Duct Averaging Transmitters in the BAPI-Box Crossover Enclosure

Installation & Operations

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Overview and Identification

Duct Averaging Temperature Transmitters in the BAPI-Box Crossover enclosure are available with 4 to 20mA output and a variety of probe lengths. They can be ordered with a 1KΩ Platinum RTD or special high accuracy matched RTD transmitter which matches the sensor to the transmitter for improved accuracy.

The Duct Averaging sensor is for temperature measurement of stratified air and provides an average temperature along its length. The flexible probe is made of bendable aluminum.

The BAPI-Box Crossover enclosure has a hinged cover for easy termination and comes with an IP10 rating (or IP44 rating with a pierceable knockout plug installed in the open port).

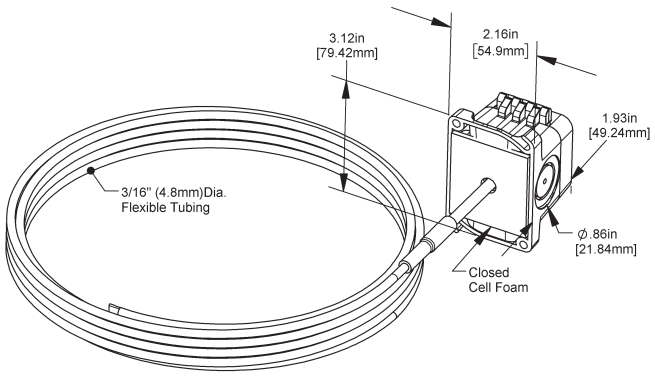

Fig. 1: Duct Averaging Transmitter with BAPI-Box Crossover Enclosure

Specifications

RTD Transmitter

Power Required: ..... 10 to 40VDC
Output: ..... 4 to 20mA, 850Ω@24VDC
Output Wiring: ..... 2 wire loop
Output Limits: ..... <1mA (short), <22.35mA (open)
Span: ..... Min. 30ºF (17ºC), Max 1,000ºF, (555ºC)
Zero: ..... Min. -148˚F (-100˚C), Max 900ºF (482ºC)
Zero & Span Adjust:.. 10% of span
Accuracy: ..... ±0.065% of span
Linearity: ..... ±0.125% of span
Power Output Shift: . ±0.009% of span
RTD Sensor: ..... 2 wire Platinum (Pt), 385 curve
Transmitter Ambient.. -4 to 158ºF(-20 to 70ºC) 0 to 95% RH, Non-condensing)

RTD Sensor: Resistance Temp Device (Bare Sensor)

Platinum (Pt): ..... 1KΩ @0ºC, 385 curve
Pt Accuracy (Std): .... 0.12% @Ref, or ±0.55ºF, (±0.3ºC)
Pt Accuracy (High): ..... 0.06% @Ref, or ±0.277ºF, (±0.15ºC)
Pt Stability: ..... ±0.25ºF, (±0.14ºC)
Pt Self Heating: ..... 0.4 ºC/mW @0ºC
Pt Probe Range: ..... -40º to 221ºF, (-40 to 105ºC)

Environmental Operating Range:
-40 to 185ºF (-40 to 85ºC)
0 to 100% RH, Non-condensing

Lead Wire: 22AWG stranded

Wire Insulation: Etched Teflon, Plenum rated

Probe: Flexible Aluminum tube, 0.19” OD

Probe Length: 8’, 12’, 24’ per order

Duct Gasket: 1/4” Closed cell foam (impervious to mold)

Mounting: Extension tabs (ears), 3/16” holes

BAPI-Box Crossover Enclosure Ratings:
IP10, NEMA 1
IP44 with knockout plug installed in the open port

BAPI-Box Crossover Enclosure Material:
UV-resistant polycarbonate & Nylon, UL94V-0

Agency:
RoHS
PT= DIN43760, IEC Pub 751-1983,
JIS C1604-1989

Specifications subject to change without notice.

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Mounting

1. Place the sensor in the middle or top of the duct as shown in Figs 2 or Fig 3 so the flexible probe can enter the duct in a convenient place. Drill the probe and mounting holes as shown in Fig 4.
2. Insert the probe by unrolling the sensor into the duct carefully to avoid kinking the sensor. Serpentine the duct with the sensor at least twice across the stratified air in the duct to achieve the best average temperature reading. At the sensor reversing points, a Flexible Probe Bracket (see Fig. 6) can be used to support the sensor and to avoid kinking the sensor.
3. Mount the enclosure to the duct using BAPI recommended #8 screws through a minimum of two opposing mounting tabs provided. A 1/8" pilot screw hole in the duct makes mounting easier through the mounting tabs. Use the enclosure tabs to mark the pilot hole locations.
4. Snug up the sensors so that the foam backing is depressed to prevent air leakage but do not over-tighten or strip the screw threads.
5. A pierceable knockout plug is available for the open port in the BAPI-Box Crossover enclosure (see Fig. 5). The plug increases the enclosure rating from IP10 to IP44.

Notes:
Use caulk or Teflon tape for your conduit entries to maintain the appropriate IP or NEMA rating for your application.

Conduit entry for outdoor or wet applications should be from the bottom of the enclosure.

