

Precision Humidity Solutions



Cooled Mirror Instruments



Background to Michell Instruments

Michell Instruments is the international leader in the field of moisture and humidity measurement solutions. With over 30 years experience, Michell designs and manufactures a wide range of transmitters, instruments and system solutions capable of measuring trace moisture, humidity and dew point in a vast range of applications and industries including compressed air, power generation, process, oil and gas, pharmaceutical and many more.

With a fast growing international subsidiary and distribution network, the Michell Group provides solutions in moisture and humidity for the most demanding applications worldwide.

Michell uses three key dew point measurement technologies in its products:

- Impedance method using a ceramic tile which delivers unrivalled speed of response and robustness.
- Cooled Mirror method which has been incorporated into advanced, precision instruments for industrial and laboratory use.
- Dark spot technology, which was developed in partnership with Shell, to offer a world-class solution for the measurement of hydrocarbon dew point.

Precision Humidity Instruments

A comprehensive range of precision hygrometers based on the fundamental cooled mirror measurement principle. Accurate and repeatable water vapour measurement in applications from trace moisture to hot saturated gases is possible with Michell Instrument's range of Precision Hygrometers. With instruments suitable for National Standard references (S4000 and S8000) or for process applications in the pharmaceutical industry (Optidew) confidence in the measurement performance is assured.

Special Features

- **Fundamental Measurement Technique**
- **Excellent Measurement Stability**
- **Wide Measurement Range –100 to +130°C Dew Point**
- **Dynamic Contamination Correction to Ensure Balanced Mirror**
- **Comprehensive Range for Process and Calibration Applications**

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Precision Humidity Solutions



Optidew

- 0.2°C dp measurement accuracy precision hygrometer
- Fundamental measurement - zero drift
- Suitable for process applications
- IP66 industrial housing
- High temperature sensor version to 130°C
- Available as a blind transmitter or with local display



Optidew Vision

- Fundamental, accurate, repeatable drift free measurement performance
- Wide measurement range -40 to +90°C dp <0.5 to 100 % rh
- Dew point, temperature and relative humidity digital and analogue outputs
- 0.15°C dp accuracy option
- High temperature sensor version to 130°C



S4000

- Transfer standard reference instrumentation
- 0.1°C dp measurement accuracy
- UKAS accredited calibration as standard
- Wide measurement range -100 to +85°C dp
- Integral or remote sensors available



S8000

- Outstanding measurement performance
- 0.1°C dp measurement accuracy
- Super sensitive dual optics
- No additional cooling required for trace moisture measurements
- In built data logging



Why use Cooled Mirror Sensing Technology?

Michell Instruments manufactures hygrometers suitable for almost any application. So why choose one of our cooled mirror instruments rather than an impedance product or a process analyser? Below are some answers to consider.

Sensitivity – Michell's cooled mirror products detect minute changes in moisture down to the ppb range.

Accuracy – Cooled mirror technology is accurate to 0.1°C (S8000 and S4000 model).

Drift free – A cooled mirror sensor will measure consistently every time.

Calibration – The S8000, S4000 and Optidew can be used to calibrate relative humidity and dew point instruments. All Michell's products offer traceability to the major national and international standards laboratories.

Rugged – Michell's cooled mirror products are designed to withstand industrial use.

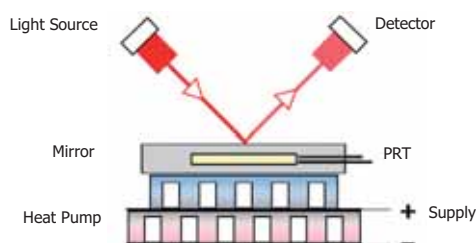
Fundamental – The optical condensation principle of dew point measurement has been established for centuries as the most fundamental method of determining the moisture content of a gas.

The Technology

In Michell's cooled mirror sensors, a miniature polished metal mirror is cooled by a solid state Peltier thermoelectric heat pump until it reaches the dew point of the gas under test. When this temperature has been reached, condensation will begin to form on the mirror surface.

An electro-optical loop, comprising a visible red light-emitting diode and a high gain photo-detector, detects that condensation is forming. A reduction in the intensity of light reflected from the mirror surface is used as a feed input into the instrument control electronics to modulate the cooling power applied to the Peltier.

