Temperature and Humidity Pendant Sensor

Installation and Operating Instructions

Overview

- 4 to 20mA Temperature Output over a 40 to 120°F Range
- 4 to 20mA Humidity Output over a 20 to 90%RH Range
- Sensor Hangs from 12 feet of PVC-Jacketed Cable
- ±2%RH Humidity Accuracy
- ±0.3°C Temperature Accuracy
- NIST Certificate Included

BAPI's Hanging Temperature and Humidity Sensor features a BAPI-Box enclosure and 12 feet of PVC-jacketed cable.

The temperature measurement has a 4 to 20mA output over a 40 to 120°F range with an accuracy of ±0.3°C. The humidity measurement has a 4 to 20mA output over a 20 to 90%RH range with an accuracy of ±2%RH.
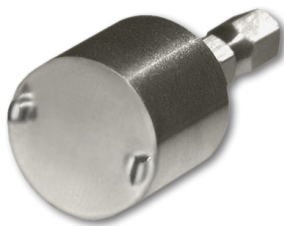
Fig. 1: Pendant Sensor

Mounting

Mount the BAPI-Box enclosure to a wall or other surface and the pendant sensor pointed downward as shown in Fig. 2.

Note: BAPI recommends using the BAPI "Clean-Cut" tool (shown below) to drill out the ports.

Pull the wiring into the unit and terminate to pluggable terminal blocks as directed on page 2. Best practice is to seal the wiring hole with caulk after the wiring is installed.

Clean-Cut Tool
Part#: BA/CLN-CUT-50
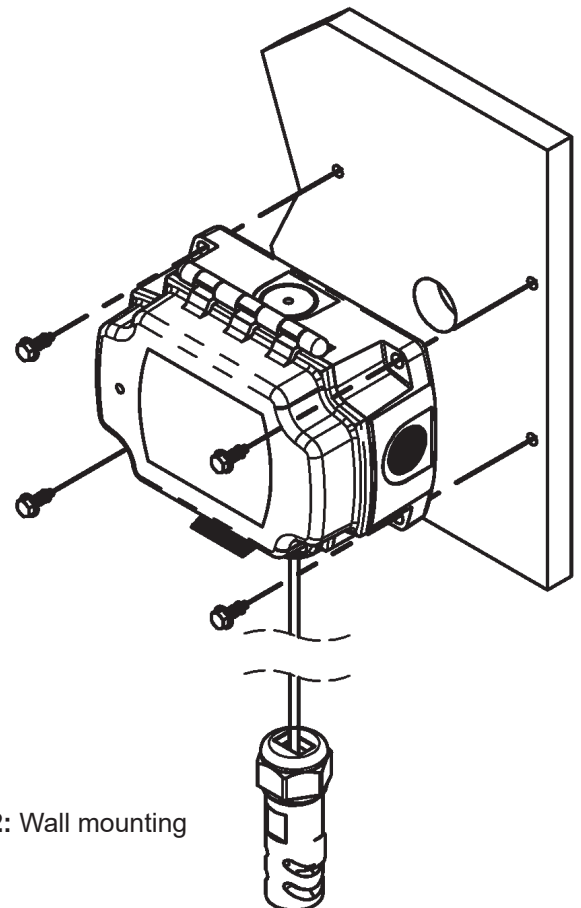For drilling out the ½" threaded ports in the BAPI-Box enclosure

Fig. 2: Wall mounting

Wiring and Termination

BAPI recommends using twisted pair of at least 22AWG to make terminations to pluggable terminal block.. Larger gauge wire may be required for long runs. All wiring must comply with the National Electric Code (NEC) and local codes.

Do NOT run this device's wiring in the same conduit as AC power wiring of NEC class 1, NEC class 2, NEC class 3 or with wiring used to supply highly inductive loads such as motors, contactors and relays. BAPI's tests show that fluctuating and inaccurate signal levels are possible when AC power wiring is present in the same conduit as the signal lines. If you are experiencing any of these difficulties, please contact your BAPI representative.

