

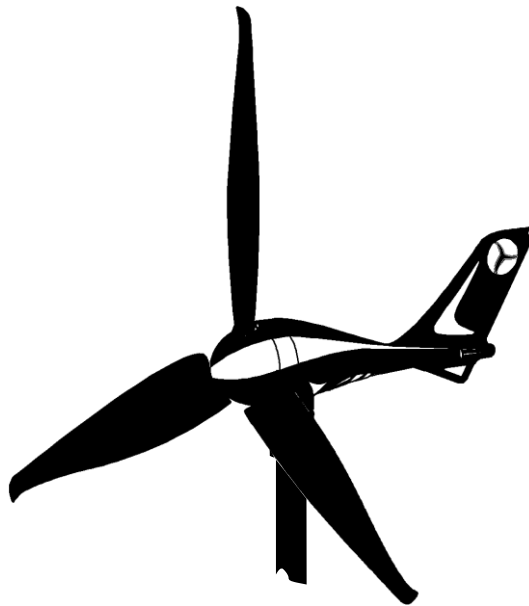


**Wind Generator**

**S-700**

Owner's Manual

Version 1.0



Serial Number: \_\_\_\_\_

## **NOTICES:**

This manual contains all necessary information for assembling, testing, operating, and maintaining this Wind Generator. Please read it carefully and retain it for future reference.

We have made every effort to ensure that the information presented in this manual is accurate but assumes no responsibility for any errors or omissions. Users of this information and products assume 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 Generator 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 our customer service department when you have questions about your Wind Generator.

Thank you.

## Important Features of S-700

### ★ UNIQUE FUNCTION IN THE WORLD!!!

★ **VOLTAGE CHANGE DIY**: Would you want to change the output voltage? It is very easy, just change the position of the 12V & 24V switch on the bottom of body and change the alternator to get the best performance. Refer to the detailed method on [www.greatwatt.com](http://www.greatwatt.com).

### ■ AERODYNAMICS & ELECTRONICS & TELEVISION

- **Smallest and Most Powerful**: With the highly efficient blades, controller and alternator, S-700 can provide the maximum output power in the world at the same size, weight and rotor diameter.
- **Whole Protection**: S-700 provide the best protection, for example, the voltage auto-brake, slow down in strong wind (Hysteresis Braking), shut down completely in cyclone, battery charge protect, and so on.
- **Over-speed Protection**: To fully “utilize” wind power, the blades will not be braked in the speed from 0m/s to 20m/s. Once the Wind Generator “sense” the wind speed higher than 20m/s, it will shut down completely and stop charging.
- **Constant Current Charge**: In the same wind speed condition, when the battery is becoming fuller and fuller, the charging current of the common wind generator will be less and less, but S-700 can always keep steady charging current, so it can fully make use of the wind energy, and, at the same time, it can also effectively protect your battery!

### ■ MATERIAL

- **CFRP Blades**: The rotor blades are made of CFRP, and manufactured by precise injection process, so S-700 has the rigidest, the best electric and the minimal vibrant blades.
- **Magnalium Frameworks**: All frameworks are made of magnalium, just as the body, the face, the hub, the yaw shaft, etc. This material is very anticorrosive and very hard.

### ■ ACCESSORIES

- **Stop Switch**: We provide a stop switch (50 amps D.C.), which can be used to “stop” the Wind Generator for service or any other reason. You will find it very useful and necessary.
- **Circuit Breaker**: We provide a “slow-blow” type circuit breaker ( D.C.), which can be used to disconnect the battery and prevent the possibility of further damage in the event of a system or Wind Generator failure.
- **Plastic Disk**: The static electricity generated from rotating blades will corrode the hub, especially used in the sea. We provide some plastic disks to protect the hub from corrosion.

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## 1. SAFETY PRECAUTIONS

Safety must be the primary concern as you plan the location, installation and operation of the Wind Generator. There are inherent dangers involved with any electrical and/or mechanical equipment.

### 1.1 MECHANICAL HAZARD

Do not approach the machine while the blades are spinning-they can cause serious injury!