The mirror surface is then controlled in an equilibrium state, whereby evaporation and condensation are occurring at the same rate. In this condition, the temperature of the mirror (measured by a platinum resistance thermometer) is equal to the dew point temperature of the gas.



Contamination Correction

All Michell's cooled mirror instruments incorporate an automatic compensation system that periodically re-balances the sensor optics to compensate for any reduction in light intensity caused by contamination.

Applications



- Air Dryers
- Environmental Chambers
- Power Generation
- Natural Gas
- Pure Gases
- Metrology Laboratories
- Plastics
- Aerospace
- Food / Beverage Processes
- Chemical
- Metallurgy / Heat Treating
- Petrochemical
- Automotive
- Drying Processes
- ... and many more

Optidew

Digital dew-point transmitter



Total Dew Point Range	-50 to +130°C
Optimal Dew Point Range	-40 to +110°C
Accuracy	±0.2°C standard ±0.15°C optional
Operating Temperature	-20 to +40°C
Pressure	to 25 MPa (250 Barg)

Optidew Vision

Precision laboratory dew-point hygrometer



Dew Point Range	-50 to +130°C
Optimal Dew Point Range	-40 to +110°C
Accuracy	±0.2°C standard ±0.15°C optional
Operating Temperature	-20 to +50°C
Pressure	to 25 MPa (250 Barg)

S4000 Remote

Laboratory standard dew-point hygrometer



Dew Point Range	-80°C to ambient
Optimal Dew Point Range	-50°C to ambient
Accuracy	±0.1°C
Operating Temperature	0 to +40°C
Pressure	to 0.1MPa (1 Barg)

S4000 Climatic

Precision reference dew-point hygrometer



Complete Dew Point Range	-80 to +85°C
Optimal Dew Point Range	-20 to +85°C
Accuracy	±0.1°C
Operating Temperature	0 to +40°C
Pressure	to 0.1MPa (1 Barg)

S4000 TRS

Calibration and dew-point hygrometer



Dew Point Range	-100 to +20°C
Optimal Dew Point Range	-90 to +20°C
Accuracy	±0.1°C
Operating Temperature	0 to +40°C
Pressure	to 0.1MPa (1 Barg)

S8000 Integrale

High performance dew-point meter



Dew Point Range	-65 to +40°C
Optimal Dew Point Range	-60 to +40°C
Accuracy	±0.1°C
Operating Temperature	0 to +40°C
Pressure	to 1.7 MPa (17 Barg)

***S8000 RS**

Laboratory standard dew-point meter



Dew Point Range	-85 to +40°C
Optimal Dew Point Range	-80 to +20°C
Accuracy	±0.1°C
Operating Temperature	0 to +40°C
Pressure	to 1.7 MPa (17 Barg)

*The S8000 RS will be available from November 2009

Cooled Mirror Instruments

Michell Instruments operates in the following markets:

- Compressed Air Dryers
- Pharmaceutical
- Standards Laboratories and Metrology
- Semiconductors
- Natural Gas and Petrochemicals
- Industrial and Pure Gas Production
- Power Generation

Other Product Ranges

Dew-Point Transmitters

Michell offers the largest grouping of dew-point sensors and transmitters on the market. From the basic Easidew 2-wire Transmitter to the new Pura Plus trace moisture event monitor for pure gases, all are supplied with sensors traceable to national standards.

Portable Instruments

Michell offers a group of easy to operate instruments designed for fast, accurate and stable measurement of dew point, relative humidity and moisture concentration rugged enough for demanding industrial applications.

Calibration Instruments

Michell offers a complete group of calibration systems for the certification of trace moisture, dew point and relative humidity sensors. From generators for producing a dry gas supply through the transfer standard reference instruments, the complete collection includes modular components for building a system to meet specific performance requirements.

Process Analysers

Michell offers a collection of analysers specifically designed to provide reliable measurements in process applications such as dedicated water and hydrocarbon dew point measurements in natural gas.

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Please note: The accuracy stated represents the typical variation between the instruments under test and a calibrated and corrected reference.

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