VAISALA

Certificate report no. H48-18500079

CALIBRATION CERTIFICATE

Instrument	Humidity and Temperature Probe HMP155
Serial number	P5020424
Manufacturer	Vaisala Oyj, Finland
Calibration date	12th December 2018

The above instrument was calibrated by comparing the readings of the instrument to working standards of the manufacturer. The reference humidity was calculated from dewpoint temperature and temperature readings with the exception of the driest condition that was measured as relative humidity. Dewpoint temperature was measured with a 373 LHX dewpoint meter. Temperature and relative humidity were measured with two factory working standards. At the time of shipment, the instrument described above met its operating specifications.

The 373 LHX dewpoint meter has been calibrated at Centre for metrology and accreditation (MIKES) by using a MIKES working standard traceable to National Institute of Standards and Technology (NIST). The temperature readings of the factory working standards 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. The relative humidity readings of the factory working standards have been calibrated at the Vaisala factory by using a 373 LHX dewpoint meter.

Humidity calibration results

Reference humidity	Reference temperature	Observed humidity	Observed probe temperature	Additional probe temperature	Humidity difference	Permissible difference
%RH	°C	%RH	°C	°C	%RH	%RH
+ 0.1	+ 21.96	+ 0.2	-	+ 21.97	+ 0.1	±1.0
+ 12.7	+ 21.98	+ 12.8	-	+ 21.99	+ 0.1	± 1.0
+ 33.7	+ 21.99	+ 33.2	-	+ 22.00	- 0.5	± 1.0
+ 54.5	+ 21.99	+ 54.4	-	+ 21.99	- 0.1	± 1.0
+ 75.4	+ 21.98	+ 75.6	-	+ 21.99	+ 0.2	± 1.0
+ 95.1	+ 21.93	+ 95.5	-	+ 21.95	+ 0.4	± 1.7

Temperature calibration results

Reference temperature	Observed probe temperature	Temperature difference		Additional probe temperature	Temperature difference	Permissible difference
°C	°C	°C		°C	°C	°C
+ 21.98	-	-		+ 21.99	+ 0.01	± 0.10

Equipment used in calibration

Type	Serial number	Calibration date	Certificate number
373 LHX	03-1218	2017-12-17	5771MBW2018
PTU303	H0730005	2018-10-18	K008-B02990
HMT337	G0810118	2018-10-19	K008-B02988
PTU303 / RH	H0730005	2018-10-23	H48-18431001
HMT337 / RH	G0810118	2018-10-23	H48-18431002

Uncertainties (95 % confidence level, k=2)
Humidity ± 0.6%RH @ 0...40%RH, ± 1.0%RH @ 40...97%RH
Temperature ± 0.10 °C.
Ambient conditions / Humidity 28 ± 5%RH, Temperature 24 ± 1 °C, Pressure 1025 ± 1 hPa.

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Certificate report no. H48-18500078

CALIBRATION CERTIFICATE

Instrument	Humidity and Temperature Probe HMP155
Serial number	P5020423
Manufacturer	Vaisala Oyj, Finland
Calibration date	12th December 2018

The above instrument was calibrated by comparing the readings of the instrument to working standards of the manufacturer. The reference humidity was calculated from dewpoint temperature and temperature readings with the exception of the driest condition that was measured as relative humidity. Dewpoint temperature was measured with a 373 LHX dewpoint meter. Temperature and relative humidity were measured with two factory working standards. At the time of shipment, the instrument described above met its operating specifications.

The 373 LHX dewpoint meter has been calibrated at Centre for metrology and accreditation (MIKES) by using a MIKES working standard traceable to National Institute of Standards and Technology (NIST). The temperature readings of the factory working standards 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. The relative humidity readings of the factory working standards have been calibrated at the Vaisala factory by using a 373 LHX dewpoint meter.

Humidity calibration results

Reference humidity	Reference temperature	Observed humidity	Observed probe temperature	Additional probe temperature	Humidity difference	Permissible difference
%RH	°C	%RH	°C	°C	%RH	%RH
+ 0.1	+ 21.96	+ 0.2	-	+ 21.98	+ 0.1	±1.0
+ 12.7	+ 21.98	+ 12.8	-	+ 21.99	+ 0.1	± 1.0
+ 33.7	+ 21.99	+ 33.2	-	+ 22.00	- 0.5	± 1.0
+ 54.5	+ 21.99	+ 54.4	-	+ 22.00	- 0.1	± 1.0
+ 75.4	+ 21.98	+ 75.6	-	+ 21.99	+ 0.2	± 1.0
+ 95.1	+ 21.93	+ 95.6	-	+ 21.95	+ 0.5	± 1.7

