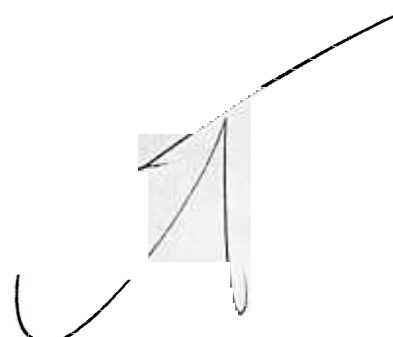


VAISALA



Operating Manual

HMP 35B
Humidity and Temperature Probe

EDITION **HMP35B-OC260-1.1**

DATE **DECEMBER 1990**

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HMP 35B HUMIDITY AND TEMPERATURE PROBE

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1 GENERAL

The HMP 35B probe is designed for the measurement of relative humidity and temperature. The probe can be used with Vaisala's HMI 36 Humidity Data Processor.

2 CONNECTION

The probe is delivered with a connector which can be inserted in the connector on the back panel of the HMI 36.

3 CALIBRATION AND MAINTENANCE

The HMP 35B probe should be checked and calibrated at regular intervals which depend on the operating conditions and accuracy desired, but at least once a year. The probe can be calibrated at one point with potentiometer "DRY". Then Vaisala's calibrated humidity meters can be used as a reference. If a more accurate two-point calibration is required, the HMK 11 Humidity Calibrator and saturated lithium chloride and sodium chloride or potassium sulphate salt solutions (LiCl , NaCl , K_2SO_4) are used. Normally LiCl and NaCl salt solutions are used, but if the humidity in the measurement range is continuously 75 ... 100 %RH, LiCl and K_2SO_4 solutions are used. The probe is adjusted first at the dry end and then at the wet end with trimmer potentiometers DRY and WET; they are located under a snap-off cover in the probe handle. More detailed calibration instructions can be found in the Operating Manual of the HMK 11 Humidity Calibrator.

3.1 Changing the HUMICAP® sensor

Remove the damaged sensor and mount a new one in its place. Handle the sensor with care. Calibrate the probe: one-point calibration is enough after a sensor change if the WET trimmer potentiometer is at its factory setting. Otherwise a two-point calibration is required.

3.2 Chemical Tolerances of the Sensor

Long-term exposure of the Humicap sensor to certain chemicals and gases may affect the characteristics of the sensor and shorten its life. The following list gives the recommended maximum ambient concentrations of some chemicals:

- 1 Organic solvents 1000 ... 10 000 ppm (Mwp.)
- 2 Aggressive chemicals
(e.g. strong acids such as
SO₂, H₂SO₄, H₂S, HCl, Cl₂,
etc. 1 ... 10 ppm (typ.)
- 3 Weak acids 100 ... 1000 ppm (typ.)
- 4 Bases 10 000 ... 100 000 ppm (typ.)

Detailed information on allowed concentrations can be requested from Vaisala representatives.

4 SPARE PARTS AND ACCESSORIES

	spare part no.
Humicap H-sensor with membrane filter	15202
Temperature sensor Pt 100 (1/3 DIN 43760B)	10429
Plastic grid	6597
Membrane filter 0.2 µm	2787
Sintered filter 37 µm	6685
Sintered filter 216 µm	6686
HMK 11 Humidity Calibrator	

5 TECHNICAL DATA

5.1 Humidity and Temperature

Relative humidity

Measurement range	0 ... 100 %RH
Output signal	0 ... 1 VDC Δ 0 ... 100 %RH
Accuracy (+20 °C) (nonlinearity and repeatability included)	best accuracy when compared to high-quality humidity standards ± 1 %RH when calibrated with salt ± 2 %RH (0 ... 90 %RH) solutions ± 3 %RH (90 ... 100 %RH)
Temperature dependence	± 0.04 %RH /°C
Typical long-term stability	better than 1 %RH per year
Response time (+20 °C, 90 % response)	5 s with plastic grid 15 s with membrane filter
Humidity sensor	HUMICAP® H-sensor with membrane filter (part no. 15202)

Temperature

Temperature sensor	Pt 100 (1/3 DIN 43760B), 4- wire connection
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5.2 Calculated Quantities

Dewpoint temperature, mixing ratio and absolute humidity can be calculated from humidity and temperature. The accuracy of the calculated quantities depends on the calibration of the probe and on how correctly the measurement is performed.

The following tables give highest possible accuracies which can be achieved when the probe has been calibrated against high-quality humidity standards, e.g. a dewpoint meter, or against salt solutions which have been prepared according to e.g. DIN 50 008, ASTM E104-85 or JIS Z 8806 standards. In the values given in the tables humidity measurement error when compared to the calibration standards is presumed to be 1 %RH and temperature measurement error 0.1 °C.

