VAISALA **Certificate of Calibration**

Certificate report no. B07-14070013
B07/14070013

CALIBRATION CERTIFICATE

Before adjustment

Customer	College Of Earth, Ocean, And Atmospheric Sciences
Instrument	PTU300(500-1100) Digital Barometer
Serial number	C2610001
Manufacturer	Vaisala Oyj, Finland
Calibration date	20th February 2014 / Due Date: 20th February 2015

The above instrument was calibrated by comparing the readings of the instrument to the factory working standard of Vaisala.

The pressure readings of the factory working standard have been calibrated at an ISO/IEC 17025 accredited calibration laboratory (FINAS), Vaisala Measurement Standards Laboratory (MSL), by using MSL working standards traceable to NIST.

Calibration results, digital output

Reference hPa	Observed hPa	Correction* hPa
510.04	510.08	-0.04
550.04	550.07	-0.03
650.02	650.05	-0.03
750.02	750.04	-0.02
850.01	850.03	-0.02
950.01	950.02	-0.01
1000.01	1000.02	-0.01
1050.00	1050.01	-0.01
1098.00	1098.01	-0.01

Calibration results, analog output

Reference	Observed		Correction*
hPa	V	hPa	hPa
510.0	0.0167	510.0	0.0
550.0	0.0833	550.0	0.0
650.0	0.2502	650.1	-0.1
750.0	0.4168	750.1	-0.1
850.0	0.5837	850.2	-0.2
950.0	0.7503	950.2	-0.2
1000.0	0.8338	1000.3	-0.3
1050.0	0.9172	1050.3	-0.3
1098.0	0.9972	1098.3	-0.3

*To obtain the true pressure, add the correction to the barometer reading.
Interpolated corrections may be used at intermediate readings of the scale of the barometer.

Equipment used in calibration

Type	Serial number	Calibration date	Certificate number
PPC4	440	2013-10-08	1500154808/1500154810
HP34970A	MY41007264	2012-07-25	702254

Uncertainties (95 % confidence level, k=2)

Pressure	± 0.07 hPa	Analog	± 0.0001 V

Ambient Conditions

Humidity	24 %RH ± 5 %RH	Temperature	22 °C ± 1 °C	Pressure	996 hPa ± 1 hPa

Approved by

Technical Operator

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VAISALA **Certificate of Calibration**

Certificate report no. B07-14070014
B07/14070014

CALIBRATION CERTIFICATE

After adjustment

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Instrument	PTU300(500-1100) Digital Barometer
Serial number	C2610001
Manufacturer	Vaisala Oyj, Finland
Calibration date	20th February 2014 / Due Date: 20th February 2015

The above instrument was calibrated by comparing the readings of the instrument to the factory working standard of Vaisala.

The pressure readings of the factory working standard have been calibrated at an ISO/IEC 17025 accredited calibration laboratory (FINAS), Vaisala Measurement Standards Laboratory (MSL), by using MSL working standards traceable to NIST.

Calibration results, digital output

Reference hPa	Observed hPa	Correction* hPa	Acceptance limit hPa
510.04	510.03	0.01	± 0.05
550.04	550.03	0.01	± 0.05
650.03	650.02	0.01	± 0.05
750.02	750.01	0.01	± 0.05
850.02	850.02	0.00	± 0.05
950.01	950.00	0.01	± 0.05
1000.01	1000.01	0.00	± 0.05
1050.00	1050.00	0.00	± 0.05
1098.00	1098.00	0.00	± 0.05

Calibration results, analog output

Reference hPa	Observed V	Observed hPa	Correction* hPa	Acceptance limit hPa
510.0	0.0167	510.0	0.0	± 0.3
550.0	0.0833	550.0	0.0	± 0.3
650.0	0.2500	650.0	0.0	± 0.3
750.0	0.4168	750.1	-0.1	± 0.3
850.0	0.5835	850.1	-0.1	± 0.3
950.0	0.7503	950.2	-0.2	± 0.3
1000.0	0.8338	1000.3	-0.3	± 0.3
1050.0	0.9172	1050.3	-0.3	± 0.3
1098.0	0.9972	1098.3	-0.3	± 0.3

*To obtain the true pressure, add the correction to the barometer reading.
Interpolated corrections may be used at intermediate readings of the scale of the barometer.

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PPC4	440	2013-10-08	1500154808/1500154810
HP34970A	MY41007264	2012-07-25	702254

Uncertainties (95 % confidence level, k=2)

Pressure	± 0.07 hPa	Analog	± 0.0001 V

Ambient Conditions

Humidity	23 %RH ± 5 %RH	Temperature	22 °C ± 1 °C	Pressure	1002 hPa ± 1 hPa

Approved by Technical Operator

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VAISALA Certificate of Calibration

Certificate #:	022014-B-C2610001
Calibration Date:	February 20, 2014
Type:	Vaisala Pressure, RH & Temp. Transmitter
Model #:	PTU307
Serial #:	C2610001
SR #:	200347

Customer: College Of Earth, Ocean And Atmospheric Sciences
Corvallis, OR

Condition: The instrument was operational upon receipt. The 'As Found' RH readings were out of tolerance. There was no RH sensor damage or contamination found.

Action Taken: The chemical purge function was run. After the purge the RH reading rose. The unit was adjusted and calibrated.

Analog Outputs:

CH1:	0...5 V	0...100 %RH
CH2:	0...5 V	-40...60 °C, T
CH3:	0...1 V	500...1100 hPa, P

Due Date: * February 20, 2015

RH Calibrated By:

Jhonson François
Calibration Technician

Approved By:

The measurement results on the certificate are traceable to national or international standards. The results of this calibration relate only to the items being calibrated. This certificate may not be reproduced, except in full, without the prior written approval of the issuing laboratory. Vaisala is ISO 9001:2008 certified. Vaisala's calibration system complies with the requirements of ANSI/NCSL Z540-1-1994.

