Panametrics

Datasheet

MIS 2 Probe

Aluminum oxide moisture probe

Panametrics aluminum oxide moisture probes have set the standard of performance and value in industrial moisture measurement for more than 40 years.
In use, the Moisture Image Series probe is coupled to Panametrics hygrometer consoles by an interconnecting cable. Ease of use, wide measurement range and rigorous calibration standards make these systems the preferred choice for industrial moisture measurement worldwide.

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Built-in pressure and temperature measurement

Accurate determination of many moisture measurement parameters requires knowledge of the process temperature and pressure. The inconvenience and limitations associated with installing and using separate temperature and pressure sensors have been eliminated, with both capabilities being built directly into the Moisture Image Series probe.
A nonlinear NTC thermistor to measure temperature from –22°F to 158°F (–30°C to 70°C), and a choice of five solid-state piezoresistive transducers to measure pressures up to 5000 psig (345 bar), are available.
Temperature and pressure input data are used by Moisture Image Series 1 analyzers and the PM880 portable hygrometer to determine parameters such as ppm, lbs/mmSCF and relative humidity.

MIS electronics module

The real power of the MIS probe comes from an electronics module that is attached to the moisture sensor probe. The built-in microprocessor provides 16 bit resolution, a real performance enhancement, allowing it to detect parts per billion (ppb) changes in moisture concentration. In addition, it continuously monitors and compensates the electronics to ensure long-term stability.
For convenience, moisture probe calibration data is stored in nonvolatile EEPROM, so data entry is automatic and safe from power outage.
The Moisture Image Series probe is intrinsically safe, saving the expense and installation problems associated with explosion-proof housings, purges, or external zener requirements of IEC/Zone 0 areas.

Rigorous calibration standards traceable to the NIST/NPL

The aluminum oxide sensor of each MIS probe is individually calibrated in one of the world's most advanced moisture calibration facilities. Developed over several decades, this facility generates precisely known moisture concentrations, traceable to the NIST/NPL, to which each sensor is exposed during the calibration process.
All data is gathered and stored by a dedicated computer system. Calibrations are repeated over a period of many months to ensure the stability of each individual moisture probe. Only those probes that meet Panametrics demanding specifications for accuracy and stability are shipped to customers.

Installation flexibility

The Moisture Image Series probe is designed to be located at the process, exactly where the measurement is needed. The sensor can withstand process temperatures of –166° to 158°F (–110° to 70°C) and pressures from vacuum up to 5000 psig (345 bar). No minimum flow rate is required. For additional flexibility, the probe can be located up to 3000 feet (0.9 km) from the analyzer, connected by inexpensive, unshielded, twisted-pair cable (AWG 22). As a result, the probe can be placed in the ideal location, even in a large plant, without the cost, delays and installation problems associated with special cabling.

Features

- Intrinsically safe
- Ambient to ppb moisture measurement: 16-bit resolution
- Three function capability with moisture sensor and optional built-in temperature and pressure sensors
- Nonvolatile calibration data storage
- Calibrations traceable to National Institute of Standards and Technology (NIST) or National Physical Lab U.K. (NPL)
- Requires only twisted pair cabling, allowing probe to be located up to 3000 ft (914 m) from analyzer
- Threaded and VCR mount configurations

Applications

This Panametrics aluminum oxide moisture sensor probe measures moisture concentration in gases and non-aqueous liquids from trace to ambient levels. It is designed to be used in conjunction with the Panametrics moisture.IQ and the PM880 portable hygrometer for industries including:

- Petrochemical
- Natural gas
- Industrial gas
- Semiconductor
- Furnace gas/heat treating
- Power generation
- Air dryer
- Pharmaceutical
- Aerospace

Technical **Specifications**

Moisture sensor

Intrinsic safety	Intrinsically safe when connected to a Panametrics moisture series analyzer, PM880 portable hygrometer or intrinsically safe barriers in accordance with the user's manual. Moisture image series probe: BAS01ATEX1095 Ⓔx II 1 G Ex ia IIC T4. (–20°C to +80°C) and CSA C US Class I, Division 1, Groups A,B,C&D T4, LR44204-23
European compliance	Complies with EMC directive 2004/108/EC and PED 97/23/EC for EN <25
Type	Aluminum oxide moisture sensor probe
Calibration	Each sensor is individually computer calibrated against known moisture concentrations, traceable to NIST or NPL.
Overall range capability	–110° to 60°C (–166° to 140°F)
Available range options	• Standard: –80° to 20°C (–112° to 68°F) with data to –110°C (–166°F) • Ultra-low: –110° to –50°C (–166° to –58°F) • High range data: –80° to 60°C (–112° to 140°F)
Calibrated accuracy at 25°C (77°F)	• ±3.6°F (±2°C) above -148°F (–100°C) • ±5.4°F (±3°C) below -148°F (–100°C)
Repeatability	• ±0.4°F (±0.2°C) above -148°F (–100°C) • ±0.9°F (±0.5°C) below -148°F (–100°C)
Temperature	• Operating temperature: -4°F to +140°F (–20°C to +60°C) • Storage temperature: -22°F to +158°F (–30°C to +70°C)
Operating pressure	5 µm Hg to 5000 psig (345 bar) Limited by optional pressure sensor - see pressure sensor ranges.
Flow range	• Gases: Static to 10,000 cm/s linear velocity at 1 atm • Liquids: Static to 10 cm/s linear velocity at density of 1 g/cc
MIS Probe/ Analyzer Separation	3000 ft (0.9 km) maximum recommended length (consult factory for longer distances)
MIS Probe/ Analyzer Compatibility	• moisture.IQ • PM880 portable hygrometer
MIS Probe/ Analyzer Cable	Unshielded, twisted pair, AWG 22

Built-in temperature sensor

Type	Nonlinear NTC thermistor (resultant temperature linearized by microprocessor)
Operating ran	– 22° to 158° F (–30° to 70°C)
Accuracy	±0.9°F (±0.5°C) overall
Response time (maximum)	One second in well stirred oil or 10 seconds in still air for a 63% step change in increasing or decreasing temperature

Built-in pressure sensor

Type	Solid-state/piezoresistive
Available ranges	• 30 to 300 psig (3 to 21 bar) • 50 to 500 psig (4 to 35 bar) • 100 to 1000 psig (7 to 69 bar) • 300 to 3000 psig (21 to 207 bar) • 500 to 5000 psig (35 to 345 bar)
Accuracy	±1% of full scalel
Pressure rating	Three times the span of the available range to a maximum of 7500 psig (518 bar)

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