Wind Speed and Direction Sensors

03001 Wind Sentry Anemometer/Vane & 03101 Wind Sentry Anemometer

R. M. Young’s Wind Sentry Anemometer and Vane accurately measure wind speed and direction. These sensors interface directly with Campbell dataloggers; no signal conditioning is required. The Wind Sentry is compatible with all of our contemporary dataloggers and many of our retired dataloggers (e.g., 21X, CR23X).

The cup anemometer measures wind speed. Rotation of its cup wheel produces an ac sine wave that is directly proportional to wind speed. The frequency of the ac signal is measured by a datalogger pulse count channel, then converted to engineering units (mph, m/s, knots). The Campbell Scientific version uses shielded bearings which lowers the anemometer’s threshold.

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 that is directly proportional to azimuth of the wind direction.

An ideal application for the Wind Sentry is Wind Profile Studies. For this application, the LLAC4 4-channel Low Level AC Conversion Module can be used to increase the number of Wind Sentries measured by one datalogger. The LLAC4 allows datalogger control ports to read the anemometer’s ac signals instead of using pulse channels. Dataloggers compatible with the LLAC4 are the CR200-series (ac signal ≤kHz only), CR800, CR850, CR1000, CR3000, and CR5000.

Ordering Information

Wind Sentry Options

03001-L Wind Sentry Set; enter wind speed lead length, in feet, after the L, then enter wind direction lead length

03101-L Wind Sentry Anemometer; enter lead length, in feet, after the L.

Mounts

1049 ¾” x 1” NU-RAIL Fitting for attaching the Wind Sentry to a crossarm, such as a CM202, CM204, or CM206.

CM220 Right Angle Mounting Bracket for attaching the Wind Sentry to a crossarm, such as a CM202, CM204, or CM206.

CM216 Sensor Mounting Kit for attaching the Wind Sentry to the top of a CM110, CM115, or CM120 stainless-steel tripod.

When purchased separately, the Wind Sentry Anemometer is supplied with a galvanized 10” x ¾”-diameter threaded pipe, which mounts to a crossarm via a CM220 Mount or NU-RAIL fitting. Alternately it can mount to an stainless-steel tripod via the CM216.
**Recommended Lead Lengths**
These lead lengths assume the sensor is mounted atop the tripod/tower via a CM202 crossarm.

<table>
<thead>
<tr>
<th>Sensor</th>
<th>CM6</th>
<th>CM10</th>
<th>CM110</th>
<th>CM115</th>
<th>CM120</th>
<th>UT10</th>
<th>UT20</th>
<th>UT30</th>
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</thead>
<tbody>
<tr>
<td>10'</td>
<td>13'</td>
<td>13'</td>
<td>19'</td>
<td>24'</td>
<td>13'</td>
<td>24'</td>
<td>34'</td>
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**Specifications**

### Wind Speed (Anemometer)
- **Range:** 0 to 50 m s⁻¹ (112 mph), gust survival 60 m s⁻¹ (134 mph)
- **Sensor:** 12 cm diameter cup wheel assembly, 40 mm diameter hemispherical cups
- **Accuracy:** ±0.5 m s⁻¹ (1.1 mph)
- **Turning Factor:** 75 cm (2.5 ft)
- **Distance Constant** (63% recovery): 2.3 m (7.5 ft)
- **Threshold:** 0.5 m s⁻¹ (1.1 mph)
- **Transducer:** Stationary coil, 1350 ohm nominal resistance
- **Transducer Output:** AC sine wave signal induced by rotating magnet on cup wheel shaft; 100 mV peak-to-peak at 60 rpm; 6 V peak-to-peak at 3600 rpm
- **Output Frequency:** 1 cycle per cup wheel revolution; 0.75 m s⁻¹ per Hz
- **Cup Wheel Diameter:** 12 cm (4.7 in)
- **Weight:** 113 g (4 oz)

### Wind Direction (Vane)
- **Range:** 360° mechanical, 355° electrical (5° open)
- **Sensor:** Balanced vane, 16 cm turning radius
- **Accuracy:** ±5°
- **Damping Ratio:** 0.2
- **Delay Distance** (50% recovery): 0.5 m (1.6 ft)
- **Threshold:** 0.8 m s⁻¹ (1.8 mph) at 10° displacement; 1.8 m s⁻¹ (4 mph) at 5° displacement
- **Transducer:** Precision conductive plastic potentiometer; 10 kohm resistance; 0.5% linearity; life expectancy 20 million revolutions. Rated 1 watt at 40°C, 0 watts at 125°C.
- **Transducer Output:** Analog dc voltage proportional to wind direction angle with regulated excitation voltage supplied by the datalogger
- **Vane Length:** 22 cm (8.7 in)
- **Vane Weight:** 170 g (6 oz)

### Wind Sentry Assembly
- **Operating Temperature:** -50° to +50°C assuming non-riming conditions
- **Overall Height:** 32 cm (12.6 in)
- **Crossarm Length:** 40 cm (15.7 in) between instruments (center-to-center)
- **Mounting Diameter:** 26.7 mm (1.05 in), mounts on standard 3/4 in. pipe