Overview and Identification

The duct temperature sensor comes in a variety of probe lengths and optional mounting enclosures shown below.

It can be ordered with all the most common Thermistors or RTDs used with virtually any BAS system. All thermistor and (385) RTD sensors come with standard accuracy as well as high accuracy models **[XP]** and **[A]** options respectively.
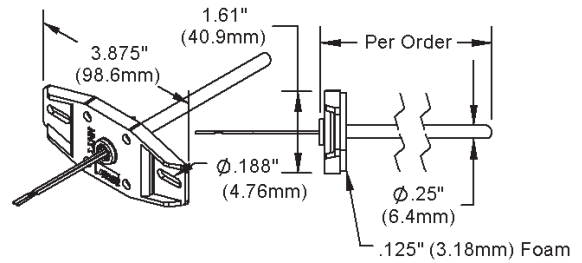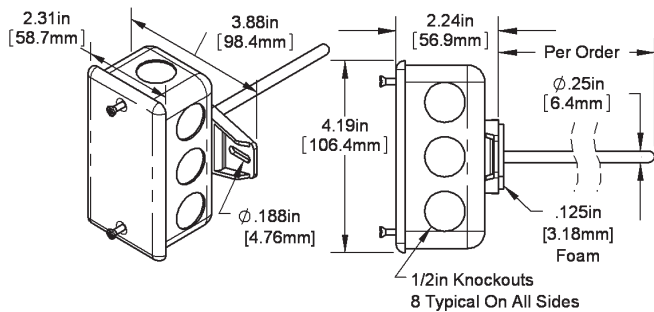

Fig. 1: Duct Unit with No Box **(NB)**

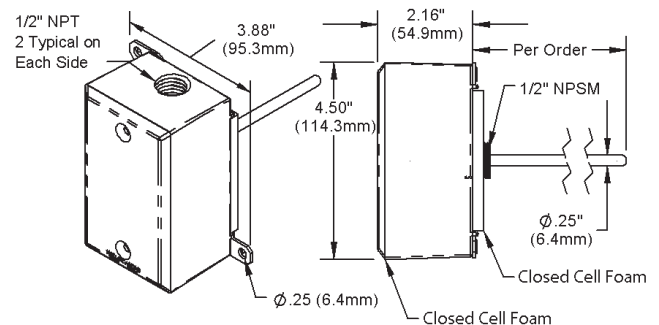**Fig. 2:** Duct Unit with J-Box (Standard)

Fig. 3: Duct Unit with Weatherproof **(WP)** Enclosure
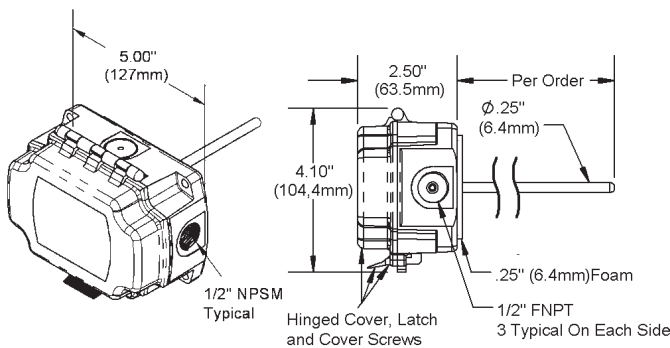

