Duct Mounted Thermistor and RTD Temperature Probe (*BA/#-D)*

Installation & Operations

Overview and Identification

The **BA/#-D** is a duct mounted passive resistive sensor. It comes in a variety of probe lengths and optional mounting enclosures shown below.

The **BA/#-D** can be ordered with all the most common Thermistor's or RTD's 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.

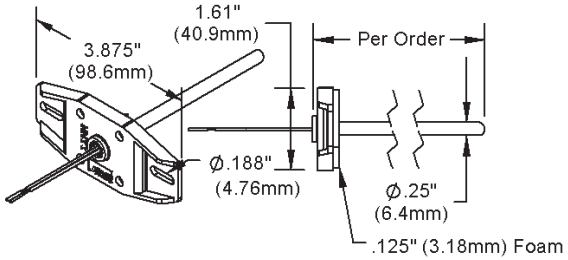


Fig 1: Duct Unit with No Box **(NB)**

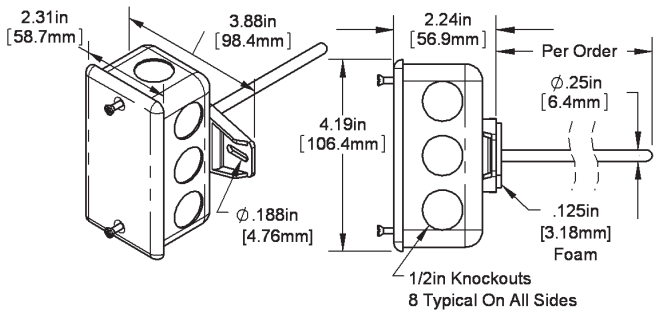


Fig 2: Duct Unit with J-Box (Standard)

