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 runsAll wiring must comply with the National Electric Code (NEC) and local codes. Do NOTrun this device's wiring in the same conduit asAC power wiring of NEC class1 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. If you are experiencing any of these difficulties, please contact your BAPI representative

BAPI does not recommend wiring the sensor with power applied as accidental arcing may damage the product and will void the warranty

Ruggedized Transmitters (RTDs)

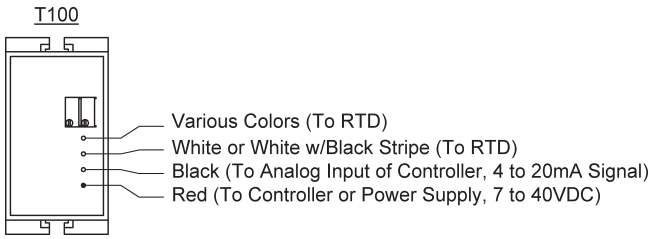
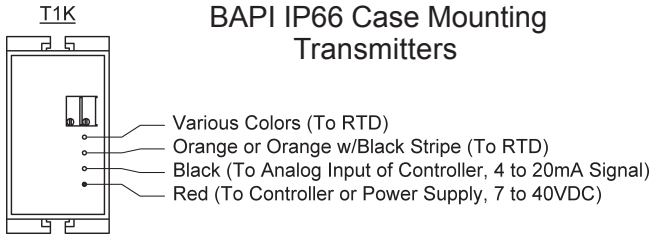


Fig. 1:
BAPI IP66 Case Mounting Transmitters



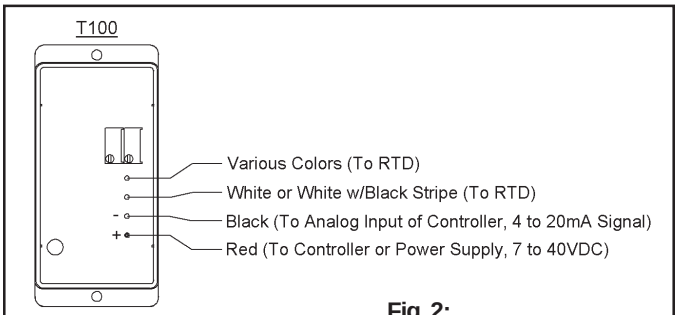
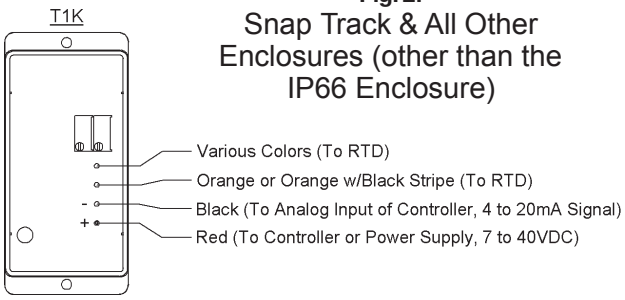


Fig. 2:
Snap Track & All Other Enclosures (other than the IP66 Enclosure)



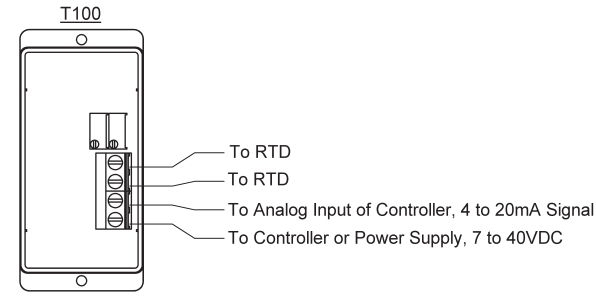
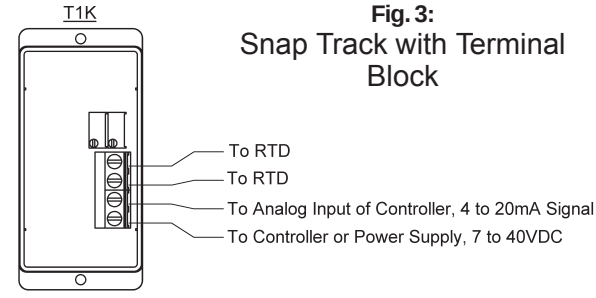


