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Pura Hygrometer Solutions

Ultra-Pure Moisture Transmitters and Online Hygrometers

This small, rugged pure gas moisture sensor/hygrometer is an ideal economical solution for moisture breakthrough indication in ultra-dry moisture purification applications.

The Pura is easy to install and use, either as a transmitter or hygrometer, for a wide variety of pure gas measurement applications. A service exchange program is also available, reducing the cost of maintenance.

Highlights

- Measures down to -120 °Cdp (-184 °Fdp) (1 ppb_V)
- Stable and repeatable measurement
- Fast response
- Economical and advanced monitor solutions
- Dew-point or moisture content output
- 4...20 mA and Modbus RTU over RS485 outputs
- Traceable 7-point calibration certificate
- 1/2”, 1/4” male VCR process connections
- MiniDIN 43650 C, M12 electrical connectors
- Optional hazardous area approval
- Sensor exchange program

Applications

- Gas purification systems
- Semiconductor manufacture
- Pure gases
- Fibre optic production
- Optical coating processes
- Electronic component manufacture
- Speciality gas production and distribution

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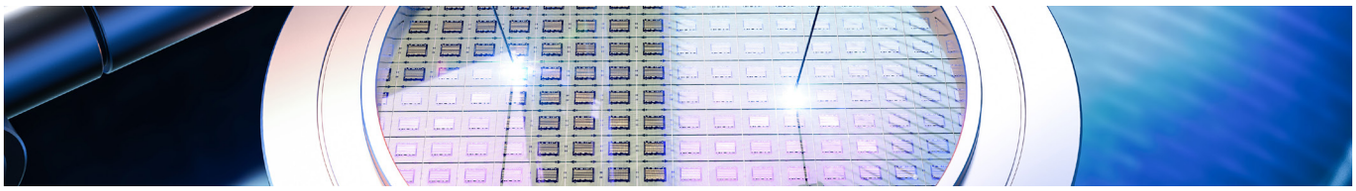

Pura Advanced Hygrometers

The Versatile Hygrometer Solutions

The Pura ultra-pure gas moisture transmitter can be supplied with an advanced or economical monitor, depending on your application requirement and budget.

The Pura Advanced Online 2 Hygrometer offers users complete versatility with the following benefits:

- Moisture and Pressure dual display with live pressure compensation
- Touch-screen end user-selectable dew-point or moisture content scalings
- Triple 4...20 mA analog outputs
- Modbus RTU over RS485 digital output
- 4 programmable relay alarms

The Pura Online Hygrometer offers users an economical monitor with the following essential features:

- Order selectable dew-point or moisture content scaling
- Single 4...20 mA analog output
- Modbus RTU over RS485 digital output
- 2 programmable relay alarms

The Pure Gas Moisture Transmitter

In many high-purity gas applications, such as the semiconductor industry, the residual moisture content of the gas is critical to the satisfactory operation of a process.

Historically, trace-moisture measurement has been problematic, demanding the use of complex moisture analyzers or expensive analytical techniques. Michell Instruments has introduced a simple, economical solution for online measurement of dew-point temperatures down to -120 °C (-184 °F) (less than 1 part per billion).

The Pura transmitter benefits from Michell's experience and expertise in the production and calibration of the ceramic metal-oxide dew-point sensor. Incorporation of industry-standard materials and manufacturing processes gives the first low-cost transmitter suitable for large-scale integration into a semiconductor fabrication plant or high-purity gas line.

The Pura family of pure gas transmitters provides a stable, reliable and repeatable moisture measurement for all pure gas trace moisture applications.

Ease of Installation

Flexible product design ensures the unit can be quickly and economically installed.