The calibration laboratory is controlled at 22 °C ± 3 °C and 40 %RH ± 20 %RH.

Special Limitations: None.

*Any due date given is based on a customer provided calibration interval. A number of factors may cause drift prior to the due date. Monitor all devices and calibrate when measurement error is suspected.

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Relative Humidity Calibration

Procedure #: 11603108
Instrument Range: 0 to 100 %RH
Lab Environment: Relative Humidity 25.1 %RH, Temperature 22.3 °C

As Found Data

Out Of Tolerance As Received: YES

Relative Humidity, %RH				
Reference	**Unit Under Test**	**Error**	**± Tolerance**	**± Uncertainty**
11.50	10.32	-1.18	1.00	0.42
33.10	30.72	-2.38	1.00	0.60
75.09	69.29	-5.80	1.00	0.79
95.00	90.20	-4.80	1.70	0.72
Temperature, °C				
Reference	**Unit Under Test**	**Error**	**± Tolerance**	**± Uncertainty**
22.17	22.34	0.17	0.21	0.13

After Chemical Purge

Relative Humidity, %RH				
Reference	**Unit Under Test**	**Error**	**± Tolerance**	**± Uncertainty**
75.10	71.90	-3.20	1.00	0.79

As Left Data

Relative Humidity, %RH				
Reference	**Unit Under Test**	**Error**	**± Tolerance**	**± Uncertainty**
11.50	11.62	0.12	1.00	0.42
33.10	33.74	0.64	1.00	0.60
75.10	75.58	0.48	1.00	0.79
95.00	95.60	0.60	1.70	0.72
Temperature, °C				
Reference	**Unit Under Test**	**Error**	**± Tolerance**	**± Uncertainty**
22.18	22.17	-0.01	0.21	0.13

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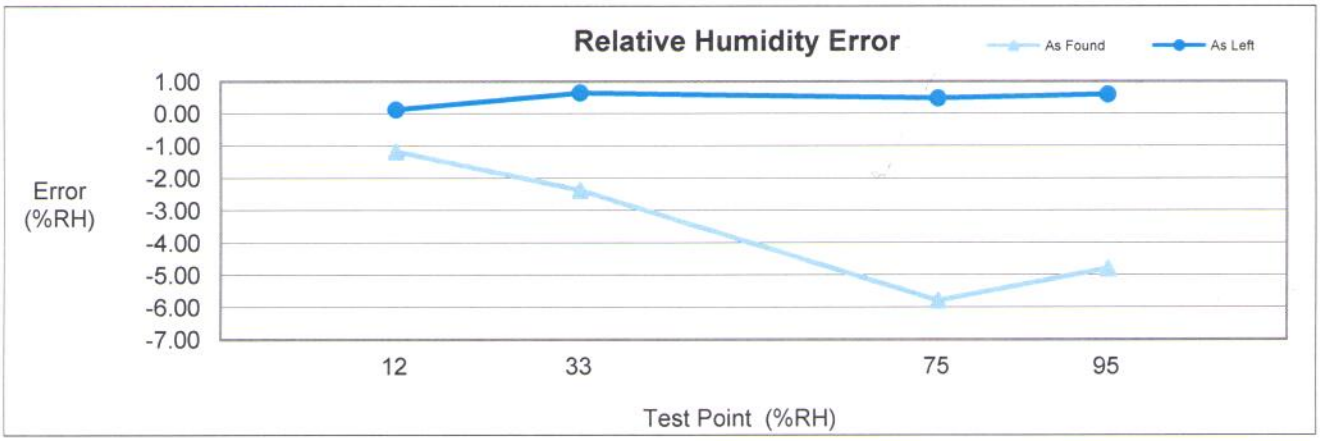
Relative Humidity Calibration



Reference Standards Calibration Information				
Model	**Serial Number**	**Asset Number**	**Calibration Date**	**Due Date**
Thunder Scientific 2500	0504485	5011-0020	Jan. 29, 2014	Jul. 29, 2014
Fluke 8846A	2156021	3011-0360	Aug. 28, 2013	Aug. 28, 2014

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Serial #:	C2610001
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Description

The calibration was performed in the Standard Laboratory of Vaisala, Inc. The instrument was first allowed to equilibrate to the laboratory environmental conditions for a period of at least 8 hours.

Relative Humidity Calibration: The sensor of the instrument was placed in the chamber of a Thunder Scientific 2500. The instrument was allowed to stabilize for at least 30 minutes at each testpoint.

Chemical Purge: A chemical purge was performed on the RH sensor before the instrument was adjusted or "As Left" data was taken. This was done to drive off any interfering chemicals that may have been absorbed by the sensor. Contamination most often causes a decrease in sensor gain. An interfering chemical may have been present on the sensor if the "After Purge" readings were higher than the "As Found" readings.

References

The Thunder Scientific 1200/2500 Two-Pressure Humidity Generator saturates a continuous stream of air with water vapor at a controlled pressure and temperature. The saturated high-pressure air then passes through an expansion valve to generate a specific humidity at the chamber pressure and temperature. The generator is traceable to NIST via Thunder Scientific or an MBW 373LHX chilled mirror hygrometer.

In or Out of Tolerance Decision Rule

Out of tolerance conditions are determined by the product specification only. The calibration uncertainty is not tied in with the instrument's accuracy.

Uncertainty

The reported expanded uncertainty of the measurement is stated as the standard uncertainty of the measurement multiplied by the coverage factor of k=2, which corresponds to a coverage probability of approximately 95%. The standard uncertainty of the measurement has been determined in accordance with the ISO Guide to the Expression of Uncertainty in Measurement.

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