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New cooled mirror hygrometer for anti-icing systems of gas Turbines

The new generation of the Optidew Hygrometer from Michell Instruments was designed especially for applications in anti-icing systems for stationary gas turbines. In power generation plants located in environments with low temperatures and high relative humidity, there is a risk of ice forming in the air intake systems, leading to many potential problems. Firstly the accumulation of ice on the filter elements will block the filter and lead to loss of power through a drop of pressure and reduced mass flow. In turn this will lead to reduced thermal efficiency. In extreme cases, chunks of ice may be ingested into the compressor and cause physical damage to the turbine.

Protecting against icing is vital to prolonging the life and efficiency of the gas turbine. Ice protection systems vary between de-icing and anti-icing, the latter usually featuring a precision hygrometer such as the new Optidew for Anti-icing Systems.

Applying the fundamental cooled-mirror measurement principle, it delivers a repeatable, drift-free dew point or relative humidity measurement. The robust design of the new Optidew hygrometer for anti-icing systems is capable of withstanding the most demanding conditions and guarantees minimal maintenance while retaining the performance and sensitivity of a high-level laboratory reference hygrometer. When compared to a traditional polymer RH probe, the Optidew Anti-icing version offers far better accuracy and stability.

The new Optidew hygrometer for anti-icing systems has a wide dynamic measurement range from -40°F to $+105^{\circ}\text{F}$ dew point over a temperature range of -5°F to $+105^{\circ}\text{F}$ and was successfully tested in the extreme atmospheric conditions. Optidew for anti-icing provides two 4-20 mA output signals, configurable through the instrument's interfacing software to dew point and temperature or relative humidity and temperature. The RS232 interface allows connection to custom data logging and configuration software, operating under a Windows™ environment.

Optidew's design also takes into account contamination, which can compromise the accuracy of many cooled mirror dew-point meters, and as such, features Michell's state of the art Dynamic Contamination Correction (DCC) System. The DCC System automatically eliminates any error that may be caused by mirror particle contamination, and intelligently adapts itself to accommodate even the dirtiest of processes.

For more information contact: us.info@michell.com

** Please see next page for Technical Specifications*

Technical Specifications for the Optidew Anti-Icing System



Performance

Measurement Technology: Chilled Mirror

Dew point measurement range

(at temperature of 21°C):

1 stage: -30 to +40°C dew point

(-22 to +104°F dew point)

2 stage: -40 to +40°C dew point

(-40 to +104°F dew point)

Measurement accuracy:

Dew point: $\pm 0.2^{\circ}\text{C}$ ($\pm 0.36^{\circ}\text{F}$)

Ambient Temperature: $\pm 0.1^{\circ}\text{C}$ ($\pm 0.18^{\circ}\text{F}$)

Measurement units:

$^{\circ}\text{C}$, $^{\circ}\text{F}$ dew point, %RH $^{\circ}\text{C}$, $^{\circ}\text{F}$, temperature;

gm-3; gkg-1; aw; $\Delta(t\text{-tdp})$

Measurement resolution:

0.1 for $^{\circ}\text{C}$, $^{\circ}\text{F}$ and %RH

0.01 for gm-3 and g/kg-1

Electrical input/output

Power supply: 220/240V, 50Hz or 100/120V; 60Hz

Analog output: Two channels: 4-20mA or 0-20mA

Digital communications: RS232 (RS485 optional)

Alarm Relay: 2A @ 30Vdc

Operating conditions

Sample flow rate: 0.5l/m (in sample block) (1 scfh)

Operating temperature: -20 to +40°C (-4 to +104°F)

Mechanical specification

Housing: Stainless Steel enclosure with clear viewing window

Ingress Protection: IP66 (NEMA 4)

Display: 2 line vacuum fluorescent display

Sampling method: Diaphragm suction pump

Filtration: Particulate filter

Gas connections: 6mm O.D. Stainless Steel tube (0.24 inch)

Dimensions: 600 x 600 x 210 mm

(23.62 x 23.62 x 8.27 inch)