

# Model 05103 Wind Monitor

*Document 1874B*



Originally developed for ocean data buoy use the Wind Monitor is well suited for a wide variety of wind measuring applications. Simplicity and lightweight corrosion resistant construction were principal design considerations. Slip rings and brushes have been eliminated resulting in improved reliability with lower cost.

The wind speed sensor is a helicoid shape propeller molded of polypropylene plastic. The propeller is four blade, 18 cm diameter x 30 cm pitch with a distance constant of 2.7 meters (8.9 feet). Threshold of the propeller is 1.0 m/s (2.2 M.P.H). Rotation of the propeller produces an AC sine wave voltage signal with frequency directly proportional to wind speed. The AC. voltage signal is induced in a centrally mounted coil by a six pole magnet mounted on the propeller shaft. The coil is located on the non-rotating central portion of the main mounting assembly, eliminating the need for slip rings and brushes.

The vane assembly has a threshold below 1.1 m/s (2.4 M.P.H) with a damping ratio of 0.3. Vane position is transmitted through a coupling to a precision conductive plastic potentiometer which is located in a sealed chamber in the center of the main housing just below the wind speed transducer coil. The potentiometer requires a regulated excitation voltage. With a constant voltage applied to the potentiometer element the output signal is an analog voltage directly proportions to azimuth angle.

All transducer leads terminate in a junction box on the mounting post for convenience in making sensor cable connections. Four conductors are required. The tail assembly is thermoformed of rigid U.V. stabilized plastic. The main housing, nose cone assembly, and other internal parts are injection molded. Propeller shaft bearings and the vertical shaft bearings are stainless steel precision grade ball bearings. The instrument mounts on standard 1 inch iron pipe - outside diameter 34 mm (1.34").

*ISO 9001 Registered*

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# Model 05103

## SPECIFICATIONS: WIND MONITOR

### RANGE:

Wind Speed - 0-60 m/s (134 M.P.H.).  
Survival - 100 m/s (220 M.P.H.).  
Azimuth - 360° mechanical, 355° electrical (5°open).

### ACCURACY:

Wind Speed  $\pm 0.6$  M.P.H  
Azimuth  $\pm 3^\circ$

### THRESHOLD:

Threshold sensitivity of propeller 1.0 m/s (2.2 M.P.H).  
Threshold sensitivity of vane 1.1 m/s (2.4 M.P.H).

### DYNAMIC RESPONSE:

Distance constant (63% recovery) of propeller 2.7 m (8.9 feet).  
Delay distance (50% recovery) of vane 1.3 m (4.3 feet). Damping ratio of vane 0.23  
Damped natural wavelength of vane 7.2 m (23.6 feet).

### SIGNAL OUTPUT:

Wind Speed - magnetically induced AC voltage. Three sine wave voltage pulses per propeller revolution. 1800 RPM (90 Hz) = 8.8 m/s (19.7 M.P.H)  
Azimuth - analog DC voltage from precision low torque conductive plastic potentiometer (requires regulated excitation voltage).  
Resistance 10K ohms, linearity 0.25%, life expectancy 20 million revolutions (2-4 years).

### POWER REQUIRED:

5 to 15 VDC regulated supply voltage recommended for potentiometer excitation

### DIMENSIONS:

Overall height 37 cm (14.6 inches).  
Overall length of main housing, including vane and propeller 55 cm (21.7 inches).  
Fin size 24 cm (9.4 inches) high x 14 cm (5.5 inches) long.  
Propeller diameter 18 cm (7.1 inches).  
Diameter of main housing 5 cm (2.0 inches).  
Mounts on standard 1 inch iron pipe - outside diameter 34 mm (1.34 inches).

### WEIGHT:

Sensor weight 1.0 kg (2.2 lb.). Shipping weight approximately 2.3 kg (5 lb.).

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