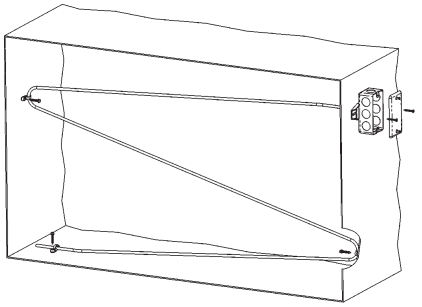

Fig 2: Flexible Sensor Horizontal Mount (Best for Vertical Stratification)

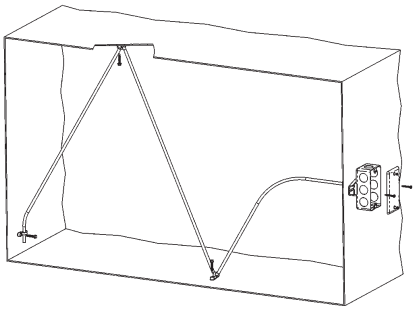

Fig 3: Flexible Sensor Vertical Mount (Best for Horizontal Stratification)

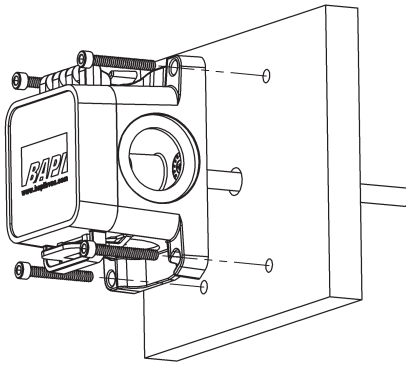

Fig. 4: BAPI-Box Crossover Mounting to the Duct

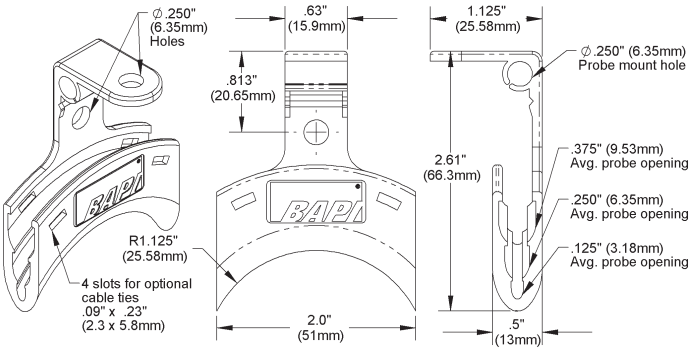

Fig 6: Flexible Probe Bracket **(BA/FPB)** (Order Separately)

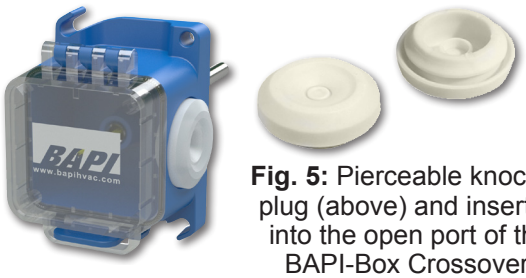

Fig. 5: Pierceable knockout plug (above) and inserted into the open port of the BAPI-Box Crossover.

Wiring & 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 high or low voltage AC power wiring. BAPI's tests show that inaccurate signal levels are possible when AC power wiring is present in the same conduit as the sensor wires.

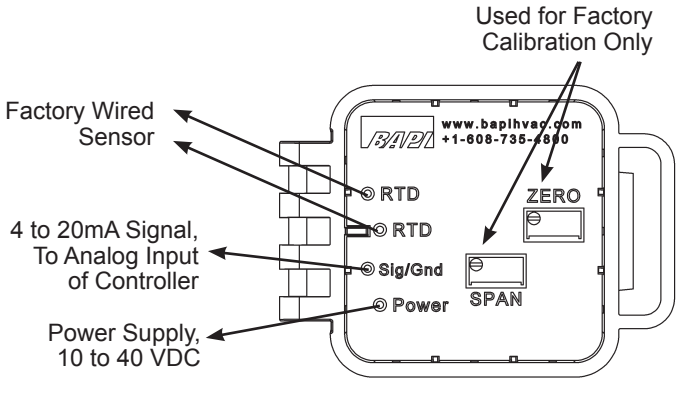

Fig. 5: Transmitter with Flying Leads

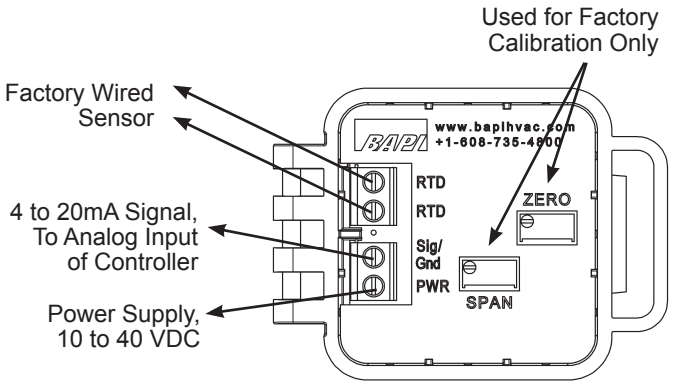

Fig. 6: Transmitter with Terminals

Note: Green LED on cover face will light when power is applied.

Diagnostics

Possible Problems:	**Possible Solutions:**
Green power LED is not on.	- Measure the power supply voltage by placing a multi-meter across the transmitter's "Power" and "Sig/Gnd" leads or terminals. Make sure that the power is 10 to 40 VDC. - Make sure that the "Power" and "Signal/Gnd" wires are not open or shorted together and are terminated correctly to the controller.
The reading is incorrect in the controller.	- Determine if the input is set up correctly in the BAS and controller's software. - Compare the transmitted current to the actual temperature measurement at the sensor location. Measure the physical temperature at the temperature sensor's location using an accurate temperature standard. Measure the transmitter current by placing an ammeter in series with the controller input. The current should read according to the "4 to 20mA Temperature Equation" shown below. If the measured resistance is different from the temperature table by more than 5% call BAPI technical support.

4 to 20mA Temperature Equation

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

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