

# FD2.5-300

## Owner's Manual

### Congratulations!

You have just purchased a advanced battery charging wind turbine in the world. We believe you will find it easy to install your FD2.5-300; however, it is important that you read this entire manual thoroughly prior to installation to assure proper performance and safety.

The FD2.5-300 consists of a 9 kilogram weight wind turbine rated at 300 watts and a built-in regulators, self-governing mechanisms.

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



### Specifications

Model: FD2.5-300

Rated Power: 300W

Maximum Power: 500W

Rotor Diameter: 1.5m

Start-up Wind Speed: 2.5m/s

Rated Wind Speed: 12m/s

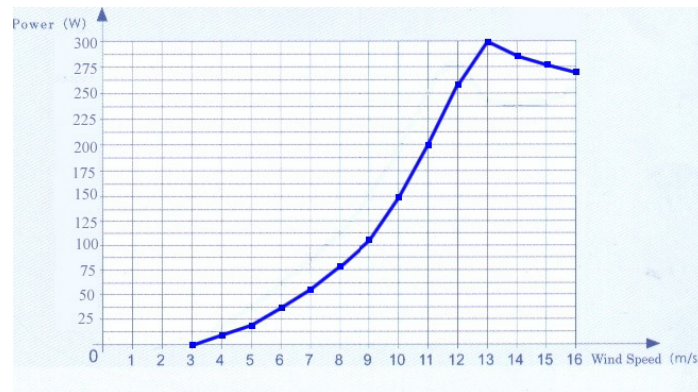
Rated Voltage: 12V/24V/36V/48V

Net Weight: 12.5kg

It can supply about 50kwh per month under the condition: average wind speed is 12m/s per day,

valid wind hours is 210h per month

## Power Curve



# 1. Safety Precautions

When installing the FD2.5-300, exercise due care at all times. The turbine weighs 12 kilograms and is awkward in shape. It is best to plan the installation carefully in advance and enlist some help when erecting the machine in order to avoid accidents.

Complete as much of the installation procedure as possible at ground level.

Choose a calm, dry day for your installation if possible.

FD2.5-300 blades are quite sharp, particularly on their trailing edges. Handle with care.

FD2.5-300 is robustly engineered, but contains high-energy permanent magnets that can be damaged if the machine is dropped or handled heavily.

When running, particularly if disconnected from the batteries, FD2.5-300 is capable of producing high voltages. Caution must be exercised at all times to avoid electric shocks.

Always observe correct polarity when connecting FD2.5-300 to an electrical circuit. Reverse polarity connection will result in damage to the wind generator.

The FD2.5-300 must be appropriately fused at all times.

