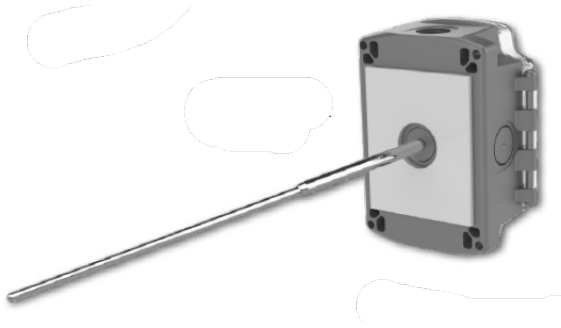
## Identification and Overview

- 304 Stainless Steel Probes: 12” and18” lengths
- Very Thin Probe to Fit Between Coil Fins
- Five Enclosure Styles



Submersible Duct Units feature closed cell foam to seal the probe insertion hole and absorb vibration and mounting tabs for easy installation. All units have etched Teflon lead wires and encapsulated sensors to create a watertight package that can perform under real world conditions.

Submersible Duct Units come standard with a BBox enclosure.

The Submersible Duct Unit is for duct mounting and temperature measurement of air across cooling coils or wet locations. The Stainless Steel probe tip is very small (1/8”) to fit between coil fins and made in different lengths for a custom duct fit.

The unit is available in multiple thermistor or RTD types 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-SD-12-BB-A**

**N1-10K-2-SD-18-BB-A**

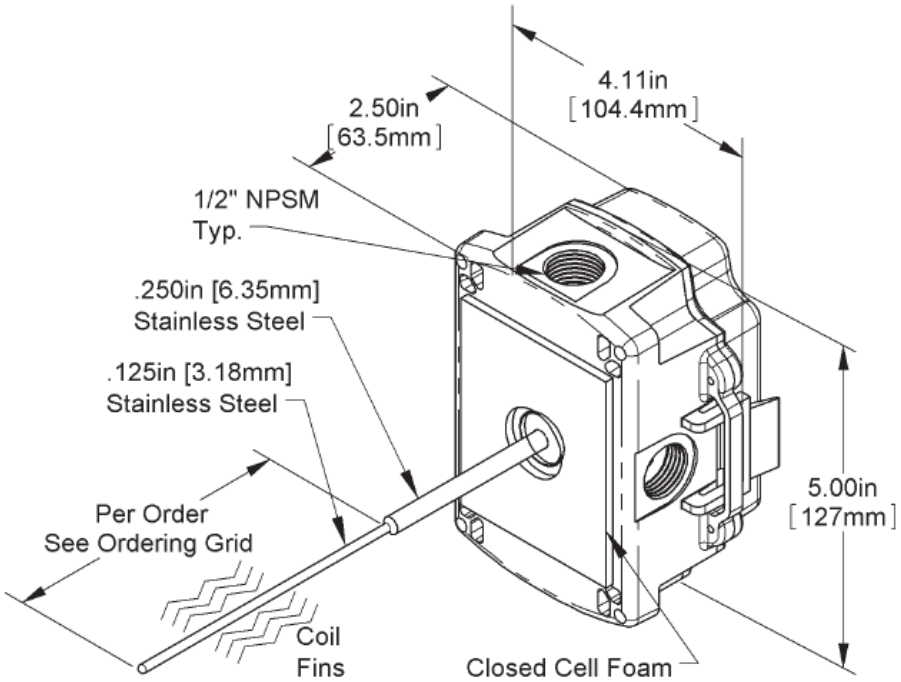
## Specifications

**Sensor:** Passive
Thermistor.....2 wire
RTD .....2 or 3 wire
**Thermistor:** Thermal resistor (NTC) Temp.
Output.....Resistance Per Order1
Accuracy .....(std) ±0.36ºF, (±0.2ºC)
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 Temp Device (PTC)
Platinum (Pt).....100Ω and 1KΩ @0ºC, 385 curve
Platinum (Pt).....1KΩ @0ºC, 375 curve
Pt Accuracy (Std).... 0.12% @Ref, or ±0.55ºF, (±0.3ºC)
Pt Accuracy (Hi) ....0.06% @Ref, or
±0.277ºF,(±0.15ºC), **[A]**option
Pt Stability .....±0.25ºF, (±0.14ºC)
Pt Self Heating.....0.4ºC/mW @0ºC
Pt Probe range .....-40 to 221ºF, (-40 to 105ºC)
Nickel (Ni).....1KΩ @70ºF, JCI curve
Ni Probe range .....-40 to 221ºF (-40 to 105ºC)

