Identification and Overview

Remote Probe and Remote Temperature Sensor Transmitters

- The Remote Sensor (N1-PP) is a small temperature conductive plastic sensor used for single point temperature measurement with twin plenum rated lead wires. It is ideal for mounting applications inside electronic circuit enclosures or existing thermostats.
- The Remote Probe with Plenum-Rated Cable (N1-RPP) is a small Stainless Steel temperature sensor used for single point temperature measurement with PVC plenum rated cable. It is ideal for bracket mounting for Chamber, Duct, Thermowell or L-bracket applications.
- The Remote Probe with FEP-Jacketed Cable (N1-RPFEP) is a small Stainless Steel temperature sensor used for single point temperature measurement with FEP plenum cable. It is ideal for bracket mounting in harsh environments for Chamber, Duct, Thermowell or L-bracket applications.
- The Remote Probe with FEP-Jacketed Cable for submersion (N1-RPFEP2) is a small Stainless Steel temperature sensor used for single point temperature measurement with submersion FEP plenum cable. It is ideal for bracket mounting in wet or water submersion environments for Chamber, Duct, Immersion or L-bracket applications.

The Remote Probe Temperature Transmitter can be ordered with a 1KΩ (385) RTD that has a field adjustable 1 to 5, 0 to 5, 2 to 10, 0 to 10VDC or 4 to 20 mA output over a selected temperature range. These adjustable outputs can be set at the factory to order or default set to 4 to 20mA.

Part #s: N1-T1K20-120F-RPFEP2-25-BB2-A

Specifications

Transmitter Circuit

Power Required: ..... 12 to 40VDC
Transmitter Output: ..... 4 to 20mA, 0 to 5, 1 to 5, 0 to 10 or 2 to 10VDC, 850Ω@24VDC
Output Wiring: ..... 2 wire loop
Output Limits: ..... <1mA (short), <22.35mA (open)
Span: ..... Min 30ºF (17ºC), Max 1000ºF, (555ºC)
Zero: ..... Min -148°F (-100°C), Max 900ºF (482ºC)
System Accuracy: ..... ±0.065% of span
Linearity: ..... ±(0.125 * T-20ºC)/100
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: ..... -40 to 221ºF, (-40 to 105ºC)
Wire Colors: ..... General color code (other colors possible)
1KΩ, Class B ..... Orange/Orange (no polarity)
1KΩ, Class A ..... Orange/White (no polarity)

RTD Sensitivity: 3.85Ω/ºC, Approximate @ 32ºF (0ºC)
Probe: ..... Rigid, 304 Stainless Steel, 0.25" OD
Probe Length: ..... 1.75" (44.5mm)
Lead Wire: ..... 22awg stranded
Wire Insulation ..... FEP jacketed, plenum and submersion rated
Wall Gasket: ..... Closed cell foam (impervious to mold)
Enclosure:
BBox2 ..... **-BB2,** w/ three ½" NPSM & three ½" drill-outs
Enclosure Ratings:
BBox2 ..... **-BB2,** NEMA 4, IP66, UV Rated
Enclosure Material:
BBox2 ..... **-BB2,** UV-Rated Polycarb., UL94V-0
Ambient (Enclosure): 0 to 100% RH, Non-condensing
BBoxes ..... **-BB2,** -40ºF to 185ºF, (-40º to 85ºC)
Agency
RoHS / PT=DIN43760, IEC Pub 751-198 / JIS C1604-1989

