



FACTORY VISIT

FuturEnergy

Behind the scenes making the Airforce1 micro wind turbine in Warwickshire

FUTUREENERGY IS a 'Made in Britain' manufacturer, designing and producing the Airforce1 1kW micro wind turbine and Airforce Control in Warwickshire. Established for over 15 years, FuturEnergy's aim is to provide customers with a product that is capable of harnessing energy from the wind efficiently, quietly and cost effectively.

The 1kW wind turbine is perfect for rural off-grid locations to supply battery charging for power for remote sites, and is ideal for the energy requirement of glamping or open air events, providing the location has an adequate wind resource.

The small, dedicated manufacturing team all live locally to the FuturEnergy factory which hand builds turbines on site, including their permanent magnet generators (PMGs) and Airforce Control. Any components that cannot be made are sourced as locally as possible.

1 Winding and Manufacture of PMGs

The process starts with the permanent magnet generator (PMG), the heart of the wind turbine. The casings are aluminium cast and e-coated by companies in the West Midlands. Copper wire is wound around bobbins depending on whether a 12V, 24V or 48V 1kW (1000watts) generator is being produced. This then creates the stator which is pressed into the casing.



The magnet rotor is made up and fitted into the casing followed by seating and sealing the lid. The generator is then tested to ensure it has the correct output including a high voltage insulation test to prove long-term durability.

The 24V and 48V PMGs are then ready to be made into wind turbines. The 12V generators are normally sold to customers for hydro projects (water wheels).



2 Main Turbine Body Construction

Laser cut components are TIG welded together to fabricate the turbine chassis. FuturEnergy manufactures the chassis from high quality stainless steel to prevent corrosion so that the turbine is suitable for environments including coastal areas.

4 Packing and Boxing

Supplied in 24V and 48V, systems comprise a ready to mount wind turbine, controller, anemometer and manual stop. Turbines are also compatible with solar for a hybrid combination.

5 Tower Kits

The FuturEnergy tower kit (8m high) is strong and designed for ease of assembly. By using special ground anchors no concrete or foundations are required and this allows for the tower to be relocated if required. The anchors meet the required loading capacity calculated from EN-61400 and are designed to withstand 50-year maximum wind speeds when installed in most ground conditions.

The tower is raised and lowered using a gin-pole of standard scaffolding tube dimensions. The scaffold poles required can be purchased from a customer's local builders' merchants to save on transport costs.



3 Assembly

The parts start to immerge into a wind turbine and as the electrical parts are connected the hub is affixed to take on the blade assembly and fixings for the tail assembly are put into place. The design is simple and robust to provide a 10 year plus service life with virtually no servicing required.

At the base of the turbine is the lower tube which the turbine is mounted on (this fits over a standard size scaffold pole). The lower tube and many other exposed parts are also

made from quality stainless steel for durability and to protect against corrosion as it's exposed to the elements of torrential rain, freezing snow, burning sun and especially sea salt at coastal locations. Many FuturEnergy turbines are actually mounted on oil and gas rigs around the world.

Over the years FuturEnergy has developed the Airforce Control so that customers can have peace of mind that the turbine and connected batteries (which may be lithium) are automatically protected from stormy weather. The controller stops the turbine

with an electrical brake when high wind speeds are measured or when batteries are fully charged and then automatically restarts when operating conditions permit. Using the Airforce Control mobile phone app, the owner can view data from the controller and turbine and stop and start it if required whilst away from the location of the turbine.

Whilst various components for the controller are sourced from suppliers, the development, assembly and testing is conducted in FuturEnergy's factory.



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FuturEnergy
01789 450280
sales@futureenergy.co.uk
www.futureenergy.co.uk



**Unit 12, Ettington Park Business Centre,
Alderminster, Stratford-upon-Avon,
Warwickshire CV37 8BT**