Fig. 3:
Snap Track with Terminal Block



Junction Box Mounting Indoors

The junction box mount is intended for indoor mounting in equipment rooms, plenums or occupied spaces. The figures below show a typical junction box mounting in an air duct. BAPI recommends using #8 sheet metal screws that need 1/8-inch pilot holes to attach the sensor to the duct. After placing the sensing element in the duct, secure the mounting flange to the duct; center the plastic fitting holding the probe in the mounting hole. Make sure that the foam seals the hole; do not over tighten the screws. No box units use the same mounting holes as Junction Box units.

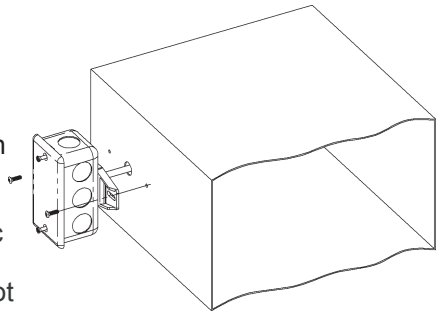


Fig. 4:
IP-66 enclosure duct installation

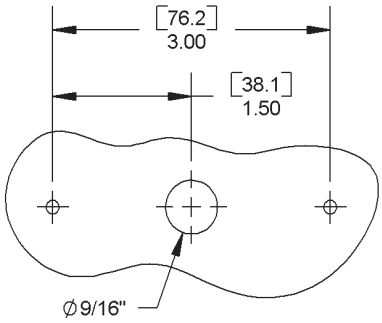


Fig. 5:
IP-66 enclosure duct installation

BAPI-Box Mounting

The BAPI-Box Enclosure is watertight and carries an IP66 rating which is similar to a NEMA 4X rating when the included 6-32 screws are fastened on either side of the latch. The BAPI-Box Enclosure is made of high imp act, UV-resistant polycarbonate and features a gasketed cover for a waterproof seal, a hinged cover to simplify installation, horizontal or vertical mounting with multiple knockouts and a window in the cover for an LCD display . The BAPI-Box Enclosure is available for the full line of BAPI duct, immersion, outside air and pressure senesors.

Mount the unit to its mounting surface with four #10 scres through the holes in the mounting feet. #10 sheet metal screws require 5/32" (4mm) pilot holes. For concrete or cinder block, drill four 5/32" (4mm) holes, 1-3/4 inch (45mm) deep. Make sure that all screws are started in their holes before tightening evenly. If unit has a foam gasket, only squeeze to about 1/2 of it s original thickness.

Be sure to seal conduit connector threads and holes in mounting surface to maintain the integrity of the box.

