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

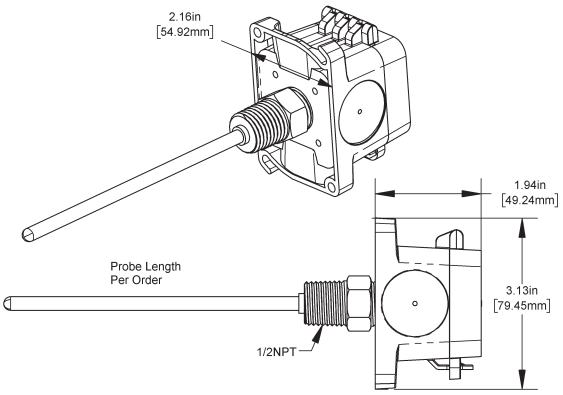
Installation & Operations

Overview and Identification

The Double Threaded Stainless Steel Immersion Sensor is 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 "20908_ins_ImrsnDblThread_Passive.pdf" which is available on the BAPI website or by contacting BAPI.



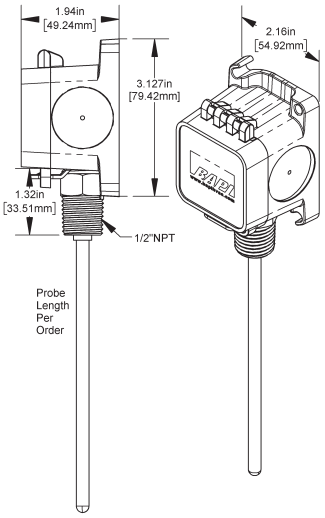


Fig 1: BAPI-Box Crossover Immersion with Stainless Steel Fittings above. Outside Mount version shown at right.

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.

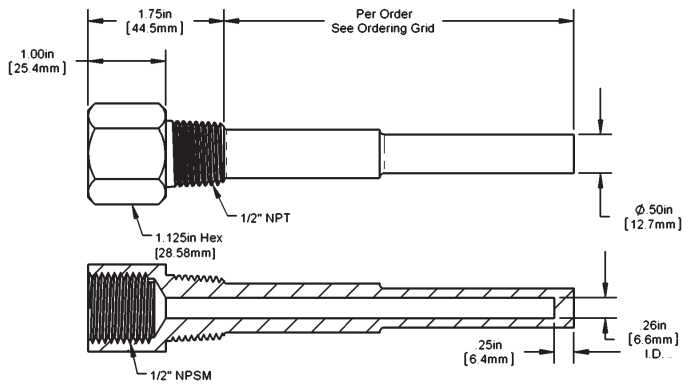


Fig 2: Machined Thermowell

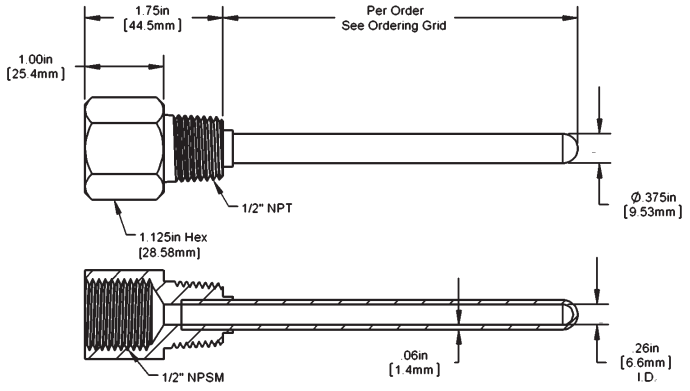


Fig 3: Two-Part Welded Thermowell

Specifications subject to change without notice.

Thermowells and Immersion Sensors continued...

