GE
Sensing

Features

- Excellent interchangeability
- Available in 3% and 5% accuracy
- Economical
- Recovers from condensation
- Good resistance to chemical vapors
- Fast response
- Low hysteresis

The EMD-4000 is a bulk resistance-type humidity sensor based on the impedance change of a thin-film polymer due to water vapor absorption. The polymer is deposited on Bismuth alloy terminals, which are set on a ceramic substrate. The sensor is excited by a low voltage alternating current and the impedance measured as a function of relative humidity.

The thin-film polymer consists of chemical functional groups that disassociate into ionic species as water vapor is absorbed. This results in increased electrical conductance through the sensor or a decrease in impedance. The impedance is an inverse exponential function of the surrounding humidity.

EMD-4000

General Eastern Humidity Sensor

EMD-4000 is a General Eastern product. General Eastern has joined other GE high-technology sensing businesses under a new name– GE Industrial, Sensing.

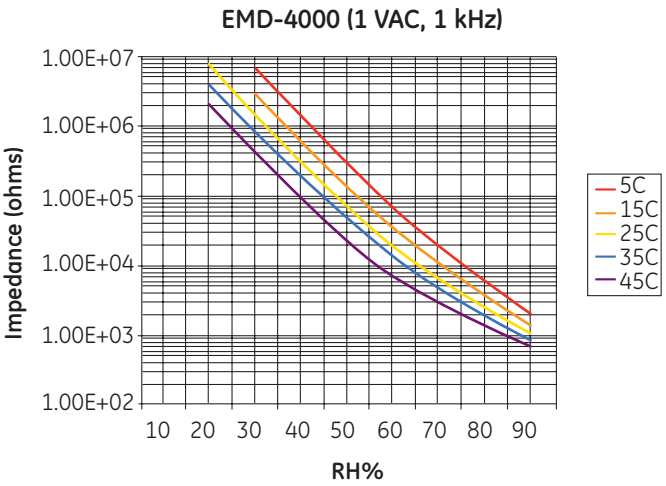
GE
Sensing

The EMD-4000 is capable of withstanding environments where organic vapors are present. It recovers from condensing environments and may be used at temperatures up to 185°F (85°C). The EMD-4000 is also capable of insitu measurement of soluble water in organic liquids such as transformer oil, gasoline, toluene, acetone, and other compounds of varying hydrogen bond strengths.

The EMD-4000 is highly repeatable and interchangeable. The sensor is manufactured in high yields to ±5% RH or better tolerances. It is also available in a tighter tolerance band of ±3% RH. This results in a sensor that can be used in many designs without the need for humidity calibration, where the measuring circuit can be calibrated with external reference resistors. The EMD-4000 exhibits a well defined standard response curve as a function of humidity and temperature and has low hysteresis and fast response.

The EMD-4000 is priced for Original Equipment Manufacturers (OEMs) with requirements to incorporate humidity sensors in HVAC controls, data loggers, appliances, automotive applications and consumer products.

Response Curves



GE
Sensing

EMD-4000 Specifications

%RH Range at 77°F (25°C)
20% to 95%

Operating Temperature
41°F to 140°F (5°C to 60°C)

Storage
0% to 95% RH, -40°F to 185°F (-40°C to 85°C)

Accuracy
- ±5% RH standard
- ±3% RH available

Repeatability
±0.5% RH

Impedance
72K Ω at 77°F (25°C), 50% RH with 1 VAC at 1 KHz excitation

Response Time
<1 minute for 63% step change in non moving air

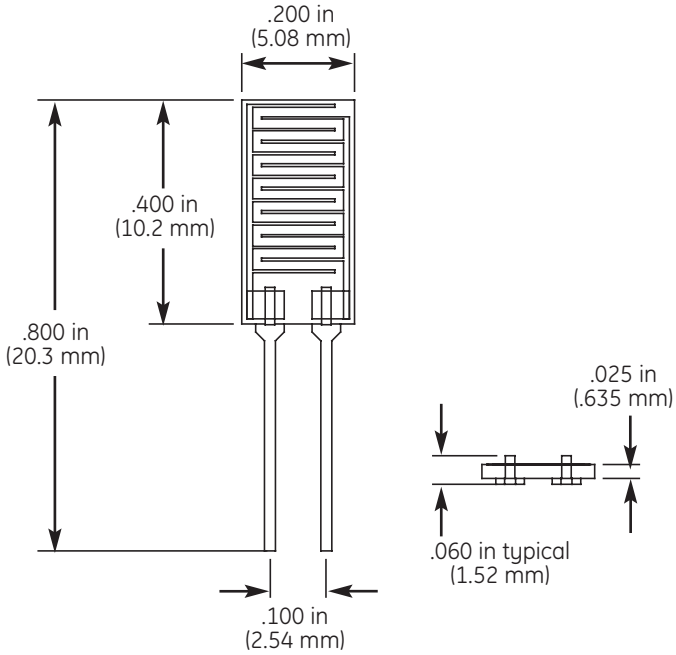
Hysteresis
<1% RH at 77°F (25°C) for step change from 30% to 98% RH then back to 30% RH

Temperature Dependence
0.5% RH/°F (°C, average)

Long Term Drift
0.1% RH/year typical in clean, chemical free air

Dimensions
0.2 in (5.1 mm) wide x 0.4 in (10.2 mm) high x 0.02 in (0.51 mm) thick

Leads: 0.4 in (10.2 mm) long x 0.15 in (3.81 mm) wide x 0.01 in (0.25 mm) thick on 0.1 in (2.54 mm) centers



Exposure to Saturated Chemical Vapors
- Toluene, 25,200 ppm/3 days: <2% RH drift
- Hexane, 152,000 ppm/3 days: <2% RH drift
- Methanol, 127,000 ppm/3 days: <5% RH drift

Transformer Oil; 60K Ω at 30 ppm at 77°F (25°C)
- 3 months at 77°F (25°C): <5% drift, 2% RH typical
- 1 month at 185°F (85°C): <5% drift, 2% RH typical

Water Vapor Saturation
100% RH/77°F (25°C)/1000 hours storage; <3% RH drift typical; 1/16 in (1.59 mm) water droplet covering entire sensor surface for 10 minutes followed by drying via air ventilation; <5% drift

Caution
DC current should never be applied to the EMD-4000 humidity sensor. Application of direct current will polarize the sensor and cause an irreversible shift. Only a symmetrical AC excitation current should be applied. GE recommends that application of a low level AC excitation (1 VAC, 1 KHz typical) to minimize self-heating effects.

GE
Sensing

920-060B

www.gesensing.com