

# Humidity Sensors Line Guide



**Performance and reliability.** At Honeywell Sensing and Productivity Solutions (S&PS), each sensor is designed to provide enhanced stability, reliability and sensitivity.

Honeywell HumidCon™ Digital Humidity/Temperature sensors offer a range of accuracies from  $\pm 1.7$  %RH to  $\pm 4.5$  %RH, wide operating temperature ranges and low hysteresis.

All humidity sensors are configured with integrated circuitry to provide on-chip signal conditioning offered on all products. Potential applications are as diverse as heating, ventilation and air conditioning equipment (HVAC), refrigeration, office automation, and medical equipment.

## FEATURES

### HUMIDITY SENSORS

#### Honeywell HumidCon™ Digital Humidity/Temperature Sensors

#### HIH6000 Series, HIH6100 Series, HIH7000 Series, HIH8000 Series HIH9000 Series

Honeywell HumidCon™ Digital Humidity/Temperature Sensors are digital output-type relative humidity (RH) and temperature sensors combined in the same package. They are available in the following accuracies:

- $\pm 1.7$  %RH (HIH9000 Series)
- $\pm 2.0$  %RH (HIH8000 Series)
- $\pm 3.0$  %RH (HIH7000 Series)
- $\pm 4.0$  %RH (HIH6100 Series)
- $\pm 4.5$  %RH (HIH6000 Series)

**Features:** Industry-leading long term stability (1.2 %RH over five years)

- Industry-leading reliability (MTTF 9,312,507 HR)
- Lowest total cost solution
- Combined humidity and temperature sensor
- Energy efficient
- High resolution
- True, temperature-compensated digital I<sup>2</sup>C or SPI output
- SOIC-8 SMD (Surface Mount Device) and SIP 4 Pin housing styles
- Available with or without hydrophobic filter and condensation-

resistance • Ultra-small package

- Industry-leading relative humidity accuracy
- Tape and reel
- Wide operating temperature ranges
- Optional one or two %RH level alarm outputs
- Multi-function ASIC
- RoHS and WEEE compliant, halogen-free

**Benefits:** Industry-leading long term stability minimizes system performance issues, helps support system uptime by eliminating the need to service or replace the sensor during its application life, and eliminates the need to regularly recalibrate the sensor in the application, which can be inconvenient and costly. Thermoset-polymer capacitive sensing element's multilayer construction provides resistance to most application hazards such as condensation, dust, dirt, oil, and common environmental chemicals, which help provide industry leading reliability. Delivers the lowest total cost solution due to the sensor's industry-leading combined humidity/temperature sensor. Allows the RH measurement to be temperature compensated and provides a second, standalone temperature sensor output which allows the user to purchase one sensor instead of two. Can operate down to 2.3 Vdc, which allows use in low energy

and wireless-compatible applications to enhance energy savings and prolong system battery life. The sensor goes into sleep mode when not taking a measurement within the application, consuming only 1  $\mu$ A versus 650  $\mu$ A in full operation in a battery operated system; helps maximize battery life, reduces power supply size, and reduces the application's overall weight. High 14-bit humidity sensor resolution and 14-bit temperature sensor resolution within the application help the user's system detect the smallest relative humidity or temperature change. True, temperature-compensated digital I<sup>2</sup>C or SPI output typically allows the customer to remove the components associated with signal conditioning from the PCB to free up space and reduce costs associated with those components (e.g., acquisition, inventory, assembly), often eliminates problems that could occur from having multiple signal conditioning components across the PCB, as well as simplifies integration to the microprocessor, eliminating the need for customer-implemented, complex signal conditioning. Ultra-small size allows for flexibility of use within the application, occupies less space on the PCB, and typically simplifies placement on crowded

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## Highly viable humidity sensing solutions.

And every Honeywell S&PS sensor contains something no other supplier can offer: Honeywell engineering and expertise. This means an unparalleled feature and benefit set: A capacitive sensing die set in thermoset polymers interacts with platinum electrodes. Laser-trimmed sensors designed to offer stable, low-drift performance and enhanced accuracy with calibration. Absorption-based humidity sensors provide both temperature and %RH. Packages are chemically resistant and operate in wide temperature ranges — performing in most harsh environments.

