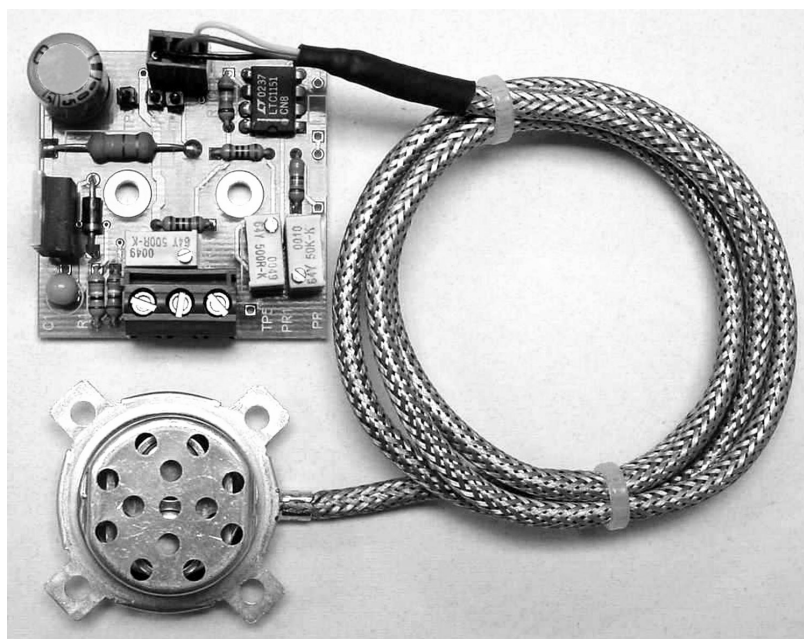


INSTRUCTION MANUAL FOR THE AHT-200-01 ABSOLUTE HUMIDITY TRANSMITTER



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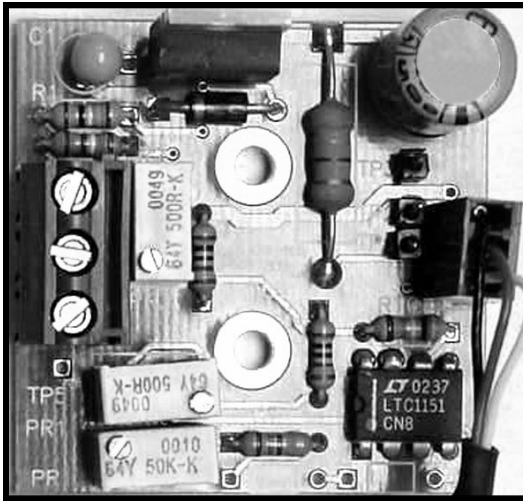
ABSOLUTE HUMIDITY SENSOR PRINCIPLE OF OPERATION

Absolute Humidity is the mass of water vapor per volume of air (or other carrier gases) normally expressed in grams/m³ or grains/ft³. When air or gas is dry it has a greater "thermal conductivity" or ability to transfer heat compared to moist air. OHMIC utilizes this principle to measure absolute humidity with the ABS Series sensors.

ABS sensors use two matched thermistors, connected in a bridge circuit, located on a common stainless-steel heat sink. One thermistor (the reference) is glass encapsulated in dry nitrogen while the other thermistor is exposed to the environment. The bridge is balanced at the reference humidity, 0 g/m³. When voltage is applied, the thermistors are heated to a high temperature, 200°C or higher; the temperature difference between the thermistors, resulting from humidity level, unbalances the bridge and generates an output voltage proportional to the moisture level of the atmosphere.

*** The AHT-200-01 card is calibrated to the sensor and must be used with the corresponding numbered sensor. The card must be recalibrated if a new sensor is used.**

INSTALLATION AND CONNECTION



AHT-200-01 Circuit Board

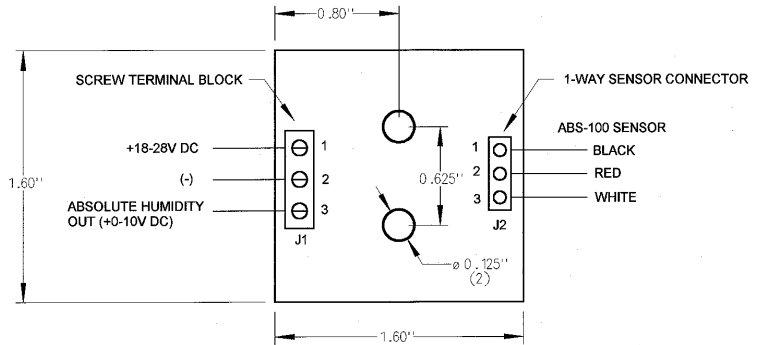


Fig. 1

The AHT-200 card has three connections 1) power supply (+18-28 VDC), 2) ground, and 3) AbsH signal output (0- 10 VDC). The black, red, and white sensor cable connector plugs into the AHT-200-01 circuit card (see Fig. 1).

