

# MDM300 & MDM300 I.S.

## Advanced Dew-Point Hygrometer

A high-speed portable dew-point hygrometer, offering rapid spot-check measurements of dew point or moisture content in many applications, including compressed air, natural gas and high-voltage switchgear quench gas. This lightweight ATEX, IECEx, UKCA, cQPSus, and EAC Ex certified product allows more measurements per working hour than any other comparable product. A hard-wearing but ergonomic case and an easy-to-use interface allows comfortable and practical operation in the toughest industrial environments.



### Highlights

- Repeatedly fast measurements at low pressure from less than 15 minutes for T95 to -60 °C (-76 °F)
- Higher pressure measurements possible up to 350 barg (5076 psig)
- Long battery life: up to 48 hours of typical use between charges
- Intuitive application kits allow quick and straightforward connection to your sample point
- Durable, yet easy to handle and operate: designed for use in industrial environments
- Lightweight: less than 1.5kg (3.3lb)
- 13-point traceable calibration certificate

### Applications

- Dew point in natural gas processing and pipelines
- Monitoring of desiccant dryers for compressed air or plastic moulding equipment
- Moisture measurement in high-voltage switchgear quench gas
- Moisture measurement in petrochemical refineries
- Industrial gas production and transportation
- Medical gas quality
- Dew-point measurement in metallurgical applications



## MDM300 & MDM300 I.S.

### The Reliable Spot Checking Portable

Ideal for spot checks of dew point or moisture content, the MDM300 & MDM300 I.S. include all the features needed for efficient work. An extremely fast response and accurate, stable measurement are complemented by an instrument which is easy to use, has data-logging and built in sampling components as standard. The instrument can be supplied with a range of accessories including sampling systems and a professional carry case. For use in Hazardous Areas, the MDM300 I.S. is fully certified in accordance with ATEX, IECEx, UKCA, USA, Canadian & EAC Ex - TR CU 012 requirements. Refer to the specification section for full product approval codings. The MDM300 and MDM300 I.S. are both IP66/ NEMA 4 rated, and therefore suitable for demanding outdoor applications.

### Measurement Range

The MDM300 series can provide measurement to  $-60^{\circ}\text{C}$  ( $-76^{\circ}\text{F}$ ) dew point in gases at atmospheric pressure in less than 15 minutes (30 minutes to  $-60^{\circ}\text{C}/-76^{\circ}\text{F}$  dew point for MDM300 I.S.). This, combined with no required waiting time between measurements, allows the user to take many readings per day, increasing efficiency and reducing costs when compared to other instruments on the market.

### Easy of Use

The rugged but ergonomic design of the MDM300 series combines industrial durability with comfortable one or two-handed operation. The intuitive menu system and large, easy-to-press buttons enable the user to easily configure the instrument to display the parameters they require, even with gloved hands.

### Measurement Performance

Best-in-class accuracy of  $1^{\circ}\text{C}$  ( $1.8^{\circ}\text{F}$ ) dew point ( $-60...+20^{\circ}\text{C}/-76...+68^{\circ}\text{Fdp}$ ) gives the user improved measurements. Every instrument undergoes a 13-point calibration over a period of 10 days and all calibration certificates are traceable to national standards via the NPL (UK) and NIST (USA).

In addition, the MDM300 series can be used to check and recalibrate Michell Easidew dew-point transmitters, affording the user the benefit of a verification without the associated downtime.

### Sampling Solutions

The MDM300 series offers versatile sampling arrangements ranging from simple fixed orifices for low pressure measurement to configurable high-pressure sampling systems up to 350 barg (5076 psig). A number of application kits are available providing out-of-the-box sampling systems specifically for the most popular applications. Please contact Michell Instruments for further details.