Dimensional Drawing

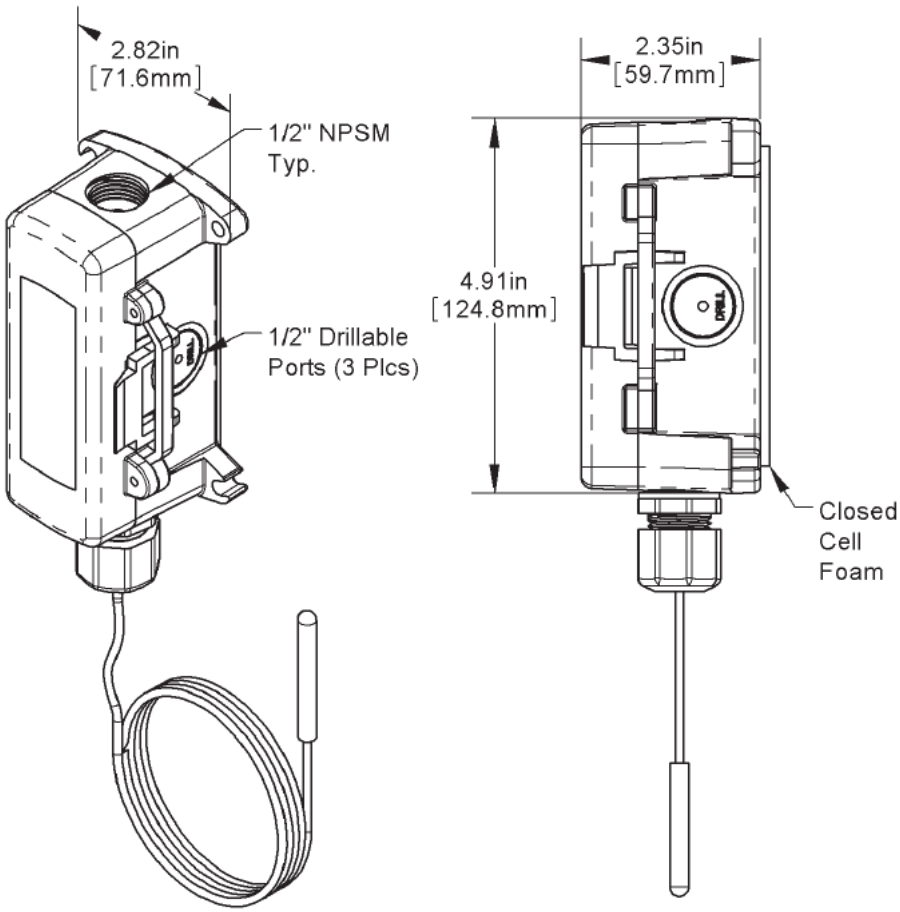
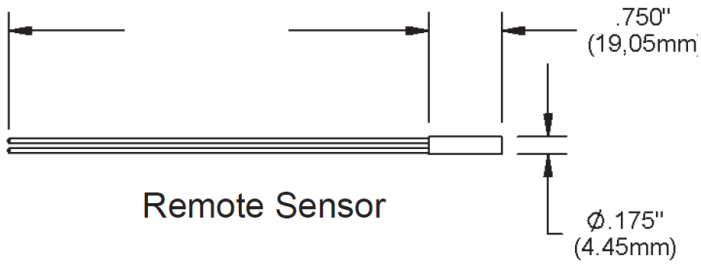
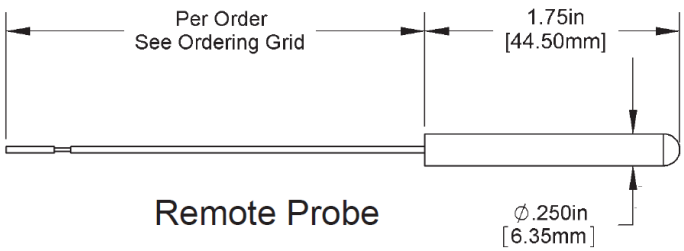


Figure 1: BBox (BB2) Enclosure





Mounting

Mounting Remote Probes to Pipes

Follow the steps below when mounting the remote probe to a pipe.

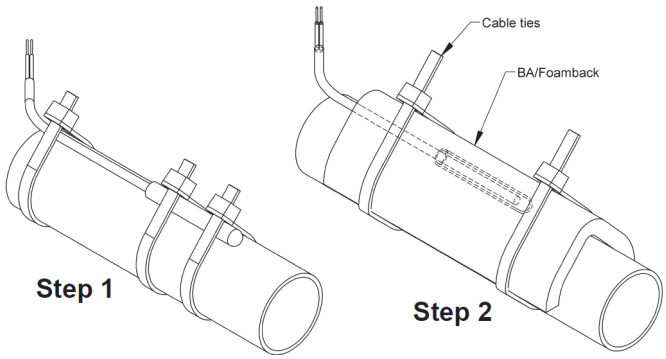
Step 1: Secure sensor to have good contact with bare pipe.

Step 2: Insulate over the sensor (see notes below)

Note: Insulation should be installed a minimum of 4 pipe diameters on each side of the sensor.

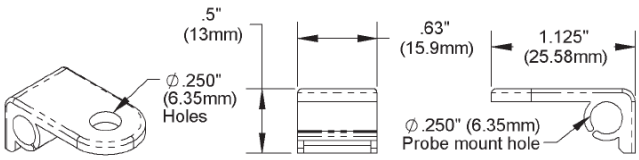
Example: ½" pipe x 4 = 2".

Insulation should be 2" on each side of the sensor wrapped all the way around the pipe.

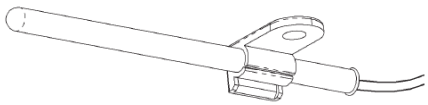


Flexible Probe Bracket

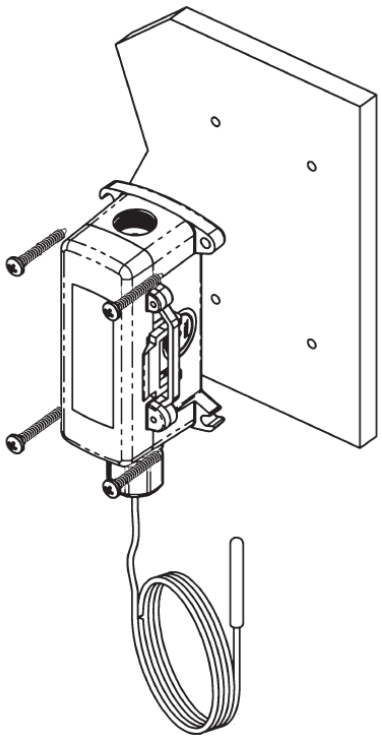
The Flexible Probe Bracket (NSB-PB-50-A) is used to mount averaging sensors. It includes a scored break off for mounting ¼" remote bullet probes.



