



## About Us

Luminous Renewable Energy Solutions (P) Limited (Formerly: UD Energy Systems (P) Limited) incorporated in February 2007, designs, manufactures, installs and maintains Off Grid & Grid Connected Wind Solar Hybrid Power Plants with its state of art technology. We are the exclusive Master Distributor in India and adjoining countries for Southwest Windpower of USA, the largest manufacturer of small wind turbines in the world. Our Company also manufactures some of the wind turbine models of Southwest, under License. We are a subsidiary of Luminous Power Technologies (P) Ltd., a USD 200 Million Company.

Luminous Renewable Energy manufactures wind – solar – battery and wind – solar – battery – diesel hybrid power plants. These Power Plants generate electricity from wind and sun, supplement any energy shortfall with short operations of diesel power controlled by a specially designed proprietary master controller.

We generate, store and deliver electricity at remote locations where Grid connected electricity have not reached. Our proprietary remote monitoring systems continuously monitor the performance of these Power Plants, store real time & historical data through GPRS/Internet for display to the customer anywhere in the world. Worldwide, specialized companies having long experience in these remote, self sustaining, automated power plants are indeed few.

Some of our major customers are State Nodal Agencies, CWET, Nokia Siemens Networks, Indian Army, Indian Navy, ONGC, Cairn Energy, Grameen Phone/TeleNor-Bangladesh, Dialog Telekom Sri Lanka, Telcom Companies in Afghanistan, Fiji, Vanuatu, Vietnam, Iran, Italy etc. Also university of Goa, Punjab, B.I.T.S & Hyatt Hotels.

### Certification & Registrations

- Ministry of New & Renewable Energy as manufacturer of Wind Turbines.
- ISO- 9001-2000 certificate for wind turbine manufacturing.
- ISO-9001-2000 certificate for project implementation.
- IEC-61400-2 & 12 certificate of performance & safety.
- CE certificate for safety - EN 60204-1, EN 1050, EN12100, ISO 7000:2004.

### Our Wind Solar Diesel Power Plant Applications:

- Off Grid Village, Tourist Resorts, Hotels & Schools Electrification
- Street Light Power supply
- Island Electrification
- Power for Light Houses & sea channel marker buoys
- Off Shore Oil Platforms
- Electricity for Yachts & mechanized fishing boats
- Power for Cathodic Protection of Pipe Lines
- Off Grid Power supply for Mobile Phone & Communication Towers
- Electric Supply to Off Grid Water Pumps
- Grid Connected small Wind Turbines for supplementing Mains power
- Hill side & sea side small wind farms up to few hundred Kilowatts