Temperature calibration results

Reference temperature	Observed probe temperature	Temperature difference		Additional probe temperature	Temperature difference	Permissible difference
°C	°C	°C		°C	°C	°C
+ 21.98	-	-		+ 21.99	+ 0.01	± 0.10

Equipment used in calibration

Type	Serial number	Calibration date	Certificate number
373 LHX	03-1218	2017-12-17	5771MBW2018
PTU303	H0730005	2018-10-18	K008-B02990
HMT337	G0810118	2018-10-19	K008-B02988
PTU303 / RH	H0730005	2018-10-23	H48-18431001
HMT337 / RH	G0810118	2018-10-23	H48-18431002

Uncertainties (95 % confidence level, k=2)
Humidity ± 0.6%RH @ 0...40%RH, ± 1.0%RH @ 40...97%RH
Temperature ± 0.10 °C.
Ambient conditions / Humidity 28 ± 5%RH, Temperature 24 ± 1 °C, Pressure 1025 ± 1 hPa.

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Certificate report no. H48-18500077

CALIBRATION CERTIFICATE

Instrument Humidity and Temperature Probe HMP155
Serial number P5020422
Manufacturer Vaisala Oyj, Finland
Calibration date 12th December 2018

The above instrument was calibrated by comparing the readings of the instrument to working standards of the manufacturer. The reference humidity was calculated from dewpoint temperature and temperature readings with the exception of the driest condition that was measured as relative humidity. Dewpoint temperature was measured with a 373 LHX dewpoint meter. Temperature and relative humidity were measured with two factory working standards. At the time of shipment, the instrument described above met its operating specifications.

The 373 LHX dewpoint meter has been calibrated at Centre for metrology and accreditation (MIKES) by using a MIKES working standard traceable to National Institute of Standards and Technology (NIST). The temperature readings of the factory working standards 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. The relative humidity readings of the factory working standards have been calibrated at the Vaisala factory by using a 373 LHX dewpoint meter.

Humidity calibration results

Reference humidity	Reference temperature	Observed humidity	Observed probe temperature	Additional probe temperature	Humidity difference	Permissible difference
%RH	°C	%RH	°C	°C	%RH	%RH
+ 0.1	+ 21.96	+ 0.2	-	+ 21.97	+ 0.1	±1.0
+ 12.6	+ 21.98	+ 12.7	-	+ 21.99	+ 0.1	± 1.0
+ 33.7	+ 21.99	+ 33.3	-	+ 22.00	- 0.4	± 1.0
+ 54.5	+ 21.99	+ 54.5	-	+ 22.00	0.0	± 1.0
+ 75.4	+ 21.98	+ 75.6	-	+ 21.99	+ 0.2	± 1.0
+ 95.1	+ 21.94	+ 95.4	-	+ 21.94	+ 0.3	± 1.7

Temperature calibration results

Reference temperature	Observed probe temperature	Temperature difference		Additional probe temperature	Temperature difference	Permissible difference
°C	°C	°C		°C	°C	°C
+ 21.98	-	-		+ 21.99	+ 0.01	± 0.10

Equipment used in calibration

Type	Serial number	Calibration date	Certificate number
373 LHX	03-1218	2017-12-17	5771MBW2018
PTU303	H0730005	2018-10-18	K008-B02990
HMT337	G0810118	2018-10-19	K008-B02988
PTU303 / RH	H0730005	2018-10-23	H48-18431001
HMT337 / RH	G0810118	2018-10-23	H48-18431002

Uncertainties (95 % confidence level, k=2)
Humidity ± 0.6%RH @ 0...40%RH, ± 1.0%RH @ 40...97%RH
Temperature ± 0.10 °C.
Ambient conditions / Humidity 29 ± 5%RH, Temperature 24 ± 1 °C, Pressure 1025 ± 1 hPa.

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Certificate report no. H48-18500076

CALIBRATION CERTIFICATE

Instrument	Humidity and Temperature Probe HMP155
Serial number	P5020421
Manufacturer	Vaisala Oyj, Finland
Calibration date	12th December 2018

The above instrument was calibrated by comparing the readings of the instrument to working standards of the manufacturer. The reference humidity was calculated from dewpoint temperature and temperature readings with the exception of the driest condition that was measured as relative humidity. Dewpoint temperature was measured with a 373 LHX dewpoint meter. Temperature and relative humidity were measured with two factory working standards. At the time of shipment, the instrument described above met its operating specifications.

The 373 LHX dewpoint meter has been calibrated at Centre for metrology and accreditation (MIKES) by using a MIKES working standard traceable to National Institute of Standards and Technology (NIST). The temperature readings of the factory working standards 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. The relative humidity readings of the factory working standards have been calibrated at the Vaisala factory by using a 373 LHX dewpoint meter.

