

## About Wind Generators...

### Wind energy as a resource...

Good sites for wind power will have average wind speeds of 16 to 24 kph or more. There are locations on the coasts, prairies and in the arctic where wind systems are ideal as a primary power source due to the consistency of the wind speeds. Most places in Canada may have strong winds occasionally, but lighter winds most of the time. In this case, wind power is an excellent supplement to other charging sources. Wind power can complement solar power, and in many places, this will give you the most power in the winter when sunlight is at a premium.



### Wind generator ratings...

Most manufacturers pick a nominal wind speed at which to rate

their wind generator, but there is not a standard wind speed that is used. Different models will perform better in lower wind speeds and others are designed for high wind areas.

Comparing wind generator output curves will tell you the expected performance at each wind speed. The current output from a wind generator increases as the square of the wind speed, so don't expect a lot of power at low wind speeds even though the unit seems to be turning quite quickly.

### Wind site selection...

Steady winds without turbulence are a must for maximum power. The higher the wind generator is placed, the stronger the winds it will experience. Avoid trees and buildings that might "shadow" the wind generator. Placing it close to the batteries will minimize the line loss and cable size. Propellers and wind generator vibration can cause a certain amount of noise. Placing the wind generator away from living quarters is recommended.

### Wind generator installation...

Access to the wind generator may be necessary, so a guyed tower with rungs is ideal. Spending time on top of a tower is not always fun, so making the wind generator easy to remove is a good idea. An electrical junction box is better than spliced connections as it makes disconnection easier. Hardware should be corrosion resistant and greased, especially in coastal areas.



Due to the height of towers and distance to the batteries, long cable lengths with wind systems are common. There are advantages tousing higher voltage systems. Consult a wiring table to keep line losses below 5% over the cable run.

## Wind generator maintenance...

All wind generators have moving parts. Bearings, brushes and shafts will all need occasional maintenance. Equipment exposed to salt water may need more frequent servicing than inland sites. Wear and tear due to normal operation can be fixed with replacement parts; however, this is not covered by the warranty.

Wind generators may be subjected to severe storm winds that can cause damage. Two blade models are more vulnerable to extra vibration than multi-bladed designs. Plastic blades are more durable than wooden blades. In very high winds the wind generator should be switched off with a stop switch.



## Small Wind Generators

### Rutland Wind Generators



Rutland wind generators are rated at 90 watts in a 32 kph wind and can deliver in excess of 250 watts in high wind conditions. They are ideal for maintaining small battery systems or to complement existing solar systems.

The 913 model is an excellent choice for marine applications. They are built using marine grade powder-coated aluminum and stainless steel. The unique, balanced, six-blade design ensures quiet operation, making this model ideal for cruising sailboats.

The Furlmatic is an industrial windcharger for use in remote, unattended sites that are subject to exceptional high winds and harsh conditions. It features auto-furling: the tail fin turns the wind charger horizontally out of the wind once speeds exceed 56 kph (35 mph), protecting the wind generator from bruning out. Furlmatics have been used at winter cabins, telecom sites and in areas prone to a lot of snow.

All models feature replaceable plastic blades, brushless, permanent magnet DC alternators and a 1 year warranty. 12 or 24 V models.



Specifications		
<b>Model</b>	<b>RUTLAND 913</b>	<b>FURLMATIC</b>
Rated Power @ 32 kph (22 mph)	90 watts	90 watts
Furling point	n/a	56 kph (35 mph)
Charging begins	9 kph (5 mph)	10 kph (6 mph)
Blade Diam.	91 cm (36")	91 cm (36")
Weight	10.5 kg (24 lbs)	17.2 kg (38 lbs)

### SR 200 Wind Regulator

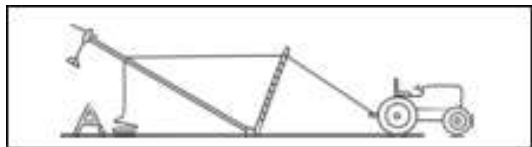
The SR-200 regulators are designed to be used with unregulated wind chargers such as the Rutlands. Once the batteries are fully charged, the regulator dissipates the surplus power as heat. Simple, reliable and easy to install. Rated at 200 watts.



SR-200/12

12 volt wind  
regulator

SR-200/24

24 volt wind  
regulator

A wind generator delivers more power if it is installed in a location with strong steady winds. The higher off the ground, the better the performance. This is why tower design is important.

In general, wind generators are mounted at least 3 to 6 m above any point within 30 m. Tower materials depend on the height, weight and lateral thrust of the wind generator. Towers range in diameter from 1 1/2" to 5" and can be made with 'Schedule 40' galvanized pipe. This is readily available from plumbing supply companies. Usually

there are four or eight guy wires supporting the tower and these are attached to concrete piers or screw anchors in the ground.

