

Overview and Identification

The Duct and Outside Air humidity transmitters 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.

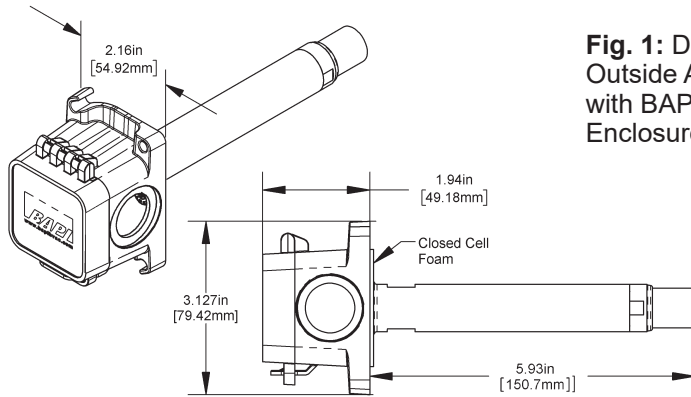


Fig. 1: Duct (left) and Outside Air Unit (right) with BAPI-Box Crossover Enclosure.

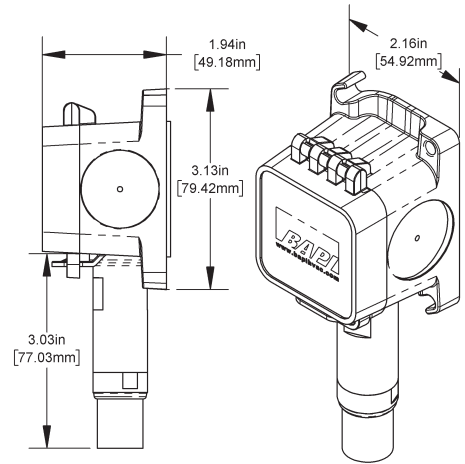


Fig. 2: Outside Air unit mounting.

Mounting

OUTSIDE AIR UNIT MOUNTING

Mount in a permanently shaded area away from windows and doors. Do not mount in direct sunlight. Mount with the sensor probe pointing down. Drill a hole large enough for your sensor cable to go through your mounting surface.

Mount the unit with the wiring knock-out centered over the wiring hole. Pull the wiring into the unit and terminate using sealant filled connectors. Best practice is to seal the wiring hole with caulk after the wiring is installed. Be sure that the foam on the back of the unit makes a good weather tight seal.

DUCT UNIT 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.

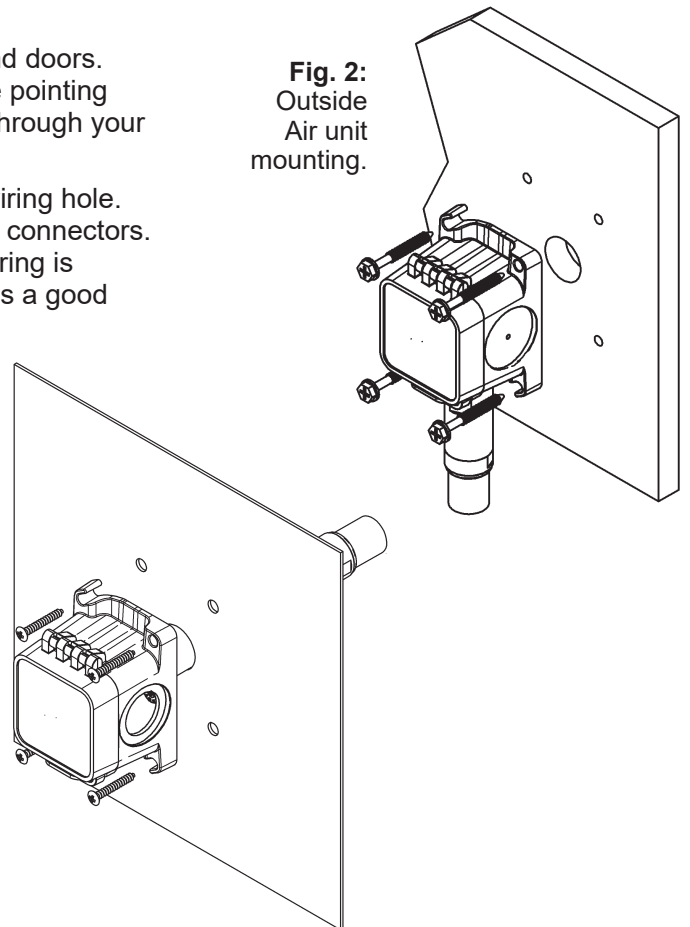


Fig. 3: Duct unit mounting.

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Duct or Outside Air Humidity Transmitter with BAPI-Box Crossover Enclosure and Optional Temperature Sensor

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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.

