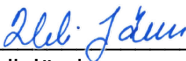


CERTIFICATE OF CALIBRATION no K008-SAMPLE

Customer	Name Addr1 Addr2 Country
Item	Humidity and Temperature Probe
Manufacturer	Vaisala Oyj
Model	HMP110
Serial number	Lxxxxxxx
Instrument number	-
Calibration performed	On December 16 and 17, 2016
Date	December 21, 2016
Signature	 Heli Järvinen Senior Calibration Engineer
Page 1 (4)	
Documents attached	
NOTES	Adjusted.
Conditions when received	Reported in Service Report.

This Certificate may only be reproduced in full, except with the prior written permission by the issuing Laboratory. The measurements carried out and the Certificates of Calibration issued by an Accredited Calibration Laboratory comply with the measurement ranges and uncertainties approved by FINAS Finnish Accreditation Service. The measurement results issued by the Laboratory are traceable to national or international measurement standards. Measurement Standards Laboratory of Vaisala Oyj is a calibration laboratory K008 accredited by FINAS Finnish Accreditation Service, accreditation requirement ISO/IEC 17025. The accreditation is included in the Multilateral Agreement (EA MLA) of the European co-operation for Accreditation (EA).

CONFIGURATION

The probe's configuration, settings and coefficients were read from the probe's memory.

Before measurements the probe was allowed to stabilize to the conditions of the laboratory for at least 1 hour with + 5,0 VDC $\pm$ 0,3 VDC power supply switched on.

The calibration is valid only with configuration and settings:

Software HMP110 / 2.0.7

REFERENCES USED DURING TEMPERATURE CALIBRATION

Hart 1502A Thermometer, serial number A09200

REFERENCES USED DURING HUMIDITY CALIBRATION

Hart 1502A Thermometer, serial number A09200

Thunder 2500 Humidity generator, serial number 1209916

Vaisala PTB220 Pressure Transmitter, serial number T2410011

TRACEABILITY

The measurement results are traceable to the international system of units (SI) through national metrology institutes (NIST in USA or equivalent) or accredited calibration laboratories.

UNCERTAINTY

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k = 2$, which for a normal distribution corresponds to a coverage probability of approximately 95 %. The standard uncertainty of measurement has been determined in accordance with EA Publication EA-4/02.

The measurement uncertainty represents the situation at the time and conditions of calibration. When using the UUC at different conditions and at different time the effect of the conditions and stability of the UUC shall be evaluated separately.

The measurement results and uncertainty are representing the measurement points only.

CALIBRATION CONDITIONS

Temperature 23 °C $\pm$ 3 °C

Humidity 35 %rh $\pm$ 25 %rh

TEMPERATURE CALIBRATION

The temperature calibration was done in the Measurement Standards Laboratory (MSL) of Vaisala Oyj on December 16 and 17, 2016.

The temperature readings of the probe were compared to the values of the reference thermometer from + 24,9 to + 39,8 °C in a climate chamber.

Temperature values were read via serial port with resolution of 0,01 °C.

Temperature values are given according to the International Temperature Scale of 1990, ITS-90.

Measurement results

The reference and the reading values are averages of ten independent observations.

Table 1. Final results, temperature, T

Reference [°C]	As found		As left		Uncertainty [°C]
	Reading T [°C]	Correction [°C]	Reading T [°C]	Correction [°C]	
+ 24,86	+ 24,86	0,00	+ 24,81	+ 0,05	± 0,16
+ 29,84	+ 29,88	- 0,04	+ 29,83	+ 0,01	± 0,16
+ 39,77	+ 39,82	- 0,05	+ 39,77	0,00	± 0,16
+ 39,83	+ 39,90	- 0,07	+ 39,86	- 0,03	± 0,16
+ 39,83	+ 39,91	- 0,08	+ 39,86	- 0,03	± 0,16

The correction shall be added algebraically to the reading.

