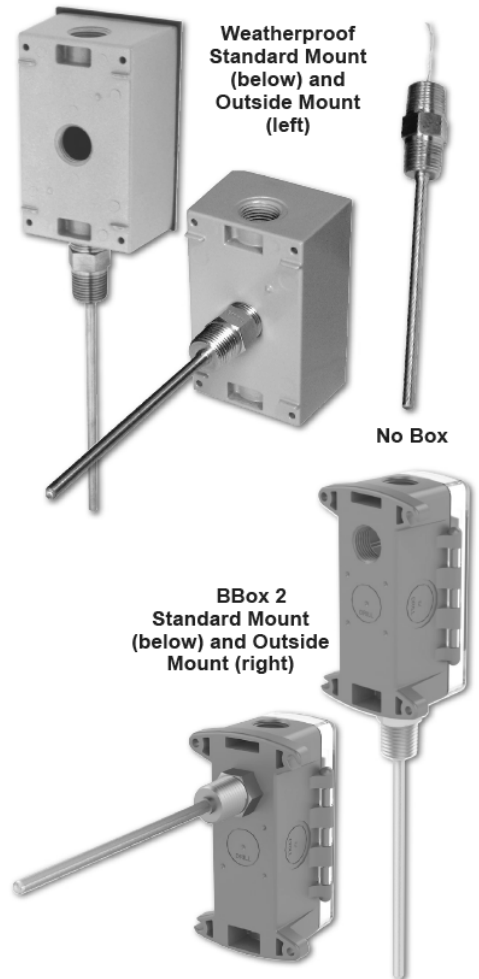


Identification and Overview**Double Threaded Immersion Temperature Sensor Units with Stainless Steel Fittings**

The Double Threaded Stainless Steel (SS) 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 rigid probe and threads are made of Stainless Steel and made in different lengths for a custom thermowell fit. The N1-10K-...-SSis versions are available with multiple thermistor's or RTD's as shown in the specifications. Enclosure mounting styles come in plastic or metal for both NEMA 1 and NEMA 4 applications and are all plenum rated.

Part #s:

- N1-10K-2[XP]-I-2-SS-BB2-A**
- N1-10K-2[XP]-I-4-SS-BB2-A**
- N1-10K-2[XP]-I-4-SS-BB2-M304-A**
- N1-10K-2[XP]-I-8-SS-BB2-A**
- N1-10K-2-I-2-SS-BB2-A**
- N1-10K-2-I-2-SS-BB-A**
- N1-10K-2-I-2-SS-WP-A**
- N1-10K-2-I-4-SS-BB2-A**
- N1-10K-2-I-4-SS-WP-A**
- N1-10K-2-I-8-SS-BB2-A**



Specifications

Sensor Passive
 Thermistor NTC, 2 wire
 RTD PTC, 2 or 3 wire
Thermistor..... Thermal resistor
 Temp. Output Resistance
 Accuracy (Std)..... $\pm 0.36^{\circ}\text{F}$, ($\pm 0.2^{\circ}\text{C}$)
 Accuracy (Hi)..... $\pm 0.18^{\circ}\text{F}$, ($\pm 0.1^{\circ}\text{C}$), [XP] option
 Stability $< 0.036^{\circ}\text{F}/\text{Year}$, ($< 0.02^{\circ}\text{C}/\text{Year}$)
 Heat dissipation.... $2.7 \text{ mW}/^{\circ}\text{C}$
 Temp. Drift..... $< 0.02^{\circ}\text{C}$ per year
 Probe range..... -40° to 221°F (-40° to 105°C)
RTD Resistance Temperature Device
 Platinum (Pt)..... 100Ω or $1\text{K}\Omega@0^{\circ}\text{C}$, 385 curve,
 Platinum (Pt)..... $1\text{K}\Omega@0^{\circ}\text{C}$, 375 curve
 Pt Accuracy (Std) . 0.12% @Ref, or $\pm 0.55^{\circ}\text{F}$, ($\pm 0.3^{\circ}\text{C}$)
 Pt Accuracy (Hi) ... 0.06% @Ref, or $\pm 0.277^{\circ}\text{F}$, ($\pm 0.15^{\circ}\text{C}$),
 [A]option
 Pt Stability $\pm 0.25^{\circ}\text{F}$, ($\pm 0.14^{\circ}\text{C}$)
 Pt Self Heating $0.4 \text{ }^{\circ}\text{C}/\text{mW}$ @ 0°C
 Pt Probe range -40° to 221°F , (-40 to 105°C)
 Nickel (Ni)..... $1000\Omega@70^{\circ}\text{F}$, JCI curve
 Ni Probe range -40° to 221°F (-40 to 105°C)
Sensitivity Approximate @ 32°F (0°C)
 Thermistor Non-linear
 RTD (Pt) $3.85\Omega/^{\circ}\text{C}$ for $1\text{K}\Omega$ RTD $0.385\Omega/^{\circ}\text{C}$ for
 100Ω RTD
 Nickel (Ni)..... $2.95\Omega/^{\circ}\text{F}$ for the JCI RTD

