Optidew Vision

Optical Dew-Point Meter

A precision hygrometer, combining drift free measurement with the flexibility of a remote sensor. Ideal for laboratory and industrial measurements, or as a calibration reference.

Highlights

- Fundamental drift-free dew-point measurement
- Convienient, transportable package
- ±0.2°Cdp accuracy; optional higher accuracy available
- High temperature sensor option to +130°C
- NEMA-12 bench-top housing
- Display and output of multiple engineering units
- High pressure sensor option to 25 MPa (250 barg)

Applications

- Metrology laboratories
- Compressed air
- Environmental chambers
- Pharmaceutical
- Frost protection of turbine blades
- Fuel cell research
- Engine testing – high performance to commercial vehicle engines
- Power generation

Optidew Vision
Optical Dew-Point Meter

The Optidew Vision precision dew-point meter is based on the proven, fundamental optical dew-point measurement principle, giving long-term drift-free performance. It offers a wide measurement range from the equivalent of <0.5 to 100% RH at ambient temperature (dew point range: -40 to +90°C, and up to 130°C with high temperature option).

Robust Sensor Design

The Optidew Vision is supplied with remote dew-point and temperature sensors that can be mounted in a variety of ways to suit the application:

- Via a permanently installed sample port into which the remote sensor can be inserted or
- Via a sensor block immediately attached to the sensor around which the sample circulates or
- In an ambient environment where the sample is diffusing through the sensor

The dew-point sensor is available with single stage or dual stage peltier devices, giving an absolute depression from ambient temperatures of either 55 or 65°C respectively. The dual-stage peltier allows measurement of dew points as low as -40°C.

A number of different corrosion resistant mirror and sensor housing materials are available, to withstand aggressive sample components in the harshest of applications. High temperature (up to 130°C) and high pressure (up to 250 barg) sensor versions are available. Michell's technical team are always available to advise on the most appropriate choices for your process.

Optional 316 SS sensor housing for applications with high corrosives

Data Communication and Application Software

The instrument provides two linear 0/4-20 mA outputs and a choice of RS232 or RS485 serial communications, allowing configuration and monitoring by a suitable computer, data logger or other device. The comprehensive application software provides an interface to configure and control instrument functions, and enables all measured and calculated parameters to be graphed or logged over time. An adjustable isolated alarm contact allows the Optidew Vision to be used for direct process control.

Compact and Convenient Package

The smart bench-top enclosure for the Optidew Vision has a handle that doubles as a stand. An optional panel mounting kit is also available for 19" rack mounting. A bright and clear

2-line vacuum fluorescent display on the front panel enables the instrument parameters to be monitored even when not connected to the application software.

For the same great features of the Optidew Vision, in an industrial package, Michell also offers the Optidew, which is supplied in a rugged, wall mountable IP66 / NEMA 4 stainless steel enclosure.

As a Calibration Reference

The Optidew Vision is also an excellent entry level calibration reference, supplied as standard with a fully traceable in-house calibration or optional UKAS-certified calibration in our ISO17025 accredited laboratory. Its simple operation allows precision measurements to be made by an operator with the minimum of training. Simply connect the instrument, power it up and measurement will begin automatically.

Frost Assurance Technology (FAST)

Super-cooled water can exist at temperatures down to -30°C, and when formed on the mirror of a chilled mirror hygrometer can introduce errors of up to 10% in reading. All Michell Chilled Mirror products feature FAST, the frost assurance technology that guarantees all dew-point measurements below 0°C are made over ice. The FAST system works by rapidly cooling the mirror until a film of ice has formed on the mirror of pre-determined thickness – once ice has been formed, control returns to the instrument and measurement can begin.

Measurement Reliability – DCC

Dynamic Contamination Control (DCC) ensures that measurement accuracy and stability are maintained even when contamination is present on the surface of the mirror.

