

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.

BAPI's Remote Probe Temperature Transmitter can be ordered with a 1K Ω (385) RTD that has a field adjustable 1 to 5, 0 to 5, 2 to 10, 0 to 10VDC or 4 to 20 mA output over a selected temperature range. These adjustable outputs can be set at the factory to order or default set to 4 to 20mA.

This transmitter can also be ordered in a variety of mounting enclosures as shown at right. 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.

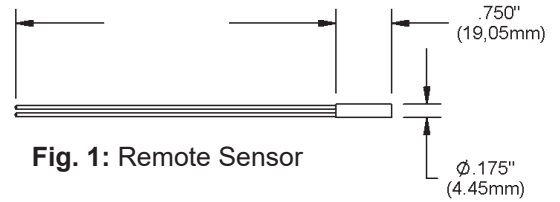


Fig. 1: Remote Sensor

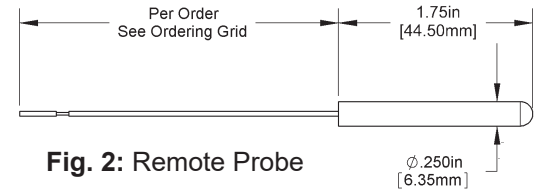


Fig. 2: Remote Probe

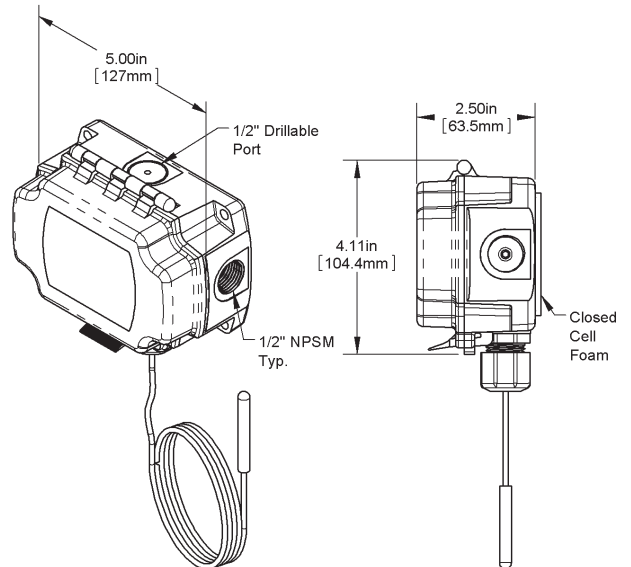


Fig. 3: BAPI-Box (BB) Enclosure

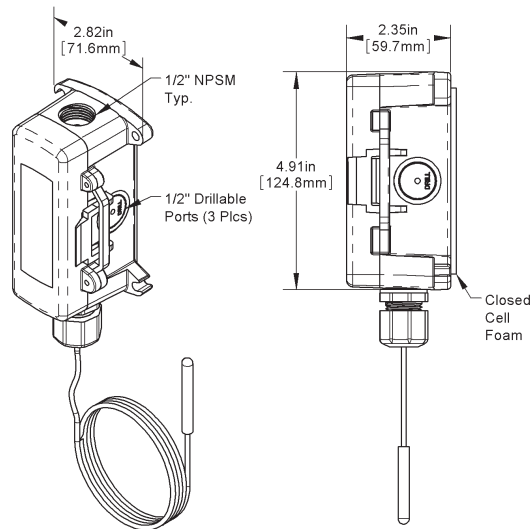


Fig. 4: BAPI-Box 2 (BB2) Enclosure

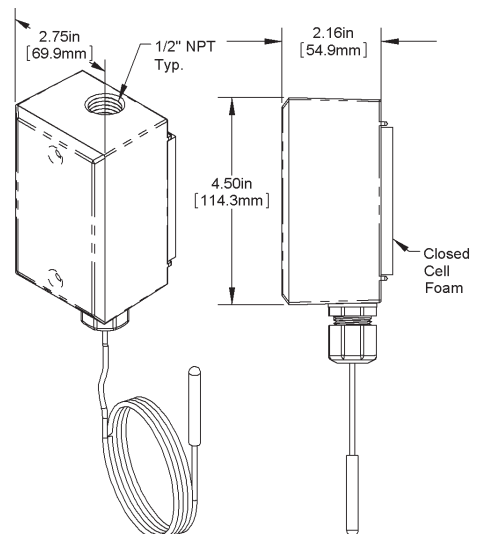
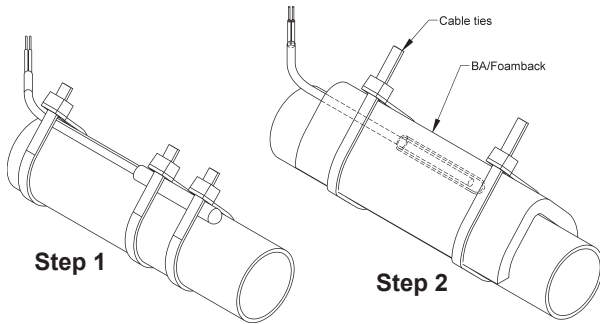


Fig. 5: Weatherproof (WP) Enclosure

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: $\frac{1}{2}$ " 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: BAPI's Flexible Probe Bracket (BA/FPB) is used to mount averaging sensors. It includes a scored break off for mounting $\frac{1}{4}$ " remote bullet probes.

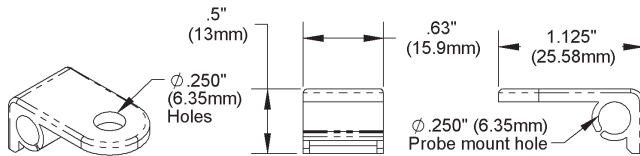
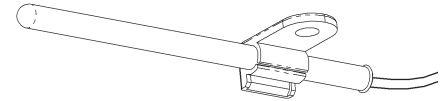


Fig. 7: Flexible Probe Bracket Break-Off Tab Dimensions and Mounting of Remote Probe