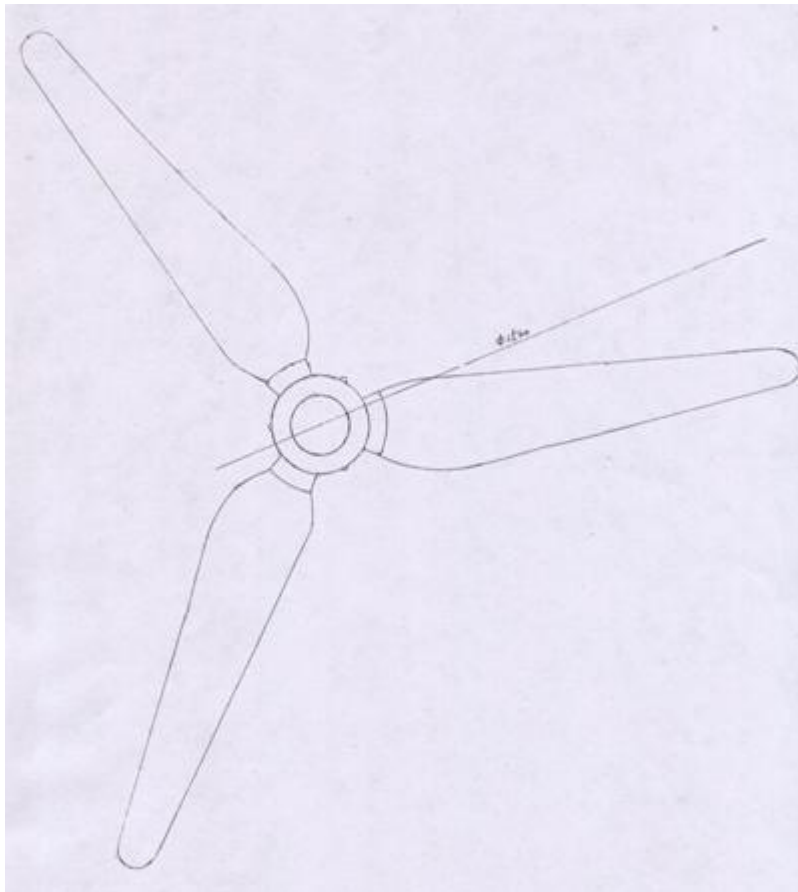
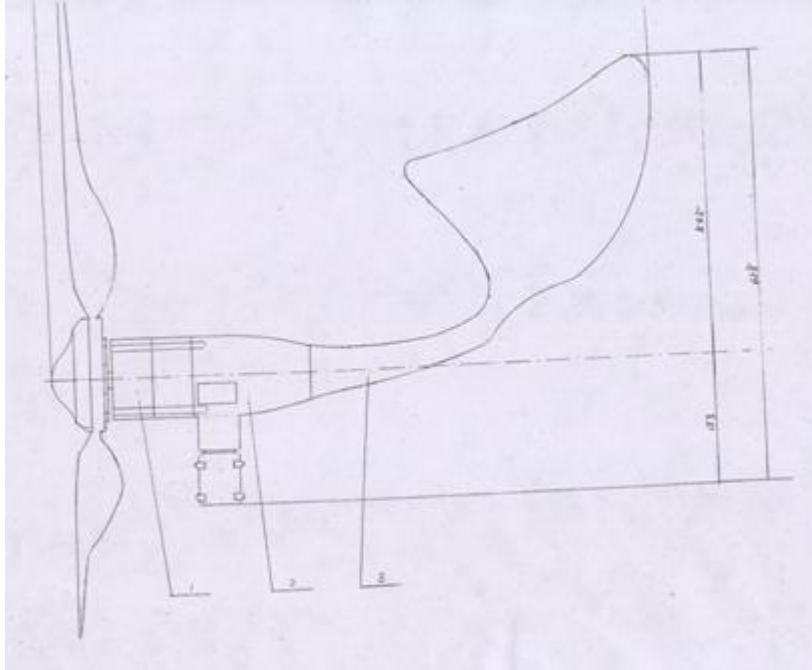
Never approach the path of the blades when the machine is operating as severe personal injury could result.

Always stop the machine and secure the blades before attempting maintenance.

Ensure that all batteries are disconnected when undertaking maintenance.

## 2. Package Contents

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



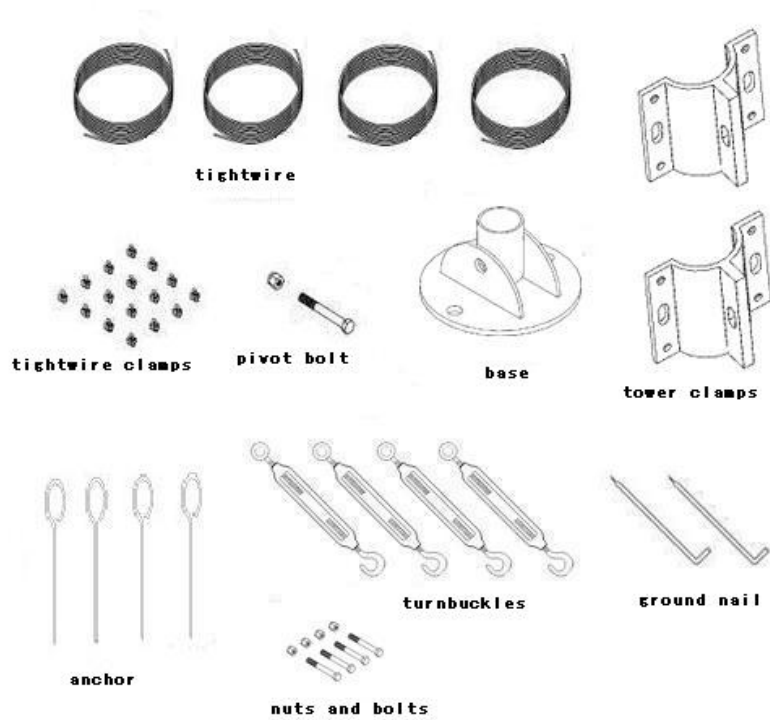


### **Name and Quantity of Each Components**

1 – Generator, tail and flange assembly	1 set
2 - Blades	3 pc
3 - Flange for blades	1 pc
4, 5, 6 – Bolts, Nuts and Washer	9 sets
7 - Done	1 pc
8 - Screw	1 pc
9, 10, 11 - Bolts, Nuts and Washer	1 set
12 - Screw	4 pc
13 – Rubber Cover (no displaying)	1 pc

