

Reliable, Accurate Wind Measurements

Compatible with all Campbell
Scientific dataloggers

Overview

The Wind Monitors* are light-weight, sturdy instruments for measuring wind speed and direction in harsh environments. Their

simplicity and corrosion-resistant construction make them ideal for a wide range of wind measuring applications.

Benefits and Features

- › Rugged enough for harsh environments
- › Constructed with thermoplastic material that resists corrosion from sea-air environments and atmospheric pollutants
- › Uses stainless-steel, precision-grade ball bearings for the propeller shaft and vertical shaft bearings (except for the 05108 and 05108-45 wind monitors that use an oversized ceramic bearing)
- › Ideal for wind profile studies
- › Compatible with the LLAC4 4-channel Low Level AC Conversion Module, which increases the number of anemometers one datalogger can measure
- › Compatible with the CWS900-series interfaces, allowing it to be used in a wireless sensor network

Wind Speed

The wind speed sensor for all the Wind Monitors is 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.

**The Wind Monitors are manufactured by RM Young (Traverse City, MI) and cabled by Campbell Scientific for use with our dataloggers.*



Wind Direction

All of the Wind Monitors use a potentiometer to measure wind direction. The datalogger applies a known precision excitation

voltage to the potentiometer element. The output is an analog voltage signal directly proportional to the azimuth angle.



05103 Wind Monitor



05106 Wind Monitor-MA



05108 Wind Monitor-HD



05108-45 Wind Monitor-HD-Alpine



05305 Wind Monitor-AQ

Model Descriptions

05103 Wind Monitor

The 05103 Wind Monitor is a sturdy instrument for measuring wind speed and direction in harsh environments. Its simplicity and corrosion-resistant construction make it ideal for a wide range of wind measuring applications.

05106 Wind Monitor-MA

The 05106 Wind Monitor-MA is a robust instrument designed for offshore and marine applications. It features waterproof bearing lubricant and a sealed, heavy-duty cable pigtail instead of the standard junction box to make it more durable at marine and off-shore locations.

05108 Wind Monitor-HD

The 05108 Wind Monitor-HD (heavy duty) is designed to greatly extend its service life and improve its survivability in severe wind measurement applications. It has oversized ceramic bearings, oversized propeller shaft, high-pitch propeller, and locking propeller nut. The ceramic bearings have a significantly longer service life than the stainless-steel bearings and are more resistant to some types of corrosion.

05108-45 Wind Monitor-HD-Alpine

The 05108-45 is a heavy-duty Wind Monitor designed specifically for harsh alpine conditions. To extend its service life and survive better in severe wind, the 05108-45 has oversized ceramic bearings, oversized propeller shaft, high pitch propeller, and locking propeller nut. To discourage ice buildup, the sensor's housing is black and covered with an ice-resistant coating.

05305 Wind Monitor-AQ

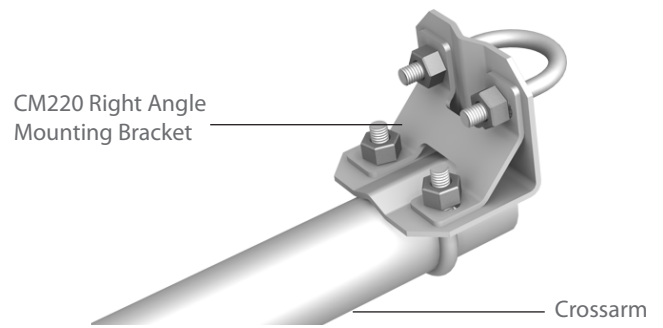
The 05305 Wind Monitor-AQ is a high performance wind speed and direction sensor designed specifically for air quality measurements. It provides a lower starting threshold, faster response, and higher accuracy than the other wind monitors. However, to achieve the superior performance, the 05305 is less ruggedly constructed.

The Wind Monitor-AQ 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

Mounting

The Wind Monitors can be attached to a CM202, CM202SS, CM203, CM204, CM204SS, or CM206 crossarm via a 17953 NU-RAIL fitting or CM220 Right Angle Mounting Bracket. Alternatively, the Wind Monitors can be attached to the top of our stainless-steel tripods via the CM216 Sensor Mounting Kit. Please note that a lightning rod cannot be used when the CM216 attaches a Wind Monitor atop the tripod's mast. Therefore the CM216 is only recommended for mounting these sensors if the deployment is short term.



Ordering Information

Wind Monitors

The Wind Monitors have user-specified cable lengths; enter the length, in feet, after the -L. Must choose a cable termination option (see below).

