

## HCH-1000 Series

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### Capacitive Humidity Sensors

#### DESCRIPTION

The HCH-1000 series humidity sensor is a capacitive polymer sensor designed for relative humidity measurement. The sensor converts humidity value into capacitance, which can be measured electronically.

Polyimide is used as a humidity sensing material because of its inherent IC (Integrated Circuit) processing compatibility, reduced temperature dependence and enhanced resistance against contamination. The HCH-1000-Series is manufactured using semiconductor technology.

#### FEATURES AND BENEFITS

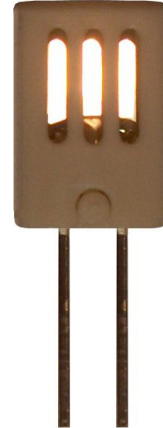
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- Polymer sensing offers enhanced resistance against contamination
- Reduced temperature dependence
- Semiconductor fabrication technology
- Uses glass wafer as substrate
- Enhanced sensitivity and accuracy provides fast response
- Low hysteresis and long-term stability

HIH-1000-001



HIH-1000-002



The sensor consists of a grid top electrode, a polyimide layer, and a bottom electrode. The grid top electrode on the bottom electrode provides enhanced sensitivity when compared to that of a standard structure.

A cased version, for dust protection, and an uncased version are available.

#### POTENTIAL APPLICATIONS

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##### Industrial

- Air compressors
- Battery-powered systems
- Drying equipment
- HVAC (includes air conditioning, air movement, thermostats, humidifiers, de-humidifiers, humidistats, enthalpy sensing)
- OEM assemblies
- Office automation equipment
- Process equipment
- Refrigeration (includes bulk and transport systems)
- Telecommunications cabinets
- Weather stations and meteorology equipment

##### Medical

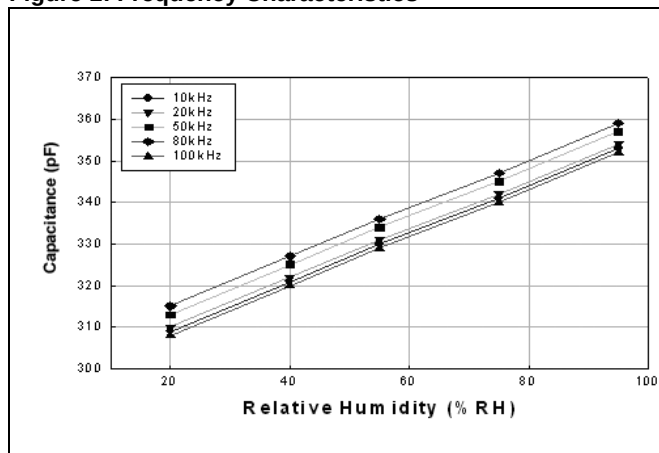
- Hospital air compressors
- Infant incubators
- Microenvironments
- Sleep apnea equipment
- Treadmill stress monitoring equipment

# HCH-1000 Series

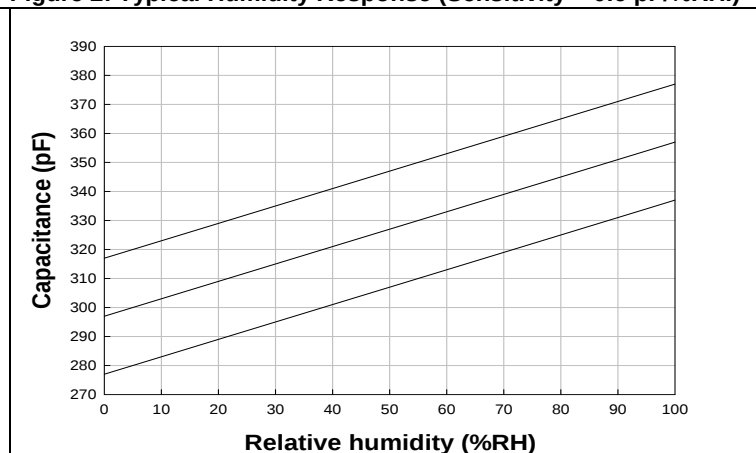
**Table 1. Specifications ( $T_A = 25\text{ }^\circ\text{C}$  [77 °F], Input Voltage = 1 V<sub>RMS</sub>, Frequency = 20 kHz)**

