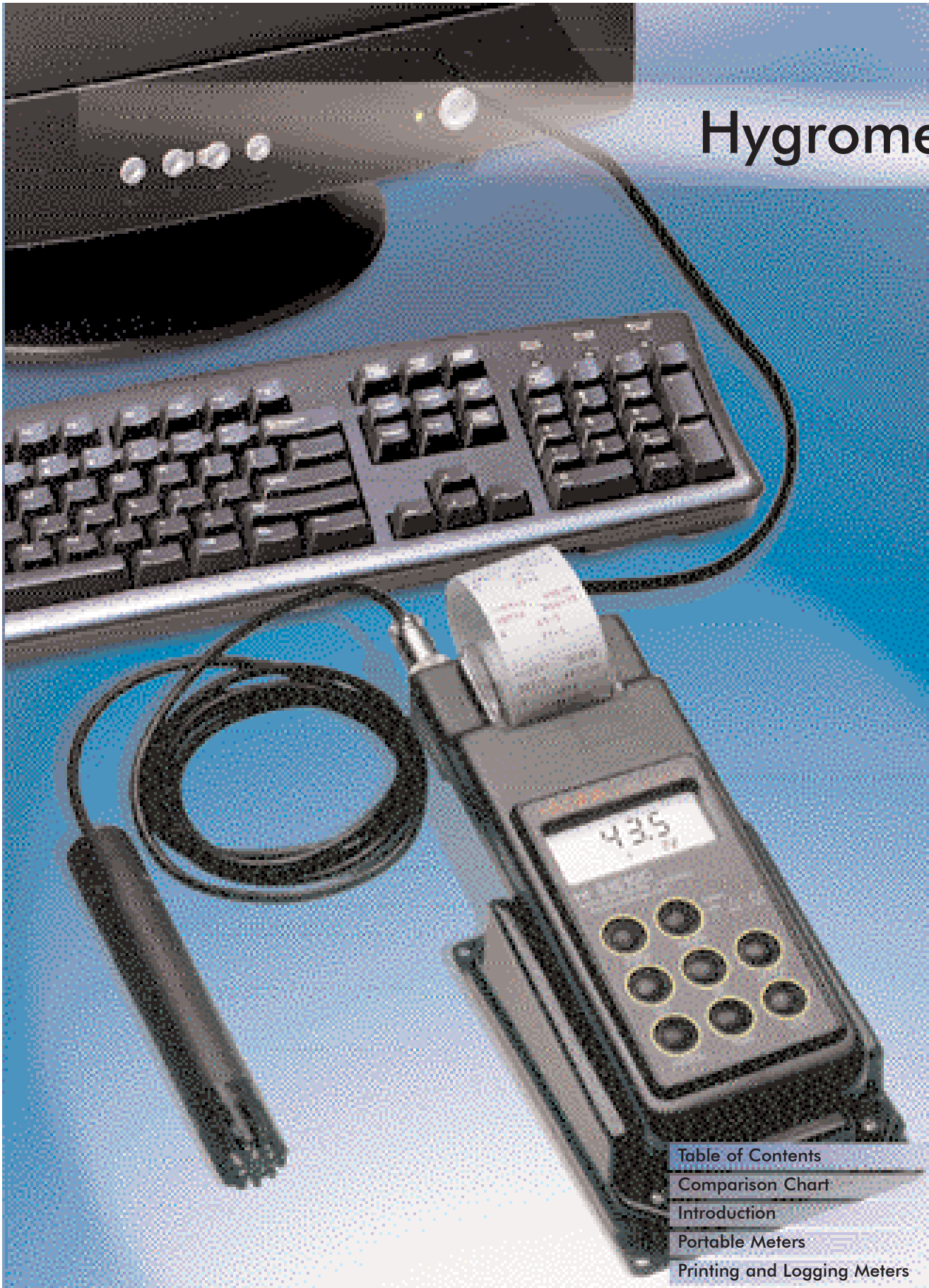
Hygrometers



Comparison Chart

Characteristics

Hygrometers	HI 8064	HI 93640	HI 8564	HI 9064	HI 9065	HI 9564	HI 9565	HI 9161	HI 91610	HI 8666
Range 0 to 100% RH										•
Range 5 to 95% RH		•		•	•			•	•	•
Range 10 to 95% RH	•		•							
Range 20 to 95% RH						•	•			
Temperature Range	•	•	•		•	•	•	•	•	•
Dew Point Measurement							•			
Accuracy ±2% RH	•	•	•	•	•			•	•	•
Accuracy ±3% RH						•	•	•	•	•
°C and °F Temperature Units		•	•		•	•	•	•	•	
Water-Resistant				•	•					
Microprocessor-Based								•	•	
Built-in Printer								•	•	
Data Logging									•	
PC Connection									•	
4-20 mA Output										•
RH Probe Fixed		•	•							•
RH Probe Included			•	•	•	•	•	•	•	
Temperature Probe Included		•*	•*	•*		•*	•*	•*	•	•*
Hard Carrying Case					•	•		•	•	
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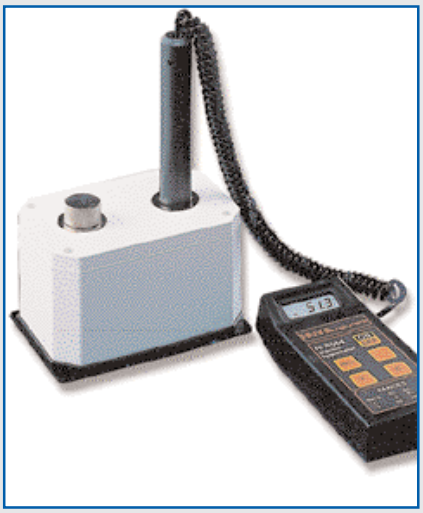
* The temperature sensor is built-in the RH probe.

Hygrometers

Measure Relative Humidity Accurately and Efficiently



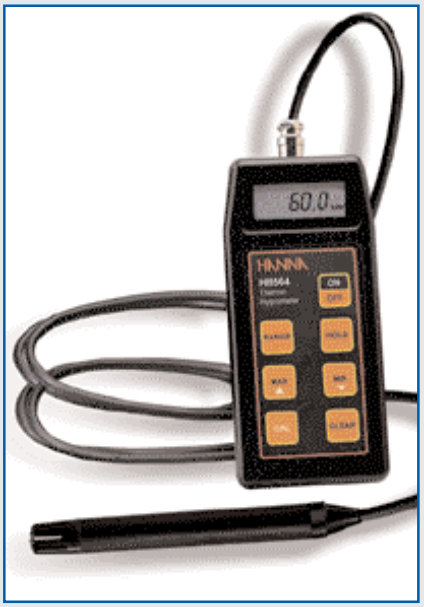
HANNA instruments® is one of the few manufacturers offering a wide range of relative humidity meters. The following pages describe all HANNA instruments®' R.H. meters. Calibration is performed at the factory using state-of-the-art humidity chambers and tuned at 3 different points (14%, 50%, 80%) against an NIST standard. Each model has been specifically designed for a certain field application.

HI 8064, for example, is a portable, easy-to-use thermohygrometer particularly suited for education.

