

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 with Plenum-Rated Cable (BA#-RPP) is a small Stainless Steel temperature sensor used for single point temperature measurement with PVC plenum rated cable. It is ideal for bracket mounting for Chamber, Duct, Thermowell or L-bracket applications.
- The Remote Probe with FEP-Jacketed Cable (BA#-RPFEP) is a small Stainless Steel temperature sensor used for single point temperature measurement with FEP plenum cable. It is ideal for bracket mounting in harsh environments for Chamber, Duct, Thermowell or L-bracket applications.
- The Remote Probe with FEP-Jacketed Cable for submersion (BA#-RPFEP2) is a small Stainless Steel temperature sensor used for single point temperature measurement with submersion FEP plenum cable. It is ideal for bracket mounting in wet or water submersion environments for Chamber, Duct, Immersion or L-bracket applications.

The 4 to 20mA output transmitter comes with a 1K Ω (385) RTD or 10K-2 thermistor sensor. A 0 to 5VDC or 0 to 10VDC output is also available with the 10K-2 thermistor sensor. Special high accuracy RTD matched transmitters (M) are available which match the sensor to the transmitter for improved accuracy. Enclosure mounting styles come in plastic or metal for both NEMA 3R and NEMA 4 applications and are all UV rated.

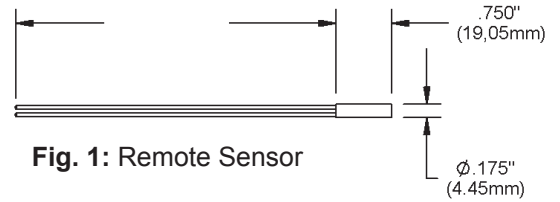


Fig. 1: Remote Sensor

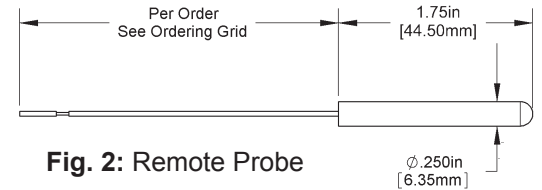


Fig. 2: Remote Probe

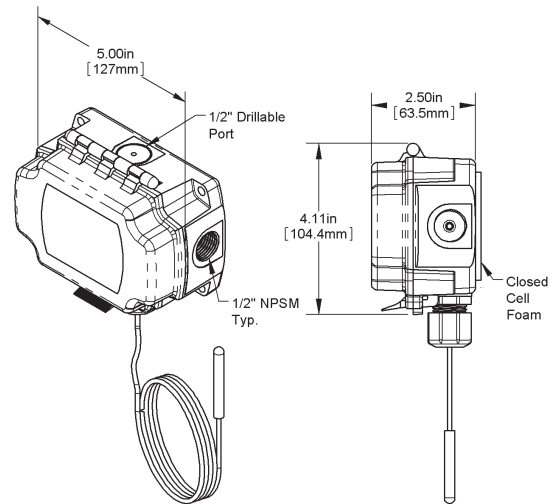


Fig. 3: Remote Probe in a BAPI-Box (BB) Enclosure

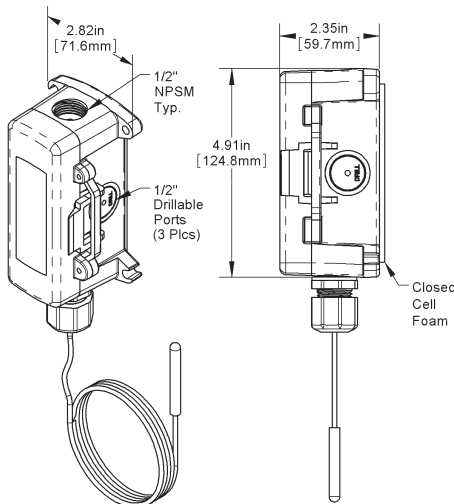


Fig. 4: Remote Probe in a BAPI-Box 2 (BB2) Enclosure

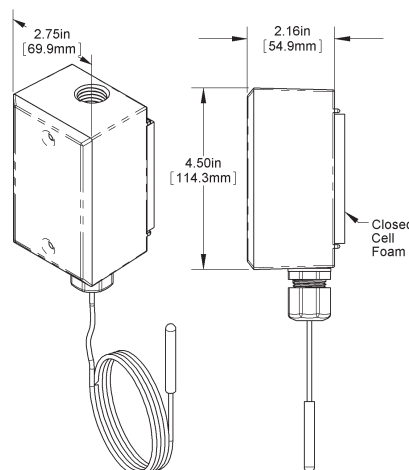
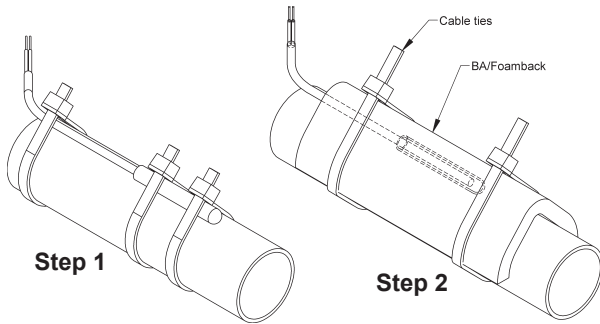