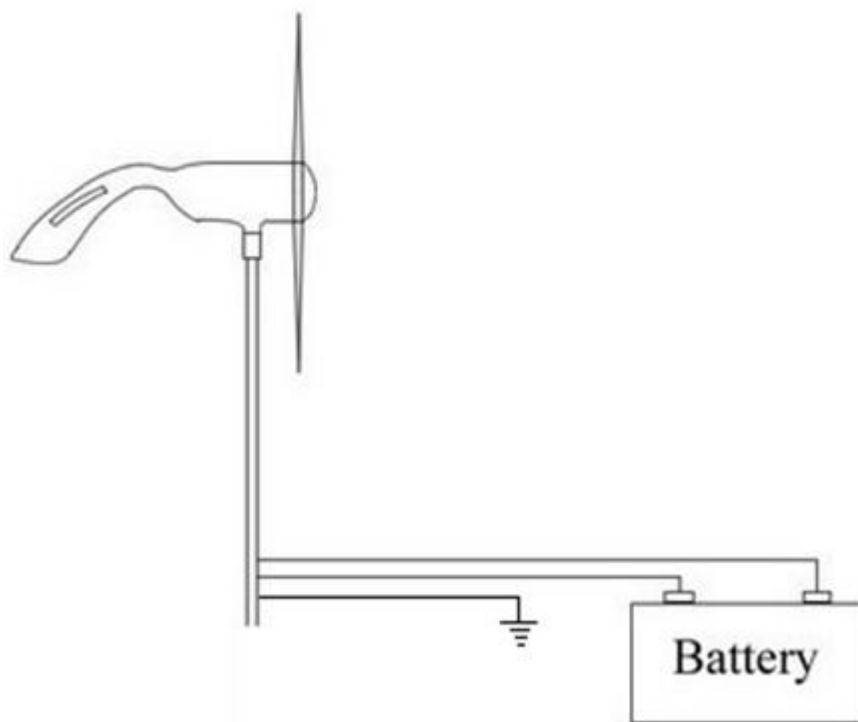
**The user can buy as option the tower and tower attachment from us as below:**

Tower	3 pc x 1.5m length
Tower Base	1 pc
Tightwire	4 pc
Tower Clamp	2 pc
Nuts and Bolts	4 set
Tightwire Clamps	16 pc
Pivot Bolt and Nut	1 set
Turnbuckles	4 set
Anchor	4 pc
Nail	2 pc



### 3. Wiring

#### System Wiring Diagrams



We recommend you wire the turbine directly to the battery bank to its own set of battery posts. This internal regulator will independently monitor the battery and charge as necessary.

**Note: FD2.5-300 12V version requires one piece of 12V/200Ah battery, and 24V version requires 2 pieces, etc...**

## Electrical Connections

**CAUTION:** MAKE SURE THE TURBINE IS DISCONNECTED FROM THE BATTERIES DURING INSTALLATION.

Avoid connecting different metals together(i.e., copper and aluminum). This will cause a galvanic cell that will erode one of the metals. When such connections can not be avoided, consult your dealer or an electrical supply house for anti-oxidant compounds. If possible solder wire termination ends.

**CAUTION:** CONNECTIONS SHOULD BE INSPECTED PERIODICALLY FOR SIGNS OF CORROSION AND CLEANED WHEN NECESSARY

**NOTE:** All electrical power cables should be physically protected. Run the wires inside the tower or conduit for maximum protection.

**NOTE:** The yaw can support a total of 70 kg in wire weight. For higher wire weights, you must install a strain relief to minimize the stress put on the hanging wires.

## Fusing

The FD2.5-300LH is capable of producing high amperages. As with all electrical installations, you must protect each of your turbines with a properly sized fuse or circuit breaker. The FD2.5-300LH should be wired with an appropriately sized “slow-blow” type fuse between itself and the batteries.

Recommended Size for Circuit Breakers or Slow-Blow Fuse

- 12-volt model : 100 amps D.C.
- 24-volt model : 50 amps D.C.
- 36-volt model : 35 amps D.C.
- 48-volt model : 25 amps D.C.

# 4. Mounting To Tower

## 4.1 Hub and Rotor Assembly

Mounting the Blades. Please see the pictures below.

Tighten all the screw with wrench to 10-12 foot lbs(13.6-16.3 Nm)

## 4.2 Mounting the Hub and Rotor

Carefully slide the blade assembly onto the alternator shaft. Place the washers and Nut on the shaft. Tighten the nut to 50-65 foot pounds(68-88 Nm). See pictures below.



