



Workplace Safety

Discover the Unexpected Places You'll Find a Humidity Sensor

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When we think about the top industries and products that need to know the level of moisture in the air, we might first think of heating, ventilation and air-conditioning (HVAC) systems inside commercial buildings, or smart thermostats within our homes. We might also think of the weather service and the various pieces of equipment it uses to tell us the outdoor temperature and humidity level each day.

Humidity is an important element to many different things – from production and distribution of the food we eat to the technology that helps maintain our health.

What is relative humidity?

Relative humidity (RH), expressed as a percentage, measures the amount of water vapor in the air compared to the total amount of vapor possible in the air at its current temperature.¹ The U.S. Environmental Protection Agency (EPA) stresses the importance of keeping indoor relative humidity below 60%, and ideally between 30-50%, as uncontrolled moisture can trigger mold growth and subsequent health issues.² On the other end of the spectrum, when air is too dry, it can lead to dehydration, skin issues, nose bleeds and worsening of respiratory symptoms from conditions like asthma.³

Humidity measurement is critical in a number of industries including:

Manufacturing

When producing and assembling electronics, many of the parts involved are highly sensitive to moisture. For instance, when the air is too dry, the electronic components can become brittle and easier to break. There is also the risk of electrostatic discharge in low humidity environments, when charged objects connect and static electricity is released. This can even cause a fire and other safety risks.⁴

Similarly, in something like textile manufacturing, low humidity can lead to impaired tensile strength, the maximum force fabric can tolerate before it breaks. When threads are damaged in processing, it can reduce efficiency and increase machine downtime.⁵

Agriculture, Farming & Grocery

When storing produce at a warehouse, transporting it to the grocery store and refrigerating it at the store before a consumer buys it, it is critical to know the conditions the produce encountered at each step of the process. Temperatures and humidity levels outside of the appropriate range can result in the produce spoiling before it can even reach the end-consumer.

Humidity is also critical for hatcheries and the incubators where eggs are stored. If the air is too dry, eggshells might stick to the chicken when the eggs are being laid, making the eggs unusable. If the air is too moist and humid, bacteria can grow.

Healthcare

Many pieces of healthcare equipment rely on information from humidity sensors, such as CPAP machines, ventilators and incubators for premature infants and babies with jaundice or breathing issues.

In the example of premature infants, incubators control for temperature, oxygen level, humidity and light. Humidity level is critical for protecting babies' skin, which does not fully mature until 34 weeks' gestation. Babies born before that time have particularly thin and fragile skin.⁶

Transportation

Not only is it important to know the humidity inside the cabin of a vehicle for individual comfort and wellbeing—whether a tractor, industrial vehicle or passenger vehicle—but it's also essential to understand the conditions within the batteries that are powering many of today's emerging electric vehicles (*EVs*). If the lithium-ion battery inside an EV is exposed to too much moisture, it can lead to reduced performance and shorter lifespan of the battery.

The role of humidity sensors and key considerations when selecting a sensor

Humidity sensors play a critical role in monitoring humidity and/or temperature levels of various applications and alerting users if the humidity is too high or too low. When determining the type of humidity sensor to choose, it is important to consider a number of factors, including:

- **The environment where the application will be used:** Humidity sensors can be exposed to dusty environments where a filter is required, or environments where condensation or chemicals are present. For example, if the sensors are used in a refrigerator storing produce, condensation may develop inside, indicating too much moisture and potentially causing the produce to rot. The sensor could need to trigger an alarm to lower the humidity in this instance. In the use case of a chicken coop, there is typically ammonia present, so the humidity sensor would need to be compatible with this chemical.
- **The humidity and temperature range needed:** It is helpful to understand upfront the humidity and temperature range the sensor will be operating in, as there is rarely a case when an application could be operating in 0% to 100% humidity. The total error band required (TEB) over this temperature and humidity range is also important to know.
- **The output type:** Will the sensor need digital or analog output? And will the output be going to a microprocessor, an alarm circuit buzzer, a digital analog converter (DAC) or a programmable logic controller (PLC)?
- **The supply voltage:** It is important to know the voltage need (2.3 Vdc, 3.3Vdc, 5Vdc, etc.) or whether the application is battery-operated and requires an option for sleep-mode.

Honeywell's range of *humidity sensors* offer numerous options to the customer, whether a company is looking for a digital or analog sensor, a filtered or an unfiltered option or a Surface Mount Device (SMD) or SIP package style. Their sensors are known for their reliability, high accuracy, robustness and long-term stability, even in harsh conditions. To learn more about their latest humidity and temperature

sensor offerings, such as the *HH8000 Series*, contact Honeywell today.

Sources:

1 - www.weather.gov/lmk/humidity

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