ENCLOSURE MOUNTING

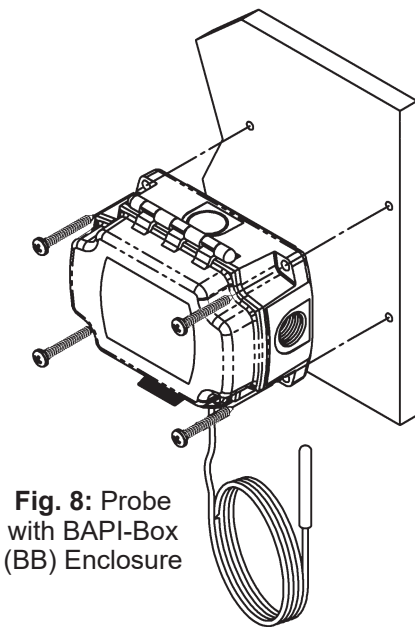


Fig. 8: Probe with BAPI-Box (BB) Enclosure

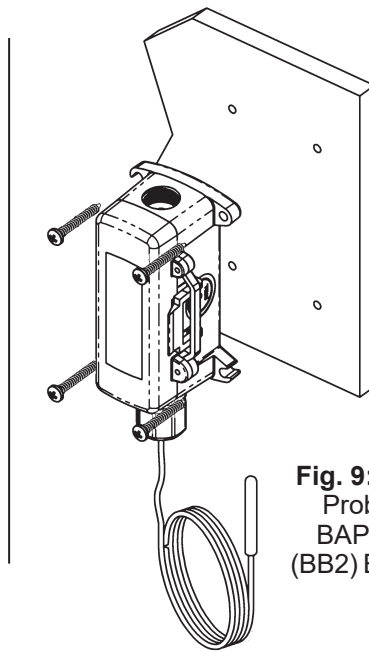


Fig. 9: Remote Probe with BAPI-Box 2 (BB2) Enclosure

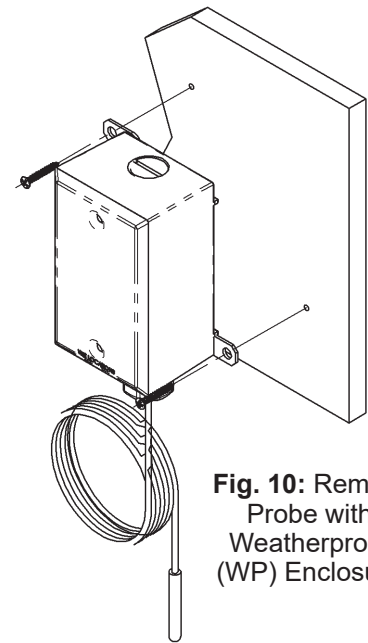


Fig. 10: Remote Probe with Weatherproof (WP) Enclosure

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 AC power wiring of NEC class 1 or NEC class 2, NEC class 3 or with wiring used to supply highly inductive loads such as motors, contactors and relays. BAPI's tests show that fluctuating and inaccurate signal levels are possible when AC power wiring is present in the same conduit as the signal lines. *Note: Keep transmitter at least 5 feet from any radio wave-emitting device (ie: 2 way radio). Transmitters that are less than 5 feet from a radio wave-emitting device can cause unwanted interference.*



BAPI recommends wiring the product with power disconnected. Proper supply voltage, polarity, and wiring connections are important to a successful installation. Not observing these recommendations may damage the product and will void the warranty.