Note : when assembling the blades to the hub, please take care of the bolt position. 2 bolts shall go down the hub while one bolt comes up.

Please see the picture



### 4.3 Attaching Nose Cone

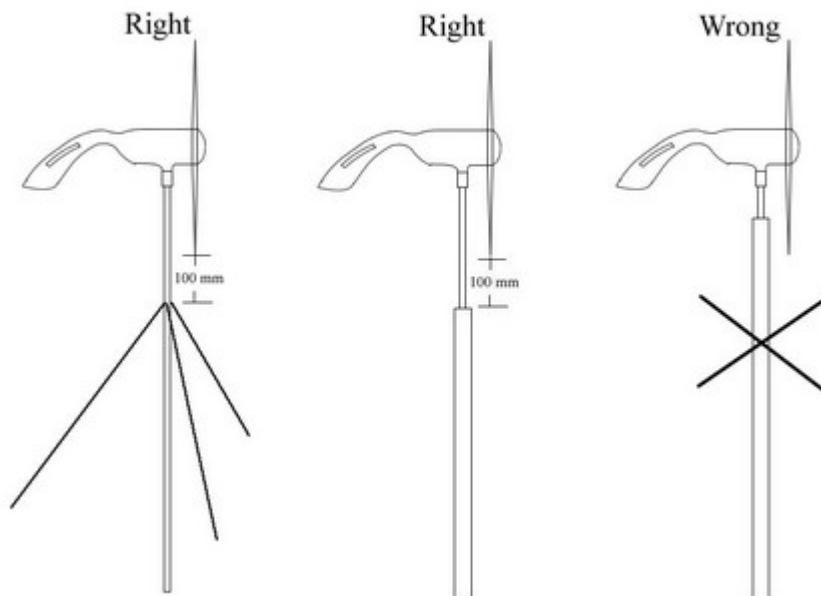
Carefully place the nose cone over the hub and the blades. Snap the nose cone into place. Insert the screw and tighten. See pictures.

## 5. Attaching to Pole

### 5.1 Blade-to-Tower Clearance

Make sure that your tower allows for proper clearance of the blades. A minimum 100 mm clearance must be given between the blade tips and any obstruction. Refer to Figure below

The FD2.5-300 is designed to be mounted on a 1 1/2" steel pipe. We offer wire guyed tower as option. Contact your dealer for details.



### 5.2 Step by Step Instructions

- 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 positive, negative and earth ground.
- 4) Insulate the connections using either heat shrink tubing or a quality electrical tape.
- 5) Connect the wires from the FD2.5-300 to the wires running to the battery.
- 6) Once the wires are attached to the FD2.5-300, gently pull the wires down through the tower sliding the yaw shaft over the 1 1/2" steel 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) Once the yaw shaft is on the tower, firmly tighten the yaw clamp screw.
- 9) Check your FD2.5-300 to be sure that it is securely attached to the mounts. Remember that this attachment will have to hold in high winds.
- 10) Run all wires from the turbine to the battery.
- 11) Before attaching the wiring to the battery, make sure that all circuit breakers are in the off position.
- 12) Attach wires to the battery. Positive wire to positive, negative to negative.
- 13) Turn on the circuit breakers
- 14) You have now completed the installation process.

## 6. Testing

### 6.1 Alternator

The FD2.5-300 uses a three-phase brushless permanent magnet alternator internally rectifies the power to D.C. The rotor is comprised of Neodymium Iron Boron arched magnets, the most powerful magnet material available. The stator is hand wound for maximum output.

### 6.2 Regulator

When the battery voltage matches the regulation set point the turbine will “shut off”. Normal charging will resume when the battery voltage drops slightly below the fully charged level. For 12V turbines the turbine will resume charging at 12.6V(25.2V for 24V turbines, 37.8V for 36V turbine and 50.4V for 48V turbine)

**Note:** Bad connections, undersized wires, and inline diodes will cause the internal regulator to not work properly.

## 6.3 Bench Testing

Two quick bench tests can verify if your FD2.5-300 is providing output.

Test 1

1. Remove blade assembly from turbine and place in a safe location.
2. Spin rotor shaft with your fingers while at the same time connecting and disconnecting the positive and negative yaw wires.
3. With the yaw wires connected, the rotor shaft should become more difficult to rotate and feel “lumpy”. With the yaw wires disconnected it should spin freely. If these conditions do not exist, you should contact your turbine dealer.

