




HO2





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WARNING
**HAZARD OF ELECTRIC SHOCK,
EXPLOSION OR ARC FLASH**

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E or CSA Z462.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Turn off all power supplying this equipment before working on or inside equipment.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace all devices, doors and covers before turning on power to this equipment.

Failure to follow these instructions can result in death, serious injury or equipment damage.

This product is intended for use in HVAC and building environmental control applications. It is not intended for direct medical monitoring of patients. It is not intended for life-safety applications. Read and understand these instructions before installing this product. The installer is responsible for all applicable codes. If this product is used in a manner not specified by the manufacturer, the protection provided by the product may be impaired. No responsibility is assumed by the manufacturer for any consequences arising out of the use of this material.

HO2 Series

Duct Mount Outdoor Humidity Sensors

Product Overview

HO2 Series Outdoor Humidity Sensors provide an ideal solution for measuring relative humidity in a wide range of conditions. All models are equipped with a solid state capacitive sensor that is easy to replace in the field. The housing is completely weatherproof and intended for outdoor mounting.

The HO2 is an all-in-one device combining humidity and temperature sensing. The device ensures a building's optimum temperature and humidity levels, resulting in greater energy efficiency.

Each device is an active sensor that converts a humidity or temperature measurement into an analog output (4-20 mA) or a voltage level (0 to 5 Vdc or 0 to 10 Vdc).

Different models are available based on application requirements for lower-cost installations.

Product Identification

User Interface

Output

RH Accuracy

Temp.

HO2

X

A

X = None

A = Analog Output

2 = 2%
3 = 3%

A = Transmitter only.
B = 100R Platinum, RTD
C = 1000 PT RTD
D = 10K T2 Thermistor
G = 10K CPC Thermistor
H = 10K T3 Thermistor
K = 10K Curve G/11K Shunt
M = 20K NTC Thermistor
N = 1.8K TAC Thermistor
R = 10K Curve G

Note: Replaceable RH and temperature modules available to be ordered separately per table below.

Replaceable RH Elements & Temperature and Humidity Calibration Modules

| Model | Description | Temp. Calibration | RH Calibration |
|-------|--|---------------------|---------------------|
| HS1N | Replaceable RH sensor, 1% with NIST certificate | N/A | 2-point calibration |
| HS2X | Replaceable RH sensor, 2% | N/A | 2-point calibration |
| TS2* | Replaceable temperature module with 2-point calibration certificate | 2-point calibration | N/A |
| THS2* | Replaceable temperature and humidity module with 2-point calibration certificate | 2-point calibration | 2-point calibration |

*For use on temperature transmitter models only.
Note: For instructions on installing replaceable elements, see Z208535-0x, Replacement Humidity and Temperature Sensors Installation Guide.

