

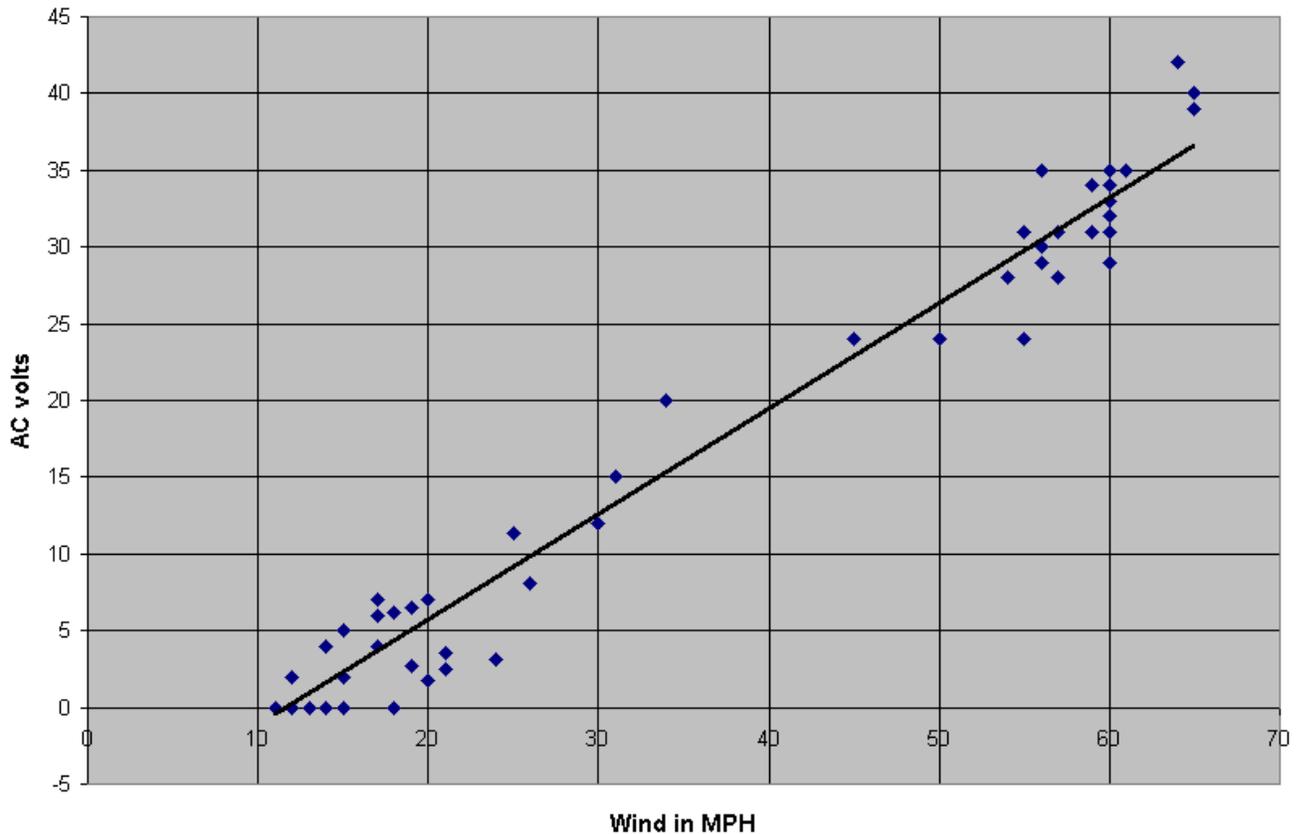
Subject: Measure Wind Speed #2 - PM motor DC fan
Date: 23 Oct 99

The first posting on this I said "If one has a way to produce a strong AC magnetic field one should be able to lower the field strength of the PM. If the PM field is reduced it should start at a lower speed."

Well I took my own advice. By using a Variac (autotransformer) and monetarily zapping (about 5-10 times) the fan with voltages up to about 100 volts across the leads soldered to the field coils, two useful things happened. One, the IC and any other components in the PC board got zapped and open circuited (I heard a pop at one point). This effectively disconnected them as a load. The second, is the permanent magnet was exposed to a strong rapidly changing magnetic field. This lowered to some extent the strength of the PM to allow it to start at a lower average speed found to be 32 MPH.

I found that a roughly 800K ohm resistance across the output helped even the output out a bit for the digital AC voltmeter. The results came out better in that the unit will work down to about 11 MPH. See new test results at

PM 12 Volt DC 2.2" Diamiter Fan (Zaped & 828K ohm)



Subject: 20" fan test as generator
Sent: 23 Oct 99

20" 115 V 60 cycle fans are common and easily available. The question becomes can they be used to generate electricity in some easy way? If the answer is yes then a bunch of these could be put on a hill or top a structure with a strong wind blowing to individually generate a small amount of power from each.

I made a test using two identical 20" three speed fans. Fan #1 the test fan-generator was placed in front of fan #2 a simulated strong wind. The power of fan #1 was measured with fan #2 running on its highest setting to turn fan #1 faster than it's lowest speed. A power 115-Volt power meter was used to compare the power with fan #1 running by it's self to running with fan #2 trying to turn it faster. My measurements show that the amount of power that fan #1 used dropped by only about 5% when fan #3 was trying to turn it faster. The resulting wind speed was about 26 MPH coming out of fan #2.

What this says to me is it is impractical to excite one of the windings on a 20" fan with 115V AC and expect to get any energy back with a reasonable wind speed. It is probably not possible with any amount of wind speed using this method.