- 05103-L** R. M. Young Wind Monitor
- 05106-L** R. M. Young Wind Monitor-MA for marine applications
- 05108-L** R. M. Young Heavy-Duty Wind Monitor-HD
- 05108-45-L** R. M. Young Heavy-Duty Wind Monitor-HD, Alpine version
- 05305-L** Wind Monitor-AQ for air quality applications

Cable Termination Options (choose one)

- PT** Cable terminates in stripped and tinned leads for direct connection to a datalogger's terminals.
- PW** Cable terminates in connector for attachment to a prewired enclosure.
- CWS** Cable terminates in a connector for attachment to a CWS900-series interface, which allows this sensor to be used in a wireless sensor network.

Mounts

- 17953** 1-inch- by-1-inch NU-RAIL Fitting for attaching the Wind Monitor to a CM202, CM202SS, CM203, CM204, CM204SS, or CM206 crossarm.
- CM220** Right Angle Mounting Bracket for attaching the Wind Monitor to a CM202, CM202SS, CM203, CM204, CM204SS, or CM206 crossarm.
- CM216** Sensor Mounting Kit for attaching sensor to atop a CM110, CM115, or CM120 stainless-steel tripod.

Wind Profile Accessory

- LLAC4** 4-Channel Low-Level AC Conversion Module



An innovative method of discouraging interference from birds was used at a station at St. Peter and St. Paul Rocks (Brazil). Photo courtesy Dr. Silvia L. Garzoli (Director of the Physical Oceanography Division of the Atlantic Oceanographic and Meteorological Laboratory of NOAA).

Recommended Cable Lengths

CM106B	CM110	CM115	CM120	UT10	UT20	UT30
4 m (13 ft)	4 m (13 ft)	6 m (19 ft)	7 m (24 ft)	4 m (13 ft)	7 m (24 ft)	10 m (34 ft)
<i>These cable lengths assume the sensor is mounted atop the tripod/tower via a CM202 crossarm. Maximum cable length is 1,000 feet.</i>						

Specifications

	05103	05106	05108	05108-45	05305
Wind Speed					
Range	0 to 100 m s ⁻¹ (0 to 224 mph)				0 to 50 m s ⁻¹ (0 to 112 mph)
Accuracy	±0.3 m s ⁻¹ (±0.6 mph) or 1% of reading				±0.2 m s ⁻¹ (±0.4 mph) or 1% of reading
Starting Threshold	1.0 m s ⁻¹ (2.2 mph)	2.4 mph (1.1 m s ⁻¹)	1.0 m s ⁻¹ (2.2 mph)		0.4 m s ⁻¹ (0.9 mph)
Distance Constant (63% recovery)	2.7 m (8.9 ft)				2.1 m (6.9 ft)
Output	ac voltage (3 pulses per revolution); 1800 rpm (90 Hz) = 8.8 m s ⁻¹ (19.7 mph)				ac voltage (3 pulses per revolution); 1800 rpm (90 Hz) = 9.2 m s ⁻¹ (20.6 mph)
Resolution	(0.0980 m s ⁻¹)/(scan rate in seconds) or (0.2192 mph)/(scan rate seconds)				(0.1024 m s ⁻¹)/(scan rate in seconds) or (0.2290 mph)/(scan rate in seconds)
Wind Direction					
Range	0° to 360° mechanical, 355° electrical (5° open)				
Accuracy	±3°				
Starting Threshold	1.1 m s ⁻¹ (2.4 mph)		1.0 m s ⁻¹ (2.2 mph)		0.5 m s ⁻¹ (1.0 mph)
Distance Constant (50% recovery)	1.3 m (4.3 ft)				1.2 m (3.9 ft)
Damping Ratio	0.3		0.25		0.45
Damped Natural Wavelength	7.4 m (24.3 ft)				4.9 m (16.1 ft)
Undamped Natural Wavelength	7.2 m (23.6 ft)				4.4 m (14.4 ft)
Output	analog dc voltage from potentiometer—resistance 10 kΩ; linearity 0.25%; life expectancy 50 million revolutions				
Power	switched excitation voltage supplied by datalogger				
Physical					
Operating Temperature Range	-50° to +50°C (assumes non-riming conditions)		-50° to +60°C (assumes non-riming conditions)		-50° to +50°C (assumes non-riming conditions)
Overall Height	37 cm (14.6 in)			40 cm (15.7 in)	38 cm (15 in)
Overall Length	55 cm (21.7 in)			57 cm (22.4 in)	65 cm (25.6 in)
Propeller Diameter	18 cm (7.1 in)	18 cm (7.1 in)			20 cm (7.9 in)
Mounting Pipe Description	34 mm (1.34 in) outer diameter; standard 1.0 in IPS schedule 40				
Weight	1.5 kg (3.2 lb)		1.0 kg (2.2 lb)		1.1 kg (2.5 lb)

