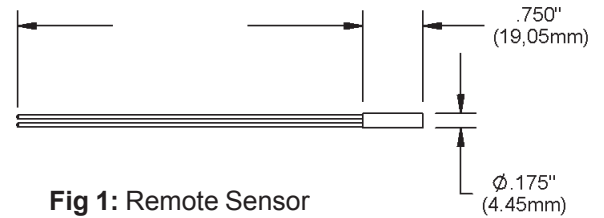


### Overview and Identification

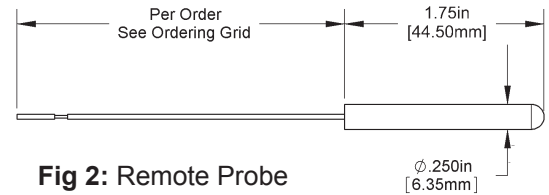
- The Remote Sensor (BA/#-PP) is a small temperature conductive plastic sensor used for single point temperature measurement with twin plenum rated lead wires. It is ideal for mounting applications inside electronic circuit enclosures or existing thermostats.
- The Remote Probe is a small Stainless Steel temperature sensor used for single point temperature measurement. It is ideal for bracket mounting for Chamber, Duct, Thermowell or L-bracket applications. It is available with Plenum-Rated, FEP-Jacketed or FEP-Jacketed Submersible Cable.

Both sensors are available with a variety of thermistor or RTD sensing elements. The probe is available alone or with various enclosures.

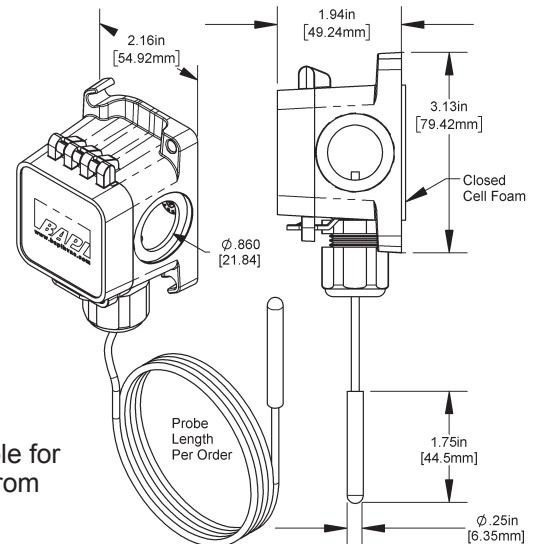
**This instruction sheet is specific to the sensors and probes with the BAPI-Box Crossover Enclosure. For other enclosures, please refer to instruction sheet "20910\_ins\_Remote\_Sensor\_Passive.pdf" which is available on the BAPI website or by contacting BAPI.**



**Fig 1: Remote Sensor**

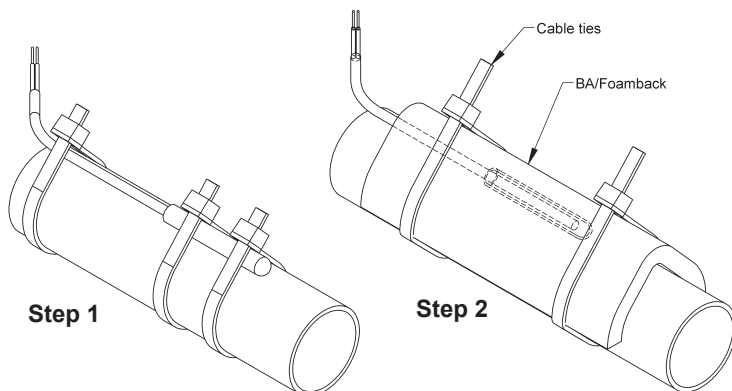


**Fig 2: Remote Probe**



**Fig 3: Remote Probe in a BAPI-Box Crossover Enclosure**  
(A Pierceable Knockout Plug is available for the open port to increase the rating from IP10 to IP44.)

### Mounting the Probe



#### MOUNTING THE PROBE TO A PIPE

**Step 1:** Secure Sensor To Have Good Contact With Bare Pipe

**Step 2:** Insulate Over The Sensor. Insulation should be installed a minimum of 4 pipe diameters on each side of the strap-on sensor. Example: 1/2" pipe x 4 = 2". Insulation should be 2" on each side of the sensor wrapped all the way around the pipe.

