Wind Speed Generators

MAXIMUM

Our wind speed sensors have proven themselves in wind tunnel tests, in mountain-top tests and in thousands of household and institutional installations to be rugged, reliable and highly accurate. The type #41 generator has recorded wind to 214 MPH. Their low moment of inertia and unique bearings permit very rapid response to gusts and lulls. The black Lexan cups (virtually shatter-proof) have thermal properties which let it resist and shed icing far more effectively than metal assemblies. Because of their output linearity these sensors are ideal for use with various data retrieval systems. The experience that Maximum has built up over the years has provided the basis of our solid confidence in these sensors for a wide variety of applications.

Technical Specifications

Mechanical

3 cups of conical cross-section, 2" diameter.
7.5" swept diameter of rotor.
2" diameter housing.
3.2" overall assembly height.
Moment of inertia of rotor assembly = 68 x 10^{-6} x S-ft².
Material of cups is black Lexan.
Material of housing is black ABS.
Shaft material is beryllium copper; fully hardened.
Upper and lower bearings of modified Teflon, self-lubricating.
They have a rated PV factor of 20,000 (at 15mph, PV is approx. 500; at 100mph PV is approx. 2,000).
Upper bearing is centered in the plane of cup thrust for optimal loading.
Permanent magnet: Indox 1,1"dia.,½" long, 4 poles.
Generators mount (using a cotter pin) on a 0.500" diameter mast with a #35 hole 0.350" from top of mast.
Starting threshold < = 4 MPH
Distance constant 10 feet

Environmental

Operating temperature: -67 to + 130 degrees F
Operating humidity range: 10 to 100% RH

Electrical

Type #41

2 coils, bobbin wound, 4100 turns of #41 wire, one coil fixed, one coil rotated for production calibration.
0.01 MFD ceramic disc capacitor for RF suppression.

The type #41 Generator is factory calibrated to drive our meter circuit. It is driven at 1800 RPM and the moveable coil is adjusted to drive our meter circuit to 102 MPH +/- 2.5%.

The easiest method of using our voltage output is to scale the voltage to the air speed. This is achieved by connecting a fixed resistance in parallel with the Generator. The resulting output voltage will be equal to the air speed divided by 100 (ie. 1.00 Volts = 100 MPH).

Resistance (Ohms)	Output Units
191	m/s divided by 100
422	Knots divided by 100
499	MPH divided by 100
1000	Km/h divided by 100

Note: If you wish to use D.C. volts for your readings, an Op-Amp used as an active rectifier will convert the A.C. volts to D.C. volts with no loss. A standard rectifier will cause nonlinearity by incurring a nearly constant voltage drop.

$$\text{AC Frequency output (Hz)} = \frac{\text{Air speed (MPH)} + 0.1}{1.6965}$$

Type #400

Single coil (approx. 2.02 VAC at 60 cycles) where voltage output is not important. Used as a frequency counting sensor. Has the same linearity-wind speed to cup rotation and frequency output-as type 41.

Hall Effect

Uses a Hall Effect Digital Switch (Allegro #A1106EUA-T) to directly drive digital circuitry. Output frequency same as types #400 & #41.