**Sensitivity:** Approximate @ 32ºF (0ºC)
Thermistor..... Non-linier RTD (Pt)
3.85Ω/ºC for 1KΩ RTD
0.385Ω/ºC for 100Ω RTD
Nickel (Ni)..... 2.95Ω/ºF for the JCI RTD
**Lead Wire:** 22awg stranded
**Insulation:** Etched Teflon, Plenum rated
**Probe:** Stainless Steel, Sheath 0.25” OD, Probe 0.125
**Probe Length**: 12” to 18” per order

**Enclosure Types**
BBox.....**BB,** w/ four ½” NPSM & one ½” drill-out
**Enclosure Ratings**
BBox.....**BB,** NEMA 4X, IP66
**Enclosure Materials**
BBox.....**BB**, Polycarbonate, UL94V-0, UV rated
**Ambient (Encl.):** 0 to 100% RH, Non-condensing
All BBoxes .....**BB,** -40 to 185ºF, (-40 to 85ºC)
**Agency**
RoHS, *CE
PT= DIN43760, IEC Pub 751-1983, JIS C1604-1989
*Passive Thermistors 20KΩ and smaller are CE compliant

## Dimensional Drawing



## Submersible Duct Sensor Option Selection

N1- ( **#1** ) - ( **#2** ) - ( **#3** ) - ( **#4** ) - A

**#1: Temperature Sensor** (required)

| | |
|---|---|
| 1.8K | 1.8K Thermistor |
| 3K | 3K Thermistor |
| 10K-2 | 10K-2 Thermistor |
| 10K-3 | 10K-3 Thermistor |
| 10K-3[11K] | 10K-3[11K] Thermistor |
| 20K | 20K Thermistor |
| 1K[375] | 1K Platinum RTD (375 curve) |
| 1K[NI] | 1K Ω Nickel RTD |
| 1K | 1K Platinum RTD (385 curve) |
| T1K[32 TO 212F] | 1K Plat. RTD Transmitter, 4 to 20 mA Output, 32 to 212°F Range |
| T1K[20 TO 120F] | 1K Plat. RTD Transmitter, 4 to 20 mA Output, 20 to 120°F Range |
| T1K[0 TO 100F] | 1K Plat. RTD Transmitter, 4 to 20 mA Output, 0 to 100°F Range |
| T1K[0 TO 100C] | 1K Plat. RTD Transmitter, 4 to 20 mA Output, 0 to 100°C Range |
| T1K[-7 TO 49C] | 1K Plat. RTD Transmitter, 4 to 20 mA Output, -7 to 49°C Range |
| T1K[-18 TO 38C] | 1K Plat. RTD Transmitter, 4 to 20 mA Output, -18 to 38°C Range |

**#2: Probe Type and Length** (required)

| | |
|---|---|
| SD-12” | Submersible Duct, 12” (0.3m) length |
| SD-18” | Submersible Duct, 18” (0.46m) length |

**#3: Enclosure and Lead Length**

| | |
|---|---|
| BB | BBox (1P66, NEMA 4) |

**#4: Test & Balance or Terminal Strip** (optional, requires a BBox Crossover, BBox or BBox2)

| | |
|---|---|
| TB | Test & Balance Switch |
| TS | Terminal Strip Connection (The $7 does not apply to T1K transmitter units) |