Most importantly, Honeywell S&PS's legendary engineering expertise, proven product dependability, global reach and support and superior technical support deliver the most critical advantage of all: reliable quality products for a lower total cost of ownership.



### Humidity Sensors

	Honeywell Humidcon™ HIH6000 Series	Honeywell Humidcon™ HIH6100 Series
<b>Description</b>	digital output-type relative humidity (RH) and temperature sensors combined in the same package	
<b>Humidity accuracy</b>	±4.5 %RH typ.	±4.0 %RH typ.
<b>Temperature accuracy (BFSL)</b>	±0.5 °C	±0.5 °C
<b>Operating temperature range</b>	-40 °C to 100 °C [-40 °F to 212 °F]	-25 °C to 85 °C [-13 °F to 185 °F]
<b>Hysteresis</b>	-	-
<b>Output</b>	I <sup>2</sup> C or SPI	I <sup>2</sup> C or SPI
<b>Package type</b>	SIP 4 Pin or SOIC-8 SMD	SIP 4 Pin or SOIC-8 SMD
<b>Response time</b>	6 s typ. in 20 l/min airflow	6 s typ. in 20 l/min airflow
<b>Long-term stability</b>	±1.2 %RH for five years	±1.2 %RH for five years
<b>Operating humidity range</b>	0 %RH to 100 %RH	0 %RH to 100 %RH
<b>Compensated humidity range</b>	20 %RH to 80 %RH	10 %RH to 90 %RH
<b>Moisture filter</b>	yes (some listings)	yes (some listings)
<b>Voltage supply</b>	3.3 Vdc typ.	3.3 Vdc typ.



### Humidity Sensors

	HIH-5030/5031 Series	HIH-4000 Series
<b>Description</b>	covered, filtered or unfiltered integrated circuit	integrated circuit
<b>Output</b>	analog voltage	analog voltage
<b>Package type</b>	surface mount	SIP (2,54 mm [0.100 in] or 1,27 mm [0.050 in] lead pitch)
<b>Response time</b>	5 s typ. 1/e in slow moving air	5 s typ. 1/e in slow moving air
<b>Long-term stability</b>	1.2 %RH for five years; 0.25 %RH each year	1.2 %RH for five years; 0.25 %RH each year
<b>Operating temperature range</b>	-40 °C to 85 °C [-40 °F to 185 °F]	-40 °C to 85 °C [-40 °F to 185 °F]
<b>Operating humidity range</b>	0 %RH to 100 %RH	0 %RH to 100 %RH
<b>Moisture/dust filter</b>	yes (some listings)	no
<b>Cover/case</b>	yes	no
<b>Calibration and data printout</b>	no	yes (some listings)
<b>Accuracy</b>	±3 %RH	±3.5 %RH
<b>Voltage supply</b>	2.7 Vdc to 5.5 Vdc	4 Vdc to 5.8 Vdc