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

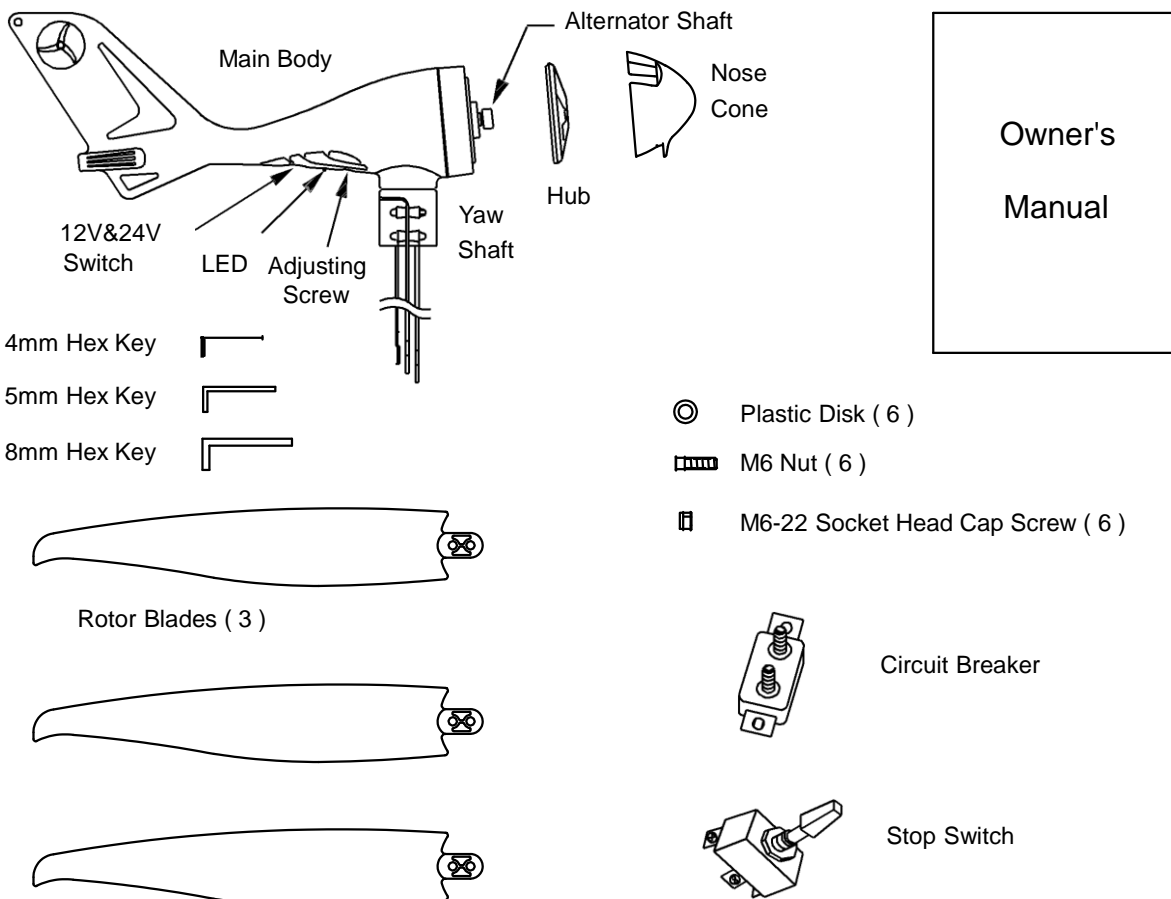
### 1.2 ELECTRICAL SHOCK HAZARD

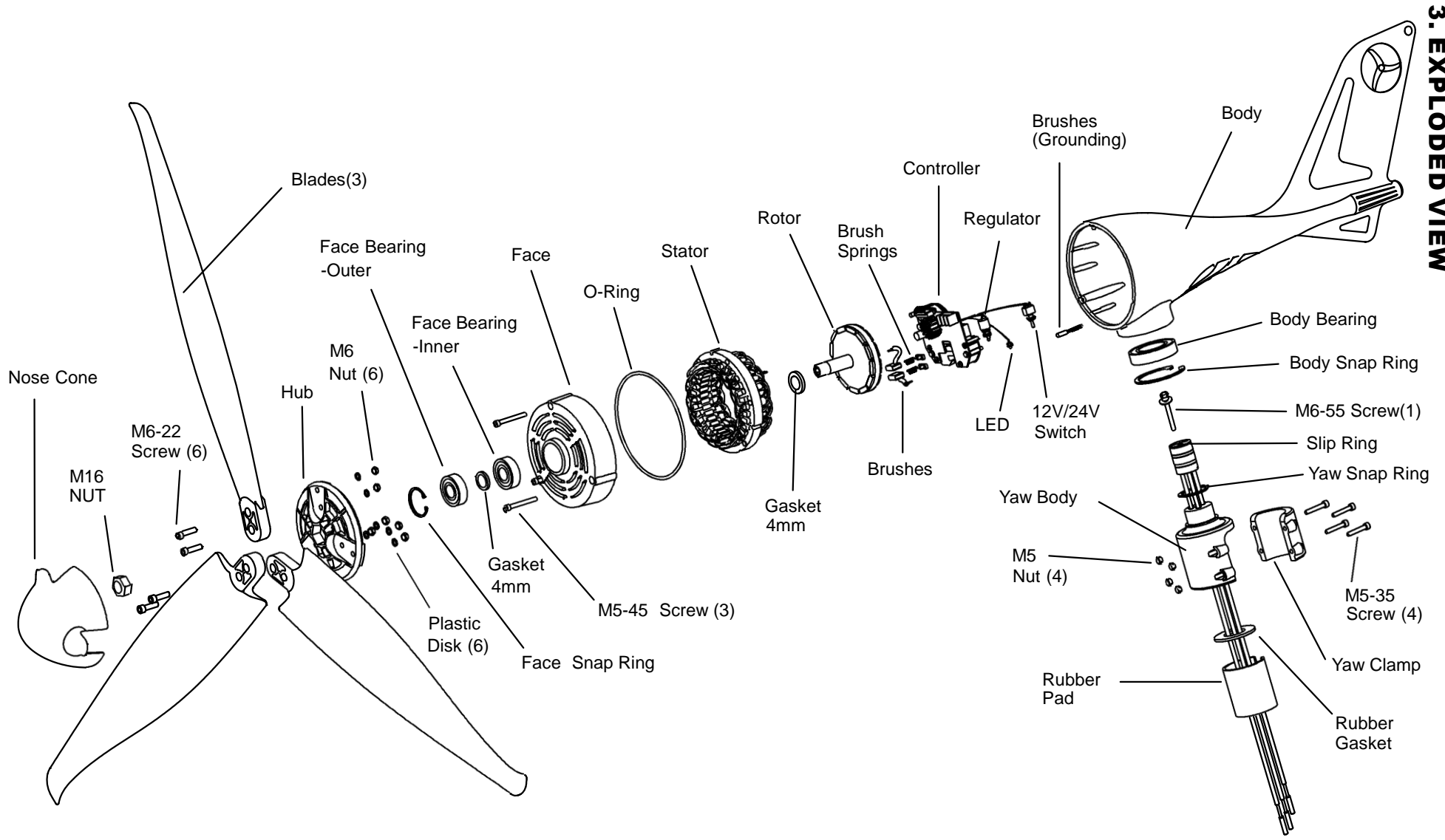
The Wind Generator can produce higher than nominal voltages when running open circuit. Keep the output wires shorted initially and carefully follow the installation instructions.

**CAUTION: FUSE ALL CONNECTIONS TO MINIMIZE THE RISK OF FIRE AND/OR AN ELECTRICAL FAILURE.**

## 2. PACKAGE CONTENTS

Compare the parts shown in the following figure to ensure that the contents of the box contain all necessary parts.



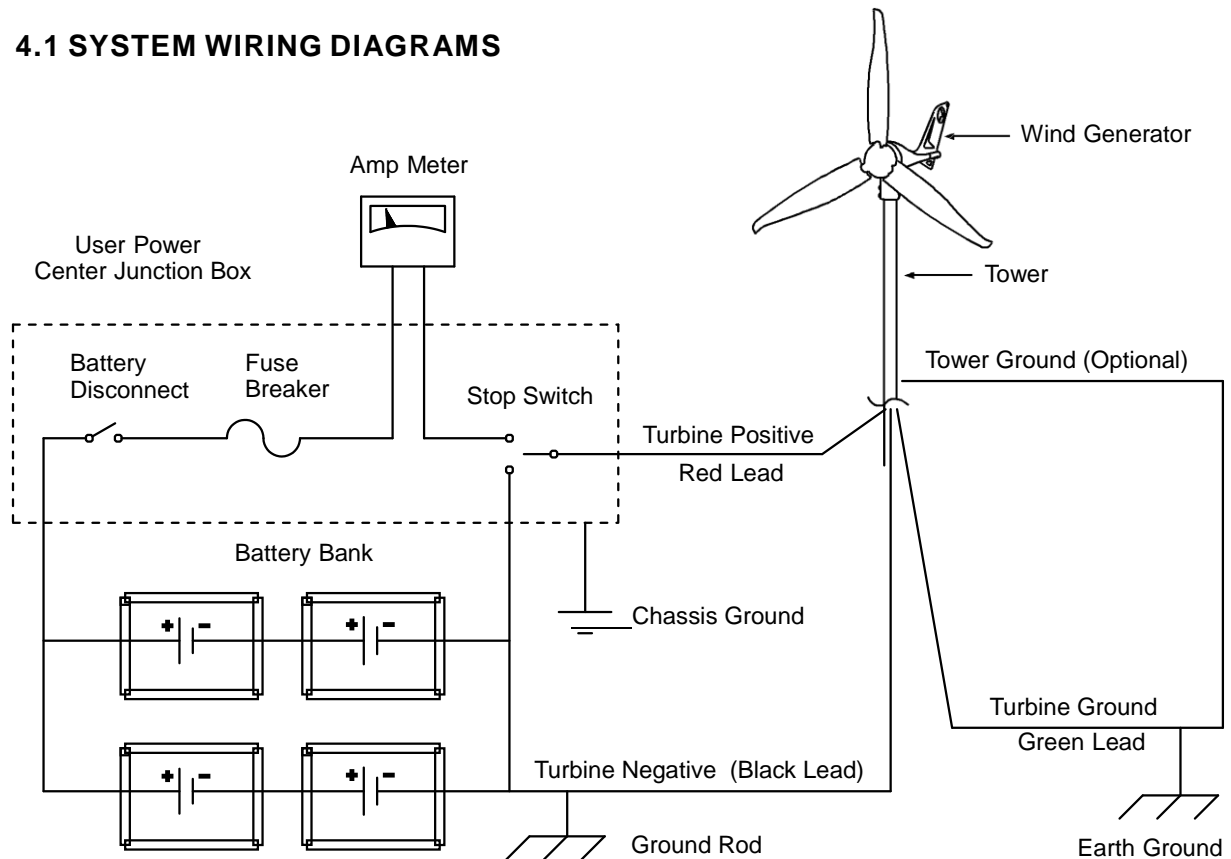


**3. EXPLODED VIEW**



## 4. ELECTRICAL SYSTEM

### 4.1 SYSTEM WIRING DIAGRAMS



Higher input voltages from additional Wind Generators, solar panels, fuel-powered generators etc., can trick the Wind Generator's controller into sensing the battery in full charge, and the controller will prematurely stop charging. It will not harm the Wind Generator, just cause to slow down or stop spin. Please disconnect the other charging sources to determine the possible interference source.