Fig. 5: Remote Probe in a Weatherproof (WP) Enclosure

Specifications subject to change without notice.

Mounting

MOUNTING REMOTE PROBES TO PIPES: Follow the steps below when mounting the remote probe to a pipe.



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

Step 2: Insulate Over The Sensor (See Notes Below)

Note: Insulation should be installed a minimum of 4 pipe diameters on each side of the 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. 6: Remote Probe Strapped to a Pipe

FLEXIBLE PROBE BRACKET: The BAPI Flexible Probe Bracket (BA/FPB) is used to mount averaging sensors. It includes a scored break off for mounting 1/4" remote bullet probes.

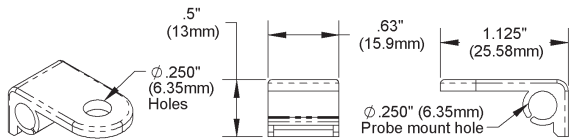


Fig. 7: Flexible Probe Bracket Break-Off Tab Dimensions and Mounting of Remote Probe

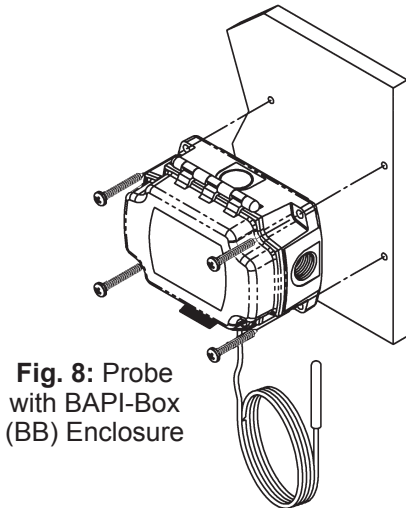
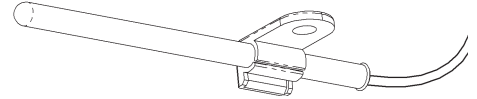


