VAISALA

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MEASUREMENT STANDARDS LABORATORY
ACCREDITED CALIBRATION LABORATORY

ilac-MRA FINAS Finnish Accreditation Service
K008 (EN ISO/IEC 17025)

CERTIFICATE OF CALIBRATION no K008-G01737

Customer	Medikro Oy Pioneerinkatu 3 70800 Kuopio FINLAND
Instrument	PTU Transmitter
Manufacturer	Vaisala Oyj
Model	PTU301
Serial number	C4530008
Instrument number	ME-023
Calibration date	From March 22 to 24, 2023
Calibration due date	March 22, 2024
Issue date	March 24, 2023
Signature	Jarno Suutari Calibration Engineer
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Documents attached	-
NOTES	The instrument was adjusted during calibration.
Conditions when received	Reported in Service Report.

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DESCRIPTION

The measurement results were obtained from the measured values or the results were calculated from the measured values by using adjustment coefficients.
The instrument's configuration, settings and coefficients were read from the instrument's memory.
Before measurements the instrument was allowed to stabilize to the conditions of the laboratory for at least 1 hour with 24,0 VDC ± 0,3 VDC power supply on.
The instrument was configured to use pressure 1013,25 hPa settings for the time of the calibration if there is a pressure compensation setting in the instrument.
The calibration is valid only with configuration and settings:

P1 linear adj.	ON	P1 offset	0
P1 multi adj.	ON		

REFERENCES USED DURING PRESSURE CALIBRATION

DHI PPC3 Pressure Controller/Calibrator, serial number 722, due date 2023-Jul-31

REFERENCES USED DURING TEMPERATURE CALIBRATION

Hart 1560/2560 Thermometer, serial number 9C625/9C432, due date 2023-Aug-31

REFERENCES USED DURING HUMIDITY CALIBRATION

Hart 1560/2560 Thermometer, serial number 9C625/9C432, due date 2023-Aug-31
Thunder 2500 Humidity generator, serial number 1209917, due date 2024-Jan-31
PTB330 Digital Barometer, serial number S1920488, due date 2023-Sep-30

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.

CALIBRATION PROCEDURE

DOC236240, pressure
DOC233127, temperature
DOC230528, humidity

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 measured instrument and measurement points only.

STATEMENT OF CONFORMITY

The calibration results and the statement of conformity with specification relate only to the calibrated instrument and the calibration points.
The statement of conformity is based on simple acceptance, whether the calibration result is within or outside the manufacturer's specification. The calibration uncertainty is not taken into account in the statement of conformity.
The probability of accepting a non-conforming result or rejecting a conforming result can be as large as 50 % with this acceptance rule when the calibration result is close to the specification limit.
Pass = The calibration result is equal or within the manufacturer's specification.
Fail = The calibration result is outside the manufacturer's specification.
There is no specified specification when the specification is marked with 'None'.

CALIBRATION CONDITIONS

Temperature	23 °C ± 3 °C
Humidity	35 %rh ± 32 %rh

PRESSURE CALIBRATION

The pressure calibration was done in the Measurement Standards Laboratory (MSL) of Vaisala Oyj on March 22, 2023. The pressure readings of the instrument were compared to the values of the reference pressure transmitter in the range from 500 hPa to 1100 hPa absolute pressure. The pressure calibration is valid only with the LC -corrections switched ON. Pressure values were read via serial port with resolution of 0,01 hPa. The used pressure transmitting medium was air and/or nitrogen.

Measurement results

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

Table 1. As found results, pressure

Reference [hPa]	Reading p [hPa]	Correction [hPa]	Uncertainty [hPa]	Specification [hPa]	Conformity Statement
1099,91	1099,91	0,00	0,06	0,10	PASS
1050,00	1050,00	0,00	0,06	0,10	PASS
1000,04	1000,05	-0,01	0,06	0,10	PASS
950,05	950,05	0,00	0,06	0,10	PASS
850,06	850,07	-0,01	0,06	0,10	PASS
750,08	750,09	-0,01	0,06	0,10	PASS
650,09	650,10	-0,01	0,06	0,10	PASS
550,11	550,12	-0,01	0,06	0,10	PASS
500,12	500,14	-0,02	0,06	0,10	PASS

The correction shall be added algebraically to the reading.

Table 2. As left results, pressure

Reference [hPa]	Reading p [hPa]	Correction [hPa]	Uncertainty [hPa]	Specification [hPa]	Conformity Statement
1099,91	1099,91	0,00	0,06	0,10	PASS
1050,00	1050,00	0,00	0,06	0,10	PASS
1000,04	1000,04	0,00	0,06	0,10	PASS
950,05	950,05	0,00	0,06	0,10	PASS
850,06	850,06	0,00	0,06	0,10	PASS
750,08	750,08	0,00	0,06	0,10	PASS
650,09	650,09	0,00	0,06	0,10	PASS
550,11	550,11	0,00	0,06	0,10	PASS
500,12	500,12	0,00	0,06	0,10	PASS

The correction shall be added algebraically to the reading.

