# Installation Instructions for the **HIH-5030/5031 Series Humidity Sensors**

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*50038351*

## ⚠ 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.
- The sensor's housing does not provide electrical safety isolation. Mount the sensor in a location where it cannot be touched, or where a surrounding barrier prevents human contact.

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

## CAUTION

**IMPROPER HANDLING**

- Do not remove the sensor from its original protective packaging until it is ready to be installed.
- Do not touch the sensor surface. Use latex finger cots. Handle the sensor by its package edges or leads.
- Do not allow objects to enter the cavity of the sensor element.

**Failure to comply with these instructions may result in product damage.**

## NOTICE

- **For HIH-5030 only:** Under condensing conditions where enough liquid water forms on the sensor to create a parasitic leakage path, the HIH-5030 Humidity Sensor produces an erroneous reading of 0% humidity. If this erroneous reading is assumed to be correct by your control function, excess humidity is likely to be introduced into the system. Once the liquid water evaporates from the sensor and the environment returns to a non-condensing state, the device returns to normal functionality.
- Shade the sensor from direct light. Intense direct light can flood junctions in the CMOS (Complementary Metal Oxide Semiconductor) device and drive the output signal to the minimum. This does not harm the sensor or affect calibration. Proper operation resumes shortly after the direct light is removed. Ambient scattered light normally does not affect performance.
- At the end of its working life, dispose the sensor in accordance with Directive 2002/96/EC (WEEE).

**SOLDERING AND ASSEMBLY**

## CAUTION

**IMPROPER CLEANING**

- Insert and solder the sensor after the PCB cleaning process.

**Failure to comply with these instructions may result in product damage.**

## CAUTION

**IMPROPER SENSOR POSITIONING**

- Position the sensor so that its face is exposed to the atmosphere being monitored.

**Failure to comply with these instructions may result in product damage.**

## CAUTION

**IMPROPER SOLDERING**

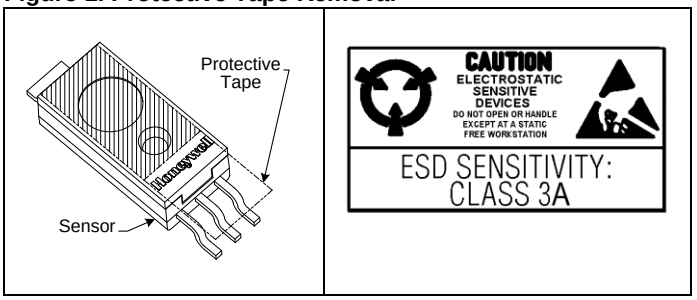
- For better product reliability, the HIH-5030/5031 Series is factory-shipped with a protective tape on the cover (sensing face). This tape must remain in place during soldering.
- After soldering, remove the protective tape as shown below to activate the sensor.

**Failure to comply with these instructions may result in product damage.**

**PROTECTIVE TAPE REMOVAL**

1. Use proper ESD protection.
2. Using covered fingers or tweezers to ensure that no foreign debris falls into the filter, sensor cover or die, grip the overhanging front edge of the protective tape and peel it back from the top surface of the sensor.
3. Ensure the complete rectangle of protective tape is removed.

**Figure 1. Protective Tape Removal**




**SOLDERING**

Hand soldering is acceptable. If reflow soldering is required, use a no-clean flux. Limit the contact of the flux to the leads only. Reflow soldering profile is specified by J-STD-020B for a small package with a peak temperature of 250 °C [482 °F].

**MOISTURE SEALING THE LEADS**

If, in the presence of intermittent moisture or other contaminants, there is the possibility of galvanic paths between the leads, moisture seal the leads and exposed pads.

**Table 1. Performance Specifications (At 3.3 Vdc supply and 25 ºC [77 ºF] unless otherwise noted.)**

| Parameter | Minimum | Typical | Maximum | Unit | Specific Note |
|---|---|---|---|---|---|
| Interchangeability (first order curve) | | | | | |
| 0 % RH to 10 % RH, 90 % RH to 100 % RH | -7 | – | 7 | % RH | – |
| 11 % RH to 89 % RH | -3 | – | 3 | % RH | |
| Accuracy (best fit straight line) 11% RH to 89% RH | -3 | – | +3 | % RH | 4 |
| Hysteresis | – | 2 | – | % RH | – |
| Repeatability | – | ±0.5 | – | % RH | – |
| Settling time | – | – | 70 | ms | – |
| Response time (1/e in slow moving air) | – | 5 | – | s | – |
| Stability (at 50% RH in 5 years) | – | ±1.2 | – | % RH | 1 |
| Voltage supply | 2.7 | – | 5.5 | Vdc | 2 |
| Current supply | – | 200 | 500 | µA | – |
| Voltage output (1st order curve fit) | $V_{OUT}=(V_{SUPPLY})(0.00636(\text{sensor RH}) + 0.1515)$, typical at 25 °C | | | | |
| Temperature compensation | True RH = (Sensor RH)/(1.0546 – 0.00216T), T in °C | | | | |
| Output voltage temp. coefficient at 50% RH, 5 V | – | -2 | – | mV/°C | – |
| Operating temperature | -40[-40] | See Figure 2. | 85[185] | °C[°F] | – |
| Operating humidity (HIH-5030) | 0 | See Figure 2. | 100 | % RH | 3 |
| Operating humidity (HIH-5031) | 0 | See Figure 2. | 100 | % RH | – |
| Storage temperature | -50[-58] | – | 125[257] | °C[°F] | – |
| Storage humidity | See Figure 3. | | | % RH | 3 |

