Warranty and Assistance

The **05103, 05106, AND 05305 R.M. YOUNG WIND MONITORS** are warranted by CAMPBELL SCIENTIFIC, INC. to be free from defects in materials and workmanship under normal use and service for twelve (12) months from date of shipment unless specified otherwise. Batteries have no warranty. CAMPBELL SCIENTIFIC, INC.’s obligation under this warranty is limited to repairing or replacing (at CAMPBELL SCIENTIFIC, INC.’s option) defective products. The customer shall assume all costs of removing, reinstalling, and shipping defective products to CAMPBELL SCIENTIFIC, INC. CAMPBELL SCIENTIFIC, INC. will return such products by surface carrier prepaid. This warranty shall not apply to any CAMPBELL SCIENTIFIC, INC. products which have been subjected to modification, misuse, neglect, accidents of nature, or shipping damage. This warranty is in lieu of all other warranties, expressed or implied, including warranties of merchantability or fitness for a particular purpose. CAMPBELL SCIENTIFIC, INC. is not liable for special, indirect, incidental, or consequential damages.

Products may not be returned without prior authorization. The following contact information is for US and International customers residing in countries served by Campbell Scientific, Inc. directly. Affiliate companies handle repairs for customers within their territories. Please visit www.campbellscl.com to determine which Campbell Scientific company serves your country. To obtain a Returned Materials Authorization (RMA), contact CAMPBELL SCIENTIFIC, INC., phone (435) 753-2342. After an applications engineer determines the nature of the problem, an RMA number will be issued. Please write this number clearly on the outside of the shipping container.
CAMPBELL SCIENTIFIC’s shipping address is:

**CAMPBELL SCIENTIFIC, INC.**
RMA#_____
815 West 1800 North
Logan, Utah 84321-1784

CAMPBELL SCIENTIFIC, INC. does not accept collect calls.
05103, 05106, 05305 Table of Contents

PDF viewers note: These page numbers refer to the printed version of this document. Use the Adobe Acrobat® bookmarks tab for links to specific sections.

1. Introduction ................................................................. 1

2. Mounting Requirements ............................................. 1

3. Sensor to Datalogger Wiring ........................................ 2

4. Programming .............................................................. 3
   4.1 Wind Speed ............................................................ 3
   4.2 Wind Direction Instruction Code ................................. 4

5. Maintenance and Repairs ........................................... 4

6. References .................................................................. 5

Figures
   2-1. Wind Monitor Mounted to a Vertical Pipe .................. 1
   2-2. Wind Monitor Mounted to Campbell Scientific’s 019 Crossarm Mount. 2
   3-1. Wind Monitor Connections to Campbell Scientific Dataloggers .......... 3

Tables
   4-1. Wind Speed Multiplier ............................................. 3
   4-2. Instruction 4 Parameters for Wind Direction ................ 4
05103, 05106, and 05305 R.M. Young Wind Monitors

1. Introduction

These notes provide information for interfacing Campbell Scientific’s dataloggers to the R.M. Young 05103 Wind Monitor, 05106 Wind Monitor Marine, and 05305 Wind Monitor AQ. The 05305 Wind Monitor AQ is a high performance version of the Wind Monitor that is designed specifically for air quality measurements. Wiring is identical for all models. R.M. Young's instruction manual, included with the sensor, contains sensor specifications, operating principles, installation and alignment guide, and calibration information. Multiplier and offset values in the Campbell Scientific notes are based on calibration data obtained from the R.M. Young Wind Monitor manual.

2. Mounting Requirements

The Wind Monitor mounts to a vertical piece of 1" IPS schedule 40 (1.32" O.D.) pipe. (See Figure 2-1.) A band clamp at the base of the sensor is tightened to secure the sensor to the pipe.

Campbell Scientific supplies a 12” length of unthreaded pipe for mounting the wind monitor to Campbell Scientific's 019ALU Crossarm Sensor Mount (Figure 2-2).
3. **Sensor to Datalogger Wiring**

Wire the Wind Monitor leads to the datalogger (see Figure 3-1).

---

**NOTE**

The black outer jacket of the cable is Santoprene® rubber. This compound was chosen for its resistance to temperature extremes, moisture, and UV degradation. However, this jacket will support combustion in air. It is rated as slow burning when tested according to U.L. 94 H.B. and will pass FMVSS302. Local fire codes may preclude its use inside buildings.
4. Programming

This section is for users who write their own datalogger programs. A datalogger program to measure this sensor can be created using Campbell Scientific’s ShortCut Program Builder software. You do not need to read this section to use ShortCut.

4.1 Wind Speed

Wind speed is measured with the pulse count instruction. The wind vector instruction is used to calculate average wind speed and direction. With the pulse count instruction, specify a low level AC configuration, discarding counts from excessive intervals, and the result in Hz. With this configuration, the pulse count instruction divides the number of counts during the execution interval by the interval in seconds before applying the multiplier and offset.

The expression for wind speed (U) is:

\[
U = MX + B
\]

where

\( M \) = multiplier

\( X \) = number of pulses per second

\( B \) = offset

Table 4-1 lists the multipliers to obtain miles/hour or meters/second when the pulse count instruction is configured to provide its result in Hz. The helicoid propeller has a calibration that passes through zero; use an offset of zero (Gill, 1973; Baynton, 1976).