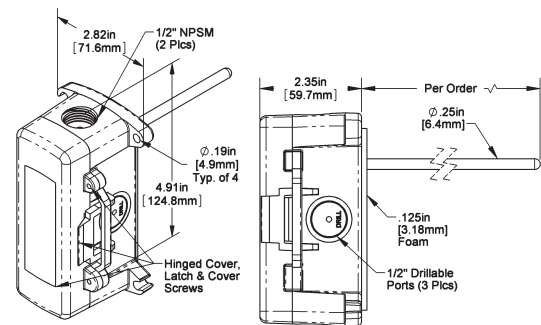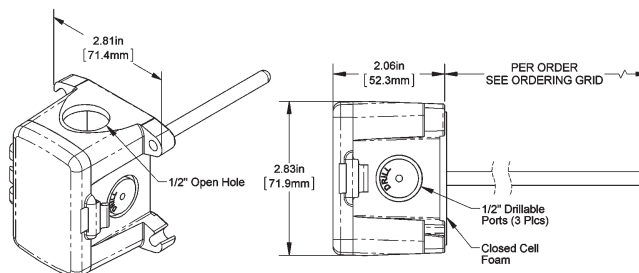**Fig. 4:** Duct Unit with BAPI-Box **(BB)** Enclosure

Fig. 5: Duct Unit with BAPI-Box 2 **(BB2)** Enclosure

Fig. 6: Duct Unit with BAPI-Box 4 **(BB4)** Enclosure

(A Pierceable Knockout Plug is available from BAPI for the open port in the BB4. Part #BA/PKP-100)

Specifications subject to change without notice.

Mounting

1. Place the sensor in the middle of the duct away from temperature stratified air, coils or humidifiers to achieve the best temperature reading.

2. Drill the probe hole as depicted on this page for the enclosure being used. Insert the probe into the duct.

3. Mount the enclosure to the duct using BAPI recommended #8 screws through a minimum of two opposing mounting tabs. Weatherproof **(WP)** enclosures require assembly of the mounting tabs on opposite corners. A 1/8 inch 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.

Note 1:
Do not drill into the water tight enclosures **(BB, BB2, WP)** which will violate the NEMA and/or IP rating.

Note 2:
Use caulk or Teflon tape for your conduit entries to maintain the appropriate NEMA or IP rating for your application.

Note 3:
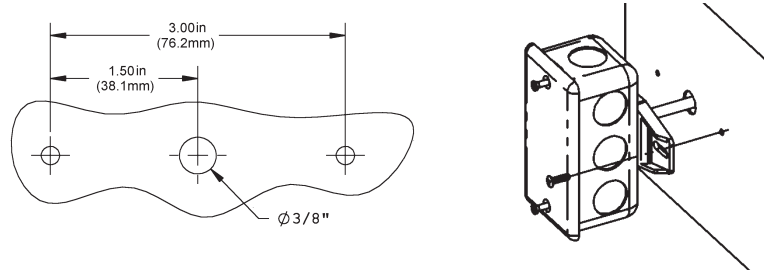Conduit entry for outdoor or wet applications should be from the bottom of the enclosure.

