

#20909 – 9/7/23

Identification and Overview

The Outside Air temperature Sensor is available with multiple thermistors or RTDs as shown in the specifications section. The probe is made to protect the sensor from rain, sleet, snow or bird droppings.

Outside Air Units are designed to be mounted outdoors. The UV-resistant plastic shield keeps the sensor out of the sunlight and allows for excellent air circulation. All Outside Air Units have etched Teflon lead wires and can withstand high humidity and condensation and perform under real world conditions. This is especially important in an outside air application which can be exposed to rain, snow and large temperature swings.

Enclosures come in plastic or metal for both NEMA 3R and NEMA 4 applications and are all UV rated.

Part #s: **N1-10K-2-O-BB-A**
 N1-10K-2-O-WP-A

**Specifications****Sensor:** Passive

Thermistor.....NTC, 2 wire

RTDPTC, 2 or 3 wire

Thermistor: Thermal resistor

Temp. Output.....Resistance

Accuracy (Std)±0.36°F, (±0.2°C)

Accuracy (High)±0.18°F, (±0.1°C), [XP] option

Stability< 0.036°F/Year, (<0.02°C/Year)

Heat dissipation2.7 mW/°C

Temp. Drift.....<0.02°C per year

Probe range -40 to 221°F (-40 to 105°C)

RTD: Resistance Temperature Device

Platinum (Pt) 100Ω or 1KΩ @0°C, 385 curve,

Platinum (Pt) 1KΩ @0°C, 375 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)

Nickel (Ni) 1KΩ @70°F, JCI curve

Ni Probe range..... -40 to 221°F (-40 to 105°C)

Sensitivity: Approximate @ 32°F (0°C)

Thermistor.....Non-linear

1KΩ RTD (Pt)3.85Ω/°C

100Ω RTD (Pt).....0.385Ω/°C

Nickel (Ni).....2.95Ω/°F for the JCI RTD

Lead Wire: 22awg stranded

Wire Insulation: Etched Teflon, Plenum rated

Probe: Vented polycarbonate shield, ½" OD

Probe Length: 1.2" w/ ½" NPT threads

Wall Gasket: Closed cell foam (impervious to mold)

Enclosure Types

Weatherproof WP, w/ two ½" FNPT entries, (Bell box)

BBox..... BB, w/ four ½" NPSM & one ½" drill-outs

Enclosure Ratings

Weatherproof WP, NEMA 3R, IP14

BBox BB, NEMA 4, IP66

Enclosure Materials

Weatherproof WP, Cast Aluminum, UV rated

BBox..... BB, Polycarbonate, UL94V-0, UV rated

Ambient (Enclosure)

Weatherproof WP, -40°F to 212°F, (-40° to 100°C)

BBox..... BB, -40°F to 185°F, (-40° to 85°C)

Humidity 0 to 100% RH, Non-condensing

Agency

RoHS, CE (CE for all sensors below 10KΩ)

