

Overview and Identification

The Submersible Duct Unit is for duct mounting and temperature measurement of air across cooling coils or wet locations. The Stainless Steel probe tip is very small (1/8") to fit between coil fins and made in different lengths for a custom duct fit. The unit is available in multiple thermistor or RTD types as shown in the specifications.

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).

This instruction sheet is specific to temperature sensor units with the BAPI-Box Crossover Enclosure. For all other temperature sensor units, please refer to instruction sheet "20905_ins_SubmersibleDuct_Passive.pdf" which is available on the BAPI website or by contacting BAPI.

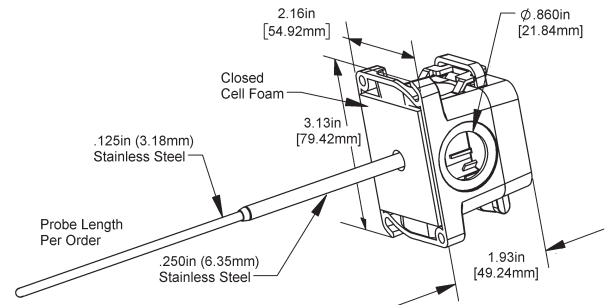


Fig 1: Submersible Duct Unit with BAPI-Box Crossover Enclosure

Mounting

1. Choose an appropriate location on the duct and drill the probe and mounting holes as shown in Figs 2 & 3.
2. Insert the probe into the duct and 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.
3. 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.
4. A pierceable knockout plug is available for the open port in the BAPI-Box Crossover enclosure. The plug increases the enclosure rating from IP10 to IP44.

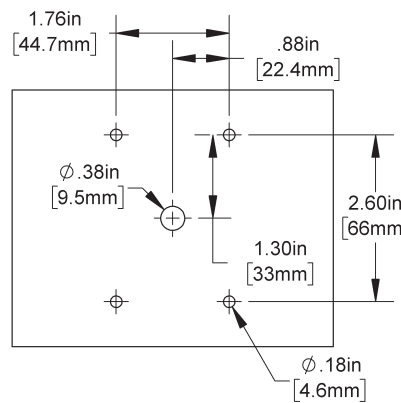


Fig 2: BAPI-Box Crossover Enclosure Mounting Holes

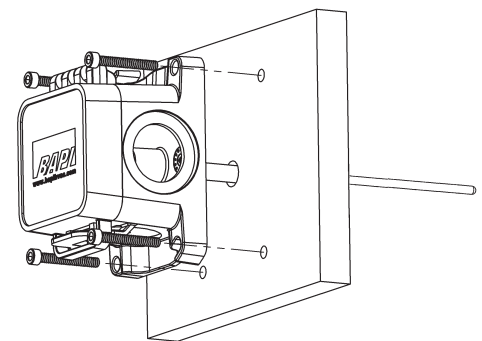


Fig 3: BAPI-Box Crossover Enclosure Mounting

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.

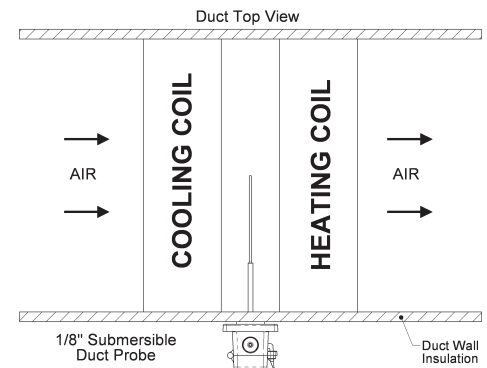


Fig 4: Cooling Coil Discharge Air Temperature Application

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.

