

Hygro Transmitter

Hygro-Thermo Transmitter

Instruction for use 1.1000.50.xxx / .52.xxx
1.1005.50.xxx / .52.xxx



1. General information

The water vapor in the air is called humidity. As, in general, air is only partially saturated with water vapor, it is of great interest to determine the relative degree of saturation which is given in percent of maximum humidity. For many institutions such as hospitals, computer rooms, meteorological measuring stations, museums, warehouses greenhouses etc., the exact knowledge and constant monitoring of the relative humidity is of great importance. The Hygro-transmitter, employed for such measurements, measures the relative humidity, displays the measured value and simultaneously provides an electrical signal.

The Hygro-thermo-transmitter is similar to the Hygro-transmitter described above but is additionally equipped with a "Pt 100" hard glass resistance in the immersion stem. This measurement resistance is ideal for long-range temperature measurement and guarantees a high resolution. The resistance of the platinum coil is a result of a temperature. The relationship between resistance and temperature is stipulated in DIN 43760 (German Industrial Standards Code). The "Pt 100" derives its name from the basic value of 100 ohms at 0 °C.

Hum. meas. element: **H** : for temperatures below and above 0°C medium and high humidity.

Hum. meas. element **K** : Maintenance free, for temperature above 0°C and complete humidity measuring range.

2. Construction of the Instrument

Hair (H) or synthetic (K) measuring elements are used to measure humidity. They have undergone an additional special treatment to ensure a particularly fast reaction. The measuring element consists of a number of hairs or fibers which change in length when the humidity changes. This change in length is transferred to the axis of a potentiometer. The slider and the scale pointer are also mounted onto a stainless steel (V2A). On the back of the case there is - depending on the wishes of the customer - either a plug or a 3 m long cable.

3. Models available

	Order no.	Model
	1.1000.xx.xxx	Hygro Transmitter
	1.1005.xx.xxx	Hygro-Thermo Transmitter
Humidity measuring element	.50.xxx	H (Hair)
	.52.xxx	K (Synthetic)
Type of connection	.0xx	Lemos plug
	.5xx	3 m cable
Electrical output (Humidity)	.x00	40-50-40 Ohm
	.x02	50-30-50 Ohm
	.x04	0...100 Ohm
	.x06	50-150-50 Ohm
	.x08	0...200 Ohm
	.x10	0...1000 Ohm
	.x12	0...2000 Ohm
	.x15	0...200 Ohm, linear

4. Technical Data

General information

Ambient temperature	: (H) -35...+70°C
	: (K) 0...+70°C
Protection	: IP 65 (case)
Weight	: 0,45 kg

Humidity

Measuring range	: (H) 10...100% rel. h
	: (K) 0...100% rel. h.
Measuring element	: H,K (see general information)
Accuracy	: $\pm 3\%$ rel. h
Scale graduation	: 1% rel. h. (non linear)
Length of scale	: 94 mm
Electr. output	: Potentiometer, see models
Load	: 1,5 VA
Slider current	: max. 100 mA

Temperature

Measuring range	: see ambient temperature
Measuring element	: Pt 100-Resistor-Thermometer acc. to IEC 751
Accuracy	: $\pm 0,1^{\circ}\text{C}$ at 0°C ; resp.. 1/3 class B
Self heating error	: $0,11^{\circ}\text{C/mW}$
Time constant	: 28 s (90%)

