MS2100 series
Hand Held BD5gMS2100

Moisture &Humidity Analyzer

Ref:HgMS2100IntE
Version:2002-01-08

Ideal for Laboratory and Quality Control in the Industrial Production
Specially Powerful for Scientific Convert

All Humidity Parameters from One Instrument

Absolute moisture, Volume ratio, Partial pressure, Saturation moisture, Relative humidity, Specific quantity, Dew point, Water content/moisture, and temperature
And Pressure Test for compensation under process conditions

- ***Multi-parameters test for Humidity, Water Activity, Moisture Analysis***
- ***Versatile usage. Open air, insertion and screw to pipe for temporary continuously test with accessories. Fine design for industry and research works in Laboratory or at field smart test***
- ***Temperature compensation, and Pressure sensor can be ordered to compensate as well***
- ***Scientific algorithm for high accuracy***
- ***Accurate and reliable, rugged design***
- ***Quickly response, <15 sec at typical cases***
- ***Self diagnostic, professional intelligent, Menu-driven digital user interface***
- ***Auto diagnostic and alarm***
- ***Data log of measurements, read and print while back to office***
- ***PC communication supported***
- ***One-year warranty***

Why Measure Moisture &Humidity?

Human beings as well as animals all like to live in certain humidity environment. Humans are best suited to and feel most comfortable at certain humidity and temperatures; excessively high or low humidity or temperatures cause discomfort.

As most materials are hygroscopic, their water content always tries to reach equilibrium with the surrounding relative humidity. Thus each material has its own ideal storage humidity which should be maintained. Too dry or too humid conditions could ruin the material.

In many production processes, the measurement and adjustment of humidity is extremely important for sustaining the high quality of products and the correct level of energy consumption. The right humidity makes it possible to optimize energy consumption and improve end product quality as well as product yield.

At low humidity cases, static electricity increases. This can be crucial in the chemical industry where dry powdery material is handled, to avert environ explosions caused by static electricity in extreme cases.

Humidity always plays important role in industrial corrosion, either from environment or pipeline. Keeping

certain humidity is the most popular industry project.

PSYCHROMETRICS & MOISTURE

MOISTURE measurements involve different terms and units.
Moisture terms and units all fall under the area of psychro-metrics, the study of water vapor concentration in air as a function of temperature and pressure. Selecting a moisture term depends on the application at hand.

Dew points and frost points are often used when the dryness of the gas is important, (moisture condensation from gas at low process temperatures must be avoided). Dew point is also used as an indicator of water vapor in high temperature processes, such as industrial drying.

Mixing ratios, volume percent, and specific humidity are usually used when water vapor is either an impurity or a defined component of a process gas mixture used in manufacturing. Mixing ratios are also used, like **dew point**, in industrial drying.

Relative humidity is most commonly used in HVAC applications where it directly impacts human comfort and indoor air quality issues. Relative humidity is also of interest to process control personnel as low RH can cause brittleness and static electricity problems, while high RH can cause swelling and clumping regardless of temperature.

Term	Definition	Unit
Absolute Humidity, (Vapor concentration)	$\frac{\text{Mass, Vapor}}{\text{Volume}}$	Grains/ft³ Grams/m³
Mixing Ratio	$\frac{\text{Mass, Vapor}}{\text{Mass, dry gas}}$	lb/lb, grains/lb, kg/kg, grams/kg
Relative Humidity	$\frac{\text{Mass, actual vapor}}{\text{Mass saturated vapor}}$ $\frac{\text{Actual vapor pressure}}{\text{Saturation vapor pressure}}$ $\frac{\text{Partial pressure, vapor}}{\text{Vapor pressure water}}$	%
Dew Point	Temperature of saturation (condensation)	°F or °C
Volume Ratio	$\frac{\text{Partial pressure, vapor}}{\text{Partial pressure, dry gas}}$	% by volume
Mass Ratio	Same as Mixing Ratio	PPM by weight, PPM_w
PPM by volume	$\frac{\text{Volume, vapor x } 10^6}{\text{Volume, dry gas}}$	PPM by volume, PPM_v
PPM by weight	$PPM_v \times \frac{\text{Mole weight of water}}{\text{Mole weight of carrier gas}}$	PPM by weight, PPM_w
Hygrometer	Instrument for measuring moisture in gas (from Greek hygros – wet, moist)	
Psychrometer	Instrument using wet/dry bulbs to measure moisture in gas (from Greek psychros – cold)	

PSYCHROMETRICS deals with the thermodynamic properties of moist gases while the term **Humidity** simply refers to the presence of water vapor in air or other carrier gas. Psychrometrics concerns mixtures of water vapor and dry air. Much of it also applies to other carrier gases since the thermo-dynamic characteristics of water vapor are fairly independent of the carrier gas. In addition, as the composition of atmospheric air is fairly constant, dry air is treated as a homogeneous gas with a molecular weight of 28.9645. The molecular weight of water is 18.01528.

