DEW POINT HYGROMETER
MODEL DPH-2020/2012

General Description

The DPH-2020 is a two stage dew point hygrometer using the chilled mirror principle to determine the absolute humidity of a gas in terms of its dew- or frost-point temperature. It was specifically designed for critical industrial process applications. A state-of-the-art digital control system maintains the sensor mirror at the equilibrium point—the point where a dew or frost layer is established on the mirror surface. A platinum resistance thermometer monitors the mirror temperature, which represents the dew- or frost-point temperature. Depending on the actual dew point, settling time from ambient may take a few seconds to one minute. Frost point measurements to –60°C or lower can be made. The high temperature Model DPH-2012 can make dew point measurements up to +120°C.

Features

- Rugged stainless steel sheeted mirror provides extra durability in industrial applications
- Convenient front panel digital readout
- Multi-stage/extend operating range
- Both analog and RS-232 serial outputs
- Two alarm limit relays for control use

Applications

Chilled mirror dew point hygrometers are used in a wide variety of industrial process-control and laboratory applications to ensure product quality, including:

- Real time process control for pharmaceutical, painting, plate glass, paper, and injection-molding production
- Production monitoring for dried foods and dry snack processing
- Monitoring of storage environments and special purpose rooms such as museums, warehouses, computer and clean rooms
- Manufacturing quality control for fabrication of sensitive electronic components such as semiconductors
- Building HVAC or air quality monitoring
- Heat treating furnace controls
- Sensor can be remotely located from electronics enclosure
- For very low dew point temperature applications, an integral chilled coolant loop can be used to extend the lower measurement limit of the system.

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BULLETIN DPH-2020/2012

DPH-2020/2012 Dew Point Hygrometer

Mechanical Configuration

The DPH requires a sample stream of air or gas. The sample enters and exits the sensor via 1/8 National Pipe Thread (NPT) ports. Flow rates should be maintained between 0.2 and 1.0 standard cubic feet per hour (SCFH). The sensor operates between temperatures of –60°C to +80°C. A front panel DPM indicates the current dew point temperature to the user and set point relay contacts are provided. A Windows application supports remote viewing or integration with SCADA systems. The DPH-2020 can run from AC line or 12Vdc battery power; the DPH-2012 requires AC power.

Maintenance

Unlike other sensors (polymer or aluminum oxide) that must be discarded once contaminated, a chilled mirror hygrometer can easily be cleaned to restore its performance. To restore proper operation of the sensor, the measurement chamber can be easily opened, inspected, and cleaned. A mirror microscope provides a means of inspecting the condition of the mirror prior to opening. The top of the sensor hinges open easily without tools via a single finger-operated spring clip. The cleanliness of the sample gas governs how often the mirror will need to be cleaned, but it is typically an interval from days-to-months.

