

# 473 Dew Point Hygrometer



## High Performance Chilled Mirror Hygrometer With Cable Mounted Measuring Heads

- Highly precise chilled mirror dew point technology
- Cable mounted dew point and temperature measurement
- Aspirated and direct insertion measuring heads
- Barometric pressure measurement options
- Intuitive color touch screen user interface
- User verifiable calibration

### Typical applications:

- Climatic chamber validation to IEC60068
- Weather station calibration
- RH generator transfer standard
- Engine test cells



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## Highly Precise Chilled Mirror Dew Point Technology



Chilled mirror condensation technology provides highly precise, stable and repeatable results. Water vapor condenses onto a temperature controlled mirror surface and this 'dew point' is detected with advanced optical electronics. Since dew point is specific to water vapor concentration and not temperature dependent, measurement precision is consistent across the full application range including high temperature and humidity conditions in climatic test chambers.

MBW chilled mirror hygrometers have a typical service life of more than 15 years thanks to the use of high quality materials and Swiss precision engineering. The high quality platinum resistance thermometer (PRT) element embedded within the mirror ensures excellent calibration stability. Thanks to the precise dew point and temperature measurements as well as the stability and long service life, MBW chilled mirrors are used by national standards and accredited laboratories worldwide. The 473 transfers reference standard performance into applications such as climatic chamber validation, relative humidity calibrators and a wide range of industrial processes.

### Dew or Frost?

Below 0 °C, water can condense in either the liquid or solid phase (dew or frost). The difference in the temperature at which the condensate layer stabilizes can be up to 3 °C, therefore the condensate phase must be known for correct calculation or validation of parameters such as relative humidity. As shown on the picture to the right, it is also possible that dew and frost can exist concurrently on the mirror; this results in a non-stable value somewhere between the dew and frost point.

### ForceFrost™ Function

Below a user defined temperature, the 473's ForceFrost function over-cools the mirror to force the condensed layer to the solid phase. This eliminates the uncertainty of whether dew or frost point is measured.



### Intuitive User Interface

The 473 features a 5.7" color touch screen with a high contrast ratio and wide viewing angle for clear and easy readability. Using the on-screen buttons and menus, each line of the instrument display can be configured for a variety of humidity, temperature and pressure parameters that may be viewed in the units of choice. These parameters can be displayed either numerically or graphically with user-configurable axes enabling measurement trends and stability to be confirmed without the need for external data acquisition or display hardware.



### Easy To Use and Minimal Maintenance

The 473 does not require either calibration adjustment or sensor replacement. Maintenance is limited to periodic mirror cleaning. The automatic mirror check feature can be user programmed to regularly check for surface contaminants.

### Convenient Calibration Check

Users can easily check the 473 system's stability at any time using the built-in Ice-Test function. This automated test procedure allows the user to confirm that ice on the mirror melts at 0 °C to verify the accuracy and stability of the mirror temperature measurement system.

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## Flexible Measurement Options

The 473 is available with different measuring heads together with temperature and pressure sensor options to meet the requirements of a wide range of applications.

### RP2 Measuring Head

The RP2 dew point measuring head has a two-stage Peltier element in a compact probe format and includes a connection for temperature measurement. It is supplied with a calibrated head mounted temperature probe and an extension cable to enable optimum placement in working volumes.

RP2 is suitable for direct insertion into applications with moving air such as relative humidity generators, climatic chambers, manufacturing processes and air ducts.

### SH2 Measuring Head

The SH2 is a flow-through dew point measuring head with a two-stage Peltier element for mirror temperature control. It includes a variable speed fan that pulls a consistent airflow across the mirror. Alternatively, with the fan removed, the SH2 head can also connect to applications using tubing and standard 6 mm or ¼" fittings. It is also supplied with a calibrated temperature probe with 0.5 m and 3 m cables for connection to either the measuring head or the 473 back panel.

Typical SH2 applications include climatic chamber validation, humidity generators, engine test cells and on-site calibration projects.

