistical wind speed distributions Rayleigh distribution,  $k = 2$  . ) .





BOLIY POWER

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