

# Pura Transmitters

## Ultra-Pure Moisture Transmitter

This small transmitter is a rugged dew-point sensor for the measurement of trace moisture in ultra-high purity gases.

Simple to use and install, the Pura features analog and digital outputs with optional I.S. approvals, plus there is a range of VCR process connections and electrical connections. A service exchange program is also available, reducing the cost of maintenance.

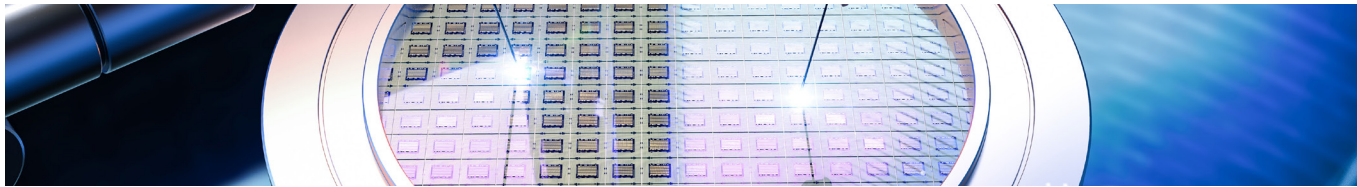


### Highlights

- Measures down to  $-120\text{ }^{\circ}\text{Cdp}$  ( $-184\text{ }^{\circ}\text{Fdp}$ ) ( $1\text{ppb}_v$ )
- Stable and repeatable measurement
- Fast response
- Modbus RTU over RS485 communication
- 4...20 mA 2 wire
- Traceable 7-point calibration certificate
- 1/2", 1/4" male VCR process connections
- Optional monitor/controller
- MiniDIN 43650 C, M12 electrical connectors
- Optional hazardous area approval
- Service 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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### 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  $-120\text{ }^{\circ}\text{C}$  ( $-184\text{ }^{\circ}\text{F}$ ) (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.

- 1/4" 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  $\mu\text{m}$  electro-polished internal sample block finish
- Clean room double-bagged or industrial single-bagged product packaging
- On-site configuration and diagnostic communication tool

### Service Exchange/Recalibration Program

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

- **Sensor Exchange** – Customers place an order for a guaranteed, reconditioned 1/2" male VCR sensor. When it arrives, they exchange it for the installed sensor which is returned to Michell, resulting in zero process downtime.
- **Recalibration** – Customers return their installed sensor to Michell, where they are inspected, checked and recalibrated before being returned. This provides on-going sensor 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.

### Optional Monitor

If the application calls for the dew-point or moisture content to be displayed, the Pura can be supplied as a hygrometer system, with an Online Monitor or Advanced Online Monitor. Our monitors are simple to connect and provide power to the Pura Transmitters.

### Measurement Performance

The transmitter uses Michell's market-leading ceramic metal-oxide moisture sensor technology, coupled with the latest-generation sophisticated microcontroller electronics, to provide accurate and stable measurement across the transmitter's product life.

- Accuracy  $\pm 1\text{ }^{\circ}\text{C}$  from  $-40$  to  $-60\text{ }^{\circ}\text{Cdp}$  (refer to page 3 for further details)
- Fast response

### Flexibility of Ownership

The Pura transmitter has a RS485 communication system, giving customers the opportunity to re-range and re-scale with a communication kit for a variety of moisture measurements.

- Re-ranging 4...20 mA within the  $-120$ ... $-40\text{ }^{\circ}\text{Cdp}$  ( $-184$ ... $-40\text{ }^{\circ}\text{Fdp}$ ) range
- Moisture scaling – dew point,  $\text{ppm}_v$ ,  $\text{ppb}_v$

### Speed of Supply

The transmitter 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.

- Calibration manufacturing system is traceable to globally recognized NPL and NIST ISO 17025 standards

### 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

If your application requires a customized sensor, we have specialized design and manufacturing capability to cover your requirements.

## Technical Specifications

Product	Pura 2-wire, 3-wire & Digital Transmitters	Pura I.S. Transmitter
<b>Performance Specifications</b>		
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	
<b>Electrical Specifications</b>		
Output Signal	4...20 mA (2-wire connection, current source) 4...20 mA (3-wire connection, current sink) <b>Pura M12:</b> Modbus RTU over RS485 <b>Pura 3-wire PUR-AOL-SEN-D:</b> Michell Mnet digital	4...20 mA (2-wire connection, current source)
Output	Dew point or moisture content (ppm <sub>v</sub> , ppb <sub>v</sub> )	
Analog Output Scaled Range	<b>Dew point:</b> -120...-40 °C (-184...-40 °F); <b>Moisture content in gas:</b> 0...127 ppm <sub>v</sub>	
Supply Voltage	<b>Pura 2-wire/3-wire &amp; Pura I.S.:</b> 12...28 V DC <b>Pura M12:</b> 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	
<b>Operating Specifications</b>		
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 <sup>-7</sup> Pa (10 <sup>-9</sup> torr); Maximum 24 MPa (240 barg/3481 psig)	
Flow Rate	1...5 NI/min mounted in standard sampling block; 0...10 m/sec direct insertion	
<b>Mechanical Specifications</b>		
Ingress Protection	IP66 in accordance with standard BS EN 60529:1992; NEMA 4 protection in accordance with standard NEMA 250-2003 <b>Pura M12:</b> 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	<b>Pura Premium:</b> Double bagged and sealed in UHP inert gas <b>Pura OEM and Pura Sensor:</b> Single bagged in 1000 gauge polythene <b>All options:</b> shipped individually in a profiled cardboard carton Sensor version supplied with protective guard over sensor technology for transportation and handling	
Process Connection	<b>Pura Premium (PRM):</b> 2 x 1/4" male VCR <b>Pura OEM (OEM):</b> 2 x 1/4" male VCR <b>Pura Sensor (SEN):</b> 1/2" male VCR	
Weight	<b>PRM and OEM versions:</b> 450 g (0.99 lb) <b>SEN version:</b> 180 g (0.4 lb)	
Electrical Connections	<b>Pura:</b> MiniDIN 43650 form C <b>Pura M12:</b> M12 5 Pin (A coded)	MiniDIN 43650 form C
Mating Electrical Connectors	Mating connector supplied as standard <b>Pura M12:</b> 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	KFD0-CS-EX1.50P KFD0-CS-EX2.50P KFD2-STC4-EX1.H	

