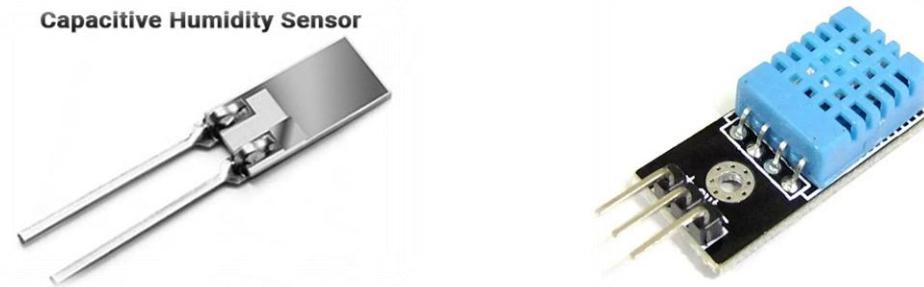


## Capacitive based humidity sensor



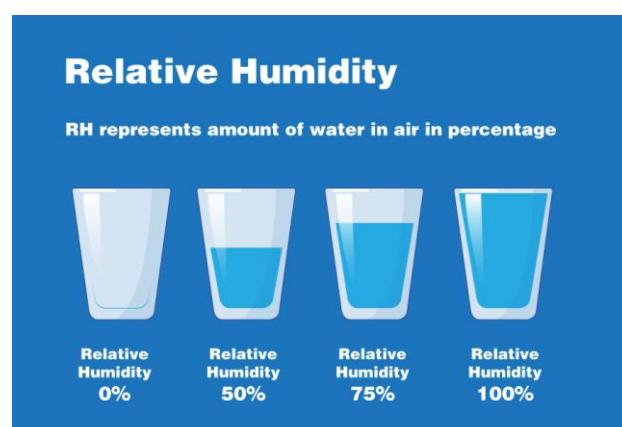
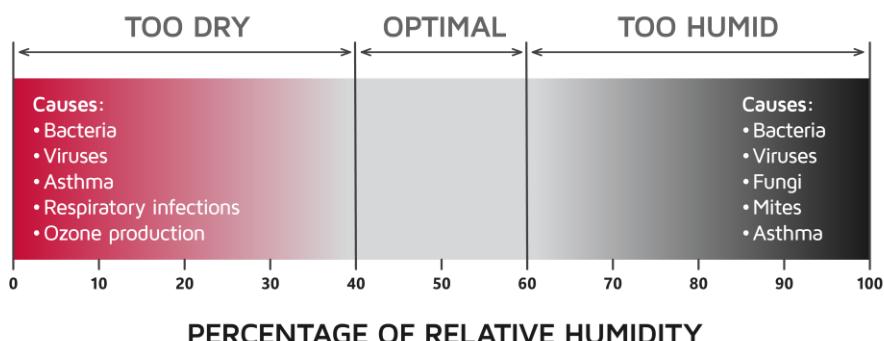
A humidity sensor, also known as a hygrometer, is an electronic device that measures the moisture content (humidity) in the environment. Humidity sensors play a vital role in climate control, agriculture, food processing, pharmaceuticals, and smart devices.

### What is Humidity?

**Humidity is the amount of water vapor present in the air.**

It is an important factor in weather and climate, influencing temperature, comfort levels, and even material properties in certain applications.

## HUMIDITY



## Capacitive based humidity sensor

<b>NORMAL HUMIDITY RANGE</b>	- 30% TO 50% IN INDOORS - 30% TO 60% IN OUTDOORS
<b>HIGH HUMIDITY RANGE</b>	- ABOVE 60%
<b>LOW HUMIDITY RANGE</b>	- BELOW 30%

Humidity can be expressed in two main ways:

