

Overview

The BA*-(H210, H212, H310 & H312) Duct and Outside Air humidity transmitters come in both 2% and 3% accuracies and transmit a 0 to 10V or 2 to 10V signal proportional to the relative humidity. They can have an optional RTD or thermistor temperature sensor mounted for use by any automation controller. They are powered from a 15 to 35VDC or a 15 to 27 VAC power source. The transmitters are housed in either a BAPI-Box (BB) or BAPI-Box 2 (BB2) Enclosure and include a terminal strip for easy field termination.

Duct Unit Mounting

Mount at least 3 duct diameters from humidifiers in the center of the duct wall. Drill a 1 inch hole 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, do not over tighten the screws.

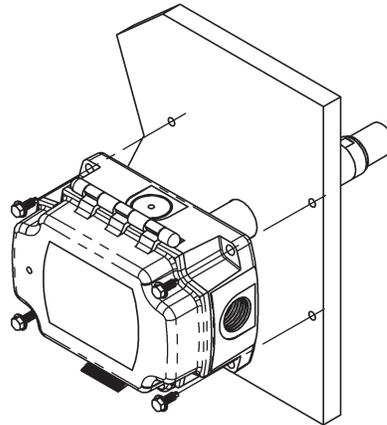


Fig. 1: Duct Humidity in a BAPI-Box (BB) Enclosure

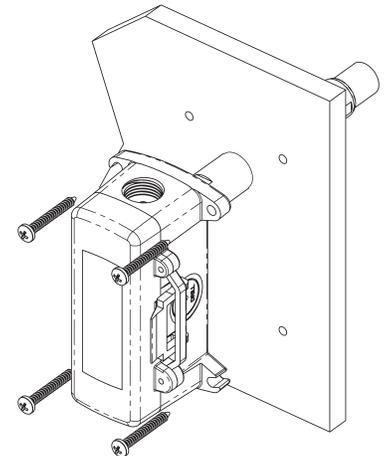


Fig. 2: Duct Humidity in a BAPI-Box 2 (BB2) Enclosure

Outside Air Mounting

Mount in a permanently shaded area away from windows and doors. Do not mount in direct sunlight. Mount with the sensor probe pointed down. Drill a hole large enough for your sensor cable through your mounting surface. Mount the unit to the surface with the wiring knock out centered over the wiring hole. Pull the wiring into the unit and terminate using seal-ant 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.

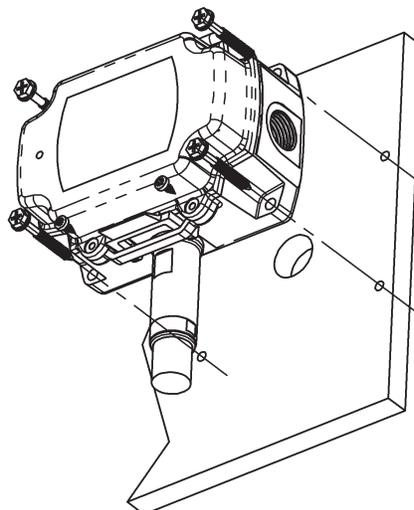


Fig. 3: Outside Humidity in a BAPI-Box (BB) Enclosure

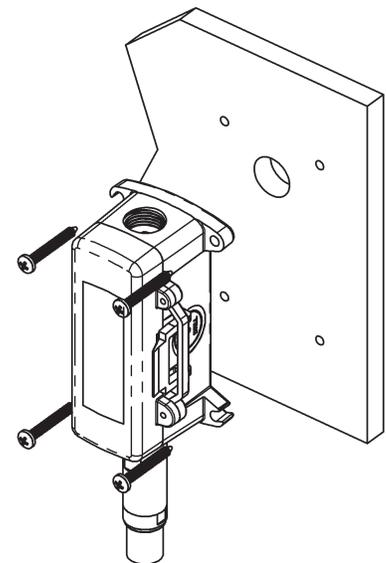


Fig. 4: Outside Humidity in a BAPI-Box 2 (BB2) Enclosure

Specifications subject to change without notice.



Duct or Outside Air Humidity Transmitter with 0 to 10 or 2 to 10V Output and Optional Temperature Sensor and Terminal Strip

Termination and Troubleshooting

32075_ins_hum_temp_duct_out_10_TS

rev. 01/12/16

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. BAPI's tests show fluctuating and inaccurate signals are possible when AC power wiring is 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 void the warranty.

Label	Purpose	Note
V, SIG	Humidity Output	0 to 10VDC, To Analog Input of Controller
+, PWR	Power	10 to 35VDC or 12 to 27VAC
-, SIG	GND (Common)	Ground for Power and Humidity Output

Label	Purpose	Note
V, SIG	Humidity Output	2 to 10VDC, To Analog Input of Controller
+, PWR	Power	10 to 35VDC or 12 to 27VAC
-, SIG	GND (Common)	Ground for Power and Humidity Output

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.

