

# Wind Speed & Direction Sensors

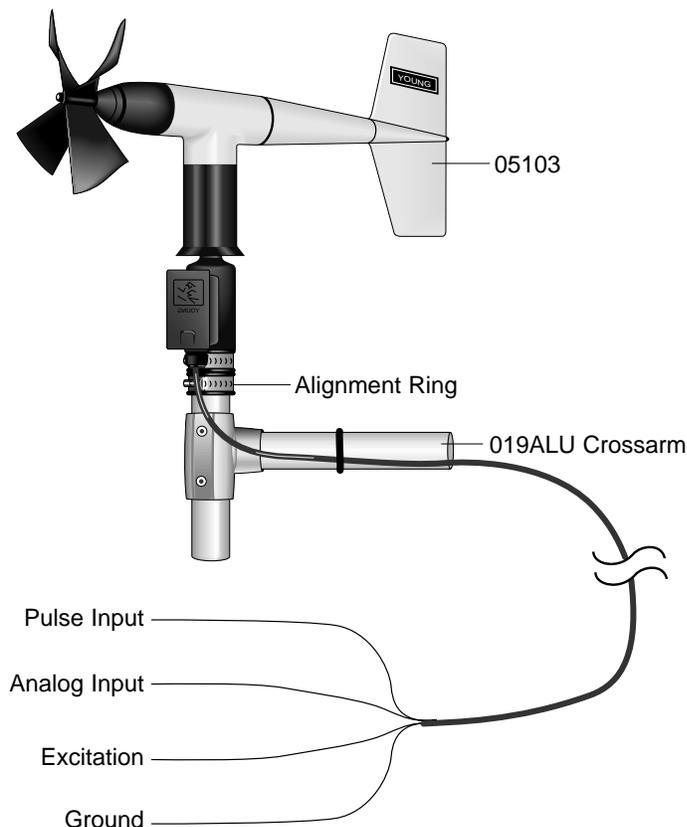
## RM Young's 05103 Wind Monitor & 05305 Wind Monitor-AQ

Model 05103 Wind Monitor (shown at right) is a sturdy instrument for measuring wind speed and direction in harsh environments. The Wind Monitor's design emphasizes simplicity and lightweight construction. Thermoplastic materials offer improved resistance to corrosion from sea air environments and atmospheric pollutants.

Model 05305 Wind Monitor-AQ is a high performance wind speed and direction sensor designed specifically for air quality measurements, but is less rugged than the 05103. The Wind Monitor-AQ features low starting threshold, fast response, and high accuracy. 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

Both models connect directly to Campbell Scientific dataloggers (CR10(X), 21X, CR23X, or CR7).



### Wind Speed

The wind speed sensor is a helicoid-shaped, four-blade propeller. Rotation of the propeller produces an AC sine wave; the frequency is directly proportional to the wind speed. The AC signal is induced in a transducer 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.

### Wind Direction

Wind direction is sensed by a potentiometer. With the precision excitation voltage from the datalogger applied to the potentiometer element, the output signal is an analog voltage directly proportional to the azimuth angle.

### Construction and Mounting

Construction is of rigid UV-stabilized thermoplastic with stainless steel and anodized aluminum fittings. Propeller shaft bearings and vertical shaft bearings are stainless steel precision-grade ball bearings.

The 05103 and 05305 mount directly on a 1.0 inch IPS Schedule 40 (1.32 in O.D.) pipe. Campbell Scientific supplies a 12-inch pipe for mounting the Wind Monitor to the 019ALU Crossarm. An alignment ring maintains wind direction reference orientation during maintenance.



**CAMPBELL SCIENTIFIC, INC.**

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## Specifications

|  | <u>Wind Monitor (Model 05103)</u>   | <u>Wind Monitor-AQ (Model 05305)</u>  |
|--|---|---|
| <b>Wind speed</b>                          |   |   |
| Range:                                     | 0-134 mph (0-60 m/s)  | 0-90 mph (0-40 m/s)   |
| Accuracy:                                  | ±0.6 mph (±0.3 m/s)   | ±0.4 mph (±0.2 m/s)   |
| Starting threshold:                        | 2.2 mph (1.0 m/s)   | 0.9 mph (0.4 m/s)   |
| Gust survival:                             | 220 mph (100 m/s)   | 100 mph (45 m/s)  |
| Distance constant<br>(63% recovery):       | 8.9 ft (2.7 m)  | 6.9 ft (2.1 m)  |
| Output:                                    | AC voltage (3 pulses/<br>revolution) 1800 rpm<br>(90 Hz) - 19.7 mph<br>(8.8 m/s)  | AC voltage (3 pulses/<br>revolution) 1800 rpm<br>(90 Hz) - 20.6 mph<br>(9.2 m/s)  |
| <b>Wind direction</b>                      |   |   |
| Electrical range:                          | 0-360° mechanical,<br>355° electrical (5° open)   | Same  |
| Accuracy:                                  | ±3°   | ±3°   |
| Starting threshold<br>at 10° displacement: | 2.0 mph (0.9 m/s)   | 1.0 mph (0.5 m/s)   |
| at 5° displacement:                        | 2.9 mph (1.3 m/s)   | 1.6 mph (0.7 m/s)   |
| Delay distance<br>(50% recovery):          | 4.3 ft (1.3 m)  | 3.9 ft (1.2 m)  |
| Damping ratio:                             | 0.25  | 0.45  |
| Damped natural wavelength:                 | 24.3 ft (7.4 m)   | 16.1 ft (4.9 m)   |
| Undamped natural<br>wavelength:            | 23.6 ft (7.2 m)   | 14.4 ft (4.4 m)   |
| Output:                                    | Analog DC voltage from<br>potentiometer - resistance<br>10KΩ, linearity 0.25%,<br>life expectancy 50 million<br>revolutions.  | Same  |
| <b>Power</b>                               | Switched excitation<br>voltage is supplied<br>by the datalogger.  | Same  |
| <b>Ordering Information</b>                | 05103-L11 = 11' lead length for CM6/10<br>tripod and UT10 10-foot (3 m) tower<br>05103-L23 = 23' lead length for UT20<br>20-foot (7 m) tower<br>05103-L34 = 34' lead length for<br>UT30 30-foot (10m) tower | 05305-L11 = 11' lead length for CM6/10<br>tripods and UT10 10-foot (3 m) tower<br>05305-L23 = 23' lead length for UT20<br>20-foot (7 m) tower<br>05305-L34 = 34' lead length for<br>UT30 30-foot (10 m) tower |
| <b>Dimensions</b>                          |   |   |
| Overall:                                   | 14.6 in H x 21.7 in L<br>(37 cm x 55 cm)  | 15.0 in H x 25.6 in L<br>(38 cm x 65 cm)  |
| Main housing (diameter):                   | 2.0 in (5 cm)   | Same  |
| Propeller (diameter):                      | 7.1 in (18 cm)  | 7.9 in (20 cm)  |
| Mounting (diameter):                       | 1.34 in (34 mm)<br>(standard 1.0 in pipe)   | Same  |
| <b>Weight (shipping approx.)</b>           | 3.2 lbs (5.5 lbs)   | 2.5 lbs (5.5 lbs)   |

Manufactured by RM Young (Traverse City, MI) and cabled by Campbell Scientific for use with our dataloggers.



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