



# CALIBRATION CERTIFICATE

## Before adjustment

**Instrument** PTU300(500-1100) Digital Barometer  
**Serial number** C2610001  
**Manufacturer** Vaisala Oyj, Finland  
**Calibration date** 16th November 2012

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
510.05	510.06	-0.01
550.05	550.06	-0.01
650.03	650.04	-0.01
750.02	750.04	-0.02
850.02	850.04	-0.02
950.00	950.02	-0.02
1000.00	1000.02	-0.02
1050.00	1050.02	-0.02
1098.02	1098.03	-0.01

### Calibration results, analog output

Reference hPa	Observed		Correction* hPa
	V	hPa	
510.1	0.0842	510.1	0.0
550.0	0.4167	550.0	0.0
650.0	1.2500	650.0	0.0
750.0	2.0833	750.0	0.0
850.0	2.9167	850.0	0.0
950.0	3.7500	950.0	0.0
1000.0	4.1667	1000.0	0.0
1050.0	4.5833	1050.0	0.0
1098.0	4.9833	1098.0	0.0

\*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	2012-09-17	1500139291
HP34970A	MY41007264	2012-07-25	702254

### Uncertainties ( 95 % confidence level, k=2)

Pressure  $\pm 0.07$  hPa      Analog       $\pm 0.0007$  V

### Ambient Conditions

Humidity      28 %RH  $\pm 5$  %RH      Temperature      22 °C  $\pm 1$  °C      Pressure      1023 hPa  $\pm 1$  hPa

Approved by

Technical Operator

# CALIBRATION CERTIFICATE

## After adjustment

**Instrument** PTU300(500-1100) Digital Barometer  
**Serial number** C2610001  
**Manufacturer** Vaisala Oyj, Finland  
**Calibration date** 20th November 2012

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
510.05	510.05	0.00	± 0.05
550.05	550.05	0.00	± 0.05
650.03	650.03	0.00	± 0.05
750.02	750.02	0.00	± 0.05
850.01	850.01	0.00	± 0.05
950.00	950.00	0.00	± 0.05
1000.01	1000.01	0.00	± 0.05
1050.00	1050.00	0.00	± 0.05
1098.02	1098.02	0.00	± 0.05

### Calibration results, analog output

Reference hPa	Observed		Correction* hPa	Acceptance limit hPa
	V	hPa		
510.0	0.0833	510.0	0.0	± 0.3
550.0	0.4167	550.0	0.0	± 0.3
650.0	1.2508	650.1	-0.1	± 0.3
750.0	2.0842	750.1	-0.1	± 0.3
850.0	2.9175	850.1	-0.1	± 0.3
950.0	3.7517	950.2	-0.2	± 0.3
1000.0	4.1683	1000.2	-0.2	± 0.3
1050.0	4.5858	1050.3	-0.3	± 0.3
1098.0	4.9858	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.

### Equipment used in calibration

Type	Serial number	Calibration date	Certificate number
PPC4	440	2012-09-17	1500139291
HP34970A	MY41007264	2012-07-25	702254

### Uncertainties ( 95 % confidence level, k=2)

Pressure ± 0.07 hPa Analog ± 0.0007 V

### Ambient Conditions

Humidity 30 %RH ± 5 %RH Temperature 21 °C ± 1 °C Pressure 1018 hPa ± 1 hPa

Approved by 

  
Technical Operator

**Certificate #:** 112012-B-C2610001  
**Calibration Date:** November 20, 2012  
**Type:** Vaisala Pressure, RH & Temp. Transmitter  
**Model #:** PTU307  
**Serial #:** C2610001  
**SR #:** 112239

**Customer:** Oregon State University  
Corvallis, OR

**Condition:** The instrument was operational upon receipt. The 'As Found' readings were out of tolerance. The third analog output was bad.