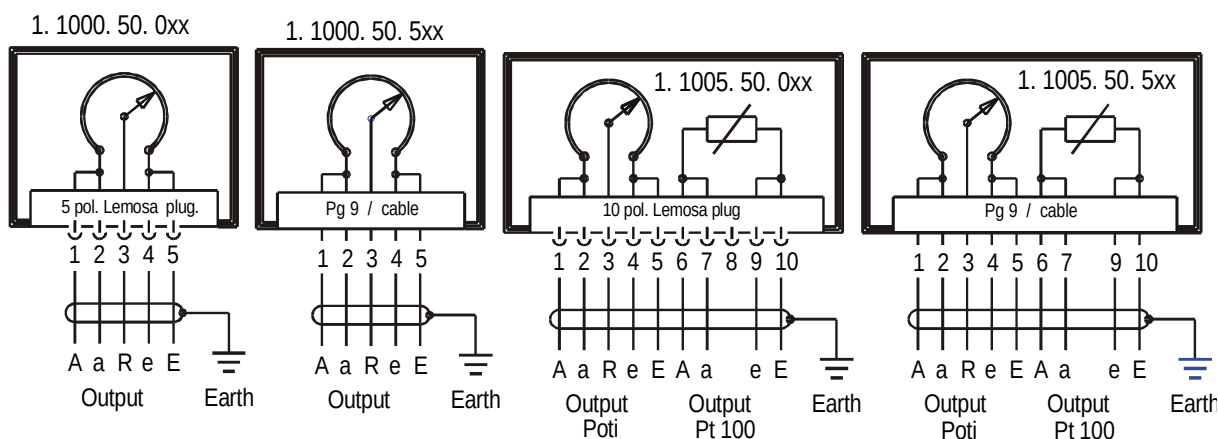
5. Mounting the instrument

Mount the Hygro-transmitter in such a way that it is protected from jarring, dust, chemical impurities and splashing water. You can either mount it with the aid of the R 3/4" nuts directly to the wall of the room where the measurements are to be taken or you can use the enclosed mounting angle to screw it to a plane surface. Please make sure that the transmitter is in the correct position for use - that immersion stem must be vertical and pointing downwards. Should there be heavily polluted air or wind velocities above about 3 m/s, then you will have to use a **wind protection** device order-no. **1.0509.85.006** in order to guarantee accurate measurements. This device is simply slipped over the immersion stem of the Hygro-transmitter and turned such that the closed side is facing the air stream.

Connect the electrical output to an appropriate display instrument (see item 6, connection diagrams). If the instrument has a double output, the second output can be used to connect a recorder or an additional display instrument. If the hygro-transmitter has a Lemosa plug connection, then we recommend using a flexible pilot line LiYCY in the following models for the electrical connection

Pole	Cross section of core	Total diameter
5	0,25...0,38 mm ²	5,2...5,7 mm
10	0,25...0,38 mm ²	7,7...8,2 mm

6. Connection diagrams



7. Table of resistant values

For humidity measurement with H-measuring element

Output	40 - 50 - 40 Ohm		50 - 30 - 50 Ohm		0 ... 100 Ohm		50 - 150 - 50 Ohm	
% rel.h.	A - R	E - R	A - R	E - R	A - R	E - R	A - R	E - R
10	40,00	90,00	50,00	80,00	0,00	100,00	50,00	200,00
15	44,46	85,54	52,68	77,32	8,92	91,08	63,38	186,62
20	48,62	81,38	55,16	74,84	17,24	82,76	75,86	174,14
25	52,40	77,60	57,43	72,57	24,80	75,20	87,20	162,80
30	55,81	74,19	59,48	70,52	31,62	68,38	97,43	152,57
35	58,85	71,15	61,30	68,70	37,70	62,30	106,56	143,44
40	61,66	68,34	62,98	67,02	43,32	56,68	114,98	135,02
45	64,26	65,74	64,54	65,46	48,52	51,48	122,78	127,22
50	66,72	63,28	66,02	63,98	53,44	46,56	130,16	119,84
55	68,99	61,01	67,37	62,63	57,98	42,02	136,97	113,03
60	71,11	58,89	68,65	61,35	62,22	37,78	143,33	106,67
65	73,24	56,76	69,92	60,08	66,48	33,52	149,72	100,28
70	75,37	54,63	71,20	58,80	70,74	29,26	156,11	93,89
75	77,50	52,50	72,47	57,53	75,00	25,00	162,50	87,50
80	79,66	50,34	73,77	56,23	79,32	20,68	168,98	81,02
85	81,89	48,11	75,11	54,89	83,78	16,22	175,67	74,33
90	84,25	45,75	76,52	53,48	88,50	11,50	182,76	67,24
95	86,96	43,04	78,14	51,86	93,92	6,08	190,88	59,12
100	90,00	40,00	80,00	50,00	100,00	0,00	200,00	50,00

