Hetronix Wind Power Generator Keith_2K

Hetronix Keith_2K Features

- Start-up wind speed：3.5m/s
- Rated wind speed：12.5m/s
- Survival wind speed：50m/s
- Rated Power：2KW
- Maximum Power：3KW
- Rotational speed：145rpm～780rpm
- Generator：3Phase/18Poles
- Over speed protection ：Active side furling protect
- Rotor Diameter：2.488m
- Weight：58kg
- Blade： carbon/glass fiber reinforced composite

Hetronix Keith_2K Specification

Hetronix Keith_2K wind turbine system is the latest small wind turbine generator system designed to provide electricity which can be used on several different type applications, such as batteries charging, or stand alone remote electrical power supply system. Furthermore, with the additional Power Grid Inverter, the Hetronix Keith_2K wind turbine system can also be connected to the power grid.

The Hetronix Keith_2K wind turbine system consists of a 2.5 meter rotor system and a generator which is 35cm in diameter. The 58 kilogram wind turbine is rated at 2000 watts @ 12.5 m/s wind.

The Hetronix Keith_2K wind turbine system features superior low wind-speed blade design which provides great performance, very high system efficiency, and low noise. The Hetronix Keith_2K wind turbine system also provides the optional mono-tower kit and guyed tubular tilt tower kit.

Depending on the output voltage, there are six types of Hetronix Keith_2K system, see the following table for more details.

Keith_2K Wind Turbine System			
Rotor diameter	2.488 m	Total weight	58 KG
Cut-in wind Speed	3.5 m/s	High Wind Protection	Start @ 13.5 m/s
Rated wind Speed	12.5 m/s	Rated output	2kW @ 12.5 m/s
Survival Wind Speed	50 m/s	Rotor RPM Maximum Power	145rpm-780rpm 3kW
Generator Output (six types)	A _type：3Phase AC 7V ~ 55V B_type：3Phase AC 15V ~ 125V C_type：3Phase AC 30V ~ 240V D_type：3Phase AC 60 V ~ 380 V E_type：3Phase AC 120 V ~ 440 V F_type：3Phase AC 160 V ~ 600 V		
Generator	3-phase permanent magnet generator of a 18 polarity structure		

High-Wind Protection

In case of high wind speeds, the High-Wind Protection Function system will protect the wind turbine automatically. When furled, the rotor will turn away from the wind direction, the rotor speed will reduce, and the power output of the turbine will be significantly reduced.

High-Wind Protection Function is an easy method to provide high wind speed protection. The High-Wind Protection Function is based on basic physical relationship between the aerodynamics, rotor, gravity, and the specially designed tail shape and weight balance of The Keith_2K wind turbine system.

The High-Wind Protection Function is completely passive, so it is very reliable. But there is one situation in the field that we have found can disrupt the operation of High-Wind Protection Function. If the wind turbine is installed on a sharp hill or next to a cliff so that the wind can come up through the rotor on an incline (e.g., from below; as opposed to horizontally) this will affect furling and can produce higher peak outputs. We strongly recommend avoiding this situation.

Protect action 1

Protect action 2

Protect action 3

Caution

- Please do not install Keith_2K wind turbine system near cliffs or precipices or on sharp hills such that the wind does not travel horizontally through the rotor.
- The weight distribution of the system is specially balanced. Any change of the system weight and balance, especially the tail, may cause malfunction of the High-Wind Protection Function

Note

- Additional Electromagnetic over-speed protection is provided by the electronic system controller.

Keith_2K wind turbine

Hetronix Keith_2K assembly consists of the blade hub, generator casing, and the nacelle.

- Central Body Assembly

The central body assembly consists of the blade hub, generator casing, and the nacelle. It is the main structural “backbone” of the rotor system, the generator, the yaw bearings, slip-ring assembly, the tail, and the tower mount. The yaw bearings allow the wind turbine to turn around the top of the tower in order to head the wind. The slip-ring assembly is the electrical connecter to connect the movable part of the wind turbine and the fixed tower wiring. The slip-rings and yaw bearings are located inside the tower mount. The tower mount attaches Keith_2K wind turbine system to the top of the tower through the tower mount adapter.