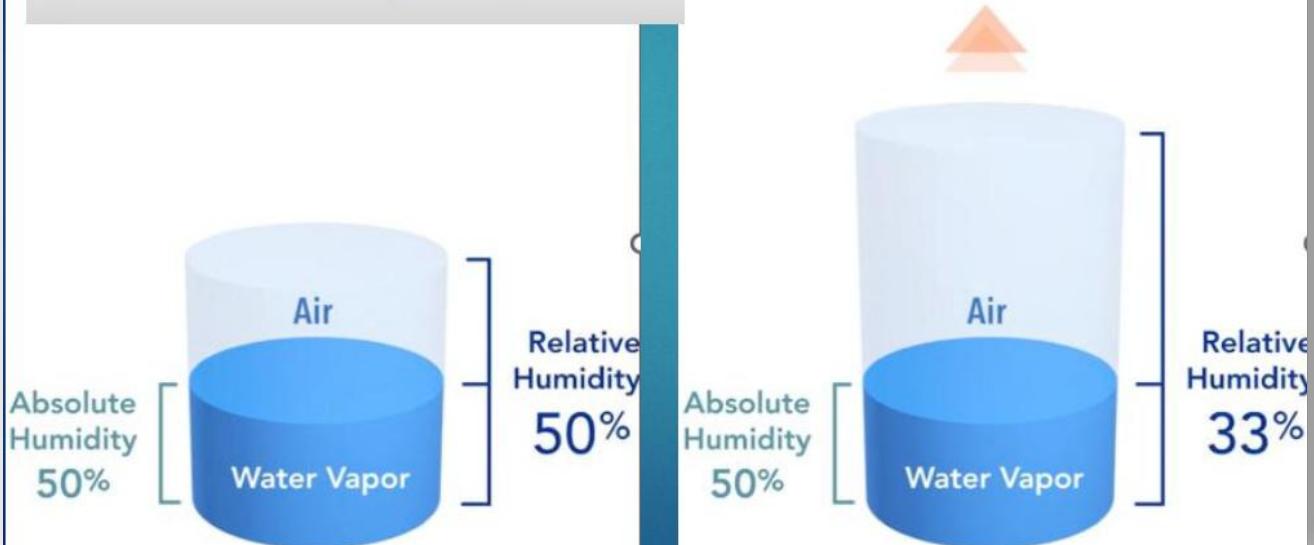
- **Relative Humidity (RH%):** The percentage of moisture in the air relative to the maximum it can hold at that temperature.
- **Absolute Humidity:** The total amount of water vapor present in a given volume of air (typically in g/m<sup>3</sup>).

**Absolute Humidity (kg/kg):**  
 $\text{Mass of water vapor} \div \text{Mass of dry air}$

**Relative Humidity (%RH):**  
 $\text{Amount of water vapor in the air at a given temperature} \div \text{Amount of water vapor needed for saturation at that temperature}$

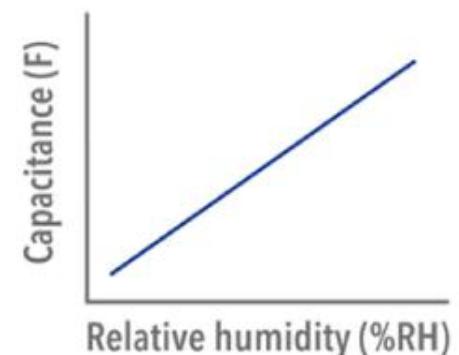
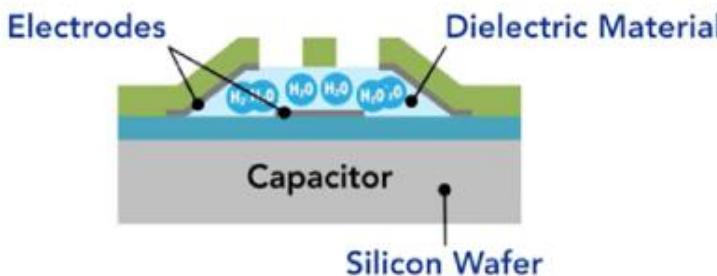
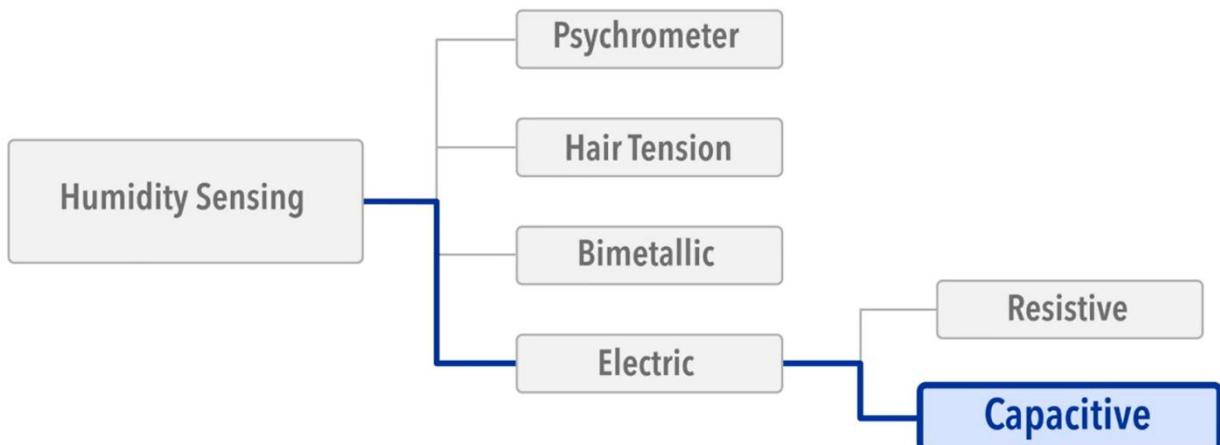
- Relative humidity Increase or decreases
- Absolute humidity stays the same