## Humidity Sensors

	Honeywell HumidCon™ HIH7000 Series	Honeywell HumidCon™ HIH8000 Series	Honeywell HumidCon™ HIH9000 Series
<b>Description</b>	digital output-type relative humidity (RH) and temperature sensors combined in the same package		
<b>Humidity accuracy</b>	±3.0 %RH typ.	±2.0 %RH typ.	±1.7 %RH typ.
<b>Temperature accuracy (BFSL)</b>	±0.5 °C	±0.5 °C	±0.3 °C
<b>Operating temperature range</b>	-40 °C to 100 °C [-40 °F to 212 °F]	-40 °C to 125 °C [-40 °F to 257 °F]	-40 °C to 125 °C [-40 °F to 257 °F]
<b>Hysteresis</b>	-	-	±1.0 %RH
<b>Output</b>	I <sup>2</sup> C or SPI	I <sup>2</sup> C or SPI	I <sup>2</sup> C or SPI
<b>Package type</b>	SIP 4 Pin or SOIC-8 SMD	SIP 4 Pin or SOIC-8 SMD	SIP 4 Pin or SOIC-8 SMD
<b>Response time</b>	6 s typ. 20 l/min airflow	6 s typ. 20 l/min airflow	30 s max. 1/e slow moving air
<b>Long-term stability</b>	±1.2 %RH for five years	±1.2 %RH for five years	±1.2 %RH for five years
<b>Operating humidity range</b>	0 %RH to 100 %RH	0 %RH to 100 %RH	0 %RH to 100 %RH
<b>Compensated humidity range</b>	20 %RH to 80 %RH	10 %RH to 90 %RH	10 %RH to 90 %RH
<b>Moisture filter</b>	yes (some listings)	yes (some listings)	yes (some listings)
<b>Voltage supply</b>	3.3 Vdc typ.	3.3 Vdc typ.	3.3 Vdc typ.



## Humidity Sensors

	HHIH-4010/4020/4021 Series	HIIH-4030/4031 Series
<b>Description</b>	covered or uncovered, filtered or unfiltered integrated circuit	covered, filtered or unfiltered integrated circuit
<b>Output</b>	analog voltage	analog voltage
<b>Package type</b>	SIP (2,54 mm [0.100 in] or 1,27 mm [0.050 in] lead pitch)	surface mount
<b>Response time</b>	5 s typ. 1/e in slow moving air	5 s typ. 1/e in slow moving air
<b>Long-term stability</b>	1.2 %RH for five years; 0.25 %RH each year	1.2 %RH for five years; 0.25 %RH each year
<b>Operating temperature range</b>	-40 °C to 85 °C [-40 °F to 185 °F]	-40 °C to 85 °C [-40 °F to 185 °F]
<b>Operating humidity range</b>	0 %RH to 100 %RH	0 %RH to 100 %RH
<b>Moisture/dust filter</b>	yes (some listings)	yes (some listings)
<b>Cover/case</b>	yes (some listings)	yes
<b>Calibration and data printout</b>	yes (some listings)	yes (some listings)
<b>Accuracy</b>	±3.5 %RH	±3.5 %RH
<b>Voltage supply</b>	4 Vdc to 5.8 Vdc	4 Vdc to 5.8 Vdc



## Humidity Sensors

### HIH-4602-A, C

### HIH-4602-L, L-CP

<b>Description</b>	monolithic IC with integral thermistor or precision RTD	integrated circuit
<b>Output</b>	analog voltage (for humidity), resistance (for temperature)	analog voltage
<b>Package type</b>	TO-5 can	slotted TO-5 can
<b>Response time</b>	50 s typ. 1/e in slow moving air	30 s typ. 1/e in slow moving air
<b>Long-term stability</b>	1.2 %RH for five years; 0.25 %RH each year	1.2 %RH for five years; 0.25 %RH each year
<b>Operating temperature range</b>	-40 °C to 85 °C [-40 °F to 185 °F]	-40 °C to 85 °C [-40 °F to 185 °F]
<b>Operating humidity range</b>	0 %RH to 100 %RH	0 %RH to 100 %RH
<b>Moisture/dust filter</b>	yes (some listings)	no
<b>Cover/case</b>	yes	yes
<b>Calibration and data printout</b>	yes (some listings)	yes (some listings)
<b>Accuracy</b>	±3.5 %RH	±3.5 %RH
<b>Voltage supply</b>	4 Vdc to 5.8 Vdc	4 Vdc to 5.8 Vdc



