

FD2.5-300

Owner's Manual

1. Congratulations!

You have just purchased one of the most advanced small battery charging wind turbines in the world. Relatively easy to install, we believe your FD2.5-300 is ideal for providing power for remote location or small domestic out buildings; however, in order to ensure proper performance and safety, it is important that you read this entire manual thoroughly prior to installation.

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



Specifications

Model: FD2.5-300

Rated Power: 300W

Maximum Power: 500W

Rotor Diameter: 1.5m

Start-up Wind Speed: 2.5m/s

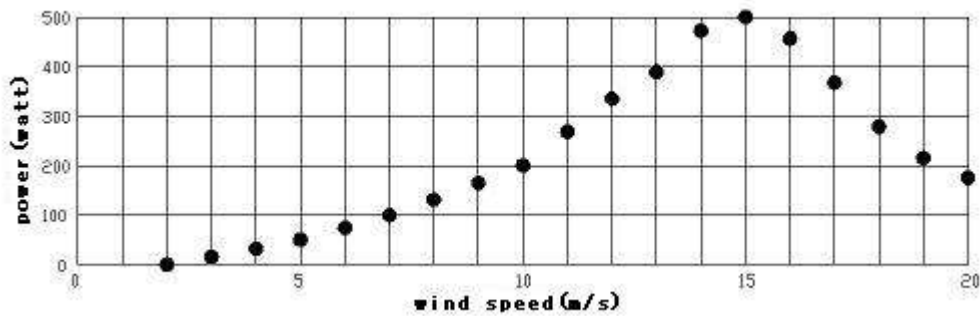
Rated Wind Speed: 12m/s

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 and valid wind hours is 210h per month.

Power Curve



2. Safety Precautions

1. The FD2.5-300 is capable of supplying lethal voltages.
2. To avoid damage, never allow the turbine to rotate without being connected to a suitable load.
3. In order to avoid accidents, plan the installation carefully in advance and enlist some help when erecting the machine.
4. It is strongly recommended to complete as much of the installation procedure as possible at ground level.
5. If possible, choose a calm, dry day for your installation.
6. Caution is to be taken when handling the blades as the edges are sharp.
7. The Turbine contains high-energy permanent magnets that can be damaged if the machine is dropped or incorrectly handled.
8. Always observe correct polarity when connecting FD2.5-300 to an electrical circuit. Reverse polarity connection will result in damage to the electrical windings of the turbine.
9. The FD2.5-300 must be appropriately fused at all times.
10. The Turbine Rotor is capable of turning at very high revolutions, therefore, never approach the path of the blades when the machine is operating as this could result in severe personal injury.
11. Always stop the machine and secure the blades before attempting maintenance.
12. Ensure that all batteries are disconnected when undertaking maintenance.

3. Package Contents

Name and Quantity of Each Component - Fig 1.

1	Turbine	1 pc
2	Blades	3 pc
3	Fin and Tail	1 pc
4	Tail Flange	2pc
5	Hub	1 pc
6	Nose Cone	1 pc
7	Bolts, Nuts and Washer	1 set

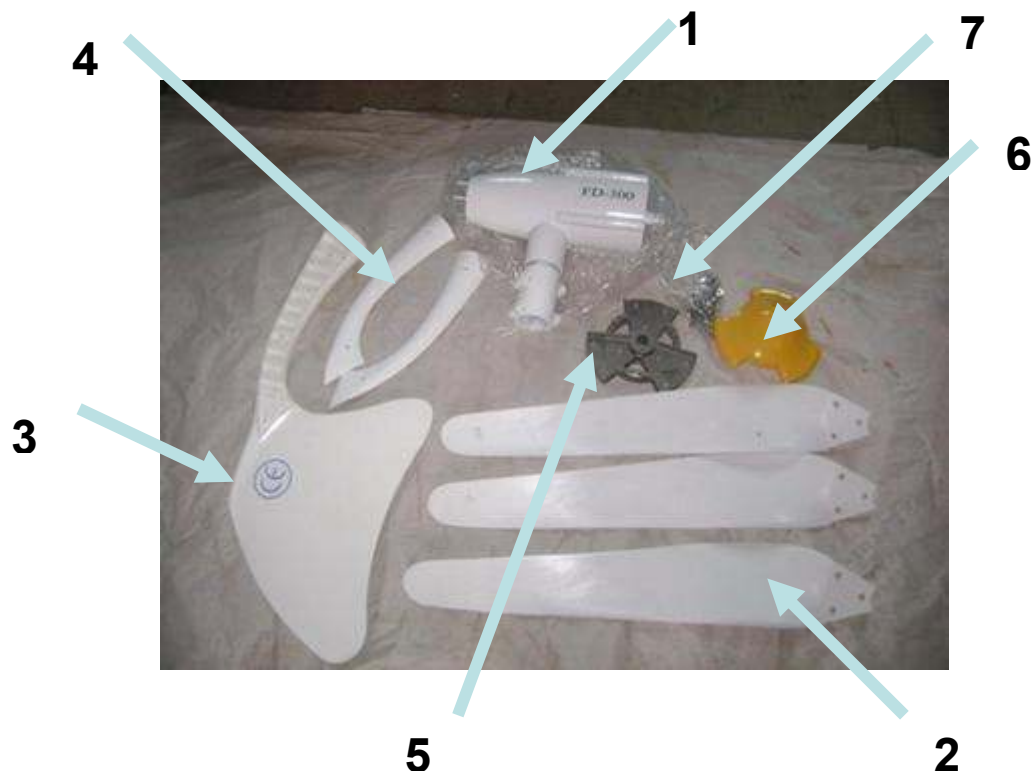


Fig 1

Optional Extra

Tower and Ground Kit - Fig 2.

