



MiniWind Product Brochure

24, 48 & 300V Domestic Turbines

Renewable Components are proud to announce the launch of our rugged MiniWind Downwind domestic scale turbines. Designed to be used in both on and off grid installations, and part of hybrid systems, these 1.8m diameter turbines can form the heart of your reliable renewable energy power source.

The rugged nature of the entire MiniWind turbine series enables our customers to install wind turbines in locations previously deemed as being too harsh for standard domestic scale machines. This, combined with the flexibility offered by our blade/hub combinations, allows our turbines to be "best matched" to the wind conditions prevailing on any installation site. This approach is unique among small turbines, and will help to create a new standard to which others aspire to.

The MiniWind 1100 Range



Our entry-level turbines include the MiniWind 1100-24 and the MiniWind 1100-48, both of which use our RC1100 series of Permanent Magnet Generators. These 6-bladed turbines have an overall diameter of 1.8m, making them small enough to sit comfortably in most domestic installation sites, whilst being large enough to produce sensible power outputs. The blades used in our entire range are injection moulded from glass-filled nylon, making them both strong and lightweight. The matching hub systems we use allow the blades to be mounted at different angles in relation to the prevailing

wind direction, giving huge flexibility in "matching" the turbine's performance to best suit the most common wind strengths associated with any particular site.

We have chosen carefully the parts used to create the entry-level 1100W range of turbines, to keep the costs to a minimum, whilst keeping the quality and durability of the product to a very high standard. We have also removed some of the components which, on other turbines, would normally require maintenance by the user, giving rise to a simple, effective and virtually indestructible domestic scale turbine.

Ideally suited to battery charging, the MiniWind 1100-24 is for use with battery banks of 24V, with a capacity of at least 200Ahr. For smaller battery capacities, a separate "charge controller" would be required in order to minimise the risk of overcharging the batteries connected to this turbine. In practice, the larger the battery bank capacity, the less likely it would be that the turbine could overcharge them. We would suggest using a typical capacity of 400Ahr, constructed from quality Deep Cycle Lead Acid Batteries. Should you wish to charge smaller capacity batteries, we would suggest sourcing a Diversion Load Charge Controller and associated Diversion Load Resistor (not sold by us), with a maximum current capacity of at least 60A.

The MiniWind 1100-48 is for use with 48V Battery banks, again with a minimum capacity of 200Ahr, but with a suggested capacity of at least 400Ahr. The downwind nature of the MiniWind 1100W Range is such that these turbines will produce high power outputs in very high winds, to the point where the blades begin to self stall, thus limiting the total power output. At these high wind speeds, the PM Generator is also limited in its power output, which again is the main limiting factor in the maximum power attainable from either model.

Under no circumstances should any of the MiniWind range be operated off-load, which would allow the turbine to spin to very high speeds, and could become permanently damaged, or could cause serious personal injury. For additional safety, the instructions supplied with each turbine shows the various ways in which the turbine can safely be connected to your battery bank, such that it can be disabled and isolated safely in wind conditions that would be seen as being potentially dangerous.

The MiniWind 2200 Range



Our rugged range was extended to include our 2200W systems, using our unique RC2200 PM Generators, and flexible blade sets. The turbines are the next level in our range, and have been specifically designed to be used in the windiest of locations. By incorporating our 2200W generators with our 1.8m rotors, we have produced a turbine which can withstand very high wind speeds, making these systems suitable for the Western - Isles of Scotland,

Western Coastal areas of the UK and Ireland, and all other exposed sites, where wind speeds regularly reach gale force.

The MiniWind 2200-24 and 48 are for use with battery systems with large capacity only. We would suggest a minimum capacity of 400Ahr, with a typical capacity of over 600Ahr. Charge controllers should be used with smaller capacity battery banks, but since the output current from these turbines can be over 60A (from the 24V model) it may be difficult to source a charge controller that can reliably handle this power.