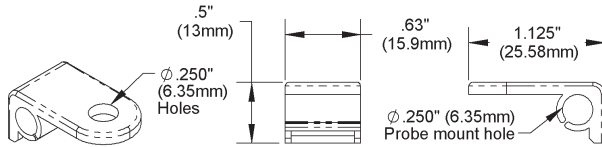
**Fig 4: Remote Probe Strapping to Pipes**

Specifications subject to change without notice.

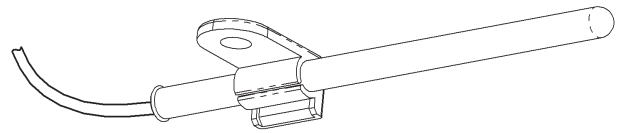
## Mounting the Probe continued...

### USING THE BREAK-OFF TAB OF AN FPB

A break-off tab on BAPI's Flexible Probe Bracket (BA/FPB) may be used to mount the remote probes. The BA/FPB is made out of tough UL94V Nylon and limits heat/cold conduction to the probe from the surface.



**Fig 5:** Break-off Tab of a Flexible Probe Bracket (BA/FPB)



**Fig 6:** Probe mounted using the break-Off tab from a BAPI Flexible Probe Bracket (BA/FPB)

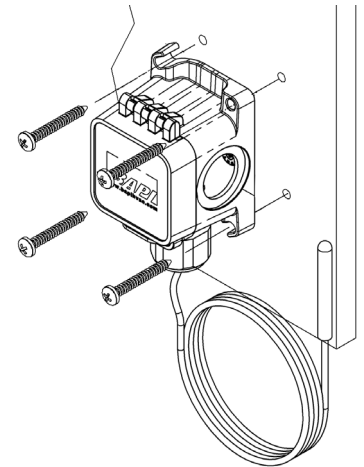
## Mounting the Optional Enclosure

Mount the enclosure to the surface using BAPI recommended #8 screws through a minimum of two opposing mounting tabs. A 1/8" inch pilot screw hole makes mounting easier through the tabs. Use the enclosure tabs to mark the pilot hole locations.

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).

**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.

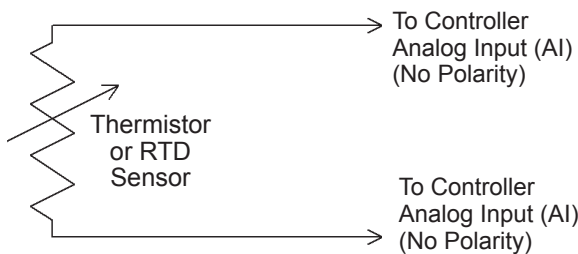


**Fig 7:** Remote Probe with BAPI-Box Crossover (BBX) Enclosure

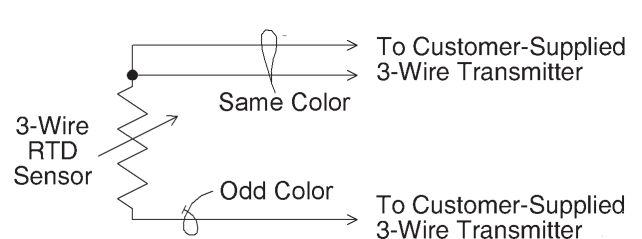
## Wiring & Termination

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.