Fig. 8: Probe with BAPI-Box (BB) Enclosure

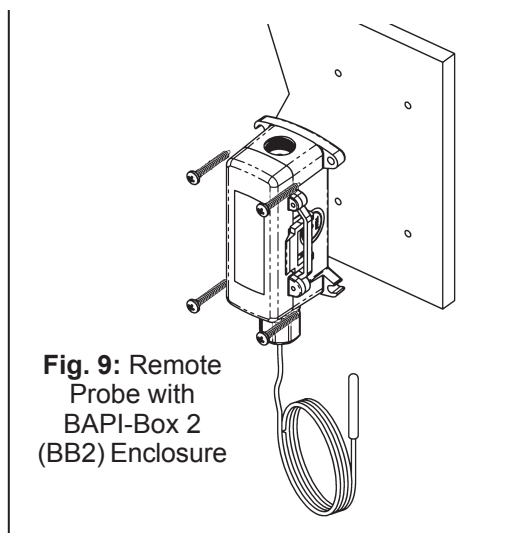


Fig. 9: Remote Probe with BAPI-Box 2 (BB2) Enclosure

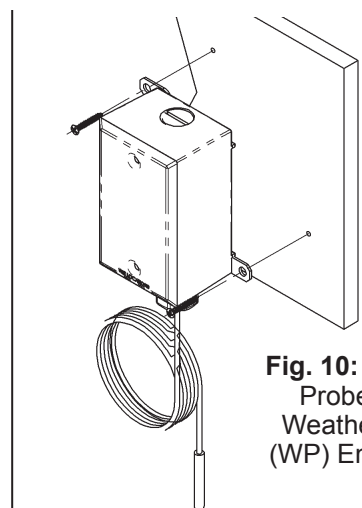


Fig. 10: Remote Probe with Weatherproof (WP) Enclosure

Fig. 11: Remote Sensor Installed in a Junction Box with Wall Plate Cover

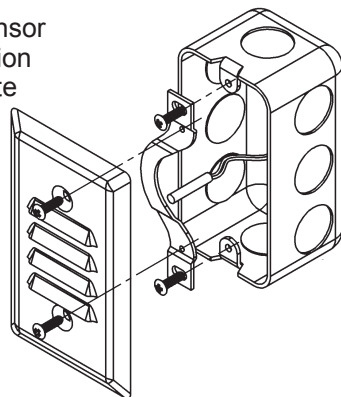
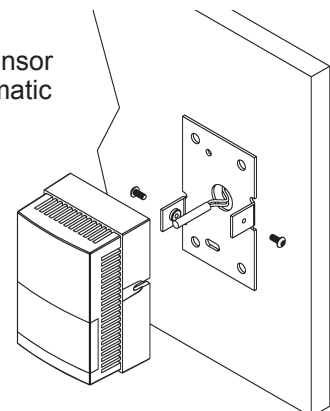


Fig. 12: Remote Sensor Installed in a Pneumatic Thermostat



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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.

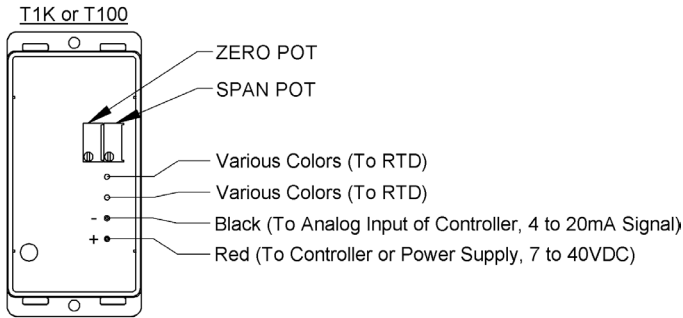


Fig. 13: Typical RTD 4 to 20mA Transmitter with Flying Leads

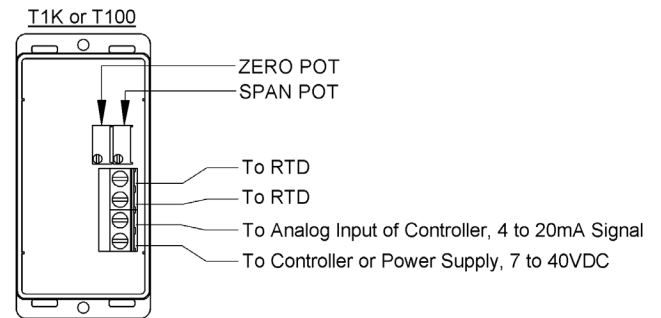


Fig. 14: Typical RTD 4 to 20mA Transmitter with Terminals

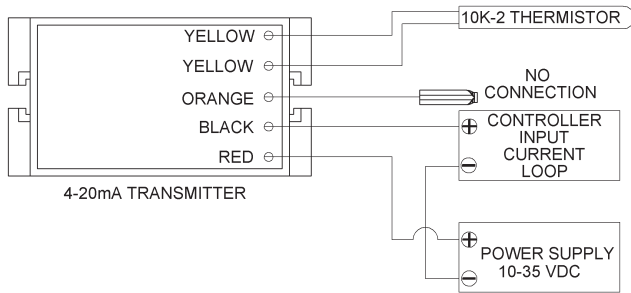


Fig. 15: Typical Thermistor 4 to 20mA Transmitter

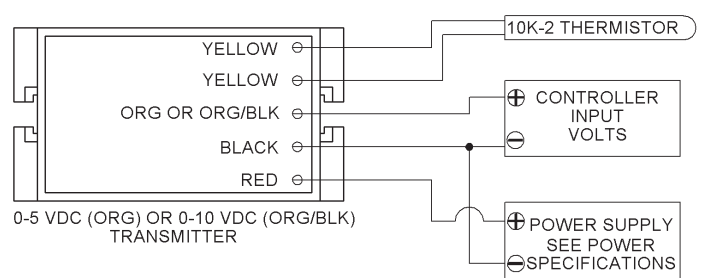


Fig. 16: Typical Thermistor Voltage Transmitter

Diagnostics

Possible Problems:

- Unit will not operate.
- The reading is incorrect in the controller.

Possible Solutions:

- Measure the power supply voltage by placing a voltmeter across the transmitter's (+) and (-) terminal. Make sure that it matches the drawings above and power requirements in the specifications.
- Check if the RTD wires are physically open or shorted together and are terminated to the transmitter.
- Determine if the input is set up correctly in the controllers and BAS software.
- For a 4 to 20mA current transmitter 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.
- For a voltage transmitter, measure the signal with a volt meter (Orange or Orange/Black to Black). The signal should read according to the "Voltage Temperature Equation" shown below.