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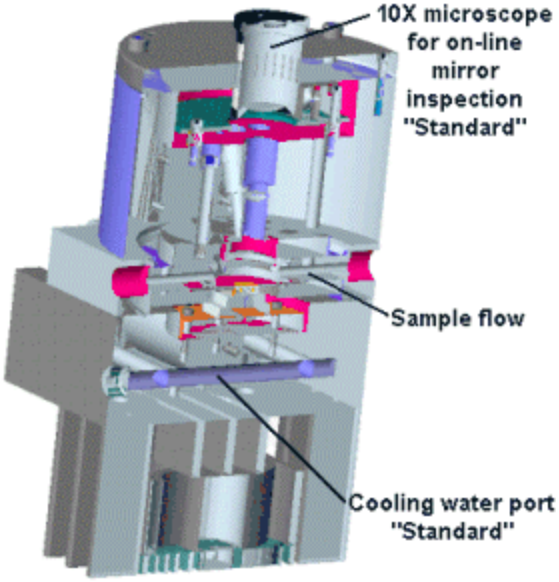
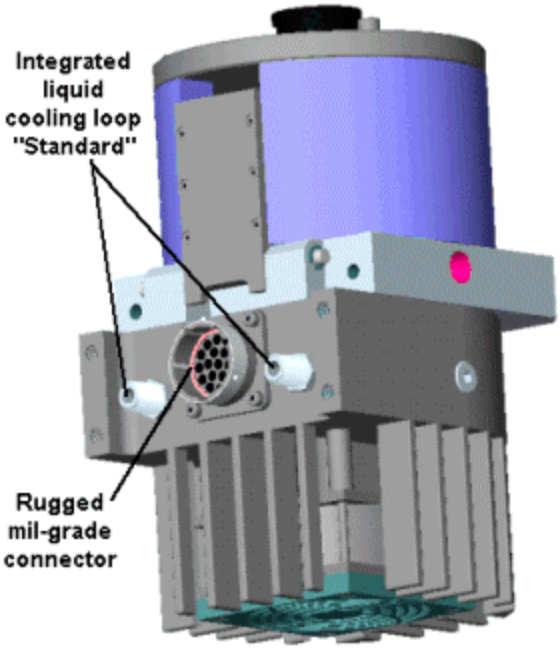
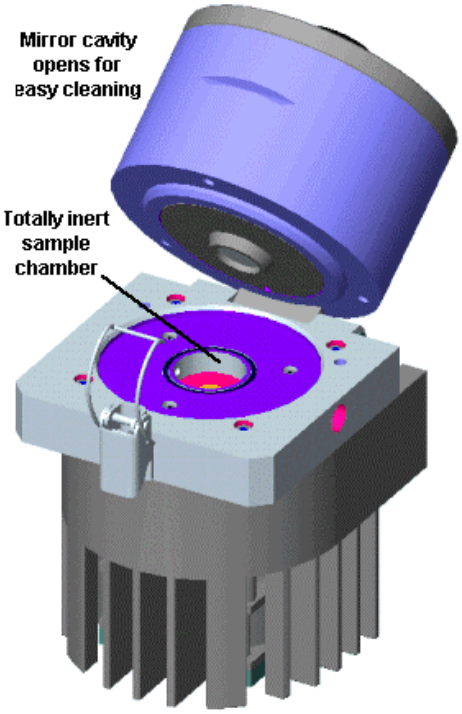