HI 93640 is a hand-held meter with a built-in sensor that has a sintered cap for protection against dusty or harsh environments. This product is ideally suited to the HVAC field.

HI 9064 and HI 9065 with their water-resistant housing, remote probe and HOLD feature are the perfect meters for libraries, museums, computer rooms and printing facilities.

HI 9161 is a printing relative humidity and temperature meter. Printouts can be obtained at user selectable intervals that contain information such as sample #, interval, R.H. and temperature reading. The meter can operate at 60 minute intervals over an entire weekend. If necessary, it can also be plugged into a 12 Vdc battery recharger for extended periods of printing.



It is often necessary to transfer data to a computer. This would normally require a serial port and long cables for the connection. HANNA instruments® has incorporated a unique system into the data logging HI 91610 meter. Infrared lights at the bottom of the meter allow instant transmission of data into the HI 9200 infrared transmitter without cables. The HI 9200 comes complete with an RS232 plug and cable and can be permanently affixed to the computer housing.

Besides these models with capacitive sensor, HANNA instruments® presents the new HI 9564 and HI 9565 with resistive sensor. These new hygrometers are ideal for greenhouse and nursery applications where temperature ranges are not high and the relative humidity range is narrow. In addition, the probe stores the calibration data and is interchangeable with other hygrometers. HI 9565 also measures the dew point.

Finally, HI 8666 can transmit both relative humidity and temperature signals.

