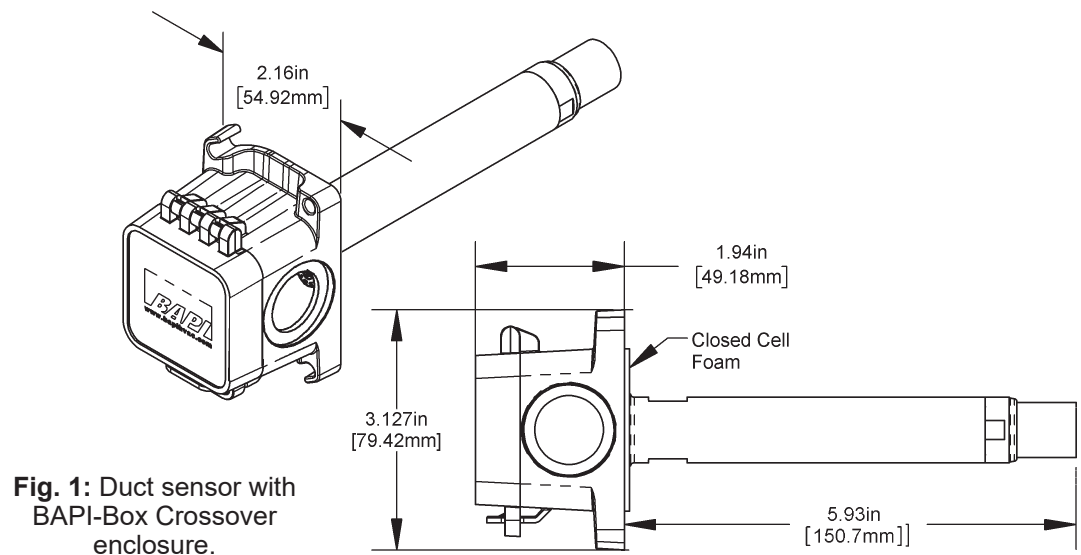


Overview and Identification

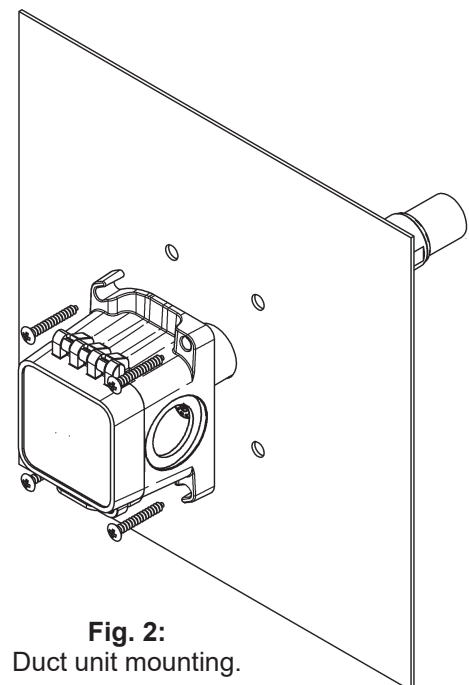
The Duct Humidity Sensors in the BAPI-Box Crossover enclosure come in 2%RH and 3%RH accuracies with a 4 to 20mA, 0 to 5V, 0 to 10V or 2 to 10V output. They are available with an optional RTD or thermistor temperature sensor. The BAPI-Box Crossover enclosure has a hinged cover for easy termination and carries an IP44 rating with a knockout plug in the open port. It includes a green power indication LED visible through the cover.

This instruction sheet is specific to units with the BAPI-Box Crossover Enclosure. For other enclosures, please refer to the BAPI website or contact you BAPI representative.



Mounting

Mount at least three (3) duct diameters from humidifiers in the center of the duct wall. Drill a 1 inch hole for the probe in the duct and use two number 8 sheet metal screws to attach the sensor to the duct. Center the probe in its mounting hole. Be sure that the foam seals the hole, but do not over tighten the screws.





Duct Humidity Sensor with BAPI-Box Crossover Enclosure and Optional Temperature Sensor

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Termination

BAPI recommends using twisted pair of at least 22AWG and sealant filled connectors for all wire connections. 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.



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.