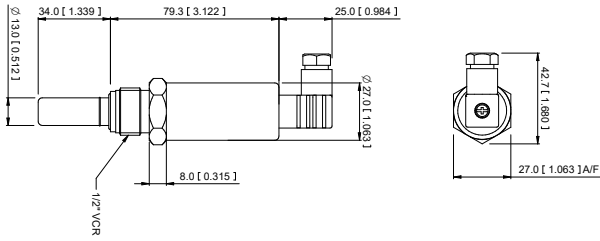
\* Applicable on digital Modbus RTU output only

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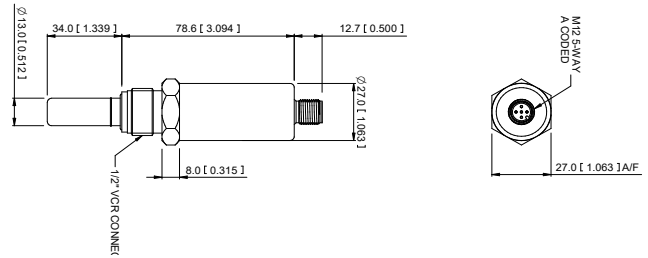
## Product Dimensions

### Pura 2-wire, 3-wire and Pura I.S.

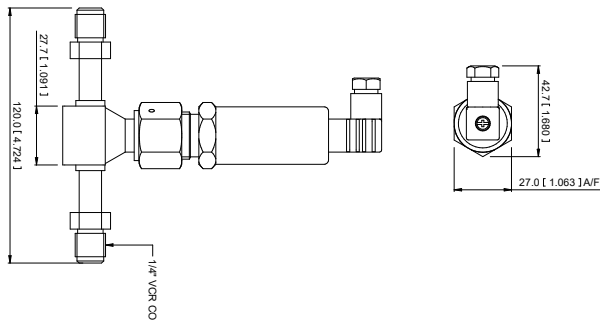
1/2" VCR (SEN)



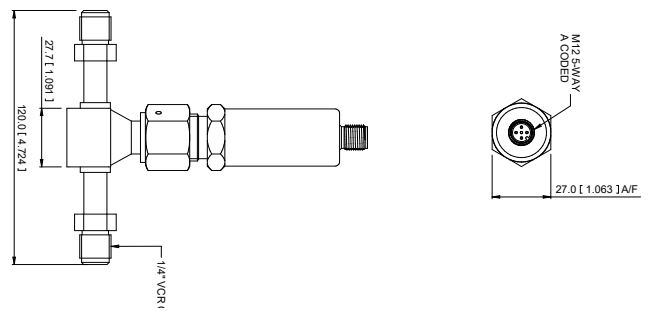
### Pura 2-wire M12



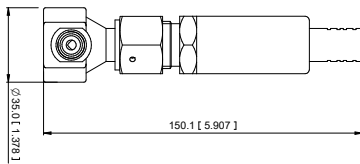
1/4" VCR Sample Block (PRM & OEM)



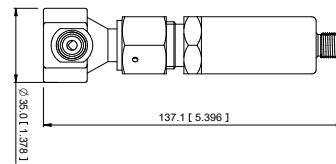
1/4" VCR Sample Block (PRM & OEM)



1/4" VCR Sample Block (PRM & OEM)



1/4" VCR Sample Block (PRM & OEM)



## Related Process Products



**Pura Advanced Online 2**  
Advanced Dew-Point Hygrometer



**Easidew Online**  
Universal Dew-Point Hygrometer



**Easidew Transitter**  
Industrial Dew-Point Transmitters



**Senz-TX**  
Oxygen Transmitter



**S8000 -100**  
High-Precision Chilled Mirror Hygrometer



**QMA401**  
Trace Moisture Analyzer



**LD8000+**  
PPB Ultra Trace Nitrogen Analyzer



**MultiDetek 3**  
Modular Process Gas Chromatograph

Michell Instruments adopts a continuous development programme which sometimes necessitates specification changes without notice.  
Issue no: Pura Transmitters\_99208\_V1.1\_EN\_1023