## Mounting

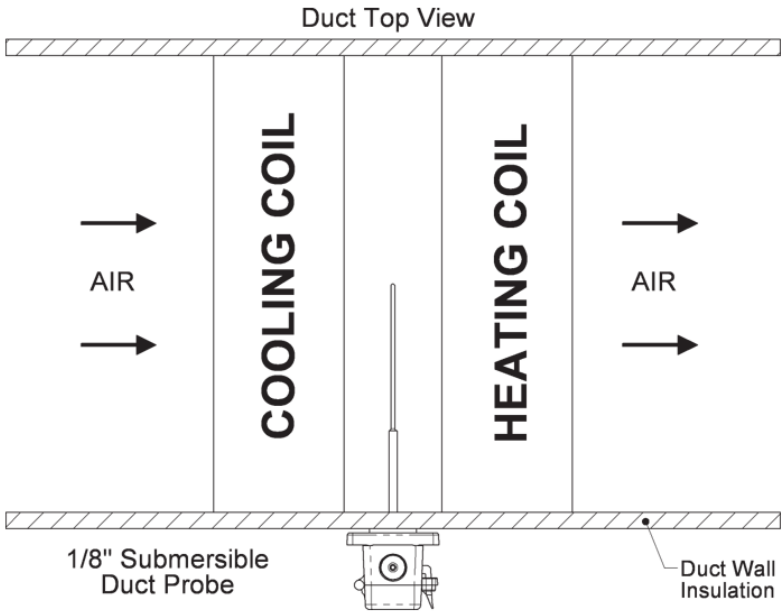



*Figure 1: Cooling Coil Discharge Air Temperature Application*

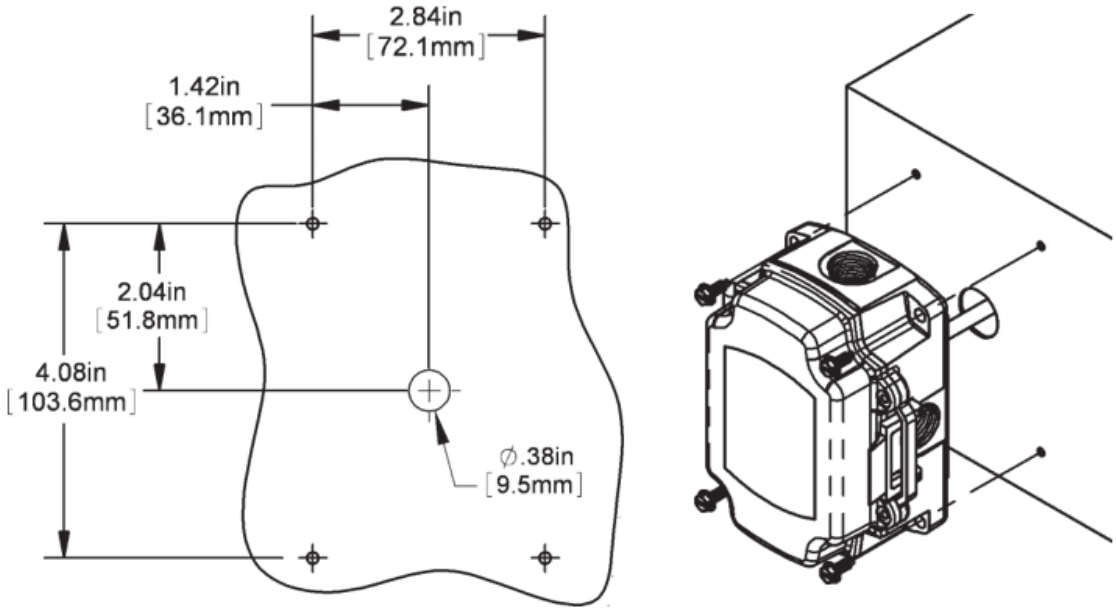



*Figure 2: Enclosure Mounting Holes, Rotate 90° for Horizontal Mounting*

## Wiring and Termination

All wiring must comply with the National Electric Code (NEC) and local codes.

| | |
|---|---|
| **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. |

| | |
|---|---|
| **Tip** | We 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. |