You can wire the Wind Generator through most "power centers". However, if you experience interference, you must bypass it and wire the Wind Generator directly to the battery bank to its own set of battery posts. Allow the Wind Generator to operate independently, monitor the battery and charge is necessary.

**CAUTION: DO NOT CONNECT WIND GENERATOR POSITIVE TO BATTERY NEGATIVE AND WIND GENERATOR NEGATIVE TO BATTERY POSITIVE FOR EVEN A SECOND, OR ELSE WILL DAMAGE THE WIND GENERATOR'S CONTROLLER AND VOID YOUR WARRANTY. (IF YOU ARE UNCERTAIN OF THE POLARITY OF THE WIRES, SIMPLY SPIN THE ROTOR SHAFT AND MEASURE THE VOLTAGE DIRECTION WITH A VOLT METER).**

**NOTE: One bad battery can create high voltages (16-18 volts) and stop the Wind Generator from charging, check the condition of each individual battery. Consult the battery manufacturer for testing individual batteries or cells.**

**NOTE: You may use an external regulator which should be "diversion load" types, be sure that the adjusting screw on the Wind Generator turned all the way clockwise.**

#### 4.2 OVER-SPEED PROTECTION

Once the Wind Generator “sense” the wind speed higher than 20m/s, it will shut down completely and stop charging.

#### 4.3 CIRCUIT BREAKER

We provide a “slow-blow” type circuit breaker (Fuse), which can be used to disconnect the battery and prevents the possibility of further damage in the event of a system or Wind Generator failure, it should be placed between the stop switch and the batteries.

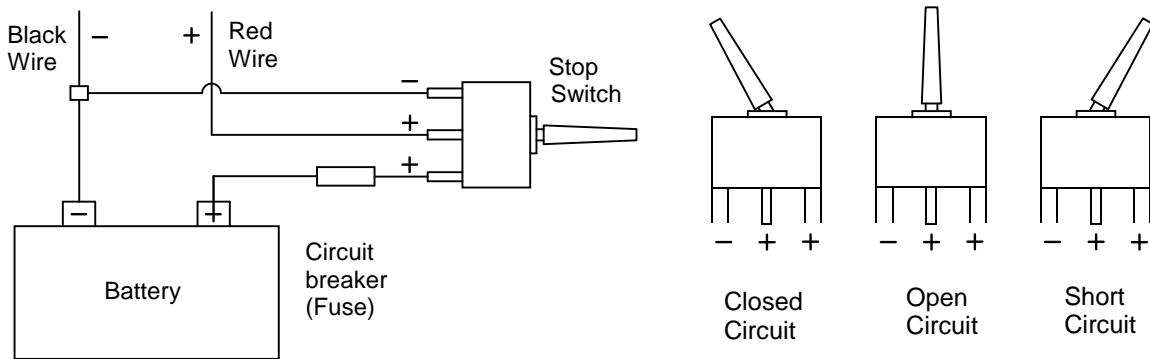
##### Recommended Size for Slow-Blow Circuit Breakers

12-volt system: 25-30 amps D.C.                      24-volt system: 15-20 amps D.C.

**NOTE:** Connect the Circuit Breaker we provide without distinguishing the positive electrode and the negative electrode.

#### 4.4 STOP SWITCH

We provide a stop switch (50 amps D.C.), which can be used to “stop” the Wind Generator for service or any other reason. The switch disconnects the battery and then shorts the Wind Generator wires causing the blades to stop spinning (in high winds the blades will spin slowly).



**CAUTION: OPEN CIRCUIT CAN CAUSE EXCESSIVE WEAR TO WINDGENERATOR.**

#### 4.5 GROUNDING

For long-term operation and protecting the electronics, properly grounding is very important. Grounding procedures must be followed along with any local electrical codes.

The green lead wire must be connected to the system earth ground. This is usually done by connecting the green lead wire to a ground rod near the base of the tower. For additional lightning and static protection, another wire should connect this ground rod to the tower pipe.

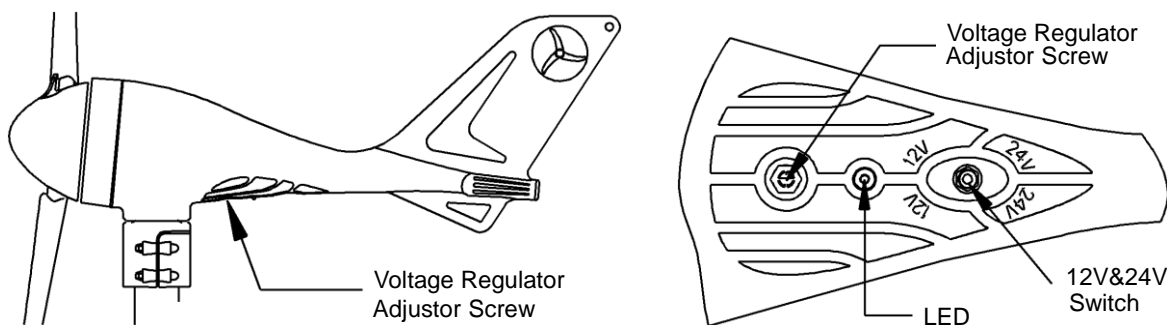
The negative wire of your system should also be connected to a ground. This is usually done by connecting a wire from the negative battery terminal to a nearby ground rod. Wires with the same ratings as the positive and negative wires must connect all system grounds.

A ground electrode can be made for systems without an existing system ground from an 8 ft. (2.4 m) section of 3/4" (19 mm) galvanized pipe or conduit, or an 8 ft. (2.4 m) section of 5/8" (16 mm) iron or steel rod. This ground electrode must be buried completely beneath the soil, at no more than 45 degrees from vertical, or horizontally at least 2 1/2 ft. (75 cm) beneath the surface. It is recommended that the ground electrode be installed as close as possible to the batteries for maximum lightning protection. The base of the tower is also a good location for an appropriate surge arrester.

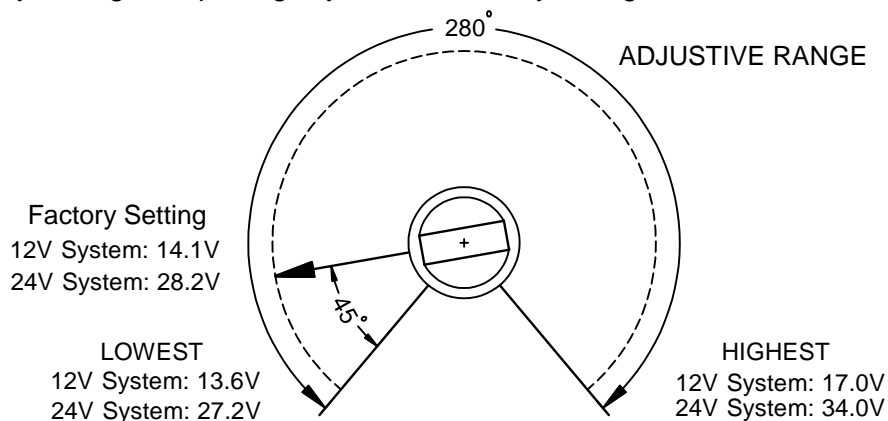
**CAUTION: IMPROPER GROUNDING WILL DAMAGE YOUR WIND GENERATOR AND VOID YOUR WARRANTY.**



#### 4.6 VOLTAGE REGULATOR



You can set the Wind Generator's stop charging point by the voltage regulator shown above. The Wind Generator continually momentarily stop charging and monitors the battery voltage and compares it to the voltage regulator's set point. When the battery voltage reaches the regulator's set point voltage, the Wind Generator will shut down and stop charging, it will wait for the battery voltage to drop and continually monitors the battery voltage, the LED will always fast blink. Normal charging will resume when the battery voltage drops slightly below the fully charged level.



