

With Xentaur
HTF™ Al₂O₃ Technology



High-Speed Portable Dewpoint Meter



**QUICK AND PRECISE SPOT CHECKS OF MOISTURE
(-148°F to +68°F Dewpoint)**

<http://www.xentaur.com>

Portable Moisture Meter Model XPDM

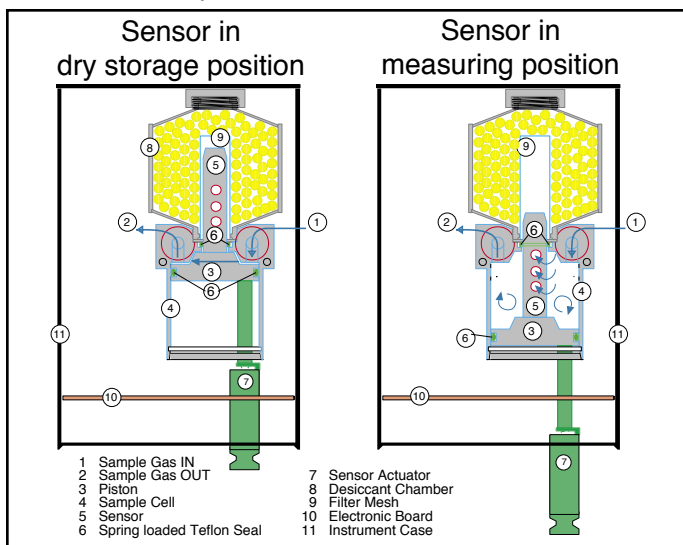
The portable Dewpoint Meter Model XPDM is a battery operated, hand-held instrument, designed for situations where quick and accurate dewpoint measurements have to be made. With the XPDM, accurate spot-checks of moisture in air or gases can be made faster and easier than ever, over the range of -148°F to +68°F (-100°C to +20°C) dewpoint.

Applications

Important uses of the XPDM include: petrochemical, feedstock gases, instrument air, transformer and switch gear insulating gases, gas cylinders and separations, welding gases, shipboard LNG and aviation oxygen, transfer standard, custody transfer.

Operating Principle

Aluminum oxide sensors adsorb much faster than they desorb water molecules. It is therefore an advantage, if at the beginning of the measurement the sensor is dryer than the sample to be measured. The XPDM keeps the sensor in dry storage until the measurement is taken. The sensor slides directly from the dry storage into the sample cell, without ever coming in contact with ambient air. After the measurement is completed, the sensor slides back into the dry storage, where it is dried down for the next sample.



Dry Storage System

The diagram above shows the mechanical design of the XPDM dry storage sample cell system. The picture on the left shows the sensor immersed into the desiccant for dry storage. The sensor is separated from the desiccant by a very fine stainless steel mesh with a thickness of approximately 5 mil. Close proximity of the sensor to the desiccant is crucial for fast dry down. With the sensor in the dry storage position, the sample flows through the head space between the bottom of the sample cell and the sensor piston. In order to take a measurement, the gas outlet is blocked temporarily. The pressure of the sample flow pushes the piston and pulls the sensor into the sample cell, where it wets up quickly to the moisture content in the sample flow. An accurate reading can be

taken within 1 to 2 minutes. Afterwards, the sensor is pushed back into the dry storage position by means of the sensor actuator which protrudes through the front of the instrument.

Sample Cell Design

All surfaces in contact with the sample are made from 316 stainless steel and are electropolished to assure rapid equilibrium with the sample. Sensor and piston slide through spring-loaded PTFE seals protecting the sample cell as well as the desiccant cartridge from intrusion of wet air or gas.

The sample cell can measure gas flows of up to 20 liters per minute. The flow rate has no effect on the measurement. The pressure in the sample cell is near atmospheric and should not exceed 2 bar (28 psi).

The instrument computer gives a read out at sensor pressure as well as at any line pressure the user enters for the particular sample. No correction is needed for different gases.

Sample Connections

Sample connections can be made by means of a variety of different fittings, depending on the application. The primary port fittings are 1/4" VCO. The following table shows the recommended fittings for different dewpoint ranges and instrument uses:

Type of adapter	Range	Remarks
VCO to barbed hose	used above -85°F (-65°C)	Make sure sample flow rate is sufficient. Use PTFE hoses only.
VCO to VCO	All ranges	Where flexible connection is required, use flexible stainless steel hoses.
VCO to Swagelok	All ranges	Where rigid connections are acceptable.