### Hazardous certifications

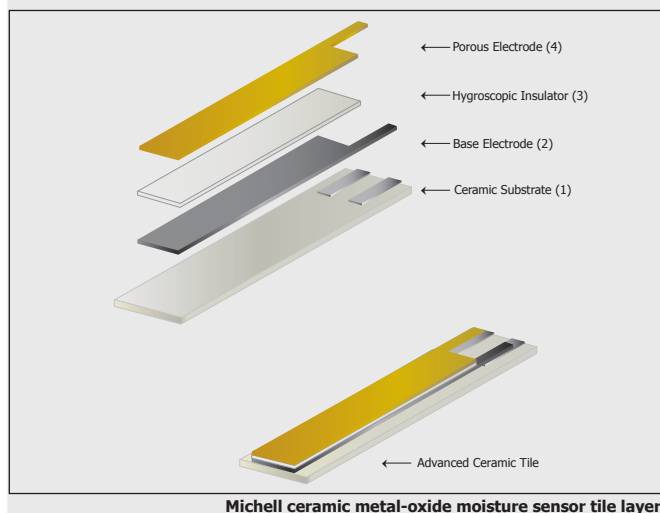
The MDM300 I.S. has been certified by ATEX & IECEx, cQPSus and EAC for use in hazardous areas. This is the perfect portable instrument for use in natural gas plants, petrochemical refineries, offshore platforms and a range of other hazardous areas.



### Sensing Technology

The MDM300 uses Michell's highly developed ceramic metal-oxide moisture sensor, which is constructed using state-of-the-art thin and thick film techniques. Operation of the sensor depends upon the adsorption of water vapor into a porous non-conducting 'sandwich' between two conductive layers built on top of a base ceramic substrate. The active sensor layer is very thin – less than one micron and the porous upper layer that allows transmission of water vapor into the sensor is less than one nano-metre.

The resulting sensor responds rapidly to changes in moisture – both in measuring humidity and also when being dried. It is very rugged and gives  $1^{\circ}\text{C}$  dew-point accuracy coupled with excellent long-term reliability and stability.



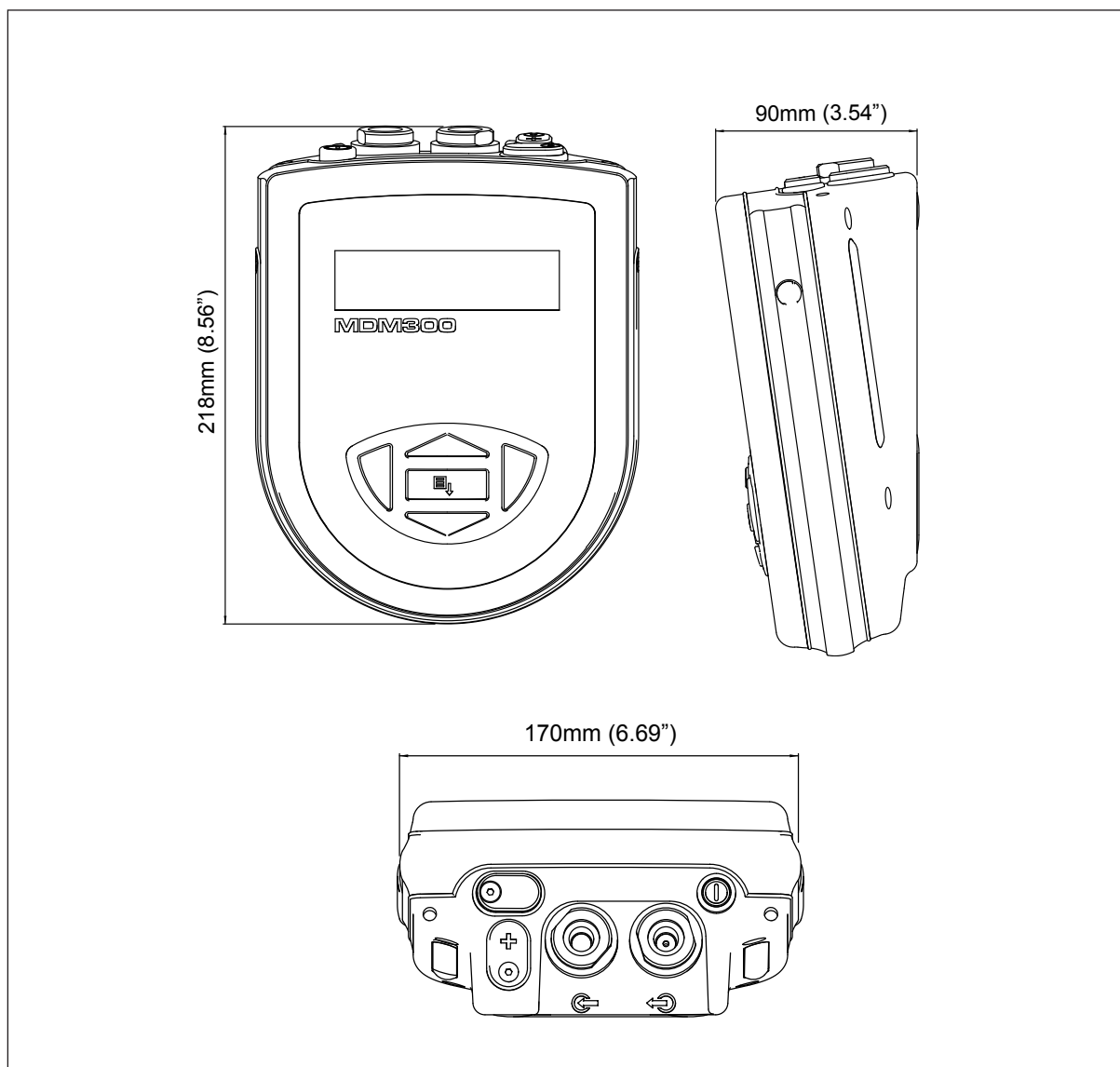
Michell ceramic metal-oxide moisture sensor tile layers