## Humidity Sensors Used in Wall Mount Transducers (Asia-Pacific Region Only)

### SCT Series

<b>Description</b>	humidity and temperature wall mount transducer using Honeywell HumidCon™ humidity/temperature sensor
<b>Humidity measurement range</b>	0 % RH to 100 %RH non-condensation
<b>Humidity accuracy</b>	±4 %RH (25 °C [77 °F], 10 %RH to 90 %RH) ±5 %RH (5 °C to 50 °C [41 °F to 122 °F], 10 %RH to 90 %RH)
<b>Temperature measurement range</b>	-5 °C to 55 °C [13 °F to 131 °F] 0 °C to 70 °C [32 °F to 158 °F] -25 °C to 60 °C [-13 °F to 140 °F]
<b>Temperature accuracy</b>	±0.5 °C, ±0.3 °C, ±0.2 °C, or ±1 °C (depending on type of internal sensor used)
<b>Long term drift</b>	±0.05 %RH typ. and ±1.2 %RH max. at 50 %RH for 5 years stability
<b>Operating temperature range</b>	-20 °C to 70 °C [-4 °F to 158 °F] (units with LDC display) -25 °C to 85 °C [-13 °F to 185 °F] (units without LDC display)
<b>Voltage supply</b>	24 Vdc ±10%, 50 mA max. (units with 4 mA to 20 mA output) 18 Vdc to 40 Vdc, 15 mA max. or 24 Vac ±15%, 50/60 Hz, 50 mA max (units with 0 V to 10 V output)

PCBs or in small devices; industry standard design simplifies design-in. hydrophobic filter allows for use in many condensing environments. Tape and reel allows for use in high volume, automated pick-and-place manufacturing, eliminating lead misalignment to the PCB and helping the customer to reduce manufacturing costs. Wide operating temperature ranges allow for use in many applications. Optional one or two %RH level alarm outputs provide the ability to monitor whether the RH level has exceeded or fallen below pre-determined and critical levels within the application. Multi-function ASIC delivers flexibility within the application by lowering or eliminating the risk and cost of OEM calibration. May be used in such potential industrial applications as HVAC/R, air compressors, weather stations, telecom cabinets, incubators/microenvironments and in such potential medical apps such as respiratory therapy, incubators/microenvironments.

#### **HIH-5030/5031 Series.**

**Features:** Surface mount package  
• Voltage output • Operates at 2.7 Vdc to 5.5 Vdc • Laser-trimmed • Accurate, fast response • Molded thermoset plastic housing • Designed to be chemically resistant • Tape and reel • Accuracy of  $\pm 3$  %RH

**Benefits:** Instrumentation-quality sensing performance in a competitively priced, solderable surface mount device. Multilayer construction designed to provide enhanced resistance to wetting, dust, dirt, oils, and common environmental chemicals. Low current draw often ideal in most low drain, battery operated systems. Tight sensor interchangeability reduces or eliminates OEM production calibration costs. Tape and reel for high volume applications (optional). Available covered, filtered/unfiltered for application flexibility in high volume OEM condensing environments such as battery-powered systems, air compressors, HVAC, refrigeration, medical, office automation, telecommunications equipment, and weather meteorology equipment.

#### **HIH-4000 Series.**

**Features:** Voltage output • Near linear voltage output vs %RH • Laser-trimmed  
• Accurate, fast response • Molded thermoset plastic housing • Chemically resistant • Accuracy of  $\pm 3.5$  %RH  
• Voltage supply of 4 Vdc to 5.8 Vdc

**Benefits:** Instrumentation-quality RH sensing performance in a competitively priced, solderable SIP. Multilayer construction designed to provide excellent resistance to wetting, dust, dirt, oils and common environmental chemicals. Laser trimmed for stable, low drift performance (optional). Factory calibration data provides individually matched downstream electronics and accuracy.

#### **HIH-4010/4020/4021 Series.**

**Features:** Voltage output • Near linear voltage output vs %RH • Laser-trimmed  
• Accurate, fast response • Molded thermoset plastic housing • Designed to be chemically resistant • Accuracy of  $\pm 3.5$  %RH • Voltage supply of 4 Vdc to 5.8 Vdc

**Benefits:** Instrumentation-quality RH sensing performance in a competitively priced, solderable packages. Multilayer construction provides enhanced resistance to wetting, dust, dirt, oils and common environmental chemicals. Laser trimmed for stable, low drift performance. Factory calibration data designed to provide individually matched downstream electronics and accuracy (available on all voltage output models). Available covered/uncovered and filtered/unfiltered for application flexibility in high volume OEM condensing environments such as HVAC, refrigeration, medical, office automation, and telecommunications equipment.