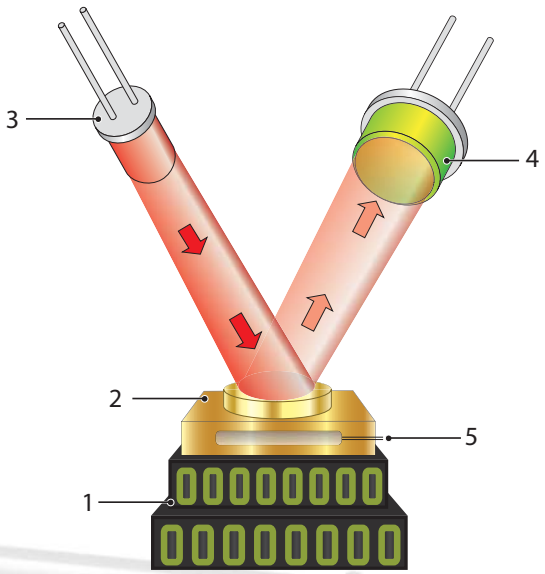
During the DCC process the mirror is heated to approximately 20°C above the sensor temperature to remove the condensation which has formed during measurement. The surface finish of this mirror, with the contamination which remains, is used by the optics as a reference point for further measurements. This removes the effect of contamination on accuracy.

For further protection, sintered stainless steel, porous membrane or HDPE sensor guard options are available. Each guard can also be used as a velocity limiter in high flow direct insertion applications.

Technology:
Chilled Mirror

Michell's chilled mirror hygrometers are precision instruments for critical measurement and control applications. Chilled mirror sensors measure a primary characteristic of moisture – the temperature at which condensation forms on a surface. This means that chilled mirror instruments:

- Have no drift: the temperature at which condensation forms is measured directly so there are no calculated variables that could shift over time
- Are inherently repeatable, giving reliable results every time



The chilled mirror sensor consists of a temperature controlled mirror and an advanced optical detection system.

The gas sample is passed over the surface of the polished mirror contained within the open sensor housing. At a temperature dependent upon the moisture content in the gas, and the operating pressure, the moisture in the gas condenses out on the surface of the mirror.

The optical system is used to detect the point at which this occurs. This information is used to control the mirror temperature and maintain a constant thickness of the condensation layer on the mirror surface.

A beam of light from an LED (3) is focused on the mirror surface (2) with a fixed intensity. As condensation forms on the mirror surface, its surface tension causes a scattering effect, resulting in less light being reflected. The level of reflected light is measured by a photo detector (4) and compared against the level of light reflected by a clean mirror.

The signals from this optics system are used to precisely control the drive to a solid state thermoelectric cooler (TEC) (1) which heats or cools the mirror surface. 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 PT100 platinum resistance thermometer (5), is equal to the dew-point temperature of the gas.

Our chilled mirror instruments prove their reliabilty on a daily basis in our production processes and service centres, as well as in our UKAS-accredited calibration laboratory.

Technical Specifications

Performance

Measurement accuracy*	±0.2°Cdp ±0.15°Cdp accuracy optional ±0.1°C temperature
Measurement units	°C, °F dew point; %RH; °C, °F temperature; g/m3; g/kg; aw; Δ (t – t dew point)
Response speed	1°C/sec plus settling time (dew point dependant)
Power supply	90 to 264 V AC OR 127 to 370 V DC, 47 to 440 Hz, 20 W max. Internally fused, 4A quick blow

Dew-Point Sensor

Sensor	1-Stage	2-Stage	High Temperature PEEK
Dew-point range	-30°Cdp @ sensor temperature of 20°C +90°Cdp @ sensor temperature of 90°C	-40°Cdp @ sensor temperature of 20°C +90°Cdp @ sensor temperature of 90°C	-40°Cdp @ sensor temperature of 20°C +130°Cdp @ sensor temperature of 130°C
Temperature range	-40 to +90°C	-40 to +90°C	-40 to +130°C
%RH range	<2 to 100%	<0.5 to 100%	<0.5 to 100%
Min measured dew point @ 20°C	-30°C	-40°C	-40°C