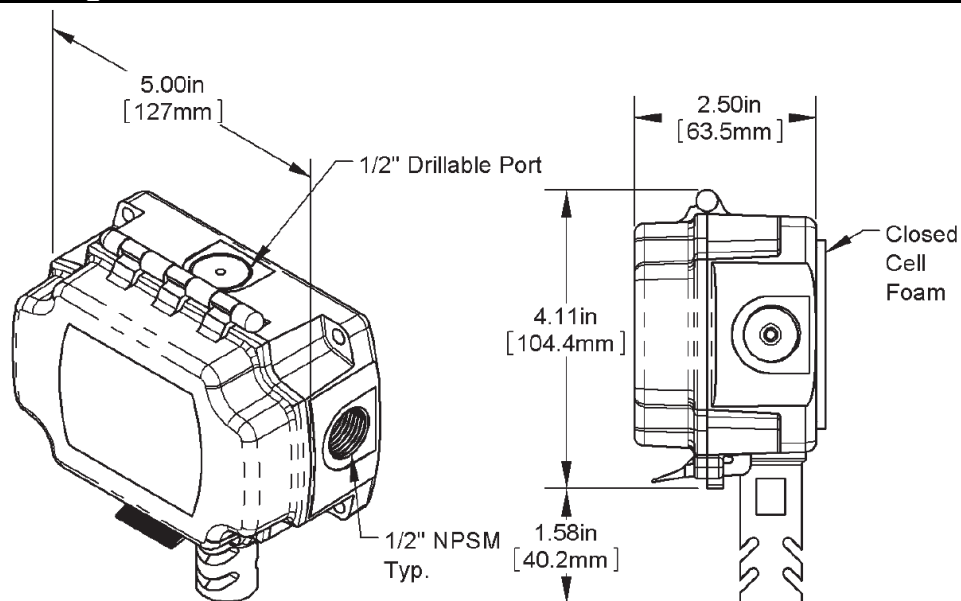
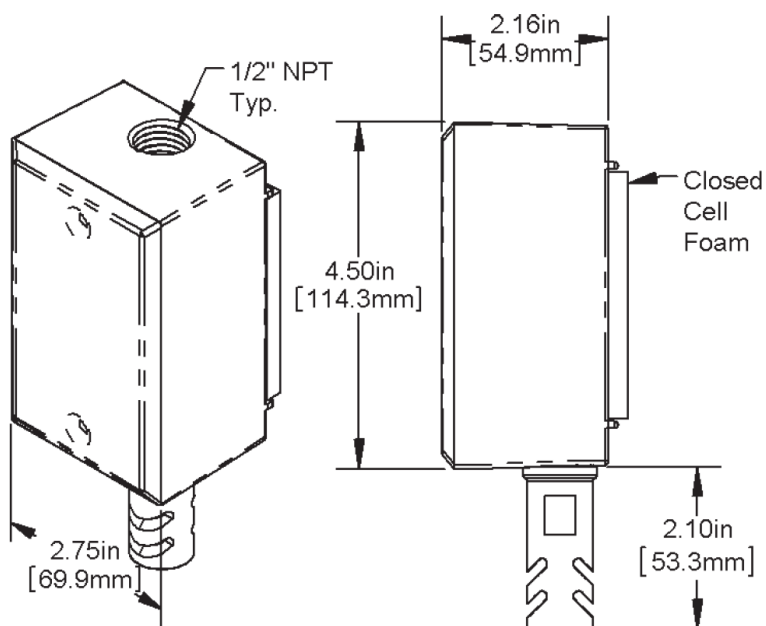
PT = DIN43760, IEC Pub 751-1983, JIS C1604-1989

*Passive Thermistors 20KΩ and smaller are CE Compliant

Specifications subject to change without notice.

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Dimensional Drawing*Figure 1: BBox Enclosure (BB)**Figure 2: Weatherproof Enclosure (WP)*

Mounting

Outside Air (OSA) sensor placement is critical to good performance. The OSA sensor must be mounted in the shade away from building windows, doors or vents. They should never be in direct sunlight or you will have higher than expected temperature readings by as much as +30%. The ideal shaded location in the Northern hemisphere is on the North side of the building. In the Southern hemisphere the South side of the building is ideal.

The sensor shield and probe should always point down and mounted between four feet above the ground/roof and one foot minimum below the eave. (Note: Four feet keeps the sensor above the ground or roof top radiation and one foot under the eave prevents measurement of trapped heat from under the eave.)

1. Drill the mounting holes and mount as shown in the figs 3 and 4.
2. Snug up the mounting screws to ensure that the foam backing compresses to about 50% of its thickness to make a gasket type seal against the wall surface.
3. Route the wires into the box and terminate with sealant filled connectors to prevent water from attacking the connection, thereby preventing costly callbacks.