Max Vout vs temp in C.

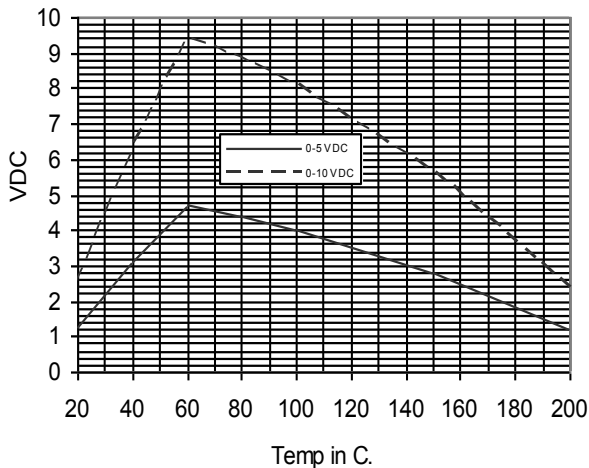


Fig. 2

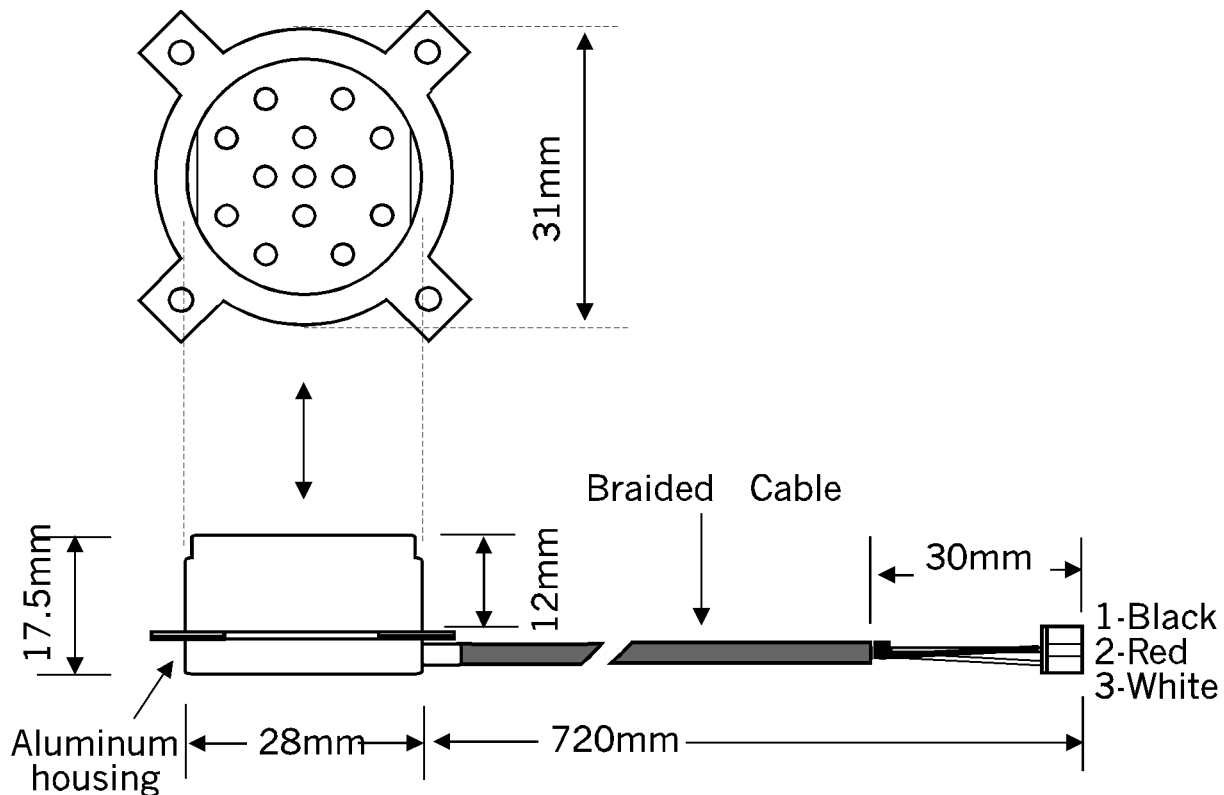
$$RH = \frac{(AbsH)(273.3+T)}{13.243e^{[17.269T \div (237.16+T)]}}$$