Humidity calibration results

Reference humidity	Reference temperature	Observed humidity	Observed probe temperature	Additional probe temperature	Humidity difference	Permissible difference
%RH	°C	%RH	°C	°C	%RH	%RH
+ 0.1	+ 21.96	+ 0.2	-	+ 21.97	+ 0.1	±1.0
+ 12.6	+ 21.98	+ 12.7	-	+ 21.98	+ 0.1	± 1.0
+ 33.7	+ 21.99	+ 33.2	-	+ 21.99	- 0.5	± 1.0
+ 54.5	+ 21.99	+ 54.4	-	+ 21.99	- 0.1	± 1.0
+ 75.4	+ 21.98	+ 75.6	-	+ 21.99	+ 0.2	± 1.0
+ 95.1	+ 21.94	+ 95.6	-	+ 21.94	+ 0.5	± 1.7

Temperature calibration results

Reference temperature	Observed probe temperature	Temperature difference		Additional probe temperature	Temperature difference	Permissible difference
°C	°C	°C		°C	°C	°C
+ 21.98	-	-		+ 21.99	+ 0.01	± 0.10

Equipment used in calibration

Type	Serial number	Calibration date	Certificate number
373 LHX	03-1218	2017-12-17	5771MBW2018
PTU303	H0730005	2018-10-18	K008-B02990
HMT337	G0810118	2018-10-19	K008-B02988
PTU303 / RH	H0730005	2018-10-23	H48-18431001
HMT337 / RH	G0810118	2018-10-23	H48-18431002

Uncertainties (95 % confidence level, k=2)
Humidity ± 0.6%RH @ 0...40%RH, ± 1.0%RH @ 40...97%RH
Temperature ± 0.10 °C.
Ambient conditions / Humidity 29 ± 5%RH, Temperature 24 ± 1 °C, Pressure 1025 ± 1 hPa.

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Certificate report no. H48-18500075

CALIBRATION CERTIFICATE

Instrument	Humidity and Temperature Probe HMP155
Serial number	P5020420
Manufacturer	Vaisala Oyj, Finland
Calibration date	12th December 2018

The above instrument was calibrated by comparing the readings of the instrument to working standards of the manufacturer. The reference humidity was calculated from dewpoint temperature and temperature readings with the exception of the driest condition that was measured as relative humidity. Dewpoint temperature was measured with a 373 LHX dewpoint meter. Temperature and relative humidity were measured with two factory working standards. At the time of shipment, the instrument described above met its operating specifications.

The 373 LHX dewpoint meter has been calibrated at Centre for metrology and accreditation (MIKES) by using a MIKES working standard traceable to National Institute of Standards and Technology (NIST). The temperature readings of the factory working standards 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. The relative humidity readings of the factory working standards have been calibrated at the Vaisala factory by using a 373 LHX dewpoint meter.

Humidity calibration results

Reference humidity	Reference temperature	Observed humidity	Observed probe temperature	Additional probe temperature	Humidity difference	Permissible difference
%RH	°C	%RH	°C	°C	%RH	%RH
+ 0.1	+ 21.97	+ 0.2	-	+ 21.98	+ 0.1	±1.0
+ 12.7	+ 21.98	+ 12.8	-	+ 22.00	+ 0.1	± 1.0
+ 33.7	+ 21.99	+ 33.2	-	+ 22.00	- 0.5	± 1.0
+ 54.5	+ 21.99	+ 54.4	-	+ 22.00	- 0.1	± 1.0
+ 75.3	+ 21.98	+ 75.5	-	+ 21.99	+ 0.2	± 1.0
+ 95.0	+ 21.94	+ 95.6	-	+ 21.96	+ 0.6	± 1.7

Temperature calibration results

Reference temperature	Observed probe temperature	Temperature difference		Additional probe temperature	Temperature difference	Permissible difference
°C	°C	°C		°C	°C	°C
+ 21.98	-	-		+ 21.99	+ 0.01	± 0.10

Equipment used in calibration

Type	Serial number	Calibration date	Certificate number
373 LHX	03-1218	2017-12-17	5771MBW2018
PTU303	H0730005	2018-10-18	K008-B02990
HMT337	G0810118	2018-10-19	K008-B02988
PTU303 / RH	H0730005	2018-10-23	H48-18431001
HMT337 / RH	G0810118	2018-10-23	H48-18431002

Uncertainties (95 % confidence level, k=2)
Humidity ± 0.6%RH @ 0...40%RH, ± 1.0%RH @ 40...97%RH
Temperature ± 0.10 °C.
Ambient conditions / Humidity 29 ± 5%RH, Temperature 24 ± 1 °C, Pressure 1025 ± 1 hPa.

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