## Precise Temperature Measurement

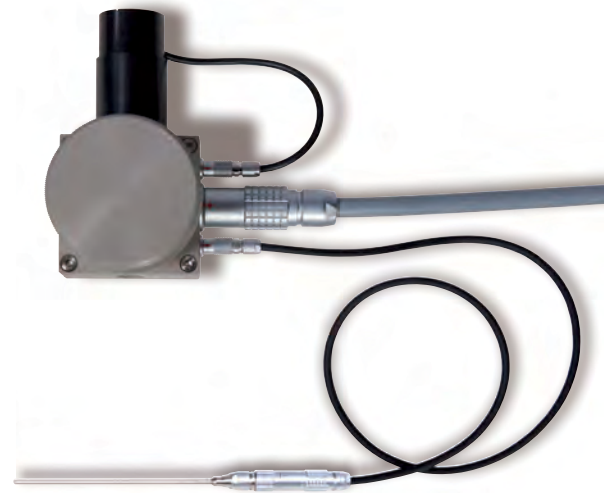
The 473 is supplied with a 4-wire PT100 platinum resistance thermometer (PRT) for precise temperature measurement and to enable calculation of relative humidity. The temperature probe supplied can be connected directly to the measuring head, or by cable to the 473 back panel. Wider temperature measurement ranges and alternative probe configurations are available on request.

## Integrated Pressure Measurement

The internal pressure measurement option enables the 473 to compensate for pressure variations at the point of measurement resulting in the lowest possible uncertainties. A pressure measurement accuracy of 0.1 or 0.01% can be specified; together with precise dew point and temperature measurement, the 473 is suitable for use as a transfer standard for all three parameters. The pressure sensor is fitted inside the 473 housing with a 3 mm gas connection on the back panel.

## Transportable

The 473 is supplied complete with a robust IP65 case to ensure that the instrument can be transported safely to site for validation projects or shipped for calibration without risk of damage. The custom foam insert provides storage space for additional measuring heads, cables, manuals and calibration certificates.



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Specifications:	473-RP2	473-SH2
<b>Measuring Ranges</b>		
Frost/Dew Point	-20...70 °C	-30...70 °C
Relative humidity	5...100 %rh	2...100 %rh
Temperature (head mount PRT)	-20...80 °C	-20...80 °C
Temperature (cable mount PRT)	-50...100 °C	-50...100 °C
<b>Accuracy</b>		
Frost/Dew point	≤ ± 0.1 °C (-20...70 °C), ± 0.2 °C	
Temperature	≤ ± 0.1 °C	
<b>Reproducibility</b>		
Frost/Dew point	≤ ± 0.05 °C	
Temperature	≤ ± 0.05 °C	
<b>Standard Features</b>		
Temperature probe	RP2: Ø3 x 30 mm PRT, 0.5 m cable    SH2: Ø2 x 100 mm PRT, 0.5 and 3 m cables	
Digital I/O	RS-232	
Display	5.7" LCD with color touch screen	
Thermoelectric mirror cooling	2-stage with typically 50 °C depression at 20 °C ambient	
Mirror temperature sensor	Platinum Resistance Thermometer (Pt100)	
Gas connections	6 mm or ¼" Swagelok (SH2 only)	
Transport case	Custom fit foam lined Peli 1550	
Power cable	2.5 m	
Operating instructions	English	
Calibration certificate	Factory calibration: 5 points FP/DP, 3 points temperature Upgrade to SCS accredited ISO17025 calibration available	
<b>Optional</b>		
Internal barometric pressure sensor	0.1% or 0.01% accuracy, 700...1200 mbar	
Analog outputs	User programmable, 2x 4...20 mA or 0...10 V	
<b>Additional Information</b>		
Power supply	100...120 VAC / 200...240 VAC, 50/60 Hz, 100 Watt (auto switching)	
Operating conditions:		
Instrument	0...40 °C, 90 %rh non-condensing	
Measuring head	-20...80 °C, 99 %rh non-condensing	
Storage conditions	-20...50 °C	
<b>Weight &amp; Dimensions</b>	<b>Instrument</b>	<b>In Transport Case</b>
Dimensions	W310 x H155 x D265 mm	W510 x H220 x D450 mm
Weight	5 kg	12 kg
Protection	IP54	IP65

473 V2.0 6.2012 We reserve the right to change design or technical data without notice.

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## Ordering Information

Description:	Order code
473, -30...70 °C FP/DP, SH2 measuring head on 2 m cable, 100 x 2 mm PRT with 0.5 and 3 m cables and transport case	103693
473, -20...70 °C FP/DP, RP2 measuring head on 2 m cable, 30 x 3 mm PRT with 0.5 m cable and transport case	103692
Options:	
473 upgrade factory calibration to ISO17025	103846
Analog outputs, user programmable, 2 x 4...20 mA or 0...10 V	102662
0.1% accuracy internal barometric pressure sensor	100282
0.01% accuracy internal barometric pressure sensor	103954
Additional 1 year warranty upgrade (maximum 3 years)	103632
For a complete range of options and accessories, please contact us and request our pricelist.	

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