Output	0 ... 200 Ohm		0 ... 1000 Ohm		0 ... 2000 Ohm		0 ... 200 Ohm, lin.	
% rel.h.	A - R	E - R	A - R	E - R	A - R	E - R	A - R	E - R
10	0,00	200,00	0,00	1000,00	0,00	2000,00	0,00	200,00
15	17,84	182,16	89,19	910,81	178,37	1821,63	11,11	188,89
20	34,47	165,53	172,37	827,63	344,74	1655,26	22,22	177,78
25	49,60	150,40	248,00	752,00	496,00	1504,00	33,33	166,67
30	63,24	136,76	316,22	683,78	632,44	1367,56	44,44	155,56
35	75,41	124,59	377,04	622,96	754,07	1245,93	55,56	144,44
40	86,64	113,36	433,19	566,81	866,37	1133,63	66,67	133,33
45	97,04	102,96	485,19	514,81	970,37	1029,63	77,78	122,22
50	106,87	93,13	534,37	465,63	1068,74	931,26	88,89	111,11
55	115,96	84,04	579,78	420,22	1159,56	840,44	100,00	100,00
60	124,44	75,56	622,22	377,78	1244,44	755,56	111,11	88,89
65	132,96	67,04	664,81	335,19	1329,63	670,37	122,22	77,78
70	141,48	58,52	707,41	292,59	1414,81	585,19	133,33	66,67
75	150,00	50,00	750,00	250,00	1499,96	500,04	144,44	55,56
80	158,64	41,36	793,19	206,81	1586,37	413,63	155,56	44,44
85	167,56	32,44	837,78	162,22	1675,56	324,44	166,67	33,33
90	177,01	22,99	885,04	114,96	1770,07	229,93	177,78	22,22
95	187,84	12,16	939,19	60,81	1878,37	121,63	188,89	11,11
100	200,00	0,00	1000,00	0,00	2000,00	0,00	200,00	0,00

