



## PowerSpin Series

Powering residential & commercial sites  
at grid-connected and off-grid locations

# 2200 Watt Wind Generator

## PowerSpin TSW 2200

### Wind Power System for residential and commercial use

The TechnoSpin PowerSpin TSW 2200 wind turbine provides a renewable energy source to a wide range of residential and commercial applications in remote and urban locations.

Based on a revolutionary blade design, the TechnoSpin wind turbine generates substantial energy in areas with low and medium winds.



### Applications

- Power for household appliances including heating applications
- Lighting (building, street, etc.)
- Industrial/small business machinery
- Advertising boards
- Grid back-up systems
- Battery charging (use in remote areas, green car battery charging stations, etc.)

### Product advantages

#### Performance

- Start-up and high energy output in low winds
- Superior efficiency (up to 30% higher than competition)
- Vibration free
- Silent operation in all wind regimes

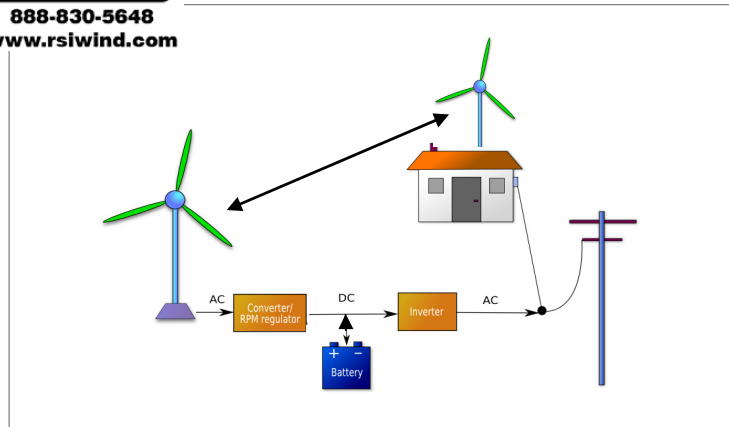
#### Reliability

- Robust design
- Simple to install
- No maintenance required
- 5 year warranty (optional extension up to 20 years)

**Cost effective - shorter ROI period  
compared to alternatives**

## System configurations

- On-grid Systems
- Off-grid systems
  - Stand-alone systems
  - Local-grid systems: serving a whole village/community instead of separate households
- Turbine could be installed on roof or on separate tower
- Wind only or Hybrid system with Solar/Diesel generator

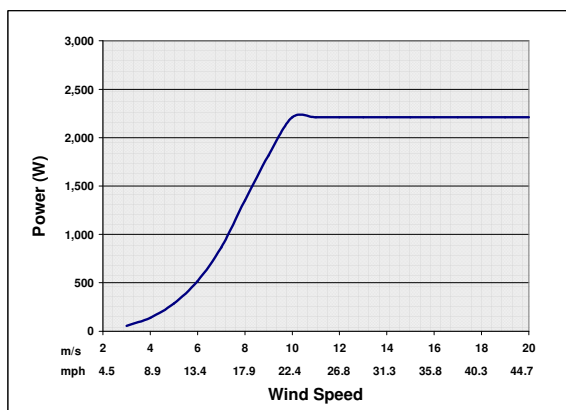


## Technical Specifications

<b>Rotor Diameter</b>	3.5 m (11.5 ft)
<b>Rated Power</b>	2.2 kW
<b>Rotor Efficiency</b>	up to 45%
<b>Yearly Energy Output - at average yearly wind speed of 5 m/s (11.2 mph)</b>	4,400 kWh
<b>Rated Wind Speed</b>	11 m/s (24.6 mph)
<b>Start-Up Wind</b>	2.5 m/s (5.6 mph)
<b>Survival Wind</b>	55 m/s (123 mph)
<b>Generator</b>	Permanent Magnet Generator
<b>Voltage for Battery Charging</b>	12-48 V DC
<b>Voltage for Grid Connection</b>	Adjusted to requirements of inverter
<b>Overspeed Protection</b>	Mechanical and Electrical System
<b>Maximum Axis Load</b>	150 Kg force (330 lb)
<b>Temperature Range</b>	-40 C to +70 C (-40 to 158 F)
<b>Installation</b>	Roof or separate tower
<b>Separate Tower Height - Minimum</b>	6 m (19.7 ft)
<b>Product Design Life</b>	30 years
<b>Warranty</b>	5 years (optional extension up to 20 years)