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

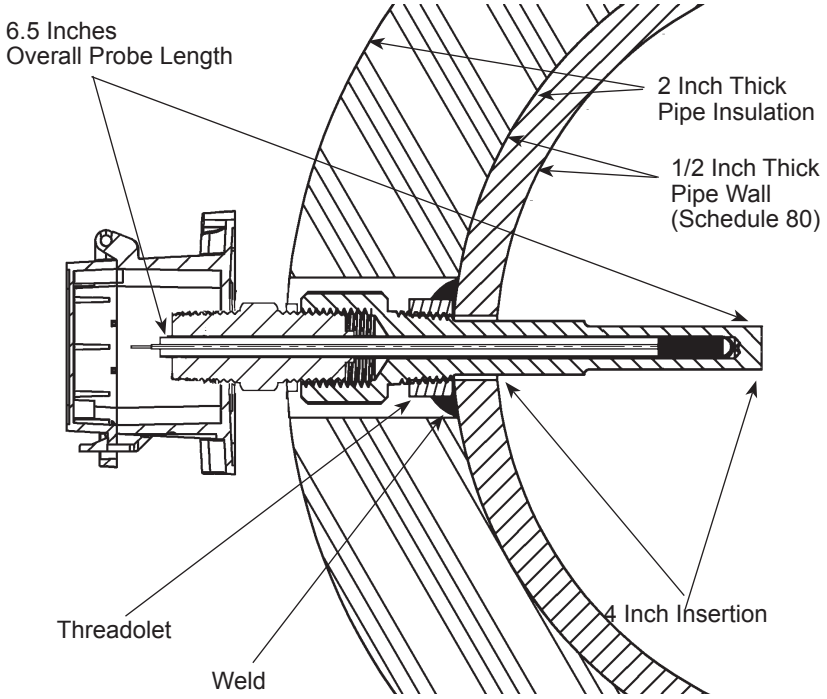


Fig 4: Typical Sensor and Thermowell Installation

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.

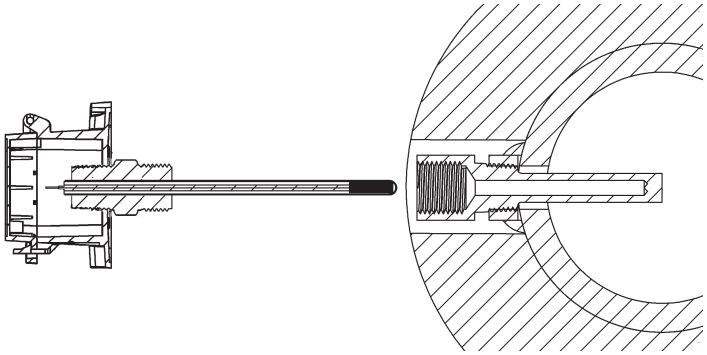


Fig 5: BAPI-Box Crossover Unit Before Insertion

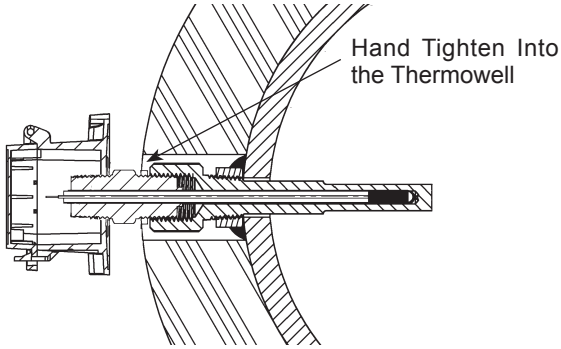


Fig 6: BAPI-Box Crossover Unit Inserted

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.

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.

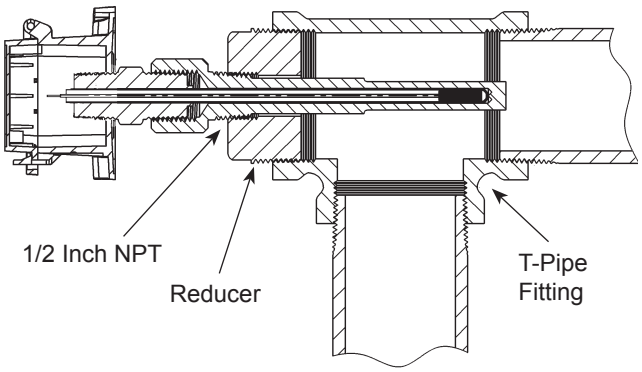


Fig 7: Typical Corner Mount
(shown with Junction Box enclosure

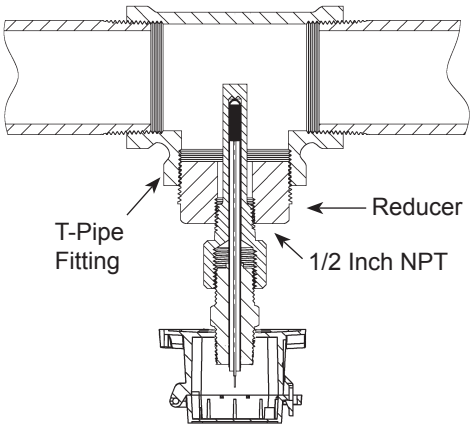


Fig 8: Typical T-Mount
(shown with Junction Box enclosure

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.

