Double Threaded Immersion Transmitters with Stainless Steel Fittings and BAPI-Box Crossover Enclosure

Installation & Operations

37726_ins_immerss_active_bbx rev. 03/23/18

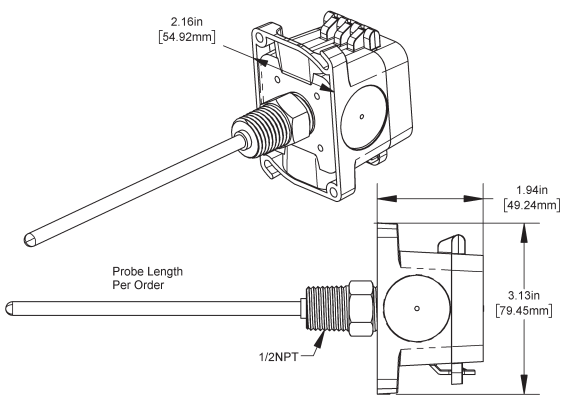
Overview and Identification

The Double Threaded Stainless Steel Immersion transmitters in the BAPI-Box Crossover enclosure 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.

They are made for thermowell mounting and temperature measurement in water pipes, water tanks or cooling tower sump applications. Direct probe insertion into a Threadolet is possible without a thermowell. However, this is not recommended as it cannot be removed after the pipe is pressurized. The probe and threads are made of Stainless Steel and made in different lengths for a custom thermowell fit. The unit is available with a variety of thermistor or RTD sensing elements.

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 the sensors and probes with the BAPI-Box Crossover Enclosure. For other enclosures, please refer to instruction sheet "20919_ins_ImrsnDblThread_Active.pdf" which is available on the BAPI website or by contacting BAPI.



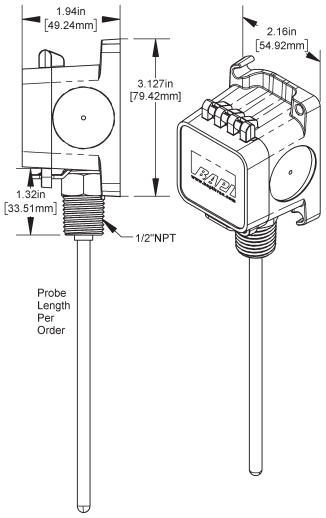


Fig 1: BAPI-Box Crossover Immersion with Stainless Steel Fittings shown above. Outside Mount version shown at right.

Thermowells and Immersion Sensors

Immersion Unit Probes are designed to be inserted into a Thermowell. Standard Thermowells from BAPI include machined 304 and 316 stainless steel and brass, and two-part welded 304 stainless steel. The Thermowell chosen for an installation is governed mainly by the corrosion conditions the well will face. Occasionally, the material consideration is one of strength rather than corrosion. For example, a machined stainless steel well may be required for high pressure water service where otherwise a brass or two-part stainless steel well would be satisfactory from a corrosion standpoint. The two-part welded stainless steel thermowells are not intended for service in moving water. Do not mount the two-part thermowells close to the inlet or outlet pipe of the tank.

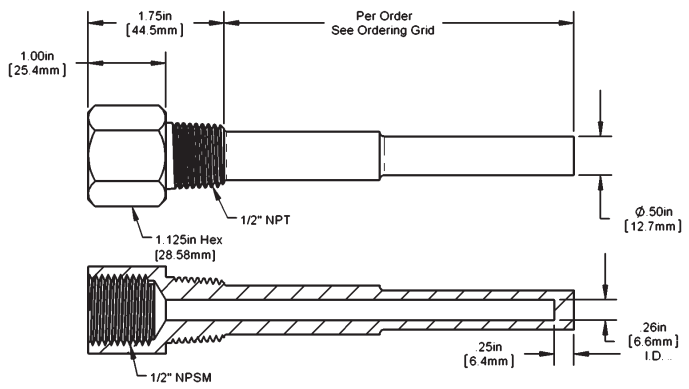


Fig 2: Machined Thermowell

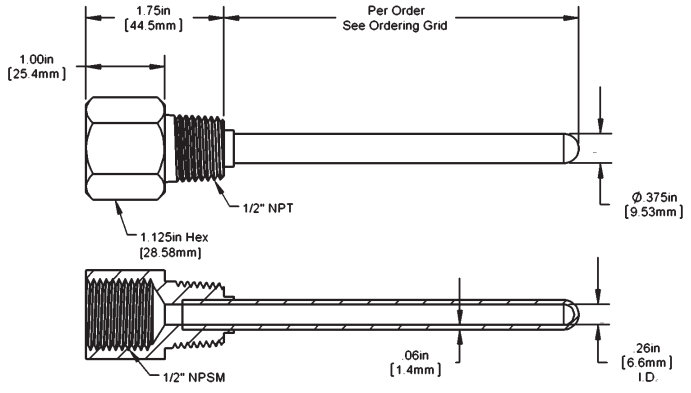


Fig 3: Two-Part Welded Thermowell

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Thermowells and Immersion Sensors continued...

Fig 4 shows a typical four-inch thermowell and four-inch immersion probe installed into an eight-inch pipe.