# Technical Specifications

| Product                          | MDM300                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | MDM300 I.S.                                                                                                                                                                                                                                                                                                                                                                                        |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Performance</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                    |
| Measurement technology           | Michell ceramic metal-oxide moisture sensor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                    |
| Accuracy                         | $\pm 1\text{ }^{\circ}\text{C}$ ( $\pm 1.8\text{ }^{\circ}\text{F}$ ) from $-60\text{ }^{\circ}\text{C}$ to $+20\text{ }^{\circ}\text{C}$ ( $-76\text{ }^{\circ}\text{F}$ to $+68\text{ }^{\circ}\text{F}$ ) dew point<br>$\pm 2\text{ }^{\circ}\text{C}$ ( $\pm 3.6\text{ }^{\circ}\text{F}$ ) from $-100\text{ }^{\circ}\text{C}$ to $-60\text{ }^{\circ}\text{C}$ ( $-148\text{ }^{\circ}\text{F}$ to $-76\text{ }^{\circ}\text{F}$ ) dew point<br>$\pm 0.2\text{ }^{\circ}\text{C}$ ( $\pm 0.36\text{ }^{\circ}\text{F}$ ) temperature |                                                                                                                                                                                                                                                                                                                                                                                                    |
| Calibrated range                 | $-70\text{ }^{\circ}\text{C}$ to $+20\text{ }^{\circ}\text{C}$ ( $-94\text{ }^{\circ}\text{F}$ to $+68\text{ }^{\circ}\text{F}$ ) dew point<br>$-100\text{ }^{\circ}\text{C}$ to $-70\text{ }^{\circ}\text{C}$ ( $-148\text{ }^{\circ}\text{F}$ to $-94\text{ }^{\circ}\text{F}$ ) dew point                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                    |
| Spot checks:                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                    |
| Online analysis:                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                    |
| Uncalibrated readings from       | $+20\text{ }^{\circ}\text{C}$ to $+30\text{ }^{\circ}\text{C}$ ( $+68\text{ }^{\circ}\text{F}$ to $+86\text{ }^{\circ}\text{F}$ ) dew point                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                    |
| Measurement units                | $^{\circ}\text{C}$ , $^{\circ}\text{F}$ , K dew point & gas temperature ppm <sub>v</sub> , ppm <sub>w</sub><br>for air, N <sub>2</sub> , CO <sub>2</sub> , SF <sub>6</sub><br>% RH, g/m <sup>3</sup> , g/kg                                                                                                                                                                                                                                                                                                                                | $^{\circ}\text{C}$ , $^{\circ}\text{F}$ , K dew point & gas temperature<br>ppm <sub>w</sub> & g/kg for air, N <sub>2</sub> , H <sub>2</sub> , CO <sub>2</sub> , SF <sub>6</sub><br>ppm <sub>v</sub> , lb/mmscf & g/m <sup>3</sup> for natural gas<br>ppm <sub>v</sub> , g/m <sup>3</sup> & % rh                                                                                                    |
| Resolution (display)             | 0.1 for all dew-point derived units and autoranging where appropriate                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                    |
| Resolution (measurement)         | Better than $0.1\text{ }^{\circ}\text{C}$ ( $0.18\text{ }^{\circ}\text{F}$ ) dew point                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                    |
| Typical response speed           | T95 in $\leq 15$ minutes to $-60\text{ }^{\circ}\text{C}$ ( $-76\text{ }^{\circ}\text{F}$ ) dew point                                                                                                                                                                                                                                                                                                                                                                                                                                      | T95 in $\leq 30$ minutes to $-60\text{ }^{\circ}\text{C}$ ( $-76\text{ }^{\circ}\text{F}$ ) dew point                                                                                                                                                                                                                                                                                              |
| <b>Electrical Input/Output</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                    |
| Battery type                     | NiMH 4.8V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                    |
| Battery operating Life           | Up to 48 hours of typical usage between charges                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Up to 24 hours of typical usage between charges                                                                                                                                                                                                                                                                                                                                                    |
