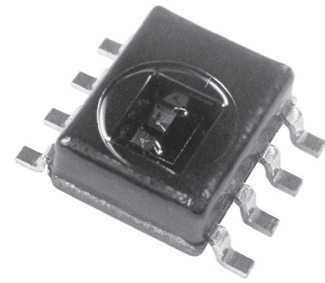


# Humidity Sensors Line Guide



**Performance and reliability.** Just because humidity products are typically standardized and platform-based, they can still deliver superior performance right out of the box. At Honeywell Sensing and Control (S&C), each sensor is designed to provide enhanced sensitivity, response time, stability and reliability. Configured with integrated circuitry to provide on-chip signal conditioning

offered on all products except the HCH Series, Honeywell S&C humidity sensors offer interchangeability of  $\pm 3$  %RH accuracy for potential applications as diverse as heating, ventilation and air conditioning equipment (HVAC), refrigeration, office automation, and medical equipment.

## FEATURES

### HUMIDITY SENSORS

#### Honeywell Humidicon™ HIH6120/6121 Series

**Features:** Industry-leading long-term stability, Total Error Band, and reliability

- Lowest total cost solution
- True temperature-compensated digital I<sup>2</sup>C output
- Energy efficient
- Ultra-small package
- Combined humidity and temperature sensor
- Cost-effective tape-and-reel packaging
- High humidity and temperature sensor resolution
- Wide operating temperature range
- Optional one or two %RH level alarm outputs
- Multi-function ASIC
- Industry standard SIP 4 Pin package
- RoHS and WEEE compliant
- With or without hydrophobic filter

**Benefits:** Industry-leading long-term stability (1.2 %RH over five years) minimizes system performance issues, helps to support system uptime, and eliminates the need to regularly recalibrate the sensor in the application. Industry-leading Total Error Band ( $\pm 5$  %RH) over a compensated range of 5 °C to 50 °C [41 °F to 122 °F] and 10 %RH to 90 %RH supports system accuracy and warranty requirements, helps to optimize system uptime, and provides excellent sensor interchangeability. Industry-

leading reliability due to laser trimmed, thermoset polymer capacitive sensing element and the element's multilayer construction which provides resistance to most application hazards such as condensation, dust, dirt, oils, and common environmental chemicals. Lowest total cost solution due to the sensor's industry-leading Total Error Band and its being a combined humidity/temperature sensor. True temperature-compensated digital SPI output typically allows the customer to remove the components associated with signal conditioning from the PCB to free up space and reduce associated costs. 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. Low supply voltage of down to 2.3 Vdc, allows use in low energy and wireless-compatible applications to enhance energy savings and prolong system battery life. Sensor goes into sleep mode when not taking a measurement within the application, consuming only 1  $\mu$ A of power versus 650  $\mu$ A in full operation in a battery operated system, helping to maximize battery life, reduce

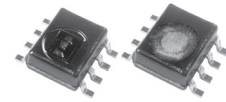
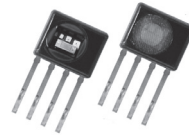
power supply size, and the application's overall weight. Ultra-small SIP 4 Pin, including the condensation-resistant model with hydrophobic filter on-board (HIH6121), allows for flexibility of use within the application, occupies less space on the PCB, and typically simplifies placement on crowded PCBs or in small devices. Humidity and temperature sensors are co-located in the same package, allowing the RH measurement to be temperature compensated and provides a second, standalone temperature sensor output, allowing the user to purchase one sensor instead of two. Cost-effective tape-and-reel packaging allows for use in high volume, automated pick-and-place manufacturing, eliminating lead misalignment to the PCB and helping to reduce manufacturing costs. 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. Potential applications include HVAC/R, respiratory therapy, incubators/microenvironments, air compressors, weather stations and telecom cabinets.

# Humidity Sensors Line Guide

## Highly viable humidity sensing solutions.

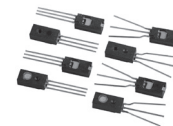
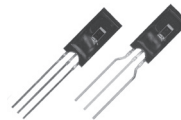
And every Honeywell S&C sensor contains something no other supplier can offer: Honeywell engineering and expertise. This means an unparalleled feature and benefit set: A capacitive sensing die set in thermoset polymers interacts with platinum electrodes. Laser-trimmed sensors designed to offer stable, 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&C'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™ HIH6120/6121 Series	Honeywell HumidCon™ HIH6130/6131 Series
<b>Description</b>	digital output-type relative humidity (RH) and temperature sensor combined in the same package	
<b>Output</b>	I <sup>2</sup> C	I <sup>2</sup> C or SPI
<b>Package type</b>	SIP 4 Pin	SOIC-8 SMD
<b>Response time</b>	6 s typ. in 20 l/min minimum airflow	6 s typ. in 20 l/min minimum airflow
<b>Long-term stability</b>	±1.2 %RH for five years	±1.2 %RH for five years
<b>Operating temperature range</b>	-25 °C to 85 °C [-13 °F to 185 °F]	-25 °C to 85 °C [-13 °F to 185 °F]
<b>Operating humidity range</b>	0 %RH to 100 %RH	0 %RH to 100 %RH
<b>Compensated humidity range</b>	10 %RH to 90 %RH	10 %RH to 90 %RH
<b>Moisture/dust filter</b>	yes (some listings)	yes (some listings)
<b>Cover/case</b>	no	no
<b>Calibration and data printout</b>	no	no
<b>Total error band</b>	±5 %RH	±5 %RH
<b>Accuracy</b>	±4 %RH	±4 %RH
<b>Voltage supply</b>	3.3 Vdc typ.	3.3 Vdc typ.