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

Enclosure Types

Weatherproof WP, w/ two 1/2" FNPT entries, (Bell
 box
 BBox2 BB2, w/three 1/2" NPSM & three 1/2"
 Drill-outs

Enclosure Ratings

Weatherproof WP, NEMA 3R, IP14
 BBox2 BB2, NEMA 4, IP66

Enclosure Materials

Weatherproof WP, Cast Aluminum, UV rated
 BBox2 BB2, Polycarbonate, UL94V-0, UV
 rated

Ambient (Encl.) 0 to 100% RH, Non-condensing
 Weatherproof WP, -40°F to 212°F , (-40° to 100°C)
 BBox2 BB2, -40°F to 185°F , (-40° to 85°C)

Agency RoHS, *CE

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

*Passive Thermistors $20\text{K}\Omega$ and smaller are CE
 Compliant

Dimensional Drawing

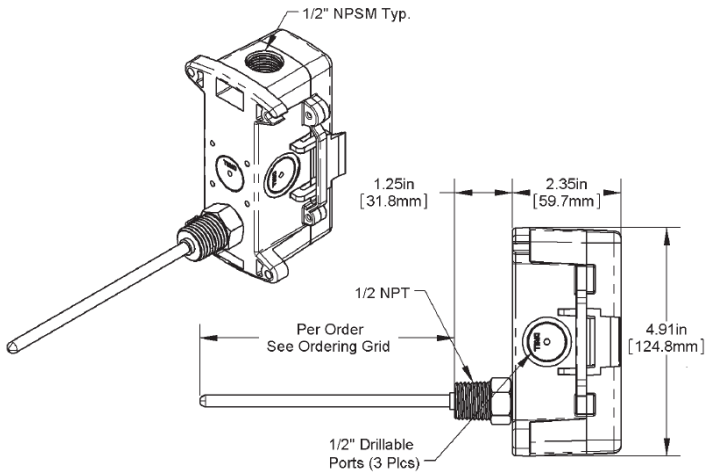


Table 1: BBox2 (BB2) Outside Mount

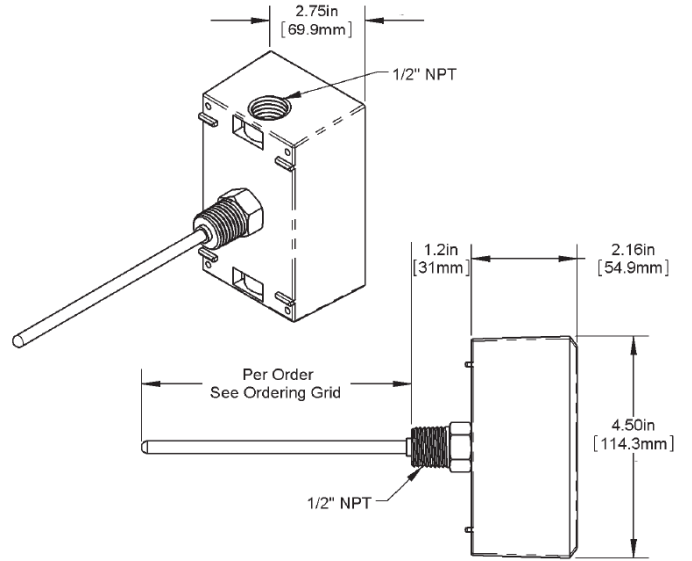
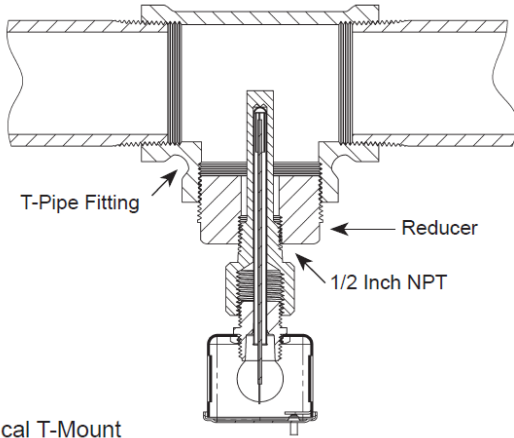
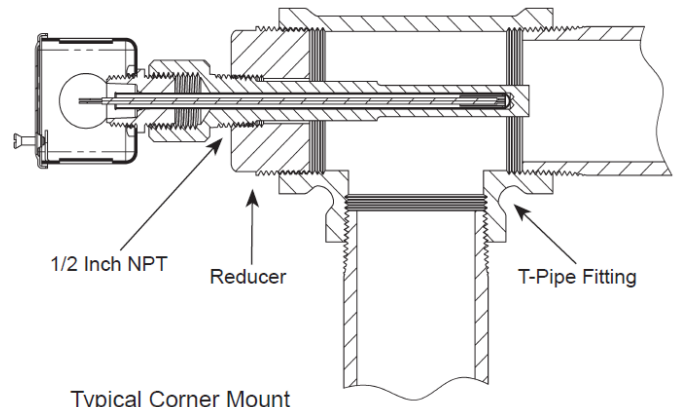


