VAISALA Certificate of Calibration

Certificate #:	2011394-150130-PTU307-C2610001
Calibration Date:	January 30, 2015
Type:	Vaisala Pressure, RH & Temp. Transmitter
Model #:	PTU307
Serial #:	C2610001
SR #:	301682

Customer:
Oregon State University
130 Burt Hall
Oceanic & Atmos Sciences
Corvallis, OR 97331

Condition: The instrument was operational upon receipt. The 'As Found' RH readings were out of tolerance. There was no RH sensor damage or visible contamination. The analog out module failed during pressure adjustment.

Action Taken: The analog output board and filter were replaced. The instrument was adjusted and calibrated.

Analog Outputs:

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

Due Date: * January 30, 2016

RH, P 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 #: PI213878 Rev. I
Instrument Range: 0 to 100 %RH
Lab Environment: Relative Humidity 49.0 %RH, Temperature 21.5 °C

As Found Data

Out Of Tolerance As Received: YES

Relative Humidity, %RH				
Reference	Unit Under Test	Error	± Tolerance	± Uncertainty
11.50	12.40	0.90	1.00	0.42
33.08	34.80	1.72	1.00	0.60
75.08	77.90	2.82	1.00	0.79
95.01	99.20	4.19	1.70	0.72
Temperature, °C				
Reference	Unit Under Test	Error	± Tolerance	± Uncertainty
22.37	22.30	-0.07	0.21	0.13

As Left Data

Relative Humidity, %RH				
Reference	Unit Under Test	Error	± Tolerance	± Uncertainty
11.50	11.80	0.30	1.00	0.42
33.10	33.40	0.30	1.00	0.60
75.10	75.40	0.30	1.00	0.79
95.04	94.80	-0.24	1.70	0.72
Temperature, °C				
Reference	Unit Under Test	Error	± Tolerance	± Uncertainty
22.19	22.20	0.01	0.21	0.13

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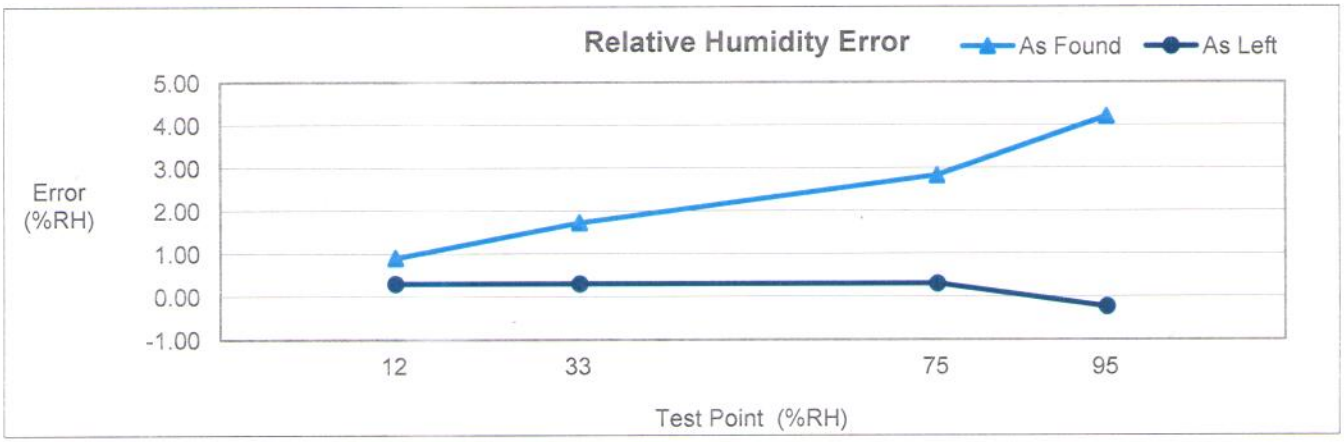
Relative Humidity Calibration



Reference Standards Calibration Information				
Model	**Serial Number**	**Asset Number**	**Calibration Date**	**Due Date**
Thunder Scientific 2500	1311989	5011-0078	Nov. 17, 2014	May. 17, 2015

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Pressure Calibration

Procedure #: 11603172 Rev. A
Instrument Range: 500 to 1100 hPa
Lab Environment: Relative Humidity 22.0 %RH, Temperature 23.0 °C

