

Upwind Turbine Assembly

FE1012, 24 and 48

Congratulations on the purchase of your FuturEnergy Upwind Turbine. Before attempting to assemble your turbine, please read these simple instructions carefully, to ensure you are familiar with all the parts, and how the finished turbine should look. Your turbine has been supplied partially assembled, leaving you to assemble the five blades and aluminium hub, attach the Furling Tail Fin, and to make the final wiring connections.

Tools you will need are Hexagon Allen Keys, 6,5,& 4 mm and 10 and 13mm Spanners or sockets.



General Description

Your turbine is rated at 1 kw in wind speeds of 12.5metres per second. It has a furling tail-fin which because it is offset will turn the turbine out of the wind automatically, thus protecting it from over-revving. It will start to furl at a windspeed of 13.5m per sec. The blades continue to rotate even in the highest winds which means that you are still generating. Your turbine is equipped with five specially computer designed blades made from 30% glass filled nylon which are not only very efficient at low wind speeds but also amazingly quiet (only 2 decibels above background across the range of windspeeds) The permanent magnet generator has 16 poles, is sealed and therefore maintenance free with a minimum of moving parts. The body of the turbine houses a rotating shaft and slip ring to avoid cable twisting. The lower tube is designed to be permanently clamped to a 48–50 mm pole, while the turbine itself is free to rotate and track the wind source.

All parts are as far as possible corrosion resistant. White surfaces are epoxy powder coated and aluminium parts are anodised to full marine specification.

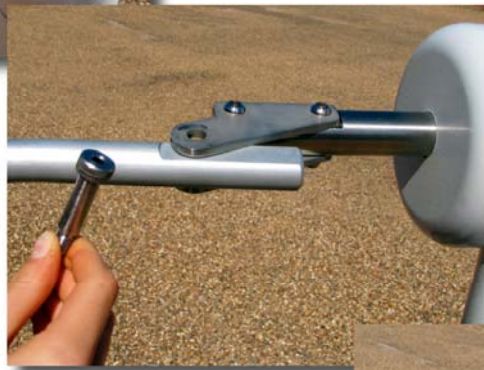
The Turbine is delivered to you in two boxes weighing a total of 25 kilos. The long box contains the five blades, two hub halves, tailfin and front cover, plus sets of fasteners to use in assembly. The square box contains the main body of the turbine complete with Permanent Magnet Generator and stub tail. You will see that there are two heavy duty cables protrud-

ing from the lower tube mounting. These are 10mm tri-rated cables from which you make further DC connections to your system using the crimps and heat-shrink supplied. You can either assemble the turbine on a soft-covered flat surface or, if you are able, make a temporary stand using a one metre length of 48.3 mm scaffold tube.

Tailfin Assembly



Having carefully unpacked the Turbine body, the first stage is to assemble the **Tailfin**. Use the single 10mm by 30mm Shoulder Screw for this. Offer the tailfin to the double bracket on the stub tail, locate the shoulder screw, push through the hole in the brackets and aluminium tailfin bar (see illustrations) and tighten. Apply a little grease at this stage to ensure free rotation of the Tailfin.



Do not overtighten the shoulder screw ...this may clamp the tailfin bar and restrict rotation. At this stage also check the two button head screws on the stainless tailfin brackets for tightness.



The next stage is to assemble the blades to the hub and mount on the Turbine.

Blade Assembly

The five black blades are made from durable and UV resistant glass filled polymer. They are computer designed for maximum low wind /start-up performance and will also behave well in high wind conditions.



They are also remarkably quiet in operation and should give many years of trouble-free service.

To assemble the blades, first insert the 25 degree pitch pins (see illustration) by pushing them into the root of each blade. These pitch pins ensure the blades are at the correct angle to the wind by locating positively in the notches in the diecast aluminium hub.



You are now ready to fix the blades into the double sided aluminium hub.



You will need a flat working area around two metres square. Place one hub side flat on the work surface and locate

each blade in the five sockets. Make sure the blades are all the same way round (important). **When you finally mount the blade assembly onto the generator casing the " Multiwing " brand faces into the wind**



When you are happy that the blades are correctly positioned and seated in the hub sockets, place the other side of the hub over the blade roots and half hub . The bolt holes will align and you can now insert the M6 cap screws into the outer holes and place the nuts on the back. You are now ready to balance the blades so just "nip" the nuts up at this stage.



Balancing

As part of your blade kit you will find a spun aluminium cone with a suspension wire. The cone fits through the hole in the hub and the flange prevents it going the whole way through. You will almost certainly need to tie a length of cord or wire to the cone wire to make it long enough to hang from the ceiling. Use the balancing cone to suspend the complete blade assembly from an overhead beam or support (garage rafter) so that the blades are allowed to settle horizontally.

Please avoid air draughts which will disturb the

blades. If the assembly hangs perfectly horizontally you will know that it is balanced. If it tips to one side try adding an M6 washer or two to the opposite side of the hub (just place it/them on the top of one of the cap screws for now) Add washers until you are happy that the blades are horizontal. Remove the cap screw(s) where you placed the washers and reassemble with the washers over the thread between the locknut and hub flange. You can now fully tighten all the cap screws to a torque setting of 8.25 Newton Metres. **Please do not overtighten which can cause the aluminium hub to stress-crack.** Your blade set should now be perfectly balanced and give you many years of vibration free service.



Tip...although you will be using self locking nuts, a few drops of Thread Locking Compound (“Nutlock”) will ensure that the bolts do not work loose over time

You are now ready to mount the blade assembly to the generator.

The hub is attached to the front of the Turbine using 5 M6 bolts. The hub locates positively over the black adaptor and will sit on the shoulder while you offer up the bolts. Tighten all five securely.



The last stage is to attach the front cowl. Use the M10 by 80mm Buttonhead screw with washer..push through the hole in the front of the cowl, slide on the aluminium tube distance piece which supports the cowl when you tighten the screw. Locate the cowl around the hub bulges carefully and tighten.



That's it !

Before finally erecting your finished turbine, please make sure that all bolts and screws are fully tight.

Please see separate instructions for tower and building mountings and connectivity.

Your turbine will produce power in relation to the available wind speed, Power Graphs are available in pdf format for download at www.futureenergy.co.uk. You will see that performance varies for different loads

We hope you enjoy using your FuturEnergy turbine, and reap the rewards of generating your own free power. If you have any problems or queries please telephone or email. Our technical support people will be happy to help.

For further information about our Renewable Energy and related products and components please visit our website. You will see details of complete wind turbine solutions, charge control devices, inverters both SineWave and Grid-Tie and Dumploads

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This product is covered by manufacturer's warranty against defective parts and faulty workmanship for a period of 2 years from date of purchase. In case of problems please contact your distributor or call our customer service line



- * Things your must not do :**
- * Connect positive and negative terminals incorrectly. (will result in irreparable damage to the generator windings.)**
- * Short circuit turbine connections in high wind speeds (will destroy the Permanent Magnet Generator)**
- * Allow the turbine to run off-load**
- * Misconnect Batteries**
- * Any of the above will automatically void the warranty.**
- * Please Note : Damage caused by mishandling, faulty installation or accident is not covered by warranty**

Having said that if you have any problems we are here to help and can action repairs in out service department or happily supply you with spares

Declaration of Conformity

We declare that this product complies with :

LV Directive 73 23 EEC and EMC Directive 89 336 EEC



and is fully ROHS compliant

Please Note : Neither Futureenergy Ltd nor Special EFX Ltd accepts any liability for damage or consequential loss caused by accident, incorrect assembly or misuse of this wind turbine or blade set.