- ¼" male or 1/2" male VCR process connections
- MiniDIN 43650 form C or M12 5-pin electrical connectors
- Cold drawn stainless steel, 0.1...0.2 Ra µm electro-polished internal sample block finish
- Clean room double-bagged or industrial single-bagged product packaging
- Configuration and diagnostic communication tool
- Order selectable AC or DC power supply

Service Exchange/Recalibration Program

Michell offers 2 services for customers who want minimum downtime and sensor traceability, while maintaining the reliability of their online system:

- **Sensor Exchange** – Customers place an order for a guaranteed, reconditioned sensor, supplied with a 13-point traceable calibration. When this arrives, they exchange it for the installed sensor which is returned to Michell, resulting in zero process downtime.
- **Recalibration** – Customers return their installed hygrometer to Michell, where it is inspected, checked and re-calibrated before being returned. This provides on-going system traceability for the process.

Global Certifications

The Pura series has a broad range of certifications to ensure a single stocked unit can be used in any global application.

- Pura I.S. – ATEX, UKCA & IECEx
- Pura I.S. – cQPSus (US and Canada)
- Pura I.S. – EX-TR CU
- Pura – UL approval

Michell has a team of experienced application engineers, based both in field and factory, who are available to assist with any dew-point sensor application.

Speed of Supply

The online system is manufactured within Michell's world-leading high-volume moisture transmitter manufacturing center in the United Kingdom, which ensures reliability and repeatability of delivery and field supported by a network of Michell's global service centers.

- Manufacturing calibration system traceable to NPL & NIST
- ISO/IEC 17025 UKAS accredited calibration available on request

Installation Accessories

Transmitters are available with a range of practical accessories.

- Mating 1/4" female VCR Swagelok adaptors
- 1/4" VCR electropolished sample blocks
- Mating electrical connector and cables

Customization

We have specialized design and manufacturing capability to cover any customized sensor requirements for your application.

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Transmitter Technical Specifications

Product	Pura 2-wire, 3-wire & Digital Transmitters	Pura I.S. Transmitter
Performance Specifications		
Measurement Range	-120...-40 °Cdp (-184...-40 °Fdp); non-standard ranges available on request	
Accuracy	±1 °C from -40 to -60 °Cdp (±1.8 °F from -40 to -76 °Fdp) ±2 °C from -60 to -100 °Cdp (±3.6 °C from -76 to -148 °Fdp) ±4 °C from -100 to -120 °Cdp (±7.2 °C from -148 to -184 °Fdp (extrapolated)	
Calibration	Traceable 7-point calibration certificate	
Electrical Specifications		
Output Signal	4...20 mA (2-wire connection, current source) 4...20 mA (3-wire connection, current sink) **Pura M12:** Modbus RTU over RS485 **Pura 3-wire PUR-AOL-SEN-D:** Michell Mnet digital	4...20 mA (2-wire connection, current source)
Output	Dew point or moisture content (ppm_V, ppb_V)	
Analog Output Scaled Range	**Dew point:** -120...-40 °C (-184...-40 °F); **Moisture content in gas:** 0...127 ppm_V;	
Supply Voltage	**Pura 2-wire/3-wire & Pura I.S.:** 12...28 V DC **Pura M12:** 5...28 V DC (digital)*	
Load Resistance	Max 250 Ω @ 14 V (500 Ω @ 24 V)	
Current Consumption	23 mA max, depending on output signal	
Compliances	CE & UKCA	
Operating Specifications		
Operating Temperature	-40...+60 °C (-40...+140 °F)	
Compensated Temperature Range	-20...+50 °C (-4...+122 °F)	
Storage Temperature	-40...+60 °C (-40...+140 °F)	
Operating Pressure	Minimum 10^{-7} Pa (10^{-9} torr); Maximum 24 MPa (240 barg/3481 psig)	
Flow Rate	1...5 Nl/min mounted in standard sampling block; 0...10 m/sec direct insertion	
Mechanical Specifications		
Ingress Protection	IP66 in accordance with standard BS EN 60529:1992; NEMA 4 protection in accordance with standard NEMA 250–2003 **Pura M12**: IP65	
Intrinsically Safe Area Certificates		ATEX/UKCA: II 1 G Ex ia IIC T4 Ga (-20...+70 °C) IECEx: Ex ia IIC T4 Ga (-20...+70 °C) TR CU: 0Ex ia IIC T4 Ga (-20...+70 °C) cQPSus: Class I, Division 1, Groups A, B, C & D, T4 Class I, Zone 0, AEx ia IIC T4 Ga, Ex ia IIC T4 Ga Tamb +70 °C
Housing Material	316 stainless steel	
Dimensions	Please refer to the dimensional drawings on page 4 of this datasheet	
Packaging	**Pura Premium:** Double bagged and sealed in UHP inert gas **Pura OEM and Pura Sensor:** Single bagged in 1000 gauge polythene **All options:** shipped individually in a profiled cardboard carton Sensor version supplied with protective guard over sensor technology for transportation and handling	
Process Connection	**Pura Premium (PRM):** 2 x 1/4" male VCR **Pura OEM (OEM):** 2 x 1/4" male VCR **Pura Sensor (SEN):** 1/2" male VCR	
Weight	**PRM and OEM versions:** 450 g (0.99 lb) **SEN version:** 180 g (0.4 lb)	
Electrical Connections	**Pura:** MiniDIN 43650 form C **Pura M12:** M12 5 Pin (A coded)	MiniDIN 43650 form C
Mating Electrical Connectors	Mating connector supplied as standard **Pura M12:** optional 0.8, 2, 5 metre (2.62, 6.56, 16.4 foot) M12 A coded connector/cable available	
Diagnostic Conditions (factory programmed)	Sensor fault: 23 mA Under-range dew point: 4 mA Over-range dew point: 20 mA	
Approved Galvanic Isolators		KFD2-CR-EX1.20200 KFD2-CR-EX1.30200 KFD0-CS-EX1.50P KFD0-CS-EX2.50P KFD2-STC4-EX1.H MTL5041 MTL5040