## 6.4 Performance Test

Electrical System. Your battery bank should be a minimum 400 amp hours for 12 V systems, and 200 amp hours for 24V system and 36V system. If your battery bank is smaller than the recommended size, battery voltage could quickly rise while the turbine is charging and cause the internal regulator to prematurely stop charging.

Measure the voltage at the battery terminals to which the FD2.5-300 is connected. For the factory regulation set point, if the voltage for a 12V system reads 14.1V or higher(24V 28.2; 36V 42.3; 48V 56.4), then the turbine will sense the battery is charged and stop producing power.

**NOTE: THE FD2.5-300 ELECTRONICS INCLUDING INTERNAL DIODES. DO NOT PUT ADDITIONAL BLOCKING DIODES BETWEEN THE FD2.5-300 AND THE BATTERIES. ANY DIODES BETWEEN THE FD2.5-300 AND THE BATTERIES WILL PREVENT THE TURBINE FROM PROPERLY “SENSING” THE BATTERIES.**

## 7. Maintenance Monthly

### 7.1 Check Mechanical Condition

Watch and listen from the tower base. Use binoculars. There should be no mechanical noise, rattle or vibration. The blades must not wobble. Lower or climb the tower for inspection, if indicated. There should be no buzzing either heard or felt with your hand on the tower mast. Go to Electrical Problems, if indicated.

### 7.2 Inspect the Tower

Follow all inspection and maintenance requirements of the tower manufacturer. Tighten all nuts and bolts, especially wire clips. Check for cracks and bent or broken parts at the anchors and base structure. Check for broken strands and tighten guys

### 7.3 Check the Battery

Add only distilled water if needed.( Consult your battery manufacturer guide.)  
Tighten battery connections

Remove corrosion and protect terminals  
Wipe tops with baking soda solution.

## 8. Maintenance Annual

Lower tower and give wind generator a complete mechanical check.

Fix or replace any worn or loose parts.

- 8.1 Check tightness of all tower mounting nuts and bolts and blades mounting bolts.
- 8.2 Check all bearings. Just perceptible play is acceptable.
- 8.3 Clean the blades with mild detergent to remove all dirt and debris. Avoid scratching the surface. Replace blades if they are cracked or damaged.

## 9. Frequent asked questions

**Q: Can I disconnect my FD2.5-300 without damaging it?**

A: You can disconnect it without causing any damage.

**Q: Is it possible to short my FD2.5-300?**

A: Yes, you can short it without causing any damage; however, be sure you do not short your batteries! First disconnect the turbine from the battery and then connect the turbine positive wire to the turbine negative wire. Doing this will "stop" the turbine from spinning.

**Q: How long will the bearings or other wearing parts last?**

A: From 5 to 10 years.

## Table: Trouble-Shooting Problems

The following guide can be used to pinpoint the cause of operational problems.

PROBLEM	CAUSE(S)	DIAGNOSIS	REMEDY
Battery voltage gets too high	Battery charge controller regulating voltage set too high.	Excessive battery gassing. Use voltmeter to check battery cell voltages or hydrometer to check the specific gravity- compare to battery manufacturers recommendations.	Contact factory or distributor to replace controller

<p>Batteries do not reach full state of charge.</p>	<p>Battery charge controller regulating voltage set too low.</p> <p>Loads are too large.</p>	<p>Use hydrometer to check the specific gravity-compare to battery manufacturers recommendations.</p> <p>Remove largest load.</p> <p>If battery bank reaches higher state of charge, then the system is overloaded.</p>	<p>Contact factory or distributor for repair.</p> <p>Remove excessive load.</p>
<p>Rotor turns, but the system does not charge the batteries.</p>	<p>Blown output fuse</p> <p>Turbine rectifier failure, possible damaged stator winding.</p>	<p>Check fuse with multi-meter</p> <p>Check voltage from the turbine.</p>	<p>Replace fuse</p> <p>Replace rectifier assembly, or stator.</p>
<p>Rotor is unbalanced, causing the turbine to move slightly back and forth as it spins.</p>	<p>Blade tips not evenly spaced.</p>	<p>Check tip-to-tip distances with a tape measure. They should be equal to one another.</p>	<p>Loosening one blade at a time, adjust the tip spacing to bring distances within specification.</p>
<p>Wind is higher than 5 m/s, but rotor will not turn, or turns slowly.</p>	<p>Batteries are full.</p> <p>Load or battery disconnected</p> <p>Short in power leads.</p>	<p>Check connections first.</p> <p>Isolate power leads.</p> <p>Use VOM to check for short circuit</p>	<p>Normal operation.</p> <p>Check all connections</p> <p>Repair short circuit</p>