Air Temperature and Air Capacity

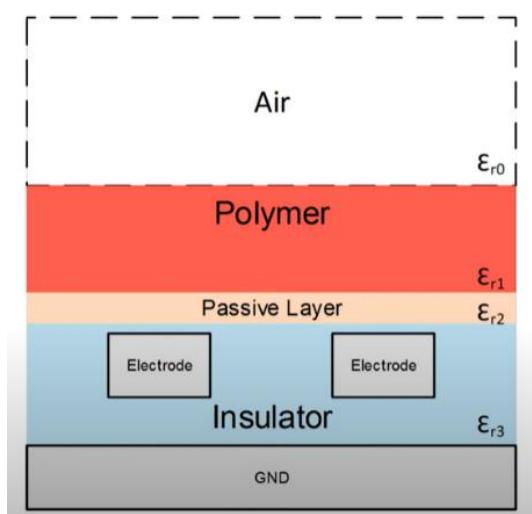
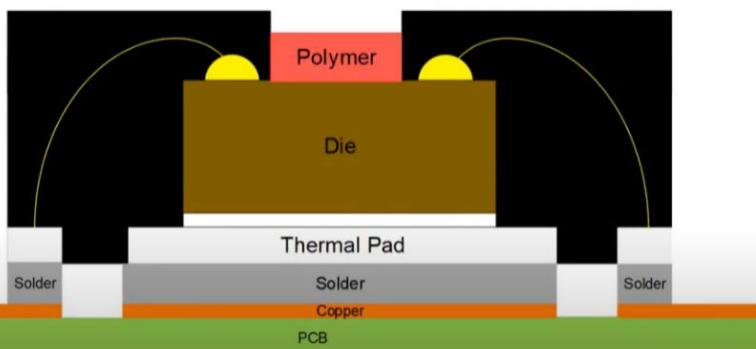


## Capacitive based humidity sensor

# Humidity Sensing Methods



- Small Capacitive Sensor
- Analog and Digital Options
- Range from 0%RH to 100%RH
- Multiple Applications



## Capacitive based humidity sensor

### Advantages:

- Low Cost
- Good Humidity Range
- Small Hysteresis (typ. 1% or less)
- Fast Response Time

### Disadvantages:

- Accuracy Loss below 5% RH
- Additional circuitry required to sample capacitance and convert to RH
- Exposed sensing polymer is sensitive to chemical contamination



## Applications

### 1. Environmental Monitoring

### 2. HVAC Systems (Heating, Ventilation, and Air Conditioning)

### 3. Industrial Applications

- Pharmaceutical Industry:

- Textile Industry:

- Paper and Printing Industry:

### 4. Medical and Healthcare

### 5. Automotive Industry

### 6. Aerospace and Defense

### 7. Consumer Electronics

### 8. Agriculture and Soil Moisture Monitoring