From the factory setting, rotate the adjusting screw 40 degree for each 0.48 (0.97) volt change desired. For example, if you want to set your voltage regulator to 14.6 (29.2) volts, turn the adjusting screw clockwise by 40 degree.

Voltage System	Stop Charging Point (Factory Setting)	Stop Charging Point Adjustable Range	Resume Charging Point (Factory Setting)
12V	14.1V	13.6V to 17.0V	12.6V
24V	28.2V	27.2V to 34.0V	25.2V

**NOTE: The 12V system recharging point is about 1.5 volts less than the stop charging point (24Vsystem: 3 volts).**

The adjusting screw will provide regulation settings for voltage ranges at least as wide as those shown above. The actual voltage set point at the extreme counter-clockwise position may be as much as 10% lower than the value listed, and at the extreme clockwise position may be up to 10% higher than the value listed.

**NOTE: Turning "up" the stop charging set point will not increase the Wind Generator's output voltage, amperage and power output.**

**CAUTION: TURNING THE ADJUSTING SCREW COMPLETELY CLOCKWISE WILL OVERCHARGING YOUR BATTERIES.**

**CAUTION: BAD BATTERIES, INLINE DIODES, UNDERSIZED WIRES AND BAD CONNECTIONS WILL CAUSE THE WIND GENERATOR TO GET A WRONG READING OF THE BATTERY VOLTAGE AND WILL NOT WORK PROPERLY.**

SYSTEM CONDITIONS					
12V Wind Generator connected to the 24V batteries			The LED will always lighten and the blades will rotate very difficult.		
24V Wind Generator connected to the 12V batteries					
OPERATE CONDITIONS	WIND SPEED (m/s)	BATTERIES VOLTAGE	CHARGE	LED	DETAIL
CLOSED CIRCUIT	0-3	Any	No	Off	Blades no spin.
	3-12	<14.1V	Yes	On	Normal charge.
		=14.1V	No	Fast Blink	Shut down completely and wait for the battery voltage to drop.
		=12.6V	Yes	On	Normal charging operation will resume.
	12-20	<14.1V	Yes	On or Blink Regularly	Normal charge. When controller and alternator are overheat, LED blink twice quickly--off--blink twice quickly, to be a loop, and wind generator shut down completely for 3 minutes and then resume.
		=14.1V	No	Fast Blink	Shut down completely and wait for the battery voltage to drop.
		=12.6V	Yes	On	Normal charging operation will resume.
	>20	Any	No	Slow Blink	Shut down completely for 5 minutes and then resume.
OPEN CIRCUIT	0-3	Any	No	Off	Blades no spin.
	>3			Blink Irregularly	Oscillating.
SHORT CIRCUIT	0-4	Any	No	Off	Blades no spin.
	>4				Shut down completely, but the blades still spin slowly.

**NORMAL OPERATION:** Wind generator connect to the batteries.

**OPEN CIRCUIT:** Wind generator disconnected from the batteries.

**SHORT CIRCUIT:** Wind generator negative and positive wires directly shorting or switch the Stop Switch.

"=12.6V": That means normal charging operation will resume when the battery voltage drops slightly below the fully charged level.

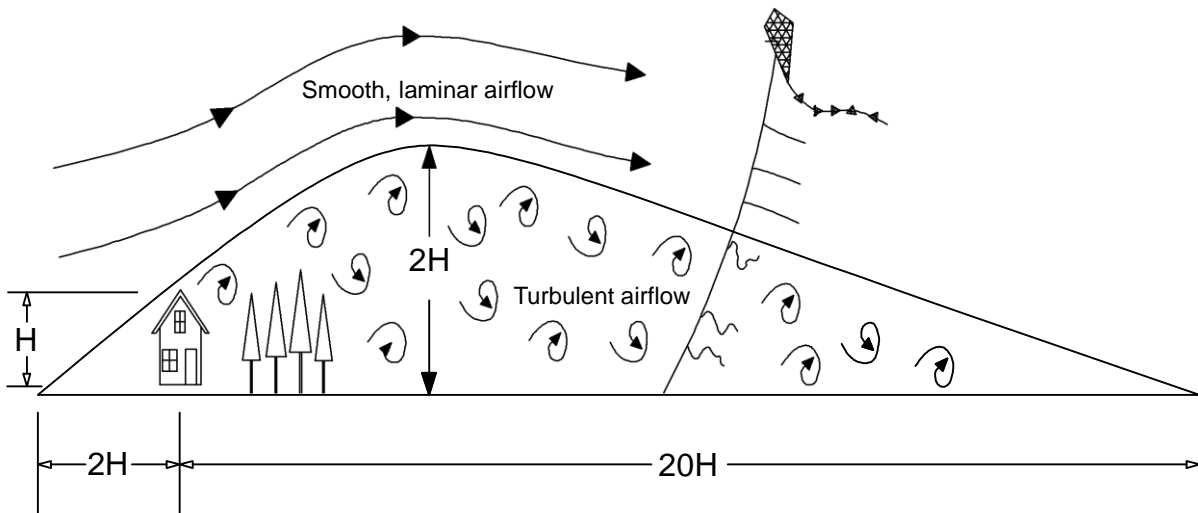
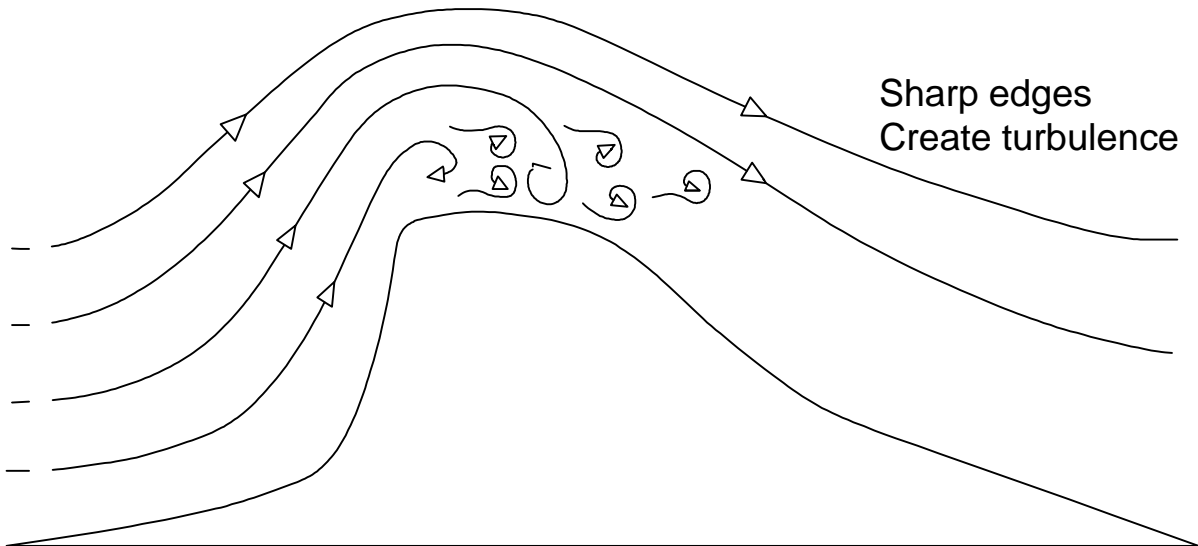
**"Shut down completely":** Wind generator stop charging and no power is generated, the blades will be braked by 100% brake horsepower.