Fig. 10: Weatherproof **(WP)** Enclosure Mounting Holes

Fig. 7: Junction Box or No Box (**NB**) Mounting Holes

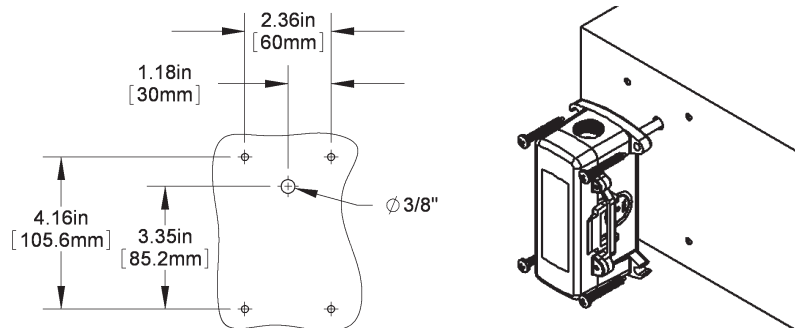**Fig. 8:** BAPI-Box 2 **(BB2)** Enclosure Mounting Holes
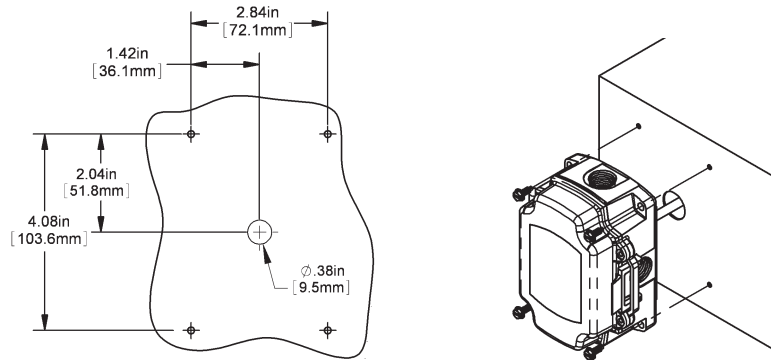
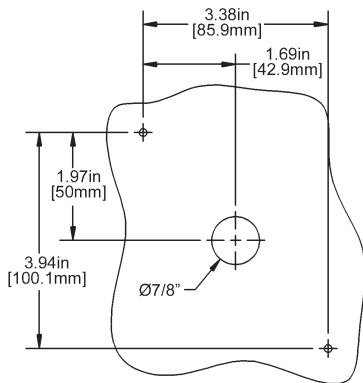**Fig. 9:** BAPI-Box **(BB)** Enclosure Mounting Holes, Rotate 90° for Horizontal Mounting
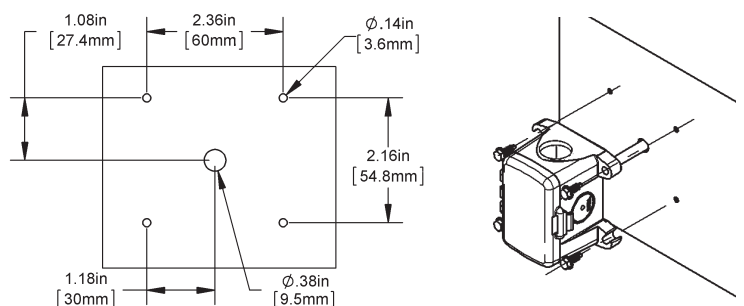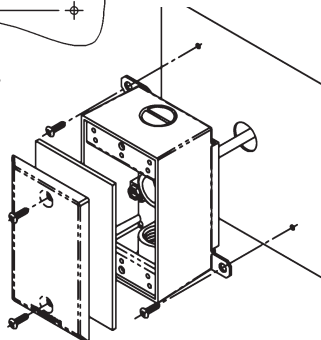

Fig. 11: BAPI-Box 4 **(BB4)** Enclosure Mounting Holes

Specifications subject to change without notice.

