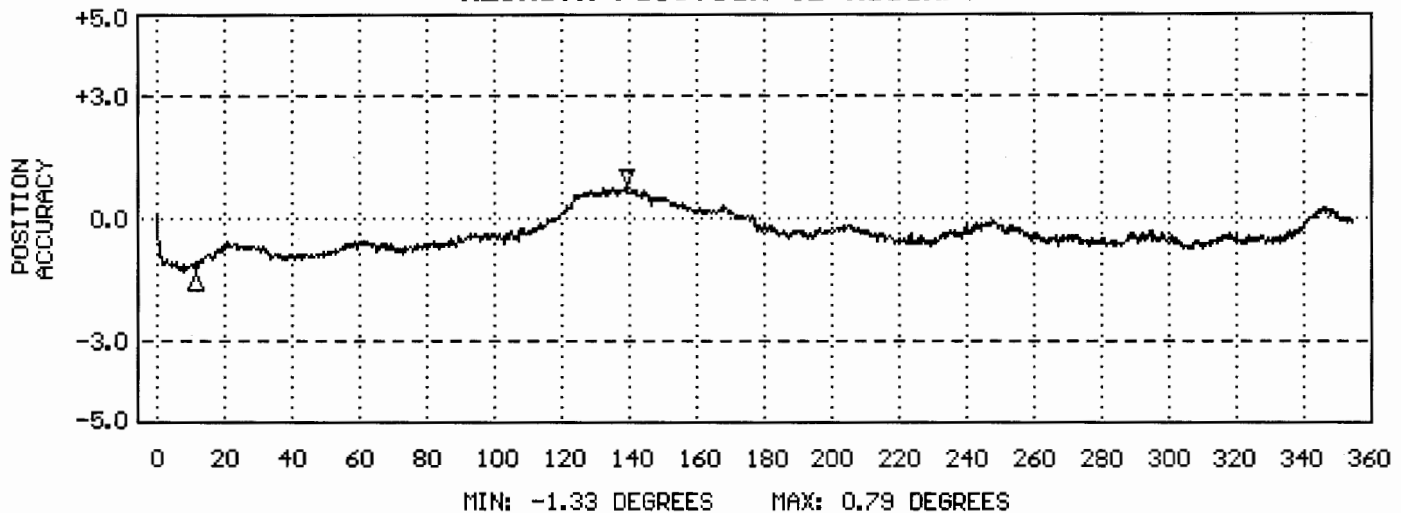


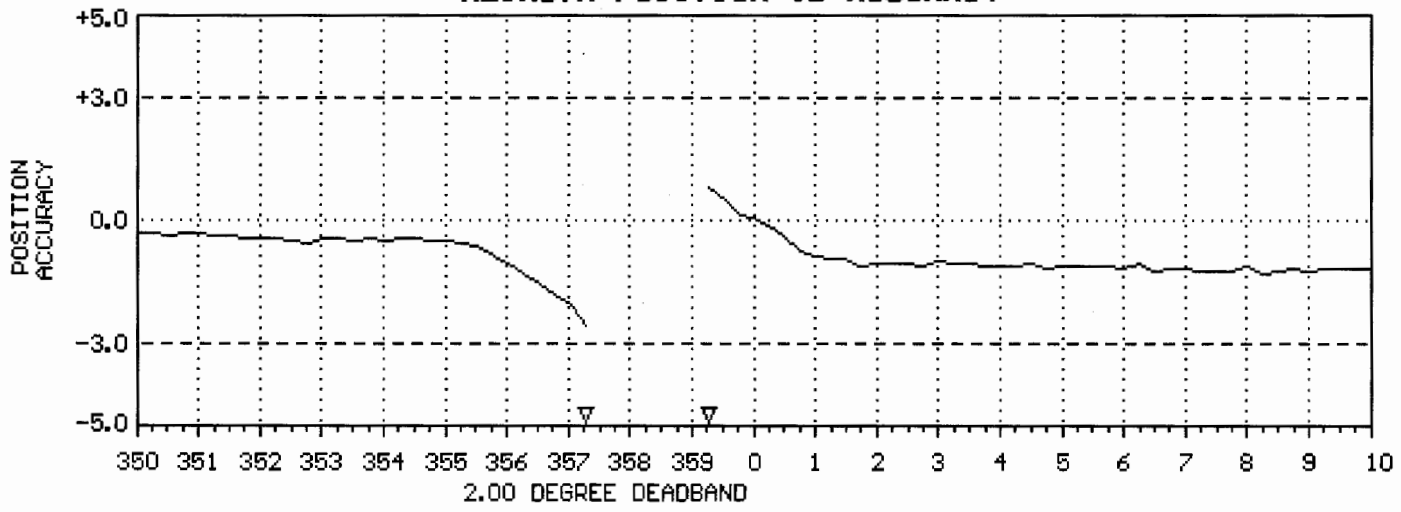
R. M. YOUNG COMPANY WIND SENSOR CALIBRATION CERTIFICATE