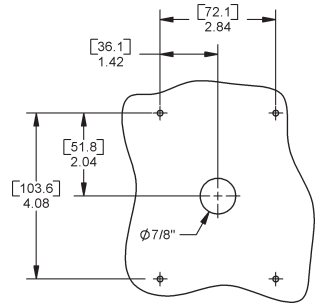


Fig 6: BAPI-Box enclosure mounting holes, rotate 90° for horizontal mount

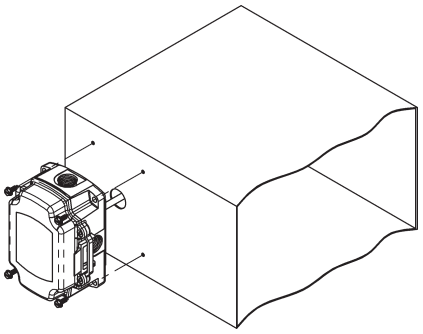


Fig 7: BAPI-Box Duct Instalation

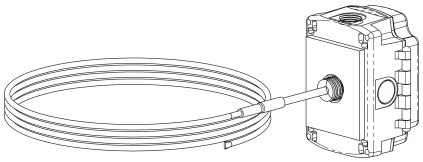


Fig 8: BAPI-Box Temperature Averaging

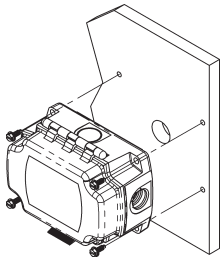


Fig 9: BAPI-Box Wall Installation

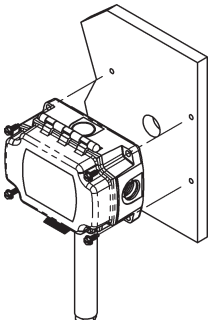


Fig 10: BAPI-Box Outdoor Installation

Weatherproof Box Mounting Indoors

The weatherproof box is intended for outdoor or equipment room mounting. Use the mounting tabs provided to mount the weatherproof box as shown in the figure below. **DO NOT** drill screw holes through the back wall of the box, this destroys the integrity of the box and may void the warranty. The figures below show a typical weatherproof box mounting in an air duct. BAPI recommends using #8 sheet metal screws that need 1/8-inch pilot holes to attach the sensor to the duct. After placing the sensing element in the duct, secure the mounting tabs to the duct; center the plastic fitting holding the probe in the mounting hole. Be sure that the foam seals the hole; do not over tighten the screws. Place the foam gasket between the cover and the box before securing the cover in place with the screws provided. To keep water out of the box, be sure to coat the threads of the box plugs or conduit connectors with caulk before screwing them into the waterproof box.

Weatherproof Box Mounting Indoors Continues ...

Weatherproof Box Mounting Indoors Continues ...

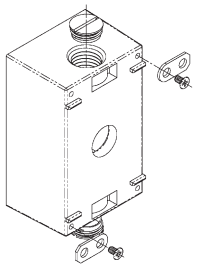


Fig. 11
Weatherproof box mounting tabs

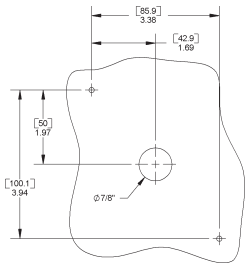


Fig. 12
Weatherproof box mounting holes

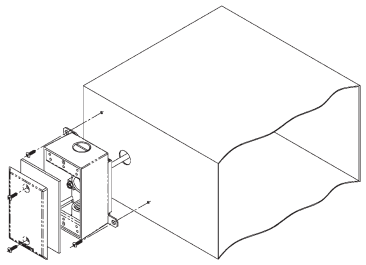


Fig. 13
Weatherproof box duct installation

IP-66 EU Enclosure Mounting Indoors

The IP-66 enclosure is made from ABS plastic for indoor applications and a UV light stabilized plastic for outdoor applications or indoor applications exposed to direct sun light. The figures below show a typical IP-66 enclosure mounting in an air duct. BAPI recommends using #8 sheet metal screws that need 1/8-inch pilot holes. After placing the sensing element in the duct, secure the mounting feet to the duct; center the plastic fitting holding the probe in the mounting hole Do not over tighten the screws but be sure that the foam insulation makes an airtight seal. Tighten the lid to two clicks when you are finished making terminations.