WATER VAPOR PRESSURE: When a mixture of air and water vapor is in equilibrium with liquid water or with ice, it is considered to be saturated (RH J100%).

Features

- Not necessary to calibrate
- High accuracy
- Fast response
- Stable, low drift performance
- Chemically resistant

Applications

- RH, AH, Dew Point smart test in laboratory or at filed
- Moisture in compressed air
- Humidity of refrigerant and desiccant dryers
- Heating, ventilation and air conditioning
- Dry process monitoring
- Chemical industry
- Production environ monitor

Technical specifications

- Measurement range:
  RH: 0-100%RH, non-condensing
  AH/Moisture(for gas):0...80 to 550 ppm relative to temperature;
  Dew point difference: 50-100 °C below the testing temperature (It means if the temperature of the gas is in 0 °C, the low detect limit would be -100 °C for standard air)
- Accuracy: ±2% of reading, 0-100% RH non-condensing, 25 °C
- Operating temperature:

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MS2123N: -40 to 85 °C;
MS2123-1100:-40...+100 °C;
MS2110:-40...+180/300 °C;

- Working Pressure: N:<0.3 Mpa
- Sensor Interchangeability: ±5% RH, 0-60% RH; ±8% @ 90% RH typical
- Linearity: ±0.5% typical
- Hysteresis ±1.2% of reading, span maximum
- Repeatability ±0.5% of reading
- Response Time: 15 sec in slowly moving air at 25 °C
- Stability: ±1% of reading /typical at 0.50 aw in 5 years

* MS2110 Just for application when the temperature of sample is over 180°C

Environment Requirements:

Environal Humidity:
Operating:0 to 100% RH, non-condensing
Storage:0 to 90% RH, non-condensing
Environal Temperature Range:
N:Operating -40 °C to 85 °C (-40 °F to 185 °F)
N:Storage -51 °C to 125 °C (-60 °F to 257 °F)

HMS2100 Series Model

Model	Introduction	Application
HBD5ms2100 gMS	for RH,AH and DP analysis for Absolute moisture, Volume ratio, %volume, Partial pressure, Saturation moisture, Relative humidity, Specific quantity, Dew point, Humidity Ratio, analysis	Gas application
HBD5ms2100 lMS	for Liquid water activity and moisture analysis	Liquid application
HBD5ms2100 sMS	for solid's water activity and moisture analysis	Solid application
HBD5ms2100 WA	for water activity analysis of liquids and solids	Versatile application
HBD5ms2100 Pro	for full humidity, water activity and moisture analysis of gases, liquids and solids	Versatile application

Computer Software

Computer Acquisition	Win98.1-MS	RS485, STIM/Modbus communication, IEEE1451.1 NCAP
RS485 Kit		232 to 485 converter for PC serial port.

Sensors (replaceable)

HMS2123M12T85	Spare sensor for HMS2123N probe replacement
HMS2123pM12T85	Spare sensor for HMS2123N probe replacement, with pressure connector
HMS2123M12T100	Spare sensor for HMS2123N probe replacement
HMS2123pM12T100	Spare sensor for HMS2123N probe replacement, with pressure connector
HMS2123M12T180	Spare sensor for MS2123N probe replacement
HMS2123pM12T180	Spare sensor for MS2123N probe replacement, with pressure connector
HMS2110M12T300	Spare sensor for MS2110N probe replacement
HMS2110pM12T300	Spare sensor for MS2110N probe replacement, with pressure connector

Accessories

Standard's Kit	1 box each EA35 (35 %RH) and EA80 (80%RH) humidity calibration standards
DSC Kit	Accessory for Clamp Kit and Vap Kit. Each pack consists of 100 disposable sample cups (14mm deep and or 40mm)

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