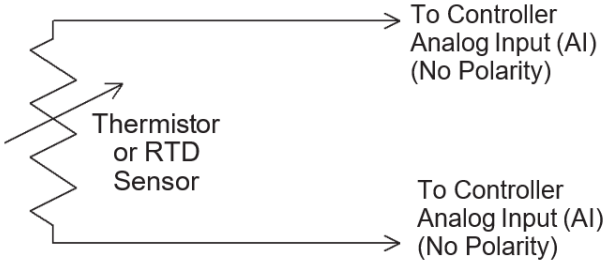



*Figure 3: 2 Wire Termination for Thermistor or RTD*

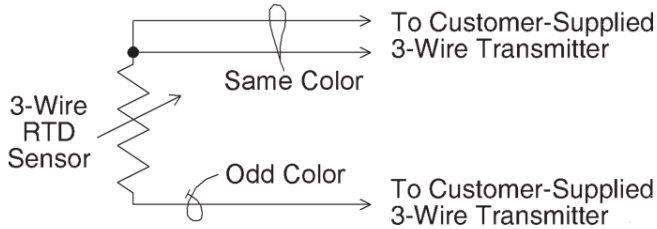



*Figure 4: 3 Wire Termination for RTD*

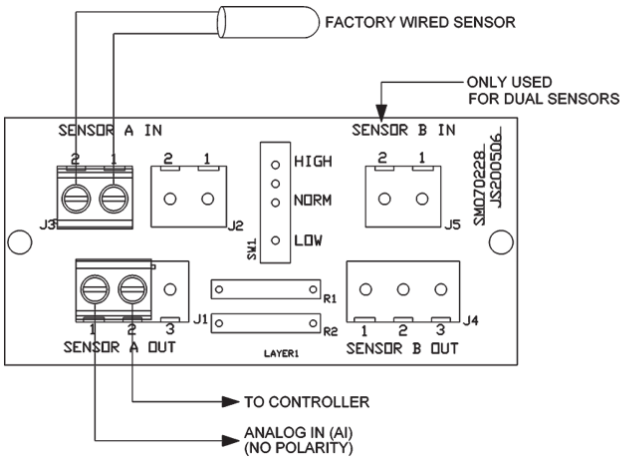



*Figure 5: Terminal Strip (-TS) Option for 2 Wire Sensors Termination*

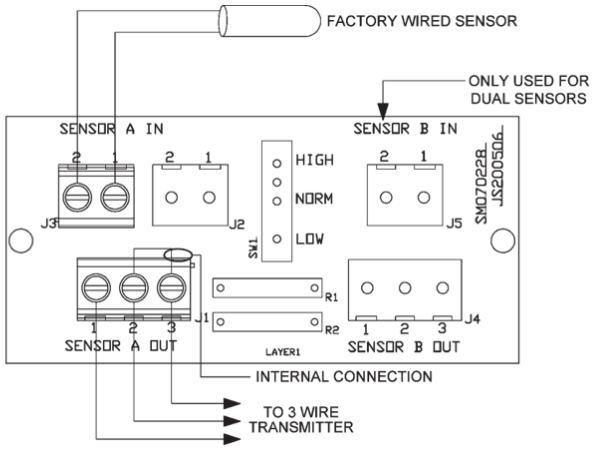



*Figure 6: Terminal Strip (-TS) Option for 3 Wire Sensors Termination*

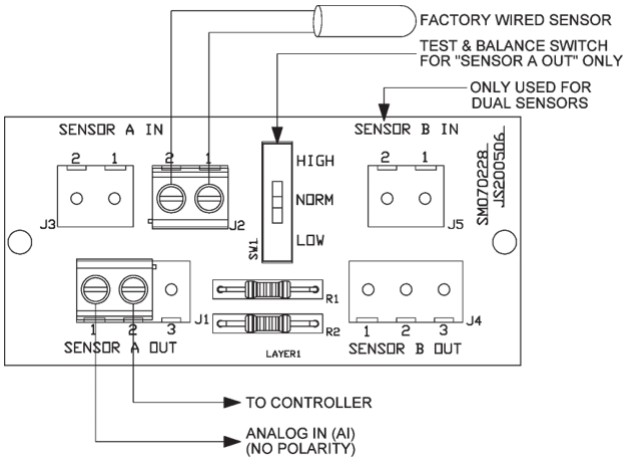



*Figure 7: Test & Balance (-TB) Option for 2 Wire Sensors Termination*

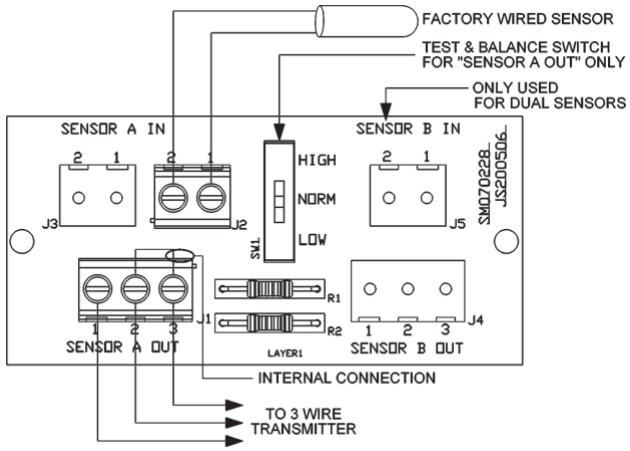



*Figure 8: Test & Balance (-TB) Option for 3 Wire Sensors Termination*

## Diagnostics

| Possible Problems: | Possible Solutions: |
|---|---|
| Controller reports higher or lower than actual temperature | Confirm the input is set up correctly in the front end software<br>Check wiring for proper termination & continuity. (shorted or open)<br>Measure the temperature at the temperature sensor's location using an accurate temperature standard. Disconnect the temperature sensor wires and measure the temperature sensor's resistance with an ohmmeter. If the measured resistance is different from the temperature table by more than 5%, call technical support. |

## 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. |