### TERMINATION OF UNITS WITHOUT A TERMINAL STRIP OR TEST AND BALANCE SWITCH



**Fig. 8:** 2-Wire Termination for Thermistor or RTDs

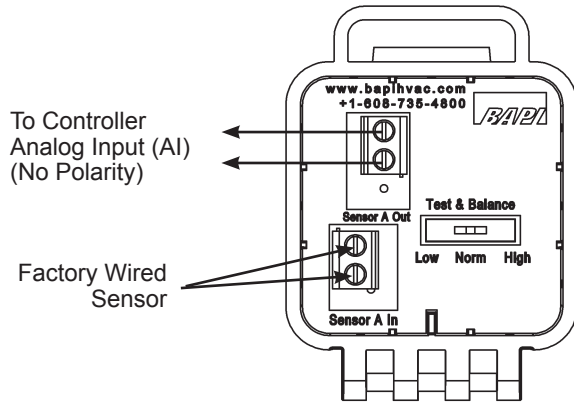


**Fig. 9:** 3-Wire Termination for RTDs

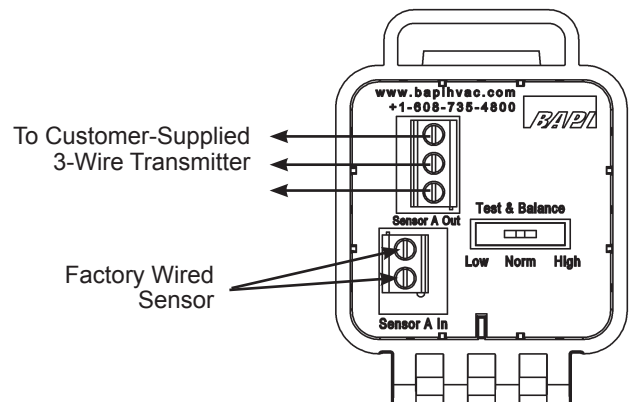
Specifications subject to change without notice.

## Wiring & Termination continued...

### TERMINATION OF UNITS WITH A TERMINAL STRIP OR TEST AND BALANCE SWITCH



**Fig. 10:** Terminal Strip (-TS) or Test and Balance (TB) Option for 2 Wire Sensors



**Fig. 11:** 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 at right).

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)

## 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)
- For units with a Test & Balance Switch, verify that it is in the center 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](http://www.bapihvac.com); click on “Resource Library” and “Sensor Specs” then click on the type of sensor you have.

Specifications subject to change without notice.



### 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 .....  $-40^{\circ}$  to  $221^{\circ}\text{F}$  ( $-40^{\circ}$  to  $105^{\circ}\text{C}$ )

##### RTD: Resistance Temperature Device

- Platinum (Pt) .....  $100\Omega$  or  $1\text{K}\Omega$  @ $0^{\circ}\text{C}$ , 385 curve,
- Platinum (Pt) .....  $1\text{K}\Omega$  @ $0^{\circ}\text{C}$ , 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 .....  $0.4^{\circ}\text{C}/\text{mW}$  @ $0^{\circ}\text{C}$
- Pt Probe Range .....  $-40^{\circ}$  to  $221^{\circ}\text{F}$ , ( $-40$  to  $105^{\circ}\text{C}$ )
- Nickel (Ni) .....  $1000\Omega$  @ $70^{\circ}\text{F}$ , JCI curve
- Ni Probe range .....  $-40^{\circ}$  to  $221^{\circ}\text{F}$  ( $-40$  to  $105^{\circ}\text{C}$ )

##### Sensitivity: Approximate @ $32^{\circ}\text{F}$ ( $0^{\circ}\text{C}$ )

- Thermistor ..... Non-linear  
See bapihvac.com "Sensor Specs"
- $1\text{K}\Omega$  RTD (Pt) .....  $3.85\Omega/^{\circ}\text{C}$
- $100\Omega$  RTD .....  $0.385\Omega/^{\circ}\text{C}$
- 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  $221^{\circ}\text{F}$  ( $-40$  to  $105^{\circ}\text{C}$ )
- Units w/ Plenum-Rated Wire:  $-4$  to  $167^{\circ}\text{F}$  ( $-20$  to  $75^{\circ}\text{C}$ )
- $0$  to  $100\%$  RH, Non-condensing

##### Lead Wire: 22AWG stranded

##### Probe Length

- PP 0.875" (22.2mm)
- RPP, RPFEP 1.75" (44.5mm)

##### Wire Insulation

- PP Etched Teflon leads, plenum rated
- RPP Flame Retardant PVC plenum cable
- RPFEP FEP-jacketed plenum rated cable
- RPFEP2 FEP-jacketed plenum and submersion rated cable

##### Probe

- PP Heat conductive plastic cup
- RPP, RPFEP Rigid, 304 Stainless Steel, 0.25" OD

##### Agency:

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

Specifications subject to change without notice.