Voltage Temperature Equation

$$T = T_{Low} + \frac{(V \times T_{Span})}{V_{Span}}$$

T	= Temperature at sensor
T _{Low}	= Low temperature of span
T _{High}	= High temperature of span
T _{Span}	= T _{High} - T _{Low}
V _{Low}	= Low transmitter voltage usually=(0, 1 or 2v)
V _{High}	= High transmitter voltage usually=(5 or 10v)
V _{Span}	= V _{High} - V _{Low}
V	= Signal reading in volts

4 to 20mA Temperature Equation

$$T = T_{Low} + \frac{(A - 4) \times (T_{Span})}{16}$$

T	= Temperature at sensor
T _{Low}	= Low temperature of span
T _{High}	= High temperature of span
T _{Span}	= T _{High} - T _{Low}
A	= Signal reading in mA

Specifications subject to change without notice.



Remote Probe Transmitters and Remote Sensor Transmitters

BA/#-(PP, RPP, RPFEP) Temperature Sensor

Installation & Operations

20921_ins_RemoteSen_Active

rev. 09/01/20

Specifications

RTD Transmitter

Power Required:7 to 40VDC
 Transmitter Output: 4 to 20mA, 850Ω@24VDC
 Output Wiring:2 wire loop
 Output Limits:<1mA (short), <22.35mA (open)
 Span:Min. 30°F (17°C), Max 1000°F, (555°C)
 Zero:Min. -148°F (-100°C), Max 900°F (482°C)
 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 158°F(-20 to 70°C)
 0 to 95% RH, Non-condensing

Thermistor Transmitter

Supply Voltage:
 10 to 35 VDC 0 to 5 VDC or 4 to 20 mA Outputs
 15 to 35 VDC 0 to 10 VDC Output
 12 to 24 VAC..... 0 to 5 VDC Outputs
 15 to 24 VAC..... 0 to 10 VDC Output
 Transmitter Output... 4 to 20mA, 700Ω@24VDC
 0 to 5VDC, 0 to 10VDC, 10KΩ min
 Output wiring 2 & 3 wire (see Wiring detail)
 Transmitter Limits-40°F to 185°F,(-40°C to 85°C)
 Accuracy±1.015°C, from (0 to 65°C)
 Linearity±0.065°C, from (0 to 65°C)
 Resolution.....Span/1024
 Thermistor Sensor 10K-2 Thermistor,10KΩ @77°F
 Transmitter Ambient..32 to 158°F, (0° to 70°C)
 0 to 95% RH, Noncondensing

Thermistor: 10K-2, Thermal resistor

Accuracy(Std) ±0.36°F, (±0.2°C)
 Accuracy(High) ±0.18°F, (±0.1°C), [XP] option
 Stability< 0.036°F/Year, (<0.02°C/Year)
 Heat Dissipation2.7 mW/°C
 Probe Range-40° to 221°F (-40° to 105°C)
 Wire Colors:
 Standard: Yellow/Yellow (no polarity)
 High Acc. [XP]: Yellow/Yellow (no polarity)

RTD: Resistance Temp Device (Continuous)

Platinum (Pt).....100Ω and 1KΩ @0°C, 385 curve,
 Pt Accuracy.....(Std) 0.12% @Ref, or ±0.55°F, (±0.3°C)
 Pt Accuracy.....(High) 0.06% @Ref, or ±0.277°F,
 (±0.15°C), [A]option
 Pt Stability.....±0.25°F, (±0.14°C)
 Pt Self Heating.....0.4 °C/mW @0°C
 Pt Probe Range-40° to 221°F, (-40 to 105°C)
 Wire Colors:.....General color code (other colors possible)
 1KΩ, Class BOrange/Orange (no polarity)
 1KΩ, Class AOrange/White (no polarity)
 100Ω, Class BRed/Red (no polarity)
 100Ω, Class A.....Red/Red-w/black stripe (no polarity)

Sensitivity: Approximate @ 32°F (0°C)

Thermistor Non-linear (see www.bapihvac.com,
 click "Sensor Specs")
 RTD (Pt) 3.85Ω/°C for 1KΩ RTD
 0.385Ω/°C for 100Ω RTD

Lead Wire: 22awg stranded

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

Probe Length

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

Wall Gasket: Closed cell foam (impervious to mold)

Enclosure Types: (Part number designator in bold)

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

Enclosure Ratings: (Part number designator in bold)

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

Enclosure Material: (Part number designator in bold)

J-Box: **-JB**, 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

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

J-Box **-JB**, -40°F to 212°F, (-40° to 100°C)
 Weatherproof ... **-WP**, -40°F to 212°F, (-40° to 100°C)
 BAPI-Box **-BB**, -40°F to 185°F, (-40° to 85°C)
 BAPI-Box 2 **-BB2**, -40°F to 185°F, (-40° to 85°C)

Agency

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

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