| Characteristic              | Condition                       | Min.      | Typ. | Max.      | Unit     |
|-----------------------------|---------------------------------|-----------|------|-----------|----------|
| Normal capacitance          | at 55 %RH                       | 310       | 330  | 350       | pF       |
| Sensitivity                 | 10 %RH to 95 %RH                | 0.55      | 0.60 | 0.65      | pF/%RH   |
| Humidity hysteresis         | —                               | —         | ±2   | —         | %RH      |
| Linearity                   | —                               | —         | ±2   | —         | %RH      |
| Response time               | 30 %RH to 90 %RH                | —         | 15   | —         | sec      |
| Temperature coefficient     | 5 °C to 70 °C [41 °F to 158 °F] | 0.15      | 0.16 | 0.17      | pF/°C    |
| Long-term stability (drift) | —                               | —         | 0.2  | —         | %RH/year |
| Operating temperature range | —                               | -40 [-40] | —    | 120 [248] | °C [°F]  |
| Operating humidity range    | —                               | 0%        | —    | 100%      | RH       |
| Operating frequency range   | —                               | 1         | —    | 100       | kHz      |

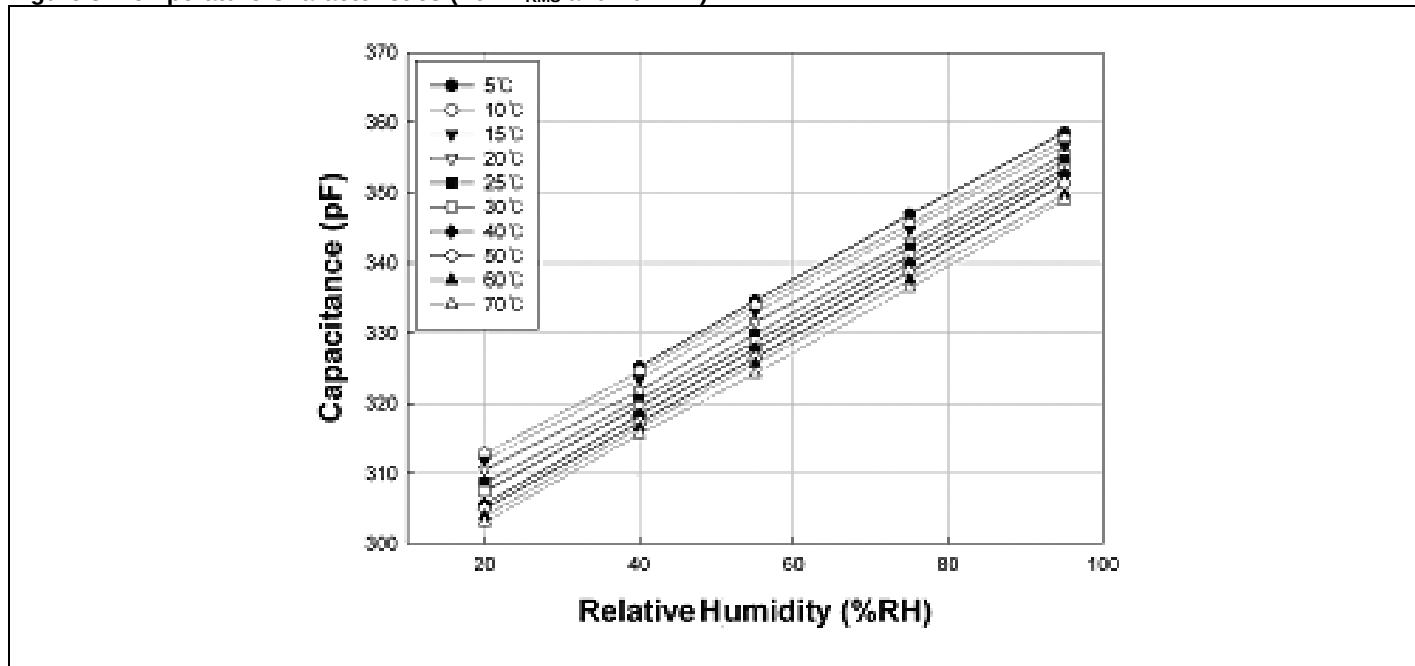
**Figure 1: Frequency Characteristics**



**Figure 2: Typical Humidity Response (Sensitivity = 0.6 pF/%RH.)**

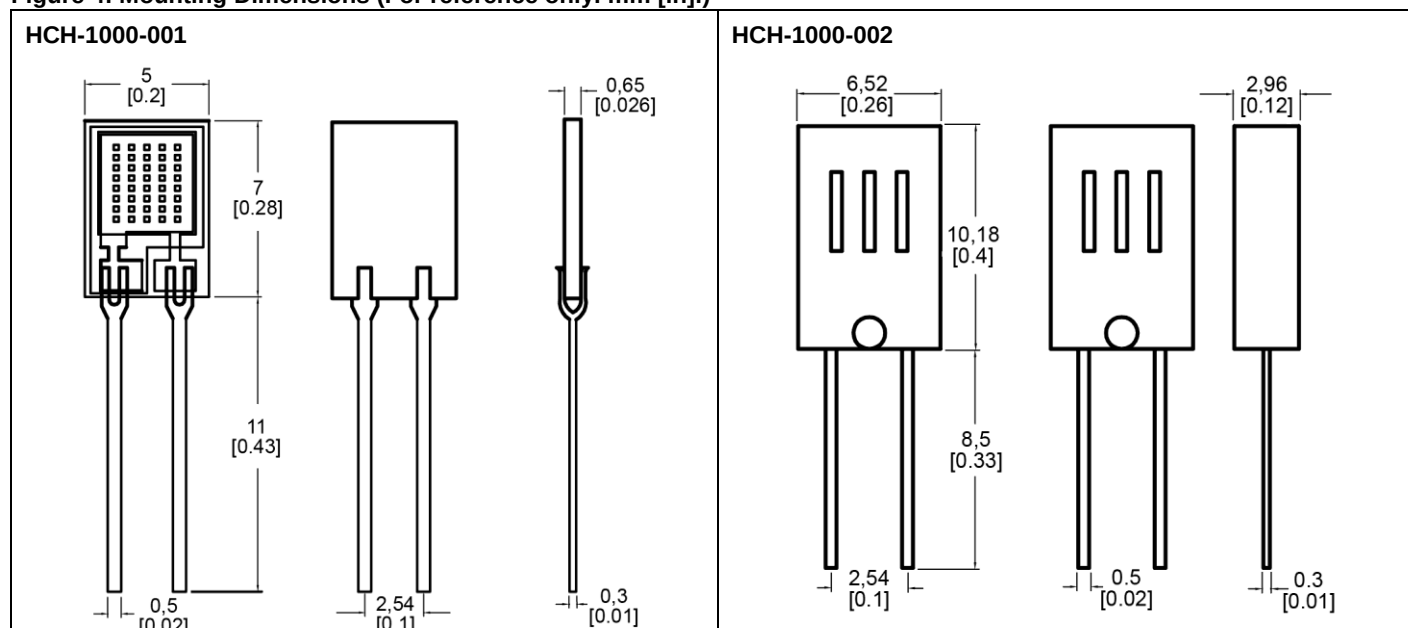


**Figure 3: Temperature Characteristics (At 1 V<sub>RMS</sub> and 20 kHz.)**



# Capacitive Humidity Sensors

Figure 4: Mounting Dimensions (For reference only: mm [in].)



