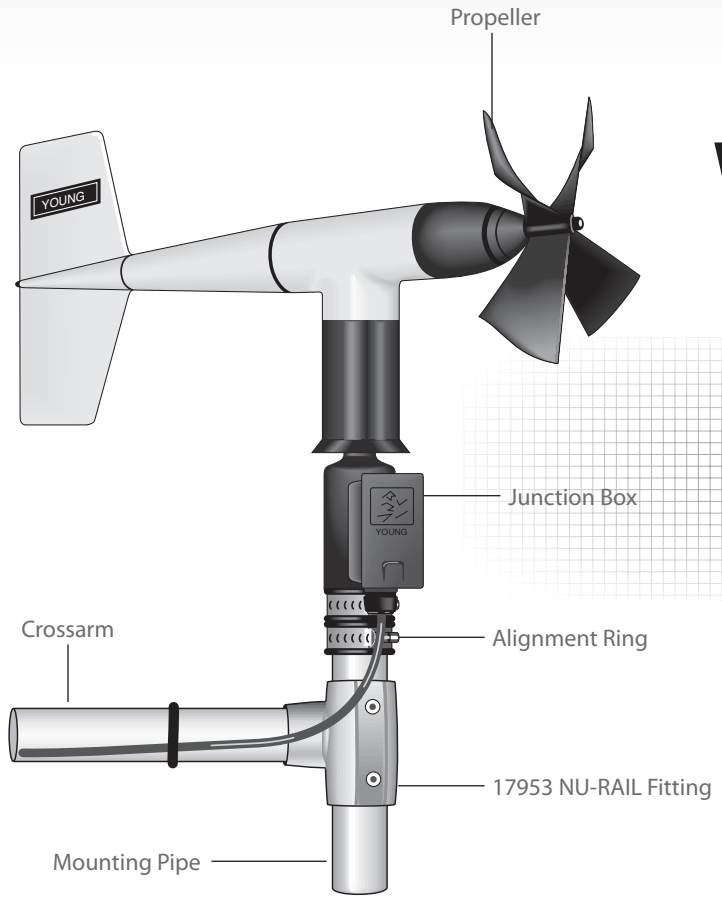
CAMPBELL SCIENTIFIC
WHEN MEASUREMENTS MATTER

05103, 05103-45, 05106, and 05305

R. M. Young Wind Monitor Series



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. Its simplicity and corrosion-resistant construction make it 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
- 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

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

Technical Description

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.

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

05103-45 Alpine Wind Monitor

05106 Wind Monitor-MA

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.

05103-45 Alpine Wind Monitor

The 05103-45 Wind Monitor is a rugged instrument designed for harsh alpine conditions. The 05103-45 has a smaller propeller diameter than the other wind monitor models, which minimizes vibration at high wind speeds. To discourage ice buildup, the sensor's housing is black and covered with an ice-resistant coating.

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.

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	
05103-L	Wind Monitor with user-specified cable length. Specify the cable length, in feet, after the L. For example, 05103-L13 orders a 13 ft lead length. A cable termination option is required (see below).
05103-45-L	Wind Monitor, Alpine Version with user-specified cable length. Specify the cable length, in feet, after the L. For example, 05103-45-L13 orders a 13 ft lead length. A cable termination option is required (see below).
05106-L	Wind Monitor-MA for marine applications with user-specified cable length. Specify the cable length, in feet, after the L. For example, 05106-L13 orders a 13 ft lead length. A cable termination option is required (see below).
05305-L	Wind Monitor-AQ for air quality applications with user-specified cable length. Specify the cable length, in feet, after the L. For example, 05305-L13 orders a 13 ft lead length. A cable termination option is required (see below).

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. Connection to a CWS900-series interface allows this sensor to be used in a wireless sensor network.

Mounts	
17953	1-in. x 1-in. NU-RAIL Fitting for attaching the Wind Monitor to a a CM202, CM202SS, CM203, CM204, CM204SS, or CM206 crossarm.
CM220	Right Angle Mounting Bracket for attaching the Wind Monitor to a 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

CM106	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)
These cable lengths assume the sensor is mounted atop the tripod/tower via a CM202 crossarm.						

Specifications

Wind Speed

	05103 Wind Monitor	05103-45 Wind Monitor-Alpine	05106 Wind Monitor-MA	05305 Wind Monitor-AQ
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})	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 in (seconds)			(0.1024 m s^{-1})/(scan rate in sec.) or (0.2290 mph)/(scan rate in sec.)

Wind Direction

	05103 Wind Monitor	05103-45 Wind Monitor-Alpine	05106 Wind Monitor-MA	05305 Wind Monitor-AQ
Range	0° to 360° mechanical, 355° electrical (5° open)			
Accuracy	±3°	±5°	±3°	
Starting Threshold	1.1 m s^{-1} (2.4 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			0.45
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

	05103 Wind Monitor	05103-45 Wind Monitor-Alpine	05106 Wind Monitor-MA	05305 Wind Monitor-AQ
Operating Temperature Range	-50° to +50°C, assuming non-riming conditions			
Overall Height	37 cm (14.6 in)			38 cm (15 in)
Overall Length	55 cm (21.7 in)			65 cm (25.6 in)
Main Housing Diameter	5 cm (2 in)			
Propeller Diameter	18 cm (7.1 in)	14 cm (5.5 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 kg (2.2 lb)	1.5 kg (3.2 lb)	1.1 kg (2.5 lb)