- Blades / Rotor System

The rotor system consists of three fiberglass/carbon fiber blades. The glass/carbon fiber blades are structurally strong because there are extra carbon/glass reinforcing fibers layers that hold the full length of the blade. The blades absorb the energy of the wind and convert them into rotational forces that drive the generator. The rotor system includes three blades because three blades will provide excellent balance between the cost and efficiency and can run much smoother than two blades rotor.

The composites blades are very strong in tension, but they are susceptible to impact damage. They should be handled carefully to avoid any impact during installation

- Generator

The generator converts the rotational energy of the blade/rotor system into electricity. It is a 3-phase permanent magnet generator of an 18 polarity structure. The generator is a completely new design for the Keith_2K wind turbine system and could produce power at low rotating speeds. The output of the generator is three-phase variable-frequency alternating current (AC), but it can be rectified to direct current or connected to power grid through a grid-tie device.

Warning :

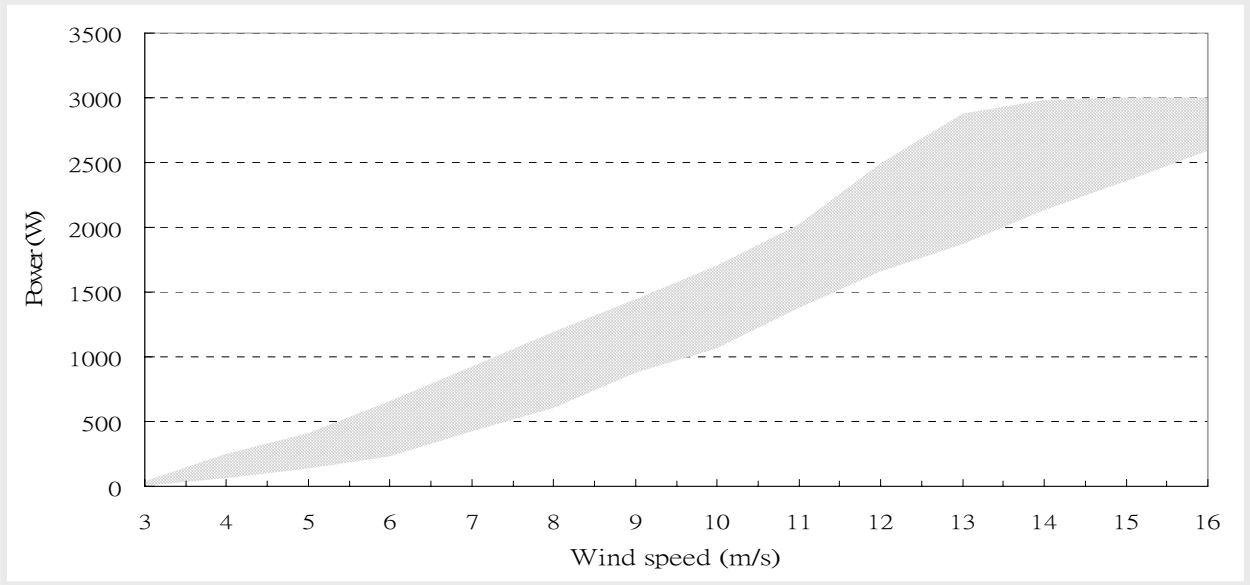
The output wiring of Keith_2K wind turbine system may cause a low voltage shock whenever the rotor is turning. Caution must be implemented at all times to avoid electrical shock.

- Tail Assembly and High-Wind Protect Function

The tail assembly, which includes the tail boom and tail fin, will keep the generator Assembly and rotor facing to wind at wind speeds less than about 13.5 m/s. At wind speeds reaching approximately 13.5 m/s, the High-Wind Protect function actives and turns the rotor partially away from the wind to prevent the rotor over-speed. The rotor does not, however, turn completely sideways. That allows the turbine to continue to generate electrical power before it reaching the safety shutdown control point in high winds. When the wind speed slower, the High-Wind Protect function will inactive and turn the turbine back to the heading wind position.