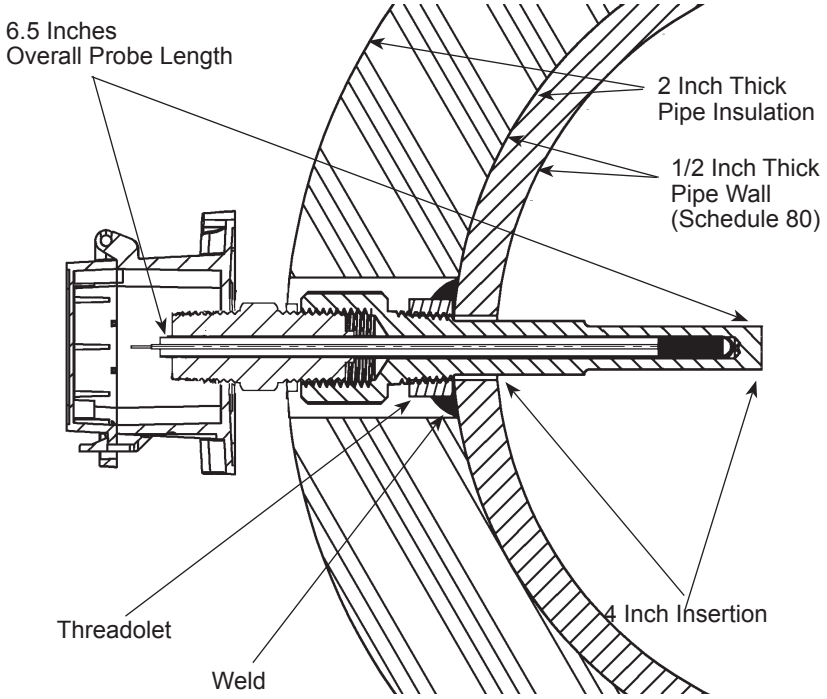

Fig 4: Typical Sensor and Thermowell Installation

Immersion Sensor Installation

SENSOR INSTALLATION WITH THERMOWELL:
Insert the immersion sensor into the well. Hand tighten the immersion sensor snugly without too much torque. The probe is tight fitting to the bottom and wall of the thermowell offering an accurate temperature reading.

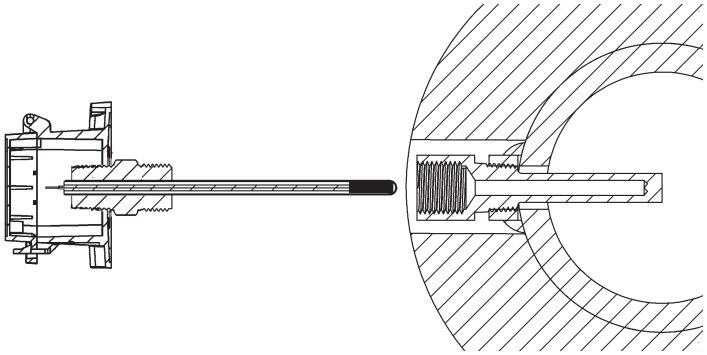

Fig 5: BAPI-Box Crossover Unit Before Insertion

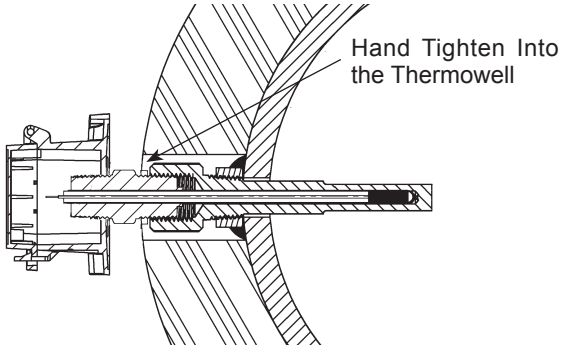

Fig 6: BAPI-Box Crossover Unit Inserted

SENSOR INSTALLATION WITHOUT A THERMOWELL:
Direct probe insertion into the pipe without a thermowell is possible. However, this is not recommended as it cannot be removed after the pipe is pressurized. Apply a minimum of five turns of Teflon tape to the SS probe side threads. Insert the SS probe and ½" NPT threads into the Threadolet and tighten with a wrench to achieve a water tight seal. The probe should not touch the far inside of the water pipe or probe failure may occur.

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Installation in Pipes Less than 3" in Diameter

Corner Mount
Fig 7 shows how a pipe Tee can be used in an elbow application. A 2" tee and a 1/2" to 2" bushing allows a 4" thermowell to measure the temperature of the contents of a 2" water pipe.

T- Mount
Fig 8 shows how a 2" Tee and a 1/2" to 2" bushing allows a 2" thermowell to measure the temperature of the contents of a 2" water pipe. Be sure to use a thread sealant on the outside threads of the thermowell.

Note: Temperatures in pipes as small as 1-1/4" may be measured by this method. In small pipes, the diameter of the thermowell may become a significant obstruction, so be sure to check for proper flow rates after installation is complete.