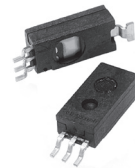
### Humidity Sensors

	HIH-4000 Series	HIH-4010/4020/4021 Series
<b>Description</b>	integrated circuit	covered or uncovered, 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)	SIP (2,54 mm [0.100 in] or 1,27 mm [0.050 in] lead pitch)
<b>Response time</b>	5 s 1/e in slow moving air	5 s 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>	no	yes (some listings)
<b>Cover/case</b>	no	yes (some listings)
<b>Calibration and data printout</b>	yes (some listings)	yes (some listings)
<b>Total error band</b>	-	-
<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	HCH-1000 Series
<b>Description</b>	monolithic IC with integral thermistor or precision RTD	integrated circuit	cased or uncased capacitive polymer
<b>Output</b>	analog voltage (for humidity), resistance (for temperature)	analog voltage	capacitance value
<b>Package type</b>	TO-5 can	slotted TO-5 can	SIP (2,54 mm [0.100 in] lead pitch)
<b>Response time</b>	50 s 1/e in slow moving air	30 s 1/e in slow moving air	15 s at 30 %RH to 90 %RH
<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	0.2 %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]	-40 °C to 120 °C [-40 °F to 248 °F]
<b>Operating humidity range</b>	0 %RH to 100 %RH	0 %RH to 100 %RH	0 %RH to 100 %RH
<b>Moisture/dust filter</b>	yes (some listings)	no	no
<b>Cover/case</b>	yes	yes	yes (some listings)
<b>Calibration and data printout</b>	yes (some listings)	yes (some listings)	no
<b>Total error band</b>	-	-	-
<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-4030/4031 Series	HIH-5030/5031 Series
<b>Description</b>	covered, filtered or unfiltered integrated circuit	covered, filtered or unfiltered integrated circuit
<b>Output</b>	analog voltage	analog voltage
<b>Package type</b>	surface mount	surface mount
<b>Response time</b>	5 s 1/e in slow moving air	5 s 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	yes
<b>Calibration and data printout</b>	yes (some listings)	no
<b>Total error band</b>	-	-
<b>Accuracy</b>	±3.5 %RH	±3 %RH
<b>Voltage supply</b>	4 Vdc to 5.8 Vdc	2.7 Vdc to 5.5 Vdc

## HIH6130/6131 Series

**Features:** Industry-leading long-term stability, Total Error Band, and reliability

- Lowest total cost solution
- True temperature-compensated digital I<sup>2</sup>C or SPI output
- Energy efficient
- Ultra-small package
- Combined humidity and temperature sensor
- Cost-effective tape-and-reel packaging
- High humidity and temperature sensor resolution
- Wide operating temperature range
- Optional one or two %RH level alarm outputs
- Multi-function ASIC
- Industry standard SOIC-8 package
- RoHS and WEEE compliant
- With or without hydrophobic filter

**Benefits:** Industry-leading long-term stability (1.2 %RH over five years) minimizes system performance issues, helps to support system uptime, and eliminates the need to regularly recalibrate the sensor in the application. Industry-leading Total Error Band ( $\pm 5$  %RH) over a compensated range of 5 °C to 50 °C [41 °F to 122 °F] and 10 %RH to 90 %RH supports system accuracy and warranty requirements, helps to optimize system uptime, and provides excellent sensor interchangeability. Industry-leading reliability due to laser trimmed, thermoset polymer capacitive sensing element and the element's multilayer construction which provides resistance to most application hazards such as condensation, dust, dirt, oils, and common environmental chemicals. Lowest total cost solution due to the sensor's industry-leading Total Error Band and its being a combined humidity/temperature sensor. 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 associated costs. 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. Low supply voltage of down to 2.3 Vdc, allows use in low energy and wireless-compatible applications to enhance energy savings and prolong

system battery life. Sensor goes into sleep mode when not taking a measurement within the application, consuming only 1  $\mu$ A of power versus 650  $\mu$ A in full operation in a battery operated system, helping to maximize battery life, reduce power supply size, and the application's overall weight. Ultra-small SOIC-8 SMD (Surface Mount Device), including the condensation-resistant model with hydrophobic filter on-board (HIH6131), allows for flexibility of use within the application, occupies less space on the PCB, and typically simplifies placement on crowded PCBs or in small devices. Humidity and temperature sensors are co-located in the same package, allowing the RH measurement to be temperature compensated and provides a second, standalone temperature sensor output, allowing the user to purchase one sensor instead of two. Cost-effective tape-and-reel packaging allows for use in high volume, automated pick-and-place manufacturing, eliminating lead misalignment to the PCB and helping to reduce manufacturing costs. 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. Potential applications include HVAC/R, respiratory therapy, incubators/microenvironments, air compressors, weather stations and telecom cabinets.

## 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-4602-L 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.

## 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.

## HCH-1000 Series.

**Features:** Capacitance output

- Polyimide sensing material
- Semiconductor fabrication technology
- Glass wafer substrate
- Low hysteresis, long-term stability
- Enhanced and accurate response time

**Benefits:** Polyimide sensing material designed to reduce temperature dependence and enhances resistance against contamination. Top grid electrode/polyimide layer, bottom electrode structure more sensitive than standard structure. Cased version designed to protect against dust. Cost-effective performance in potential applications such as refrigeration, drying, meteorology, battery-powered systems, and OEM assemblies.

#### **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-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.

**Warranty.** 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 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.

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

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