	Tower (not shown)	3pc x 1.5m
1	Tower Clamps	2pc
2	Tower Base Plate	1pc
3	Tower Base Plate Ground Spike	2pc
4	Turnbuckles	4pc
5	Attaching Nuts and Bolts	4 sets
6	Guy Cable Ground Spike	4pc
7	Tower Base Plate Pivot Bolt and Nut	1 set
8	U-bolt Clamps	16pc
9	Guy Cables	4pc

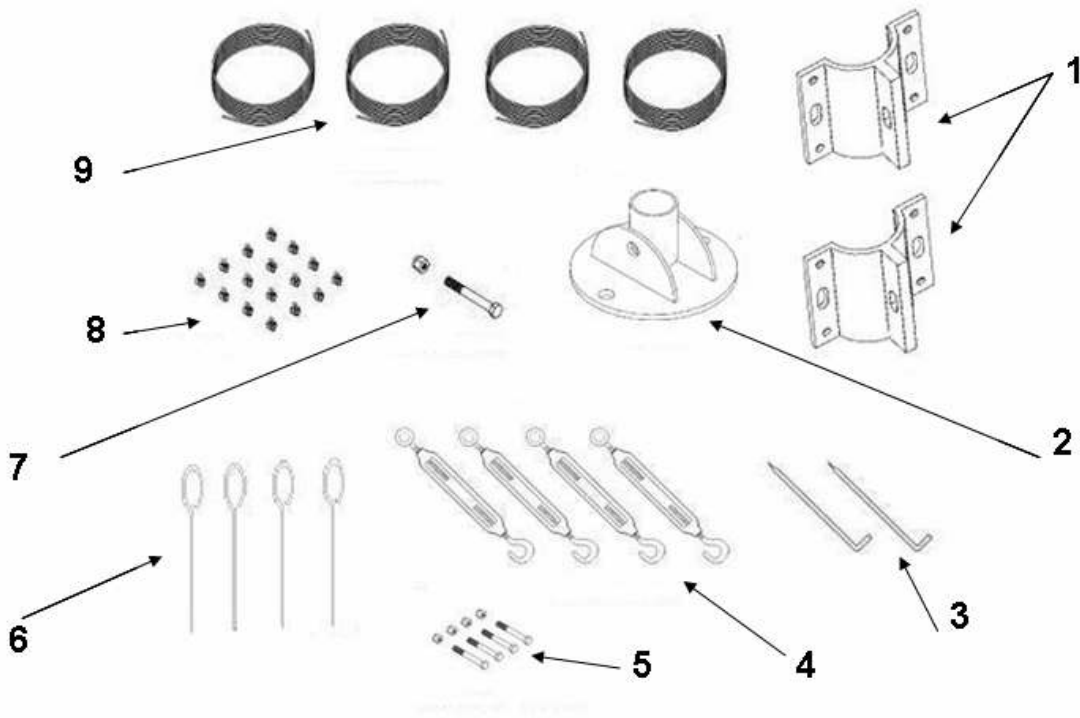


Fig 2

4. Wiring

Typical System Wiring Diagram

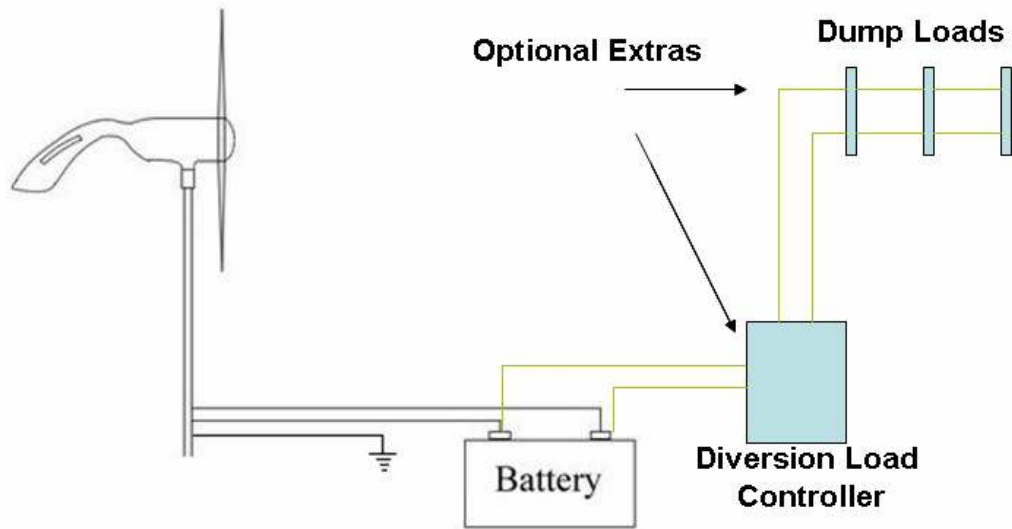


Fig 3

We recommend you connect the turbine directly to the battery bank and use a Diversion Load Controller and Dump Loads. This internal regulator will independently monitor the battery and charge as necessary.