**LUMINOUS**  
RENEWABLE ENERGY  
(Formerly : UD Energy Systems (P) Limited)  
ISO 9001 - 2008, IEC 61400 & CE Certified

### Office / Factory:

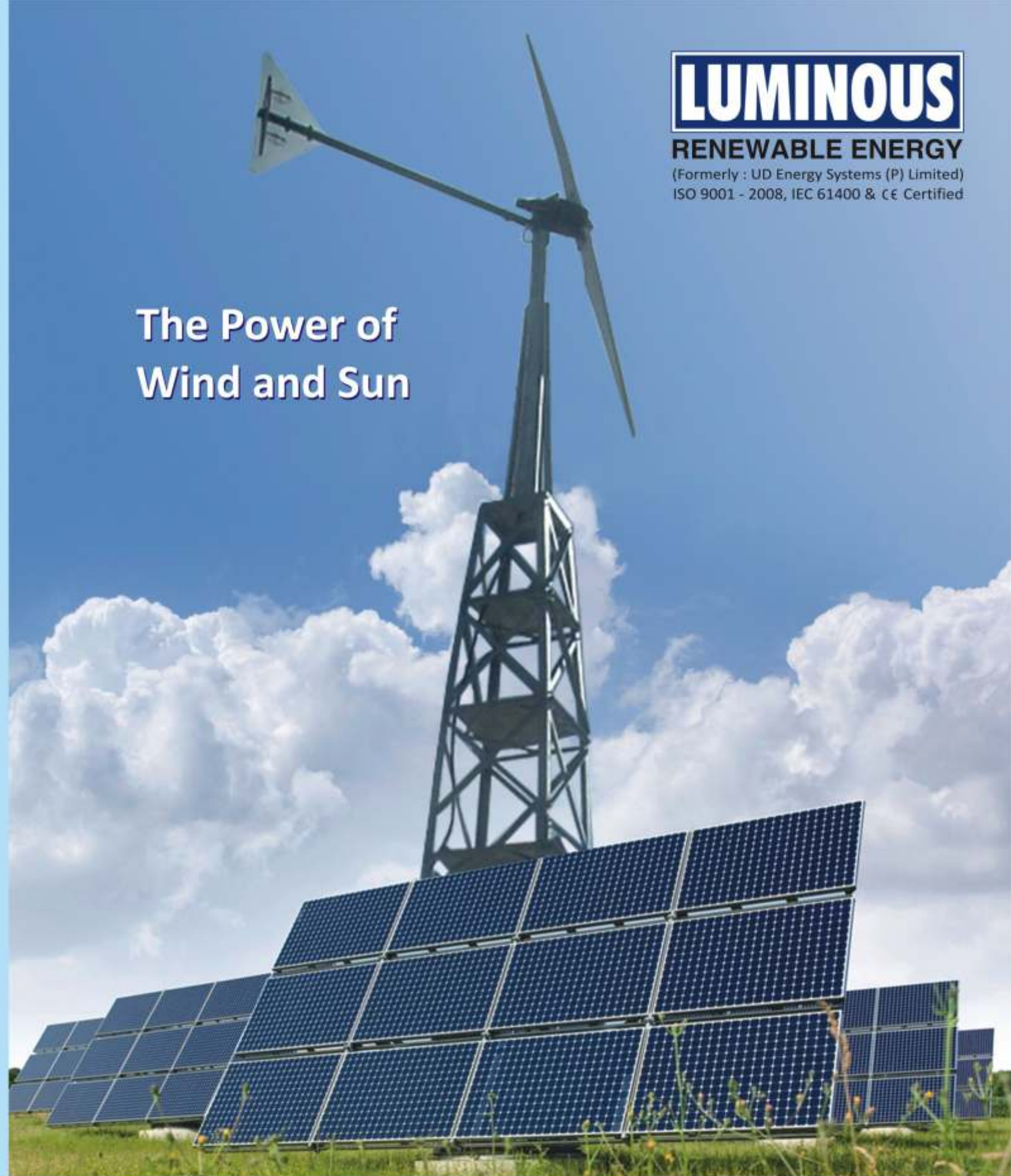
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## The Power of Wind and Sun

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Small Wind Turbines

Wind Solar Hybrid

Wind Solar Diesel Hybrid

Solar & Wind Charge Controllers

## AIR-X 400

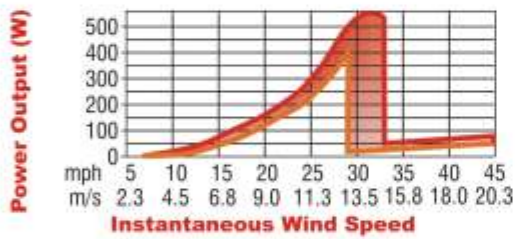
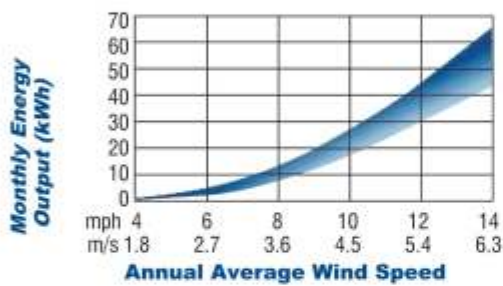
The AIR-X is an ideal product where less power is needed for basic appliances such as TV, Fan and a few lights. Also for yacht & marine use.