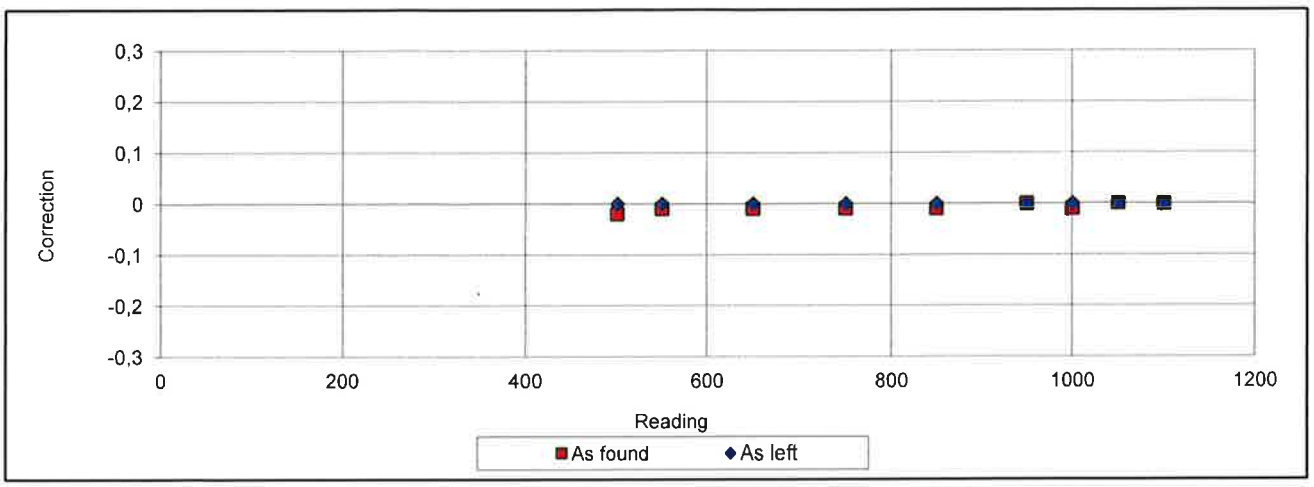

Figure 1. Final results, pressure [hPa]

TEMPERATURE CALIBRATION

The temperature calibration was done in the Measurement Standards Laboratory (MSL) of Vaisala Oyj on March 23 and 24, 2023.
The temperature readings of the instrument were compared to the values of the reference thermometer from 0,1 °C to 39,7 °C in a climate chamber.
During calibration the instrument was allowed to stabilize to the conditions of the measurement temperature for at least 30 minutes.
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 at least ten independent observations.

Table 3. As found results, temperature, T

Reference [°C]	Reading T [°C]	Correction [°C]	Uncertainty [°C]	Specification [°C]	Conformity Statement
0,11	0,09	0,02	0,07	0,27	PASS
23,23	23,22	0,01	0,07	0,21	PASS
39,69	39,69	0,00	0,07	0,25	PASS

The correction shall be added algebraically to the reading.

Table 4. As left results, temperature, T

Reference [°C]	Reading T [°C]	Correction [°C]	Uncertainty [°C]	Specification [°C]	Conformity Statement
0,11	0,11	0,00	0,07	0,27	PASS
23,23	23,23	0,00	0,07	0,21	PASS
39,69	39,69	0,00	0,07	0,25	PASS

The correction shall be added algebraically to the reading.