Specifications

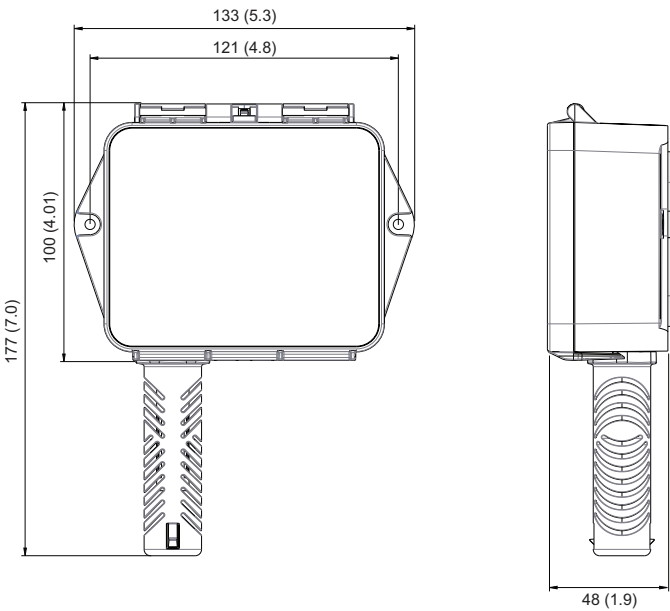
| OPERATING / STORAGE ENVIRONMENT | |
|---------------------------------|--|
| Operating Temp. Range | -40 to 55 °C (-40 to 131 °F) |
| Operating Humidity Range | 0 to 95% RH (non-condensing) |
| Storage Temp. Range | -40 to 60 °C (-40 to 140 °F) |
| Storage Humidity Range | 0 to 95% RH (non-condensing) |
| Power Supply | 3-wire volt mode: 20 to 30 Vdc, 24 Vac, 50 to 60 Hz; loop powered 20 to 30 Vdc |
| Output | Selectable 4 to 20 mA, 0 to 5 Vdc, 0 to 10 Vdc |
| Power Consumption | 0.8VA @ 24VAC Voltage Mode 0.96W @ 24V DC Current Mode |
| Output Load | Voltage mode \geq 5K Ohms Current mode \leq 250 Ohms |
| Housing Material | Polycarbonate; flammability rating UL 94 V0 |
| Mouting Location | For outdoor use. |
| IP Rating | IP65 |
| Protection Class | Class III |
| RH SENSOR | |
| Sensor Type | Solid state capacitive, replaceable |
| Accuracy* | $\pm 2\%$ / $\pm 3\%$ from 10 to 80% RH @ 25 °C (77 °F) $\pm 2\%$ NIST and 2% replaceable option |
| Hysteresis | 1.5% typical |
| Linearity | Included in accuracy specification |
| Stability | $\pm 1\%$ @ 20°C (68 °F) annually for 2 years |
| Output Range | 0 to 100% RH |
| Temperature Coefficient | $\pm 0.1\%$ RH/°C above or below 25 °C (77 °F) typical |
| TEMPERATURE SENSOR | |
| Sensor Type | Solid state, integrated circuit |
| Temp. Sensing Element** | See Product Identification section on page 1 for available temp sensing elements |
| Accuracy*** | ± 0.2 °C (± 0.4 °F) typical typical |
| Resolution | 0.1 °C (0.1 °F) |
| Range | -40 to 55 °C (-40 to 131 °F) |
| WIRING TERMINALS | |
| Terminal Blocks | Screwless terminal block with spring actuator, 16-24 AWG |
| WARRANTY | |
| Limited Warranty | 5 years |
| COMPLIANCE INFORMATION | |
| Agency Approvals | UL 916 European Conformance CE: EN 60730-1, EN 61000-6-2, EN 61000-6-3, EN 61000 Series - Industrial Immunity, EN 61326-1 FCC Part 15 Class A, REACH, RoHS, RoHS 2 (China), RCM (Australia), ICES-001 (Canada), UKCA (UK) |

*Humidity sensor measurement uncertainty should include: accuracy, hysteresis, temperature coefficient and stability. Humidity accuracy range up to -20 °C.

**See thermistor table Z202030 for accuracy.

*** ± 0.5 °C accuracy from 0 to 55 °C, ± 1 °C accuracy from -40 to 0 °C.

Dimensions
mm (in.)



Installation

NOTICE

PRODUCT DAMAGE DUE TO ELECTRO-STATIC DISCHARGE
Circuit boards and components can be damaged by static electricity or electro-static discharge (ESD). Observe the following electro-static precautions when handling this product and cables and components connected to the product.

- Keep static-producing material such as plastic, upholstery, carpeting, etc. out of the immediate work area
- Store the product in ESD-protective packaging when it is not installed in the panel
- When handling the product or a conductive cable/ESD-sensitive component connected to the product, wear a conductive wrist strap connected to ground through a minimum of 1 MΩ resistance
- Do not touch exposed conductors and component leads with skin or clothing

Failure to follow these instructions can result in equipment damage.