4 to 20mA Output with Flying Leads

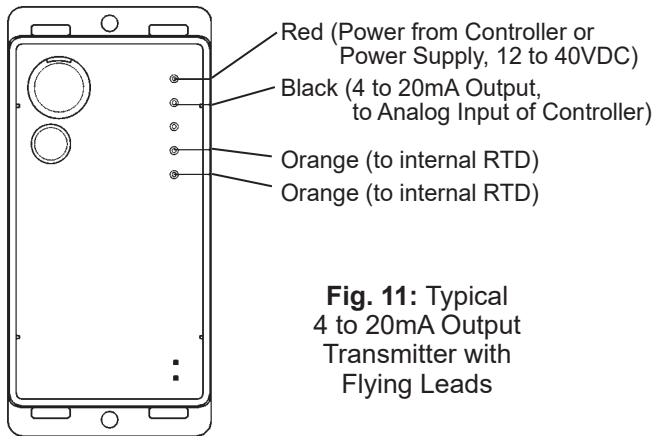


Fig. 11: Typical 4 to 20mA Output Transmitter with Flying Leads

4 to 20mA Output with Terminals

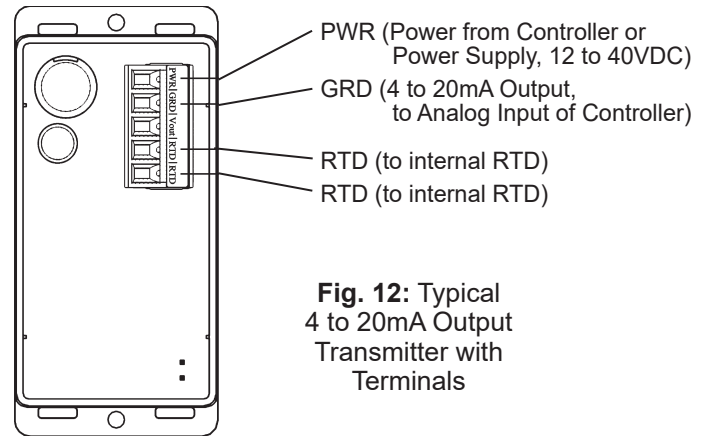


Fig. 12: Typical 4 to 20mA Output Transmitter with Terminals

Voltage Output with Flying Leads

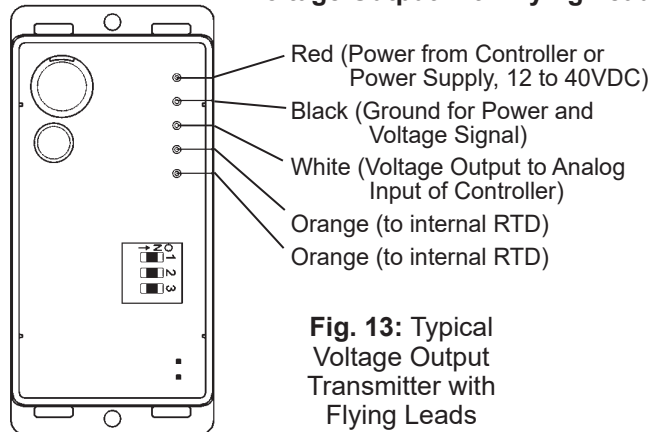


Fig. 13: Typical Voltage Output Transmitter with Flying Leads

Voltage Output with Terminals

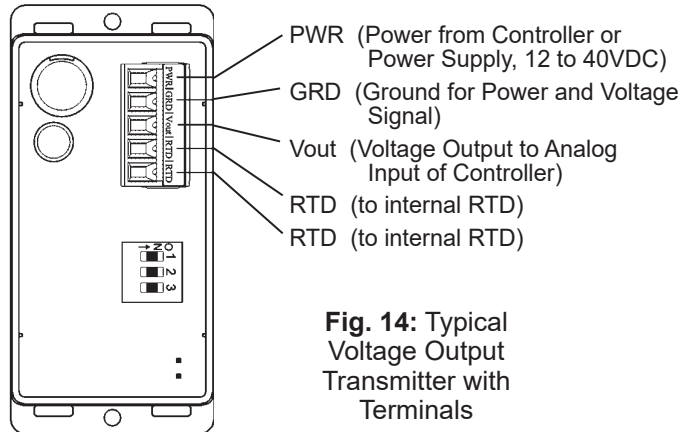
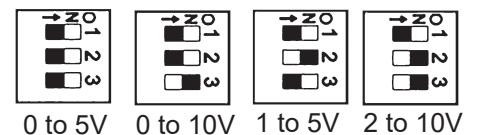


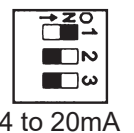
Fig. 14: Typical Voltage Output Transmitter with Terminals

DIP Switch Settings for Field-Selectable Voltage Output Units

The circuit board for voltage output units has a 3-position DIP switch that controls the output value. This switch is set at the factory at the time of the order but may be changed in the field.



Note: Units ordered with Voltage Output can be switched to 4 to 20mA output with the DIP switch setting shown at right. The middle flying lead or middle terminal would not be used in that case and the unit would be wired similar to Figs 11 and 12 above.





Remote Probe and Remote Sensor Transmitters

Installation & Operations

20921_ins_RemoteSen_Active

rev. 03/11/24

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

Transmitter Circuit

Power Required:..... 12 to 40VDC
 Transmitter Output:.... 4 to 20mA, 0 to 5, 1 to 5, 0 to 10 or 2 to 10VDC, 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)
