Macromolecule Humidity Sensor

(Model：MS-Z3)

Manual

Zhengzhou Winsen Electronics Technology Co., Ltd

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MS-Z3 Macromolecule Humidity Sensor

Overview

In wet conditions, water molecules are adsorbed by polar group on the surface of martial. And as the humidity increases, the quantity of water molecules will be changed accordingly. The adsorbed water is gradually condensing and coming into be liquid, which is electrolyte solution with current channel quality.

With the humidity increasing, macromolecule will swell, interior free volume will be bigger, carrier will be increased and the activated energy of macromolecule polyelectrolyte counter-ions will decrease, drift mobility will increase and impedance will decrease. And then when humidity decreases, water molecules are released from ion polymer and the resistor of material will increase. The environment humidity can be monitored through testing the impedance.

Features

Wide humidity detected rang

Fast response

Small Humidity hysteresis error

Simple manufacture

Easy integration

Application

Humidity sensor, as an important chemical sensor, which is widely used in fields of warehousing, industry production, and process control, environmental monitoring, home appliances and meteorology etc.
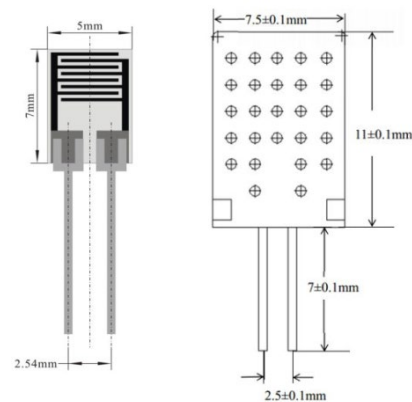
Technical specification Basic testing circuit

	Temperature	Humidity
Working range	0~60°C	20~90%RH
Storage range	-25~70°C	≤90%RH (non condensation)
Detection range	10~90%RH(0~60℃)	
Rated voltage	1.5V AC(MAX, sine wave)	
Rated power	0.2mW(MAX, sine wave)	
Working frequency	500Hz~2kHz	
Nominal value &range	31 (20～50) KΩ(60%RH, 25°C)	
Temperature Character	≤0.5%RH/°C	
Hysteresis	±2%RH	
Response time	Moisture absorption：≤30s Dehumidification：≤40s	
Stability	2%RH/year	
Accuracy	3%RH	

Impedance characters

Test conditions: 1V, 1kHz

| /	相对湿度/%RH							
	20	30	40	50	60	70	80	90
5℃	26000	3277.5	1030.26	225.72	85.2	29.78	11.94	5.46
10℃	17600	2167.24	532.82	137.86	51.22	18.78	9	4.28
15℃	10000	1686.34	367.1	110.86	42.82	16.4	8.18	4
20℃	6360	1191.8	281.08	84.06	34.96	14.04	7.14	3.78
25℃	3260.08	725.82	205.98	62.66	31	11.88	6.6	3.64
30℃	1822.08	480.64	136.48	43.82	22.84	9.56	5.22	3.46
35℃	1662.96	365.2	112.82	39.4	20.66	8.94	5.02	3.3
40℃	1365.32	264.36	86.74	31.24	17.72	7.68	4.78	3.28
45℃	768.34	201.04	67.28	26.28	15.8	7.3	4.64	3.2