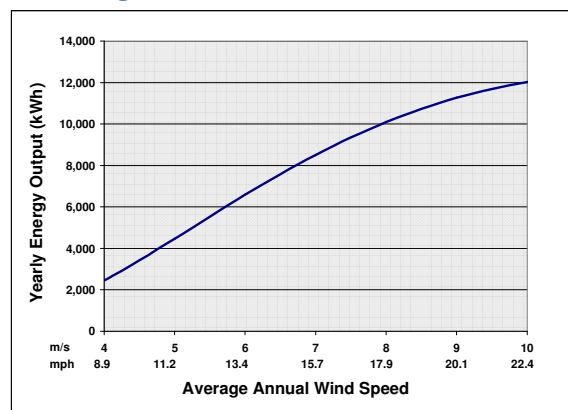


## Power Curve



\*Power curve data measured with appropriate load

## Average Annual Power



\*This distribution is based on the Power Curve data and the average annual wind speed (weibull distribution)



## The standard kit includes:

- Blades
- Hub
- PMG Generator
- Turbine head
- Tail
- Stub
- Charge controller (for battery charging)

## Noise

The turbine is extremely silent; its noise level is lower than 40 dB. Noise measurements are conducted based on the international standard 61400-11 and chapter 3 of the BWEA standard.

## Regulation

The turbine is manufactured according to relevant international standards:

- IEC 61400-2 (International Electrotechnical Commission)
- BWEA British Wind Energy Association Small Wind Turbine Performance and Safety Standard

## Mechanical Data

### Aerodynamic tail

The aerodynamic tail allows utilization of wind resources irrespective of wind direction, and serves as part of mechanical protection set-up.

### Furling

Wind furling by over pressure sensing

### Generator

The PMG generator is optimized for maximum efficiency. Due to the direct drive, there are no transmission losses. Bearings are lubricated for life, the generator is closed and maintenance free.

### The tower

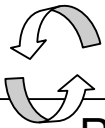
The turbines are light and vibration-free; therefore they can be installed on roof tops. Alternatively, they can be installed on separate galvanized towers, both guyed and free-standing monopole towers. The turbines can be easily installed by a small professional team, using basic equipment.

## Electronics Data

The turbine standard kit includes a controller, which is used for rectifying unstable wind energy power output, voltage control and battery charging. This device converts the generator's 3-phase AC voltage to DC voltage, acts as a safety device, making sure that the voltage will never exceed the allowed maximum. The controller has the following additional functions:

- MPPT (Maximum Power Point Tracking) - synchronizes between the turbine and the batteries and ensures that the turbine is working at the point where it gives maximum output.
- LVD (Low Voltage Disconnection) - used to protect batteries from discharging beyond the minimum level. In hybrid system with diesel generators this system is used to connect and disconnect the generator when power input from the turbine is low.
- OCP (Over Charging Protection) – protection of over charging of the batteries. Excessive energy is diverted to the dump load and converted into heat.

For grid connected applications, the standard kit includes a controller that is designed to connect to the specific grid inverter suitable for the installation

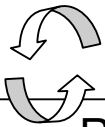


BWEA small wind turbine  
standard, 2008

Self certified by  
TechnoSpin Inc.

Reference  
Annual  
Energy **4,400 kWh**

Annual average wind speed of 5 m/s (11 mph). Your performance may vary



BWEA small wind turbine  
standard, 2008

Self certified by  
TechnoSpin Inc.

Reference  
Power **2,200 w**

Power at wind speed of 11 m/s (25 mph). Your performance may vary