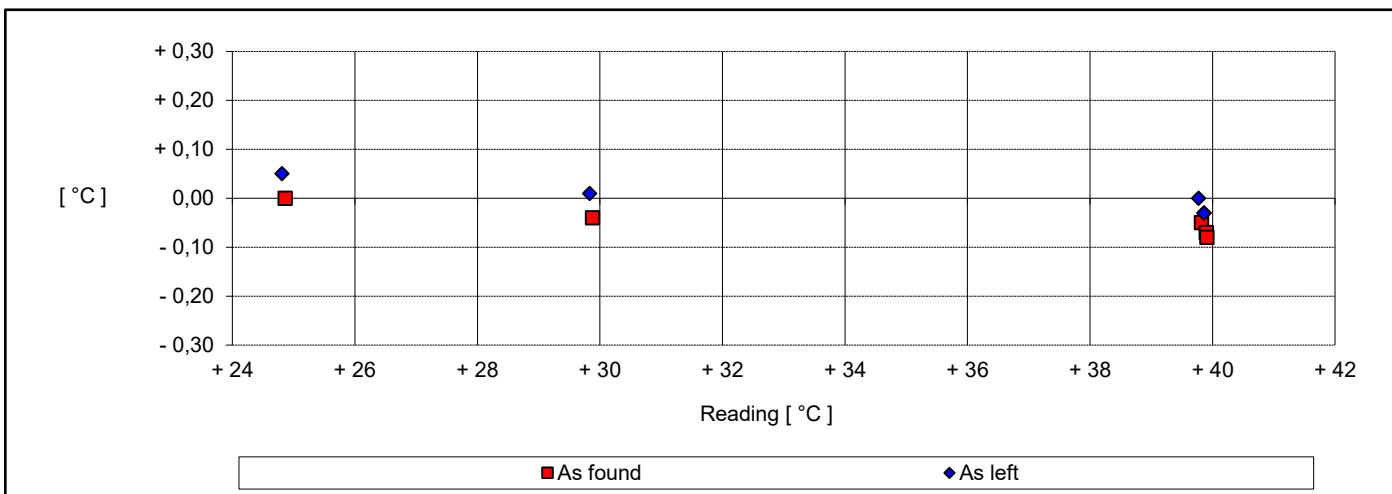


Figure 1. Final results, T

HUMIDITY CALIBRATION

The humidity calibration was done in the Measurement Standards Laboratory (MSL) of Vaisala Oyj on December 16 and 17, 2016.

The humidity readings of the probe were compared to the reference humidity values at climate chamber in the range from 39,9 to 74,9 %rh. The humidity readings were read via serial port with resolution of 0,01 %rh.

Measurement results

The probe was allowed to stabilize to each humidity for at least 60 minutes before the readings were read. The reference and the reading values are averages of ten independent observations.

Table 2. Final results, humidity

Temperature [°C]	Reference [%rh]	As found		As left		Uncertainty [%rh]
		Reading RHout [%rh]	Correction [%rh]	Reading RHout [%rh]	Correction [%rh]	
+ 24,9	60,1	60,9	- 0,8	60,3	- 0,2	± 0,8
+ 29,8	64,9	65,6	- 0,7	65,0	- 0,1	± 0,9
+ 39,8	39,9	40,6	- 0,7	39,9	0,0	± 0,7
+ 39,8	50,0	50,6	- 0,6	49,9	+ 0,1	± 0,8
+ 39,8	74,9	75,4	- 0,5	74,7	+ 0,2	± 0,9

The correction shall be added algebraically to the reading.

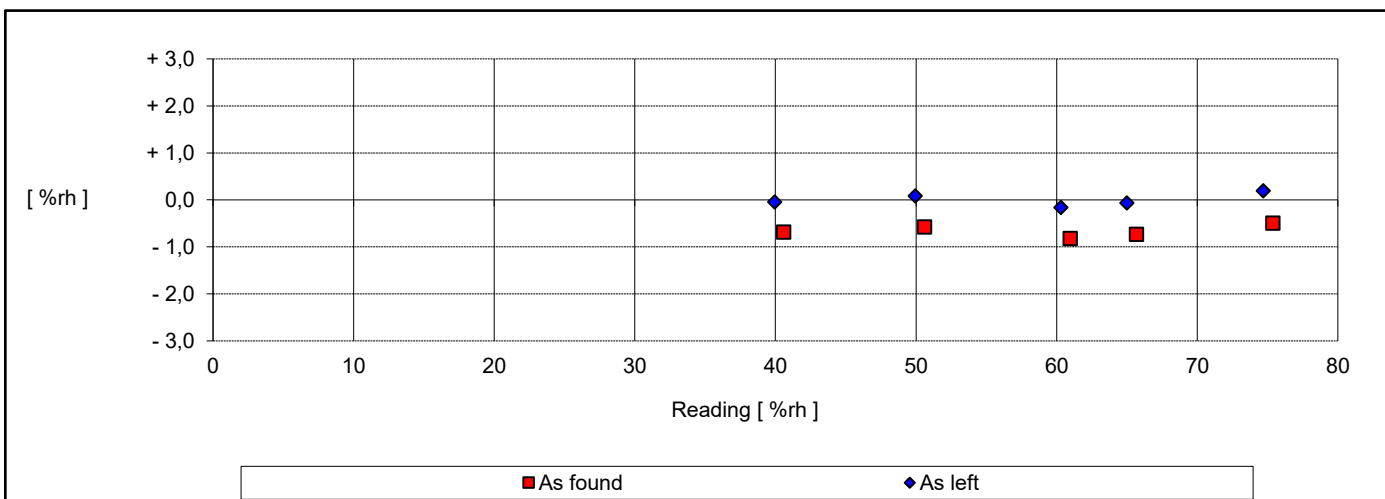


Figure 2. Final results