<table>
<thead>
<tr>
<th>Signal</th>
<th>CR7, 21X, CR23X, CRBasic Dataloggers</th>
<th>CR10(X)</th>
<th>Wind Monitor with Black Cable (P/N 9721)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WSPD (REF)</td>
<td>✧ or G</td>
<td>G</td>
<td>Black</td>
</tr>
<tr>
<td>WDIR (REF)</td>
<td>✧ or G</td>
<td>AG</td>
<td>White</td>
</tr>
<tr>
<td>WDIR (SIG+)</td>
<td>H or L (Analog Channel)</td>
<td>H or L (Analog Channel)</td>
<td>Green</td>
</tr>
<tr>
<td>WDIR (EX+)</td>
<td>Excitation</td>
<td>Excitation</td>
<td>Blue</td>
</tr>
<tr>
<td>WSPD (SIG+)</td>
<td>Pulse</td>
<td>Pulse</td>
<td>Red</td>
</tr>
<tr>
<td>Shield</td>
<td>✧ or G</td>
<td>G</td>
<td>Clear</td>
</tr>
</tbody>
</table>

TABLE 4-1. Wind Speed Multiplier (With Configuration Code 21*)

<table>
<thead>
<tr>
<th>Model</th>
<th>Miles/Hour Output</th>
<th>Meters/Second Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>05103 or 05106</td>
<td>0.2192</td>
<td>0.0980</td>
</tr>
<tr>
<td>05305</td>
<td>0.2290</td>
<td>0.1024</td>
</tr>
</tbody>
</table>

*When configuration code 11 is used, the multiplier above is divided by the execution interval in seconds.
21Xs without OSX PROMs and CR7s without OS7 PROMs (dataloggers purchased prior to March 1989 and August 1991 respectively, and not updated) do not have the option of outputting frequency in hertz. Program Instruction 3 with configuration code 11 (pulses per execution interval). The multiplier from Table 4-1 is divided by the execution interval in seconds to obtain the multiplier used with code 11. For example, with a 10-second execution interval, the multiplier for meters/second with the 05103 would be 0.0980/10 = 0.0098. The offset remains zero.

### 4.2 Wind Direction Instruction Code

The wind direction sensor is a potentiometer that is measured as a “half bridge”. The output ranges from 0 mV at 0 degrees to the excitation voltage at 355 degrees. In dataloggers programmed with Edlog, measure the wind direction with Instruction 4 (Excite, Delay, and Measure). CR200 series dataloggers use the ExDelSE instruction and other CRBasic dataloggers use the BRHalf instruction. In general, a delay of 1 (0.01 seconds) is sufficient when lead lengths are less than 100 feet. If the cable is 100 to 1000 feet, use a delay of 5 (0.05 seconds). The wind direction potentiometer has a five degree deadband between 355 and 360 degrees; therefore, the maximum signal is at 355 degrees. The result of the BRHalf instruction prior to applying the multiplier is measured mV/Excitation mV; therefore, the multiplier is 355. The other measurement result is the measured mV; the multiplier with these instructions is 355/Excitation Voltage. The offset is zero. The parameters to be used with each datalogger are listed in Table 4-2.

| TABLE 4-2. Instruction 4 Parameters for Wind Direction |
|-----------------|-----------------|-----------------|
| **CR10(X)**     | **21X**         | **CR7**         |
| Measurement Range | 2500 mV, slow | 5000 mV, slow |
| Excitation Voltage | 2500 mV | 5000 mV |
| Multiplier       | 0.142 deg/mV   | 0.071 deg/mV   |
| Offset           | 0               | 0               |

### 5. Maintenance and Repairs

R.M. Young suggests the anemometer bearings be inspected at least every 24 months. Please refer to the R.M. Young manual for maintenance information.

Contact R.M. Young's customer service department directly to obtain repair cost estimates and authorization for return of the unit. Their phone number is (616) 946-3980.
6. References


Campbell Scientific Companies

Campbell Scientific, Inc. (CSI)
815 West 1800 North
Logan, Utah  84321
UNITED STATES
www.campbellsci.com
info@campbellsci.com

Campbell Scientific Africa Pty. Ltd. (CSAf)
PO Box 2450
Somerset West 7129
SOUTH AFRICA
www.csafrica.co.za
sales@csafrica.co.za

Campbell Scientific Australia Pty. Ltd. (CSA)
PO Box 444
Thuringowa Central
QLD 4812 AUSTRALIA
www.campbellsci.com.au
info@campbellsci.com.au

Campbell Scientific do Brazil Ltda. (CSB)
Rua Luisa Crapsi Orsi, 15 Butantã
CEP: 005543-000 São Paulo SP BRAZIL
www.campbellsci.com.br
suporte@campbellsci.com.br

Campbell Scientific Canada Corp. (CSC)
11564 - 149th Street NW
Edmonton, Alberta T5M 1W7
CANADA
www.campbellsci.ca
dataloggers@campbellsci.ca

Campbell Scientific Ltd. (CSL)
Campbell Park
80 Hathern Road
Shepshed, Loughborough LE12 9GX
UNITED KINGDOM
www.campbellsci.co.uk
sales@campbellsci.co.uk

Campbell Scientific Ltd. (France)
Miniparc du Verger - Bat. H
1, rue de Terre Neuve - Les Ulis
91967 COURTABOEUF CEDEX
FRANCE
www.campbellsci.fr
campbell.scientific@wanadoo.fr

Campbell Scientific Spain, S. L.
Psg. Font 14, local 8
08013 Barcelona
SPAIN
www.campbellsci.es
info@campbellsci.es

Please visit www.campbellsci.com to obtain contact information for your local US or International representative.