Rotor Diameter	3.8 feet (1.16 m)
Weight	5.8 kg
Pipe Mount	1.5 inch (38.1 mm)
Start-Up Wind Speed	3.6 m/sec
Voltage	12V/24V/48V D.C
Peak / Rated Power	400 watts @ 12.5 m/sec
Number of Blades	3
Material of Blades	Carbon Fiber composite
Material of Body	Cast Aluminium
Survival Wind Speed	49.2 m/sec
Over-speed Protection	Electronic torque control
Controller	Microprocessor-based smart internal regulator with peak power tracking.
Bearings	Low friction Sealed Ceramic

**SPECIFICATIONS**

**PERFORMANCE CURVES**



## Whisper 100

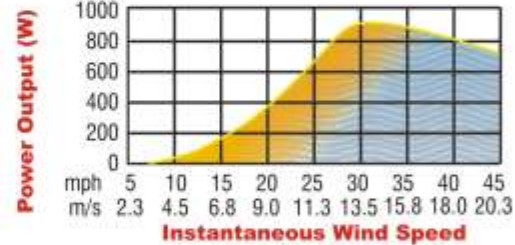
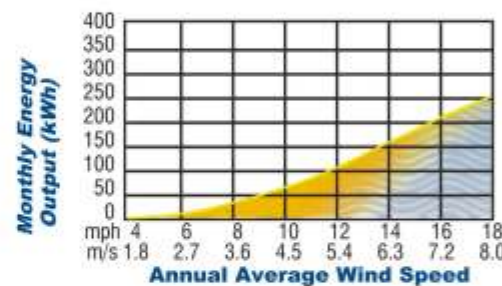
The Whisper 100 is designed to operate at medium to high wind speed. Ideal for mounting on rooftops & on mobile phone / communication towers.



Rotor Diameter	7 feet (2.14 m)
Weight	21 kg
Pipe Mount	2.5 inch (63.5 mm)
Start-Up Wind Speed	3.4 m/sec
Voltage	12V/24V/48V D.C
Peak / Rated Power	900 watts @ 12.5 m/sec
Number of Blades	3
Material of Blades	Polypropylene & Carbon Fiber Composite
Material of Body	Cast Aluminium (Corrosion proof)
Survival Wind Speed	49.2 m/sec
Over-speed Protection	Angle governor & dump load
Controller	External regulator.
Bearings	Low Friction, totally enclosed & self lubricated

**SPECIFICATIONS**

**PERFORMANCE CURVES**



## Whisper 200

The Whisper 200 is designed to operate at low to medium wind speeds. Ideal for mounting on rooftops or mobile phone / communication towers & offshore oil platforms.

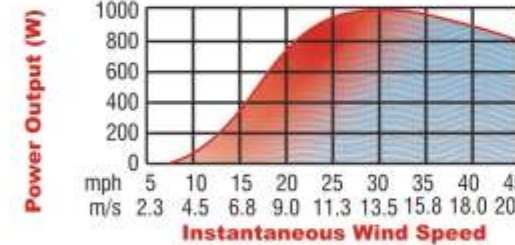
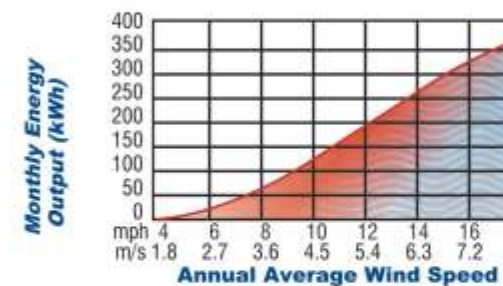


Rotor Diameter	9 feet (2.75 m)
Weight	30 kg
Mount	2.5 inch (63.5 mm)
Start-Up Wind Speed	3.1 m/sec
Voltage	24V/48V & also 120V/240V D.C
Peak / Rated Power	1000 watts @ 11.6 m/sec
Average 1 min output	700 watts
Number of Blades	3
Material of Blades	Polypropylene & Carbon Fiber Composite
Material of Body	Cast Aluminium (Corrosion proof)
Survival Wind Speed	55 m/sec
Over-speed Protection	Angle governor & dump load
Controller	External regulator
Bearings	Low Friction, totally enclosed & self lubricated

**SPECIFICATIONS**

Note: Both peak & average output type tested as per IEC 61400-12

**PERFORMANCE CURVES**



## Whisper 500

The Whisper 500 can produce enough energy to power a cluster of rural homes. Ideal for mounting on rooftops. At windy locations a single W500 can provide all power required by a mobile phone tower.