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.
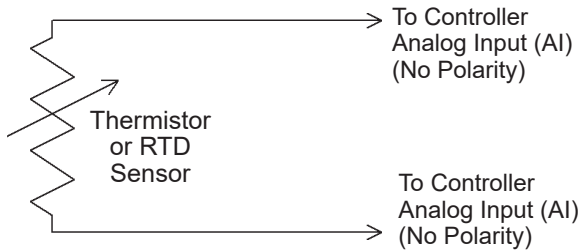
Fig. 12: 2 Wire Termination for Thermistor or RTD
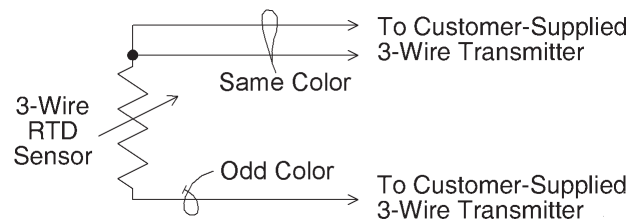
Fig. 13: 3 Wire Wire Termination for RTD
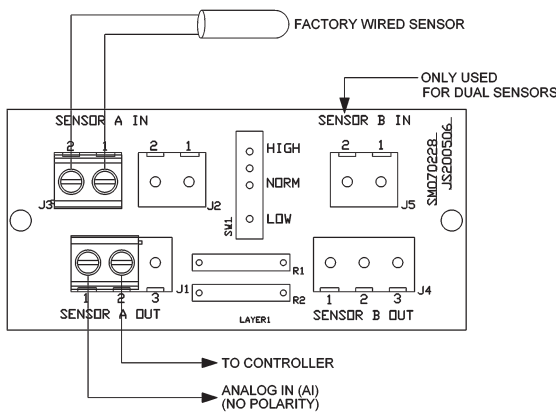
Fig. 14: Terminal Strip (-TS) Option for 2 Wire Sensors Termination
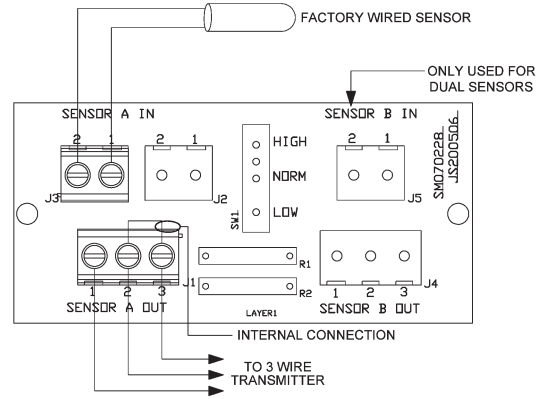
Fig. 15: Terminal Strip (-TS) Option for 3 Wire Sensors Termination

Fig. 16: Test & Balance (-TB) Option for 2 Wire Sensors Termination

Fig. 17: Test & Balance (-TB) Option for 3 Wire Sensors Termination

Specifications subject to change without notice.

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Diagnostics

Possible Problems:
Controller reports higher or lower than actual temperature

Possible Solutions:
- Confirm the input is set up correctly in the front end software
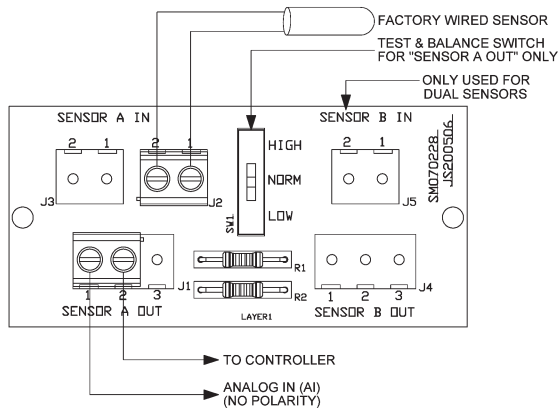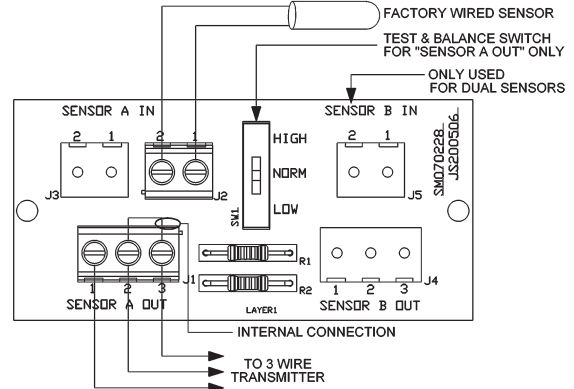- Check wiring for proper termination & continuity. (shorted or open)
- Measure the temperature at the temperature sensor's location using an accurate temperature standard. Disconnect the temperature sensor wires and measure the temperature sensor's resistance with an ohmmeter. Compare the temperature 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 website is found at www.bapihvac.com; click on the "Resources" then "BAPI Sensors Overview" and then click on the type of sensor you have.