For humidity measurement with K-measuring element

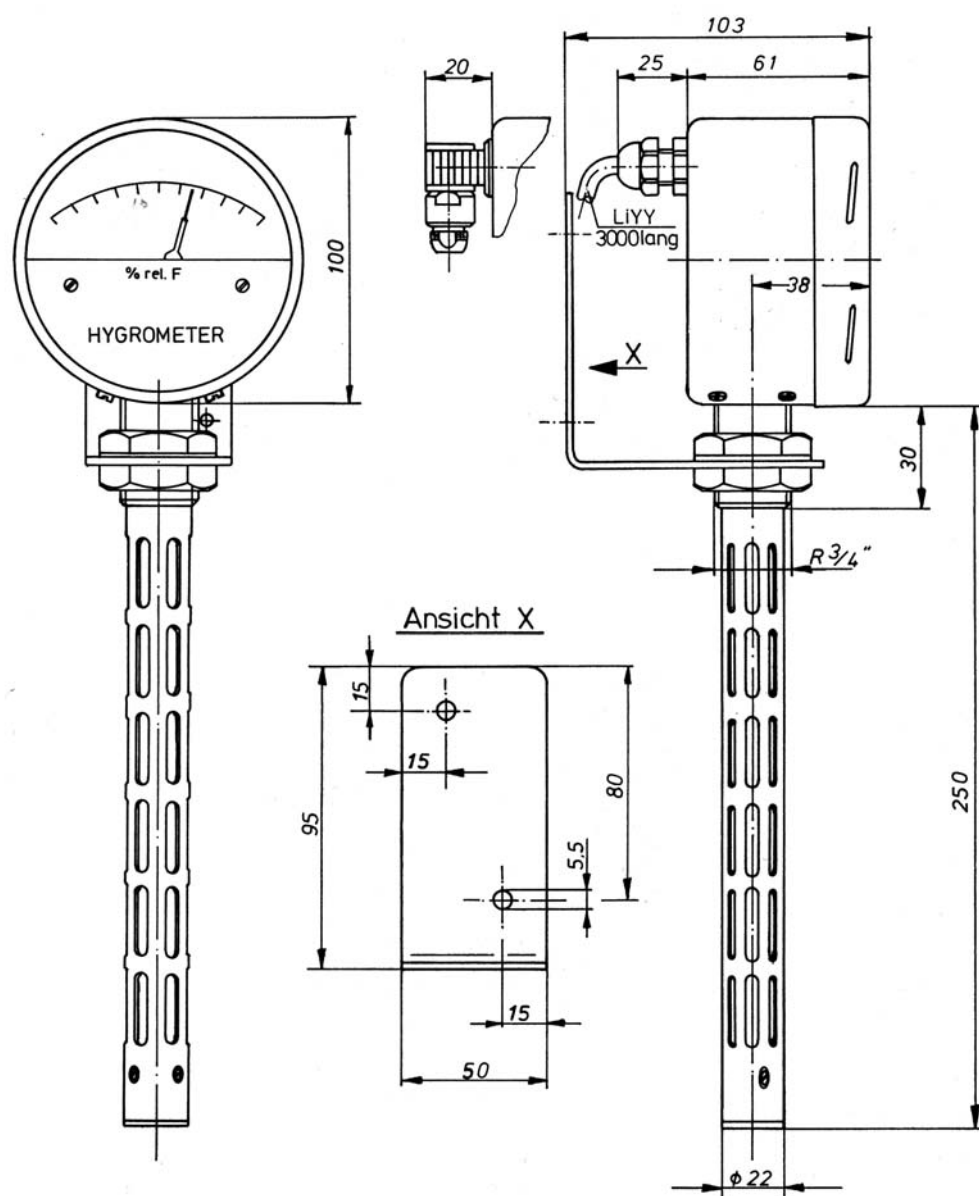
Output	40 - 50 - 40 Ohm		50 - 30 - 50 Ohm		0 ... 100 Ohm		50 - 150 - 50 Ohm	
% rel.h.	A - R	E - R	A - R	E - R	A - R	E - R	A - R	E - R
0	40,00	90,00	50,00	80,00	0,00	100,00	50,00	200,00
5	42,22	87,78	51,33	78,67	4,45	95,55	56,68	193,33
10	44,33	85,67	52,60	77,40	8,67	91,33	63,01	186,99
15	46,45	83,55	53,86	76,14	12,89	87,11	69,34	180,66
20	48,50	81,50	55,10	74,90	17,00	83,00	75,50	174,50
25	50,61	79,39	56,36	73,64	21,22	78,78	81,83	168,17
30	52,61	77,39	57,56	72,44	25,22	74,78	87,83	162,17
35	54,72	75,28	58,83	71,17	29,44	70,56	94,16	155,84
40	56,72	73,28	60,02	69,98	33,44	66,56	100,16	149,84
45	58,89	71,11	61,32	68,68	37,77	62,23	106,66	143,34
50	61,00	69,00	62,59	67,41	41,99	58,01	112,99	137,01
55	63,28	66,72	63,95	66,05	46,55	53,45	119,83	130,17
60	65,67	64,33	65,38	64,62	51,33	48,67	127,00	123,00
65	68,17	61,83	66,88	63,12	56,33	43,67	134,50	115,50
70	70,78	59,22	68,45	61,55	61,55	38,45	142,33	107,67
75	73,56	56,44	70,11	59,89	67,11	32,89	150,67	99,33
80	76,45	53,55	71,84	58,16	72,89	27,11	159,34	90,66
85	79,56	50,44	73,71	56,29	79,11	20,89	168,67	81,33
90	82,78	47,22	75,64	54,36	85,56	14,44	178,34	71,66
95	86,28	43,72	77,74	52,26	92,56	7,44	188,84	61,16
100	90,00	40,00	80,00	50,00	100,00	0,00	200,00	50,00

