

Overview

The BA/T100 units are 4 to 20mA loop powered transmitters that can be ordered with separately purchased 100Ω (385) platinum RTD. The BA/T1K units are 4 to 20mA loop powered transmitters that can be ordered with separately purchased 1KΩ (385) platinum RTD. The BA/T10K units are 4 to 20mA loop powered or 0 to 5VDC or 0 to 10VDC transmitters that can be ordered with separately purchased 10K-2, 10KΩ type 2 thermistors. T100 and T1K transmitters come with flying leads but terminals are available (-TS). Terminals are not available on the T10K units.

Identification

Fig 1: Transmitter with plate
(BA/T1x-XOR-TS)

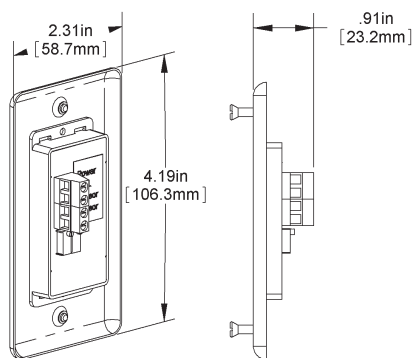


Fig 2: Transmitter only
(BA/T1x-XOR-STM-TS)

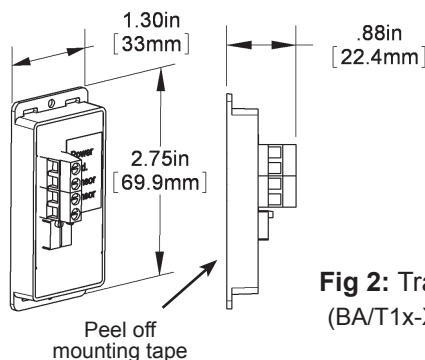


Fig 3: Transmitter with Snaptrack
(BA/T1x-XOR-TRK)

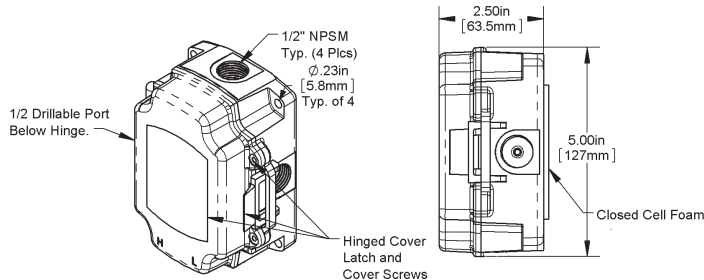
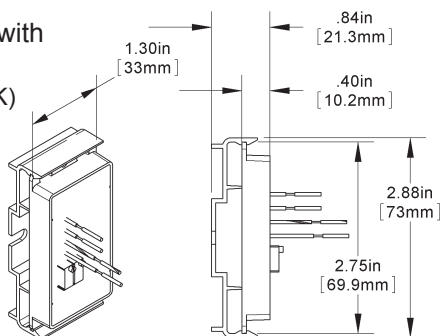


Fig 4: Transmitter in BAPI-Box (BA/T1x-XOR-BB)

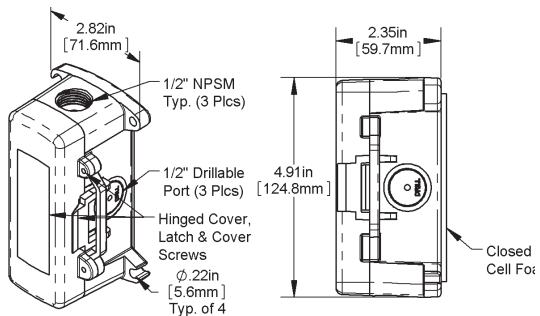


Fig 5: Transmitter in BAPI-Box 2 (BA/T1x-XOR-BB2)