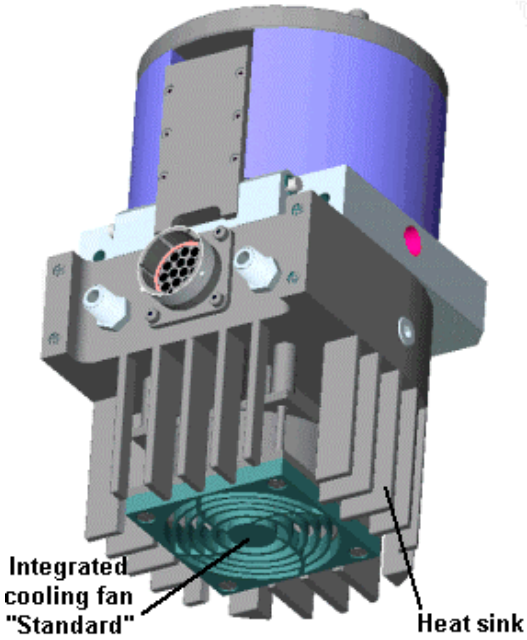
DPH sensor cross-section view



DPH sensor rear view



DPH sensor showing access to mirror for cleaning



DPH sensor bottom view of heat sink and integrated cooling fan

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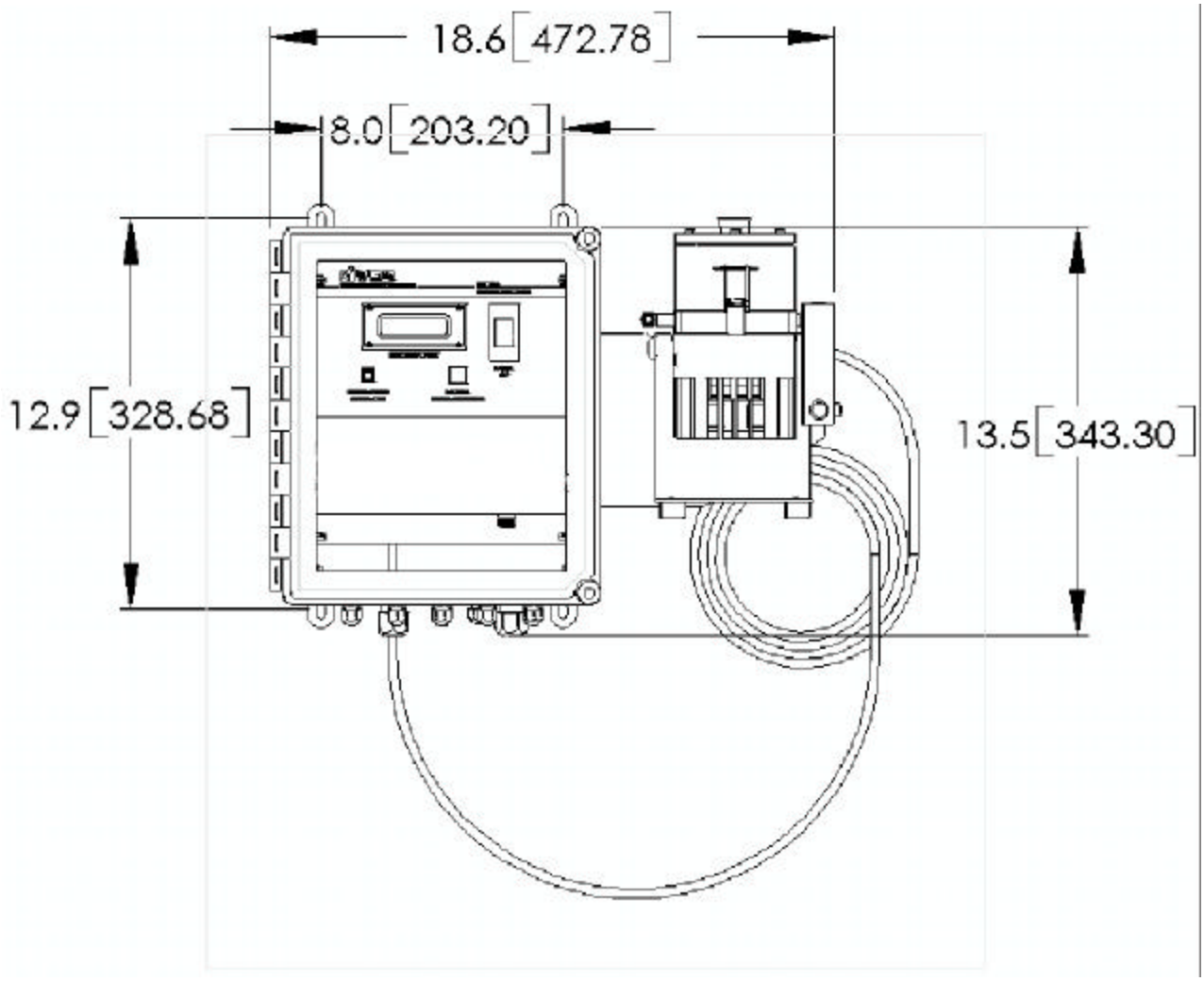
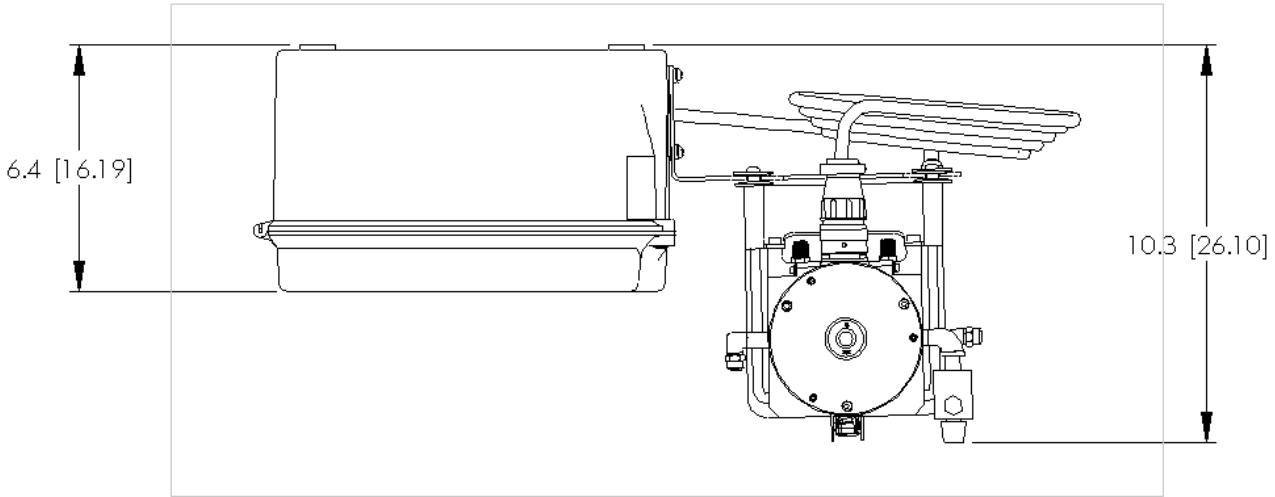
Mechanical Interface



