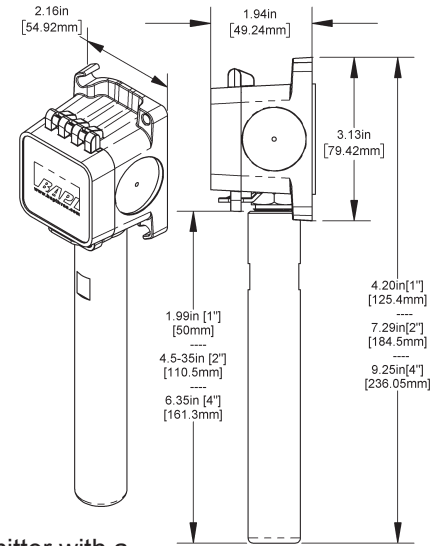


### Overview and Identification

Thermobuffer Temperature Transmitters in the BAPI-Box Crossover Enclosure are designed for temperature sensing in walk-in freezers or refrigerators. The buffers chambers are filled with customer-supplied food grade glycol to slow down the temperature response and track the temperature of the contents of the freezer or refrigerator rather than the air temperature. The units are available with 4 to 20mA output and a variety of probe lengths. They can be ordered with a 1KΩ Platinum RTD or special high accuracy RTD matched transmitters which match the sensor to the transmitter for improved accuracy.

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).

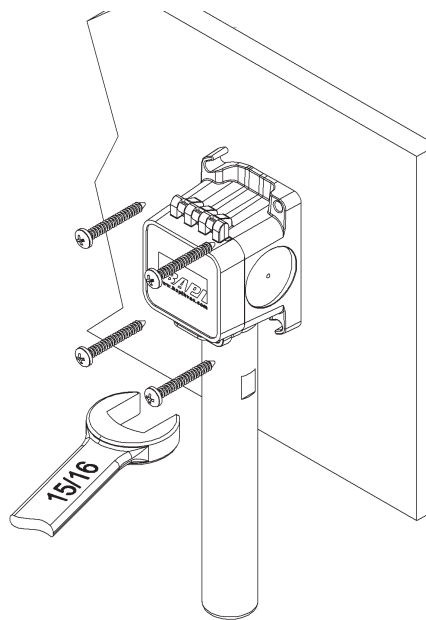
**This instruction sheet is specific to temperature transmitter units with the BAPI-Box Crossover Enclosure. For all other transmitter units, please refer to instruction sheet "20898\_ins\_Thermobuffer\_Active.pdf" which is available on the BAPI website or by contacting BAPI.**



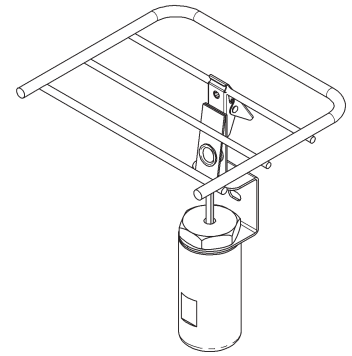
**Fig. 1:** Thermobuffer Transmitter with a BAPI-Box Crossover Enclosure

### Assembly & Installation

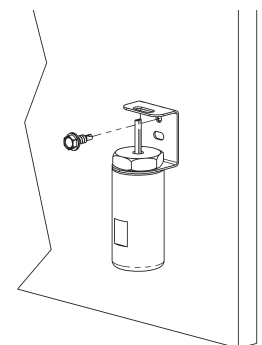
1. Fill the buffer with the appropriate amount of customer-provided glycol to the amount as dictated by table 1.
2. Wrap the probe threads with Teflon tape with at least 4 wraps so a watertight seal is established. Insert the probe into the buffer and screw in for a secure water tight fit. Towel off excess fluid which may leak out during assembly and check for leaking. If the assembly leaks, a 15/16ths wrench may be used to snug up the probe to the buffer. More tape may also be needed. The use of food safe silicon may also be used.
3. Select a location on a wall or hanging from a wire rack near the contents you wish to monitor. Mount the Thermobuffer with the buffer facing down (Probe on top). Any other orientation may cause leaking.
4. BAPI recommends positioning BAPI-Box Crossover over the refrigerator wire way hole using the rear open port of the enclosure. 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. Secure with mounting screws and ensure that the foam backing compresses to about 50% of its thickness to make a gasket type seal against the surface.



**Fig 2:** Thermobuffer in a BAPI-Box Crossover Installation



**Fig 2:** Hanging Bracket Rack Installation



**Fig 3:** Hanging Bracket Wall Installation (Customer Provided Screws)

Table 1:	
Buffer Size	Recommended Fluid Fill
1" Buffer	0.17 Fluid oz (5mL)
2" Buffer	0.67 Fluid oz (20mL)
4" Buffer	1.00 Fluid oz (30mL)

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.