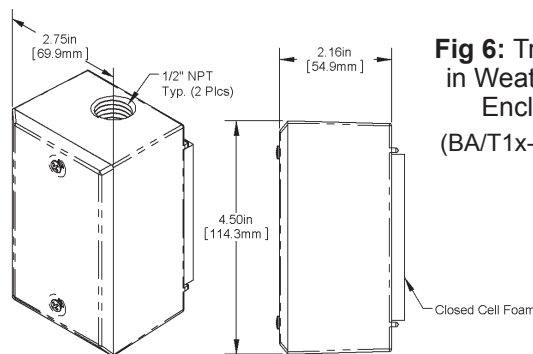


Fig 6: Transmitter in Weatherproof Enclosure
(BA/T1x-XOR-WP)

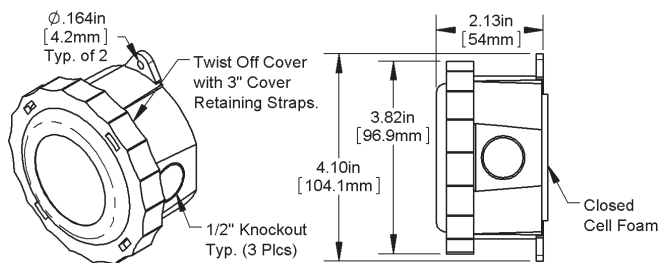


Fig 7: Transmitter in Weather Tight Encl. (BA/T1x-XOR-EU)

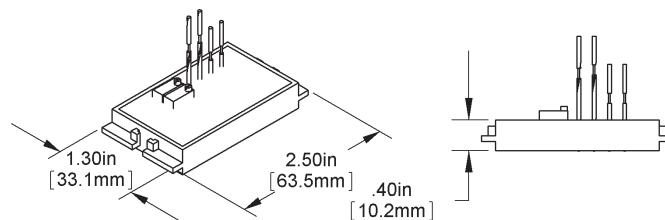


Fig 8: Transmitter only - fits inside Weather Tight Enclosure (BA/T1x-XOR-EUM)

Specifications subject to change without notice.

Mounting

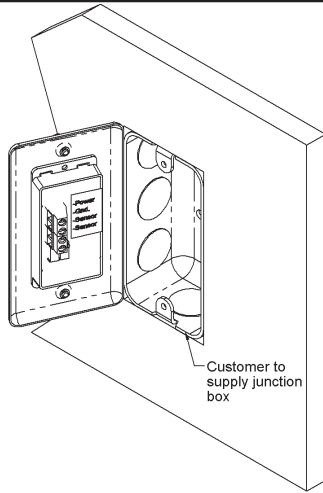


Fig 9: Transmitter w/ plate mounted in a Handy Box

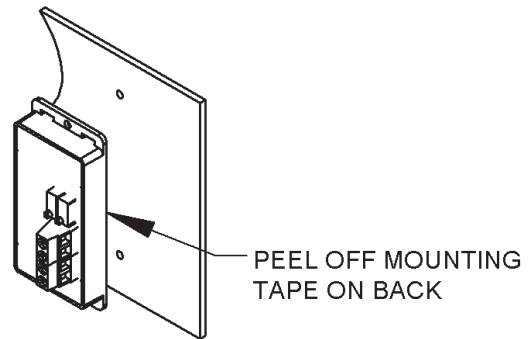
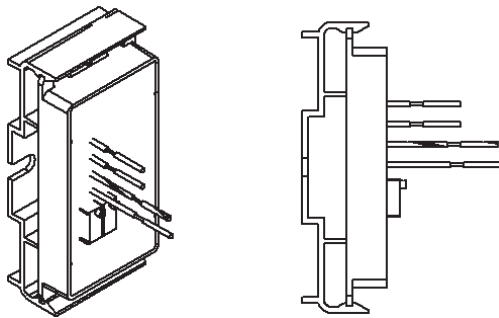


Fig 10: Transmitter with double stick mounting tape



1. Mount track with screws through the bottom of the plastic track.
2. Insert one edge of the transmitter, then snap the other edge in.

