Cermet II

Hygrometer

The hygrometer of choice for the measurement of dew point, temperature, or gaseous moisture applications with a choice of units of measurement or where pressure compensation is required.

Highlights

- Wide measurement range, calibrated -100 to +20°C (-148 to +68°F) dew point
- ±1°C (±1.8°F) dew point measurement accuracy
- Pressure sensor input
- Up to 4 alarm relays
- User selectable units of measurement
- Easy to read display
- Analog and digital outputs

Applications

- Industrial gases
- Dried compressed air
- Welding gases
- Glove boxes
- Medical gases
- High voltage switchgear (SF_6)

MICHELL Instruments

Cermet II Hygrometer

Complete On-Line Dew Point Solution

Cermet II is the intelligent choice for reliable on-line measurement of moisture in virtually any gas, across many applications. Cermet II combines Michell's Advanced Ceramic Moisture Sensor and a monitor unit that can be located up to 1200 m apart (3930 ft). While Cermet II is so simple to use, it has the flexibility to be applied to almost any humidity measurement application. The instrument can display measurement units in °C or °F dew point, ppm_v, lb/mmscf or g/m^3 across the measurement range -100 to +20°C (-148 to +68°F) dew point at pressures up to 5000 psig. The Cermet II also can accept a pressure signal from a pressure transmitter (optional) providing the means of active pressure compensation for concentration units of measurement.

Cermet II Monitor

The Cermet II Monitor is a fully self-contained display system in a 1/8 DIN panel mounting case that indicates the measured humidity parameter and performs pressure compensation (if required). Cermet II also provides current and digital outputs and two 10 A alarm relays. It is protected to NEMA 12 and can be supplied with an optional front panel providing a NEMA 4 rating. Its operating temperature range is -20 to + 50°C (-4 to + 122°F).

Cermet II Sensor

The Cermet II Sensor uses Michell's Advanced Ceramic Moisture Sensor technology with on-board intelligence. This smart sensor has a measurement range of -100 to +20°C dew point (-148 to +68°F) at pressures up to 45 MPa (450 barg/6500 psi) max and offers a superior measurement accuracy of better than ±1°C dew point from -60 to +20°C (±1.8°F from -76 to +68°F). From -100 to -60°C dew point the measurement accuracy is ±2°C dew point (±3.6°F from -148 to -76°F dew point). The on-board processor in the sensor electronics enables excellent performance, reliability and interchangeability of sensors. Cermet II's sensor is designed to perform in harsh environments. Constructed in stainless steel, the sensor is also protected to NEMA 4 and has an operating temperature range of -40 to +60°C (-40 to +140°F).

Extreme Flexibility

The dew point of any gas will vary with pressure. When calculating concentration units of measure, Cermet II can compensate for these variations either by using of a live pressure transducer input, or by using a pressure factor input via the instrument front panel.

For control of external devices Cermet II is supplied as with two 10 A, 240 V AC fully user configurable alarms as standard. These can be set over the full operating range of the instrument, with variable hysteresis for any chosen engineering unit. The alarms can also be configured to flag sensor or cable fault conditions. An additional two alarms can be added if required.

Cermet II is supplied with a 4-20 mA output, which is fully configurable for range and scale as standard. In addition, a 2-way RS232 digital signal is provided which gives full data access to the user. Optionally a 0-10 V configurable analog output can be specified, as can an RS485 2-way digital output.

Applications

Cermet II can provide the solution to both energy management and quality assurance in the supply of pure gases and compressed air from heat regenerative, adsorption dryers. The durability of the Advanced Ceramic Moisture Sensor provides long term service in applications such as pipeline drying using vacuum and dry gas purging techniques.

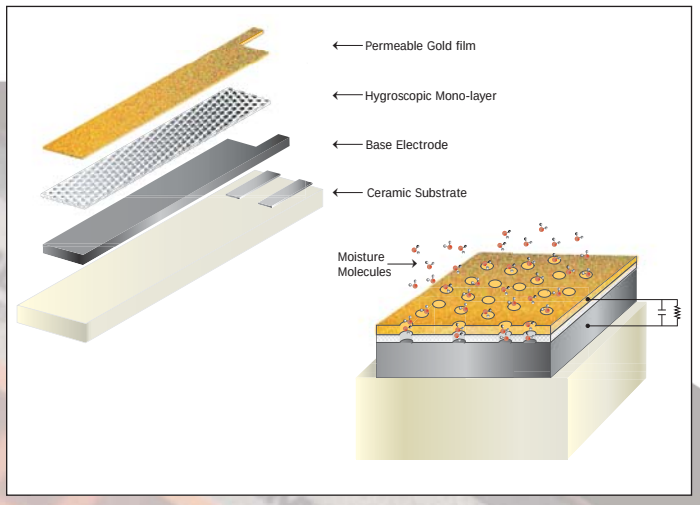
Power station (Peterhead CS)

Technology: Impedance

The Cermet uses Impedance technology, based on Michell's advanced ceramic sensor. The operation of this sensor depends on the dielectric property of water molecules absorbing onto an active porous insulating layer sandwiched between two layers of conductive material deposited on a ceramic substrate.

Water has a very high dielectric compared to the dielectric of the active layer and the background of the carrier gas so it can be detected easily.

The active layer is very thin – less than one micron and the porous top conductor that allows water molecules to penetrate into the active layer is less than 0.1 micron thick. This allows the sensor to respond very rapidly to changes in the moisture surrounding it both when moisture decreases (drying) and increases in the sensor environment.



