



ohmic instruments co.

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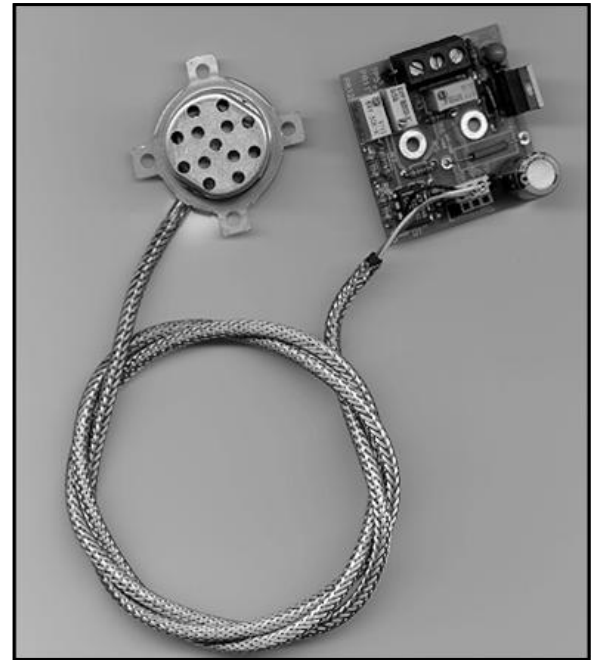
www.ohmicinstruments.com



INDUSTRIAL & ENVIRONMENTAL SENSORS, INSTRUMENTS & CONTROLS SINCE 1969

**ABSOLUTE HUMIDITY TRANSMITTER MODEL AHT-200-01
THERMAL CONDUCTIVITY SENSOR VOLTAGE OUTPUT PROPORTIONAL TO ABSOLUTE MOISTURE**

- **REPEATABLE & DURABLE**
- **PERFORMS WHERE OTHER HUMIDITY SENSORS FAIL**
- **RANGE: 0-130g/m³ (0-100% RH) @ 60°C**
- **OUTPUT: 0-5 or 0-10 VDC (Set at factory)**
- **24 VDC OPERATION**
- **OPERATION TO 200°C (392°F)**
- **IMMUNE TO MOST PHYSICAL & CHEMICAL CONTAMINANTS**
- **OPERATION IN FULLY SATURATED ENVIRONMENTS**
- **IDEAL FOR INDUSTRIAL PROCESS DRYING**



MEASUREMENT & CONTROL OF THE MASS TO VOLUME RATIO OF WATER VAPOR

AHT-200 Series transmitters overcome many of the limitations of humidity sensors that cannot be used or fail prematurely in corrosive industrial applications. Unlike other humidity sensors which rely on surface or bulk moisture absorption, the ABS-300 sensor used by the AHT-200 utilizes thermal conductivity to measure moisture level.

The sensor consists of two matched NTC (Negative Temperature Coefficient) thermistors: one is hermetically glass-encapsulated in dry nitrogen, the other is exposed to the environment. When voltage is applied, more heat is dissipated from the sealed thermistor resulting in operation at a lower temperature than the exposed element. The difference in temperature (DT) between the two thermistors is proportional to the absolute humidity of the surrounding environment measured in grams per cubic meter or grains per pound. Absolute humidity can be converted to other psychrometric units such as %RH, PPMv, PPMw, and Dew Point. In addition, if the absolute

humidity and temperature is known, the enthalpy (total heat content of air or gas measured in Kilojoules per Kilogram or BTU's per Pound) can be determined.

AHT-200 transmitters are not limited to the measurement of water vapor. Any gas concentration can be determined by utilizing the difference in thermal conductivity with respect to dry nitrogen.

AHT-200 transmitters are used to control the process drying of wood, paper, textiles, chemicals and food products. In addition, they are ideal for applications where moisture levels must be maintained to optimum levels such as in cooking, chemical production, the intake of turbines, battery production and fuel-cell operation. Contact our engineers to discuss your requirements.

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.

WARRANTY: All products manufactured by OHMIC Co. are warranted to be free of defects in material and workmanship for one year after delivery. Any equipment found to be defective within this period will be repaired or replaced free of charge.

SPECIFICATIONS: Model AHT-200-01

Range	0-130 g/m ³
Output	0-10 VDC
Power Supply	18-28 VDC
Accuracy	± 3g/m ³ at 35g/m ³ & 40°C
Repeatability	±0.5 VDC
Stabilization Time	120 seconds after power is applied
Response Time	50 seconds for 90% change
Operating Temperature	25 to +200°C for sensor 0 to 60°C for electronics
Insulation Resistance	>50MW @ 500 VDC for sensor
Material of Construction	Aluminum sensor housing, steel braided, rubber Insulated cable with 22 AWG Wire (3-Conductor) & fiberglass circuit card.