*** Applicable on digital Modbus RTU output only**

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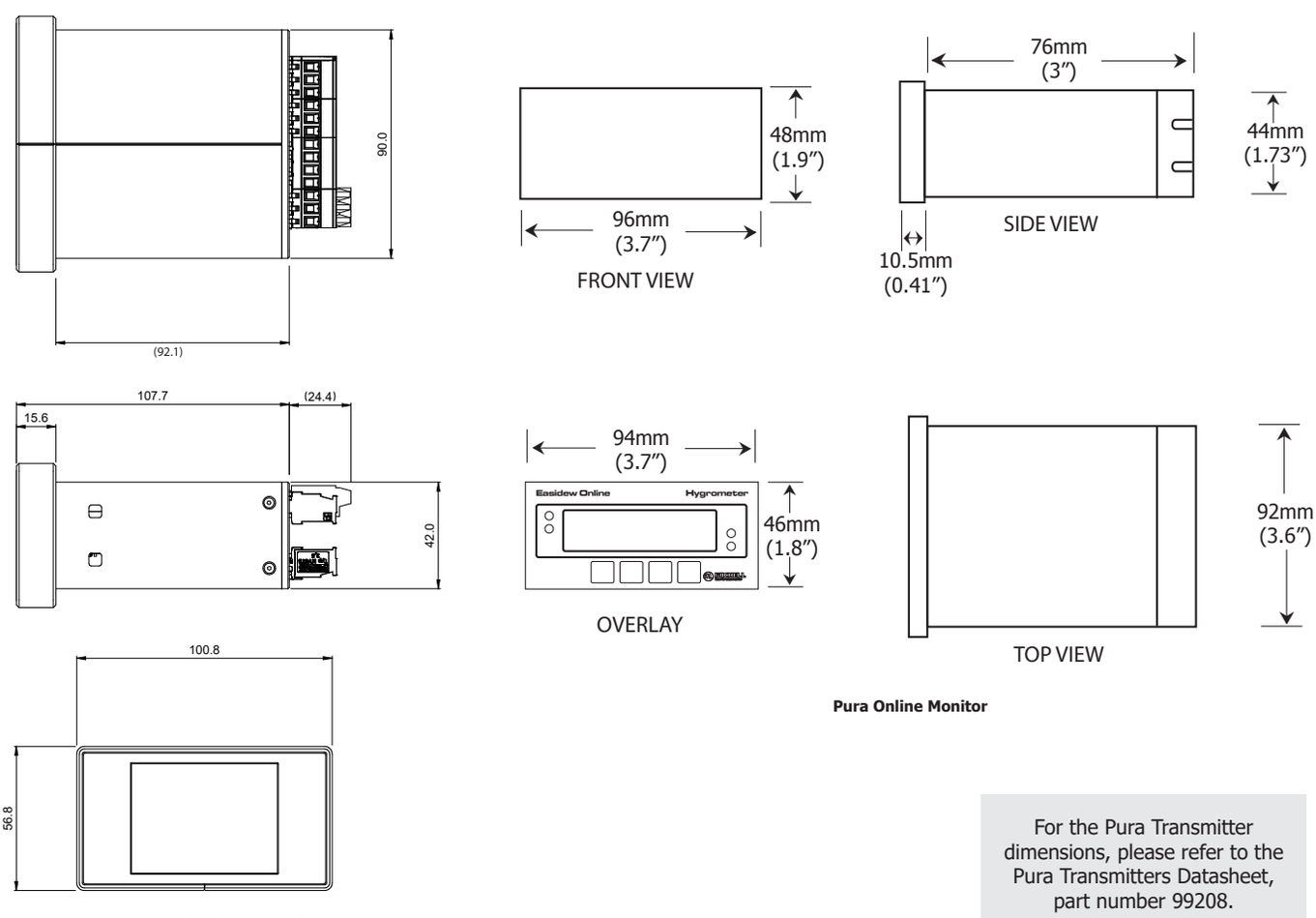
Pura Advanced Online Hygrometer