The MiniWind 2200-300 is suitable for use with Grid-Tied inverters. We currently supply the WindyBoy 2500W inverter for grid-tied installations. Great care should be taken when using this turbine, since the output voltage can rise to over 500VDC. This represents a serious shock hazard, and even death. WindyBoy 2500 Grid-Tied Inverters can be purchased from ourselves, and these will be programmed to match the performance of the MiniWind 2200-300 prior to use. You will also require one of our inverter controllers, which includes an over-voltage disconnect between the turbine and inverter, to ensure complete safety.

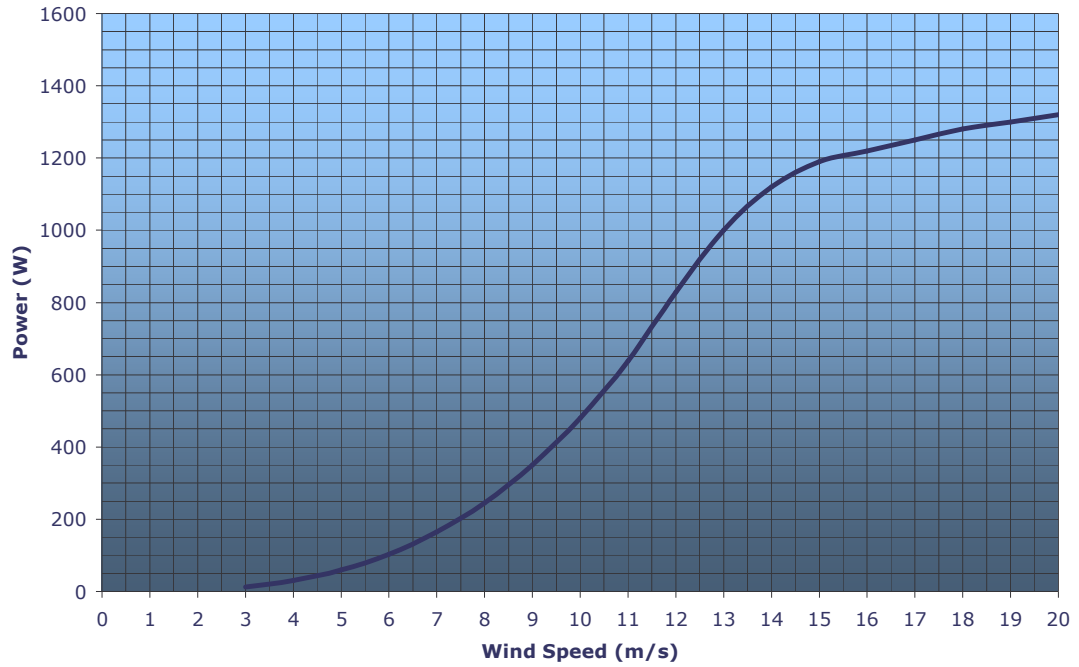
MiniWind Technical Data

Start-Up Wind Speed	3.2m/s	
Cut-In Wind Speed	3.8m/s	(when used with WindyBoy 2500)
Rated Wind Speed	12m/s	
Maximum Wind Speed	20m/s	(is used with our controller)
Survival Wind Speed	65m/s	(with turbine off)
Rotor Diameter	1.8m	
Number of Blades	6	
Blade Pitch	Variable	(2 angles supplied)
Blade Material	PAG	(50% Glass-filled Nylon)
(Blade Colour	Black	
Cowling Material	GRP	
Cowling Colour	White	(Black available on request)
Generator Type	3-Phase	(Neodymium Permanent Magnet)
Generator Wiring	6-Wire	(Star or Delta Connection)
Yaw Bearing	Nylon	
Rectifier Type	3-Phase	(160A for 24/48 & 100A for 300V)
Slip Ring	None	(Hard wired power connections)
Noise Level at 5m/s	36dB	(measured at base of 8m tower)
Noise Level at 7m/s	54dB	(measured at base of 8m tower)
Noise Level > 7m/s	**	(wind noise exceeds turbine noise)
Suitable Tower Diam.	50mm	(48.3 / 50mm scaffold tower)
Suitable Tower Type	Self Supporting	(Or guy wired)
Maximum Wind Force	2000Nm	(30m/s wind force on rotor)
Turbine body material	Steel	(Fully galvanised)
Bolts & Fixings	S/Steel	(Stainless Steel)
Electrical Noise	Compliant	(EU Directive 89/336/EEC)
Low Voltage Compliance	Compliant	(LV Directive 73/23/EEC)
Certification	CE	
Warranty	2 Years	(Limited Warranty)* see below
Weight MiniWind 1100	30kg	
Weight MiniWind 2200	40kg	