Michell ceramic sensor tile layers

MICHELL Instruments

Technical Specifications

Sensor

Measurement Range	-100 to +20°C (-148 to +68°F) dew point
Accuracy (dew point)	±1°C from -60 to +20°C dew point (±1.8°F, -76 to +68°F dew point) ±2°C from -100 to -60°C dew point (±3.6°F, -148 to -76°F dew point)
Enclosure	Stainless steel
Ingress Protection	NEMA 4 in protection and accordance with standard NEMA 250-2003 and IP66 in accordance with standard BS EN 60529:1992
Operating Temperature	-40 to +60°C (-40 to +140°F) compensated over -20 to +40°C (-4 to +104°F)
Storage Temperature	-40 to +109°C (-40 to +165°F)
Operating Pressure	From vacuum to 40 MPa (400 barg/5801 psig) (max)
Flow Rate	1 to 5 l/min (2.1 to 10.5 scfh)
Gas Velocity	0 to 10m/sec (0 to 32.8 ft/sec)
Process Connection	5/8" UNF parallel thread
Sensor Calibration	Traceable to NIST and UKAS

Analyzer

Measurement Units	°Cdp, °Fdp; ppm_V with user selectable range and resolution; lbs/MMscf range dependent on pressure (natural gas); g/m^3 (natural gas). Digital processing and linearization with active or passive pressure compensation
Resolution	0.1 °C from -80 to +20°C dew point (0.18°F, -112 to +68°F dew point) 1°C from -100 to -80°C dew point (1.8°F, -148 to -112°F dew point)
Secondary Measurement Variable	Pressure using an optional external transducer over a range of 0-45 MPa (450 barg/6527 psig. Completely user-configurable for any industry standard transducer with an 4-20 mA output. Automatic compensation for ppm_V, lbs/MMscf and g/m^3 units.
Alarm Relays	Two user adjustable isolated 10A form 'C' rated at 240 V AC or 24 V DC
Outputs:	
Analog	4-20 mA as standard (max load 500 Ω) user configurable and scalable
Digital	RS232
Power Supply	Universal 85 to 265 V AC, 50/60 Hz or 95 to 370 V DC

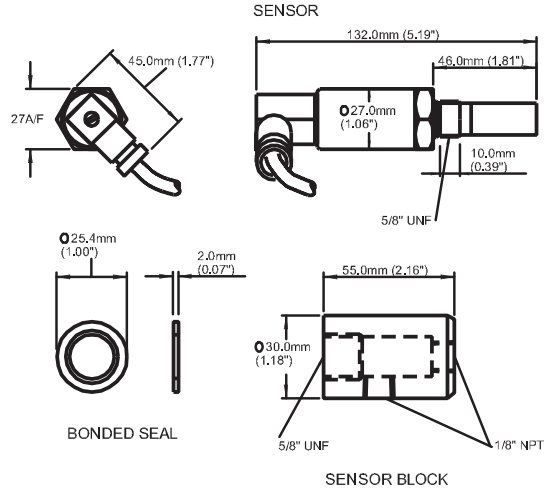
Operating Conditions

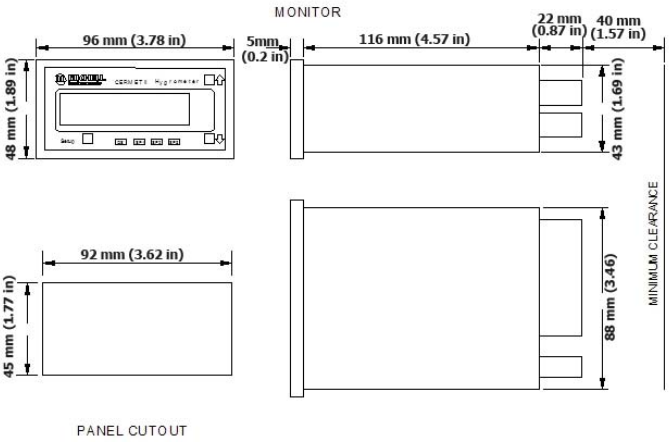
Operating Temperature	
Analyzer:	0 to +50°C (32 to +122°F)
Sensor:	-20 to +50°C (-5 to +122°F)
Ingress Protection	
Analyzer:	IP54 (NEMA 12) standard (front panel only) IP66 (NEMA4) with optional cover (front panel only)
Sensor:	IP66 (NEMA4)

Options

Outputs	
Analog:	0-20 mA optional (max load 500 Ω) 0-10 V optional (min load 5 K Ω) both user configurable and scalable
Digital:	RS485: provides 2-way communication - full data access to user and total instrument configuration
Alarm Relays	1 or 2 additional 5 A relays (max 4 total) n/o type fully user configurable and adjustable over the full range, full choice of units and sensor fault alarm functions
Power Supply	18 to 36 V AC; 9 to 60 V DC
Cable	Standard 2 m (6.56 ft) (1200 m/3937 ft max)

Dimensions





Michell Instruments Ltd, Rotronic Instruments Corp. 135 Engineers Road, Suite 150, Hauppauge NY 11788
Tel: 631 427 3898, Email: us.info@michell.com, Web: www.michell.com/us

Michell Instruments adopts a continuous development programme which sometimes necessitates specification changes without notice.
Issue no: Cermet II_97169_V2.1_US_0518