Output	0 ... 200 Ohm		0 ... 1000 Ohm		0 ... 2000 Ohm		0 ... 200 Ohm, lin.	
%rel.h.	A - R	E - R	A - R	E - R	A - R	E - R	A - R	E - R
0	0,00	200,00	0,00	1000,00	0,00	2000,00	0,00	200,00
5	8,88	191,12	44,50	955,50	89,00	1911,00	10,00	190,00
10	17,31	182,69	86,70	913,30	173,40	1826,60	20,00	180,00
15	25,75	174,25	128,90	871,10	257,80	1742,20	30,00	170,00
20	33,97	166,03	170,00	830,00	340,00	1660,00	40,00	160,00
25	42,40	157,60	212,20	787,80	424,40	1575,60	50,00	150,00
30	50,39	149,61	252,20	747,80	504,40	1495,60	60,00	140,00
35	58,83	141,17	294,40	705,60	588,80	1411,20	70,00	130,00
40	66,82	133,18	334,40	665,60	668,80	1331,20	80,00	120,00
45	75,48	124,52	377,70	622,30	755,40	1244,60	90,00	110,00
50	83,91	116,09	419,90	580,10	839,80	1160,20	100,00	100,00
55	93,03	106,97	465,50	534,50	931,00	1069,00	110,00	90,00
60	102,56	97,44	513,30	486,70	1026,60	973,40	120,00	80,00
65	112,55	87,45	563,30	436,70	1126,60	873,40	130,00	70,00
70	122,99	77,01	615,50	384,50	1231,00	769,00	140,00	60,00
75	134,09	65,91	671,10	328,90	1342,20	657,80	150,00	50,00
80	145,63	54,37	728,90	271,90	1457,80	542,20	160,00	40,00
85	158,06	41,94	791,10	208,90	1582,20	417,80	170,00	30,00
90	170,94	29,06	855,60	144,40	1711,20	288,80	180,00	20,00
95	184,93	15,07	925,60	74,40	1851,20	148,80	190,00	10,00
100	200,00	0,00	1000,00	0,00	2000,00	0,00	200,00	0,00

Temperature measurement

°C	0	1	2	3	4	5	6	7	8	9
80	130,89	131,27	131,66	132,04	132,42	132,80	133,18	133,56	133,94	134,32
70	127,07	127,45	127,84	128,22	128,60	128,98	129,37	129,75	130,13	130,51
60	123,24	123,62	124,01	124,39	124,77	125,16	125,54	125,92	126,31	126,69
50	119,40	119,78	120,16	120,55	120,93	121,32	121,70	122,09	122,47	122,86
40	115,54	115,93	116,31	116,70	117,08	117,47	117,85	118,24	118,62	119,01
30	111,67	112,06	112,45	112,83	113,22	113,61	113,99	114,38	114,77	115,15
20	107,79	108,18	108,57	108,96	109,35	109,73	110,12	110,51	110,90	111,28
10	103,90	104,29	104,68	105,07	105,46	105,85	106,24	106,63	107,02	107,40
0	100,00	100,39	100,78	101,17	101,56	101,95	102,34	102,73	103,12	103,51
0	100,00	99,61	99,22	98,83	98,44	98,04	97,65	97,26	96,87	96,48
-10	96,09	95,69	95,30	94,91	94,52	94,12	93,73	93,34	92,95	92,55
-20	92,16	91,77	91,37	90,98	90,59	90,19	89,80	89,40	89,01	88,62
-30	88,22	87,83	87,43	87,04	86,64	86,25	85,85	85,46	85,06	84,67

8. Scale drawing



9. Maintenance

In the course of time, H measuring elements dry out resulting incorrect measurement values. This process is called degeneration. It leads to the display of values which are too high. The degree of deviation is dependent on the extend and the duration of the drying.

Degeneration can be reversed by exposing the measuring element to saturated air. This process is called regeneration. Hygro-transmitters used in air with a humidity of 80% do not have to be regenerated.

In the interests of measuring accuracy, it is advisable to regenerate the H measuring element at regular intervals. The easiest way to do this is to wrap the immersion stem of the Hygro-transmitter for about 60 minutes in a damp cloth which has been dipped in lukewarm water. Normally the indicator will settle at 95 - 97 % rel. humidity. If there are significant deviations from this value, then correct this by means of the setting screw marked in red at the lower end of the stem. The Hygro-transmitter which is now correctly set at 97 % rel. humidity will also indicate all other humidity values correctly, provided that the characteristic hygrometric features of the hair have not changed as a result of detrimental influences (heat, aggressive vapors, mechanical strains etc.).

If the hygro-transmitter is used with a wind protector, then it will be necessary to check this regularly. If it is dirty, remove it from the stem of the instrument and clean it.

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