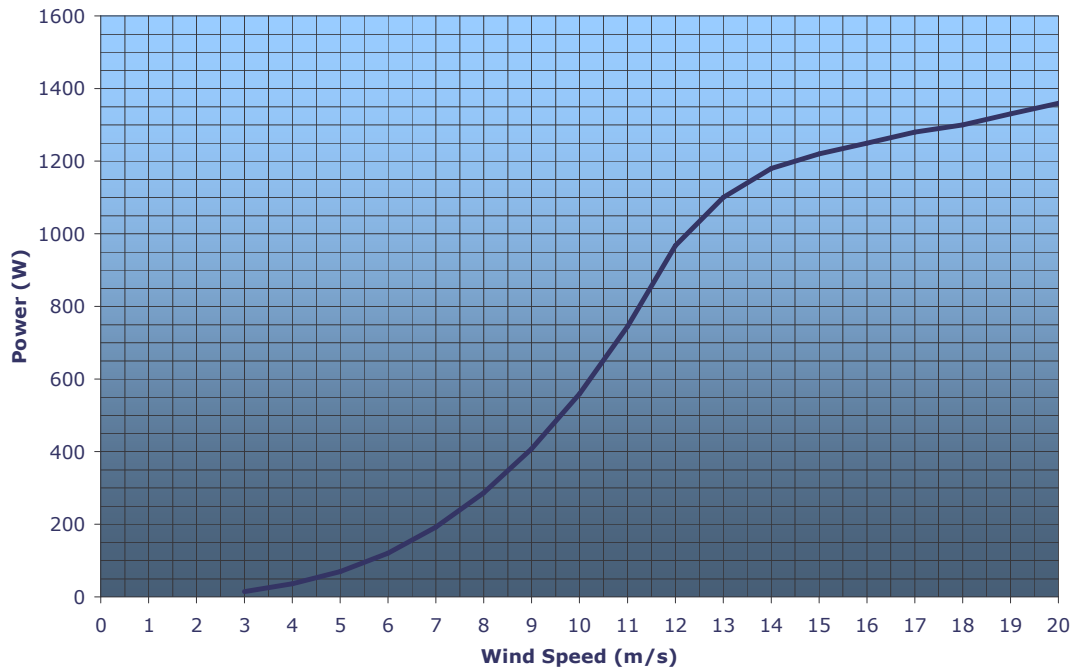
*All turbines are guaranteed against defective parts and faulty workmanship for a period of 2 years from date of purchase. Not covered under the terms of the warranty are any losses, damages or injuries sustained either directly or indirectly by the improper use, installation or maintenance of the turbines and all associated components. Our warranty does not cover any damage to the turbine by incorrect installation or electrical connection or any damage resulting from the turbine being allowed to operate off-load, or with an unsuitable load. The turbine should not be "short circuited" whilst in operation, and all switches, cabling and fuse ratings should be carefully chosen to handle the power and voltages being generated in all operating conditions. The warranty will be void if the turbine, or its installation, does not meet the required electrical standards, safe practices or wiring regulations.