**Action Taken:** The chemical purge function was run. After the purge the RH reading rose. The third analog output was replaced. 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: \*** November 20, 2013

RH Calibrated By:

  
Jhonson François  
Calibration Technician

Approved By:



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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 23 °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 #:** 11603105  
**Instrument Range:** 0 to 100 %RH  
**Lab Environment:** Relative Humidity 49.0 %RH, Temperature 22.0 °C

### As Found Data

Out Of Tolerance As Received: YES

Relative Humidity, %RH				
Reference	Unit Under Test	Error	± Tolerance	± Uncertainty
0.03	0.20	0.17	1.00	0.50
11.09	11.80	0.71	1.00	0.43
33.13	34.20	1.07	1.00	0.60
75.10	75.50	0.40	1.00	0.79
95.07	95.40	0.33	1.70	0.72
Temperature, °C				
Reference	Unit Under Test	Error	± Tolerance	± Uncertainty
22.14	22.20	0.06	0.21	0.12

### After Chemical Purge

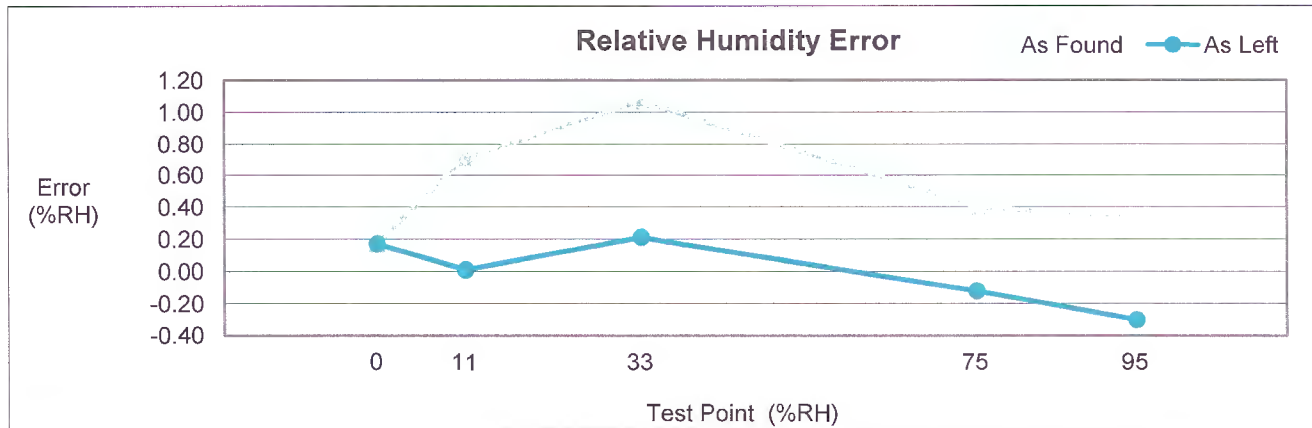
Relative Humidity, %RH				
Reference	Unit Under Test	Error	± Tolerance	± Uncertainty
75.05	76.30	1.25	1.00	0.79

### As Left Data

Relative Humidity, %RH				
Reference	Unit Under Test	Error	± Tolerance	± Uncertainty
0.03	0.20	0.17	1.00	0.50
11.09	11.10	0.01	1.00	0.43
33.09	33.30	0.21	1.00	0.60
75.12	75.00	-0.12	1.00	0.79
95.10	94.80	-0.30	1.70	0.72
Temperature, °C				
Reference	Unit Under Test	Error	± Tolerance	± Uncertainty
22.09	22.14	0.05	0.21	0.12

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## Relative Humidity Calibration



Reference Standards Calibration Information				
Model	Serial Number	Asset Number	Calibration Date	Due Date
Thunder Scientific 2500	0105299	5011-0064	Aug. 17, 2012	Feb. 17, 2013
Fluke 45	7781002	3011-0265	Dec. 22, 2010	Dec. 22, 2012
Vaisala DMP248	Z3230008	3011-0341	Feb. 06, 2012	Feb. 06, 2013

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**SR #:** 112239

#### 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 in the path of the outlet air stream. The instrument was allowed to stabilize for at least 30 minutes at each testpoint. A dry air line monitored by a Vaisala DMP248 was used to test 0 %RH.

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.

The Vaisala DMP248 measures dewpoint using a capacitive polymer sensor and temperature using an RTD. It calculates RH from the dewpoint and temperature readings.

#### 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 U.S. Guide to the Expression of Uncertainty in Measurement.