

Withstands contamination

The DM500 operates reliably even with substantial particulate contamination on the sensing element. The SAW signal is sensitive for condensate (dew/frost) but not for particulates.

Salt sensing

Hygroscopic dirt is a common source of error in conventional dewpoint measurement techniques as it can change water vapor pressure close to the sensor. The DM500 can detect the presence of salts or hygroscopic dirt on the sensor surface with its intelligent self diagnostics.

Chemically durable

Use of a quartz wafer as a sensor substrate gives excellent resistance to aggressive chemicals. Wetted parts are limited to stainless steel, silicone, tantalum, vectra polymer and quartz. All water absorbing materials are located downstream.

Various output variables

The DM500 displays user selectable hygrometric units, such as dewpoint/frostpoint temperature, relative humidity, partial pressure of water vapor, and humid air volume/dry air volume (ppmv). In addition, the DM500 can measure temperature, pressure and gas flow rate if the instrument includes the corresponding optional sensor.

Wide variety of additional features

The DM500's display can be switched between numeric or graphical. The multi-lingual user interface is menu based and very easy to use. The DM500 also has data-logging capability and is equipped with the sophisticated MI70 Link Windows® software program for easy PC connection. ●



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How to fully benefit from using the Vaisala DM500 Precision

Good planning is essential for achieving high performance measurement results with any metrology tool. Successful application of the Vaisala DM500 Precision SAW Hygrometer is best achieved with a three step planning approach. These steps can be described as evaluation, preparation, and execution.

DEWCAP® Sensor and Surface Acoustic Wave (SAW)

Vaisala's DEWCAP® Sensor uses Surface Acoustic Wave (SAW) technology to usher in a new generation of condensation hygrometers. In Surface Acoustic Wave (SAW) technology the temperature controlled quartz sensor surface is cooled until dew or frost collects on the sensor surface. The presence or absence of condensation is sensed using the SAW instead of the traditional optical beam used in chilled mirrors. In measuring mode, the temperature of the DEWCAP® quartz surface is varied until condensation exists in equilibrium. When the equilibrium is reached, the temperature of the sensor surface is measured by a precision Pt-100 PRT. This measured temperature equals the dew/frostpoint temperature of the measured gas. ●

The DEWCAP® sensor is based on innovative SAW technology.



Evaluation

Evaluation starts with an understanding of the intended use of the Vaisala DM500 Precision SAW Hygrometer. The results of evaluation include a "go" or a "no-go" decision as to the suitability of the instrument for the application. In the case of a "go," the correct product configuration will be evident. The following are critical things to consider during the evaluation:

What is the anticipated dewpoint or range of dewpoints to be measured?

- Identifies the correct sensor model and any possible need for external cooling,
- Identifies whether elevated dewpoints may cause condensation in the gas system, requiring the use of a heated sensor,

What is the pressure of the sample gas?

- Identifies the need for a pump option if pressure is ambient,
- Assures that maximum process pressure is within safe limits,

What is the temperature of the sample gas?

- High temperature gas should be cooled to ambient before measurement,

What is the composition of the sample gas?

- Assures material compatibility with the sensor,

What are the desired humidity parameters for display or output?

- For %RH, a temperature sensor option is required,
- For ppmv or other pressure

on SAW Hygrometer



sensitive parameters, a pressure sensor should be specified.

Preparation

When the suitability of the DM500 has been established, preparation takes into account the entire measurement scenario.

Filtration

If substantial particulate contamination is present in the gas sample, a non-hygroscopic filter should be installed in the sample line before the sensor. This minimizes the need for sensor cleaning and keeps the gas channel free of contaminants that may adversely affect measurement response time.

Fittings & tubing

Stainless steel tubing should be

used for best results with dewpoint temperatures below -30°C . US users will typically want to use 1/4" tubing, compression fittings, and accessories that are equipped to be connected in this way. Other users will typically specify 6 mm tubing and fittings. Rubber and/or Tygon tubing should not be used for sampling!

Flow control

Samples at positive pressure will require some type of flow control downstream from the sensor for correct measurement of pressure dewpoint.

Physical location

The DM500 should be located in an environment consistent with the specifications. Access to the back of the sensor is required

for gas and coolant connections. Appropriate line voltage should be available.

%RH measurements

Location of the temperature sensor is important. In general, the temperature sensor should be in the location where the user wants to know the relative humidity.

Execution

With the DM500 correctly specified and installed, all that remains is to operate and maintain the system.

- Cooling water should be circulating if installed; care should be taken to assure that condensation forming inside the sensor housing is drained.
- Response time is a function of

The DM500 Precision SAW Hygrometer is an automatic, continuously controlling condensation hygrometer which is suitable for calibration laboratories and for use as a transfer standard.

the slew rate of the Peltier coolers and the rate of water vapor capture at the process dewpoint.

- Maintenance of the sensor should be performed as required. When liquid cooling is in use, sensor cleaning should only be done when the coolant temperature is above the ambient dewpoint.
- Maintenance of the cooling system and filtration components should be performed as required. ●