

Calibration Report: Wind Sensor s/n 19659

ECN: n/a

11 January 2000

Kevin Larman
Analytical Services & Materials, Inc.
Hampton, Virginia

SUMMARY

Calibration date: 11 January 2000. Next calibration due: 11 January 2002

A collection, analysis and calibration of data from a Wind Sensor instrument, s/n 19659, has been completed. The calibration was performed by the Wind Sensor manufacturer., R.M. Young, Inc. These data were collected by R.M. Young on 6 Jan 2000.

Model : 05103

Serial Number : 19659

The test data presented in graphical format show the sensor to be within a +/-3 degrees in determining wind direction, azimuth. The report states that the sensor is within +/- 3 m/s.

Application:

Standard Campbell Data logger program for R.M. Young.



CERTIFICATE OF CALIBRATION AND TESTING

CUSTOMER WYLE LABORATORIES P.O. NUMBER HMP004164
MODEL 05103-5 WIND MONITOR SERIAL NUMBER 19659

R. M. YOUNG COMPANY CERTIFIES THAT THE ABOVE EQUIPMENT WAS ASSEMBLED AND CALIBRATED TO MEET THE FOLLOWING SPECIFICATIONS.

AS STATED ON PUBLISHED LITERATURE
DATED SEPTEMBER 1999

TO MAINTAIN THIS SPECIFICATION, REGULAR MAINTENANCE INTERVALS ARE ESSENTIAL.

STANDARDS ESTABLISHED BY R. M. YOUNG COMPANY FOR CALIBRATING THE MEASURING & TEST EQUIPMENT USED IN CONTROLLING PRODUCT QUALITY ARE TRACEABLE TO THE NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY.

11 JANUARY 2000
DATE OF CERTIFICATION

John Campbell
JOHN CAMPBELL
QUALITY CONTROL

R. M. YOUNG COMPANY
2801 AERO PARK DRIVE, TRAVERSE CITY, MICHIGAN, 49686 USA
TEL 616-946-3980 FAX 616-946-4772

DOC FEB 1996

YOUNG

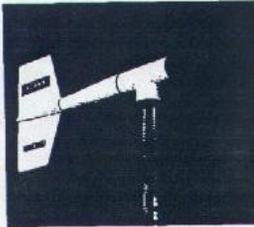
Model 05103 Wind Monitor

The Wind Monitor is a high performance, rugged wind sensor. Its simplicity and corrosion-resistant construction make it ideal for a wide range of wind measuring applications.

The wind speed sensor is a four blade helioid propeller. Propeller rotation produces an AC sine wave voltage signal with frequency directly proportional to wind speed. Slip rings and brushes are eliminated for increased reliability.

The wind direction sensor is a rugged yet lightweight vane with a sufficiently low aspect ratio to assure good fidelity in fluctuating wind conditions. Vane angle is sensed by a precision potentiometer housed in a sealed chamber. With a known excitation voltage applied to the potentiometer, the output voltage is directly proportional to vane angle. A mounting orientation ring assures correct realignment of the wind direction reference when the instrument is removed for maintenance.

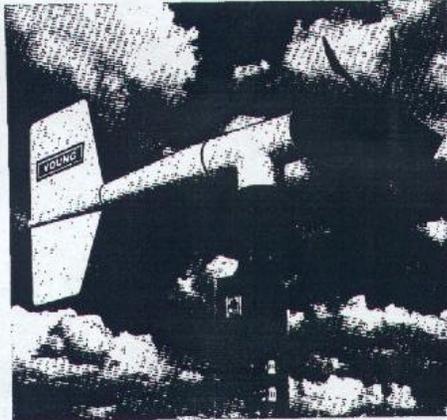
The instrument is made of UV stabilized plastic with stainless steel and anodized aluminum fittings. Precision grade, stainless steel ball bearings are used. Transient protection and cable terminations are in a convenient junction box. The instrument mounts on standard 1 inch pipe.



For offshore and marine use, the **Model 05106, Wind Monitor-MA** features special waterproof bearing lubricant and a sealed, heavy-duty cable pigtail in place of the standard junction box. Separate signal conditioning for voltage or current outputs is available.