Table 2: Weatherproof (WP) Outside Mount

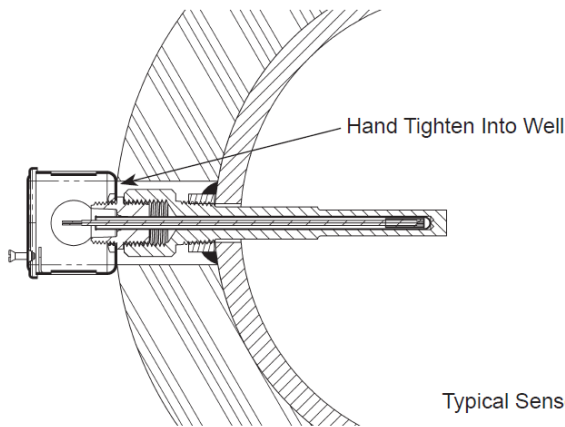
Mounting



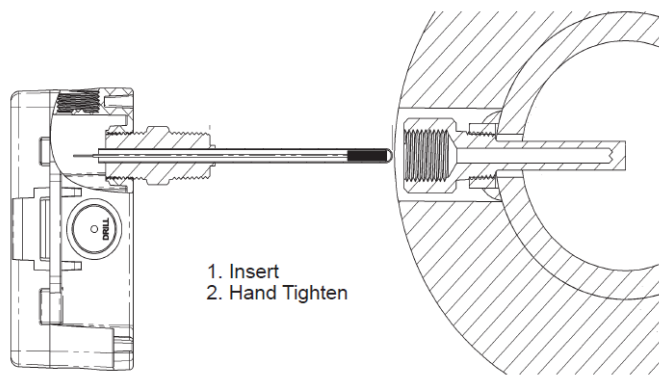
Typical T-Mount



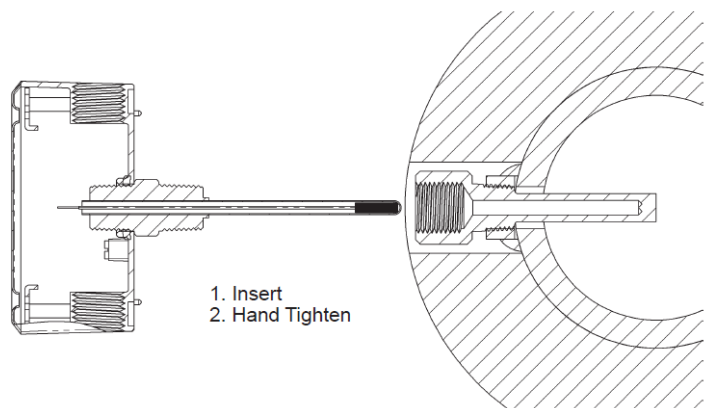
Typical Corner Mount



Typical Sensor Inserted



BBBox2 (BB2) Sensor Before Insertion




Weatherproof (WP) Sensor Before Insertion


Application: The Typical Sensor Inserted figure shows a typical thermowell and immersion probe installed into a pipe. In a properly insulated pipe with liquid or steam, the temperature is essentially the same across the entire cross section of the pipe. Usually thermowells are sized to extend to the center of the pipe; however, shorter thermowells will give proper temperature readings if properly insulated. The shorter thermowells are used in pipes with high flow velocities.

Thermowell Installer: Typically a Pipe Fitter drills a 3/4-inch hole into the pipe where the thermowell is needed. A customer provided fitting, called a Threadolet or Weldolet, is welded to the pipe over the hole. The Threadolet has a 1/2" NPT thread in the center. Thread sealant such as Teflon tape or pipe dope is applied to the 1/2" NPT threads of the thermowell. The thermowell is then inserted into the Threadolet and tightened.

Sensor Installation: 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. 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 tap to the SS probe side threads. Insert the SS probe and 1/2" 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.

Wiring and Termination

 Caution	<ul style="list-style-type: none"> Do NOT run this device's wiring in the same conduit as high or low voltage AC power wiring. Tests show that inaccurate signal levels are possible when AC power wiring is present in the same conduit as the sensor wires. All wiring must comply with the National Electric Code (NEC) and local codes.
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 Tip	<p>We recommend using twisted pair of at least 22AWG and sealant filled connectors for all wire connections. Larger gauge wire may be required for long runs</p>
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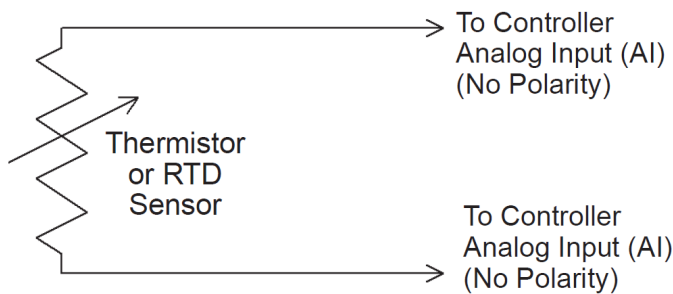