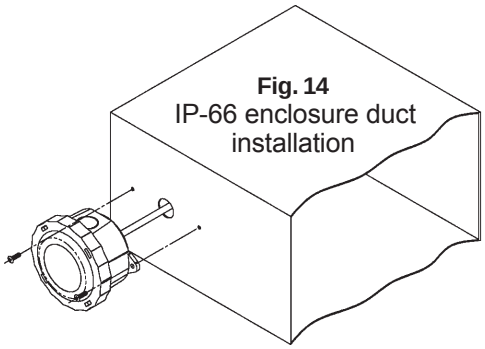


Fig. 14
IP-66 enclosure duct installation

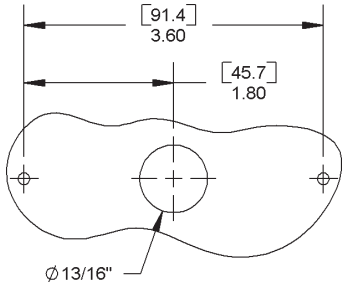


Fig. 15
IP-66 enclosure mounting holes

IP-66 EU Enclosure and Weatherproof Box Mounting Outdoors

Do not mount in direct sunlight, preferably mount on the north side of the building. Install with the sensor probe pointed down. For best correlation with the local weather bureau's temperature, position the end of the probe between four feet and six and one-half feet above the ground. Drill a hole through your mounting surface as shown in the figures below Mount the unit to the surface with a wiring knock out centered over the wiring hole. Pull the wiring into the unit and terminate using sealant filled connectors. Best practice is to caulk the wiring hole after the wiring is installed. Be sure that the foam on the back of the unit makes a good weather tight seal. Use the mounting tabs provided to mount the weatherproof box as shown in the figure below. **DO NOT** drill screw holes through the back wall of the box, this destroys the integrity of the box and may void the warranty Note: Air temperature units are shown. Temperature and humidity units are available in double gang weatherproof boxes only. To keep water out of the box, be sure to coat the threads of the box plugs or conduit connectors with caulk before screwing them into the waterproof box.

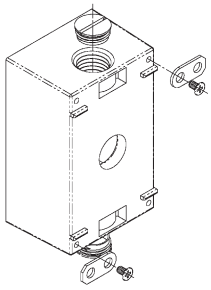


Fig. 16: Weatherproof box enclosure mounting tabs

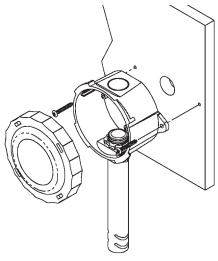


Fig. 17: Outdoor Air/IP-66 rated enclosure installation

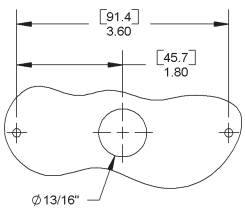


Fig. 18:
IP-66 rated enclosure mounting holes

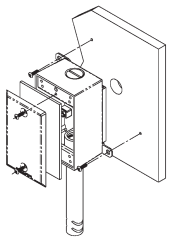


Fig. 19:
Outdoor Air/Weatherproof box installation

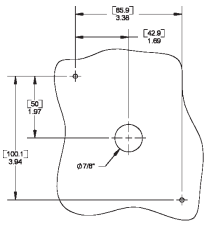


Fig. 20:
Weatherproof box enclosure mounting holes

Specifications subject to change without notice.

Immersion Sensor Mounting

Place the thermowell into the pipe nipple using Teflon tape and/or pipe dope. Tighten securely but do not over torque. Insert the immersion sensor into the well with the plastic fitting screwing into the opening on the well. Tighten the immersion sensor snugly by hand without too much torque. Make sure that the tip of the immersion sensor is in contact with the bottom of the well. The unit is designed so that the temperature probe moves slightly into the junction box as the sensor hits the bottom of the well. The figure shows a junction box, but weatherproof boxes, IP66 or BAPI-Box enclosures may be used as well.

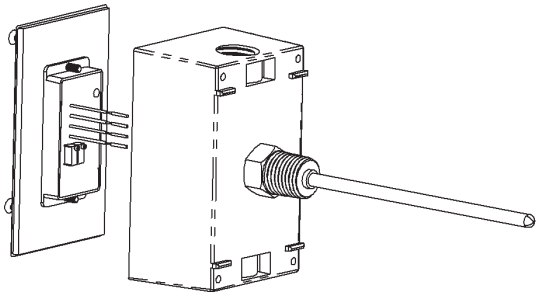


Fig. 21:
T1K transmitter mounted to a Weatherproof box cover and Weatherproof box with an immersion probe