NOTICE

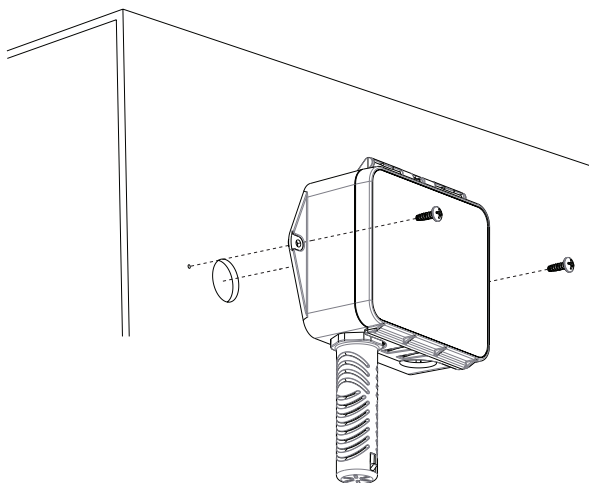
INCORRECT PRODUCT INSTALLATION

- Choose an outdoor location in a sheltered area, out of direct sunlight.
- Mount unit with probe pointing down. Unit may be suspended by conduit. Do not obstruct vent openings.

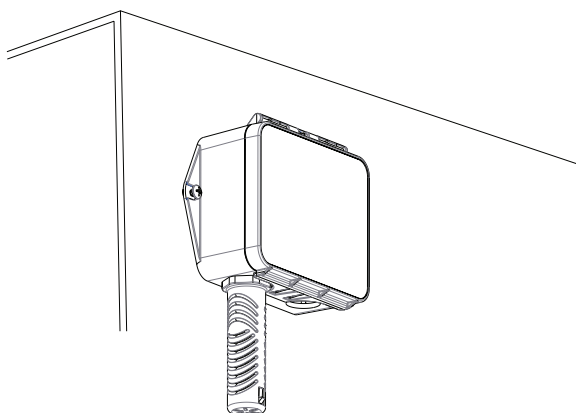
Failure to follow these instructions will lead to incorrect sensor readings.

Installation (cont.)

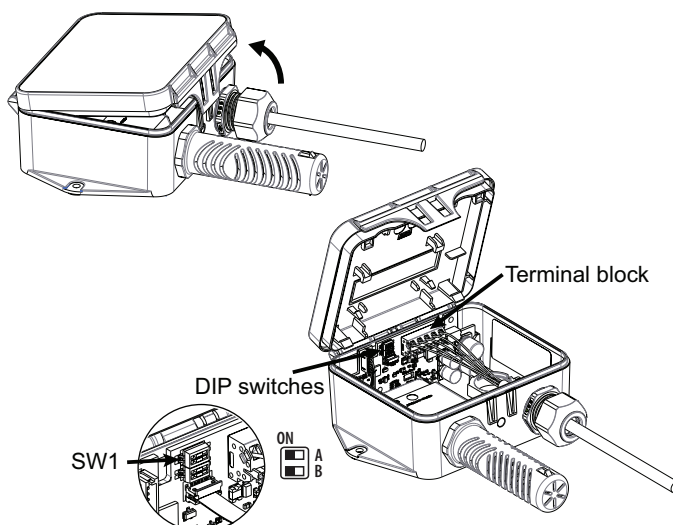
1. Prepare the installation by drilling holes on the wall. Ensure the gasket on the back is depressed to prevent leakage between the product and the wall. Do not over-tighten the screws.



2. Ensure the probes are installed on the wall with no obstruction to airflow around the probe.



3. Release the latch on the lid to access the DIP switches and terminal block.



Installation (cont.)

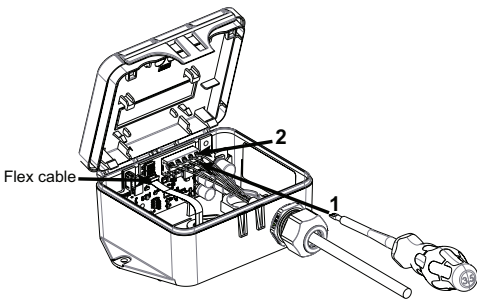
4. Wire the connections per the diagram in the Wiring section below. This device features spring terminals for screwless termination. Open the terminal point by inserting a screwdriver, then insert the wire above. Release the screwdriver to hold the wire in place. Details on wiring and configuration are contained in the next sections of this document.