Fig. 3

APPLICATIONS

Absolute Humidity Sensors are widely used in appliances such as clothes dryers and microwave ovens. There has been an increase in the number of industrial and process applications for absolute humidity detectors *due to their ability to operate at high temperatures, recover from condensation and their excellent immunity to many chemical and physical contaminants.* Absolute humidity measurement is an economical way of monitoring and controlling many industrial processes such as drying, fuel cell operation, combustion, catalytic converters, material curing, catalyst production, cooking, sterilization, desiccant heat recovery, etc. Due to the low signal levels from the sensor Ohmic has developed a chopper stabilized amplifier circuit to provide control signals. Model AHT-200-01, produces a 0-5 or 0-10 VDC output. The data sheet for the unit can be viewed at www.ohmicinstruments.com.

ABS- 300 Sensor Dimensions



AHT-200-01 Output Equations.

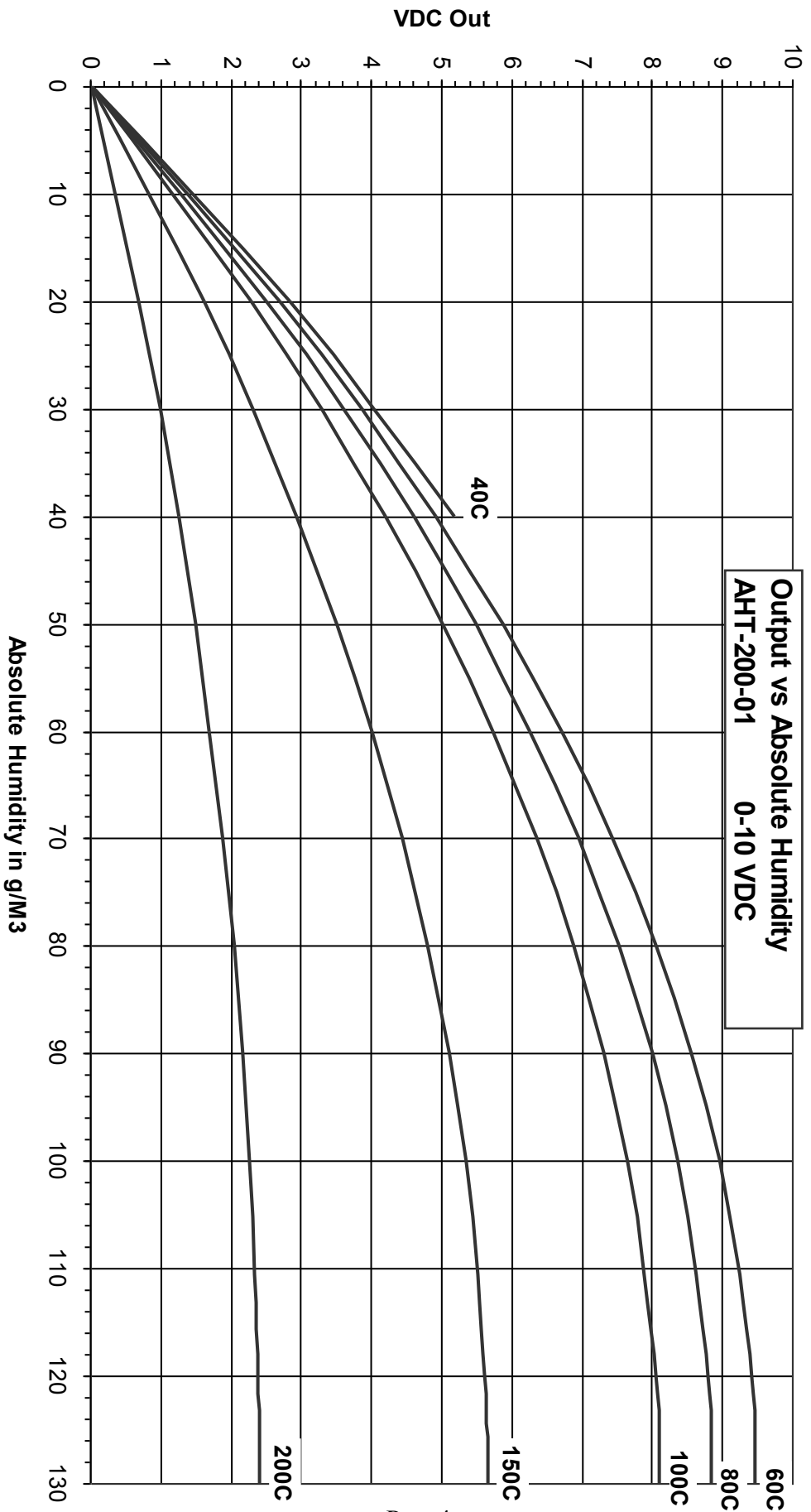
Where: AH is in g/m^3 and T is temp. in Deg. C.