> **STOP** BAPI recommends wiring the product with power disconnected. Proper supply voltage, polarity, and wiring connections are important to a successful installation. Not observing these recommendations may damage the product and will void the warranty.
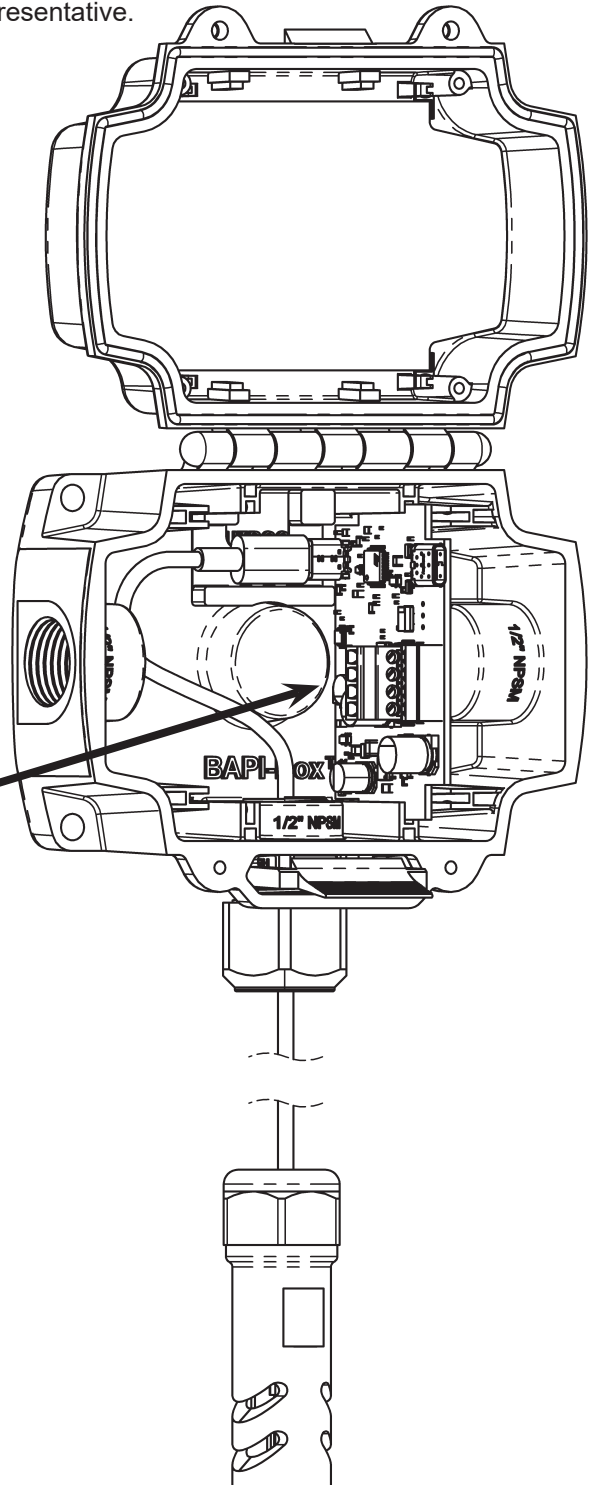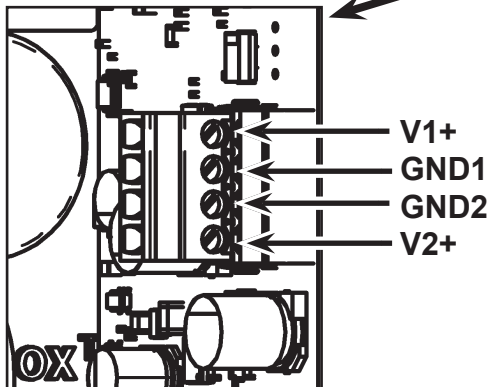
Table 1: Wiring Connections		
Terminal	**Purpose**	**Note**
V1+	Power for Temperature	16 to 40VDC
GND1	Temperature Output and Ground	4 to 20mA, to Analog Input of Controller
GND2	Humidity Output and Ground	4 to 20mA, to Analog Input of Controller
V2+	Power for Humidity	16 to 40VDC

V1+
GND1
GND2
V2+

Building Automation Products, Inc., 750 North Royal Avenue, Gays Mills, WI 54631 USA
Tel:+1-608-735-4800 • Fax+1-608-735-4804 • E-mail:sales@bapihvac.com • Web:www.bapihvac.com

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Specifications

Power:
16 to 40VDC, 40 mA max (20 mA/loop) DC

Humidity Sensor Type:
Capacitive Polymer

Temperature Sensor Type:
1KΩ, 2 Wire Platinum RTD, 385 Curve

Humidity Output:
4 to 20mA over 20 to 90%RH Range

Temperature Output:
4 to 20mA over 40 to 120°F Range

Humidity Drift:
0.5%RH per year

Humidity Accuracy:
±2% (20 to 80%RH @ 25°C), Non-condensing
±3% (80 to 90%RH @ 25°C), Non-condensing

Temperature Accuracy:
±0.3°C

Output Impedance (Max Load/Loop):
700Ω @ 24VDC, Voltage drop is 10VDC
(Supply Voltage – 10VDC) / 0.02 Amps = Max load Impedance