To raise the tower from a horizontal position, a 'gin pole' can be used. The gin pole is about 1/3 of the tower height and is attached to the base of the tower at a 90 degree angle. A tackle or winch pulls the tower up using the gin pole as a lever. For larger towers, a crane is employed. Once the tower is in a vertical position, the guy wires are adjusted to stabilize the tower. Larger wind generators may require lattice-type towers.



## Southwest Windpower Generators

The popular Air 403 wind generators are the ideal complement to any power system. They combine performance and value, and can deliver significant amounts of power in the right climates. All AIR models mount on 1.5" schedule 40 pipe. Three styles are available:

### Air-X Land

Ideal for home and cottage power systems, the AIR-X will add to a solar charging system by providing power when the weather is at its worst. A built-in regulator prevents battery overcharging, and output voltage is user adjustable to different battery types. Mounts on a 1.5" pipe.

### Air-X Marine

Marine models feature powder coated aluminum, sealed electronics and an improved regulator to reduce noise and vibration.

### Air Industrial

For high wind areas or extreme environments, the Industrial Air 403 has special design features to improve performance and reliability. These include higher strength blades, anodized cooling fins to reduce internal heating and larger gauge wires. It has an external regulator, with a resistive load dump to dissipate the excess power.



Air Specifications	
<b>Model</b>	<b>AIR-X Land, AIR-X Marine, AIR Industrial</b>
Rated Power	400 watts @ 45 kph
Blade Diam.	115 cm (45")
Weight	5.9 kg (13 lbs)
Voltage	12, 24 or 48 (specify)



### Air 403 Wind Generator Stop Switch



Installation of Air 403 wind generators requires a stop switch to short circuit the output for servicing or to prevent overspeed conditions. The short circuit acts like a brake and slows the wind generator rotation down enough to stop the blades by hand. The Stop Switch also provides overcurrent protection on the wiring and can be installed anywhere between the wind generator and the batteries.

Model: **AIR STOP SWITCH**

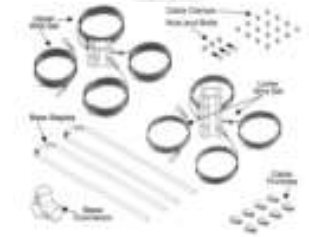
The new Wind Generator Towers from Southwest Windpower are available in 8 m (27') and 14 m (45') guyed tower kits. Installation can be completed in a few hours. Kits provide everything needed: base connector, bolts, locknuts, cable thimbles, clamps and base staples. Pipe and anchors not included.

**AIR 8 TOWER**

**8 m Guyed Tower Kit**

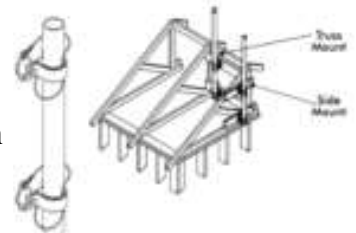
**AIR 14 TOWER**

**14 m Guyed Tower Kit**



### The Roof Mount Kit

Roof mounting has long been the simplest method of securing your wind generator, but noise and vibration often precludes this as a viable choice. Now with the AIR Roof Mount Kit, simple installation is combined with vibration isolators that reduces noise and vibration by 80%! All kits include everything the installation calls for except 1.875" OD pipe and mounting bolts. Available with or without the roof seal. Model: TOW-RA



## Wind Generators

### Whisper Series Wind Generators



The Whisper series of wind generators are ideal for cabin and full time home power systems. Sizes range from 900 to 3000 watts and these quality generators are easy to install using the optional tower kits. Featuring injection molded blades, the WP-H40 and WP-H80 have balanced three blade designs. The two bladed WP-H175 is a powerful solution for the larger power needs of farms and lodges.

Whispers are full of features including:

- Permanent magnet generator eliminates brushes
- Aerodynamic blades maximize output at slow wind speeds
- Auto-furling protects components in high winds
- EZ-Wire Centre II for regulating 24, 36 and 48 VDC systems
- High voltage AC output minimizes wire size
- User configurable output voltage (24, 36 and 48 VDC)
- Two year warranty



Specifications			
Model	WP-H40	WP-H80	WP-H175
Rated Power	900 W	1000 W	3000 W
Output/Month	60 kWhr	130 kWhr	333 kWhr
Rotor Diameter	210 cm	270 cm	450 cm
Pipe Size	2.5" Sched 40	2.5" Sched 40	5" Sched 40
Weight	25 kg (55 lbs.)	35 kg (77 lbs.)	70 kg (155 lbs.)

\*Note: Although the H40 and H80 have similar peak power ratings, the H80 will deliver up to twice as much power in lower wind speeds. "Typical output" is based on an average wind speed of 16 kph (or 10 mph).