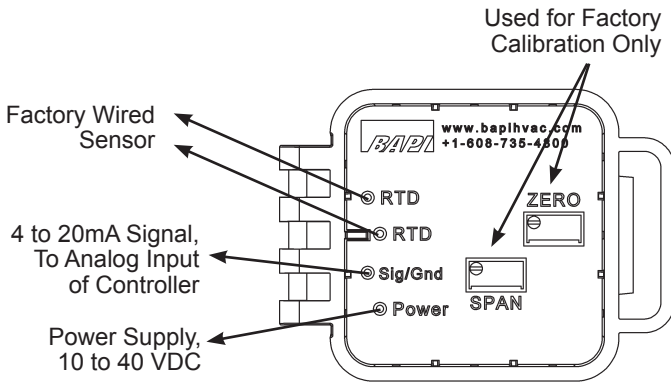


Fig. 5: Transmitter with Flying Leads

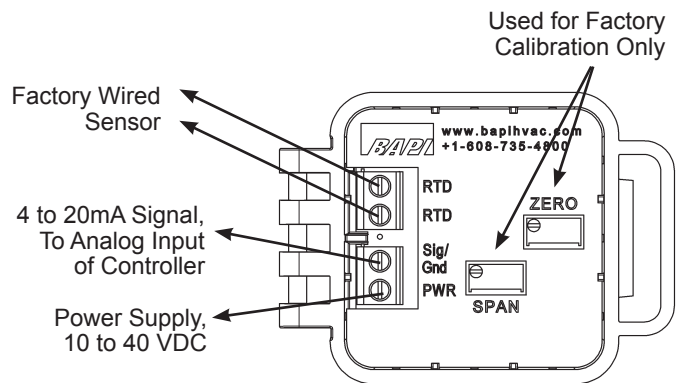


Fig. 6: Transmitter with Terminal Strip

Note: Green LED on cover face will light when power is applied.

### Diagnostics

#### Possible Problems:

Green power LED is not on.

The reading is incorrect in the controller.

#### Possible Solutions:

- Measure the power supply voltage by placing a multi-meter across the transmitter's "Power" and "Sig/Gnd" leads or terminals. Make sure that the power is 10 to 40 VDC.
- Make sure that the "Power" and "Signal/Gnd" wires are not open or shorted together and are terminated correctly to the controller.
- Determine if the input is set up correctly in the BAS and controller's software.
- Compare the transmitted current to the actual temperature measurement at the sensor location. Measure the physical temperature at the temperature sensor's location using an accurate temperature standard. 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 at right. If the measured resistance is different from the temperature table by more than 5% call BAPI technical support.

#### 4 to 20mA Temperature Equation

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

- T = Temperature at sensor
- T<sub>Low</sub> = Low temperature of span
- T<sub>High</sub> = High temperature of span
- T<sub>Span</sub> = T<sub>High</sub> - T<sub>Low</sub>
- A = Signal reading in mA

Specifications subject to change without notice.



# Thermobuffer Temperature Transmitters with a BAPI-Box Crossover Enclosure

*Installation & Operations*

37730\_ins\_thermobuffer\_active\_bbx

rev. 03/23/18

## **Specifications**

### **RTD Transmitter**

Power Required: ..... 10 to 40VDC  
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 1,000°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)

### **RTD Sensor:** Resistance Temp Device (Bare Sensor)

Platinum (Pt): ..... 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)

**Lead Wire:** ..... 22AWG stranded

**Wire Insulation:**..... Etched Teflon, Plenum rated

### **Probe Length:** Probe tip to thread start

1" ..... 0.75"  
2" ..... 3.5"  
4" ..... 5.5"

### **Buffer Chamber Dimensions:**

1" Buffer..... 2.75"H x 1"Dia  
2" Buffer..... 5.1"H x 1"Dia  
4" Buffer..... 7.1"H x 1"Dia

### **Buffer Chamber Construction:**

M-304 ..... Machined 304 Stainless Steel, 0.7" core  
MAL ..... Machined Aluminum, 0.7" core

### **Liquid Fill:** Food Grade Glycol (Customer provided)

1" Buffer..... 5 mL  
2" Buffer..... 20 mL  
4" Buffer..... 30 mL

### **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:**

-4 to 158°F (-20 to 70°C)  
0 to 100% RH, Non-condensing

### **Agency:**

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

Specifications subject to change without notice.