MiniWind Power Curves

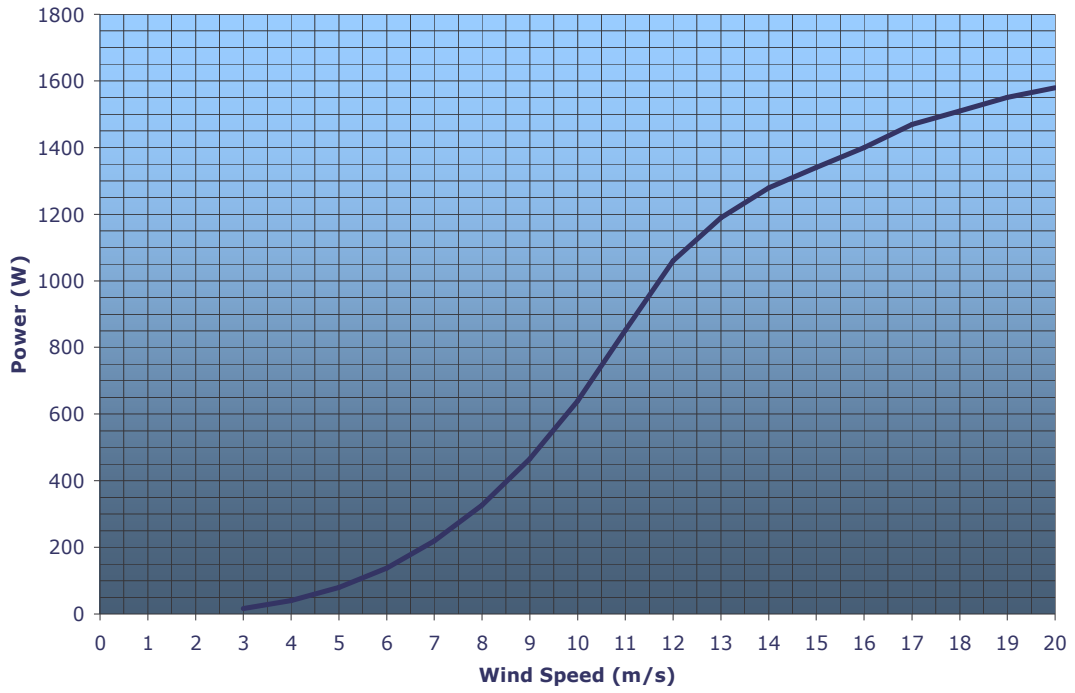
MiniWind 1100-24



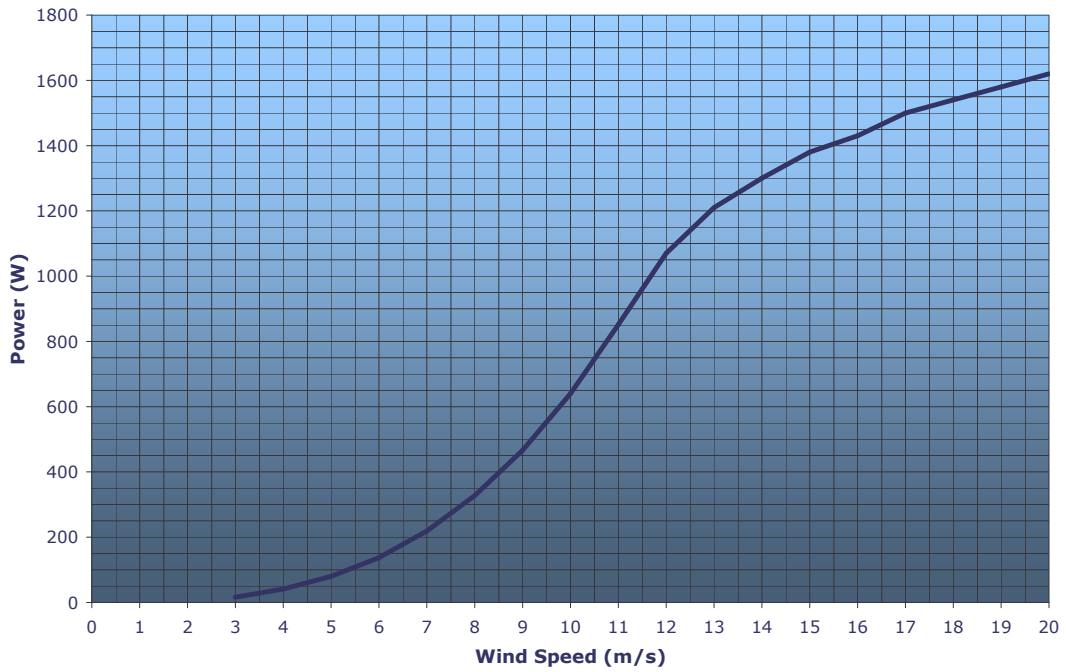