SENSOR: 05106 WIND MONITOR-MA
SENSOR SERIAL NUMBER: WM86188
BEARINGS: SEALED/WATERPROOF GREASE
DATE: DEC 10 2012
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:

AZIMUTH POSITION vs ACCURACY



AZIMUTH POSITION vs ACCURACY



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).



R.M. Young Company
 2801 Aero Park Drive
 Traverse City, Michigan 49686 USA

CALIBRATION REPORT Wind Speed

Customer: **NOAA**

Test Number: 2071-01W Customer PO: (G Streeter)
 Test Date: 10 December 2012 Sales Order: 3024

Test Sensor:	
Anemometer: 05106 Wind Monitor	Propeller: 08234
Serial Number: WM86188	Serial Number: 15142

Report of calibration comparison with National Institute of Standards and Technology calibrated anemometer in the R.M. Young Company 50 x 75 cm rectangular test section open return wind tunnel. The following data describe the relationship between test section wind speed, as determined by the NIST calibrated standard anemometer, and test anemometer rpm, as determined by its output. Indicated wind speed is calculated using anemometer's published formula.

Wind Speed According to Standard Anemometer		Wind Speed According to Test Anemometer			
Model:	05103 / 08234	Anem:	05106	Prop:	08234
Serial #:	00005	Serial #:	WM86188	Serial #:	15142
Nominal Speed m/s	Actual Speed m/s (1)	100 Second Pulse Count	Output Frequency	Propeller RPM (2)	Indicated Speed m/s (3)
30	30.0	30623	306.2	6125	30.0
25	25.0	25510	255.1	5102	25.0
20	20.0	20358	203.6	4072	20.0
16	16.0	16232	162.3	3246	15.9
14	14.0	14178	141.8	2836	13.9
12	12.0	12142	121.4	2428	11.9
10	10.0	10101	101.0	2020	9.9
8	8.0	8050	80.5	1610	7.9
6	6.0	6028	60.3	1206	5.9
5	5.0	5006	50.1	1001	4.9
4	4.0	4004	40.0	801	3.9
3	3.1	3005	30.1	601	2.9
2	2.1	1980	19.8	396	1.9
1	1.1	942	9.4	188	0.9

National Institute of Standards and Technology Reference

Calibrated Standard Anemometer (4)
 Test #: TN251034
 Date: 9 Nov 1992
 Model: 08234 Serial #: 00005

Environmental Conditions

Barometric Pressure (hPa): 982
 Temperature (C): 22.5
 Relative Humidity (%): 51.0

- (1) Actual wind speed determined by relationship between tunnel fan rpm and NIST calibrated standard propeller rpm.
- (2) Wind Monitor output is three (3) pulses per revolution: $Rpm = Hz / 3 \times 60 \text{ sec.}$
- (3) Published calibration: Wind speed (m/s) = $0.00490 \times \text{propeller rpm.}$
- (4) NIST Calibration accuracy is within 1%.

Tested By



R.M. Young Company
 2801 Aero Park Drive
 Traverse City, Michigan 49686 USA

CALIBRATION REPORT
Wind Speed (page 2)

Test Number: 2071-01W

Linear Regression

A linear regression is performed on the calibration data to determine the best fit straight line representing the relationship between propeller rpm and actual wind speed as determined by the NIST calibrated standard anemometer.

Slope: 0.00488 meters per second per RPM
 Intercept: 0.14 meters per second
 Pitch: 29.25 centimeters per revolution
 Correlation Coefficient: 1.00000

Wind Speed =	<u>Slope</u>	x RPM +	<u>Intercept</u>		<u>Slope</u>	x Hz +	<u>Intercept</u>
m/s	= 0.00488	x RPM +	0.14		0.09751	x Hz +	0.14
mph	= 0.01091	x RPM +	0.31		0.21812	x Hz +	0.31
knots	= 0.00947	x RPM +	0.27		0.18941	x Hz +	0.27
km/hr	= 0.01755	x RPM +	0.50		0.35102	x Hz +	0.50

Threshold Measurements

	<u>New Instrument</u>	<u>As Found</u>	<u>As Left</u>
Start:		0.4 m/s	0.4 m/s
	n/a		
Stop:		0.3 m/s	0.3 m/s