The Wind Monitor is available with two additional output signal options. **Model 05103V** offers calibrated 0-1 VDC outputs (0-5 VDC optional), convenient for use with many dataloggers. **Model 05103L** provides a calibrated 4-20 mA current signal for each channel, useful in

high noise areas or for long cables (up to several kilometers). Signal conditioning electronics are integrated into the sensor junction box.



Specifications

Range:
 Wind speed: 0-60 m/s (134 mph)
 Gust survival: 100 m/s (220 mph)
 Azimuth: 360° mechanical, 355° electrical (5° open)

Accuracy:
 Wind speed: ± 0.3 m/s (0.6 mph)
 Wind direction: ± 3 degrees

Threshold*:
 Propeller: 1.0 m/s (2.2 mph)
 1.1 m/s (2.4 mph) 05106
 Vane: 1.1 m/s (2.4 mph) 05103

Dynamic Response*:
 Propeller distance constant (63% recovery) 2.7 m (8.9 ft)
 Vane delay distance (50% recovery) 1.3 m (4.3 ft)
 Damping ratio: 0.3
 Damped natural wavelength: 7.4 m (24.3 ft)
 Undamped natural wavelength: 7.2 m (23.6 ft)

Signal Output:
 Wind speed: magnetically induced AC voltage, 3 pulses per revolution. 1800 rpm (90 Hz) = 8.8 m/s (19.7 mph)
 Azimuth: analog DC voltage from conductive plastic potentiometer- resistance 10K Ω , linearity 0.25%, life expectancy- 50 million revolutions

Power Requirement:
 Potentiometer excitation: 15 VDC maximum

Dimensions:
 Overall height: 37 cm (14.6 in)
 Overall length: 55 cm (21.7 in)
 Propeller: 18 cm (7 in) diameter
 Mounting: 34 mm (1.34 in) diameter (std. 1 inch pipe)

Weight:
 Sensor weight: 1.0 kg (2.2 lbs)
 Shipping weight: 2.3 kg (5 lbs)

*Nominal values, determined in accordance with ASTM standard procedures.

MODEL 05103V 0-1 VDC outputs

Power Requirement:
 8-24 VDC (5 mA @ 12 VDC)

Operating Temperature:
 -50 to 50° C

Output Signals:
 0-1.00 VDC full scale
 0-5.00 VDC optional

MODEL 05103L 4-20 mA outputs

Power Requirement:
 8-30 VDC (40 mA max.)

Operating Temperature:
 -50 to 50° C

Output Signals:
 4-20 mA full scale

Ordering Information

| | MODEL |
|--|---------|
| WIND MONITOR | 05103 |
| WIND MONITOR 0-1 VDC OUTPUTS | 05103V* |
| WIND MONITOR 4-20 mA OUTPUTS | 05103L* |
| WIND MONITOR-MA (MARINE MODEL) | 05106 |
| WIND SENSOR INTERFACE (FOR USE WITH 05106) 0-1 VDC | 05603B* |
| WIND LINE DRIVER (FOR USE WITH 05106) 4-20 mA | 05631B* |

* SPECIFY SUFFIX FOR DESIRED WIND SPEED SCALE:

| | |
|-------------------|----------------|
| 0-50 M/S | ADD SUFFIX "M" |
| 0-100 MPH | ADD SUFFIX "P" |
| 0-100 KNOTS | ADD SUFFIX "N" |
| 0-200 KM/HR | ADD SUFFIX "K" |