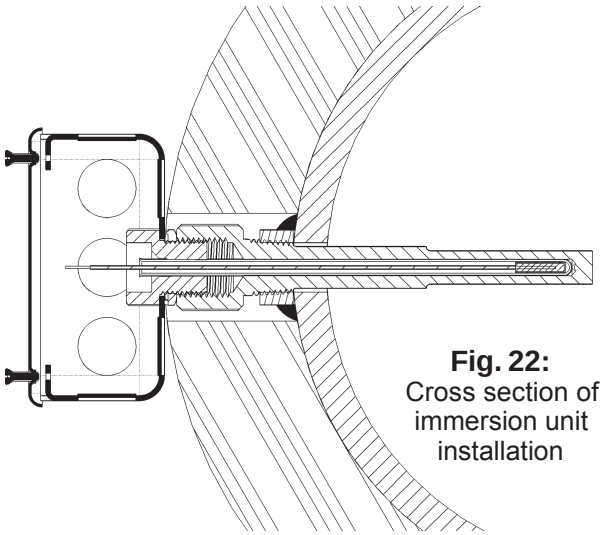


Fig. 22:
Cross section of immersion unit installation

Spring-Loaded Strap Mounting

The spring-loaded strap sensor is used when a large section of insulation cannot be removed from a pipe. The spring-loaded strap sensor accommodates insulation of up to two inches thick. Cut a 1 1/4 inch diameter hole in the insulation and remove the insulation from the hole down to the bare pipe. Be sure to remove all insulation and debris from the hole. Place the copper pad on the end of the spring-mounted foam into the hole; make sure it makes good physical contact with the pipe. Tighten the straps until the strap-mounting bracket contacts the insulation. The spring-loaded strap on sensor is sized for pipe diameters of 5 to 12.5 inches, including the insulation.

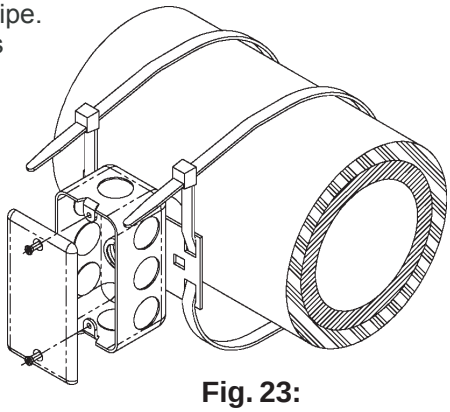


Fig. 23:
Spring-Loaded Strap installation

Clamp On Strap Mounting

Place the clamp-on sensor on bare pipe, or a section of pipe with the insulation removed. Make sure that the copper pad on the foam is in good physical contact with the pipe. Snug the straps so that the assembly does not rotate around the pipe when moderate pressure is applied to the junction box. Do not over tighten. You may place pipe insulation over the whole assembly. The clamp-on strap sensor is sized for bare pipes of 2 to 4.5 inches in diameter. Add another pipe clamp if needed.

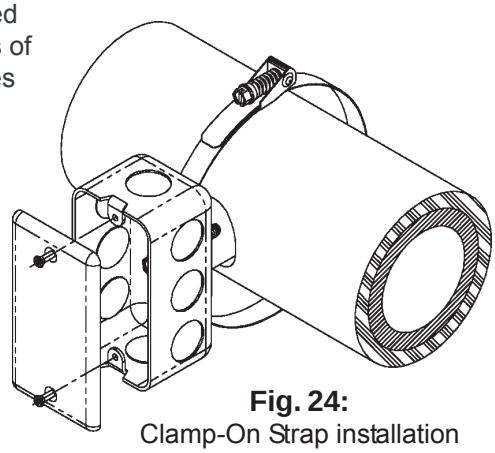


Fig. 24:
Clamp-On Strap installation

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Tel:+1-608-735-4800 • Fax+1-608-735-4804 • E-mail:sales@bapihvac.com • Web:www.bapihvac.com

Stainless Steel Mounting Indoors

The stainless steel plate is intended for indoor mounting to a two-inch by four-inch junction box. Install a junction box as shown in the figure.Terminate your wiring cables to the red and black wires, preferably with sealant filled connectors. Secure the plate to the junction box with the screws provided making sure that the foam gasket on the back of the plate seals to the wall without wrinkling the foam. The plate should not contact the wall.