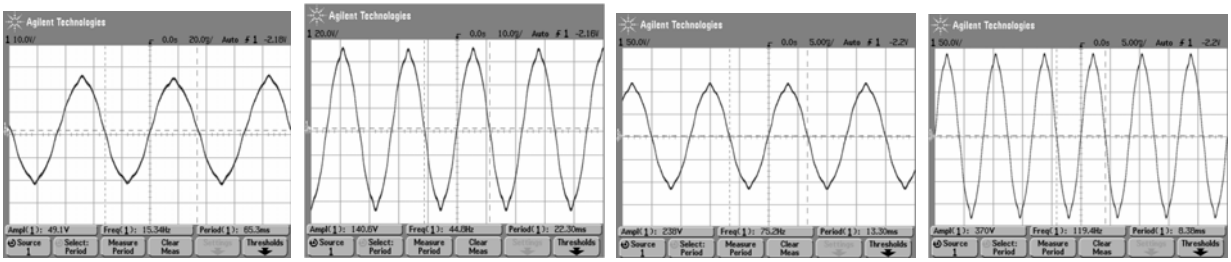
Keith_2K Efficiency

The generator of Keith_2K wind turbine system should begin to generate electricity when the wind speed reaches approximately 3 m/s. The rotor rotational speed will increase with higher wind speed. The generator output is proportional to the third power of wind speed. Please refer to Figure for the relationship between energy output and wind speed.



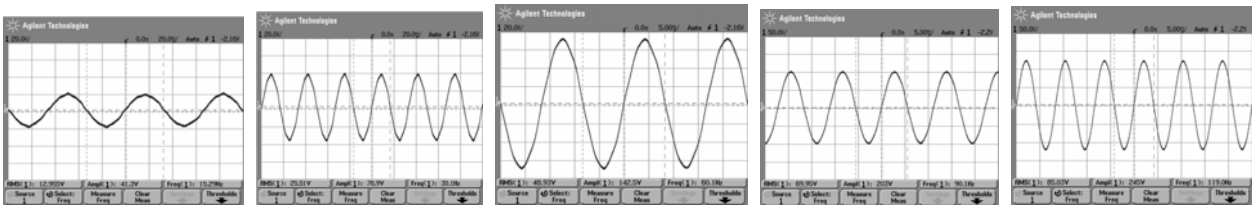
Note

The operational wind speeds and performance in the manual assume the condition of sea-level altitude, steady winds, and moderate temperatures. High altitude, hot temperatures, turbulence and gusting winds will usually bring the system performance lower than expectation.



(a) 100 rpm voltage (b) 300 rpm voltage (c) 500 rpm voltage (d) 800 rpm voltage

Open circuit voltage at the rotational speed of **(a) 100 rpm、(b) 300 rpm、(c) 500 rpm (d) 800 rpm**。



(a) 100 rpm (b) 200 rpm (c) 400 rpm (d) 600 rpm (e) 800 rpm

Load 2.3Ω test voltage at the rotational speed of (a) 100 rpm、(b) 200 rpm、(c) 400 rpm、(d) 600 rpm (e)800 rpm。

CE Certification

- EN 61400-2：2006,Wind turbines – Part 2： Design requirement for small wind turbines
- EN ISO 12100-1：2003, Saffty of machinery – Basic concepts, general principles for design – Part 1：Basic terminology, methodology
- EN ISO 12100-2：2003, Saffty of machinery – Basic concepts, general principles for design – Part 2：Technical principles
- EN 1050：1996, Safety of machinery – Risk assessment
- EN 60204-1：2006, Safety of machinery –Electrical equipment of machines-Part 1：General requirements
- EN 44011：1998, Electromagnetic compatibility – Industrial, scientific and medical (ISM) radio-frequency equipment- Radio disturbance characteristics- Limits and methods of measurement
- EN 61000-4-2：1995, Electrostatic discharge (ESD)
- EN 61000-4-4：1995, Electrical fast transient/burst requirements (EFT/Burst)
- EN 61000-4-6：1995,Immunity to conducted disturbances, induced by radio-frequency fields (CS)

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