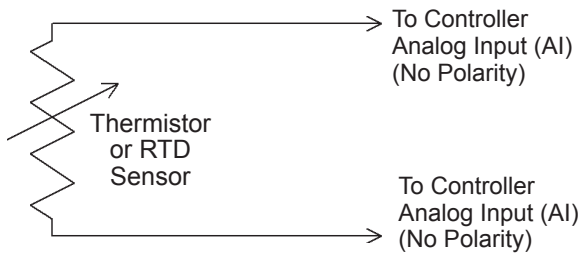


Fig. 5: 2-Wire Termination for Thermistor or RTDs

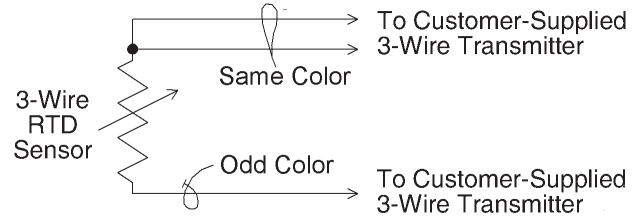


Fig. 6: 3-Wire Termination for RTDs

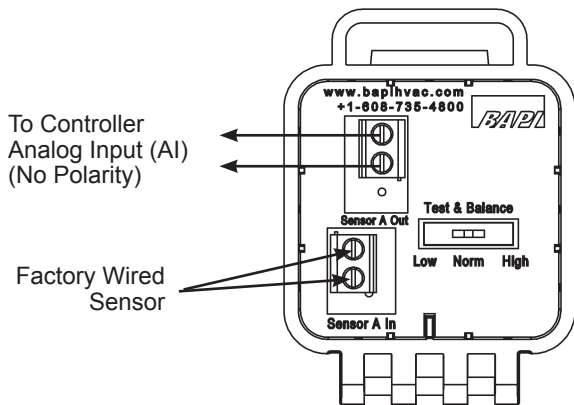


Fig. 7: Terminal Strip (-TS) or Test and Balance (-TB) Option for 2 Wire Sensors

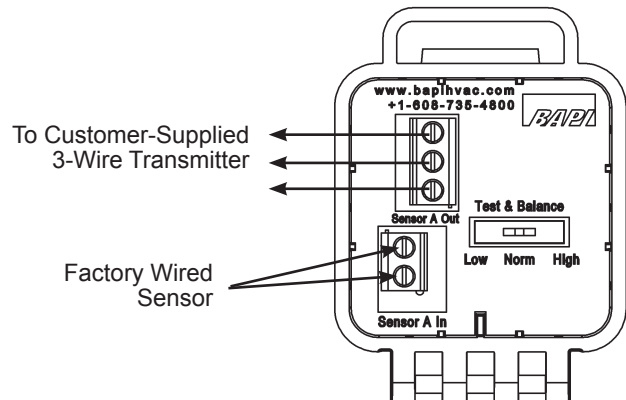


Fig. 8: Terminal Strip (-TS) or Test and Balance (-TB) Option for 3 Wire Sensors

Test and Balance Switch:

For units with a Test and Balance Switch, the Norm position allows the real sensor at be monitored at "Sensor A Out". The High position forces the "Sensor A Out" to a very hot reading and the Low position forces "Sensor A Out" to a very cold reading (see Table below).

Sensor Type	Low Temp (40° F) Resistance Value	High Temp (105°F) Resistance Value
1000Ω RTD	1.02KΩ (41.20°F)	1.15KΩ (101.5°F)
3000Ω Thermistor	7.87KΩ (39.8°F)	1.5KΩ (106.8°F)
10K-2 Thermistor	30.1KΩ (34.9°F)	4.75Ω (109.1°F)
10K-3 Thermistor	26.7KΩ (35.9°F)	5.11KΩ (108.4°F)
10K-3(11K) Thermistor	7.32KΩ (43.7°F)	3.65Ω (105.2°F)

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Submersible Duct Temperature Sensors in the BAPI-Box Crossover Enclosure

Installation & Operations

37709_ins_subduct_passive_bbx

rev. 03/22/18

Diagnositics

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)
- If the unit has a Test and Balance switch, make sure that the switch is in the center "Norm" position.
- Measure the physical temperature at the temperature sensor's location using an accurate temperature standard. Disconnect the temperature sensor wires and measure the temperature sensor's resistance across the sensor output pins 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. Find BAPI's website at www.bapihvac.com; click on "Resource Library" and "Sensor Specs" then click on the type of sensor you have.

Specifications

SENSOR SPECS

Sensor: Passive

Thermistor NTC, 2 wire
RTD PTC, 2 or 3 wire

Thermistor: Thermal resistor

Temp. Output..... Resistance
Accuracy (Std) $\pm 0.36^\circ\text{F}$, ($\pm 0.2^\circ\text{C}$)
Accuracy (High) $\pm 0.18^\circ\text{F}$, ($\pm 0.1^\circ\text{C}$), [XP] option
Stability $< 0.036^\circ\text{F}/\text{Year}$, ($< 0.02^\circ\text{C}/\text{Year}$)
Heat Dissipation $2.7 \text{ mW}/^\circ\text{C}$
Temp. Drift..... $< 0.02^\circ\text{C}$ per year
Probe Range -40° to 221°F (-40° to 105°C)

RTD: Resistance Temperature Device

Platinum (Pt) $1\text{K}\Omega$ @ 0°C , 385 curve,
Platinum (Pt) $1\text{K}\Omega$ @ 0°C , 375 curve
Pt Accuracy (Std) ... 0.12% @Ref, or $\pm 0.55^\circ\text{F}$, ($\pm 0.3^\circ\text{C}$)
Pt Accuracy (High) . 0.06% @Ref, or $\pm 0.277^\circ\text{F}$
($\pm 0.15^\circ\text{C}$), [A]option

Pt Stability $\pm 0.25^\circ\text{F}$, ($\pm 0.14^\circ\text{C}$)
Pt Self Heating $0.4 \text{ }^\circ\text{C}/\text{mW}$ @ 0°C
Pt Probe Range -40° to 221°F , (-40 to 105°C)
Nickel (Ni) 1000Ω @ 70°F , JCI curve
Ni Probe range -40° to 221°F (-40 to 105°C)

Sensitivity: Approximate @ 32°F (0°C)

Thermistor Non-linear
See bapihvac.com "Sensor Specs"

 $1\text{K}\Omega$ RTD (Pt) $3.85\Omega/^\circ\text{C}$
Nickel (Ni) $2.95\Omega/^\circ\text{F}$ for the JCI RTD

ENCLOSURE AND WIRING SPECS

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

Environmental Operating Range:

-40 to 185°F (-40 to 85°C)
 0 to 100% RH, Non-condensing

Lead Wire:

22AWG stranded

Wire Insulation:

Etched Teflon, Plenum rated

Probe:

Stainless Steel, Sheath $0.25"$ OD, probe 0.125

Probe Length:

$12"$ to $48"$ per order

Duct Gasket:

$1/4"$ Closed cell foam (impervious to mold)

Agency:

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

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