In very high winds speed, the blades will spin slowly even the blades be braked by 100% brake horsepower.

**"Oscillating":** To protect the controller from high voltage conditions, the blades will be continually repeatedly the "rotate-brake-rotate" operation which look like "Oscillating". Operating in open circuit for a long period of time can cause excessive wear to the bearing and is NOT recommended.

## 5. SITING

To ensure good performance from the Wind Generator, it is important that care is taken in the site of the machine. Buildings, trees and rocky outcrops etc. disrupt the smooth flow of wind creating a “Wind Shear” with the wind velocity nearer the ground being slower than that higher up. Turbulence is also created by these obstructions. Turbulence is detrimental as the swirling air causes the Wind Generator to yaw continually thus stressing the mechanical parts and greatly increasing wear and tear.



Turbulent airflow created by obstructions (Ad. P. Gipe, 93)

Therefore, as a general rule the Wind Generator should be mounted twice as high as any such obstructions. The power obtained from the wind is proportional the cube of the wind speed, and the wind speed increases with height from the ground. A 26% increase in wind speed from a higher tower will yield a 100% increase in power from the Wind Generator. A little more money spent on a higher tower will harvest the same power as 2 machines! Preference should be given to the prevailing wind direction, but it should be noted that all features behind the Wind Generator can also slow down the wind flow through the Wind Generator.

The Wind Generator should be mounted on a tower a minimum of 25' (8 meters) above any surrounding objects within a 500' (150m) radius. If this is not possible, then place it as high as you can. If this is a roof top installation, it is important there are no objects around the structure that may block the wind.

## 6. TOWER

Great care should be taken in the selection and preparation of the Wind Generator's tower, as this is the most difficult and crucial aspect of the entire installation. If you select a tower from another source or build your own, you are responsible for assuring the tower is suitable. As with all towers, you must first evaluate your site to determine the appropriate tower height, available space and reasonable cost.

**The following list considerations must be consulted:**

- Number of Wind Generators
- Budget
- Type: guyed, freestanding or rooftop
- Site: hills, trees, buildings
- Ease of use

**NOTE: Guyed and freestanding towers are the most common way to install a Wind Generator. These towers are available in all shapes, sizes and costs.**

**CAUTION: DO NOT INSTALL THE WIND GENERATOR WHERE THE PATH OF THE BLADES CAN BE REACHED DURING NORMAL OPERATION! NEVER APPROACH THE WIND GENERATOR DURING OPERATION!**

Usually, the higher tower is erected, the greater the output, but also the greater cost and effort of the installation. If purchasing a taller tower will provide significantly more power it might offset the additional cost and effort. It's very important to mount the Wind Generator in the best winds while being balanced by the cost and effort of the installation.

The S-700 is designed to use steel pipe 1.875 inch (48mm) outside diameter, equivalent to 1 ½ inch SCH 40 pipe, which can be used in some tower applications. If larger pipe is used for your tower, make sure that the 1.875 inch pipe is at least 22 inch long or will damage the blades. **Refer to SPHERE OF OPERATION (Minimum Safe Pole Length Above Obstructions).**

**CAUTION: SAFETY, ENGINEERING AND LOCAL CODES MUST BE ADDRESSED BEFORE ATTEMPTING ANY INSTALLATION.**

**NOTE: The yaw wires can support loads up to a total of 155 lbs. (70kg). If the wire weight is higher, you must install a strain relief to minimize the stress put on the hanging wires.**

**NOTE: Towers must be capable of withstanding 155 lb. (70kg) of load in the horizontal direction at the Wind Generator.**

For more information about some very economical tower kits for the Wind Generator, please refer or purchase them from your dealer/distributor.

## **7. INSTALLATION INSTRUCTIONS**

### **7.1 REQUIRED TOOLS**

Circuit Breaker (included)  
Stop Switch (included)  
Plastic Disk (included)  
4mm hex key wrench (included)  
5mm hex key wrench (included)  
8mm hex key wrench (included)

Power cables (not included):  
6 sq mm (Europe Wire Gage) stranded or #10 AWG (American Wire Gage) stranded.

Batteries (not included)  
Steel Pipe: 1 1/2", Schedule 40 steel pipe (Actual OD 1.875 inches, 48mm) (not included)  
Torque wrench with 4mm, 5mm, and 8mm hex drives (not included)  
Soldering iron or propane torch (not included)  
Rosin core solder (not included)  
Electrical tape or 1/4" (6-7mm) heat shrink (not included)  
Wire strippers (not included)  
Wire crimpers (not included)

### **7.2 PRECHECK**

Follow these processes shown below to verify if your Wind Generator is working correctly.

Spin rotor shaft slowly with your fingers provided while at the same time connecting and disconnecting the Wind Generator's positive and negative wires. With the wires connected, the rotor shaft should become more difficult to rotate. With the wires disconnected, it should spin freely.

Every time connect the Wind Generator's wires (RED= Positive, BLACK = Negative) directly to the set of posts of the battery, the LED will slow blink four times to indicate that the controller is running properly.

If these conditions shown above do not exist, please contact your dealer or Greatwatt Power.

### 7.3 INSTALLATION OPERATION

Choose a calm day and have someone available to help during the installation process.

**NOTE: THE BLADE EDGES ARE SHARP. PLEASE HANDLE IT CAREFULLY.**

**NOTE: DO NOT install the blade assembly until the body is mounted on the tower.**

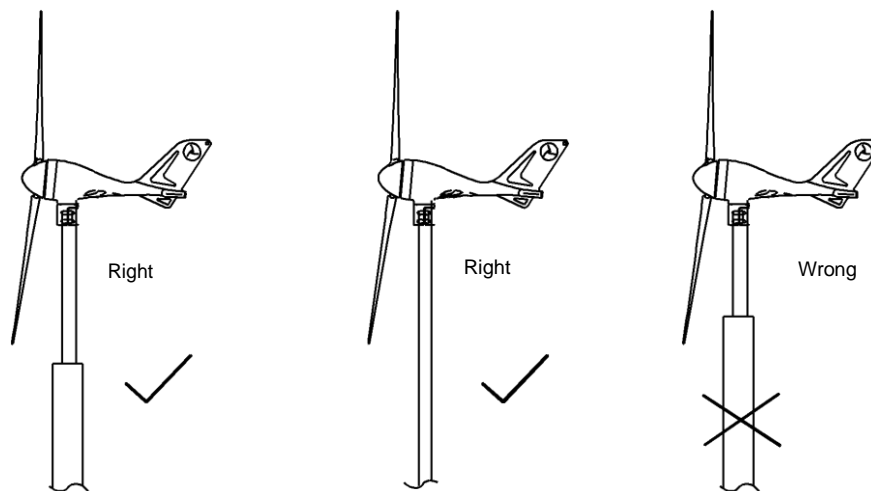
**CAUTION: ALL BATTERIES MUST DISCONNECTED THROUGHOUT THE INSTALLATION PROCESS!**

**CAUTION: DO NOT INSTALL THE WIND GENERATOR WHERE THE PATH OF THE BLADES CAN BE REACHED DURING NORMAL OPERATION! NEVER APPROACH THE WIND GENERATOR DURING OPERATION!**

**USE COMMON SENSE AND PLEASE BE CAREFUL**

**Please follow these steps to install your Wind Generator:**

1/ We recommend that mounted your Wind Generator on 1 1/2", Schedule 40 steel pipe (Actual OD 1.875 inches, 48mm). Larger pipes will reduce the blade tip clearance and may cause damage to the blades. If you want to use larger pipe, refer to the figure show below.