| Battery charger                  | Intelligent charger (supplied)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Intelligent charger (charger not certified for hazardous area use)                                                                                                                                                                                                                                                                                                                                 |
| <b>Operating Conditions</b>      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                    |
| Operating pressure               | 350 barg (5076 psig) max                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                    |
| Operating environment            | Outdoors 0...+100% rh condensing                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                    |
| Operating temperature            | $-20\text{ }^{\circ}\text{C}$ to $+50\text{ }^{\circ}\text{C}$ ( $-4\text{ }^{\circ}\text{F}$ to $+122\text{ }^{\circ}\text{F}$ )                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                    |
| Storage/transport temperature    | $-20\text{ }^{\circ}\text{C}$ to $+50\text{ }^{\circ}\text{C}$ ( $-4\text{ }^{\circ}\text{F}$ to $+122\text{ }^{\circ}\text{F}$ )                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Mechanical Specifications</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                    |
| Display                          | Blue LCD graphical display                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                    |
| Enclosure type                   | Steel fiber-loaded high-impact polyamide 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                    |
| IP/NEMA rating                   | IP66/NEMA 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                    |
| Gas connections                  | 1/8" NPT female (other options available)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                    |
| Flow across sensor               | 0.2...1.2 NI/min                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 0.2...0.5 NI/min                                                                                                                                                                                                                                                                                                                                                                                   |
| Gas wetted materials             | AISI 316L stainless steel                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | AISI 316L stainless steel, PTFE Seal, Borosilicate glass, ceramic                                                                                                                                                                                                                                                                                                                                  |
| Outline dimensions               | 218mm x 170mm x 90mm (8.58" x 6.69" x 3.54") (d x w x h)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                    |
| Weight                           | 1.35kg (2.98lb)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1.5kg (3.3lb)                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>General</b>                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                    |
| Data logging                     | 8 megabytes; Log interval: 5...60 sec; Logs per log file: Up to 10,000                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                    |
| Communications                   | (Wireless) Bluetooth™ range up to 5m (version 2.0)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                    |
| User interface languages         | English, French, German, Italian, Portuguese, Spanish                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Certification Codes</b>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                    |
|                                  | CE<br>UKCA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ATEX/UKCA: II 1G Ex ia IIC T4 Ga ( $-20\text{ }^{\circ}\text{C}$ ... $+50\text{ }^{\circ}\text{C}$ )<br>IECEx: Ex ia IIC T4 Ga ( $-20\text{ }^{\circ}\text{C}$ ... $+50\text{ }^{\circ}\text{C}$ )<br>TR CU Ex: 0Ex ia IIC T4 Ga<br>cQPSus: Class I, Division 1, Groups A B C D, T4<br>Class I, ZONE 1, AEx/Ex ia IIC Ga T4<br>( $-20\text{ }^{\circ}\text{C}$ ... $+50\text{ }^{\circ}\text{C}$ ) |

\* The end user has a responsibility to ensure that when installed in the Hazardous Area, the system is compliant with relevant local and international installation Standards for the use of equipment in explosive atmospheres.

## Dimensions



## Related Products



**Easidew Online**  
Dew-Point Hygrometer



**MDM50**  
Portable Hygrometer



**Optidew 501**  
Chilled Mirror Hygrometer



**S8000 RS**  
High Precision Chilled  
Mirror Hygrometer



**ES20**  
Compact Sampling System

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