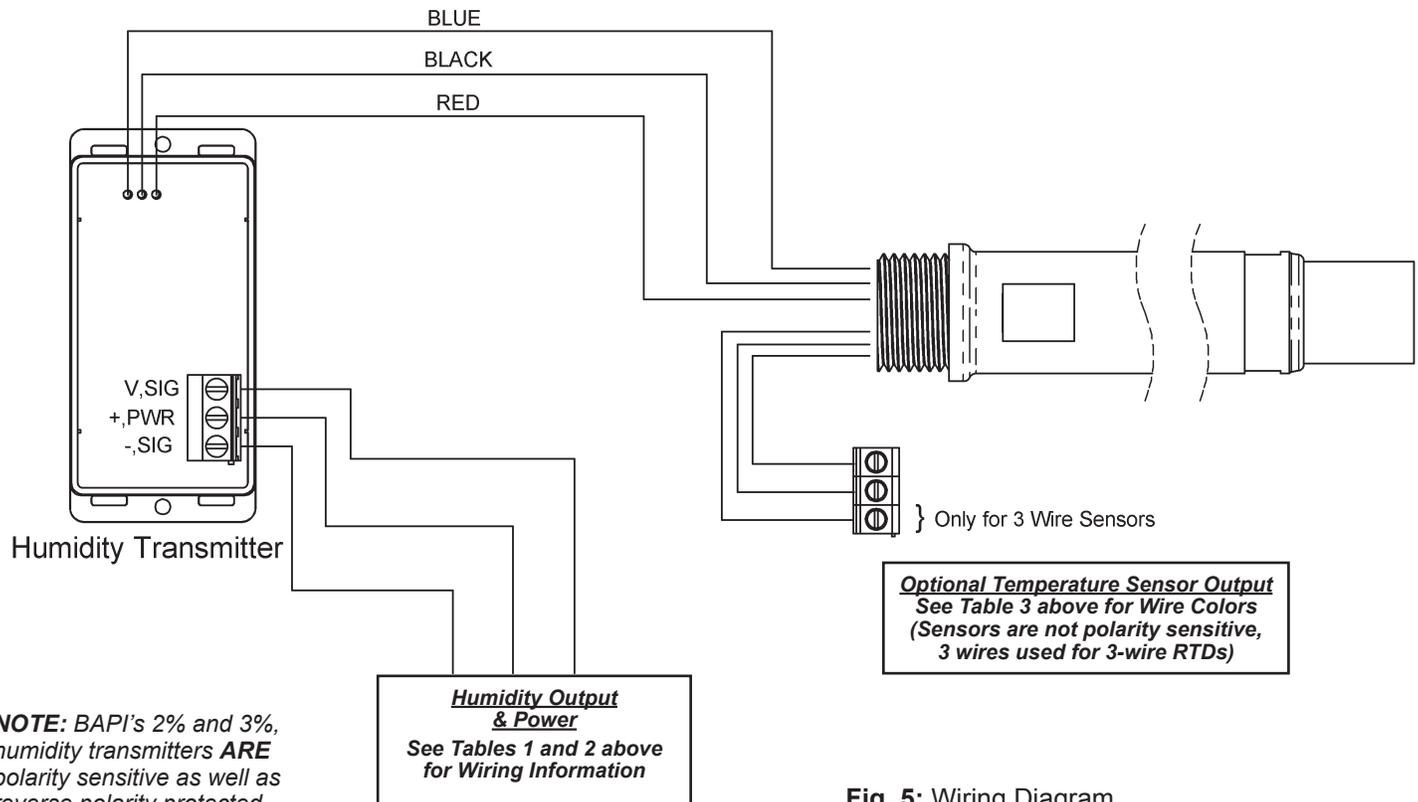


Fig. 5: Wiring Diagram

NOTE: BAPI's 2% and 3%, humidity transmitters ARE polarity sensitive as well as reverse polarity protected.

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Duct or Outside Air Humidity Transmitter with 0 to 10 or 2 to 10V Output and Optional Temperature Sensor and Terminal Strip

Termination and Troubleshooting

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Specifications

Power:	15 to 35 VDC, 6mA max 15 to 27 VAC, 0.14VA max
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 linier from 10 to 90%
RH Hysteresis	Factory corrected to <1%
Opt. Temp.	Passive RTD or Thermistor
Filter:	80 micron sintered stainless steel filter
Calibrated Accuracy:	Calibration @17 RH points, (10% to 90%)
RH 2%	2% from 10 to 90% @ 73°F (23°C), Non-condensing
RH 3%	3% 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:	Selectable via wiring detail
Humidity	0 to 10VDC or 2 to 10V at 0 to 100% RH
Opt. Temp.	Resistance RTD or Thermistor
Humidity Output Impedance:	
Voltage	10KΩ
Probe Length:	
Duct	5.3" (13.5cm) Duct Insertion, 1" diameter
Outside Air	2.4" (6.1cm) Below Enclosure, 1" diameter
Dimensions:	W x H x D
BAPI-Box (BB)	4.15" x 5" x 2.5", (105.4 x 127 x 63.5mm)
BAPI-Box 2 (BB2)	4.9" x 2.8" x 2.35", (124.8 x 71.6 x 59.7mm)
Termination:	
Terminals	14 to 26 AWG
Enclosure Material:	
BAPI-Boxes (BB, BB2)	Polycarbonate, UV resistant
Enclosures Ratings:	
BAPI-Boxes (BB, BB2)	NEMA-4, IP66, UL94V-0
Environmental Operation Range:	-40° to 158°F (-40° to 70°C) • 0% to 100% RH
Approvals:	RoHs

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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. The filter should screw all the way into the probe. Hand tighten only. If a replacement filter is needed, call BAPI.

BA/HDOFS3 Stainless Steel Sintered Filter Replacement for Outside Air Units

Humidity Diagnostics

Possible Problems:

Unit will not operate

Humidity output is at its maximum value of 10V

Humidity output is at its minimum value of 0V or 2V

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.
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- 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 formula at left. Compare the calculated output to the actual humidity transmitter output (see the wiring diagram on page 2 for the humidity transmitter output wire colors). If the calculated output differs from the humidity transmitter output by more than 4% to 5%, contact BAPI technical support.

Output	Humidity Formula
0 to 10 VDC	%RH = V/0.10
2 to 10 VDC	%RH = (V-2)/0.08

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
- 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 website. (Go to www.bapihvac.com; click "Resource Library" and "Sensor Specs", then click on the type of sensor you have.) If the measured resistance differs from the temperature table by more than 5%, call BAPI technical support.

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