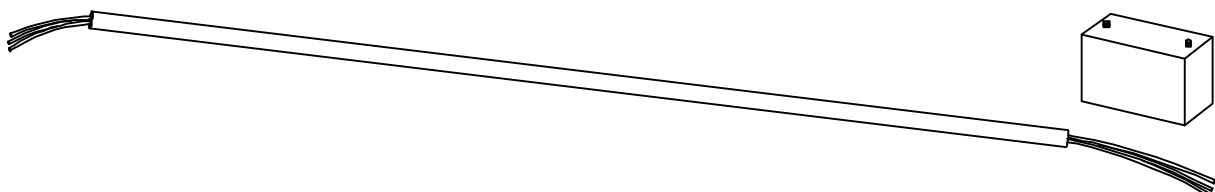


**NOTE: No more than 8 feet (2.5m) of pipe should extend from the upper most support.**

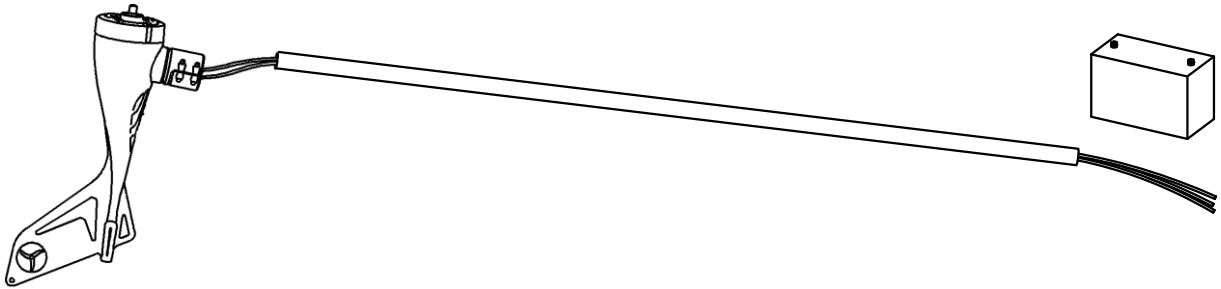
**CAUTION: DO NOT USE PLASTIC PIPE. USE ONLY METAL PIPE FOR TOWER.**

2/ Check the 12V & 24V Switch to see if it is in the right place. Ensure the voltage systems of the wind generator and the battery bank are the same. Prepare the appropriate wire, Circuit Breaker, Amp meter, etc.

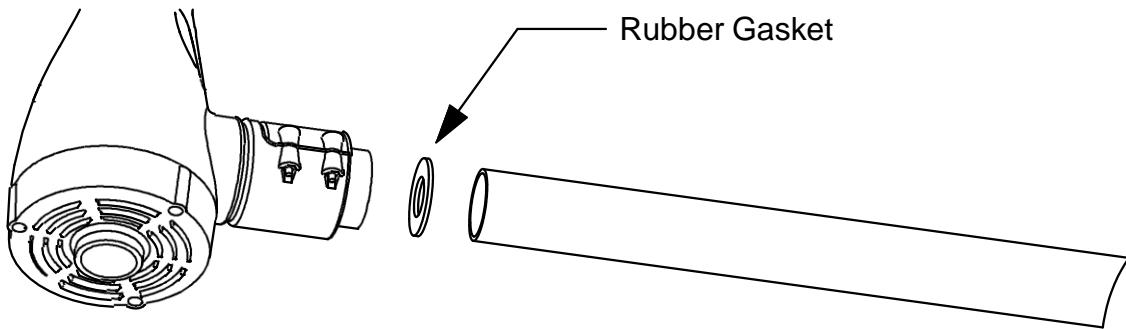
3/ Run the wire through the pipe and drag the wires near to the batteries (**Do not connect to the battery**), strip the insulation back from each set of wires.



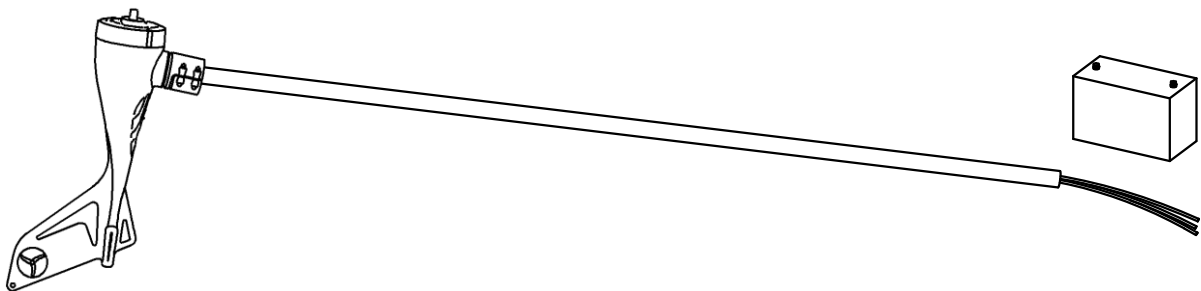
**4/** Connect the Wind Generator to the wires and insulate the connections using either heat shrink tubing or a quality electrical tape.



**5/** We provide a rubber gasket 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. Once the yaw shaft is on the tower, firmly tighten the yaw clamp screws with the 4mm hex key to 3-5 foot pounds (4.0-6.5Nm). Be sure that it is securely attached to the mounts.



**6/** 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 Wind Generator can be removed.



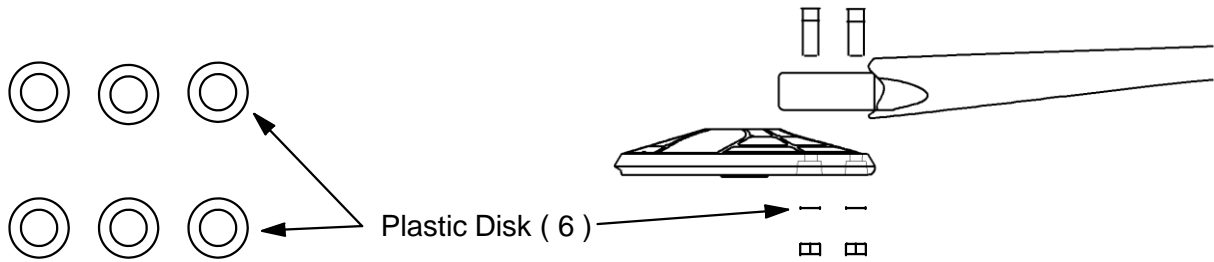
**7/** Mark both ends of all the wires with tape to identify which is negative, positive and ground.