Monitor Technical Specifications

Product	Pura Advanced Online 2	Pura Online
Online Range	-120...-40 °Cdp (-184...-40 °Fdp)	
Online Resolution	51/2 digit	4 digit
Auxiliary Pressure Input	Maximum 24 MPa (240 barg/3481 psig)	Not available
Pressure Compensation	Live 4 ...20 mA pressure transmitter or fixed programmable value	Not available
Moisture Content Scales	Automatic compensation for ppm_v, lbs/MMscf, g/m^3 units	Dew-point and ppm_V ranges available
Relay Alarm Type/Rating	2 x Form A, 2 x Form C 30 V DC 5A Namur compliant programmable relay outputs for process and fault conditions	Alarm 1 relay: single pole make contact, rating 3 A @ 250 V AC Alarm 2 relay: changeover contacts, rating 5 A @ 250 V AC
Sensor Input Signal	Modbus RTU over RS485	4...20 mA
Online Output Signals (analog)	3 x 4...20 mA fully user-configurable and scalable	1 x 4...20 mA or 0...20 mA fully user-configurable and scalable
Online Output Signal (digital)	Modbus RTU over RS485	Modbus RTU over RS485
Online Supply Voltage	85...265 V AC 18...28 V DC	85...265 V AC 24 V DC
Online Power Consumption	AC Power: 7.5 VA DC Current: 170 mA @24 V DC	60 mA max.
Electrical Safety	BS/EN61010-1: 2010	
Operating Temperature	0...+50 °C (+32...+122 °F)	
Storage Temperature	0...+60 °C (+32...+140 °F)	-10...+60 °C (+14...+140 °F)
Ingress Protection	IP54 & NEMA Type 2 & 12K front panel only	IP65 front panel IP20 rear panel

Monitor Product Dimensions



Pura Online Monitor

Pura Advanced Online 2 Monitor

For the Pura Transmitter dimensions, please refer to the Pura Transmitters Datasheet, part number 99208.

Michell Instruments adopts a continuous development programme which sometimes necessitates specification changes without notice.
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