Alpha Dewpoint Sensor

Ultra High Capacitance Aluminium Oxide Sensor

The Alpha Moisture Systems Dewpoint Sensor is an ultra high capacitance aluminium oxide sensor. The sensor consists of an ultra high purity aluminium wire, the surface of which is chemically oxidised to produce a porous insulating layer of partially hydrated aluminium oxide. A permeable conductive gold film is deposited on the oxide layer and that gold film and the aluminium wire form the two plates of a capacitor. (see diagram below).

The oxide layer, which forms the dielectric layer of a capacitor, is in the form of a mass of tubular pores running up from the aluminium core to the surface.
A dynamic equilibrium is established between the water vapour outside the sensor and the absorbed water within it, the water absorbed into the pores is directly related to the moisture content of the gas surrounding the sensor.

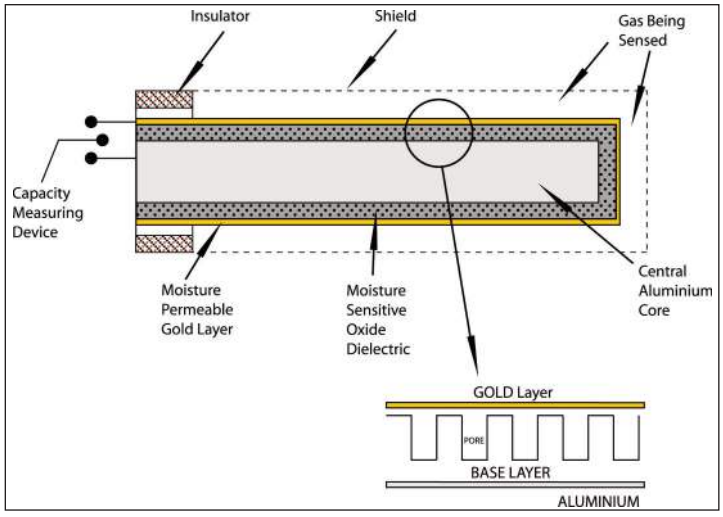
The pore size of the aluminium oxide layer is specific to water vapour and smaller molecules but, due to the dielectric constant of water compared to that of other gases that may enter the pores, such as hydrogen, the sensor response is specific to changes in water vapour concentration regardless of the carrier gas, and is resistant to many contaminants because they cannot enter the pore structure.

The overall dewpoint range covered by the sensor is -110°C to +20°C (-184°F to +68°F) dewpoint, which corresponds to 0.001 ppm to 0.2 per cent by volume.

Advantages of the Alpha Sensor

- Wide dynamic range from 0.001 ppm to 0.2 per cent by volume
- Stability, low hysteresis and temperature coefficients
- Flow independent
- Can be intrinsically safe (when used in conjunction with a Zener Barrier)
- High selectivity for moisture
- Can operate over a wide range of temperature and pressure
- Require little or no maintenance

Aluminium Oxide Sensor



Sensor Specifications

INTRINSIC SAFETY CERTIFICATION:
Sira 02ATEX2130X. IECEx BAS 16.0082X. CSAE 21UKEX3447X.

ATEX, UKCA and IECEx Markings

II 1G, Ex ia IIC T6 Ga (T_a = -20°C to +50°C)

Ex. ia IIC T6 Ga (-20°C ≤ Ta ≤ +60°C)

Standard Dewpoint Ranges
Ranges Available: Various between –110°C to +20°C (1.6ppb(v) to 23,000ppm(v)

Accuracy: Better than ± 2°C over full range
Operating Temperature: -20°C to + 50°C
Storage Temperature: -50°C to +70°C
Operating Humidity: 0-90% RH non-condensing
Mechanical Connections: M14 x 1.25mm pitch
Electrical Connection: Male coaxial plug
Approvals: CE and UKCA Compliant.

How to Order

Range Cable Holder
Sensor + [XX] + [X]m + [X/X]

Select a Standard Range Below

SILVER	-110 to -20°C	(-166°F to -4°F)	**SR**
PURPLE	-100 to +0°C	(-148°F to +32°F)	**PL**
RED	-80 to -20°C	(-112°F to -4°F)	**RD**
GREY	-80 to 0°C	(-112°F to +32°F)	**GY**
YELLOW	-60 to 0°C	(-76°F to +32°F)	**YE**
BLUE	-80 to +20°C	(-112°F to +68°F)	**BL**

Select a cable (optional)

Other lengths are available - please specify.

–
3
4
5
10
12
15
25

Select a Sensor Holder (optional)

No Sensor Holder needed	–
Sensor Holder No Fittings needed (Note: Ports are 1/8" NPT)	**0/0**
With 1/4" Swagelok® Stainless Steel Compression Fittings	**4/4**
With 1/8" Swagelok® Stainless Steel Compression Fittings	**8/8**
With 6mm Swagelok® Stainless Steel Compression Fittings	**6/6**

Ordering Example: To order a SENSOR with a dewpoint range of **-100°C to 0°C dewpoint**, 5 metres connecting cable and sensor holder with 1/4" Swagelok® fittings, the order code will look like this: **Sensor - PL - 5m - 4/4.**

The Sensor is ATEX, IECEx and UKCA Certified and can be used in either hazardous or non-hazardous areas. Where the sensor is to operate in an area where a flammability hazard my exist, the Sensor is located in the Hazardous Zone and the Zener Barrier and Hygrometer Display unit are installed in the Safe Area (see illustration below). Distance from Sensor to Zener Barrier or Hygrometer Display can be up to 1000m.

Zener Barriers for Ex Environments

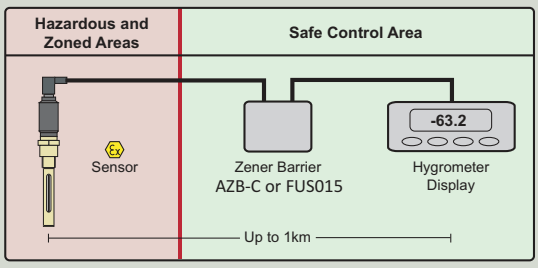
Model AZB-C
Shown here with enclosure is used for stand alone installations.

The Zener Barrier Unit comes in a custom enclosure. A Zener barrier (shunt diode safety barrier) should be used when installing the sensor in a hazardous area.

The connection from the moisture sensor to the Zener Barrier is via low loss coaxial cable.

The Zener Barrier can also be supplied without the enclosure for direct installation into an existing bus bar system. **Order No. FUS015**

To the right is a simple drawing highlighting the location of a Zener Barrier Unit in the safe zone.



Corrosive Gases: The Sensor should not be exposed to corrosive gases (or corrosive contaminants in the gas sample) as these can chemically attack the sensor, impairing calibration accuracy and/or damaging it beyond economic repair. Examples of such gases are mercury (Hg), ammonia (NH_3), chlorine (Cl_2) etc. Strong oxidising agents such as ozone (O_3) should also be prevented from coming into contact with the sensor.

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