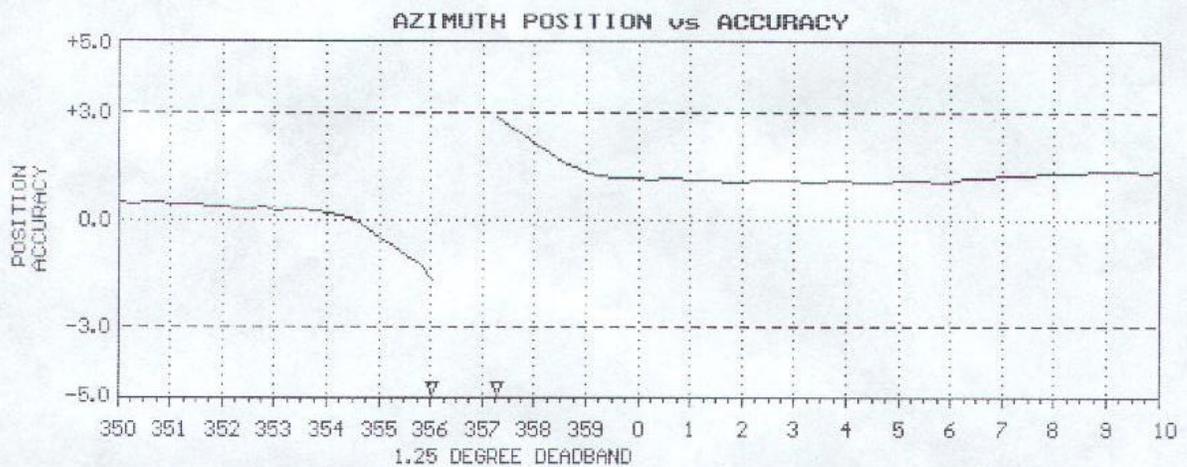
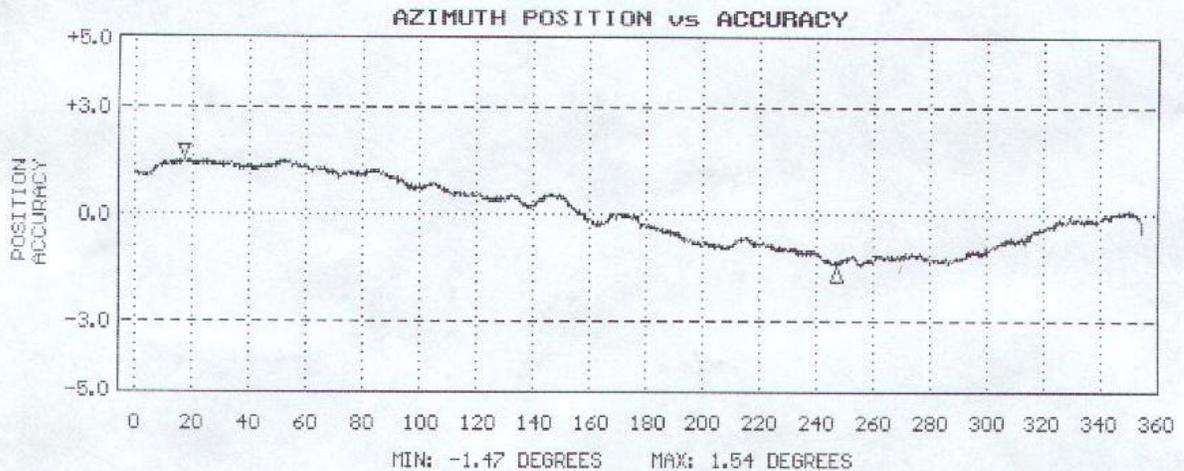
R.M. YOUNG COMPANY
 2801 Aero Park Drive
 Traverse City, Michigan 49686 U.S.A.
 TEL: (231) 946-3980 FAX: (231) 946-4772
 E-mail: met_sales@rmyoungusa.com

Post-it* Fax Note 7671

| Date | # of pages |
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| 1-27-00 | 2 |
| To | From |
| MIKE CZARNECKI | JOHN CAMPBELL |
| Co./Dept. | Co. |
| | R.M. YOUNG CO. |
| Phone # | Phone # |
| | 231-946-3980 |

R. M. YOUNG COMPANY WIND SENSOR CALIBRATION CERTIFICATE

SENSOR: 05103 WIND MONITOR
SENSOR SERIAL NUMBER: 19659
BEARINGS: SEALED/GREASE LUBE
DATE: JAN 6 2000
WIND SPEED THRESHOLD TEST: PASS
LOW WIND SPEED AMPLITUDE/FREQUENCY TEST: PASS
HIGH WIND SPEED AMPLITUDE/FREQUENCY TEST: PASS
VANE TORQUE TEST: PASS
SPECIAL NOTES:
SPECIAL NOTES:



NOTE: Azimuth Position vs Accuracy graphs are accurate to within 0.5 degrees. The accuracy shown in the potentiometer deadband region between 355 and 0 degrees is the result of no resistance change while position changes. The gap represents the actual deadband (open circuit).