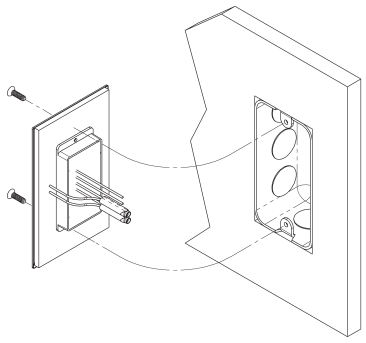

Fig. 25:
Stainless Steel Plate Mounting

RPFEP and FEP Mounting Indoors

Mount the WP or the IP-66 style enclosure as shown in the figures below Mount with the wire connector down. Route the temperature probe to the spot where you wish to measure the temperature. Best practice is to tie down the wire every two feet. Make sure to caulk the upper screw in plug on the WP enclosure. Center mounting hole shown is only used if you are wiring through the mounting surface.

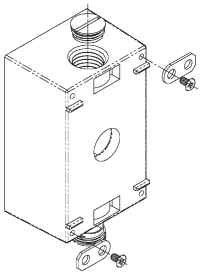

Fig. 26:
Weatherproof box mounting tabs

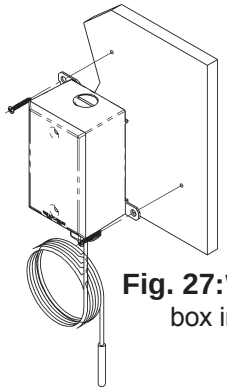

Fig. 27: Weatherproof box installation

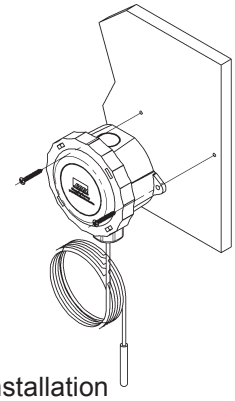

Fig. 28: IP-66 (EU) installation

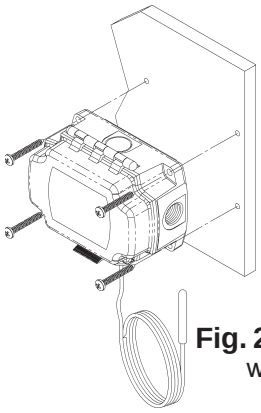

Fig. 29: Remote Probe with BAPI-Box

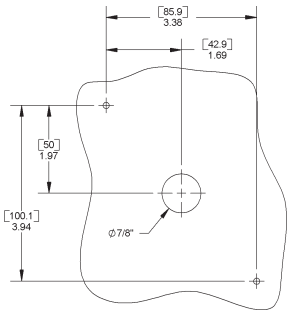

Fig. 30:
Weatherproof box mounting holes

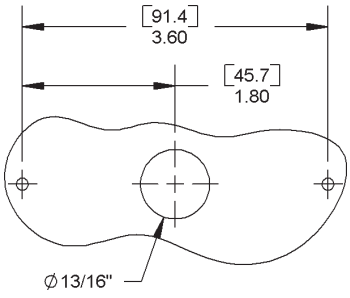

Fig. 31:
Horizontal Mounting Template

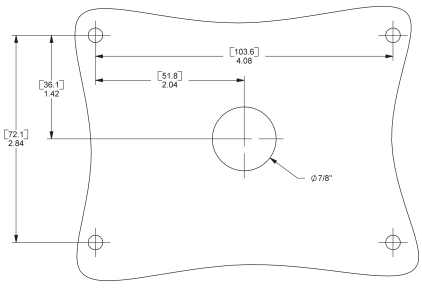

Fig. 32:
IP-66 enclosure mounting holes

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BAPI-Box Mounting

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Mount the unit to its mounting surface with four #10 scres through the holes in the mounting feet. #10 sheet metal screws require 5/32" (4mm) pilot holes. For concrete or cinder block, drill four 5/32" (4mm) holes, 1-3/4 inch (45mm) deep. Make sure that all screws are started in their holes before tightening evenly If the unit has a foam gasket, only squeeze to about 1/2 of it original thickness.