MikeL

Subject: Measure Wind Speed - PM motor DC fan
Date: 22 Oct 99

If you get caught after the PS without a way to measure wind speed, and if you can find a small PM (permanent magnet) fan and a voltmeter, then you can make one.

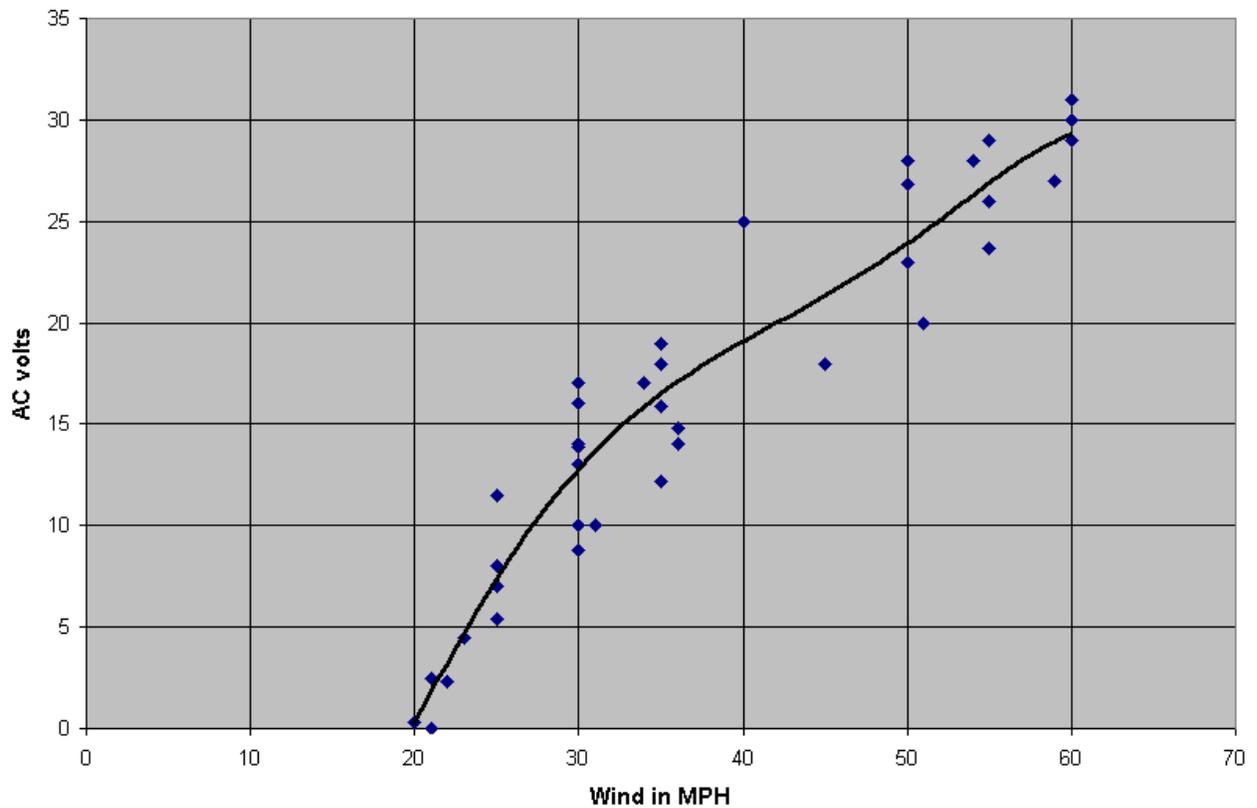
Test results measuring wind speed using a small surplus electronic cooling fan. This was a 2.35" by 2.35" PM (Permanent Magnet) motor 12-Volt .07 Amp DC brushless. It has 2.2" diameter blade on tiny ball bearings. Specifically this was a Wind Ace Model D60M12A. It has three leads Red (positive), Blue (negative) and Yellow.

It uses an integrated circuit on a small printed circuit board internally to take the 12-Volt DC and change it to AC to drive the stationary windings. If one drives this as is with wind one gets up to about 70 mili-volts across Red and Yellow with no voltage across any other combinations. This is not very efficient and not recommended way of using it.

By taking one unit apart and determining where the windings are that produce the most AC voltage when the fan blades are turned, one can then find the proper place to drill through the housing on another good unit. Connect two wires directly to the printed circuit board where the static field coil wires come through. Run this to a voltmeter (from Harbor Freight Tools \$10) and you have a crude high speed wind meter. Put this in an old plastic bottle with the top and bottom cut off. I stuffed plastic foam around it to hold it. See picture <http://homel.gte.net/mikelob/r0301057.jpg>

Because of the strong Permanent Magnets it won't start turning until between about 28-50 Miles/hr with an average of about 40 Miles/hr wind. The variation occurs because some places it stops at are harder to get started than other places. The magnet is closer to the field at some places, I believe. If one has 25 MPH or above wind speed, and one gives it a genital spin it will keep going and give you wind speed down to about 20 MPH. See test result using a car speedometer to calibrate it.

PM 12 Volt DC 2.2" Diameter Fan



Other small fans may work better. If one has a way to produce a strong AC magnetic field one should be able to lower the field strength of the PM. Will need to take it apart to do this. Most have a metal shield around the magnet so that attempting this from the outside doesn't work. I tried it. If the PM field is reduced it should start at a lower speed.

I didn't disconnect the IC circuit and it worked fine. If you are lucky enough to find one that starts turning consistently at a given RPM then this could be used as a high wind warning, by tripping a small relay and an alarm.