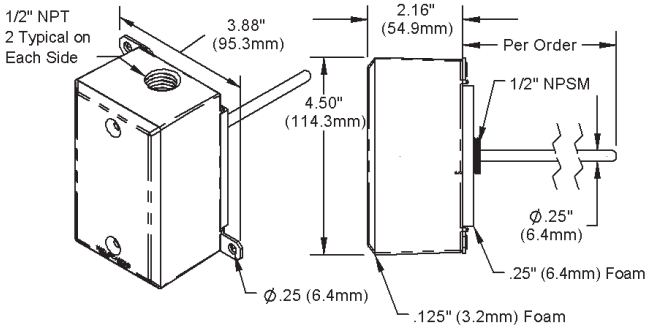


Fig 3: Duct Unit with Weatherproof **(WP)** Enclosure

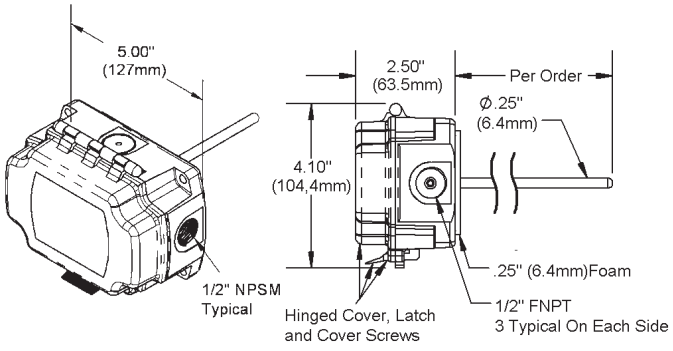


Fig 4: Duct Unit with BAPI-Box **(BB)** Enclosure

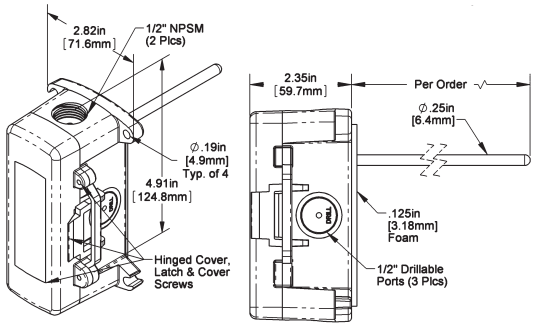


Fig 5: Duct Unit with BAPI-Box 2 **(BB2)** Enclosure

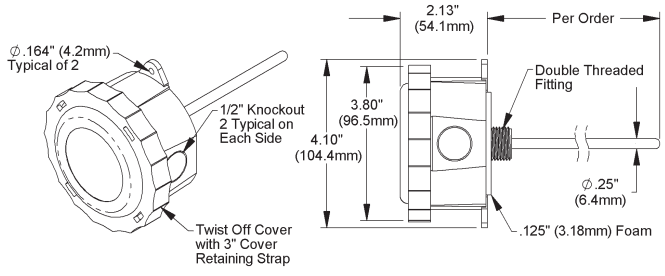


Fig 6: Duct Unit with Weather Tight **(EU)** Enclosure

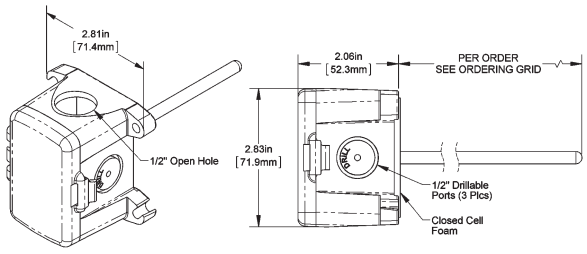


Fig 7: Duct Unit with BAPI-Box 4 **(BB4)** Enclosure

(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, EU, EUO)** 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.

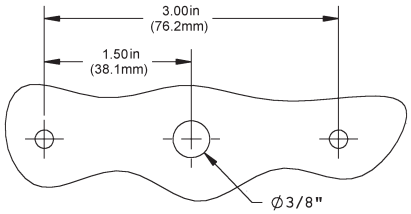
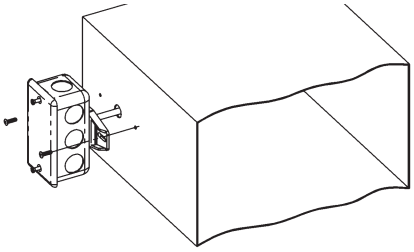


Fig 8: Junction Box or No Box (**NB)** Mounting Holes



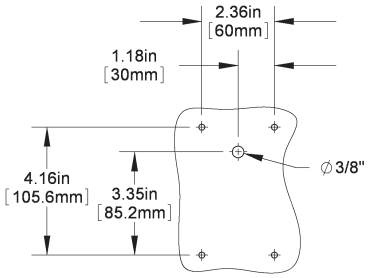
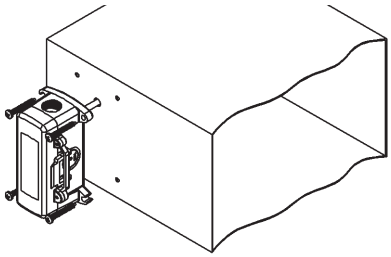


Fig 9: BAPI-Box 2 **(BB2)** Enclosure Mounting Holes



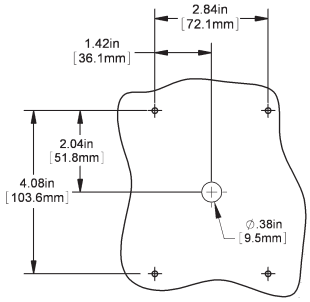
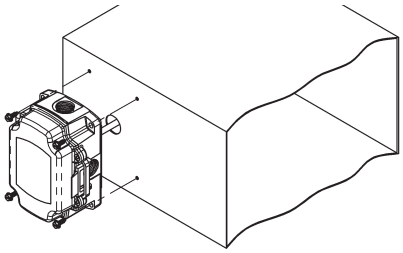


Fig 10: BAPI-Box (**BB)** Enclosure Mounting Holes, Rotate 90° for Horizontal Mounting



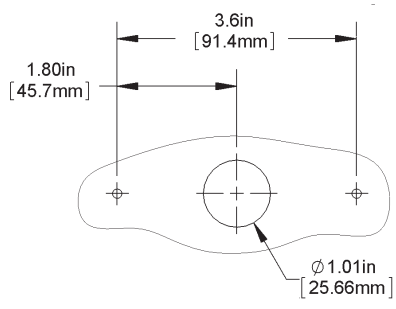
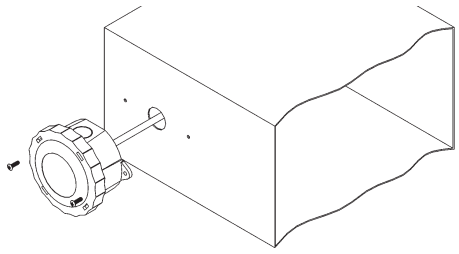