Mirror material options	Gold plated copper (standard) Gold stud 316 stainless steel stud* Platinum stud* **Recommended for special applications only, consult Michell Instruments before ordering*
Sensor body material options	Acetal (standard) High temperature PEEK 316 stainless steel* Anodized aluminum* **Recommended for special applications only, consult Michell Instruments before ordering*
Temperature measurement	4 wire Pt100, 1/3 DIN class B
Sample flow	0.1 to 2 Nl/min (in sampling block)
Maximum velocity	10 m/sec direct insertion 30 m/sec with sintered guard
Pressure	Standard unit: 2 Mpa / 20 barg (max) Ingress Protection: IP66 High Pressure version: 25 Mpa / 250 barg (max) Ingress Protection: IP65
Cable length	2m; 50m maximum (up to 250m on special request)

Remote PRT

Temperature measurement	4 wire Pt100, 1/10 DIN class B
Cable length	2m; 50m maximum (up to 250m on special request)

Transmitter Electronics

Resolution	0.1 for °C, °F and %RH 0.01 for g/m^3 and g/kg
Outputs	
Analog	4-20 mA or 0-20 mA over user-settable output Accuracy: ±0.2°C; 500 Ω maximum load resistance
Digital	RS232 @ 9600 baud rate
Alarm	Volt free contact, max 2 A @ 30 V DC, 0.5 A @ 120 V AC
Status LEDs	DCC/Alarm Status
Operating temperature	-20 to +50°C ambient
Enclosure	Standing case with carry handle Panel mounting kit optional
Ingress protection	IP54 (NEMA 2)
Cable pack	Mains, RS232 cable and output connector

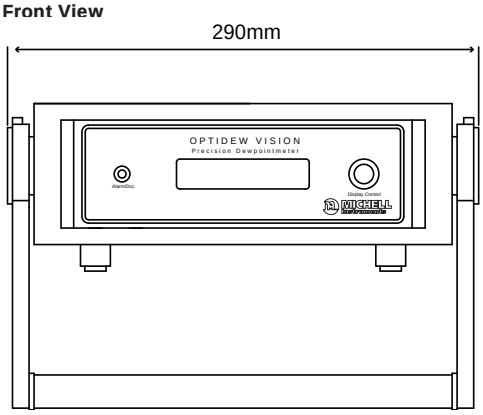
General

Calibration	4-point traceable in-house calibration as standard, UKAS accredited calibrations optional – please consult Michell Instruments

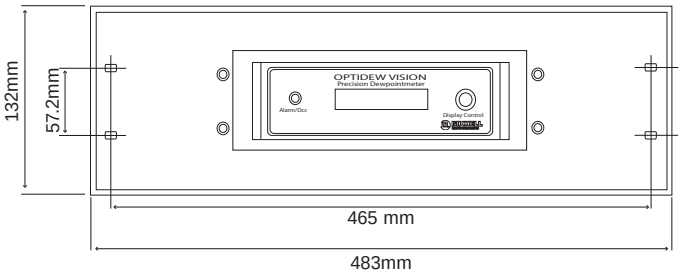
Measurement accuracy means maximum deviation between instrument under test and corrected reference. To this must be added the uncertainties associated with the calibration system and the environmental conditions during testing or subsequent use.

Dimensions

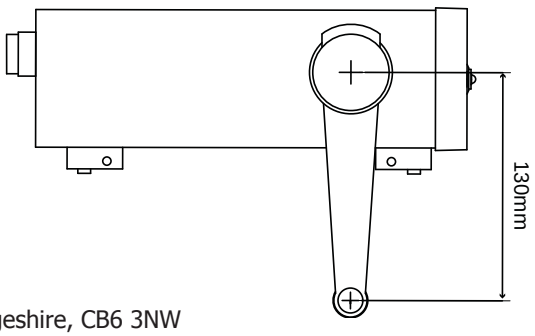
Front View



Front with Panel Mount Kit



Side View



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