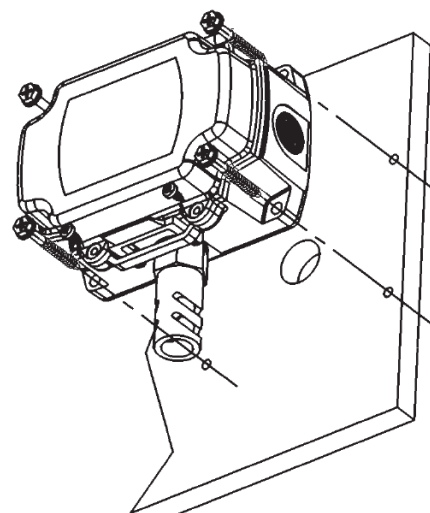


Figure 3: BBox Enclosure - Mounting



Tip

Caulk the wiring hole after the wiring is installed. Close the cover of the enclosures and secure with provided cover security screws.

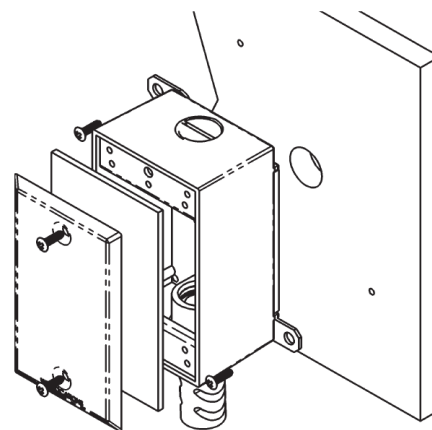


Figure 4: Weatherproof Enclosure - Mounting

Wiring and Termination



Caution

- 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.



Tip

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

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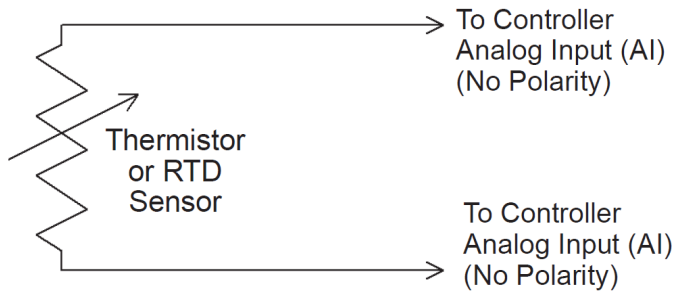