Field Exchangeable Desiccant Cartridge

The desiccant cartridge and its connection to the sample cell have been designed for maximum gas tightness. The sensor movement between desiccant chamber and sample cell occurs with a minimum amount of gas transfer. Thus, the desiccant life is prolonged.

The desiccant can be replaced in the field in a matter of minutes, by simply exchanging the cartridge.



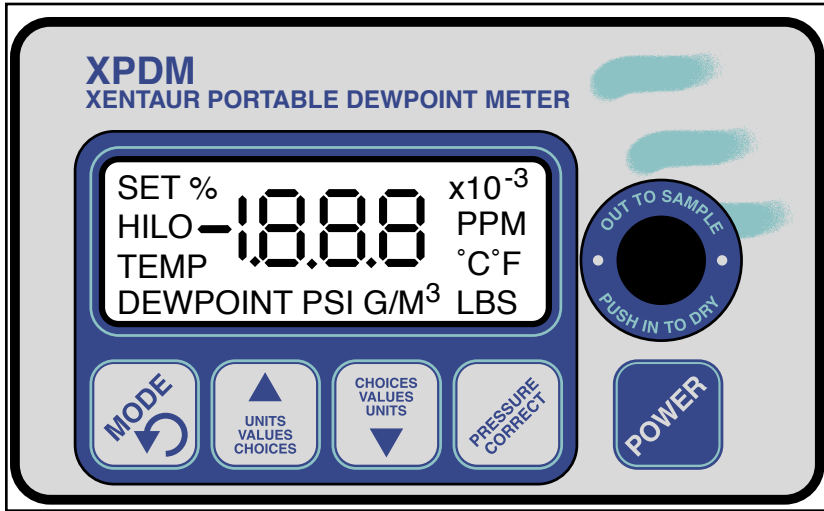
Automatic Field Calibration

Xentaur instruments can be field calibrated anywhere, anytime without cumbersome or expensive reference standards. Xentaur sensors saturate at a predesigned moisture level below +20°C and have a very low residual capacitance when dry. Therefore, the microprocessor calibrates by adjusting the maximum reading when the sensor is exposed to dewpoints above +20°C. There is no need to send the instrument back to the factory for recalibration, ever.

User Interface

The instrument is operated through a simple user interface consisting of a digital LCD display, and four push buttons.

The user can select from the following engineering units:



Actual size of front panel

Dewpoint in °C or °F, ppmv, g H₂O/m³ and lbs H₂O/ million scf.

Results are displayed at sensor pressure (atmospheric) or by pushing the Pressure Correct key at a user selectable alternative pressure, such as the line pressure.

Power Supply and Signal Outputs Option

The instrument is powered by a 9V battery which lasts for 100 hours of continuous operation. An automatic shut-off feature makes sure that the battery is not kept in use unnecessarily.

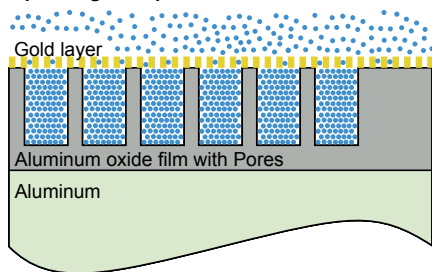
Optionally, the instrument can be equipped with an external power supply jack and signal output board. The instrument can then operate 15 -25 V AC or DC or a car battery adapter.

All signal outputs are isolated from the sensor. The analog output can be current or voltage. The RS-232 output can be easily connected to a PC or a modem.

Xentaur Hyper-Thin-Film (HTF) Al₂O₃™ Moisture Sensor Technology

The HTF Aluminum Oxide™ sensor installed in the model XPDM is the product of years of intensive research at Xentaur's laboratories. It offers significant performance advantages over all other aluminum oxide moisture sensors.

Operating Principle of Aluminum Oxide Sensor



The operating principle is similar to that of other aluminum oxide sensors: a hygroscopic layer of aluminum oxide absorbs or

releases water molecules within its pores, depending on the water vapor pressure in its environment. Thus, the electrical capacitance of the aluminum oxide layer changes with the surrounding water vapor pressure. The electrical capacitance is measured between the aluminum core of the sensor and a porous conductive gold layer on the outside.