**Specific Notes:**

1. Includes stress outside of recommended operating zone.
2. Device is tested at 3.3 Vdc and 25 °C.
3. Non-condensing environment. When liquid water falls on the humidity sensor die, output goes to a low rail condition indicating no humidity.
4. Total accuracy including interchangeability is ±3 %RH.

**General Notes:**

- Sensor is ratiometric to supply voltage.
- Extended exposure to ≥90 % RH causes a reversible shift of 3 % RH.
- Sensor is light sensitive. For best performance, shield sensor from bright light.

**Figure 2. Operating Environment (Non-condensing environment for HIH-5030 catalog listings only.)**

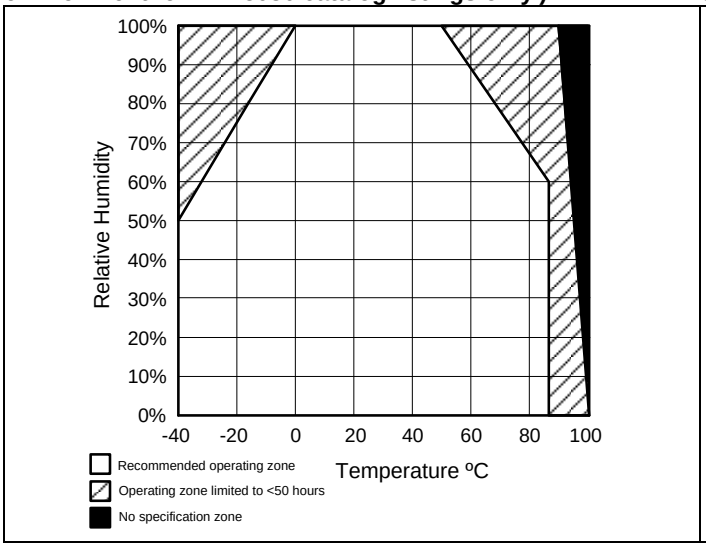
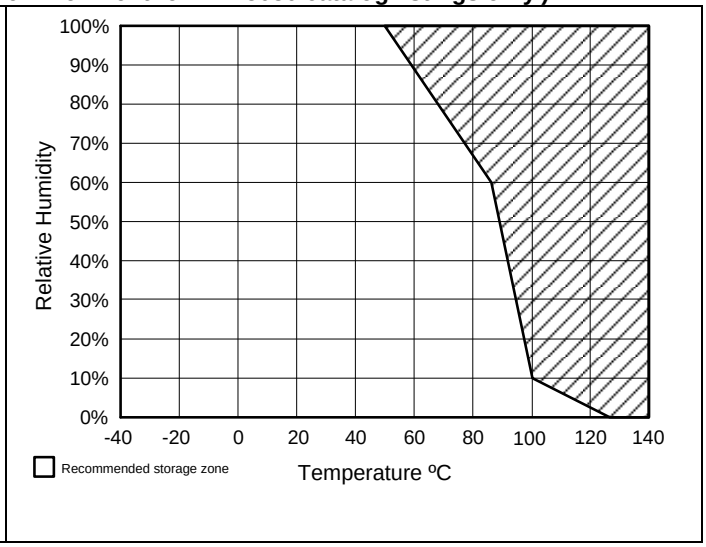



**Figure 3. Storage Environment (Non-condensing environment for HIH-5030 catalog listings only.)**



**NOTICE**

The metal tab on the top of the sensor as shown is for support purposes only. Ensure it is electrically isolated.