UNITS WITH 4 TO 20 MA OR 0 TO 5 VOLT OUTPUT

Table 1: Humidity Transmitter with 4 to 20mA Output

| Wire Color | Purpose | Note |
|------------|-----------------|---|
| White | Not Used | Not Used |
| Black | Humidity Output | 4 to 20 mA, To Analog Input of Controller |
| Red | Power | 10 to 35VDC |

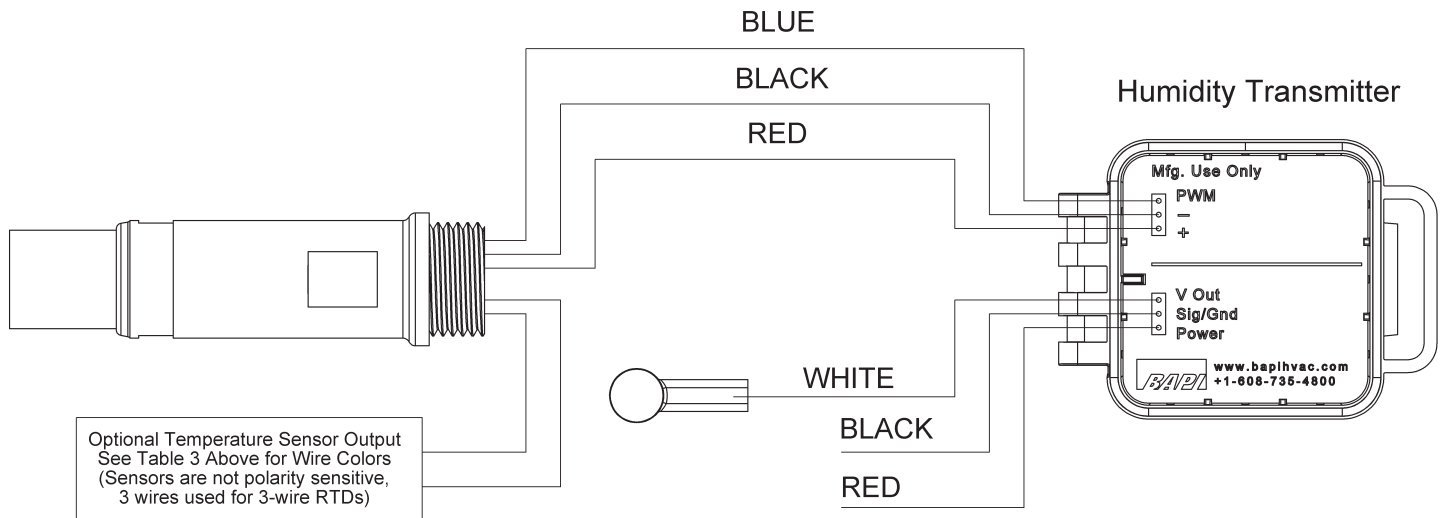
Table 2: Humidity Transmitter with 0 to 5VDC Output

| Wire Color | Purpose | Note |
|------------|-----------------|--|
| White | Humidity Output | 0 to 5VDC, To Analog Input of Controller |
| Black | GND (Common) | Ground for Power and Humidity Output |
| Red | Power | 10 to 35VDC or 12 to 27 VAC |

Table 3: Temperature Sensor Lead Wire Colors

| Thermistors | | Platinum RTDs - 2 Wire | |
|---------------------|---------------|---|----------------------|
| 1.8K Ω | Orange/Red | 100 Ω | Red/Red |
| 2.2K Ω | Brown/White | 1K Ω | Orange/Orange |
| 3K Ω | Yellow/Black | Nickel RTD | |
| 3.25K Ω | Brown/Green | 1K Ω | Green/Green |
| 3.3K Ω | Yellow/Brown | Silicon RTD | |
| 10K-2 Ω | Yellow/Yellow | 2K Ω | Brown/Blue |
| 10K-3 Ω | Yellow/Red | Platinum RTDs - 3 Wire | |
| 10K-3(11K) Ω | Yellow/Blue | 100 Ω | Red/Red/Black* |
| 20K Ω | White/White | 1K Ω | Orange/Orange/Black* |
| 47K Ω | Yellow/Orange | *In the 3-Wire RTD sensors listed above, the two wires of similar color are connected together. | |
| 50K Ω | White/Blue | | |
| 100K Ω | Yellow/White | | |

Additional sensors are available so your sensor may not be listed on this table.



Termination continued...