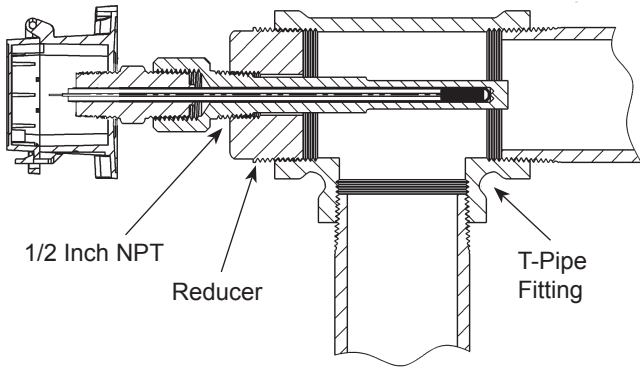

Fig 7: Typical Corner Mount
(shown with Junction Box enclosure

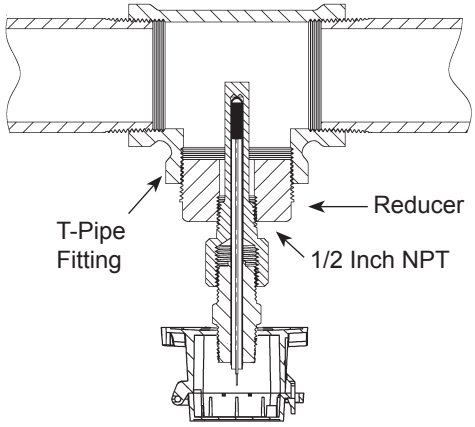

Fig 8: Typical T-Mount
(shown with Junction Box enclosure

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.

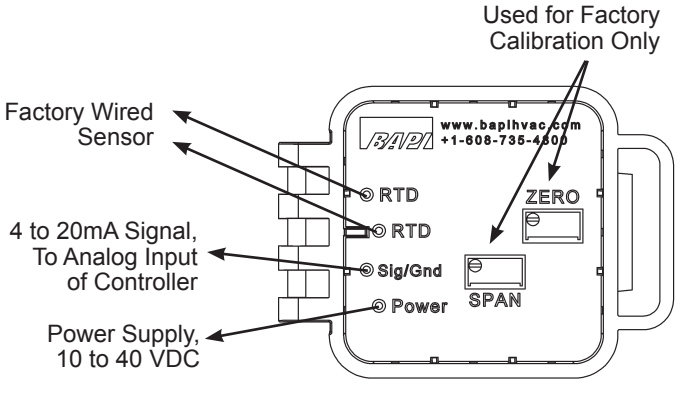

Fig. 5: Transmitter with Flying Leads

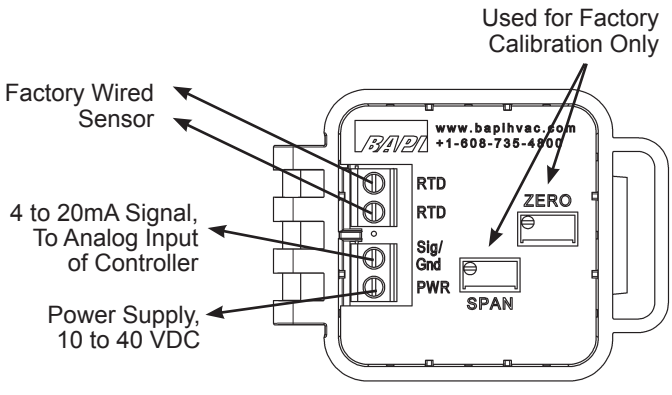

Fig. 6: Transmitter with Terminals

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

Diagnostics

Possible Problems:	**Possible Solutions:**
Green power LED is not on.	- 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.
The reading is incorrect in 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

$$T = \frac{TLow + (A - 4) \times (TSpan)}{16}$$

T = Temperature at sensor
TLow = Low temperature of span
THigh = High temperature of span
TSpan = THigh - TLow
A = Signal reading in mA

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. 30ºF (17ºC), Max 1,000ºF, (555ºC)
Zero: .....Min. -148°F (-100°C), Max 900ºF (482ºC)
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 158ºF(-20 to 70ºC)
0 to 95% RH, Non-condensing)

RTD Sensor: Resistance Temp Device (Bare Sensor)

Platinum (Pt): .....1KΩ @0ºC, 385 curve
Pt Accuracy (Std): .....0.12% @Ref, or ±0.55ºF, (±0.3ºC)
Pt Accuracy (High): .....0.06% @Ref, or ±0.277ºF, (±0.15ºC), **[A]**option
Pt Stability: .....±0.25ºF, (±0.14ºC)
Pt Self Heating: .....0.4 ºC/mW @0ºC
Pt Probe Range: .....-40º to 221ºF, (-40 to 105ºC)

Lead Wire: .....22AWG stranded

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

Probe .....Rigid, 316 St. Steel, 0.25" OD

Probe Length: .....2", 4", 8" or custom per order

Mounting: .....Extension tabs, 3/16" holes

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:
-40 to 185ºF (-40 to 85ºC)
0 to 100% RH, Non-condensing

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

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