KAHN Hygrometers

Optisure Hygrometer

An optical (chilled mirror) hygrometer for determining dewpoint using a fundamental measurement technology

- NIST Traceable
- Analog and Digital Outputs
- Intuitive Touchscreen Display
- Dewpoint Accuracy of ±0.18°F
- Data Logging to USB or SD Card
- -130°F to +248°F Dewpoint Range
- Guaranteed Frost Formation Below 0°C
- Bench or 19 Inch Rack Mount Configuration
- Fundamental, Accurate, Drift-Free Measurement

Optisure Integrale

Optisure Remote

General Description

The NIST-traceable Optisure product family provides a fundamental and therefore highly accurate and reliable method of continuously measuring the dewpoint temperature of a gas sample. This instrument features fast response, a clear readable touchscreen with a simple, intuitive customer interface. Available in models that can measure dewpoints as low as -130°F and as high as +248°F, the Optisure offers unmatched accuracy (±0.18°F) in dewpoint measurements of air and gas systems.

The heart of the Optisure is a sensor head that has an advanced optics system offering excellent measurement sensitivity and accuracy. The sensor head also features built-in compensation for sample gas temperature and is easily accessible for mirror inspection and cleaning. An innovative frost assurance system eliminates any ambiguity in determining ice versus super-cooled water formation. The high-resolution LCD display is divided into sections. Measured or calculated operational data, such as temperature, dewpoint, ppm, relative humidity, pressure, flow rate and others are shown in large horizontal panes. Status of measurement and instrument output, such as instrument operating phase, dewpoint stability, sensor operating mode, process alarm state and mirror contamination level are also shown.

Operating Principle

A chemically resistant, polished gold-plated copper mirror is thermally bonded to a two or three-stage Peltier thermoelectric heat pump. The temperature of the mirror is controlled by applying a direct current to the heat pump. The heat pump cools the mirror surface until condensation begins to form. This condensation causes a corresponding reduction in the reflected light intensity seen by the photodetectors. Closed loop control of the system results in rapid equilibrium of the mirror surface at the precise temperature at which condensation starts to form. This is, by definition, the dewpoint (or frostpoint) of the gas under test and is measured by the instrument directly with a highly accurate 100 Ω platinum resistance thermometer embedded within the mirror. This measurement technique is the reason the Optisure is characterized as using a fundamental method of determining dewpoint.

On the Optisure Integrale and Optisure RS models, two photo detectors are used: one measures reflected light, the other scattered light. Using the differential of the outputs from these two photodetectors, the exact temperature that dew or frost forms can be measured. By using two photodetectors, the thinnest possible condensation films can be detected, yielding faster response times and greater repeatability.

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Models

All models feature dewpoint and temperature sensors.

Optisure Integrale — Dewpoints to -76ºF with internal dewpoint sensor

Optisure Remote Hygrometer — Remote sensor with up to 33-foot cable Dewpoints to +248ºF

Optisure RS Hygrometer — Dewpoints to -130ºF with internal dewpoint sensor

Measurement Reliability

To alleviate the problems of measurement accuracy due to contamination, the Optisure includes an improved contamination compensation system. The enhanced Dynamic Contamination Correction (DCC) automatically eliminates any error that may be caused by mirror particulate contamination. This feature extends operation in harsh or dirty environments without the need to stop the process to manually clean the mirror. Although the DCC system is fully automatic, it can be user configured to accommodate your own process conditions.

Installation

The Optisure hygrometer models are supplied in a horizontal bench-top enclosure. In addition, panel mounting brackets (Integrale model) are available as an optional feature allowing the instrument to be installed in a 19 inch instrument rack. Included are ¼" NPT inlet and outlet ports to accept the sample gas tubing (not applicable to Optisure Remote). The inlet gas port of the Optisure RS model is a VCR fitting to minimize moisture ingress in the low dewpoint model.

SPECIFICATIONS

Display:
High resolution backlit LCD touchscreen

Measurement Units:
Humidity: °Fdp, °Cdp, PPMv, PPMw for SF_6, %RH, g/kg, g/m^3
Temperature: °F, °C
Flow: ml/min (excluding Remote model)
Pressure: PSIG, barg, KPa, MPa

Accuracy:
Dewpoint ±0.18°F
Temperature ±0.18°F

Resolution:
To 0.001 depending on measurement unit

Configuration:
Integrale: 19 inch rack mount
Remote and RS: Horizontal bench

Repeatability:
±0.09°F

Flow Sensor:
Internal (excluding Remote model)
0-1000 Milliliters/minute

Dewpoint Sensor Location:
Internal (excluding Remote model)

Outputs:
Analog: 4-20 mA, 0-20 mA, 0-1 VDC
Digital: USB, SD Card
Alarm: Process alarm and fault alarm relays, 1A 30VDC

Power Requirements:
85 to 264 VAC, 47/63 Hz
100 Watts (Integrale, Remote)
125 Watts (RS)

Options:
Microscope
Transportation case
Built-in pressure sensor
Built-in pump assembly
Ethernet, RS232, RS485
19 inch rack mount (RS)

	Optisure Integrale	Optisure Remote	Optisure RS80	Optisure RS90
Dewpoint Range	-76°F to +104°F	-40°F to +248°F	-112°F to +68°F	-130°F to +68°F
Operating Temp.	Sensor: -4°F to +104°F Monitor: -4°F to +104°F	Sensor: -40°F to +248°F Monitor: -4°F to +122°F	Sensor: +41°F to +86°F Monitor:+41°F to +86°F	Sensor: +41°F to +86°F Monitor:+41°F to +86°F
Operating Pressure	0 to 290 PSIG	0 to 3625 PSIG	0 to 145 PSIG	0 to 145 PSIG
Sample Flow Rate	0.2 to 2 SCFH	0.2 to 4 SCFH	1 to 2 SCFH	1 to 2 SCFH
Cooling Rate	3.6°F/Second	1.8°F/Second	3.6°F/Second	3.6°F/Second
Weight	24.3 Pounds	9.25 Pounds	49.4 Pounds	49.4 Pounds
Dimensions (HxWxD)	7.3" x 19.0" x 14.5"	7.5" x 10.0" x 8.4"	7.5" x 17.5" x 21.7"	7.5" x 17.5" x 21.7"

Number 062218 Optisure Printed in USA

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