Effects of Carrier Gas Thermal Conductivity

When working with thermal conductivity sensors, to measure humidity accurately, the thermo-dynamic properties of the carrier gas are to be considered.

For example, due to differences in structure and molecular weight, air and nitrogen differ in thermal conductivity; at low absolute humidity wet nitrogen will read the same as dry air.

Ohmic's calibration standard uses air as the carrier gas; if you are using gasses other than air you may correct as follows:

1. Insert the ABS-300 in dry carrier gas.
2. Using the on-board potentiometer, set output to 0.0 VDC.
3. Generate an output vs. humidity graph using several points over your expected operating range.

Saturated salt solutions are convenient for generating varying humidity levels for calibration.

Relationship Between Absolute Humidity, Relative Humidity & Mixing Ratio

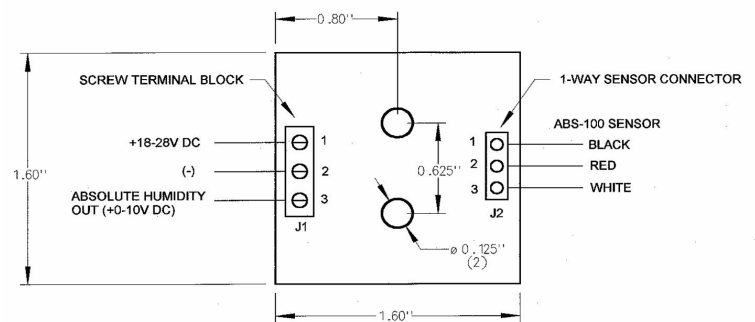
(1) $\%RH = \frac{100E}{E_s}$

(2) $AH = \frac{804E}{(1+0.00366T)P_o}$

(3) $MR = \frac{0.622E}{P_o - E}$

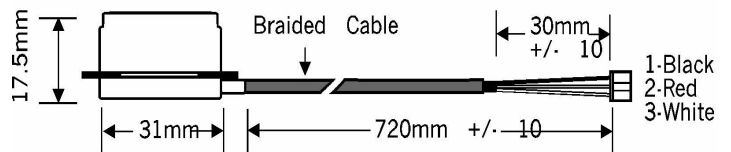
%RH = Percent Relative Humidity
AH = Absolute Humidity in g/m³
MR = Mixing Ratio in Kg of Watr Vapor per Kg of Air
E = Actual Water Vapor Pressure In Air in Pascals
E_s = Saturation Water Vapor Pressure in Air in Pascals
P_o = Atmospheric Pressure in Pascals
 (1 Atmosphere = 101,323 Pa)
T = Temperature in Celcius
E_s values may be obtained from Psychrometric Tables.
 $(3168.10)(0.50) = 1584 Pa$ Solve for **AH** using Eq 2.
 $(804)(1584)/[1+(0.00366)(25)][101323] = 11.48 g/m^3$

AHT-200 Circuit Board



The AHT-200 card has three outputs 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.

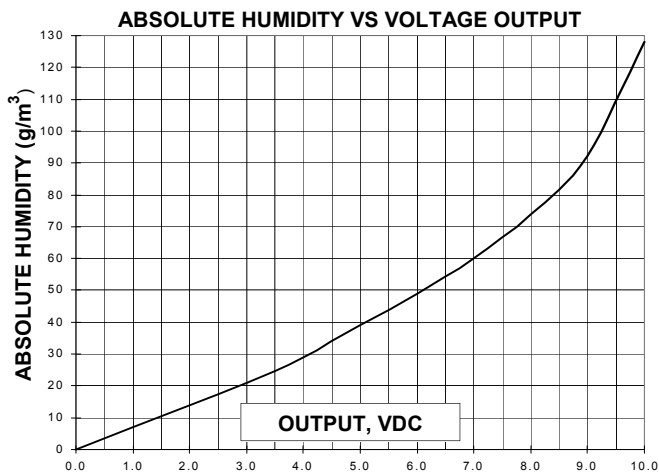
ABS- 300 Remote Probe



Ordering Information

AHT-200-01 Absolute Humidity Transmitter consists of a printed circuit board with a ABS-300 thermal conductivity sensor. The sensor is equipped with 720mm Stainless Steel Braided Cable. (0-10VDC output is standard; 0- 5 VDC available.)

* For more information go to www.ohmicinstruments.com and download the product manual.



ENGINEERING SUPPORT: OHMIC Instruments Co. designs and manufactures a full line of environmental and bio-medical sensors, instruments and controls. Many of our products are custom designed to meet specific requirements. Our engineers will be pleased to discuss your application.



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