 System Accuracy: ±0.065% of span
 Linearity: ±(0.125 * T-20°C)/100
 RTD Sensor:..... 2 wire Platinum (Pt), 385 curve
 Transmitter Ambient: .-4 to 158°F(-20 to 70°C)
 0 to 95% RH, Non-condensing

RTD Sensor: Resistance Temp Device (Bare Sensor)
 Platinum RTD: 1KΩ @ 0°C, 385 curve
 Sensitivity: 3.85Ω/°C, Approximate @ 32°F (0°C)
 Accuracy (Standard):.0.12% @Ref, or ±0.55°F, (±0.3°C)
 Accuracy (High): 0.06% @Ref, or ±0.277°F, (±0.15°C),
 [A]option

Stability: ±0.25°F, (±0.14°C)
 Self Heating: 0.4 °C/mW @0°C
 Probe Range: -40 to 221°F, (-40 to 105°C)

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)

Lead Wire: 22awg stranded

Wire Insulation

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

Wall Gasket: Closed cell foam (impervious to mold)

Enclosure Types:

 (Part number designator in bold)

- 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)

- Weatherproof... **-WP**, NEMA 3R, IP14
- BAPI-Box..... **-BB, BB2**, NEMA 4, IP66, UV Rated

Enclosure Material:

 (Part number designator in bold)

- Weatherproof... **-WP**, Cast Aluminum, UV rated
- BAPI-Boxes **-BB, BB2**, UV-Rated Polycarb., UL94V-0

Ambient (Enclosure):

 0 to 100% RH, Non-condensing

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

Agency

CE EN 61326-1:2013 EMC (Industrial Electromagnetic Environment) / RoHS / PT=DIN43760, IEC Pub 751-198 / JIS C1604-1989

Specifications subject to change without notice.