NOTICE

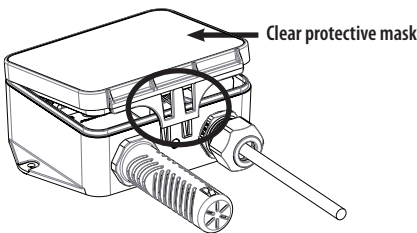
MISSING TEMPERATURE AND HUMIDITY READINGS

- Ensure flex cable is in place after wiring.

Failure to follow these instructions can result in no temperature or humidity readings.



5. Secure the latch-on cover in the closed position and remove the clear protective mask on the front label of the device.



Wiring

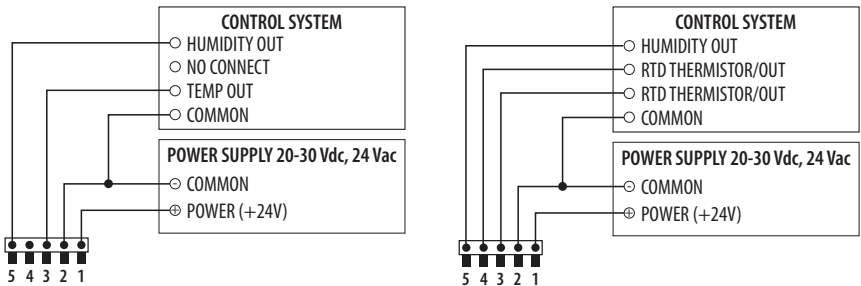
NOTICE

INACCURATE READINGS

- Do not run wiring in the same conduit as AC power wiring. Close proximity to AC power may influence accuracy.
- In current output mode do not use AC voltage, use 20-30V DC Volts.

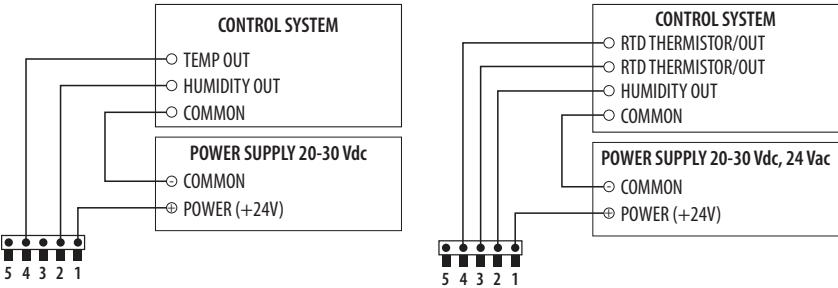
Failure to follow these instructions can result in reduced accuracy and incorrect readings.

Voltage Mode Wiring



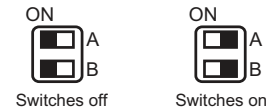
Wiring (cont.)

Current Mode Wiring



Configuration

Set the DIP switches.
White squares indicate switch position:



| Switch | Function | Description |
|--------|----------------|--|
| A | Output mode | ON - 4-20mA output mode enabled OFF - Voltage output mode enabled |
| B | Voltage output | ON - 0-5V output range enabled OFF 0-10V output range enabled |

Thermistor Table

Standard RTD and Thermistor Values - Ohms (Ω)