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 (Cap Wires)
Black	Humidity Output	4 to 20 mA, To Analog Input of Controller
Red	Power	10 to 35VDC

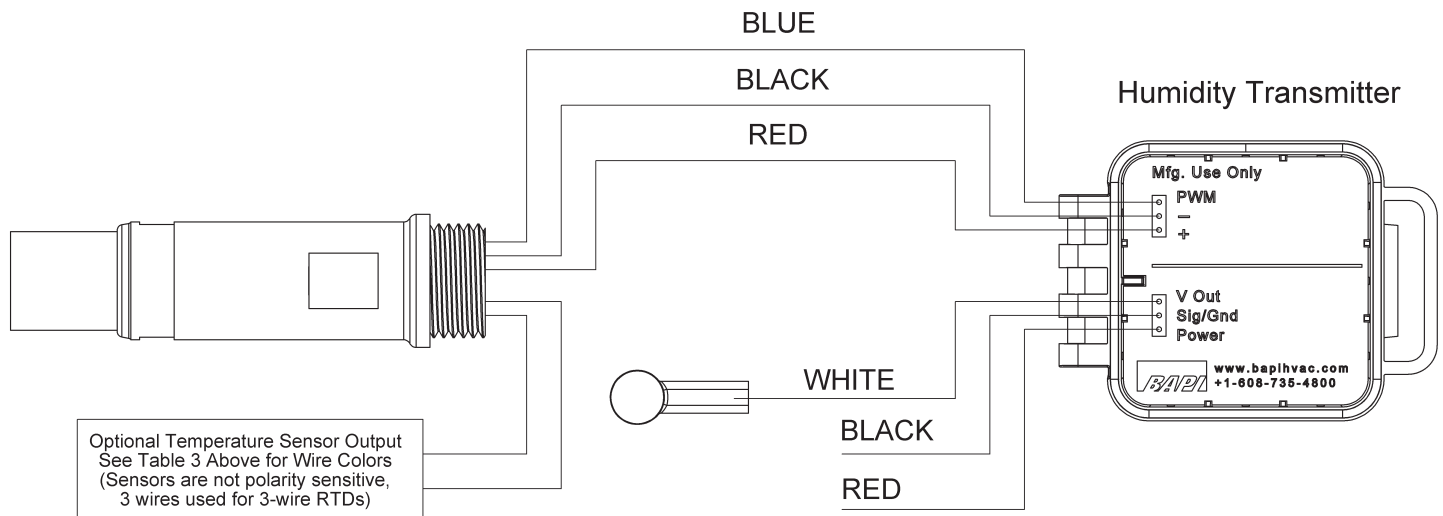
Table 2: Humidity Transmitter with 0 to 5VDC Output

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.



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Termination continued...

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

Table 1: Humidity Transmitter with 0 to 10VDC 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

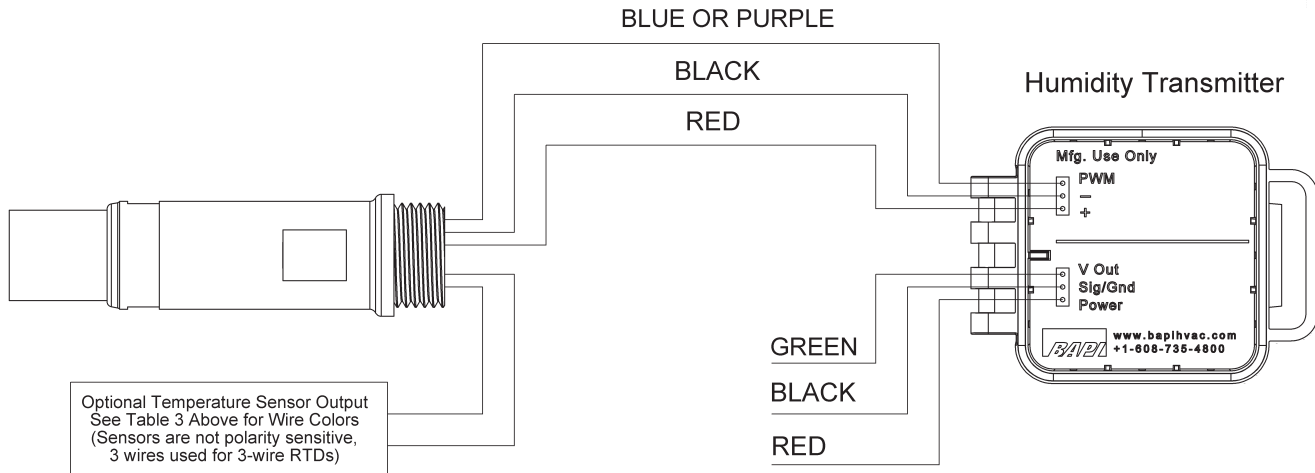
Table 2: Humidity Transmitter with 2 to 10VDC Output

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

Table 3: Temperature Sensor Lead Wire Colors

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	$\%RH = (V-2)/0.08$

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Duct or Outside Air Humidity Transmitter with BAPI-Box Crossover Enclosure and Optional Temperature Sensor

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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 temperature 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 web site. If the measured resistance is different 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.

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:

- Duct5.3" (13.5cm) Duct Insertion, 1" diameter
- Outside Air2.4" (6.1cm) Below Enclosure, 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

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