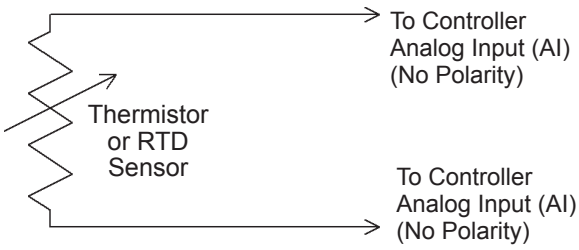


Fig. 9: 2-Wire Termination for Thermistor or RTDs

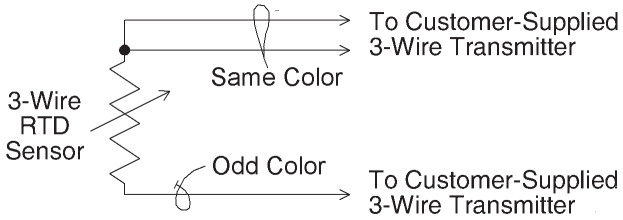


Fig. 10: 3-Wire Termination for RTDs

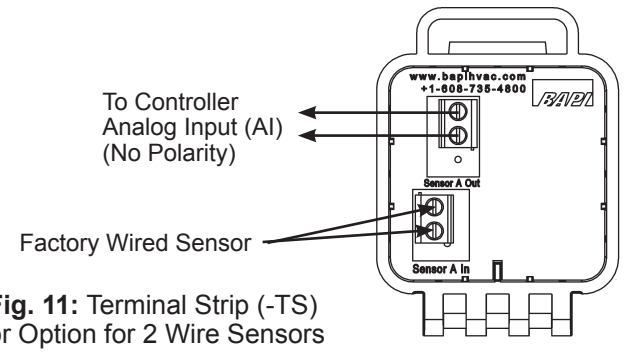


Fig. 11: Terminal Strip (-TS)
or Option for 2 Wire Sensors

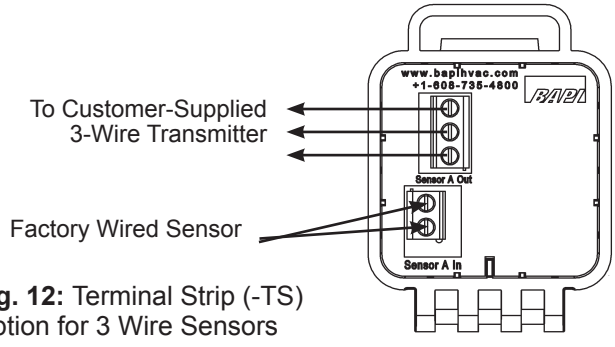


Fig. 12: Terminal Strip (-TS)
Option for 3 Wire Sensors

Specifications subject to change without notice.

Diagnostics

Possible Problems:
Controller reports higher or lower than actual temperature

Possible Solutions:
- Confirm the input is set up correctly in the front end software
- Check wiring for proper termination & continuity. (shorted or open)
- If the unit has a Test and Balance switch, make sure that the switch is in the center “Norm” position.
- 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 across the sensor output pins with an ohmmeter. Compare the temperature sensor’s resistance to the appropriate temperature sensor table on the BAPI website. If the measured resistance is different from the temperature table by more than 5% call BAPI technical support. Find BAPI’s website at www.bapihvac.com; click on “Resource Library” and “Sensor Specs” then click on the type of sensor you have.

Specifications

SENSOR SPECS

Sensor: Passive
Thermistor ..... NTC, 2 wire
RTD ..... PTC, 2 or 3 wire

Thermistor: Thermal resistor
Temp. Output..... Resistance
Accuracy (Std) ..... ±0.36ºF, (±0.2ºC)
Accuracy (High) ..... ±0.18ºF, (±0.1ºC), **[XP]** option
Stability ..... < 0.036ºF/Year, (<0.02ºC/Year)
Heat Dissipation ..... 2.7 mW/ºC
Temp. Drift..... <0.02ºC per year
Probe Range ..... -40º to 221ºF (-40º to 105ºC)

RTD: Resistance Temperature Device
Platinum (Pt) ..... 100Ωor 1KΩ @0ºC, 385 curve,
Platinum (Pt) ..... 1KΩ @0ºC, 375 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)
Nickel (Ni) ..... 1000Ω @70ºF, JCI curve
Ni Probe range ..... -40º to 221ºF (-40 to 105ºC)

Sensitivity: Approximate @ 32ºF (0ºC)
Thermistor ..... Non-linier
See bapihvac.com “Sensor Specs”
1KΩ RTD (Pt) 3.85Ω/ºC
100Ω RTD 0.385Ω/ºC
Nickel (Ni) ..... 2.95Ω/ºF for the JCI RTD

ENCLOSURE AND WIRING SPECS

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

Lead Wire:
22AWG stranded

Wire Insulation:
Etched Teflon, Plenum rated

Probe
Rigid, 316 Stainless Steel, 0.25” OD

Probe Length
2”, 4”, 8” or custom per order

Mounting
1/2” NPT, 316 Stainless Steel
Double Threaded Fitting

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

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