Rotor Diameter	15 feet (4.58 m)
Weight	70 kg +/- 10%
Pipe Mount	5 inch (127 mm)
Start-Up Wind Speed	3.1 m/sec
Voltage	24V/48V DC & also 120V/240V DC
Peak / Rated Power	3200 watts @ 12 m/sec Rated power 3000W at 10.7 m/sec
Number of Blades	2
Material of Blades	Epoxy, Fiber Glass and carbon composite
Material of Body	M.S. powder coating as per ASTM B-117 suitable for marine
Survival Wind Speed	55 m/sec
Over-speed Protection	Angle governor with shock absorber, auto dumping and auto electro magnetic brake
Controller	External regulator
Bearings	Low Friction, totally enclosed & self lubricated

**SPECIFICATIONS**

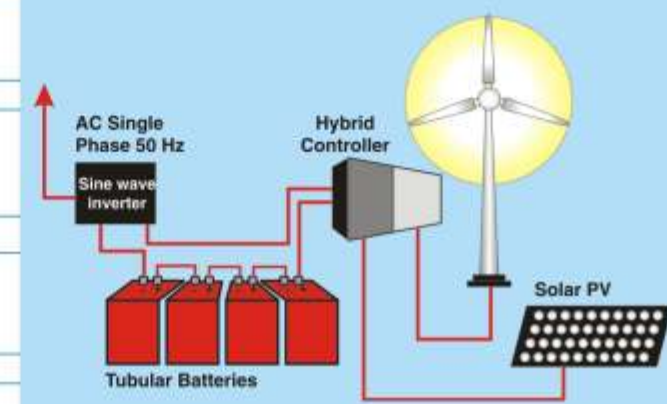
**PERFORMANCE CURVES**



### Ready reckoner for Wind Solar Hybrid selection : Configuration - Energy Output - Utilization

Wind Turbine Model & Capacity (W)	Solar Panel Capacity (W)	Type of House	Energy per Month (wind speed 4.5 m/s avg.)	Energy per Month (wind speed 5.4 m/s avg.)	Energy per Month (wind speed 6.3 m/s avg.)	Energy per Month (wind speed 7.2 m/s avg.)
			Electrical Equipment - hrs. of use	Electrical Equipment - hrs. of use	Electrical Equipment - hrs. of use	Electrical Equipment - hrs. of use
AIR X 400 (400W)	150 W	Hut	30 KWH 1 Hut Only 4X15W CFL - 6H 1XSmall CTV - 4H	40 KWH 1 Hut Only 4x15W CFL - 6H 1XSmall CTV - 4H 1XFan - 6H	60 KWH 2 Huts only 8X15W CFL - 6H 2XSmall CTV - 4H	80 KWH 3 Huts only 12X15W CFL - 6H 3XSmall CTV - 4H
			60 KWH 6X18W CFL - 6H 1XCeiling fan - 8H 1XCTV - 5H	90 KWH 6x18W CFL - 6H 2XCeiling Fan - 6H 1XCTV - 5H	140 KWH 8X18W CFL - 6H 2XCeiling Fan - 8H 1XCTV - 5H, 1XPC - 2H	190 KWH 6X18W CFL - 6H 2XCeiling Fan - 6H 1XCTV - 5H, 1XPC - 2H Small Fridge - 24H
Whisper 100 (900W)	300 W	Small House	120 KWH 8X18W CFL - 6H 2XCeiling Fan - 8H 1XCTV - 5H	190 KWH 8X18W CFL - 6 H 2XCeiling Fan - 8H 1XCTV - 5H, 1XPC - 2H Small Fridge - 24H	260 KWH 10X18W CFL - 6H 3XCeiling Fan - 8H 1XCTV - 5H, 1XPC - 2H 260L Fridge - 24H	310 KWH 12X18W CFL - 6H 4XCeiling Fan - 8H 1XCTV - 5H, 1XPC - 2H 260L Fridge - 24H
			370 KWH 12X18W CFL - 6H 4XCeiling Fan - 8H 1XCTV - 5H, 1XPC - 4H Large Fridge - 24H	500 KWH 16X18W CFL - 6 H 4XCeiling Fan - 8H 1XCTV - 5H, 1XPC - 2H Large Fridge - 24H 1HP water pump - 1H	720 KWH 24X18W CFL - 6 H 6XCeiling Fan - 8H 2XCTV - 5H, 3XPC - 4H Large Fridge - 24H 1HP water pump - 1H	980 KWH 24X18W CFL - 6 H 6XCeiling Fan - 8H 3XCTV & PC - 5H Large Fridge - 24H 1HP water pump - 1H Toaster / Mixer / Etc