Side view - dimensions in inches [cm]

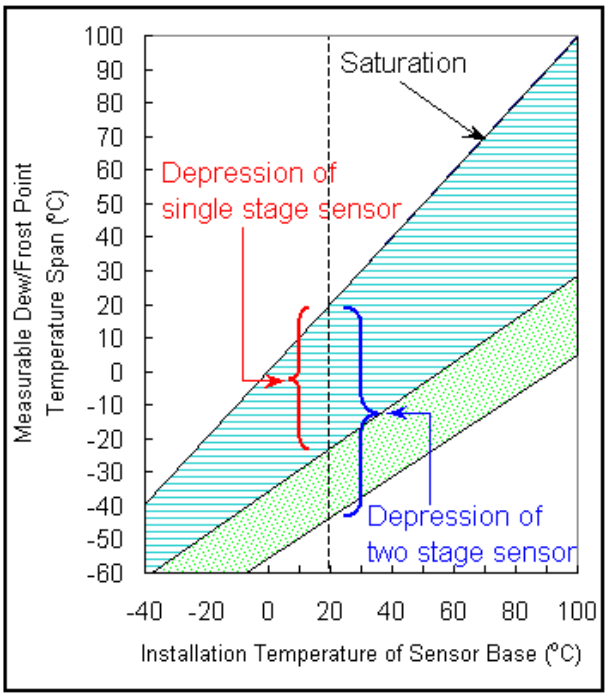


Top view - dimensions in inches [cm]

Specifications

Dew/frost point range*	**2020**: 65°C depression; from room ambient temperature of 22°C, dew/frost point measurements can be made to approx. -40°C with room temperature installations; **2012**: +120°C to –40°C; down to –60°C with customer-supplied –20°C liquid coolant loop
Accuracy	±0.1°C
Sensitivity	±0.01°C
Repeatability	±0.01°C
Hysteresis	None
Response time	35 seconds (typical)
Power Supply	**2020**: 110/220 Vac or 12Vdc **2012**: 110/220 Vac only approximately 100 watts
Gas contacts	Anodized aluminum, Viton, stainless steel, glass
Output signals	±5 Vdc analog, limit (Form C relay), RS-232
Storage Temp Range *	Sensor: -50°C to +80°C Electronics: -50°C to +50°C

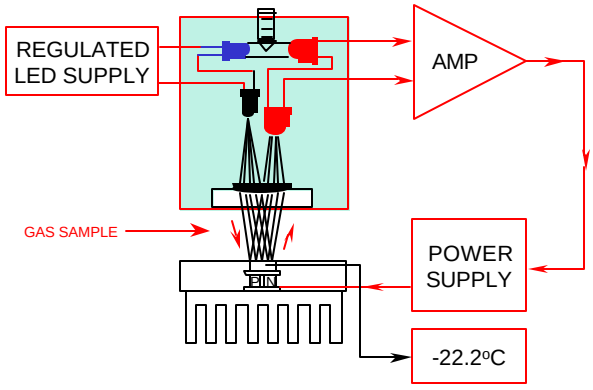
*Note: working depression limit is a function of ambient sensor temperature. A customer-supplied chilled coolant loop permits lower dew point range.



Measurement span of one-and two-stages

Standard Accessories Provided at No Extra Charge

- Totally inert mirror sensor chamber
- Full digital control for precise operation
- Analog and digital outputs, PLUS alarm relays
- Mirror microscope permits visual verification of dew layer and mirror state during operation
- Forced air cooling improves reliability
- Auxiliary liquid cooling loop permits even lower temperature depression operation



Chilled mirror principle of operation

YANKEE ENVIRONMENTAL SYSTEMS, INC.
Airport Industrial Park
101 Industrial Blvd., Turners Falls, MA 01376 USA
Tel: (413) 863-0200 Fax: (413) 863-0255