Fig 11: Transmitter in Snaptrack

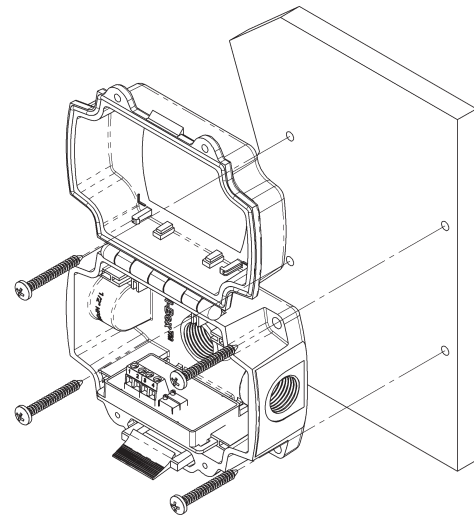


Fig 12: Transmitter in a BAPI-Box Enclosure

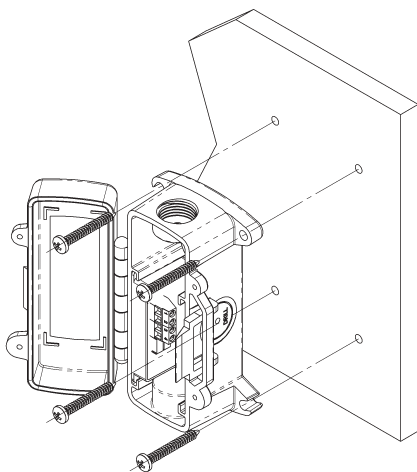


Fig 13: Transmitter in a BAPI-Box 2 Enclosure

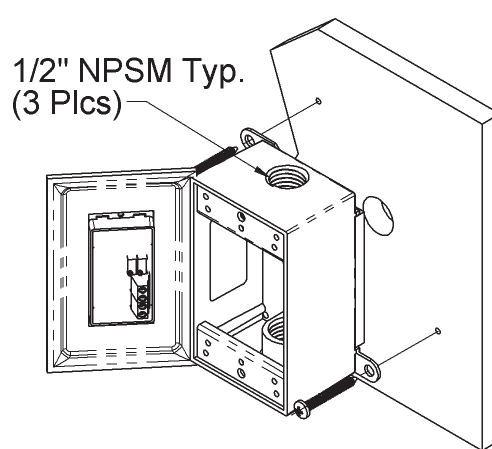


Fig 14: Transmitter in a Weatherproof Enclosure

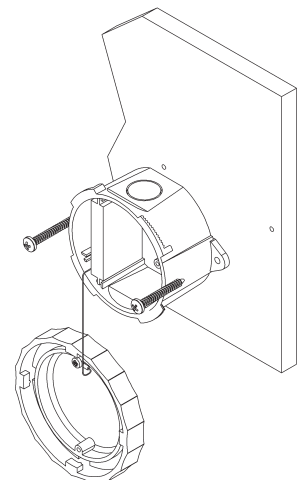


Fig 15: Transmitter in a Weather Tight Enclosure

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.

