

## AIR-X WIND TURBINE

Manufactured by Southwest Wind Power, the Air-X wind turbine is capable of producing a maximum of 400 W under ideal (28 mph) conditions. It sits atop a 25 foot tall mast and is mounted so that it may rotate freely to face the wind, no matter the direction. The AirX requires an 8 mph wind to begin charging the batteries, and intelligently self-brakes in 33 mph winds to prevent damage.

Unlike the solar panels, the turbine has no need for the Xantrex 35A charge controller. Essentially, the turbine has a charge controller of its own inside the casing. It actively monitors the batteries, only charging them when necessary. A knob on the turbine's aluminum casing allows the user to specify the "float charge" setting, or "when it's necessary" to charge the batteries.

**WHAT:** Southwest Wind Power AIR-X Wind Generator  
**ROTOR DIAMETER:** 46 inches  
**WEIGHT:** 13 lbs  
**START-UP WIND SPEED:** 8 mph  
**SHUT-DOWN WIND SPEED:** 33 mph

**400** Watts (max)

## CONTROL CABINET



- 1 Custom Data Acquisition Board**  
The DAQ is the "brain" of the operation. It monitors and records the flow of energy all over the system.
- 2 Vector 750 Watt Power Inverter**  
The inverter is responsible for converting the batteries' DC electricity into familiar AC electricity that everyday appliances can use.
- 3 Xantrex 35A Charge Controller**  
Batteries are permanently damaged when overcharged. The Charge Controller prevents this from happening.
- 4 115Ah Deepcycle Marine Batteries**  
Notice, these are not car batteries. Unlike car batteries, these offer steady power no matter how "charged" they are.
- 5 Standard Duplex Electrical Outlet**  
Just like an outlet in your home, except everything plugged in here is powered by 100% renewable green energy!
- 6 Pyramid PA205 Power Amplifier**  
This Amplifier takes energy from the batteries to power the speakers. It also makes karaoke possible!

## KYOCERA SOLAR PANELS

These solar panels are photovoltaic modules that convert light from the sun into electricity. They generate the most power when pointed directly at the sun, and are far less efficient when angled away from direct sunlight. Each panel consists of 4 groups of 9 modules wired in series, so any shadow or obstruction of any part of the panels effectively turns the panel "off."

**WHAT:** Kyocera KC125TM  
**SIZE:** 56 inches x 26 inches x 2.5 inches  
**WEIGHT:** 27 lbs

**125** Watts (each)

# REST

## ANDREW CROSS

Having read my resume, you may be interested in more information on the senior design project I led as a senior at the University of Kansas. This is a slightly modified version of the poster I created to accompany our "Mobile Power Station" when giving demonstrations and formal presentations. Every piece of the rendering was modeled by myself and assembled to scale in SolidWorks 2009.

As previously mentioned, I was the acting team captain. However, outside of the expected project planning and managing I did, I was vital to the design and construction of the electrical subsystem. More specifically, I collaborated with one other team member to produce a robust and fully functional data acquisition system that was capable of monitoring, storing, displaying, and analyzing the instantaneous flow of energy throughout the system. I converted our conceptual ideas to CAD files, and had our design manufactured. One component was soldered onto the board, I wrote on-board software for what was essentially a data acquisition board, and offboard software for a USB-connected laptop.

In its completion, the power station was well received by everyone who witnessed it in action. Being durable, functional, and accessible, I expect the station to be a continuing source of education for students and the general public alike. In fact, as part of a larger initiative, I, along with my team members, were co-founders of the now-popular KU EcoHawks that strive to make advances in the area of a sustainable energy infrastructure.

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