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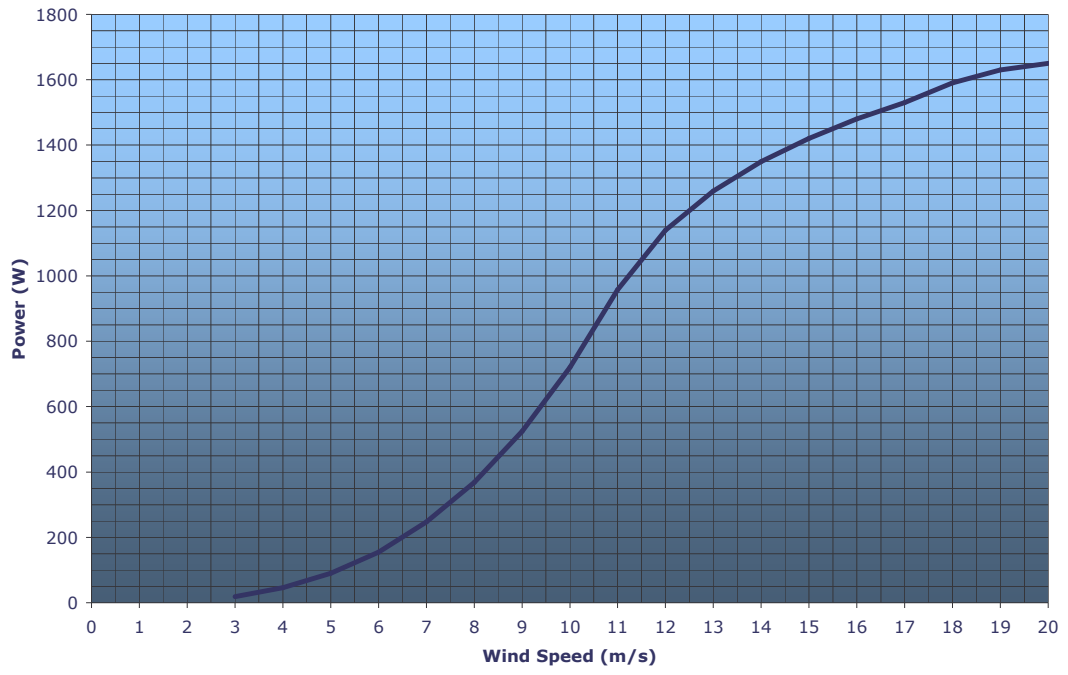
MiniWind 2200-24



