Overview

The BA/H (H200-TS, H300-TS) is a humidity transmitter which comes in 2% or 3% accuracies and an optional temperature sensor. The temperature sensor can be either a Thermistor or RTD. It can be ordered for either Duct or Outside Air applications with a BAPI-Box (BB) or BAPI-Box 2 (BB2) Enclosure. The transmitter can be wired for either a 0 to 5VDC output or a loop powered 4 to 20mA output and includes 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 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, do not over tighten the screws.

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.

Specifications subject to change without notice.
**Wiring and 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.

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**Table 1: Humidity Transmitter with 4 to 20mA Output**

<table>
<thead>
<tr>
<th>Label</th>
<th>Purpose</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>V, SIG</td>
<td>Not Used</td>
<td>Not Used (Cap Wires)</td>
</tr>
<tr>
<td>+, PWR</td>
<td>Power</td>
<td>10 to 35VDC</td>
</tr>
<tr>
<td>-, SIG</td>
<td>Humidity Output</td>
<td>4 to 20 mA, To Analog Input of Controller</td>
</tr>
</tbody>
</table>

**Table 2: Humidity Transmitter with 0 to 5VDC Output**

<table>
<thead>
<tr>
<th>Label</th>
<th>Purpose</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>V, SIG</td>
<td>Humidity Output</td>
<td>0 to 5VDC, To Analog Input of Controller</td>
</tr>
<tr>
<td>+, PWR</td>
<td>Power</td>
<td>10 to 35VDC or 12 to 27VAC</td>
</tr>
<tr>
<td>-, SIG</td>
<td>GND (Common)</td>
<td>Ground for Power and Humidity Output</td>
</tr>
</tbody>
</table>

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**Table 3: Temperature Sensor Lead Wire Colors**

<table>
<thead>
<tr>
<th>Thermistors</th>
<th>Nickel RTD</th>
<th>Silicon RTD</th>
<th>Platinum RTDs - 2 Wire</th>
<th>Platinum RTDs - 3 Wire</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.8KΩ</td>
<td>Orange/Red</td>
<td>100Ω</td>
<td>Red/Red</td>
<td></td>
</tr>
<tr>
<td>2.2KΩ</td>
<td>Brown/White</td>
<td>1KΩ</td>
<td>Orange/Orange</td>
<td></td>
</tr>
<tr>
<td>3KΩ</td>
<td>Yellow/Black</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.25KΩ</td>
<td>Brown/Green</td>
<td>1KΩ</td>
<td>Green/Green</td>
<td></td>
</tr>
<tr>
<td>3.3KΩ</td>
<td>Yellow/Brown</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10K-2Ω</td>
<td>Yellow/Yellow</td>
<td></td>
<td>Brown/Blue</td>
<td></td>
</tr>
<tr>
<td>10K-3Ω</td>
<td>Yellow/Red</td>
<td>2KΩ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10K-3(11K)Ω</td>
<td>Yellow/Blue</td>
<td>1KΩ</td>
<td>Orange/Orange/Black*</td>
<td></td>
</tr>
<tr>
<td>20KΩ</td>
<td>White/White</td>
<td>1KΩ</td>
<td>Red/Red/Black*</td>
<td></td>
</tr>
<tr>
<td>47KΩ</td>
<td>Yellow/Orange</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50KΩ</td>
<td>White/Blue</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100KΩ</td>
<td>Yellow/White</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*In the 3-Wire RTD sensors listed above, the two wires of similar color are connected together.

**Optional Temperature Sensor Output**

See Table 3 above for Wire Colors (Sensors are not polarity sensitive, 3 wires used for 3-wire RTDs)

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

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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.
## Specifications

**Power:**
- 10 to 35 VDC  For 0 to 5 VDC or 4 to 20 mA Humidity Outputs
- 12 to 27 VAC  For 0 to 5 VDC Humidity Output

**Power Consumption:**
- 22 mA max. DC  For 0 to 5 VDC or 4 to 20 mA Humidity Outputs
- 0.53 VA max. AC  For 0 to 5 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%
  - 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 5VDC or 4 to 20mA at 0 to 100% RH
  - Opt. Temp.: Resistance RTD or Thermistor

**Humidity Output Impedance:**
- Current: 700Ω @ 24VDC, Voltage drop is 10VDC
  - Voltage: (Supply Voltage DC – Transmitter voltage drop 10VDC) / 0.02 Amps = Max load 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:**
- 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:**
- -40º to 158ºF (-40º to 70ºC) • 0% to 100% RH

**Approvals:**
- RoHS

Specifications subject to change without notice.
**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.

**Humidity Diagnostics**

<table>
<thead>
<tr>
<th>Possible Problems:</th>
<th>Possible Solutions:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit will not operate</td>
<td>- Check for proper supply power. (See page 2 for wiring diagram and power specifications)</td>
</tr>
<tr>
<td>Humidity output is at its maximum value of 5V or 20mA</td>
<td>- Make sure the humidity sensor is wired properly.</td>
</tr>
<tr>
<td>Humidity output is at its minimum value of 0V or 4mA</td>
<td>- Make sure the humidity sensor is wired properly.</td>
</tr>
<tr>
<td>Humidity reading in controller’s software appears to be off by more than the specified accuracy</td>
<td>- Check all software parameters</td>
</tr>
</tbody>
</table>

**Output Humidity Formula**

<table>
<thead>
<tr>
<th>Output</th>
<th>Humidity Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 to 20mA</td>
<td>%RH = (mA-4)/0.16</td>
</tr>
<tr>
<td>0 to 5VDC</td>
<td>%RH = V/0.05</td>
</tr>
</tbody>
</table>

**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. If the measured resistance is different from the temperature table by more than 5%, call BAPI technical support. BAPI’s web site is found at www.bapihvac.com; click on the button labeled “Sensor Specs” and then click on the type of sensor you have.