Response Time:
< 5 seconds in moving air

Environmental Operation Range:
Temperature: -40 to 158°F (-40 to 70°C)
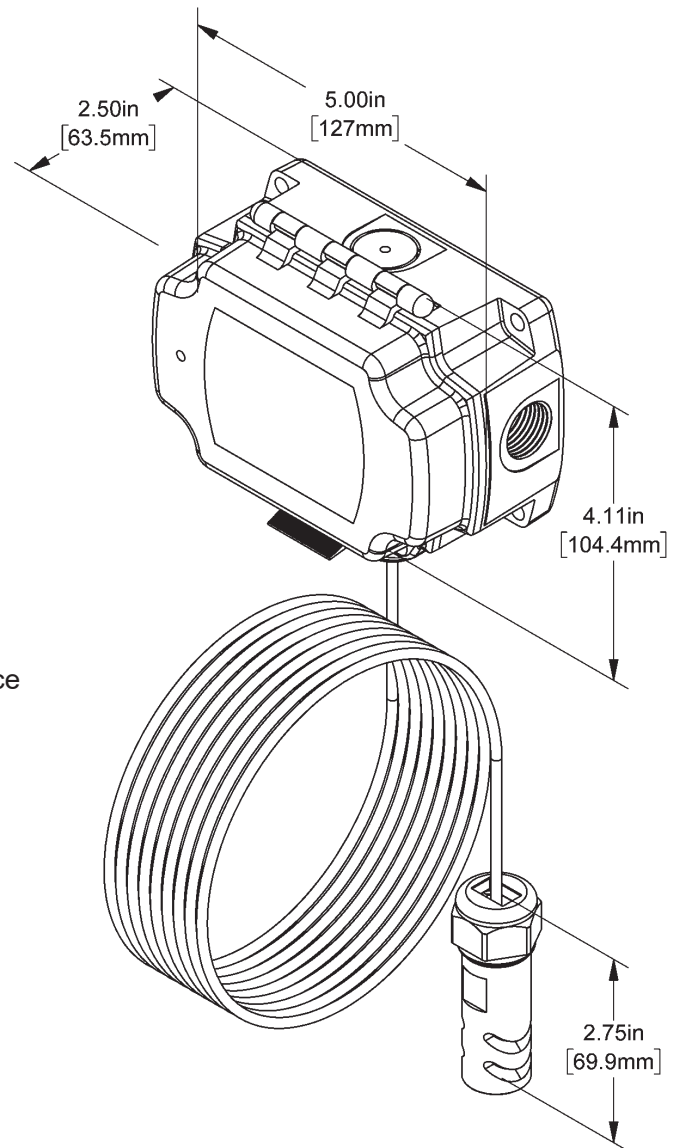Humidity: 0 to 95%RH, non-condensing
Fully Temperature Compensated

BAPI-Box Material:
UV-resistant Polycarbonate, UL94 V-0

Agency:
RoHS

2.50in
[63.5mm]

5.00in
[127mm]

4.11in
[104.4mm]

2.75in
[69.9mm]

Specifications subject to change without notice.

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Humidity Diagnostics

Possible Problems:

Unit will not operate

Humidity output is at its maximum

Humidity output is at its minimum

Humidity reading in controller's software appears to be off by more than the specified accuracy

Possible Solutions:

- Check for proper supply power. (See page 2 for wiring diagram and power specifications)

- Make sure the humidity sensor is wired properly.
- Verify humidity with a reference sensor. If humidity drops to 5% or below in the environment, the output will go to the maximum value.

- Make sure the humidity sensor is wired properly.

- Check all software parameters
- Determine if the sensor is exposed to an external air source different from the intended measured environment or reference device.
- Check the Humidity transmitter output against a calibrated reference such as a 2% accurate hygrometer. Measure the humidity at the sensor's location using the reference meter, then calculate the humidity transmitter output using the humidity equation below. Compare the calculated output to the actual humidity transmitter output (see the wiring diagram on page 2 for the humidity transmitter output wires). If the calculated output differs from the humidity transmitter output by more than 5%, contact BAPI technical support.

Humidity Equation:
$$\%RH = (((MEASUREDmA - 4mA) / 16mA) * (maxRH - minRH)) + minRH$$

Temperature Diagnostics

Possible Problems:

Controller reports Incorrect temperature

Possible Solutions:

- Confirm the input is set up correctly in the controller's software
- Verify that the sensor wires are not physically shorted or open
- Check wiring for proper termination
- Check the Temperature transmitter output against a calibrated reference. Measure the temperature at the sensor's location using the reference meter, then calculate the temperature transmitter output using the temperature equation below. Compare the calculated output to the actual temperature transmitter output (see the wiring diagram on page 2 for the temperature transmitter output wires). If the calculated output differs from the temperature transmitter output by more than 5%, contact BAPI technical support.

4 to 20mA Temperature Equation

$$T = TLow + \frac{(A - 4) \times (TSpan)}{16}$$

T	= Temperature at sensor
TLow	= Low temperature of span
THigh	= High temperature of span
TSpan	= THigh - TLow
A	= Signal reading in mA