Temperature & Humidity Characteristic
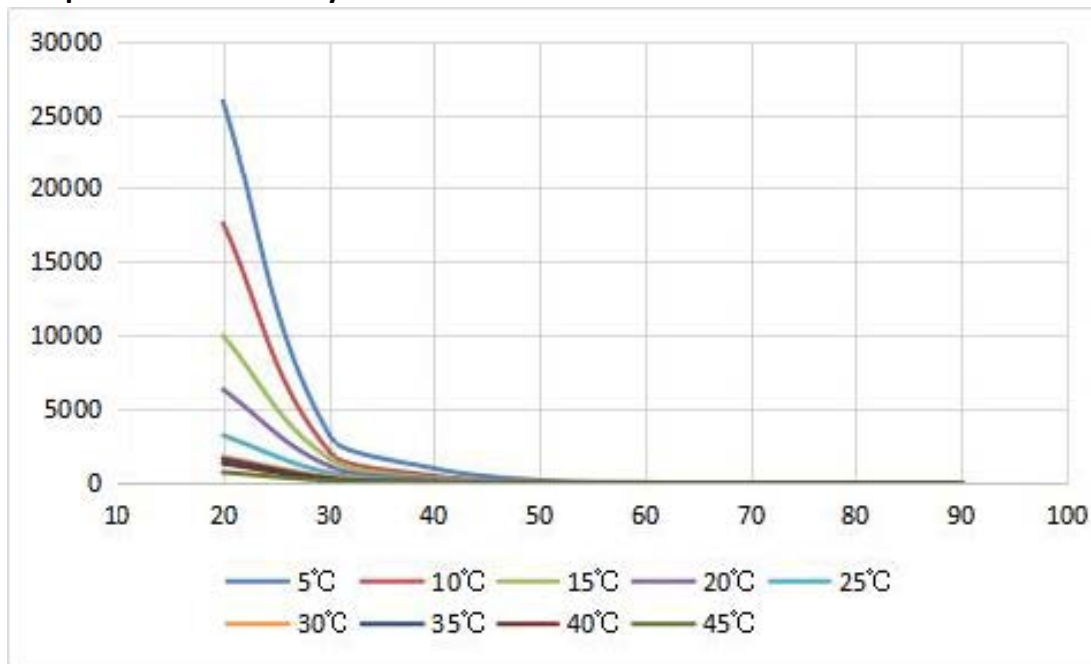
y-axis: resistance value

Application Circuit

Working principle: Use IO port of single-chip microcomputer to have an output of a square wave of 1KHz. Charge capacitor through R1 (humidity resistor MS-Z series).

Note down charging time when IO port's low level reverts to high level, and then get humidity value by calculation.

Note: the ratio of the high level should be higher than that of low level, otherwise it cannot be fully charged.
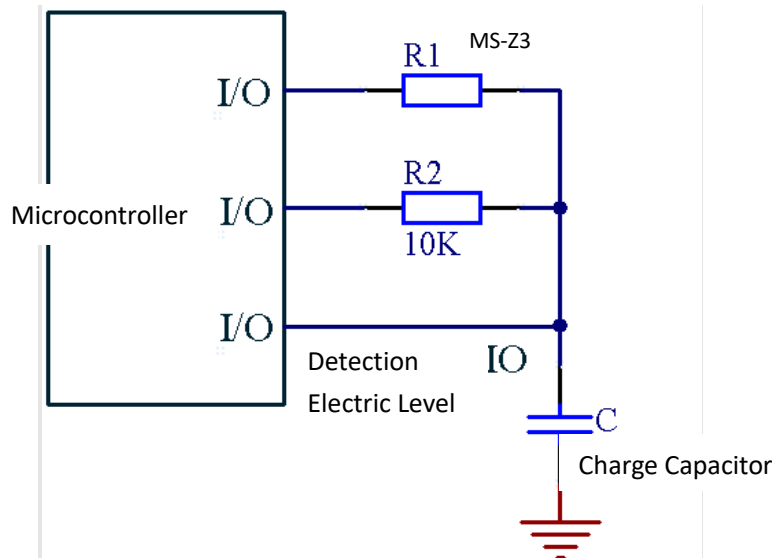
Note

- The characteristic impedance is the value measured after stabilization for 15 min in 25° C, 60% RH temperature and humidity test chamber. Test frequency is 1 kHz and test voltage is 1VAC (sine wave).
- To avoid Polarization, the voltage or current driving the sensor should be AC.
- Do not place the sensor in the presence of water droplets or condensation; avoid testing under salt spray, corrosive gases, strong acids, strong alkalis and organic solvents, alcohol, acetone, etc.
- Don't touch the sensor's surface, and do not bend or stretch the lead terminals repeatedly.
- Do not reflow soldering or repeat welding to the component. When soldering, keep the lead terminals at a distance of 1.6mm from soldering iron (350±10℃ heat source) and finish soldering in 5 seconds.
- Recommended storage conditions:
  Temperature: 10°C~ 40°C
  Humidity: under 60%RH

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