Wire Color- Codes:
RED = Positive
BLACK = Negative
GREEN = Earth Ground

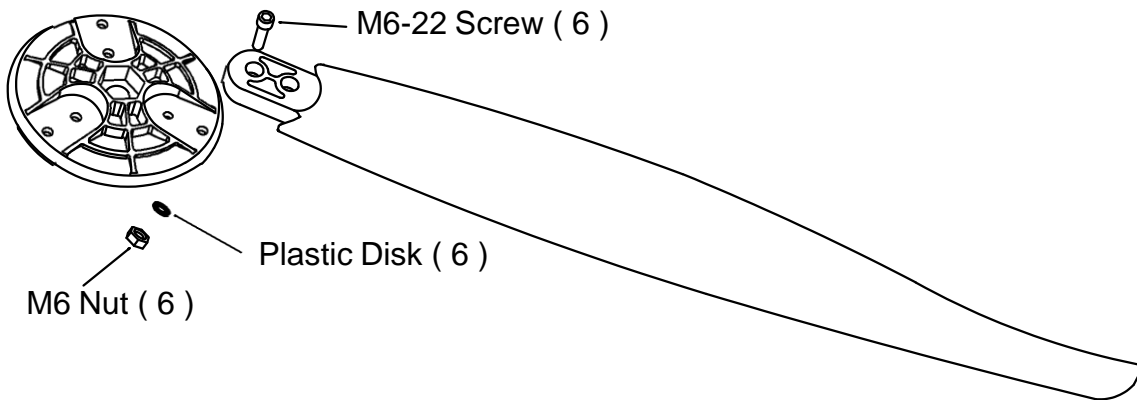
**NOTE:** If you are uncertain of the wires polarity, simply spin the rotor shaft and measure the voltage direction with a volt meter.

**8/** We provide 6 pieces of plastic disk to dramatically reduce the occurrence of corrosion between the blades and hub due to electrolysis.

**Note: The corrosion will be more obvious in th sea.**

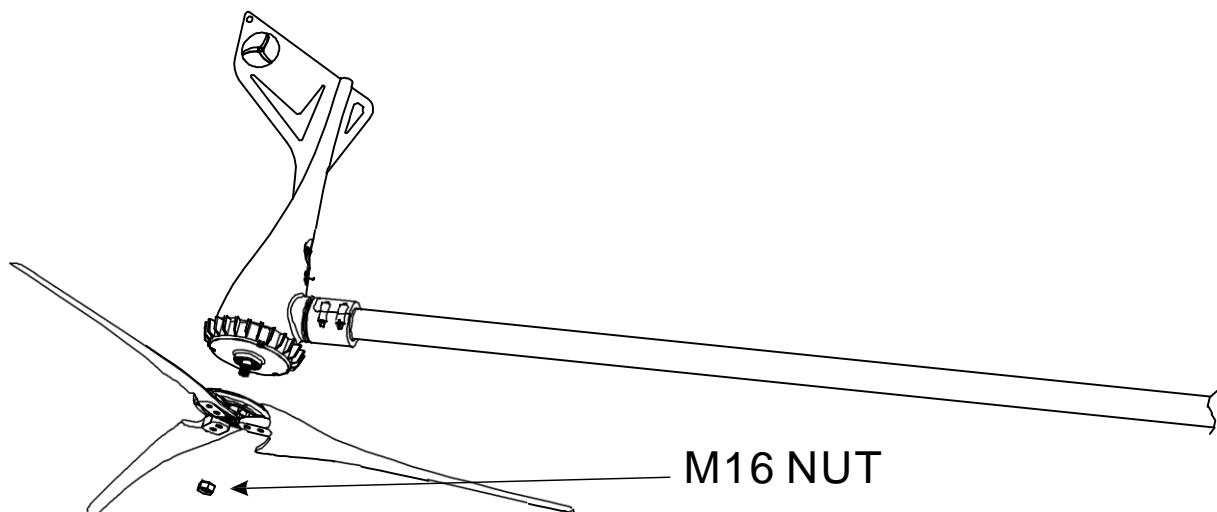


**9/** Place one of the blades on the hub socket and insert one of the M6-20 socket head cap screws. Place a plastic disk on the end of the screw, then place a self-locking nut (M6) and tighten it with the 5mm hex key to 8-10 foot lbs. (10.5-13.5 N.m). Repeat this procedure on all three blades.



**CAUTION: OVER-TORQUE WILL DAMAGE THE BLADES AND WIND GENERATOR.**

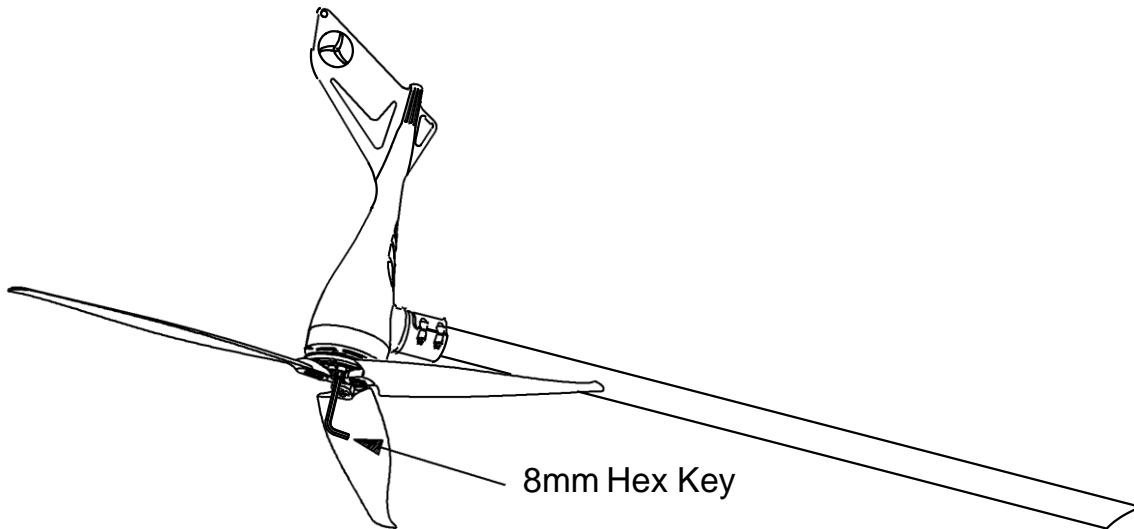
**10/** Remove the M16 nut from the rotor shaft. Slide the blades assembly onto the rotor shaft and place the nut on the shaft. **DO NOT** press the rotor shaft into the body.