$$0 \text{ to } 5 \text{ VDC out} = ((a * AH * AH + b * AH) * (c * T * T + d * T + e) * f) * 0.3846153846$$

$$0 \text{ to } 10 \text{ VDC out} = ((a * AH * AH + b * AH) * (c * T * T + d * T + e) * f) * 0.7692307692$$

Constants: $a = -0.00067742$ $b = 0.17704445$ $c = -0.000017156$
 $d = -0.00088115$ $e = 1.11463$ $f = 1.062806$

The maximum VDC out is at 130 g/m^3 at 60 Deg. C. The VDC out will be a lower value for others temperatures.



0 to 10 VDC Out given AH and TEMP in C. *(For 0 to 5 VDC out divide value in chart by 2)

AH g/m3	0C	5c	10c	15C	20C	25C	30C	35C	40C	45C	50C	60C	70C	80C	90C	100C	150C	200C
1.0	0.16	0.16	0.16	0.16	0.16	0.16	0.15	0.15	0.15	0.15	0.15	0.14	0.14	0.13	0.13	0.12	0.09	0.04
2.0	0.32	0.32	0.32	0.32	0.31	0.31	0.31	0.31	0.30	0.30	0.30	0.29	0.28	0.27	0.26	0.25	0.17	0.07
3.0	0.48	0.48	0.47	0.47	0.47	0.46	0.46	0.46	0.45	0.45	0.44	0.43	0.42	0.40	0.38	0.37	0.26	0.11
4.0	0.64	0.63	0.63	0.63	0.62	0.62	0.61	0.61	0.60	0.59	0.59	0.57	0.55	0.53	0.51	0.49	0.34	0.14
5.0	SAT	0.79	0.78	0.78	0.77	0.77	0.76	0.75	0.75	0.74	0.73	0.71	0.69	0.66	0.64	0.61	0.42	0.18
6.0		0.94	0.94	0.93	0.93	0.92	0.91	0.90	0.89	0.88	0.87	0.85	0.82	0.79	0.76	0.73	0.51	0.21
7.0		SAT	1.09	1.08	1.07	1.07	1.06	1.05	1.04	1.03	1.01	0.99	0.96	0.92	0.88	0.84	0.59	0.25
8.0			1.24	1.23	1.22	1.21	1.20	1.19	1.18	1.17	1.15	1.12	1.09	1.05	1.01	0.96	0.67	0.28
9.0			1.39	1.38	1.37	1.36	1.35	1.34	1.32	1.31	1.29	1.26	1.22	1.18	1.13	1.08	0.75	0.32
10.0			SAT	1.53	1.52	1.51	1.49	1.48	1.46	1.45	1.43	1.39	1.35	1.30	1.25	1.19	0.83	0.35
11.0				1.67	1.66	1.65	1.64	1.62	1.60	1.59	1.57	1.53	1.48	1.43	1.37	1.30	0.91	0.38
12.0				1.82	1.81	1.79	1.78	1.76	1.74	1.72	1.70	1.66	1.61	1.55	1.49	1.42	0.99	0.42
13.0				SAT	1.95	1.93	1.92	1.90	1.88	1.86	1.84	1.79	1.73	1.67	1.60	1.53	1.07	0.45
14.0					2.09	2.07	2.06	2.04	2.02	2.00	1.97	1.92	1.86	1.79	1.72	1.64	1.14	0.48
15.0					2.23	2.21	2.20	2.17	2.15	2.13	2.10	2.05	1.98	1.91	1.83	1.75	1.22	0.52
16.0					2.37	2.35	2.33	2.31	2.29	2.26	2.23	2.17	2.11	2.03	1.95	1.86	1.30	0.55
17.0					2.51	2.49	2.47	2.44	2.42	2.39	2.36	2.30	2.23	2.15	2.06	1.97	1.37	0.58
18.0					SAT	2.62	2.60	2.58	2.55	2.52	2.49	2.43	2.35	2.27	2.17	2.07	1.45	0.61
19.0						2.76	2.74	2.71	2.68	2.65	2.62	2.55	2.47	2.38	2.29	2.18	1.52	0.64
20.0						2.89	2.87	2.84	2.81	2.78	2.75	2.67	2.59	2.50	2.40	2.29	1.59	0.67
21.0						3.02	3.00	2.97	2.94	2.91	2.87	2.80	2.71	2.61	2.51	2.39	1.67	0.70
22.0						3.16	3.13	3.10	2.94	3.07	3.03	2.92	2.83	2.72	2.61	2.49	1.74	0.74
23.0						3.28	3.26	3.23	3.19	3.16	3.12	3.04	2.94	2.84	2.72	2.60	1.81	0.77
24.0						SAT	3.38	3.35	3.32	3.28	3.24	3.15	3.06	2.95	2.83	2.70	1.88	0.80
25.0							3.51	3.48	3.44	3.40	3.36	3.27	3.17	3.06	2.93	2.80	1.95	0.83
26.0							3.64	3.60	3.56	3.53	3.48	3.39	3.28	3.17	3.04	2.90	2.02	0.85
27.0							3.76	3.72	3.69	3.65	3.60	3.50	3.40	3.27	3.14	3.00	2.09	0.88
28.0							3.88	3.85	3.81	3.76	3.72	3.62	3.51	3.38	3.24	3.09	2.16	0.91
29.0							4.00	3.97	3.93	3.88	3.84	3.73	3.62	3.49	3.34	3.19	2.23	0.94
30.0							4.12	4.09	4.04	4.00	3.95	3.84	3.72	3.59	3.45	3.29	2.29	0.97
31.0							SAT	4.20	4.16	4.11	4.06	3.95	3.83	3.70	3.54	3.38	2.36	1.00
32.0								4.32	4.28	4.23	4.18	4.06	3.94	3.80	3.64	3.48	2.42	1.02
33.0								4.44	4.39	4.34	4.29	4.17	4.04	3.90	3.74	3.57	2.49	1.05
34.0								4.55	4.50	4.45	4.40	4.28	4.15	4.00	3.84	3.66	2.55	1.08
35.0								4.66	4.62	4.56	4.51	4.39	4.25	4.10	3.93	3.75	2.62	1.11
36.0								4.77	4.73	4.67	4.62	4.49	4.35	4.20	4.03	3.84	2.68	1.13
37.0								4.89	4.84	4.78	4.72	4.60	4.45	4.30	4.12	3.93	2.74	1.16
38.0								5.00	4.94	4.89	4.83	4.70	4.55	4.39	4.21	4.02	2.80	1.19