Figure 5: 2 Wire Termination for Thermistor or RTD

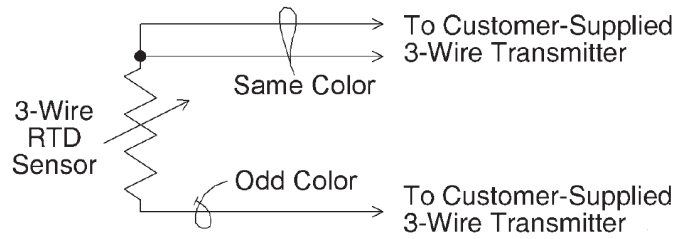


Figure 6: 3 Wire Termination for RTD

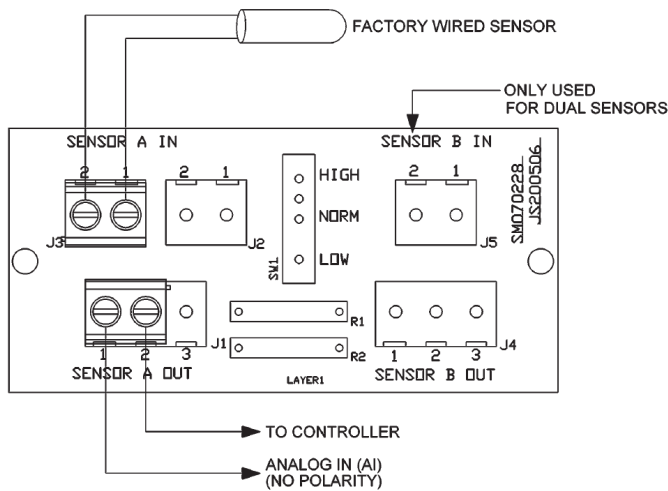


Figure 7: Terminal Strip (-TS) Option for 2 Wire Sensors Termination

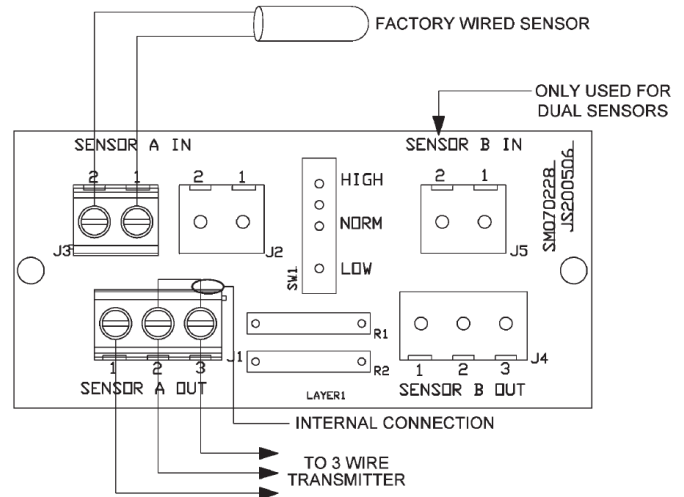


Figure 8: Terminal Strip (-TS) Option for 3 Wire Sensors Termination

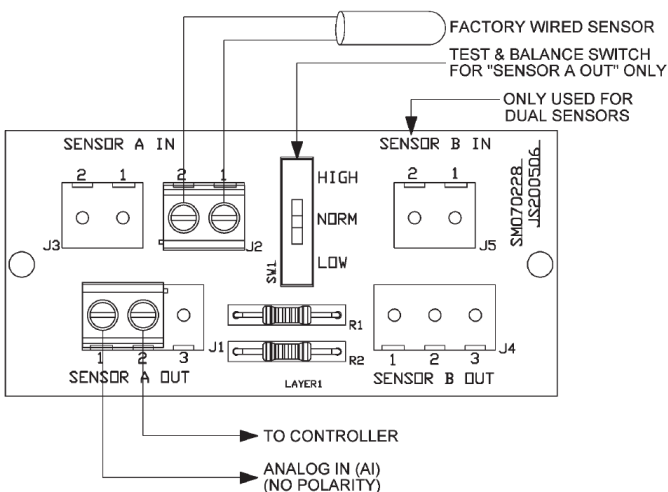


Figure 9: Test & Balance (-TB) Option for 2 Wire Sensors Termination

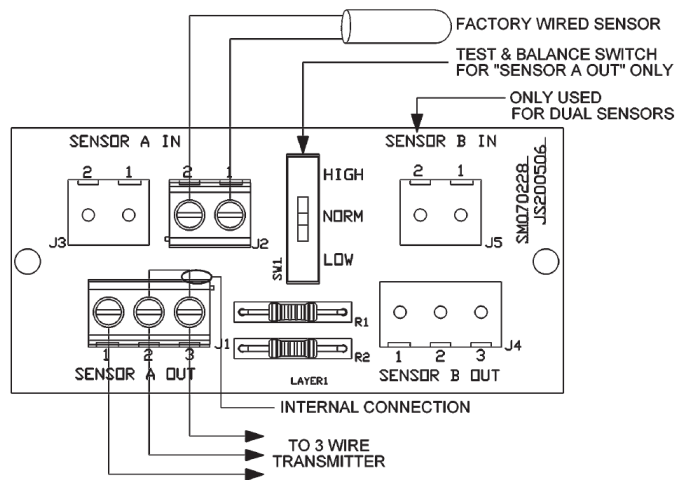


Figure 10: Test & Balance (-TB) Option for 3 Wire Sensors Termination

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.