### SYSTEM CONFIGURATION



Figures above are approximate.

## Tubular Batteries (SUNCHARGE BRAND)

(Cycle Life: 1200 cycles at 80% depth of discharge)

Battery Type	Nominal Voltage	Ampere Hour Capacity at different discharge rates.				
		@ C <sub>10</sub>	@ C <sub>5</sub>	@ C <sub>3</sub>	@ C <sub>2</sub>	@ C <sub>1</sub>
12SC150	12	150	124	104	92	75
12SC200	12	200	166	140	124	100
2SC400	2	400	332	280	248	200
2SC500	2	500	415	350	310	250
2SC600	2	600	496	416	368	300
2SC800	2	800	664	560	496	400
2SC1000	2	1000	830	700	620	500



## Solar Photovoltaic Modules

Power	Pp (watts)	40	50	70	80	100	110	125	135	140	145	150	160	170
Voltage at rated power	V <sub>ld</sub> (Volts)	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	33.0	33.0	33.0
Voltage at maximum power	V <sub>mp</sub> (volts)	>16.4	>16.0	>16.0	>16.0	>16.0	>16.0	>16.0	>16.0	>16.0	>16.0	>32.0	>32.0	>32.0
Current at maximum power	I <sub>mp</sub> (amps)	2.35	2.95	4.10	4.70	5.90	6.50	6.95	7.50	7.80	8.05	4.15	4.45	4.70
Open circuit voltage	V <sub>oc</sub> (volts)	>21.0	>21.0	>21.0	>21.0	>21.0	>21.0	>21.0	>21.0	>21.0	>21.0	>42.0	>42.0	>42.0
Short circuit current	I <sub>sc</sub> (amps)	2.71	3.03	4.25	4.84	5.99	6.71	7.43	8.18	8.29	8.38	4.36	4.91	5.00
Solar cells per Module	Units	36	36	36	36	36	36	36	36	36	36	72	72	72
Length	mm	702±3	822±3	1202±3	1202±3	1102±3	1212±3	1322±3	1485±1	1485±1	1485±1	1665±3	1235±1	1235±1
Width	mm	530±3	530±3	530±3	530±3	655±3	655±3	655±3	655±1	655±1	655±1	655±3	990±1	990±1
Weight	kg	4.20±5%	5.00±5%	6.60±5%	7.20±5%	8.20±5%	9.00±5%	9.80	11.2	11.2	11.2	13.0	14.3	14.3

**Note:** • Dimension & weight can change from time to time as per latest design & development.

• ± 3% Tolerance on Electrical Parameters tested under STC

• TEMPERATURE CO-EFFICIENT: V<sub>oc</sub> -0.34% / K, I<sub>sc</sub> + 0.03% / K, P<sub>max</sub> - 0.48% / K

## Power Electronics



### PWM Solar Charge Controller

24v to 240v in  
2.5 kw / 4kw Modules  
Battery overcharge / reverse flow protection.  
(Energy & Data logging optional)



### Master Controller

Microcontroller based control of Multiple Wind Turbines, Solar Arrays, Generator auto start stop, AC/DC Battery charger 75A to 200A. Real Time Data Storage, Battery S.O.C monitoring & output voltage regulation.



### PWM Wind Charge Controller

24v to 240v & 1000w to 3200w  
Battery & wind turbine protection in auto mode. Equalising charge in Manual mode.  
(Energy & Wind speed data logging - optional)



It is a Wind-Solar-Battery-Diesel / Biogas Generator based automated hybrid power station for continuous / no-break power supply at remote locations. Multiple energy sources are utilized one or more at a time to ensure continuous power delivery to critical installations.