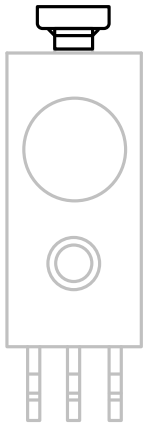
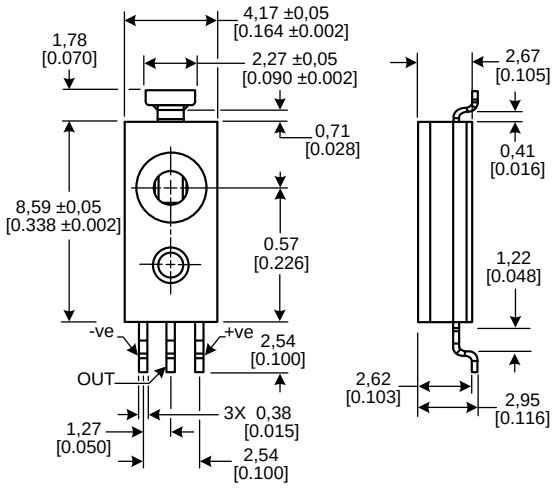


**Figure 4. HIH-5030 Mounting Dimensions (For reference only. mm/[in])**




**PCB LANDING PATTERN**

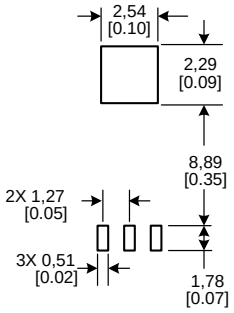
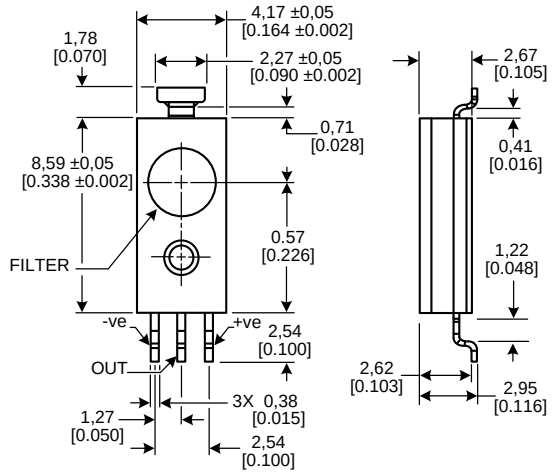



**Figure 5. HIH-5031 Mounting Dimensions (For reference only. mm/[in])**




**PCB LANDING PATTERN**

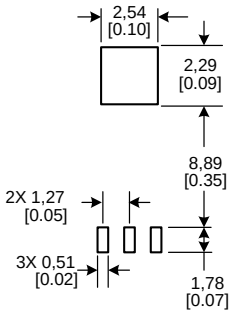
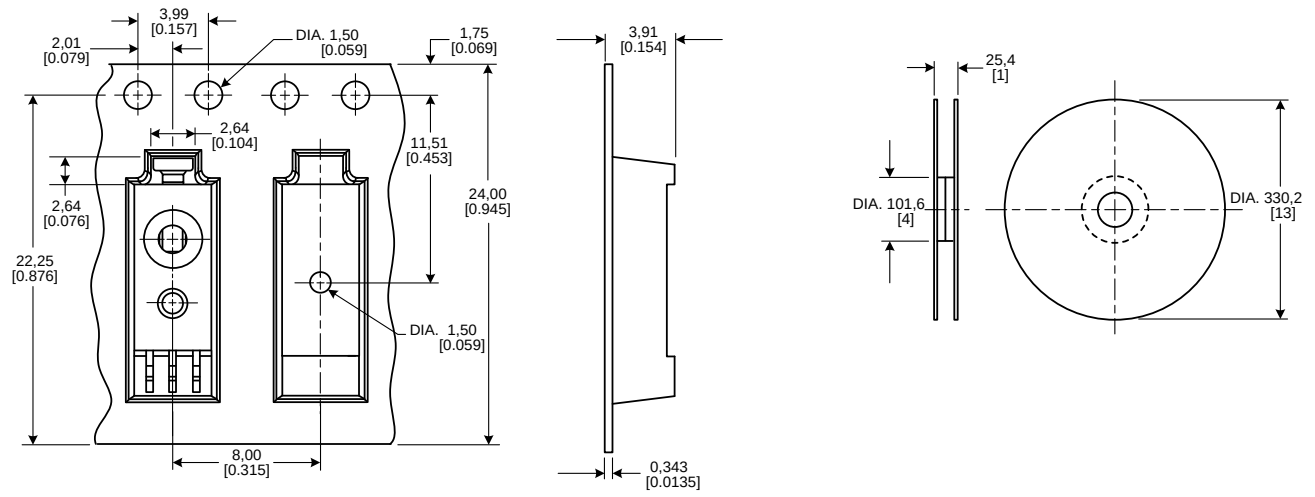


**Figure 6. Tape and Reel Dimensions (For reference only. mm/[in])**

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