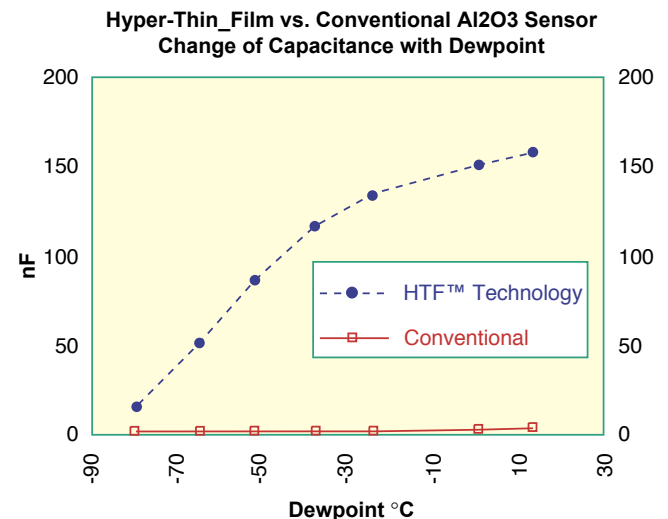
The advantage of the Xentaur sensor is a proprietary manufacturing method in which the aluminum oxide layer is made to be hyper thin as well as extremely hygroscopic. This results in a very sensitive sensor with fast response.

High Capacitance Response:

Due to the hyper thin film and a special activation pro-

cess, Xentaur sensors have a capacitance change over their full range, several orders of magnitude larger than that of conventional aluminum oxide sensors. Additionally, this change is quasi linear and its sensitivity to temperature is negligible.

The advantages of a linear high capacitance response are: **better sensitivity, better repeatability and faster response times.** Also, the measurement system is less prone to noise and drift, and signal conditioning is kept to a minimum.



Portable Dewpoint Meter Model XPDM

Technical Specifications:

Dewpoint Sensor element:

Type: Hyper Thin Film high capacitance AL2O3

Dew point range -148°F to +68°F (-100°C to +20°C)

Accuracy: ±5.5°F (± 3°C)

Repeatability: ±0.9°F (±0.5°C)

Response time*: For a step change
from -40°C to -60°C;
63% in 90 seconds
90% in 450 seconds

Temperature range:

 Sensor: -22°F to 120°F (-30°C to +50°C)

 Electronics: 14°F to 120°F (-10°C to +50°C)

Storage temperature: -4°F to +140°F (-20°C to +60°C)

Sample Flow range: Static to 100 m/s(linear velocity @1atm)

Calibration method: Automatic calibration, sensor saturates at dew points above +68°F (+20°C). NIST traceable factory calibration optionally available.

Temperature and Pressure Measurements:

The sample temperature is measured with a precision integrated circuit temperature sensor. Units may be optionally fitted with a pressure sensor.

Mechanical :

Enclosure Anodized Aluminum, Dimensions: 2.5" x 4.25" x 7.5". Regulator and Filter mounting facilities.

Sampling Chamber Electro-polished 316 stainless steel.

Moving Parts Seals: Spring energized PTFE seals.

Pressure operating range: Standard: 28 PSI (2 bar).
Absolute max.: 100 PSI (6.9 bar)

Gas sample connections: 1/4" VCO input and output ports.

Electrical connections: Optional 2mm DC power jack, 9 pin "D" for analog & RS-232.

Power Requirements: 9v battery and optional 15-25V AC or DC wall transformer.

Features:

Sensor Storage: When not in use the sensor is retracted in a molecular sieve container and kept at an approximate dewpoint of -80°C. The sample gas pressure activates a piston which automatically moves the sensor into the sampling chamber, thus even low dewpoints can be measured extremely quickly.

Input Resolution: 0.1°C dew point.

Indicators: LCD with backlight, 3.5 digits and custom legends for units and mode, audio alert.

Engineering Units: °C, °F, PPM, lbs.H2O/mm scf, gm.H2O/m3

Controls: 5 push buttons, all settings stored in EEprom. Manual Sensor Actuator.

Outputs: Optional 4/20mA or 0/24mA and RS-232.

Isolation: Sensor and case are isolated from the power supply , analog output and RS-232.

Battery saver: Auto power off after 6 minutes.

Pressure Correct: Programmable pressure correction button.

* These response times are not directly comparable to competitors data because of differences in measurement methodology and data presentation. Please inquire for detailed comparisons between Xentaur and other major sensor manufacturers.

For more detailed technical comparisons with other technologies visit:

<http://www.xentaur.com>

Warranty: 1 year for full workmanship and defective parts.



Xentaur Corporation
84F Horseblock Road
Fax.: (631) 345-3434 - e-mail: xentaur@xentaur.com
<http://www.xentaur.com>

Represented by:

Dr. Marino Müller AG
Process Control Instrumentation

welcome@muellerag.ch
Gewerbstrasse 9 CH-8132 Egg Switzerland
Tel. +41 44 986 29 29 Fax +41 44 986 29 39