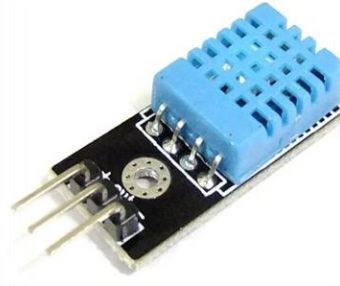


Capacitive based humidity sensor

Capacitive Humidity Sensor



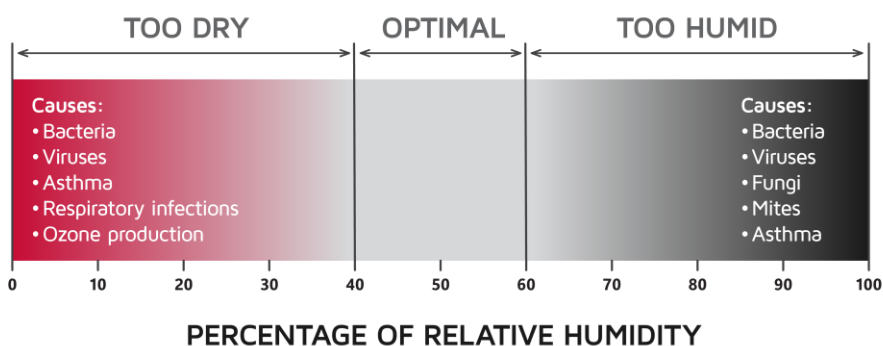
A humidity sensor, also known as a hygrometer, is an electronic device that measures the moisture content (humidity) in the environment. Humidity sensors play a vital role in climate control, agriculture, food processing, pharmaceuticals, and smart devices.

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



Relative Humidity

RH represents amount of water in air in percentage



Capacitive based humidity sensor

NORMAL HUMIDITY RANGE - 30% TO 50% IN INDOORS
- 30% TO 60% IN OUTDOORS

HIGH HUMIDITY RANGE - ABOVE 60%

LOW HUMIDITY RANGE - BELOVE 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^3).

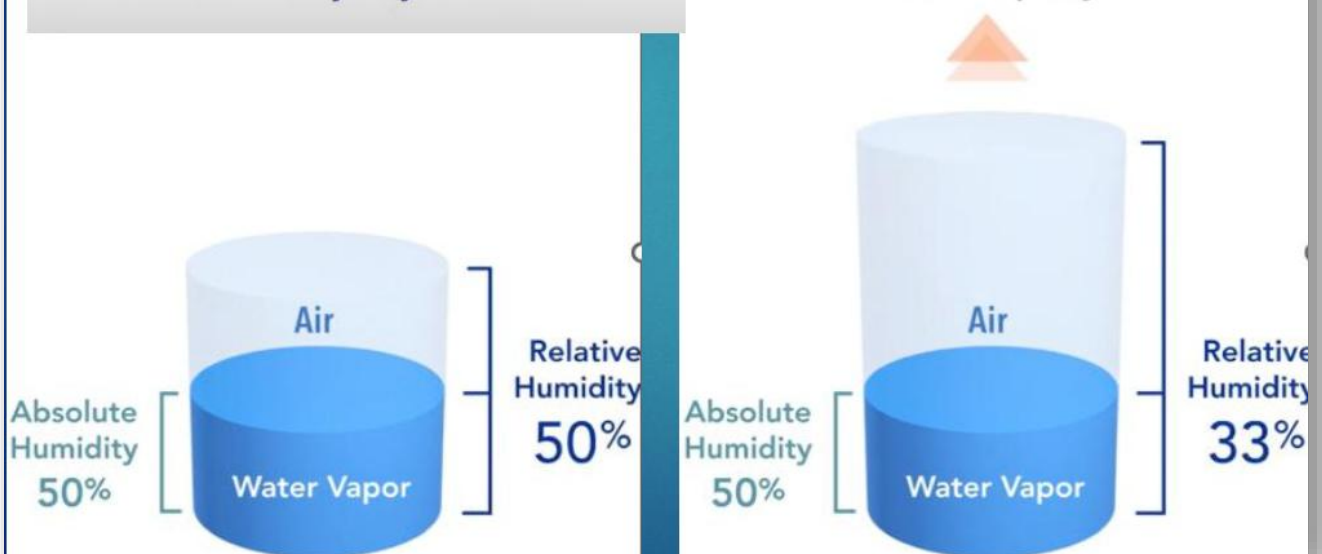
Absolute Humidity (kg/kg):

Mass of water vapor \div Mass of dry air

Relative Humidity (%RH):