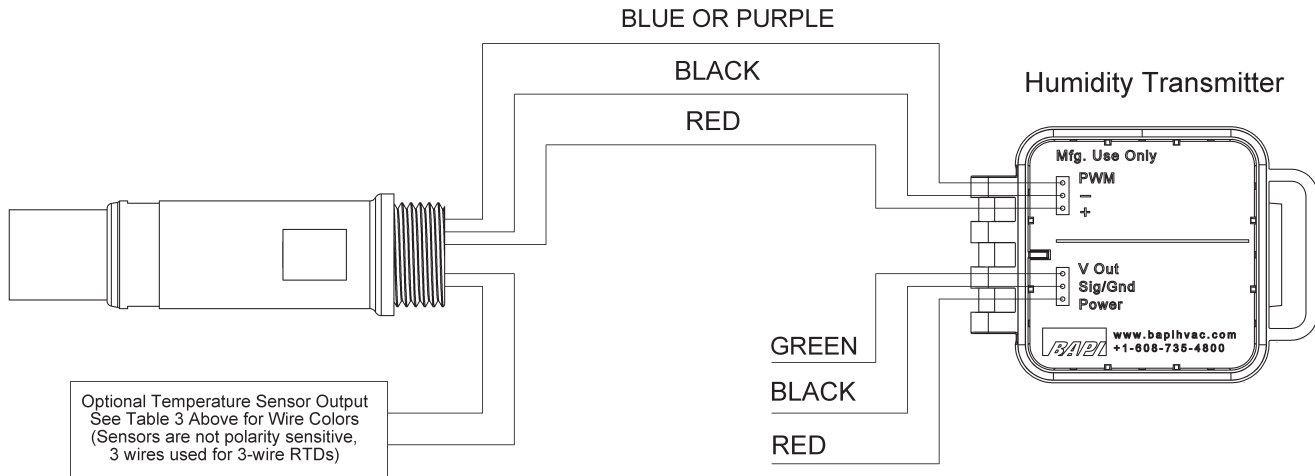
UNITS WITH 0 TO 10V OR 2 TO 10 VOLT OUTPUT

| Wire Color | Purpose | Note |
|------------|-----------------|---|
| Green | Humidity Output | 0 to 10VDC, To Analog Input of Controller |
| Black | GND (Common) | Ground for Power and Humidity Output |
| Red | Power | 15 to 35VDC or 15 to 27VAC |

| Wire Color | Purpose | Note |
|------------|-----------------|---|
| Green | Humidity Output | 2 to 10VDC, To Analog Input of Controller |
| Black | GND (Common) | Ground for Power and Humidity Output |
| Red | Power | 15 to 35VDC or 15 to 27VAC |

| Thermistors | | Platinum RTDs - 2 Wire | |
|-------------|---------------|---|----------------------|
| 1.8KΩ | Orange/Red | 100Ω | Red/Red |
| 2.2KΩ | Brown/White | 1KΩ | Orange/Orange |
| 3KΩ | Yellow/Black | Nickel RTD | |
| 3.25KΩ | Brown/Green | 1KΩ | Green/Green |
| 3.3KΩ | Yellow/Brown | Silicon RTD | |
| 10K-2Ω | Yellow/Yellow | 2KΩ | Brown/Blue |
| 10K-3Ω | Yellow/Red | Platinum RTDs - 3 Wire | |
| 10K-3(11K)Ω | Yellow/Blue | 100Ω | Red/Red/Black* |
| 20KΩ | White/White | 1KΩ | Orange/Orange/Black* |
| 47KΩ | Yellow/Orange | *In the 3-Wire RTD sensors listed above, the two wires of similar color are connected together. | |
| 50KΩ | White/Blue | | |
| 100KΩ | Yellow/White | | |

Additional sensors are available so your sensor may not be listed on this table.