Relative humidity calibration is a very delicate process that requires special equipment and trained personnel. HANNA instruments® now offers service contracts for all relative humidity meters. This supplies the user with the confidence that the meter is operating at 100% of its performance.
Ask your dealer or the nearest HANNA instruments® office for more details.

Relative Humidity Measurement

Definition

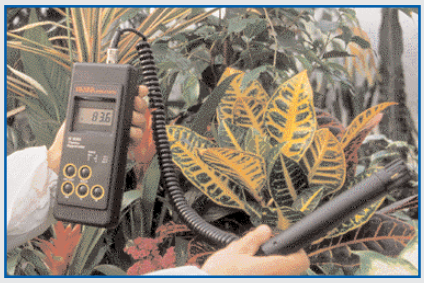
The hygrometer is an instrument used to measure relative humidity (RH), that is, the quantity of water vapor present in the air. Hygrometers are often available in versions that also measure temperature. These are normally called thermo-hygrometers. Relative humidity is expressed as the ratio of the quantity of water vapor present in the air to the quantity at which the air would reach saturation (100%) at a given temperature.

Principle of Operation

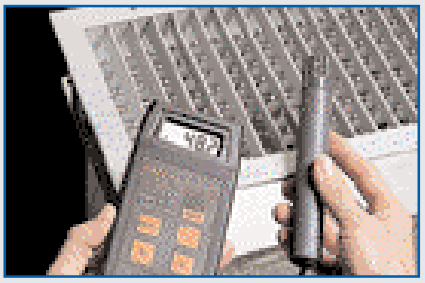
The measurement system is made up of a meter connected to a probe. The probe measures capacitance, a capacitor with a polymer or plastic dielectric material with a fixed dielectrical constant from 2 to 15. Increased humidity causes the dielectric to dilate, hence distancing the plates with consequent variation of the capacitor's geometry and reduction of its capacitance. These capacitance variations in turn cause a frequency change in the instrument's electronics, resulting in a frequency modulation which is a function of relative humidity. The frequency is then converted into voltage, which is converted into a relative humidity value displayed on the LCD.
The hygrometers' precision essentially depends on how insusceptible it is to the following three factors: the first is the "linearity error" caused by the typical non-linearity of RH sensors. HANNA instruments® hygrometers compensate for the effects of this error. It is advisable, however, to calibrate the meter periodically to reduce the probability of this error reoccurring. The second factor is the "temperature error" caused by the variation of the hygroscopic properties of the sensor's dielectric material as a function of temperature. In fact, the ratio between the quantity of water vapor present in the dielectric and the relative humidity is not directly proportional, but varies with temperature. The third factor is the "calibration error" caused by an incorrect calibration procedure. There are many "do-it-yourself" calibration kits on the market. Most are made of a receptacle containing two sealed chambers and two different types of salt. It is possible to simulate a particular RH value by filling each chamber with the correct distilled water and salt solution. The RH probe is first immersed in the low RH chamber and allowed to stabilize. The meter is then calibrated at the RH value of the chamber being used. The procedure is repeated with the high RH chamber. Since RH is dramatically affected by temperature changes, kits do not provide accurate calibration due to the practical difficulties in performing the calibration at a constant temperature. Climatic chambers that simulate different humidity levels are the ideal solution to calibrate hygrometers accurately. Hygrometers are also calibrated using two different levels of relative humidity in this calibration procedure, and then the accuracy is checked by simulating other RH values in the chamber. HANNA instruments® Service Centers are equipped with state-of-the-art calibration chambers to provide the best accuracy.

Dew Point

The dew point is defined as the temperature to which air must be cooled in order for condensation (saturation) to occur. The dew point is dependent on the concentration of water vapor present, and therefore the relative humidity. The graphs here can help to easily determine the dew point after measuring the relative humidity and temperature of the air. To determine the dew point temperature, start by drawing a horizontal line at the measured temperature level until it intersects the measured relative humidity line. From the intersection point, draw a vertical line down to the dew point axis, and read the dew point temperature.
Another option is now available with a new hygrometer from HANNA instruments®, HI 9565, automatically measures and displays the dew point.



Horticulture & Floriculture
Where the growth rate in greenhouses is highly dependent on humidity levels.



Heating & Air-Conditioning
In the construction and maintenance of heating and air-conditioning plants.

Food Industry
Where certain food manufacturing and preservation processes have to be at a specific humidity level.

Libraries & Museums
Where the monitoring of humidity levels is essential to guarantee the preservation of works of art.