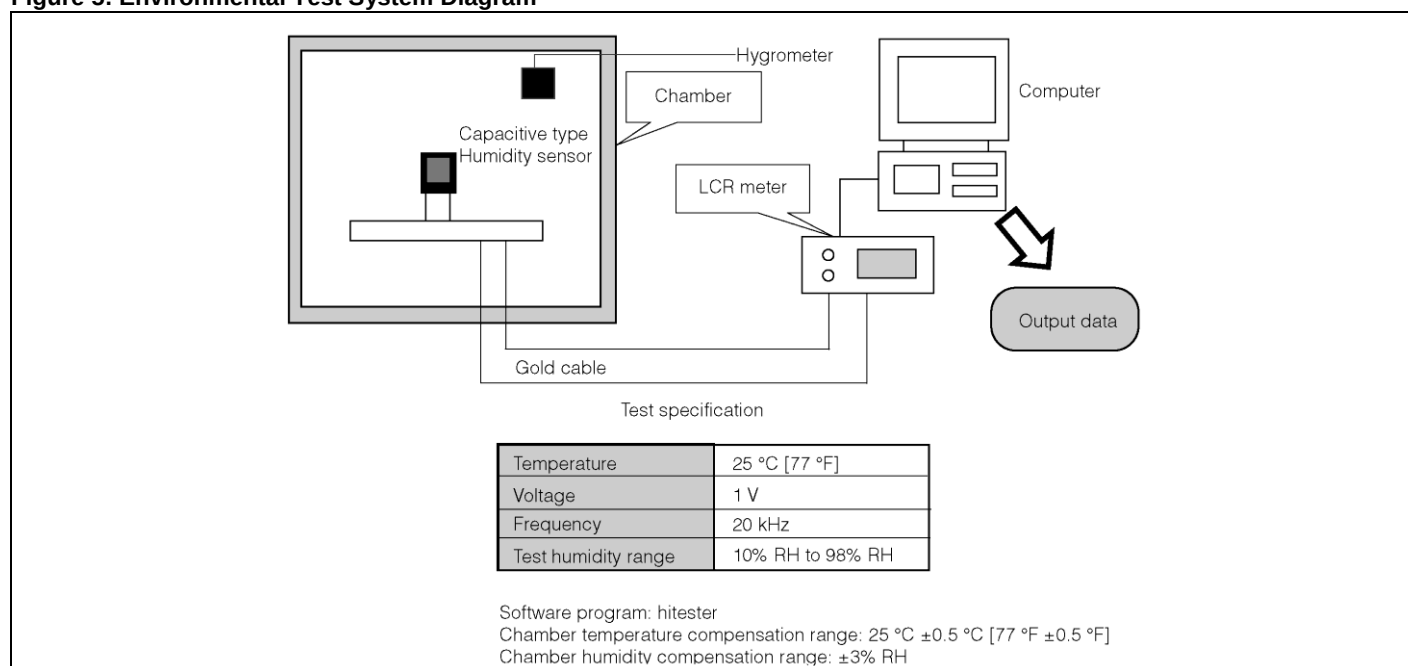
## ENVIRONMENTAL TEST SYSTEM

Figure 5 depicts environmental testing. The devices are characterized at 25 °C [77 °F] between 20 %RH and 95 %RH. The meter is set to measure capacitance at 1 V and 20 kHz.

For a precise measurement, a hygrometer is compared with the humidity of the temperature-humidity chamber.

The data output indicates the effect of sensor characterization before/after environmental tests.

Figure 5: Environmental Test System Diagram



## Order Guide

| Catalog Listing | Description                                                                                     |
|-----------------|-------------------------------------------------------------------------------------------------|
| HCH-1000-001    | HCH Series capacitive polymer humidity sensor, 2,54 mm [0.100 in] lead pitch SIP                |
| HCH-1000-002    | HCH Series capacitive polymer humidity sensor, 2,54 mm [0.100 in] lead pitch SIP, cased version |

### **WARNING**

#### **PERSONAL INJURY**

DO NOT USE these products as safety or emergency stop devices or in any other application where failure of the product could result in personal injury.

**Failure to comply with these instructions could result in death or serious injury.**

#### **WARRANTY/REMEDY**

Honeywell warrants goods of its manufacture as being free of defective materials and faulty workmanship. Honeywell's standard product warranty applies unless agreed to otherwise by Honeywell in writing; please refer to your order acknowledgement or consult your local sales office for specific warranty details. If warranted goods are returned to Honeywell during the period of coverage, Honeywell will repair or replace, at its option, without charge those items it finds defective. **The foregoing is buyer's sole remedy and is in lieu of all other warranties, expressed or implied, including those of merchantability and fitness for a particular purpose. In no event shall Honeywell be liable for consequential, special, or indirect damages.**

While we provide application assistance personally, through our literature and the Honeywell web site, it is up to the customer to determine the suitability of the product in the application.

Specifications may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However, we assume no responsibility for its use.

### **WARNING**

#### **MISUSE OF DOCUMENTATION**

- The information presented in this product sheet is for reference only. Do not use this document as a product installation guide.
- Complete installation, operation, and maintenance information is provided in the instructions supplied with each product.

**Failure to comply with these instructions could result in death or serious injury.**

#### **SALES AND SERVICE**

Honeywell serves its customers through a worldwide network of sales offices, representatives and distributors. For application assistance, current specifications, pricing or name of the nearest Authorized Distributor, contact your local sales office or:

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