0 to 10 V Out given AH and TEMP in C. *(For 0 to 5 V out divide value in chart by 2)

AH g/m3	0C	5c	10c	15C	20C	25C	30C	35C	40C	45C	50C	60C	70C	80C	90C	100C	150C	200C
39.0								5.10	5.05	5.00	4.94	4.80	4.65	4.49	4.30	4.11	2.86	1.21
40.0								SAT	5.16	5.10	5.04	4.90	4.75	4.58	4.40	4.19	2.92	1.24
41.0									5.26	5.20	5.14	5.00	4.85	4.67	4.48	4.28	2.98	1.26
42.0									5.37	5.31	5.24	5.10	4.94	4.77	4.57	4.36	3.04	1.29
43.0									5.47	5.41	5.34	5.20	5.04	4.86	4.66	4.45	3.10	1.31
44.0									5.57	5.51	5.44	5.30	5.13	4.95	4.75	4.53	3.16	1.34
45.0									5.67	5.61	5.54	5.39	5.22	5.04	4.83	4.61	3.22	1.36
46.0									5.77	5.71	5.64	5.49	5.32	5.13	4.92	4.69	3.27	1.38
47.0									5.87	5.80	5.73	5.58	5.41	5.21	5.00	4.77	3.33	1.41
48.0									5.97	5.90	5.83	5.67	5.50	5.30	5.08	4.85	3.38	1.43
49.0									6.06	5.99	5.92	5.76	5.58	5.38	5.17	4.93	3.44	1.45
50.0									6.16	6.09	6.01	5.85	5.67	5.47	5.25	5.00	3.49	1.48
51.0									6.25	6.18	6.11	5.94	5.76	5.55	5.33	5.08	3.54	1.50
52.0									SAT	6.27	6.20	6.03	5.84	5.63	5.40	5.15	3.60	1.52
53.0										6.36	6.28	6.12	5.93	5.71	5.48	5.23	3.65	1.54
54.0										6.45	6.37	6.20	6.01	5.79	5.56	5.30	3.70	1.56
55.0										6.54	6.46	6.29	6.09	5.87	5.63	5.37	3.75	1.58
56.0										6.63	6.55	6.37	6.17	5.95	5.71	5.44	3.80	1.61
57.0										6.71	6.63	6.45	6.25	6.03	5.78	5.52	3.85	1.63
58.0										6.79	6.71	6.53	6.33	6.10	5.86	5.58	3.90	1.65
59.0										6.88	6.79	6.61	6.41	6.18	5.93	5.65	3.94	1.67
60.0										6.96	6.88	6.69	6.48	6.25	6.00	5.72	3.99	1.69
61.0										7.04	6.96	6.77	6.56	6.32	6.07	5.79	4.04	1.71
62.0										7.12	7.03	6.85	6.63	6.40	6.14	5.85	4.08	1.73
63.0										7.20	7.11	6.92	6.71	6.47	6.20	5.92	4.13	1.75
64.0										7.28	7.19	7.00	6.78	6.54	6.27	5.98	4.17	1.76
65.0										7.35	7.26	7.07	6.85	6.60	6.34	6.04	4.22	1.78
66.0										SAT	7.34	7.14	6.92	6.67	6.40	6.10	4.26	1.80
67.0											7.41	7.21	6.99	6.74	6.46	6.17	4.30	1.82
68.0											7.48	7.28	7.05	6.80	6.53	6.23	4.34	1.84
69.0											7.55	7.35	7.12	6.87	6.59	6.28	4.38	1.85
70.0											7.62	7.42	7.19	6.93	6.65	6.34	4.42	1.87
71.0											7.69	7.48	7.25	6.99	6.71	6.40	4.46	1.89
72.0											7.76	7.55	7.32	7.05	6.77	6.46	4.50	1.90
73.0											7.83	7.61	7.38	7.11	6.83	6.51	4.54	1.92
74.0											7.89	7.68	7.44	7.17	6.88	6.56	4.58	1.94