| $^{\circ}\text{C}$ | $^{\circ}\text{F}$ | 100 Ohm | 1000 Ohm | 1800 Ω (NTC) | 10k Type 2 | 10k CPC | 10k Type 3 | 10k "G" US | 20k NTC |
|--------------------|--------------------|-----------|-----------|---------------------|------------------|------------------|------------------|------------------|------------------|
| | | RTD (PTC) | RTD (PTC) | Thermistor (NTC) | Thermistor (NTC) | Thermistor (NTC) | Thermistor (NTC) | Thermistor (NTC) | Thermistor (NTC) |
| -50 | -58 | 80.306 | 803.06 | 63,880 | 670,600 | | 441,300 | 441,200 | 1,267,600 |
| -40 | -40 | 84.271 | 842.71 | 35,680 | 336,600 | 336,052 | 239,800 | 239,700 | 643,800 |
| -30 | -22 | 88.222 | 882.22 | 20,720 | 177,000 | 176,785 | 135,200 | 135,300 | 342,000 |
| -20 | -4 | 92.16 | 921.6 | 12,460 | 97,120 | 96,999 | 78,910 | 78,910 | 189,080 |
| -10 | 14 | 96.086 | 960.86 | 7,733 | 55,340 | 55,301 | 47,540 | 47,540 | 108,380 |
| 0 | 32 | 100 | 1,000.00 | 4,940 | 32,660 | 32,650 | 29,490 | 29,490 | 64,160 |
| 10 | 50 | 103.903 | 1,039.03 | 3,240 | 19,900 | 19,902 | 18,790 | 18,780 | 39,440 |
| 20 | 68 | 107.794 | 1,077.94 | 2,177 | 12,490 | 12,493 | 12,260 | 12,260 | 24,920 |
| 25 | 77 | 109.735 | 1,097.35 | 1,800 | 10,000 | 10,000 | 10,000 | 10,000 | 20,000 |
| 30 | 86 | 111.673 | 1,116.73 | 1,496 | 8,058 | 8,056 | 8,194 | 8,194 | 16,144 |
| 40 | 104 | 115.541 | 1,155.41 | 1,049 | 5,326 | 5,325 | 5,592 | 5,592 | 10,696 |
| 50 | 122 | 119.397 | 1,193.97 | 749.7 | 3,602 | 3,601 | 3,893 | 3,893 | 7,234 |
| 60 | 140 | 123.242 | 1,232.42 | 545.3 | 2,488 | 2,487 | 2,760 | 2,760 | 4,992 |
| 70 | 158 | 127.075 | 1,270.75 | 403.1 | 1,751 | 1,751 | 1,990 | 1,990 | 3,512 |
| 80 | 176 | 130.897 | 1,308.97 | 302.5 | 1,256 | 1,256 | 1,458 | 1,458 | 2,516 |
| 90 | 194 | 134.707 | 1,347.07 | 230.2 | 916 | 916.0 | 1,084 | 1,084 | 1,833 |
| 100 | 212 | 138.506 | 1,385.06 | 177.5 | 679.2 | 678.4 | 816.8 | 816.8 | 1,356 |
| 110 | 230 | 142.293 | 1,422.93 | 138.6 | 510.8 | 509.8 | 623.6 | 623.6 | 1,016 |
| 120 | 248 | 146.068 | 1,460.68 | 109.5 | 389.4 | 388.3 | 481.8 | 481.8 | 770 |
| 130 | 266 | 149.832 | 1,498.32 | 87.4 | 300.6 | - | 376.4 | 376.4 | 591 |
| Sensor Codes | | B | C | N | D | G | H | R | M |

Note: Sensor Code K includes a 10K Curve 9 (Sensor Code R) in parallel with an 11k Ω resistor.

China RoHS
Compliance
Information

Environment-Friendly Use Period (EFUP) Table

| 有害物质 - Hazardous Substances | | | | | | |
|-----------------------------|--------|--------|--------|---------------|------------|--------------|
| Part Name | 铅 (Pb) | 汞 (Hg) | 镉 (Cd) | 六价铬 (Cr (VI)) | 多溴联苯 (PBB) | 多溴二苯醚 (PBDE) |
| 电子件 Electronic | X | O | O | O | O | O |

本表格依据SJ/T11364的规定编制。

O: 表示该有害物质在该部件所有均质材料中的含量均在GB/T 26572规定的限量要求以下。

X: 表示该有害物质至少在该部件的某一均质材料中的含量超出GB/T 26572规定的限量要求。

(企业可在此处，根据实际情况对上表中打“X”的技术原因进行进一步说明。)

This table is made according to SJ/T 11364.

O: indicates that the concentration of hazardous substance in all of the homogeneous materials for this part is below the limit as stipulated in GB/T 26572.

X: indicates that concentration of hazardous substance in at least one of the homogeneous materials used for this part is above the limit as stipulated in GB/T 26572

Z000057-0B