Humidity Diagnostics

Possible Problems:

Green Power LED is not on

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

Possible Solutions:

- Measure the power supply voltage by placing a multi-meter across the transmitter's "Power" and "Sig/Gnd" leads or terminals. Check for proper supply power based on the humidity output.
- Make sure that the "Power" and "Signal/Gnd" wires are not open or shorted together and are terminated correctly to the controller.
- Check software parameters, termination and supply power.
- Determine if the sensor is exposed to an external air source different from the intended measured environment or reference device.
- If the output is at its maximum value, verify the humidity in the environment with a reference sensor. If the humidity drops to 5% or below in the environment, the output will go to the maximum value.
- Check the Humidity transmitter output against a calibrated reference. Measure the humidity at the sensor's location using the reference meter, then calculate the humidity transmitter output using the humidity formula at left. Compare the calculated output to the actual humidity transmitter output (see the wiring diagrams for the humidity transmitter output wire colors). If the calculated output differs from the humidity transmitter output by more than 5%, contact BAPI technical support.

| Output | Humidity Formula |
|------------|-------------------|
| 4 to 20mA | %RH = (mA-4)/0.16 |
| 0 to 5VDC | %RH = V/0.05 |
| 0 to 10VDC | %RH = V/0.1 |
| 2 to 10VDC | %RH = (V-2)/0.08 |



Duct Humidity Sensor with BAPI-Box Crossover Enclosure and Optional Temperature Sensor

Installation & Operations

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Temperature Diagnostics

Possible Problems:

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

Possible Solutions:

- Confirm the input is set up correctly in the controller's software
- Check wiring for proper termination
- Measure the temperature at the sensor's location using an accurate temperature standard. Disconnect the temperature sensor wires and measure the temperature sensor's resistance with an ohmmeter. Compare the temperature sensor's resistance to the appropriate temperature sensor table on the BAPI website. If the measured resistance differs from the temperature table by more than 5%, call BAPI technical support. BAPI's website is found at www.bapihvac.com; click on "Resource Library" and "Sensor Specs" and then click on the type of sensor you have.

Filter Care

A sintered filter protects the humidity sensor from various airborne particles and may need periodic cleaning. To do this, gently unscrew the filter from the probe. Rinse the filter in warm soapy water and rinse until clean. A nylon brush may be used if necessary. Gently replace the filter by screwing it back into the probe.

Specifications

Power:

- 10 to 35 VDC, 22 mA max. (for units with 0 to 5 VDC or 4 to 20 mA Humidity Outputs)
- 15 to 35 VDC, 6 mA max. (for units with 0 to 10 or 2 to 10 VDC Humidity Output)
- 12 to 27 VAC, 0.53 VA max. (for units with 0 to 5 VDC Humidity Outputs)
- 15 to 27 VAC, 0.14 VA max. (for units with 0 to 10 or 2 to 10 VDC Humidity Output)

Sensor: Factory corrected @17 RH points (10 to 90% RH)

- Humidity.....Capacitive Polymer
- %RH Accuracy ...±2% @ 73°F (23°C) from 10 to 90%
- Drift.....0.5% per year
- Response time....< 5 seconds in moving air
- RH Linearity.....Negligible, factory corrected linear from 10 to 90%
- RH Hysteresis.....Factory corrected to <1%

Filter: 80 micron sintered stainless steel filter

Calibrated Accuracy: Calibration @17 RH points, (10% to 90%)

- 2%RH2% from 10 to 90% @ 73°F (23°C), Non-condensing
- 3%RH3% from 10 to 95% @ 73°F (23°C), Non-condensing
- Thermistor±0.36°F (0.2°C) from 32 to 158°F (0 to 70°C) - High accuracy units are available
- RTD±0.55°F (0.31°C) @ 32°F (0°C) - High accuracy units are available

Output:

- Humidity.....4 to 20mA, 0 to 5V, 0 to 10V or 2 to 10V at 0 to 100% RH
- Optional Temp. ...RTD or Thermistor

Humidity Output Impedance:

- Current700Ω@ 24VDC, Voltage drop is 10VDC
(Supply Voltage DC – Transmitter voltage drop 10VDC) / 0.02 Amps = Max load Impedance
- Voltage.....10KΩ

Probe Length: 5.3" (13.5cm) Duct Insertion, 1" diameter

Termination: Open wire

- Crimp18 to 26 AWG with Sealant Filled Crimp Connector (BA/SFC3000)
- Wire Nut.....26 to 16 AWG with Sealant Filled Wire Nut (BA/SFC2000)

Enclosure Material & Rating: Polycarbonate, UV resistant, IP10, NEMA 1 (IP44 with knockout plug in open port)

Environmental Operation Range: -40° to 158°F (-40° to 70°C) • 0% to 100% RH

Approvals: RoHS

Specifications subject to change without notice.