**CAUTION: PUSHING ROTOR SHAFT INTO THE BODY WILL DAMAGE THE CONTROLLER.**

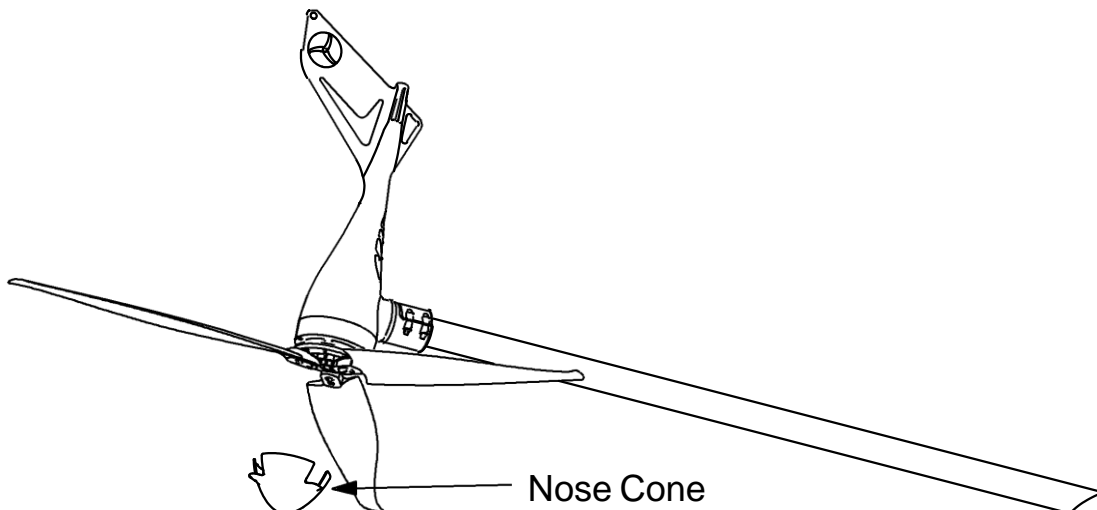


**11/** Insert the 8mm hex key into the rotor shaft and thread the nut on by spinning the blades assembly. Holding the blades assembly and tightening the M16 nut lightly with the 8mm hex key. Finally, spin the blades slowly to be sure they turn freely.



**CAUTION: DO NOT SCREW M16 NUT TOO TIGHTLY, OTHERWISE THE FACE BEARING WILL BE STUCK AND THE BLADES ROTATE DIFFICULTLY!**

**12/** Place the nose cone over the center line of the blades assembly and snap the nose cone into place. Carefully check it is secure by firmly pulling on and be sure all three edges are caught. Don't worry if the nose cone missing, it will not affect the performance of the Wind Generator.



**13/** Run all wires close to the batteries. Connect the Circuit Breaker, Stop Switch, Amp Meter (if you needed) etc., **Refer to Section 4.1 for SYSTEM WIRING DIAGRAMS.** Be sure to crimp and solder the connections using the appropriate sized connectors.

**CAUTION: DO NOT CONNECT TO THE BATTERIES!**

**14/** Make sure that your system is properly grounding. **Refer to Section 4.5 for GROUNDING.**

**CAUTION: IMPROPER GROUNDING WILL DAMAGE THE WIND GENERATOR AND VOID YOUR WARRANTY!**

**15/** Carefully raise the tower and secure base and/or guy cables.

**CAUTION: ENSURE THAT THE TOWER IS VERTICAL SO THAT THE WIND GENERATOR CAN YAW (TURN INTO THE WIND) PROPERLY.**

**16/** Make sure that all Circuit Breakers and Stop Switch are in the off or stop position, then connect wires to the batteries (Red wire to Positive, Black wire to Negative).

**17/** Turn on the Circuit Breakers and Stop Switch, you will find the LED slow blink four times to indicate that the controller is running properly.

**CONGRATULATIONS! You have completed the installation process now.**

## **8. TROUBLE SHOOTING**

If you have followed the installation instructions, but the Wind Generator still does not work properly, please carefully review your installation and refer this section shown below.

### **8.1 MECHANICAL SYSTEM**

If the blades spin “flutter” and the sound noise, please check by placing the 8mm hex key in the rotor shaft, holding it and turn the blades assembly to tighten.

### **8.2 ELECTRICAL SYSTEM**

**If you find the blades always stall or rotate slowly even then wind is very high:**

- Be sure that your Stop Switch is properly installed.
- Be sure that you have not any electrical shorts in the system.

**If you find the blades continually rotate like “oscillating”:**

- Be sure that you have not any open circuit in the system.
- Be sure that the fuse or breaker does not expire.

**If you find the Amp Meter has no any indication:**

- Be sure that your amp meter is not an averaging style and measure the current through the positive wire.
- Be sure that your amp meter is hooked up properly and connect with the proper type.

**If you find the Wind Generator prematurely stop charging but the batteries are not fully charged, please check by these steps list below:**

- Be sure that no bad batteries in the Electrical System.
- Be sure that no diodes in the line between the Wind Generator and the battery.
- Be sure that no undersized wires in the line between the Wind Generator and the battery.
- Be sure that no bad connections in the line between the Wind Generator and the battery.
- Be sure that turn the Wind Generator's Voltage Regulator adjusting screw all the way clockwise if you are using an external regulator. The External Regulators should be "diversion load" types.
- Be sure that measure the voltage at the battery terminals.

### 8.3 ELEVATION

An important fact to keep in mind is elevation. The higher a Wind Generator is from sea level, the lower the air density. Air density is directly proportional to the output of your Wind Generator. Here are some general numbers to keep in mind when determine the maximum output that can be expected from a Wind Generator.

FEET	METER	OUTPUT POWER
1-500ft	0-150m	100%
500-1,000ft	150-300m	97%
1,000-2,000ft	300-600m	94%
2,000-3,000ft	600-900m	91%
3,000-4,000ft	900-1,200m	88%
4,000-5,000ft	1,200-1,500m	85%
5,000-6,000ft	1,500-1,800m	82%
6,000-7,000ft	1,800-2,100m	79%
7,000-8,000ft	2,100-2,400m	76%
8,000-9,000ft	2,400-2,700m	73%
9,000-10,000ft	2,700-3,000m	70%

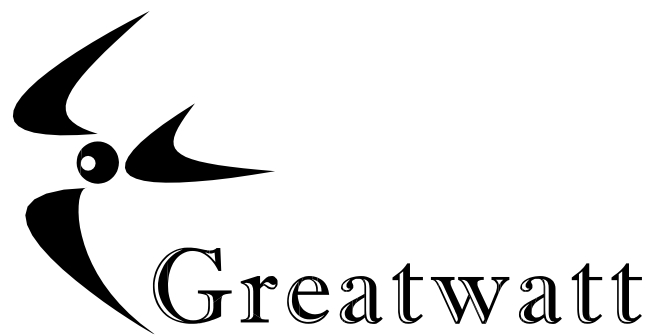
## 9. MAINTENANCE

Although the S-700 has been designed to run for long periods without requiring any maintenance, reliability and performance will be enhanced if you periodically inspect your system. Before performing any inspection, be sure to shut down the Wind Generator.

### **CAUTION: NEVER APPROACH THE BLADES DURING OPERATION.**

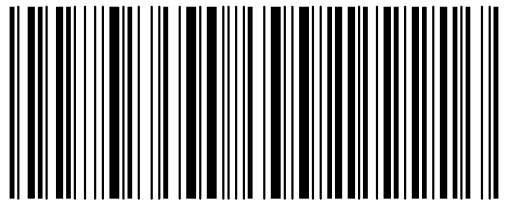
The following items should be checked two months after the initial installation and then every six months thereafter:

- Be sure that your battery water levels and add distilled water in accordance with manufacturer's recommendation.
- Be sure that all electrical connections are tight and free from corrosion.
- Be sure that the tower is solid and reliable.
- Be sure that the yaw-shaft bolts are tightened to the appropriate torque specification see Section 7.3.
- Be sure that the blades bolts and the hub nuts are tightened to the appropriate torque specification see Section 7.3.
- Be sure that no dirt or debris buildup on the blades and body or may cause a decrease in performance of the Wind Generator and long-term damage that is not covered by the warranty. Wash off any buildup with clean soap and water.
- Be sure that the nose cone is solid and reliable.
- Be sure that no chips, no nicks and no unbalanced of the blades or may cause severe wear, damage, and possible failure.  
**NOTE: Do not install individual blades. The blades are balanced as sets.**
- We suggest replacing the blades and bearings every five years for optimal performance.



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