Be sure to seal conduit connector threads and holes in mounting surface to maintain the integrity of the box.

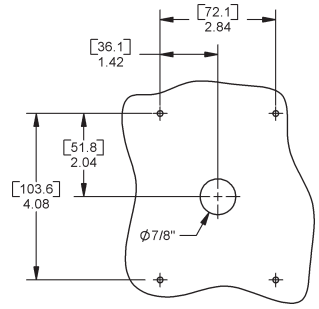

Fig 31: BAPI-Box enclosure mounting holes, rotate 90° for horizontal mount

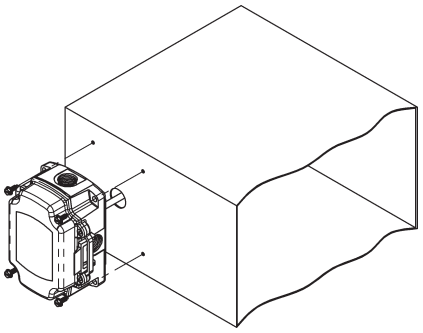

Fig 32: BAPI-Box Duct Instalation

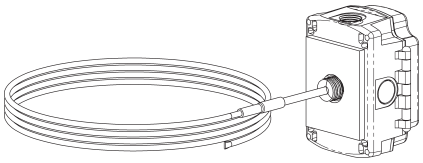

Fig 33: BAPI-Box Temperature Averaging

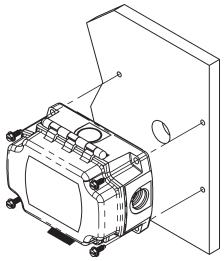

Fig 34: BAPI-Box Wall Installation

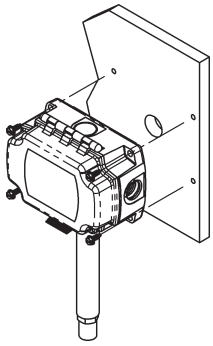

Fig 35: BAPI-Box Outdoor Installation

Diagnostics

Problems:

Unit will not operate

Possible Solutions:

- Measure the power supply voltage by placing a voltmeter across the transmitter's (+) and (-) terminals. The voltage reading should be between 7 to 40 VDC. If the voltage is above 40 VDC the transmitter is damaged. Fix the power supply so that it is between 7 to 40VDC and replace the transmitter.
- If the voltage measured above is below 7 VDC, disconnect the power wires from the transmitter. Measure the voltage on the power wires by placing a voltmeter from wire to wire. If the measured voltage reading is between 7 to 40 VDC replace the transmitter. If the measured voltage is below 7 VDC fix the power supply

Temperature sensor is reading incorrectly in controller software

- Determine if the input is set up correctly in the controllers and BAS software
- Check if the RTD wires are physically open or shorted together
- *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. (BAPI's web site is found at www.bapihvac.com; click on the button labeled SENSORS on the left of the screen and then click on the type of sensor you have.) If the measured resistance is incorrect, replace the sensing element. Measure the transmitter current by placing an ammeter in series with the controller input. Set the ammeter to the 200mA range. The current should read according to the equation shown at left. If the transmitter's measured output does not agree with the computed output, replace the transmitter. If both measurements are correct, there is nothing wrong with the sensor and transmitter combination, look elsewhere.

Temperature Equation

$$T = T_{low} + \frac{(A-4)x(T_{span})}{16}$$

T = Temperature at sensor
T_{low} = Low temperature of span
T_{high} = High temperature of span
$T_{span} = T_{high} - T_{low}$
A = Ammeter reading in mA

Note: The temperature surrounding the transmitter must be between -20 and 158 °F (-29 and 70 °C).

Specifications subject to change without notice.