Fig 11: Weather Tight **(EU** or **EUO)** Enclosure Mounting Holes



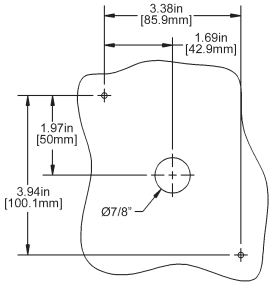
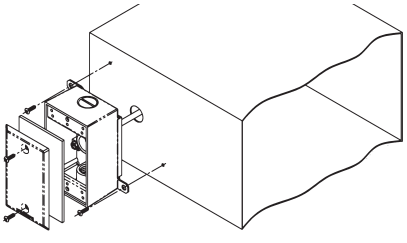


Fig 12: Weatherproof **(WP)** Enclosure Mounting Holes



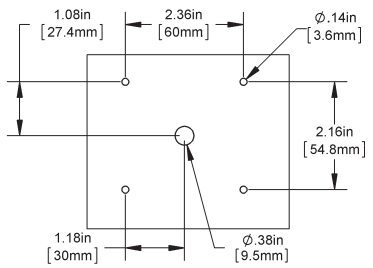
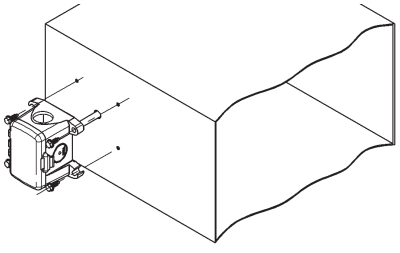


Fig 13: BAPI-Box 4 **(BB4)** Enclosure Mounting Holes



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.