## Whisper Wind Generator Accessories

**EZ Wire I Upgrade:** Combined regulation and metering for wind and solar systems. Required for 12 V systems.

**WP-H40 Upgrade:** 12 V or EZWire I for WP-H40

**WP-H80 Upgrade:** 12 V or EZWire I for WP-H80

### High Voltage Models

For long distance power transmission. Wind generator outputs 220 VAC, a transformer then drops this down to 12-48 VDC.

**WP-H80-HV:** High voltage model for WP-H80

**WP-H175-HV:** High voltage model for WP-H175

### Marine Models

Available for the WP-H40 and WP-H80 models, the marine version of these wind generators include powder coated castings and sealed electronics.



## Micro Hydro

### An Introduction to Micro-Hydro Systems

If your property has an adequate source of flowing water, then a small hydro system may be the most economical way of generating electricity for your home. Small hydro systems are simple, reliable and usually produce more power when you need it most, in the winter.

To take advantage of hydro power, your water source must provide both volume and pressure (head). If your creek or stream can deliver more than 45 litres (10 gallons) per minute, then you will have enough volume. Pressure is derived from the height water falls vertically, called head and expressed in meters or feet. A small hydro system needs at least 10 feet of head to provide usable amounts of power.

Our hydro systems are designed for DC battery charging, and if AC power is needed, an inverter can be added to the system. A small hydro system incorporates a turbine, alternator and water jets aimed at the turbine, and a control circuit. You will also need a battery storage bank, regulator, and enough plumbing to get the water to your turbine, usually a 2" pipe or larger.

### PM-1000 Micro-Hydro System

The PM-1000 Micro-Hydro System, manufactured by Platpus Power, is designed to maximize the output from low head and high flow situations in a simple, easy-to-install package.



		Head (Vertical Fall)					
Flow Rate	(Feet)	20	50	75	100	110	250
	<b>10</b>	-	40	75	100	110	175
	<b>15</b>	20	60	120	140	170	265
Gallons	<b>20</b>	35	90	160	200	230	340
/	<b>30</b>	70	140	220	290	340	475
Minutes	<b>70</b>	120	240	350	640	540	740
	<b>120</b>	200	480	650	-	-	-
	<b>200</b>	-	565	765	-	-	-

The generator's maximum output is 800 W. A single easily interchangeable nozzle delivers the full range of flows.

Connection of the turbine to your intake pipe is simple completed. The marine-grade 316 stainless steel runner and powder coated aluminum casing resist abrasion and corrosion to offer a durable product

**PM-1000** Platpus micro hydro system

**PM-1000-CC** Charge controller with metering

### Steam Power System

The steam engine is a quality micro hydro generator capable of producing up to 800 watts of continuous DC power. It will operate effectively with a wide range of flow and head inputs, eliminating the need for custom models. The permanent magnet design eliminates the need for brushes, dramatically increasing efficiency and reducing potential maintenance. Power output is optimized by simple adjusting the rotor clearance. A unique multi sized nozzle assembly provides a range of diameter from 1/8 " to 1". The standard unit automatically adjusts for 12, 24 or 48 VCD battery systems. A three phase AC model is also available for sites with long transmission distances. The AC is rectified to low voltage DC at the battery bank. A low head model is also available.



#### Features:

- Works on head as low 10 feet
- Adjustable for maximum efficiency
- Rugged bronze turgo runner
- Brushless design

#### Charge Regulation With Small Hydro

Since small hydro systems deliver power 24 hours a day, a load diversion regulator is ideal to use the excess power for space or water heating! See page 36 for Load Diversion controls and dump loads.

#### MHS800          Micro Hydro System

		Head (vertical Fall)													
Flow Rate	(Feet)	5	10	15	20	30	40	50	75	100	150	200	300	400	
Gallons	<b>5</b>	-	-	5	8	12	16	20	30	40	60	80	120	160	
/	<b>10</b>	-	-	10	16	30	40	50	75	100	150	200	240	320	
Minutes	<b>15</b>	-	7	15	25	45	60	75	110	150	225	300	360	480	
	<b>20</b>	5	12	20	32	60	8	100	150	200	300	400	400	640	
	<b>30</b>	8	18	30	50	90	120	150	225	300	400	550	720	-	
	<b>40</b>	10	23	40	65	120	160	200	300	400	500	650	-	-	
	<b>50</b>	15	30	50	85	160	200	250	375	500	650	-	-	-	
	<b>75</b>	20	45	75	125	200	300	375	560	650	-	-	-	-	
	<b>100</b>	30	60	100	170	300	400	500	700	-	-	-	-	-	
	<b>150</b>	40	80	125	210	400	500	300	-	-	-	-	-	-	
	<b>200</b>	-	100	150	275	500	600	-	-	-	-	-	-	-	
	<b>300</b>	-	-	200	350	700	-	-	-	-	-	-	-	-	