Figure 1: 2 Wire Termination for Thermistor or RTD

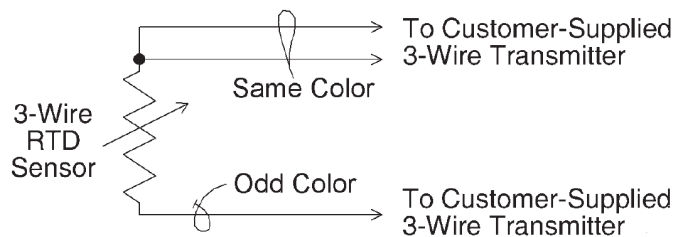


Figure 2: 3 Wire Termination for RTD

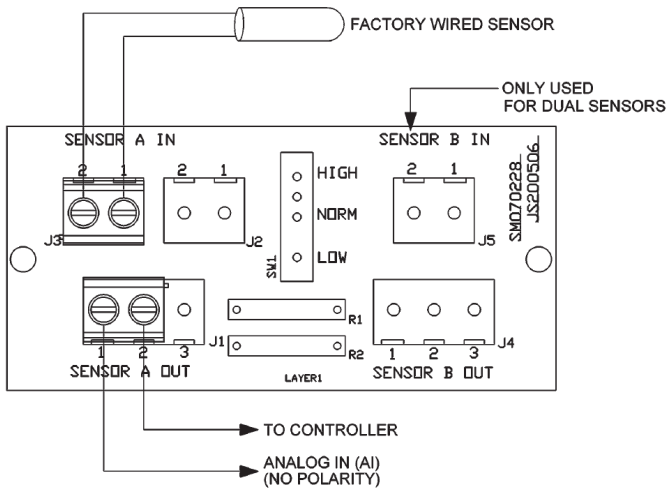


Figure 3: Terminal Strip (-TS) Option for 2 Wire Sensors Termination

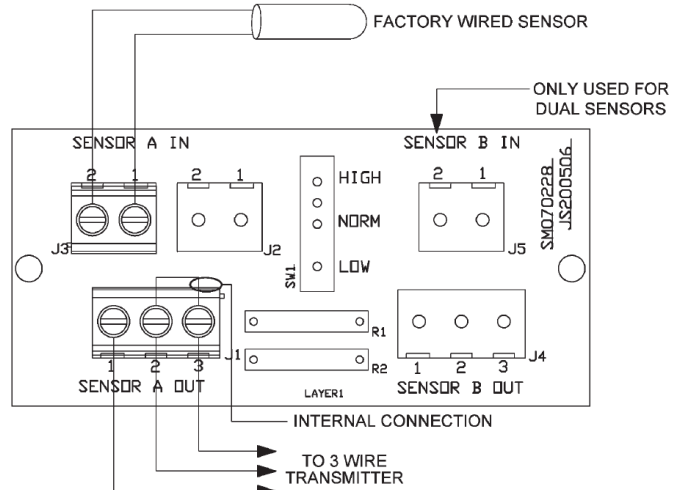


Figure 4: Terminal Strip (-TS) Option for 3 Wire Sensors Termination

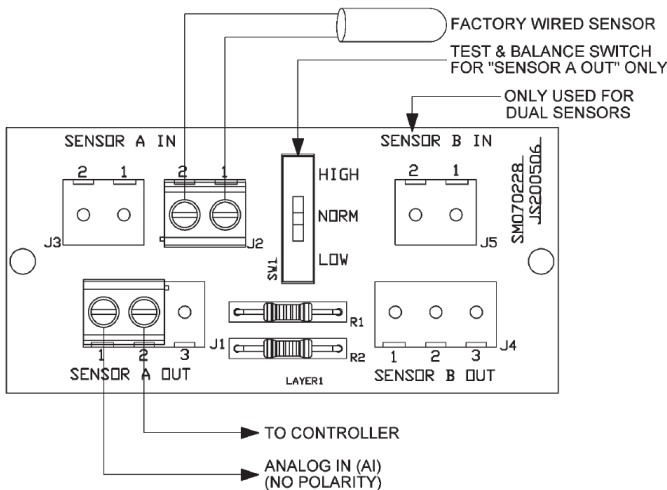


Figure 5: Test & Balance (-TB) Option for 2 Wire Sensors Termination

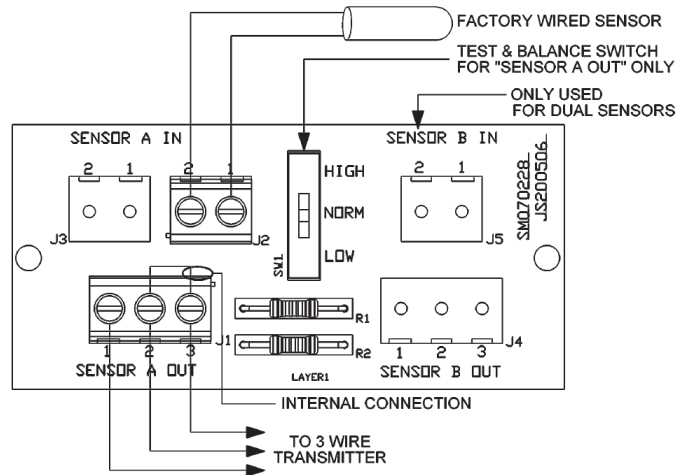


Figure 6: Test & Balance (-TB) Option for 3 Wire Sensors Termination

Diagnostics




Possible Problem:

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)
- Disconnect wires and measure sensor resistance and verify the “Sensor” output is correct.

Appendix – Symbols Key

 Warning	Potential for death, serious injury, or permanent damage to a system.
 Caution	Potential for injury, damage to a system, or system failure.
 Tip	Useful information not related to injury or system damage.