



PowerSpin Series

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

PowerSpin TSW2200

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
- 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

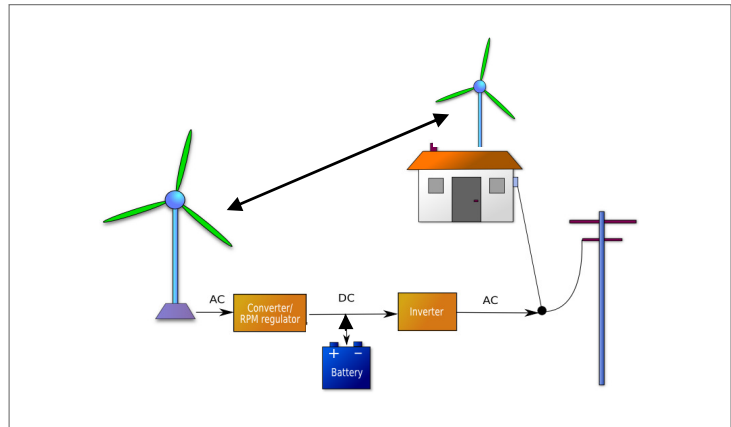
Reliability

- Robust design
- Simple to install
- No maintenance required
- 5 year warranty

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

System configurations

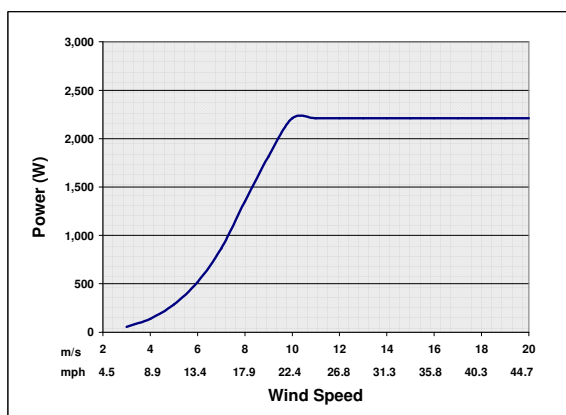
- On-grid Systems
- Off-grid systems
 - Stand-alone systems
 - Local-grid systems: serving a whole village/community instead of separate households
- Turbine could be installed on roof or on separate tower
- Wind only or Hybrid system with Solar/Diesel generator



Technical Specifications

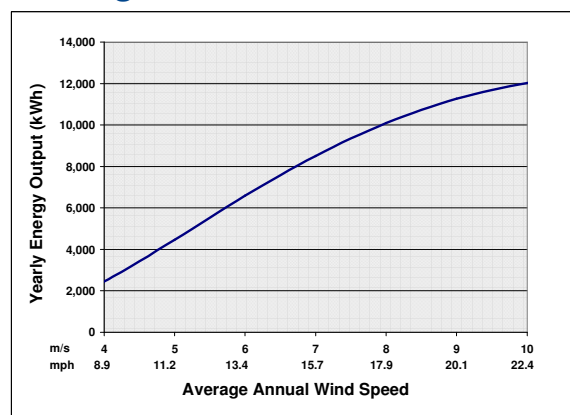
Rotor Diameter	3.5 m (11.5 ft)
Rated Power	2.2 kW
Rotor Efficiency	up to 45%
Yearly Energy Output - at average yearly wind speed of 5 m/s (11.2 mph)	4,500 kWh
Rated Wind Speed	11 m/s (24.6 mph)
Start-Up Wind	2.5 m/s (5.6 mph)
Survival Wind	55 m/s (123 mph)
Generator	Permanent Magnet Generator
Voltage for Battery Charging	12-48 V DC
Voltage for Grid Connection	Adjusted to requirements of inverter
Overspeed Protection	Mechanical and Electrical System
Maximum Axis Load	140 Kg force (310 lb)
Temperature Range	-40 C to +70 C (-40 to 158 F)
Installation	Roof or separate tower
Separate Tower Height - Minimum	6 m (19.7 ft)
Product Design Life	30 years
Warranty	5 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
- Wind head
- Tail
- Stub
- Charge controller (for battery charging) OR Electronic controller for connecting to grid-tie inverter

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 Electricity 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

TechnoSpin Inc.

601 W 26th St Rm 1260
New York NY 10001-1129 USA

E-mail: info@tswind.com

Tel. 1-212-7518336

Fax. 1-212-6561444

www.tswind.com