

KAHN Hygrometers

Optisure Hygrometer

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

- NIST Traceability
- Analog and Digital Outputs
- Intuitive Touchscreen Display
- Dewpoint Accuracy of $\pm 0.18^\circ\text{F}$
- Data Logging to USB or SD Card
- -130°F to $+194^\circ\text{F}$ Dewpoint Range
- Guaranteed Frost Information Below 0°C
- Horizontal 19 Inch Rack Mount Configuration
- Fundamental, Accurate, Drift-Free Measurement

General Description

The 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 $+194^\circ\text{F}$, the Optisure offers unmatched accuracy ($\pm 0.18^\circ\text{F}$) in dewpoint measurements of air and gas systems.

The heart of the Optisure is a new sensor head that has an advanced optics system offering excellent measurement sensitivity and accuracy. The new 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 two sections. Measured or calculated operational data, such as temperature, dewpoint, ppm, relative humidity, pressure, flow rate and others are shown in large horizontal panes on the left side of the display. Status of measurement and instrument output, such as instrument operating phase, dewpoint stability, sensor operating mode, process alarm state and mirror contamination level are shown on the right side of the display.



Optisure Integrale



Optisure Remote Hygrometer

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 $100\ \Omega$ 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.

Models

All models feature dewpoint and temperature sensors.

Optisure Integrale Dewpoints to -76°F with internal dewpoint sensor

Optisure Remote Hygrometer Remote sensor with up to 10 meter cable
Dewpoints to +194°F

Optisure RS Hygrometer Dewpoints to -130°F with integral dewpoint sensor and intuitive touch screen display

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. DCC is a self-learning system that adapts itself to the user's specific operating conditions. 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 incorporated as a standard feature allowing the instrument to be installed in a 19 inch instrument rack. Included are 1/4" 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 for Integrale and RS

Measurement Units:

Humidity: °Fdp, °Cdp, PPMv, PPMw for SF₆, %RH, g/kg, g/m³
Temperature: °F, °C
Flow: ml/min (excluding Remote model)
Pressure: PSIA, MPa, KPa, BarA

Accuracy:

Dewpoint ±0.18°F
Temperature ±0.18°F

Resolution:

To 0.001 for all measurement units
0.01 for Optisure Remote

Configuration:

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

Repeatability:

±0.09°F

Flow Transducer:

Integral (excluding Remote model)
0-1000 Milliliters/minute

Sensor Location:

Integral (excluding Remote model)

Outputs:

Analog: 4-20 mA, 0-20 mA, 0-1 VDC
Digital: USB, SD Card
Alarm: Relays

Power Requirements:

85 to 264 VAC, 47/63 Hz

Options:

Microscope
Transportation case
Built-in pressure transducer
Built-in pump assembly
Ethernet, RS232, RS485

	Optisure Integrale	Optisure Remote	Optisure RS80	Optisure RS90
Dewpoint Range	-76°F to +104°F	-40°F to +194°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: +14°F to +194°F Monitor: -4°F to +104°F	Sensor: +41°F to +86°F Monitor: +41°F to +104°F	Sensor: +41°F to +86°F Monitor: +41°F to +104°F
Operating Pressure	Vacuum to 290 PSIG	Vacuum to 3600 PSIG	Vacuum to 145 PSIG	Vacuum 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	18.1 Pounds	37.5 Pounds	37.5 Pounds
Dimensions (HxWxD)	7.3" x 19" x 14.5"	7.1" x 17.3" x 21.7"	7.1" x 17.3" x 21.7"	7.1" x 17.3" x 21.7"

NOTE: The information included herein was correct at the time of publication and supercedes all previous data. It is our policy to continually improve our products to insure even better performance. Consequently current Kahn products may incorporate modifications not shown on these pages.

Number 0116 Optisure Printed in USA

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