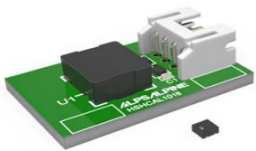
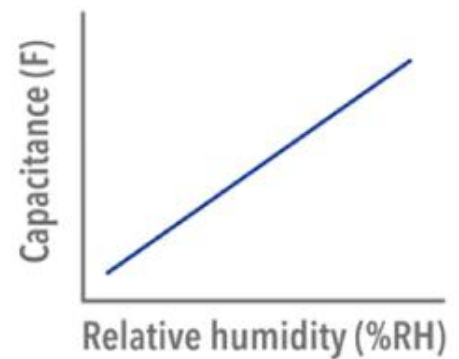
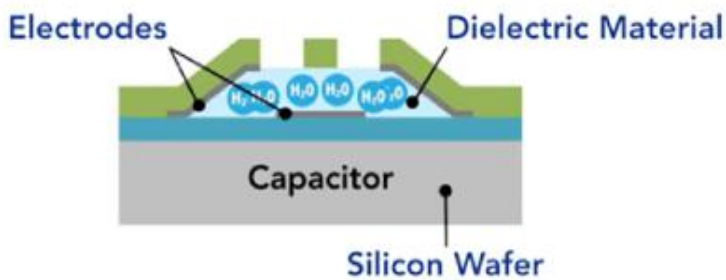
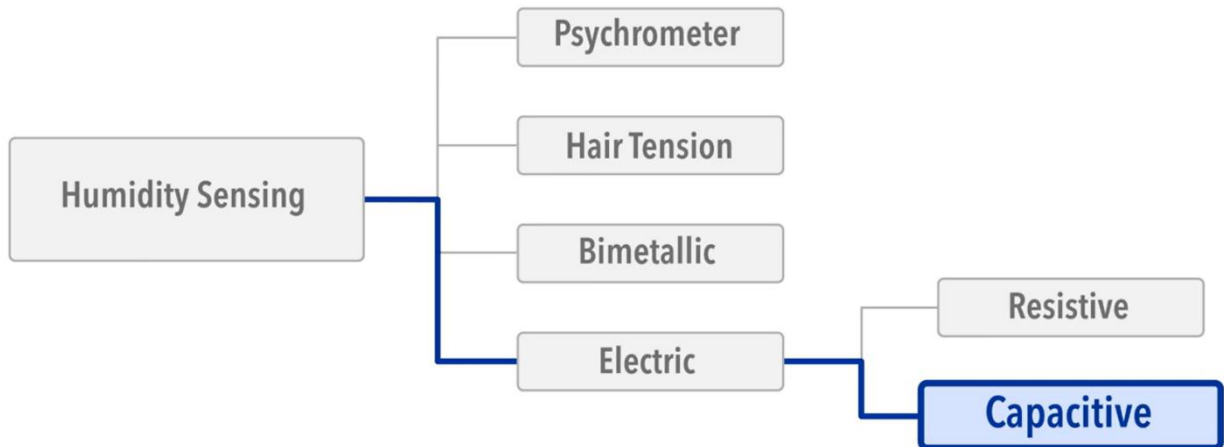
Amount of water vapor in the air at a given temperature \div Amount of water vapor needed for saturation at that temperature

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

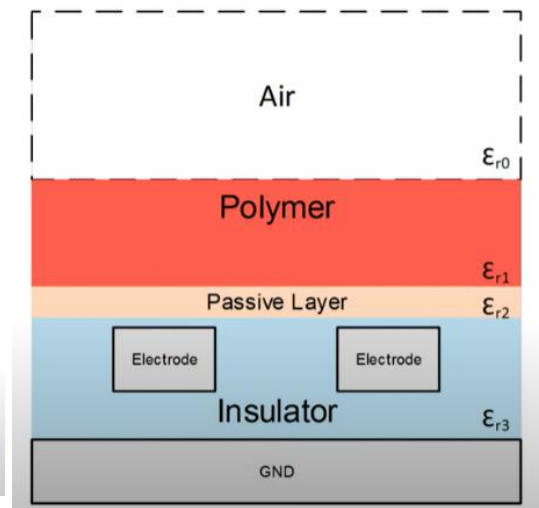
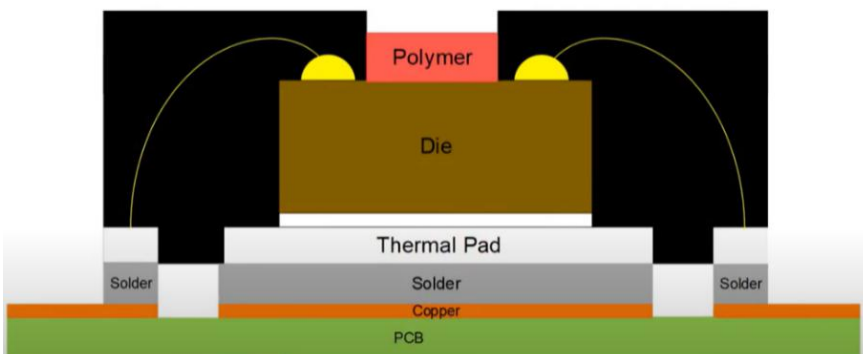


Capacitive based humidity sensor

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