MiniWind 2200-48



MiniWind 2200-300

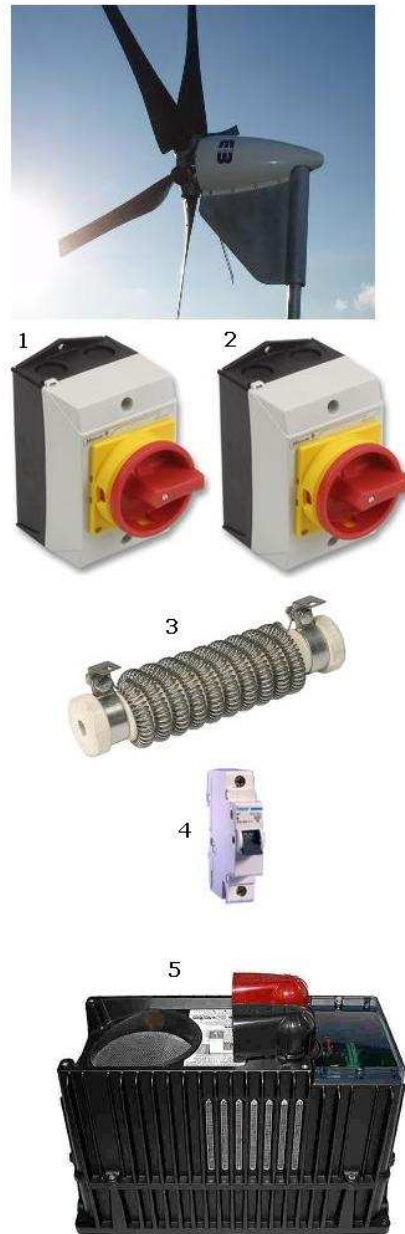


Battery System Components



Item	Description
1	4-pole 63A breaker
2	4-pole 63A breaker
3	Resistive Dump Load
4	DC Isolator or MCB
5	Battery Bank (24 or 48V)
6	Charge Controller
7	Resistive Dump Load

Grid Connected System Components



Item	Description
1	4-pole 63A breaker
2	4-pole 63A breaker
3	Resistive Dump Load
4	DC Isolator or MCB
5	Grid-Tied Inverter

Battery Charging System

The basic components required to operate a successful battery charging system are shown in the previous page. The turbine is connected to a 63A 4-Pole switch, such that, when activated, the turbine is Short-Circuited. This switch can only be operated when the turbine is stationary, or is rotating very slowly in very light winds. A second 4-Pole 63A isolator switch is used to connect a resistive Dump Load to the turbine to act as a "brake" to slow the turbine down in high winds, or for other safety reasons. The resistor used to dump the power from the turbine must be rated at a low enough resistance and high enough power to bring the turbine to a halt. For 24V and 48V systems, this resistor should have a resistance of 0.5 to 1 Ohms.

A DC isolator and circuit breaker should be connected between the main "braking" switches and the batteries to be charged. This can be a standard MCB type breaker, since these will operate well in 24V and 48V systems, but cannot be used for higher DC voltages than this. Prior to shutting down your turbine, this MCB should be "tripped" or "switched off" such that the resistive dump load, when added to the circuit during braking, does not drain power back out of your batteries. Should you forget to do this, the MCB will "trip" when the main "short circuit" brake is activated. The MCB current rating should be chosen to be above the typical maximum current expected from your turbine in high wind conditions. Typically this MCB would be rated at 50A for the 48V system, and 100A for the 24V system (2 x 50A MCBs connected in parallel).

Power from the DC isolator should then be connected directly to your battery bank. A charge controller with associated dump load should be used to protect the charge state of your batteries and to prevent overcharging of them in high winds. If, however, your battery bank capacity is high enough, there will no need to use a charge controller. Typically we would suggest using a 400Ahr bank with the 24V system, and 400-600Ahr with the 48V turbines.

Grid Connected System

The system components required to create a successful grid connected turbine are similar to those used for the battery system. The braking system and DC isolation components can be the same, with the proviso that a suitably rated DC isolator is used instead of the MCB for DC isolation of any high voltages used. For low voltage grid tied inverters, the MCB described above will suffice.

The choice of grid tied inverter is the responsibility of the installer, and care should be taken to select one which can handle the maximum power and voltage produced by the chosen turbine, in all operating conditions. A suitable low voltage inverter may be the WindyBoy 1100LV, which can operate from 24 to 60VDC, and so can be used with a battery system as part of a hybrid (wind and solar PV) setup.