75.0											7.95	7.74	7.50	7.23	6.94	6.62	4.62	1.95
76.0											8.02	7.80	7.56	7.29	6.99	6.67	4.65	1.97
77.0											8.08	7.86	7.62	7.35	7.05	6.72	4.69	1.98

0 to 10 V Out given AH and TEMP in C. *(For 0 to 5 V out divide value in chart by 2)

AH g/m3	0C	5c	10c	15C	20C	25C	30C	35C	40C	45C	50C	60C	70C	80C	90C	100C	150C	200C
78.0											8.14	7.92	7.67	7.40	7.10	6.77	4.72	2.00
79.0											8.20	7.98	7.73	7.45	7.15	6.82	4.76	2.01
80.0											8.26	8.03	7.78	7.51	7.20	6.87	4.79	2.03
81.0											SAT	8.09	7.84	7.56	7.25	6.92	4.83	2.04
82.0												8.14	7.89	7.61	7.30	6.96	4.86	2.05
83.0												8.20	7.94	7.66	7.35	7.01	4.89	2.07
84.0												8.25	7.99	7.71	7.40	7.05	4.92	2.08
85.0												8.30	8.04	7.76	7.44	7.10	4.95	2.09
86.0												8.35	8.09	7.80	7.49	7.14	4.98	2.11
87.0												8.40	8.14	7.85	7.53	7.18	5.01	2.12
88.0												8.45	8.19	7.89	7.57	7.22	5.04	2.13
89.0												8.50	8.23	7.94	7.61	7.26	5.07	2.14
90.0												8.54	8.28	7.98	7.66	7.30	5.09	2.15
91.0												8.59	8.32	8.02	7.70	7.34	5.12	2.16
92.0												8.63	8.36	8.06	7.73	7.38	5.15	2.18
93.0												8.67	8.40	8.10	7.77	7.41	5.17	2.19
94.0												8.71	8.44	8.14	7.81	7.45	5.20	2.20
95.0												8.75	8.48	8.18	7.85	7.48	5.22	2.21
96.0												8.79	8.52	8.21	7.88	7.52	5.24	2.22
97.0												8.83	8.55	8.25	7.91	7.55	5.27	2.23
98.0												8.87	8.59	8.28	7.95	7.58	5.29	2.24
99.0												8.90	8.62	8.32	7.98	7.61	5.31	2.24
100.0												8.94	8.66	8.35	8.01	7.64	5.33	2.25
101.0												8.97	8.69	8.38	8.04	7.67	5.35	2.26
102.0												9.00	8.72	8.41	8.07	7.70	5.37	2.27
103.0												9.03	8.75	8.44	8.10	7.72	5.39	2.28
104.0												9.06	8.78	8.47	8.12	7.75	5.41	2.29
105.0												9.09	8.81	8.50	8.15	7.77	5.42	2.29
106.0												9.12	8.84	8.52	8.17	7.80	5.44	2.30
107.0												9.15	8.86	8.55	8.20	7.82	5.46	2.31
108.0												9.17	8.89	8.57	8.22	7.84	5.47	2.31
109.0												9.20	8.91	8.59	8.24	7.86	5.49	2.32
110.0												9.22	8.93	8.61	8.26	7.88	5.50	2.33
111.0												9.24	8.96	8.64	8.28	7.90	5.51	2.33
112.0												9.26	8.98	8.66	8.30	7.92	5.53	2.34
113.0												9.28	9.00	8.67	8.32	7.94	5.54	2.34
114.0												9.30	9.01	8.69	8.34	7.95	5.55	2.35
115.0												9.32	9.03	8.71	8.35	7.97	5.56	2.35
116.0												9.34	9.05	8.72	8.37	7.98	5.57	2.35