### Remote off grid Critical installations viz:

- Mobile / Tele Communication towers
- VHF / Microwave repeater stations
- Meteorological stations & Light Houses
- Border Defence / Communication / Radars
- Cathodic protection for pipelines, etc

### A typical installation consists of a Wind-Solar-DG-Battery hybrid to provide continuous power, totally unmanned.

1. **Wind** : Micro wind turbines, light in weight, mounted on own tower or telecom tower at a height of 20 to 35 meters. Wind turbines are sized optimally to generate full day's power, round-the-clock (depending on wind speed) they also generate at the peak capacity in monsoon, when solar does not work. One or multiple turbines are used, depending on load requirement.
2. **Solar** : Solar module of adequate capacity to provide and supplement power, during low wind season.
3. **Battery** : A deep cycle tubular battery bank with one to three days autonomy is used to store the power and supply to the equipment. The battery has a life of 1200 cycles at 80% DOD or 7 to 10 years.
4. **Master controller**
  - A master controller consisting of solar charge controller, wind charge controller/multiple controllers, over & under voltage protection and continuous metering & display by micro controller for power input & output.
  - Master controller controls output voltage within a specific band to meet telecom/other system requirements by a voltage regulator.
  - Continuously monitoring battery state of charge by micro controller.



- If the battery gets discharged beyond a certain point due to low /zero generation from wind and solar, the sensor notes low energy level in battery, signals & automatically starts the Diesel / Gas generator. The DG recharges the battery through a specially designed battery charger built into the controller & stops only after a preset level of recharge is sensed. The recharge is designed to be completed in 3 to 4 hours thus reducing DG run time.
  - In the event of a DG failure, the master controller sends an alarm signal, so the repair team can be alerted. The battery still has 12 to 24 hrs. of energy storage & so the equipment has uninterrupted work cycle.
  - The micro controller has periodic auto calibration properties inbuilt & error in reading is corrected periodically.
  - The Master Controller displays real time data on voltage / current / power generation / consumption / battery state of charge & stores past data of energy generation & consumption.
  - Special units can also be provided for monitoring DG operation (temperature, lubrication etc) & wind speed data display & storage.
  - The AC/DC charger units have redundancy and the complete master controller can be operated on manual mode in case of any temporary auto system malfunction.
5. **Remote Monitoring** (Internet / GPRS based)  
Continuous data on power generation, power usage, state of health of the system/batteries can be monitored through the internet from anywhere in the world. History of power generation and usage for any earlier period is also available in tables or graphs. (optional)

## SKYSTREAM 3.7™



The first small wind generator designed specially for grid connected residential use.

Skystream 3.7™ allows all buildings located in average to medium windy areas to harness wind energy, supplement their mains electricity and drastically reduce electricity bills.

Skystream has a built in micro-processor controlled grid tie inverter, which connects to your residential power line & feeds power, matching voltage, frequency & phase. It is designed to generate at low wind speeds. This wind turbine is of downwind design with curved blades for very low noise levels.

Model	Skystream 3.7™
Rated Capacity	2.4 kW peak
Weight	170 lbs / 77 kg
Rotor Diameter	12 feet / 3.72 m
Swept Area	115.7 ft <sup>2</sup> / 10.87 m <sup>2</sup>
Type	Downwind rotor with stall regulation control
Direction of Rotation	Clockwise looking upwind
Blade Material	Fiberglass reinforced composite
Number of Blades	3
Rated Speed	50 - 325 rpm
Tip Speed	66 - 213 f / s / 9.7-63 m/s
Alternator	Slotless permanent magnet brushless
Yaw Control	Passive
Grid Feeding	120 / 240 VAC 50 - 60 /Hz
Braking System	Electronic stall regulation with redundant relay switch control
Cut-in Wind Speed	12.5 kmph / 3.5m/s
Rated Wind Speed	32 kmph / 9 m/s
User Control	Wireless 2-way interface remote system
Survival Wind Speed	225 kmph / 63 m/s
Sound	45 decibels @ 40 ft (12 m)