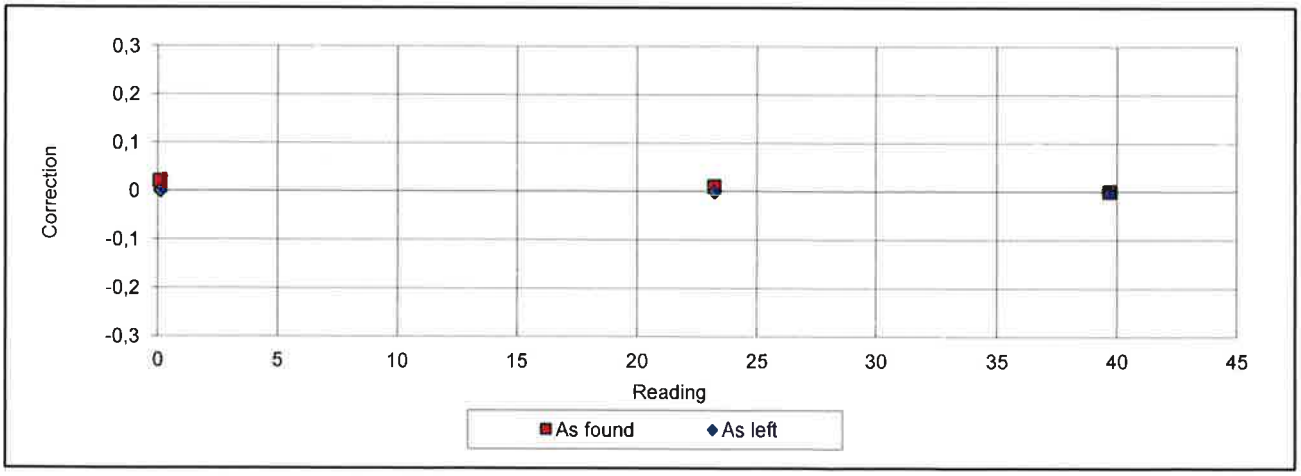

Figure 2. Final results, temperature [°C]

HUMIDITY CALIBRATION

The humidity calibration was done in the Measurement Standards Laboratory (MSL) of Vaisala Oyj on March 23 and 24, 2023.

The humidity readings of the instrument were compared to the reference humidity values at climate chamber in the range from 15 %rh to 95 %rh. The humidity readings were read via serial port with resolution of 0,01 %rh.

The chemical purge was run before each humidity calibration point if the instrument has the chemical purge option.

Measurement results

The instrument 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 at least ten independent observations.

Table 5. As found results, humidity

Temperature [°C]	Reference [%rh]	Reading [%rh]	Correction [%rh]	Uncertainty [%rh]	Specification [%rh]	Conformity Statement
23,1	15,0	14,9	0,1	0,4	1,0	PASS
23,2	33,0	32,8	0,2	0,6	1,0	PASS
23,2	54,0	54,1	-0,1	0,7	1,0	PASS
23,2	75,0	75,4	-0,4	0,8	1,0	PASS
23,2	95,0	95,9	-0,9	0,9	1,7	PASS

The correction shall be added algebraically to the reading.

Table 6. As left results, humidity

Temperature [°C]	Reference [%rh]	Reading [%rh]	Correction [%rh]	Uncertainty [%rh]	Specification [%rh]	Conformity Statement
23,1	15,0	15,2	-0,2	0,4	1,0	PASS
23,2	33,0	32,9	0,1	0,6	1,0	PASS
23,2	54,0	54,0	0,0	0,7	1,0	PASS
23,2	75,0	75,1	-0,1	0,8	1,0	PASS
23,2	95,0	95,4	-0,4	0,9	1,7	PASS

The correction shall be added algebraically to the reading.

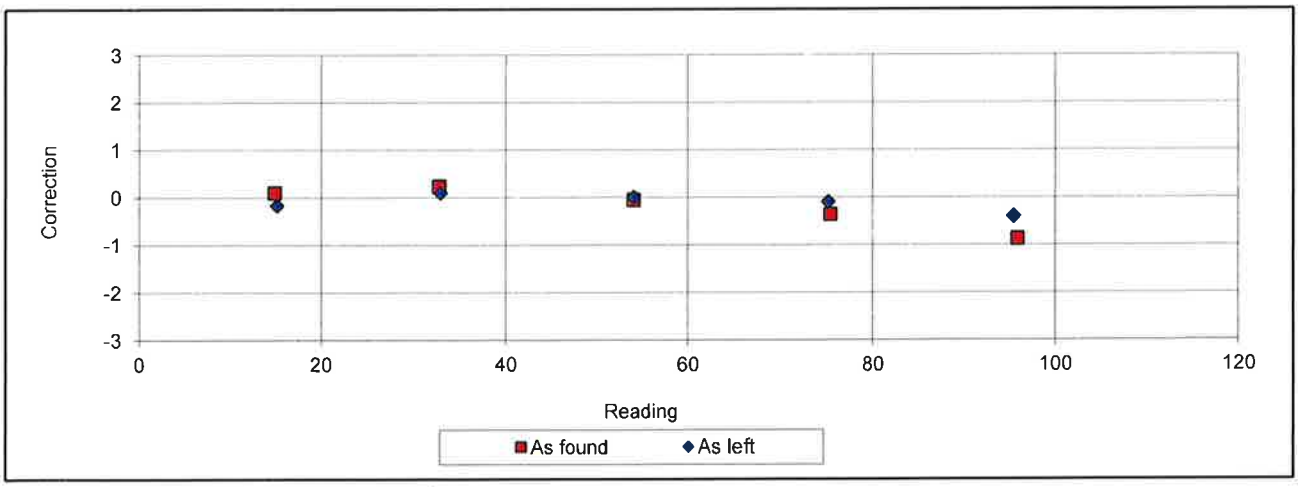

Figure 3. Final results, humidity [%rh]