Campbell SCIENTIFIC

05305

RM Young Wind Monitor AQ

Reliable, Accurate Wind Measurements

Suitable for air quality applications

Overview

The 05305 is a lightweight, high-performance wind-speed and wind-direction sensor designed specifically for your air-quality measurements. It is more responsive but less rugged than the other wind monitors. Manufactured by R. M. Young, this sensor is cabled for use with Campbell Scientific data loggers.

Benefits and Features

- Compatible with most Campbell Scientific data loggers
- Constructed with thermoplastic material that resists corrosion from sea-air environments and atmospheric pollutants
- Lower starting threshold, faster response, and higher accuracy than the other wind monitors
- Meets or exceeds requirements of the following regulatory agencies: U.S. Environmental Protection Agency, U.S. Nuclear Regulatory Agency, and American Nuclear Society
- Compatible with the LLAC4 4-channel Low-Level AC-Conversion Module, which increases the number of anemometers one data logger can measure
- Compatible with the CWS900-series interfaces, allowing it to be used in a wireless sensor network

Detailed Description

The 05305 is made out of lightweight, UV-stabilized thermoplastic with stainless steel and anodized aluminum fittings. The thermoplastic material resists corrosion from sea air environments and atmospheric pollutants. It uses stainless-steel precision-grade ball bearings for the propeller shaft and vertical shaft bearings.

The 05305 measures wind speed with a helicoid-shaped, four-blade propeller. Rotation of the propeller produces an ac sine wave that has a frequency directly proportional to wind speed. The ac signal is induced in a transducer coil by a six-pole magnet mounted on the propeller shaft. The coil resides on the non-rotating central portion of the main mounting assembly, eliminating the need for slip rings and brushes.

Wind direction is sensed by the orientation of the fuselage-shaped sensor body, which is connected to an internal potentiometer. The data logger applies a known precision excitation voltage to the potentiometer element. The output is an analog voltage signal directly proportional to the azimuth angle.

Designed specifically for air quality measurements, the 05305 provides a lower starting threshold, faster response, and higher accuracy than the other wind monitors. It meets or exceeds the requirements published by the following regulatory agencies:

- **U.S. Environmental Protection Agency**—Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD) and On-Site Meteorological Instrumentation Requirements to Characterize Diffusion from Point Sources
- **U.S. Nuclear Regulatory Agency**—NRC Regulatory Guide 1.23 Meteorological Programs in Support of Nuclear Power Plants
- **American Nuclear Society**—Standard for Determining Meteorological Information at Nuclear Power Plants

Specifications

Applications	❱ Air quality (Designed to meet specific government standards for air-quality applications.) ❱ General (Rain with light snow. Little or no riming or blowing sand. No salt spray.)
Sensor	Helicoid-shaped, 4-blade propeller and fuselage-shaped sensor body
Measurement Description	Wind speed and direction
Operating Temperature Range	-50° to +50°C (assuming non-riming conditions)
Mounting Pipe Description	❱ 34 mm (1.34 in.) OD ❱ Standard 1.0-in. IPS schedule 40
Housing Diameter	5 cm (2.0 in.)
Height	38 cm (15.0 in.)
Length	65 cm (25.6 in.)
Propeller Diameter	20 cm (7.9 in.)
Weight	1.1 kg (2.5 lb)

Wind Speed

Range	0 to 50 m/s (0 to 112 mph)
Accuracy	±0.2 m/s (±0.4 mph) or 1% of reading
Starting Threshold	0.4 m/s (0.9 mph)
Distance Constant	2.1 m (6.9 ft) 63% recovery
Output	ac voltage (three pulses per revolution) 90 Hz (1800 rpm) = 9.2 m/s (20.6 mph)
Resolution	(0.1024 m s^{-1}) / (scan rate in seconds) **or** (0.2290 mph) / (scan rate in seconds)

Wind Direction

Mechanical Range	0 to 360°
Electrical Range	355° (5° open)
Accuracy	±3°
Starting Threshold	0.5 m/s (1.0 mph) at 10° displacement
Distance Constant	1.2 m (3.9 ft) 50% recovery
Damping Ratio	0.45
Damped Natural Wavelength	4.9 m (16.1 ft)
Undamped Natural Wavelength	4.4 m (14.4 ft)
Output	❱ Analog dc voltage from potentiometer (resistance 10 kohm) ❱ Linearity is 0.25%. ❱ Life expectancy is 50 million revolutions.
Voltage	Power switched excitation voltage supplied by data logger

For comprehensive details, visit: www.campbellsci.com/05305

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