#### **HIH-4030/4031 Series.**

**Features:** Surface mount package  
• Voltage output • Near linear voltage output vs %RH • Laser-trimmed  
• Accurate, fast response • Molded thermoset plastic housing • Designed to be chemically resistant • Tape and reel  
• Accuracy of  $\pm 3.5$  %RH • Voltage supply of 4 Vdc to 5.8 Vdc

**Benefits:** Instrumentation-quality sensing performance in a competitively priced, solderable surface mount device. Multilayer construction designed to provide enhanced resistance to wetting, dust, dirt, oils, and common environmental chemicals. Low current draw often ideal in most low drain, battery operated systems. Tight sensor interchangeability reduces or eliminates OEM production calibration costs. Tape and reel for high volume applications (optional). Factory calibration data designed to provide individually matched downstream electronics and accuracy. Available covered, filtered/unfiltered for application flexibility in high volume OEM condensing environments such as HVAC, refrigeration, medical, office automation, and telecommunications equipment.

#### **HIH-4602 A, C Series.**

**Features:** Humidity and temperature sensing in one package • Near linear voltage output vs %RH • Laser-trimmed  
• Accurate, fast response • Designed to be chemically resistant • Built-in static protection • Accuracy of  $\pm 3.5$  %RH  
• Voltage supply of 4 Vdc to 5.8 Vdc  
• Stable, low drift performance • TO-5 can

**Benefits:** Combine both relative humidity and temperature sensing for measuring dew point and other absolute moisture terms. Can-type housing designed to provide quick response while still maintaining robustness of enclosed component. Factory calibration data designed to provide individually matched downstream electronics and accuracy, standard. Laser trimmed for stable, low drift performance in potential applications such as HVAC, refrigeration, medical, office automation, telecommunications and meteorology equipment.

#### **HIH-4602-L, L-CP Series.**

**Features:** Voltage output • Near linear voltage output vs %RH • Laser-trimmed  
• Accurate, fast response • Designed to be chemically resistant • Built-in static protection • Accuracy of  $\pm 3.5$  %RH  
• Voltage supply of 4 Vdc to 5.8 Vdc  
• Stable, low drift performance • Slotted TO-5 can

**Benefits:** Slotted can design allows for quick response while still maintaining robustness of enclosed components. Factory calibration data designed to provide individually matched downstream electronics and accuracy, optional. Laser trimmed for stable, low drift performance in potential applications such as refrigeration, drying, meteorology equipment, battery-powered systems, and OEM (Original Equipment Manufacturer) assemblies.

## **HUMIDITY SENSORS USED IN WALL MOUNT TRANSDUCERS (Asia-Pacific region only)**

### **SCT Series**

**Features:** Utilize Honeywell HumidIcon™ humidity/temperature sensors • Optional LCD display shows ambient temperature with relative humidity or dew point • True temperature-compensated humidity element • Enhanced accuracy • Long-term stability • Enhanced reliability • Standard humidity output • Cost-effective • Choice of silver or gold cover trim • Full 0 %RH to 100 %RH measurement range

**Benefits:** Accurately and reliably senses humidity and temperature in the area to enhance user comfort. Enables customer to potentially reduce/eliminate transmitter recalibration cost. Supports and optimizes system accuracy and uptime. Enhanced stability over next best alternatives. Humidity sensor element's multilayer construction provides resistance to most application hazards such as dust, dirt, condensation, oils and common environmental chemicals. Potential industrial applications include climate monitoring and control for residential and office buildings, production and manufacturing plants, storerooms, equipment cabinets, and testing environments.

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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.

For more information about Sensing and Control products, visit [sensing.honeywell.com](http://sensing.honeywell.com) or call +1-815-235-6847  
Email inquiries to [info.sc@honeywell.com](mailto:info.sc@honeywell.com)

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