0 to 10 V Out given AH and TEMP in C. *(For 0 to 5 V out divide value in chart by 2)

AH g/m ³	0C	5c	10c	15C	20C	25C	30C	35C	40C	45C	50C	60C	70C	80C	90C	100C	150C	200C
117.0												9.35	9.06	8.74	8.38	8.00	5.58	2.36
118.0												9.37	9.08	8.75	8.40	8.01	5.59	2.36
119.0												9.38	9.09	8.77	8.41	8.02	5.60	2.37
120.0												9.39	9.10	8.78	8.42	8.03	5.60	2.37
121.0												9.41	9.11	8.79	8.43	8.04	5.61	2.37
122.0												9.42	9.12	8.80	8.44	8.05	5.62	2.37
123.0												9.42	9.13	8.81	8.45	8.06	5.62	2.38
124.0												9.43	9.14	8.81	8.45	8.06	5.63	2.38
125.0												9.44	9.15	8.82	8.46	8.07	5.63	2.38
126.0												9.44	9.15	8.82	8.47	8.08	5.63	2.38
127.0												9.45	9.16	8.83	8.47	8.08	5.64	2.38
128.0												9.45	9.16	8.83	8.47	8.08	5.64	2.38
129.0												9.46	9.16	8.83	8.48	8.08	5.64	2.38
130.0												9.46	9.16	8.84	8.48	8.09	5.64	2.38

Absolute Humidity (AH) vs. Relative Humidity (RH%)

AH (g/m ³)	0C	5C	10C	15C	20C	25C	30C	35C	40C	45C	50C	60C
1.0	20.6	14.7	10.6	7.8	5.8	4.3	3.3	2.5	2.0	1.5	1.2	0.8
2.0	41.3	29.4	21.3	15.6	11.6	8.7	6.6	5.0	3.9	3.1	2.4	1.5
3.0	61.9	44.1	31.9	23.4	17.4	13.0	9.9	7.6	5.9	4.6	3.6	2.3
4.0	82.5	58.9	42.6	31.2	23.1	17.4	13.2	10.1	7.8	6.1	4.8	3.0
5.0	SAT	73.6	53.2	39.0	28.9	21.7	16.5	12.6	9.8	7.7	6.0	3.8
6.0		88.3	63.9	46.8	34.7	26.0	19.8	15.1	11.7	9.2	7.2	4.6
7.0		SAT	74.5	54.6	40.5	30.4	23.1	17.7	13.7	10.7	8.5	5.4
8.0			85.1	62.4	46.3	34.7	26.4	20.2	15.7	12.2	9.7	6.2
9.0			95.8	70.2	52.1	39.1	29.7	22.7	17.6	13.8	10.9	6.9
10.0			SAT	78.0	57.9	43.4	33.0	25.3	19.6	15.3	12.7	7.7
15.0				SAT	86.8	65.1	49.4	37.9	29.3	23.0	18.1	11.6
20.0					SAT	86.8	65.9	50.5	39.1	30.6	24.1	15.4
25.0						SAT	82.4	63.1	48.9	38.3	30.2	19.3
30.0							98.9	75.8	58.7	45.9	36.2	23.1
35.0							SAT	88.4	68.5	53.6	42.3	27.0
40.0								SAT	78.3	61.2	48.3	30.8
45.0									88.0	68.9	54.3	34.7
50.0									97.9	76.5	60.4	38.5
55.0									SAT	84.1	66.4	42.4
60.0										91.8	72.5	46.2
65.0										99.4	78.5	50.1
70.0										SAT	84.5	54.0
75.0											90.6	57.8
80.0											96.6	61.7
85.0											SAT	65.5
90.0												69.4
95.0												73.2
100.0												77.1
105.0												80.9
110.0												84.8
120.0												92.5
130.0												SAT