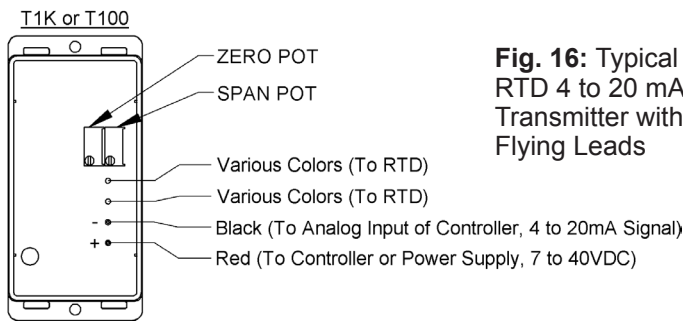


Fig. 16: Typical RTD 4 to 20 mA Transmitter with Flying Leads

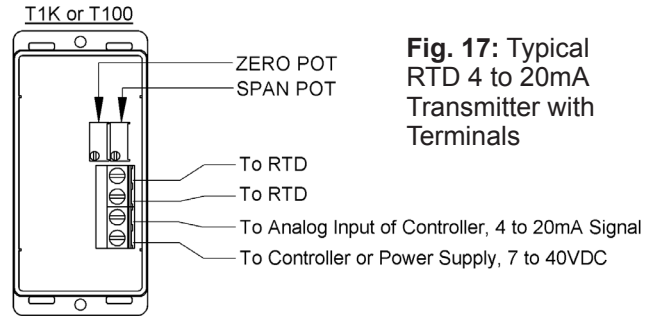


Fig. 17: Typical RTD 4 to 20mA Transmitter with Terminals

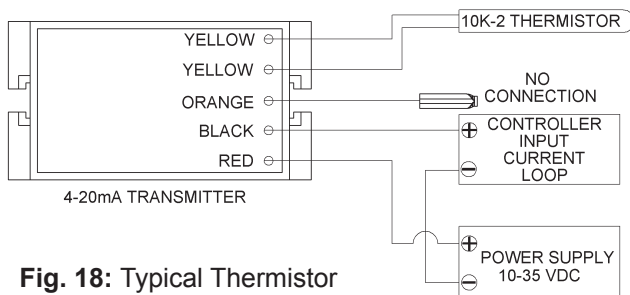


Fig. 18: Typical Thermistor 4 to 20mA Transmitter

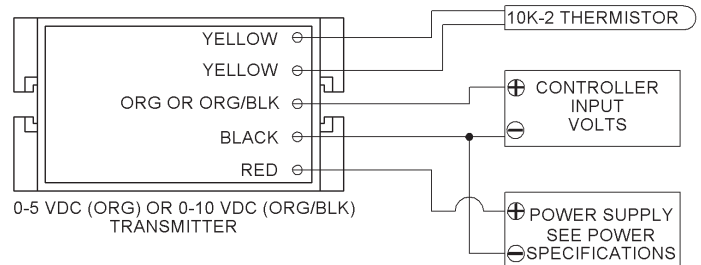


Fig. 19: Typical Thermistor Voltage Transmitter

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.
- 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 with an ohmmeter. Compare the temperature sensor's resistance to the appropriate temperature sensor table on the BAPI web site.
- Determine if the input is set up correctly in the controllers and BAS software.
- For a 4-20mA current transmitter measure the transmitter current by placing an ammeter in series with the controller input. The current should read according to the "4-20mA 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

4-20mA 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.



Temperature Sensor Transmitters

BA(T100, T1K, T10K) Temperature Transmitters

Installation & Operating Instructions

22199_ins_T1K_T100_XMTR

rev. 06/30/15

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 5 & 0 to 10VDC, 10KΩ min
 Output Wiring: 2 & 3 wire (See wiring detail on pg. 3)
 Transmitter Limits: -40 to 185°F, (-40 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 (Bare Sensor)
 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 Dissipation: 2.7 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 (Bare Sensor)
 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 B Orange/Orange (no polarity)
 1KΩ, Class A Orange/White (no polarity)
 100Ω, Class B Red/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

Enclosure Types: (Part number designator in bold)

Box Cover Plate: **XOR**, single gang box cover only.
 Weatherproof: **XOR-WP**, w/ two ½" FNPT entries, (Bell box)
 BAPI-Box: **XOR-BB**, w/ four ½" NPSM & one ½" drill-out
 BAPI-Box 2: **XOR-BB2**, w/ three ½" NPSM & three ½" drill-outs
 Weather Tight: **XOR-EU**, **XOR-EUO**, w/ two ½" knock-outs
 Transmitter Only: **XOR-STM**, No Enclosure
XOR-EUM, No Enclosure

Enclosure Ratings: (Part number designator in bold)

Weatherproof: **-WP**, NEMA 3R, IP14
 BAPI-Box: **-BB**, NEMA 4, IP66, UV Rated
 BAPI-Box 2: **-BB2**, NEMA 4, IP66, UV Rated
 Weather Tight: **-EU**, NEMA 4, IP66
 Weather Tight: **-EUO**, NEMA 4, IP66, UV rated

Enclosure Material: (Part number designator in bold)

Weatherproof: **-WP**, Cast Aluminum, UV rated
 BAPI-Box: **-BB**, Polycarbonate, UL94V-0, UV rated
 BAPI-Box 2: **-BB2**, Polycarbonate, UL94V-0, UV rated
 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

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)
 Weather Tight **-EU**, **-EUO**, -40°F to 185°F, (-40° to 85°C)

Agency:

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