Dewpoint temperature

HUMIDITY

Temperature	10	20	30	40	50	60	70	80	90	100
-20	1.04	0.59	0.43	0.36	0.31	0.28	0.26	0.24	0.23	0.22
0	1.20	0.67	0.49	0.40	0.35	0.31	0.29	0.27	0.25	0.24
20	1.37	0.76	0.56	0.45	0.39	0.35	0.32	0.29	0.28	0.26
40	1.55	0.86	0.63	0.51	0.44	0.39	0.35	0.33	0.31	0.29
60	1.72	0.96	0.70	0.57	0.48	0.43	0.39	0.36	0.34	0.32

Mixing ratio

HUMIDITY

Temperature	10	20	30	40	50	60	70	80	90	100
-20	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
0	0.04	0.04	0.05	0.05	0.05	0.05	0.06	0.06	0.06	0.07
20	0.15	0.16	0.17	0.18	0.19	0.20	0.21	0.22	0.23	0.24
40	0.48	0.52	0.55	0.58	0.62	0.65	0.69	0.73	0.77	0.81
60	1.34	1.45	1.58	1.71	1.86	2.02	2.18	2.37	2.57	2.78

Absolute humidity

HUMIDITY

Temperature	10	20	30	40	50	60	70	80	90	100
-20	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02
0	0.05	0.06	0.06	0.06	0.07	0.07	0.07	0.08	0.08	0.08
20	0.18	0.19	0.20	0.21	0.22	0.23	0.24	0.25	0.26	0.27
40	0.54	0.56	0.59	0.61	0.64	0.66	0.69	0.72	0.74	0.77
60	1.35	1.41	1.46	1.52	1.58	1.63	1.69	1.75	1.80	1.86

5.3 General

Supply voltage	7 ... 35 VDC
Current consumption	≤4 mA
Operating temperature range	
sensor head	-40 ... +60 °C
electronics	-20 ... +60 °C
Sensor protection	
standard	plastic grid (part no. 6597)
option	0.2 µm membrane filter (part no. 2787)
	sintered filter 37 µm (part no. 6685)
	sintered filter 216 µm (part no. 6686)
Housing classification	IP 55 (NEMA 3S)
Housing material	ABS plastic
Connector	D-type male D9S
Cable length	1500 mm
Weight	180 g

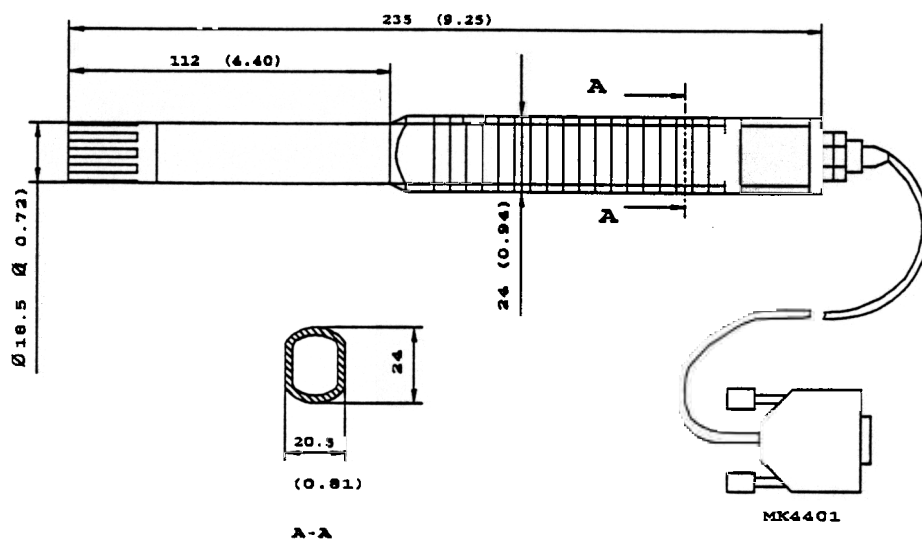
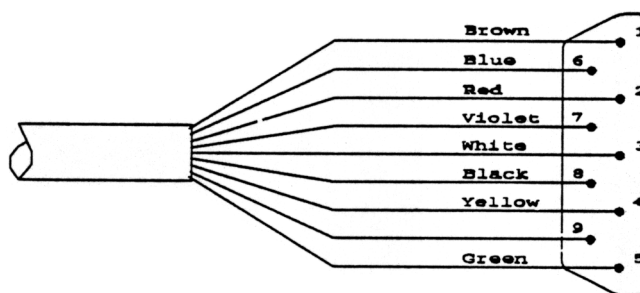


Fig. 1 Dimensions



Pin	Signal	Colour
1	Humidity output signal	brown
2	V- ground / Pt 100 temperature signal (-)	red
3	supply voltage V+ 7 ... 35 VDC	white
4	no connection	yellow
5	Pt 100 temperature signal (+)	green
6	Pt 100 temperature signal (-)	blue
7	Pt 100 temperature signal (+)	violet
8	V- ground / Pt 100 temperature signal (-)	black
9	shield	

Fig. 2 Electrical connections

GUARANTEE

Vaisala issues a guarantee for the material and workmanship of this product for on (1) year from the date of delivery. Damage due to exceptional operating conditions, careless handling or misapplication will void the guarantee. Detailed warranty information is given in the Warranty and the Standard Conditions of Sale of Vaisala Oy.