Absolute Humidity (AH) vs. Relative Humidity (RH%)

Absolute Humidity (AH) vs. Relative Humidity (RH%)											
AH(g/m ³)	70C	80C	90C	100C	110C	120C	130C	140C	160C	180C	200C
1.0	0.5	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.0
2.0	1.0	0.7	0.5	0.3	0.2	0.2	0.1	0.1	0.1	0.0	0.0
3.0	1.5	1.0	0.7	0.5	0.4	0.3	0.3	0.1	0.1	0.1	0.0
4.0	2.0	1.4	1.0	0.7	0.5	0.4	0.3	0.2	0.1	0.1	0.0
5.0	2.5	1.7	1.2	0.9	0.6	0.4	0.3	0.3	0.2	0.1	0.1
6.0	3.0	2.1	1.4	1.0	0.7	0.5	0.4	0.3	0.2	0.1	0.1
7.0	3.6	2.4	1.7	1.2	0.8	0.6	0.5	0.4	0.2	0.1	0.1
8.0	4.1	2.8	1.9	1.4	1.0	0.7	0.5	0.4	0.2	0.2	0.1
9.0	4.6	3.1	2.2	1.5	1.1	0.8	0.6	0.5	0.3	0.2	0.1
10.0	5.1	3.4	2.4	1.7	1.2	0.9	0.7	0.5	0.3	0.2	0.1
15.0	7.6	5.2	3.6	2.6	1.8	1.3	1.0	0.8	0.5	0.3	0.2
20.0	10.2	6.9	4.8	3.4	2.4	1.8	1.4	1.0	0.6	0.4	0.3
25.0	12.7	8.6	5.8	4.2	3.0	2.2	1.7	1.3	0.8	0.5	0.3
30.0	15.2	10.3	7.2	5.1	3.6	2.7	2.0	1.5	0.9	0.6	0.4
35.0	17.8	12.0	8.4	5.9	4.3	3.1	2.4	1.8	1.1	0.7	0.5
40.0	20.3	13.7	9.6	6.8	4.9	3.6	2.7	2.0	1.2	0.8	0.5
45.0	22.8	15.5	10.7	7.6	5.5	4.0	3.0	2.3	1.4	0.9	0.6
50.0	25.4	17.2	11.9	8.5	6.0	4.5	3.4	2.6	1.6	1.0	0.7
55.0	27.9	18.9	13.1	9.3	6.7	4.9	3.7	2.8	1.7	1.1	0.7
60.0	30.4	20.6	14.3	10.2	7.3	5.4	4.0	3.0	1.9	1.2	0.8
65.0	33.0	22.3	15.5	11.1	7.9	5.8	4.4	3.3	2.0	1.3	0.9
70.0	35.5	24.1	16.7	11.8	8.5	6.3	4.7	3.6	2.2	1.4	0.9
75.0	38.1	25.8	17.9	12.7	9.1	6.7	5.0	3.9	2.3	1.5	1.0
80.0	40.6	27.5	19.1	13.6	9.7	7.2	5.4	4.1	2.5	1.6	1.1
85.0	43.1	29.2	20.3	14.4	10.3	7.6	5.7	4.4	2.7	1.7	1.1
90.0	45.7	30.9	21.4	15.4	10.9	8.1	6.0	4.6	2.8	1.8	1.2
95.0	48.2	32.6	22.6	16.1	11.6	8.5	6.4	4.9	3.0	1.9	1.3
100.0	50.7	34.4	23.8	17.0	12.2	9.0	6.7	5.1	3.1	2.0	1.3
105.0	53.3	36.0	25.1	17.8	12.8	9.4	7.1	5.4	3.3	2.1	1.4
110.0	55.8	37.8	26.2	18.7	13.4	9.9	7.4	5.7	3.4	2.2	1.5
120.0	60.9	41.2	28.7	20.4	14.6	10.8	8.1	6.2	3.7	2.4	1.6
130.0	66.0	44.7	31.0	22.1	15.8	11.7	8.7	6.7	4.0	2.6	1.7