Note: **The amount of batteries required will depend on the output voltage of the turbine and the load being supplied**

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. 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 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.

5. Mounting to Tower

5.1 Hub and Rotor Assembly

Mounting the Blades.

Tighten all the screws with a wrench to 10-12 foot lbs (13.6-16.3 Nm). Please see the pictures below.

5.2 Mounting the Hub and Rotor

Carefully slide the blade assembly onto the alternator shaft, place the washers and nuts on the shaft and tighten the nuts to 50-65 foot pounds (68-88 Nm). See pictures below.



Fig 4



Fig 5



Fig 6



Fig 7



Fig 8



Fig 9



Fig 10



Fig 11



Fig 12



Fig 13

Note: The 2 outer bolts are fitted down through the hub towards the body of the turbine while the inner bolt is fitted in the opposite direction.



Fig14

5.3 Attaching Nose Cone

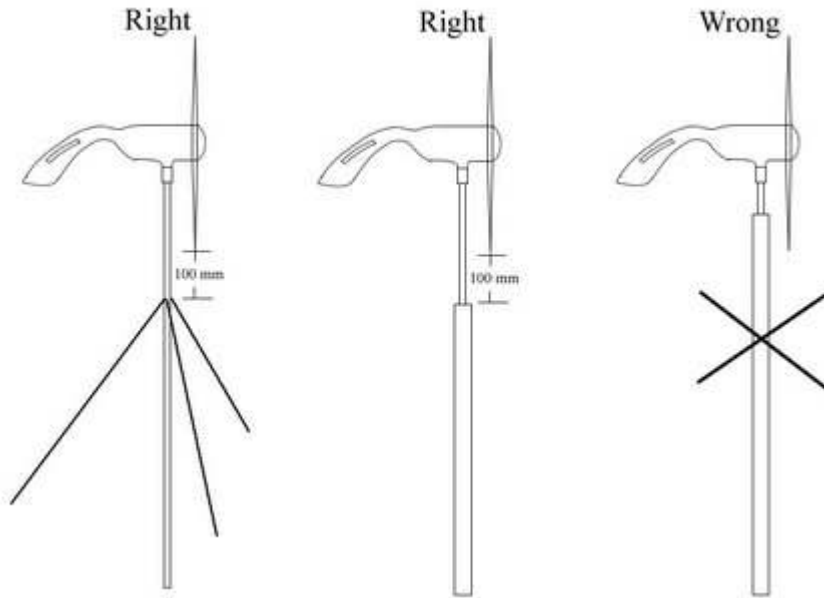
Carefully place the nose cone over the hub and the blades, snap the nose cone into place and insert the screws and tighten. See pictures.

6. Attaching to Pole

6.1 Blade-to-Tower Clearance

Make sure that your tower allows for adequate clearance of the blades. Allow for a minimum clearance of 100mm 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 towers as an option. Contact your dealer for details.



6.2 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.
- 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.

7. Testing

7.1 Alternator

The FD2.5-300 uses a three-phase brushless permanent magnet alternator which 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.

7.2 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.

7.3 Bench Testing

There is a quick bench test which can verify if your FD2.5-300 is providing the correct output.

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.

7.4 Performance Test

Your battery bank should be a minimum 400 amp hours for 12V 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. 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 INCLUDE 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.

8. Monthly Maintenance

8.1 Check Mechanical Condition

NOT ROTATING – gain access to the turbine and check for signs of damage. Rotate the blades by hand insuring the internal mechanism is running smoothly. Check the blades for sings of damage and replace if necessary. Check the mounting plate to the tower is secure.

ROTATING – stand a safe distance from the tower and ensure the turbine is running smoothly

8.2 Inspect the Tower

Ensure guy cables are connected correctly and all fixings are in a service condition. Ensure the tower is vertical but adjusting the guy cable tension as necessary

8.3 Check the Battery

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

Tighten battery connections.

Remove corrosion and protect terminals.

9. Annual Maintenance

Ensure the turbine is not rotating. Lower tower and check the wind generator a complete mechanical check. Fix or replace any worn or loose parts.

1. Check tightness of all tower mounting nuts, bolts and blade mounting bolts.
2. Check all bearings
3. Clean the blades with mild detergent to remove all dirt and debris. Avoid scratching the surface and replace blades if they are cracked or damaged.

10. Frequently asked questions

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

A: Yes 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 connect the positive and negative turbine wires together. This will provide a maximum electrical load to the turbine preventing the turbine from rotating.

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

A: From 5 to 10 years.