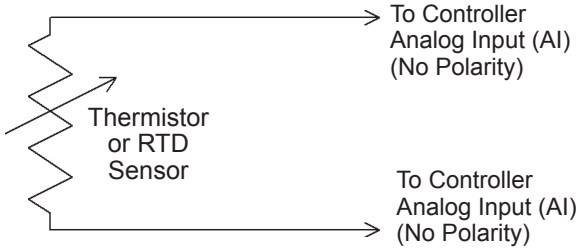


Fig. 14: 2 Wire Lead Wire Termination for Thermistor or RTD

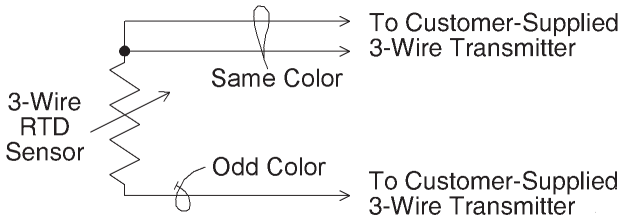


Fig. 15: 3 Wire Lead Wire Termination for RTD

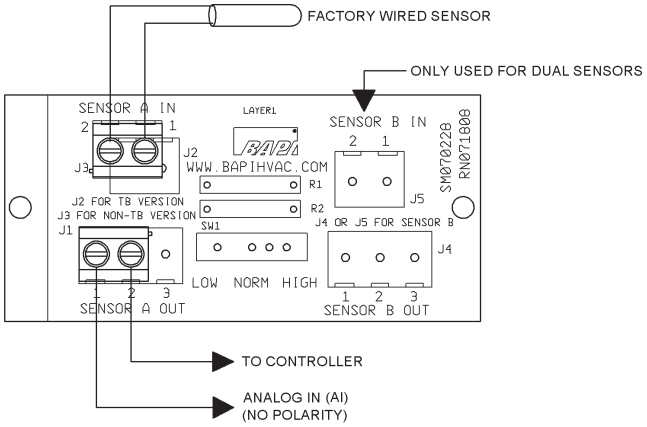


Fig. 16: Terminal Strip (-TS) Option for 2 Wire Sensors Termination

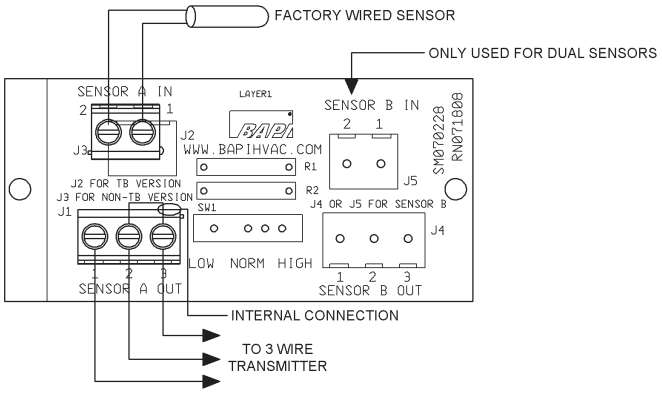


Fig. 17: Terminal Strip (-TS) Option for 3 Wire Sensors Termination

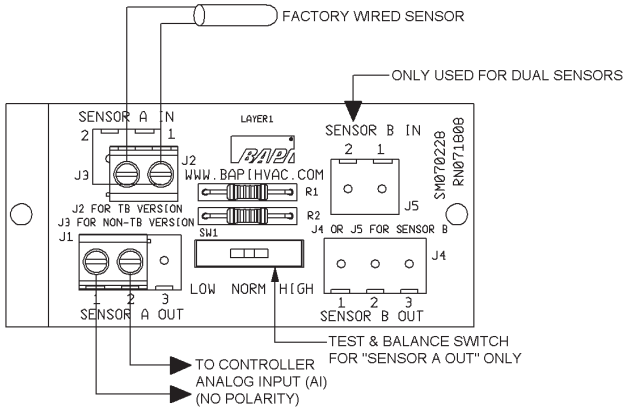


Fig. 18: Test & Balance (-TB) Option for 2 Wire Sensors Termination

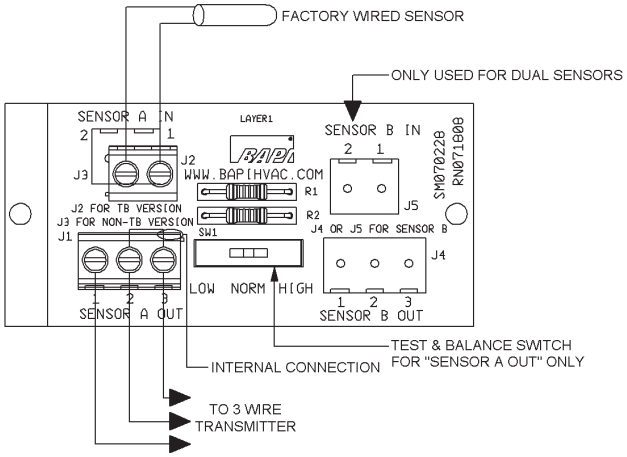


Fig. 19: Test & Balance (-TB) Option for 3 Wire Sensors Termination

Specifications subject to change without notice.

Diagnostics

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)
- Disconnect wires and measure sensor resistance and verify the “Sensor” output is correct.

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)	100Ωor 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 See bapihvac.com “Sensor Specs”
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
Mounting	Extension tabs (ears), 3/16” holes
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
Weather Tight:	**-EU, EUO,** w/ two ½” knock-outs

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)
Weather Tight:	**-EU,** NEMA 4, IP66
Weather Tight:	**-EUO,** NEMA 4, IP66, UV rated

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
Weather Tight:	**-EU,** ABS Plastic, UL94V-0
Weather Tight:	**-EUO,** ASA (Geloy) Plastic, UL94V-0, UV rated

Ambient (Enclosure): 0 to 100% RH, Non-condensing

All BAPI-Boxes:	**-BB, BB2 & BB4,** -40 to 185ºF (-40 to 85ºC)
Weather Tight:	**-EU,** -40 to 185ºF (-40 to 85ºC)
Junction Box:	**-JB,** -40 to 212ºF (-40 to 100ºC)
No Box	**-NB,** -40 to 212ºF (-40 to 100ºC)
Weatherproof:	**-WP,** -40ºF to 212ºF (-40º to 100ºC)

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

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