Specifications

Sensor: Passive
Thermistor .... NTC, 2 wire
RTD .... PTC, 2 or 3 wire

Thermistor: Thermal resistor
Temp. Output .... Resistance
Accuracy (Std) .... ±0.36ºF, (±0.2ºC)
Accuracy (High) ..... ±0.18ºF, (±0.1ºC), **[XP]** option
Stability .... < 0.036ºF/Year, (<0.02ºC/Year)
Heat dissipation .... 2.7 mW/ºC
Temp. Drift .... <0.02ºC per year
Probe range .... -40º to 221ºF (-40º to 105ºC)

RTD: Resistance Temperature Device
Platinum (Pt) .... 100Ω or 1KΩ @0ºC, 385 curve,
Platinum (Pt) .... 1KΩ @0ºC, 375 curve
Pt Accuracy (Std) .. 0.12% @Ref, or ±0.55ºF, (±0.3ºC)
Pt Accuracy (High) 0.06% @Ref, or ±0.277ºF (±0.15ºC), **[A]**option
Pt Stability .... ±0.25ºF, (±0.14ºC)
Pt Self Heating ...... 0.4 ºC/mW @0ºC
Pt Probe range ...... -40º to 221ºF, (-40 to 105ºC)
Nickel (Ni) .... 1000Ω @70ºF, JCI curve
Ni Probe range ...... -40º to 221ºF (-40 to 105ºC)

Sensitivity: Approximate @ 32ºF (0ºC)
Thermistor ....Non-linier – Go to bapihvac.com click "Resources" and "BAPI Sensors Overview"
1KΩ RTD (Pt) 3.85Ω/ºC
100Ω RTD 0.385Ω/ºC
Nickel (Ni) .... 2.95Ω/ºF for the JCI RTD

Lead Wire: 22awg stranded

Wire Insulation: Etched Teflon, Plenum rated

Probe: 304 Stainless steel, 0.25" OD

Probe Length: 2', 4', 8' or per order

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

Enclosure Types: (Part number designator in bold)
No Box: .... **-NB**, intended for open wiring
J-Box: .... **-JB,** w/ eight ½" knock-outs
Weatherproof: .. **-WP,** w/ two ½" FNPT entries, (Bell box)
BAPI-Box: .... **-BB,** w/ four ½" NPSM & one ½" drill-out
BAPI-Box 2: ..... **-BB2,** w/ three ½" NPSM & three ½" drill-outs
BAPI-Box 4: ..... **-BB4,** with three ½" drill-outs, one ½" open port

Enclosure Ratings: (Part number designator in bold)
No Box: .... **-NB**, No rating
J-Box: .... **-JB,** NEMA 1
Weatherproof: .. **-WP,** NEMA 3R, IP14
BAPI-Box: .... **-BB,** NEMA 4, IP66, UV Rated
BAPI-Box 2: ..... **-BB2,** NEMA 4, IP66, UV Rated
BAPI-Box 4: ..... **-BB4,** IP10 (IP44 with Knockout Plug in open port)

Enclosure Material: (Part number designator in bold)
No Box: .... **-NB**, Nylon 66, UL94H-B
J-Box: .... **-JB,** Galvanized steel, UL94H-B
Weatherproof: ... **-WP,** Cast Aluminum, UV rated
BAPI-Box: .... **-BB,** Polycarbonate, UL94V-0, UV rated
BAPI-Box 2: ..... **-BB2,** Polycarbonate, UL94V-0, UV rated
BAPI-Box 4: ..... **-BB4,** Polycarbonate & Nylon, UL94V-0

Ambient (Enclosure): 0 to 100% RH, Non-condensing
All BAPI-Boxes: **-BB, BB2 & BB4,** -40 to 185ºF (-40 to 85ºC)
Junction Box: ... **-JB,** -40 to 212ºF (-40 to 100ºC)
Weatherproof: .. **-WP,** -40ºF to 212ºF (-40º to 100ºC)
No Box .... **-NB,** -40 to 212ºF (-40 to 100ºC)
No Box w/ Plenum-Rated Wire: **-NB,** -4 to 167°F (-20 to 75°C)

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

Specifications subject to change without notice.

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