As Found Data

Out Of Tolerance As Received: NO

Pressure, hPa				
Reference	Unit Under Test	Error	± Tolerance	± Uncertainty
510.07	510.15	0.08	0.14	0.066
550.11	550.18	0.07	0.14	0.066
650.07	650.13	0.06	0.14	0.066
750.06	750.12	0.06	0.14	0.066
850.04	850.09	0.05	0.14	0.066
950.02	950.07	0.05	0.14	0.066
1000.01	1000.06	0.05	0.14	0.066
1050.02	1050.06	0.04	0.14	0.066
1097.99	1098.03	0.04	0.14	0.066

As Left Data

Pressure, hPa				
Reference	Unit Under Test	Error	± Tolerance	± Uncertainty
510.04	510.03	-0.01	0.05	0.066
550.04	550.03	-0.01	0.05	0.066
650.04	650.04	0.00	0.05	0.066
749.99	749.99	0.00	0.05	0.066
850.01	850.01	0.00	0.05	0.066
950.02	950.02	0.00	0.05	0.066
1000.01	1000.01	0.00	0.05	0.066
1050.02	1050.02	0.00	0.05	0.066
1098.01	1098.01	0.00	0.05	0.066

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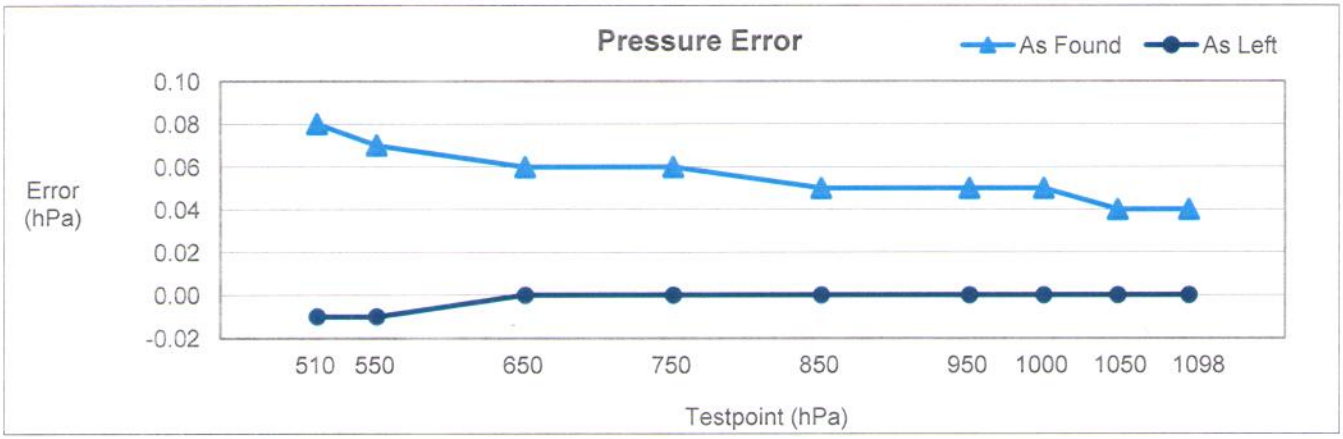
Pressure Calibration



Reference Standards and Measurement Equipment				
Model	**Serial Number**	**Asset Number**	**Calibration Date**	**Due Date**
Fluke PPC4 A100Kp	439	PA-13451	Aug. 16, 2014	May. 16, 2015

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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.

Pressure Calibration: The instrument was allowed to warm up for at least 2 hours before the calibration. The instrument's input port was connected to the output of a Fluke PPC4 Pressure Controller/Calibrator and the connection was tested for leaks. The testpoints are measured from high to low then again from low to high. The instruments were allowed to stabilize for at least 2 minutes after each testpoint was reached. The reported readings are the average of the readings from the high to low cycle and the readings from the low to high cycle.

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 Fluke PPC4 Pressure Controller/Calibrator digitally controls the pneumatic pressure output using solenoid valves and differential pressure regulators. It measures the pressure with a quartz reference pressure transducter (Q-RPT). The PPC4 is traceable to NIST through Fluke.

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.

DOC228428 Rev. B

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