Flexible Probe Bracket Break-Off Tab Dimensions and Mounting of Remote Probe



Enclosure Mounting



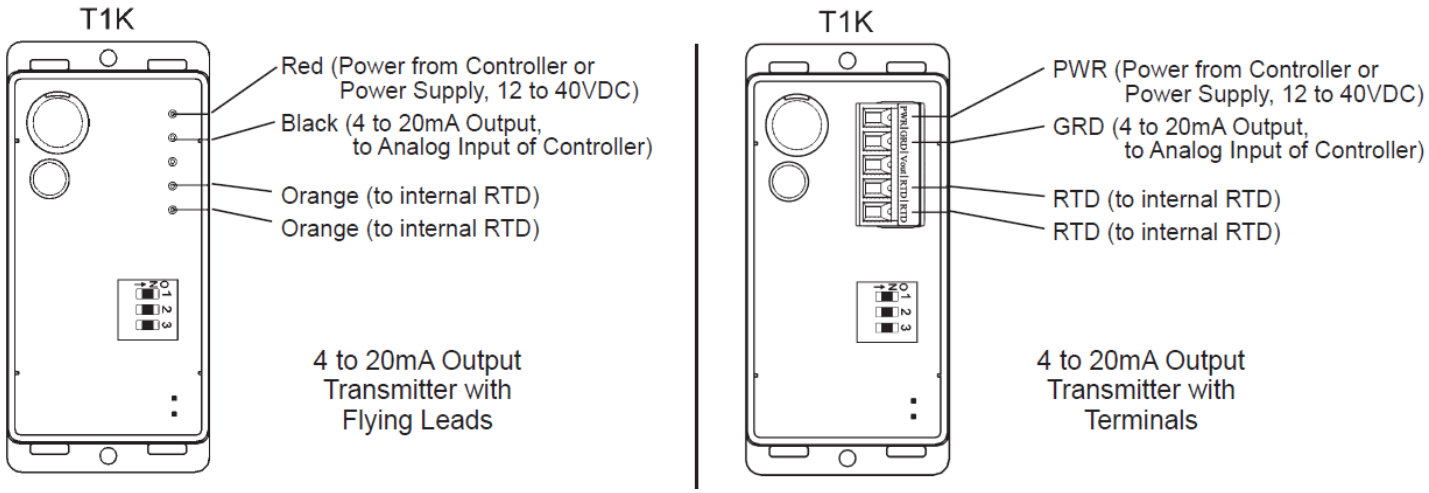
Termination

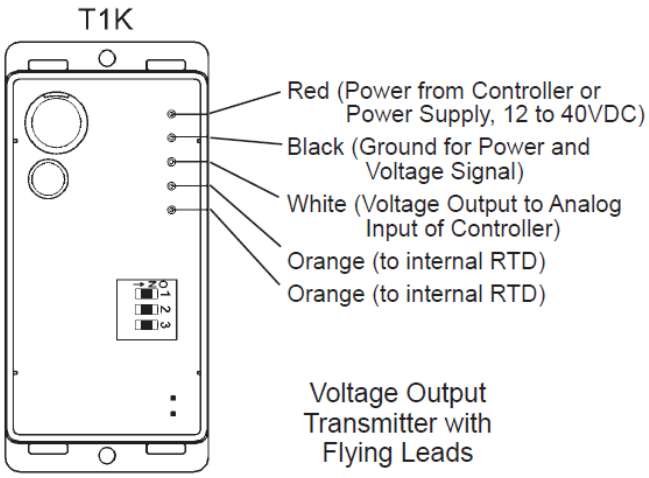
Warning	Wire the product with power disconnected. Proper supply voltage, polarity, and wiring connections are important to a successful installation. Not observing these recommendations may damage the product and will void the warranty.

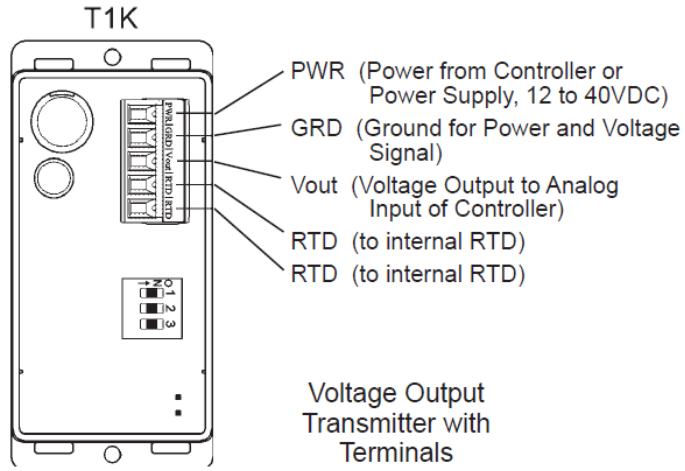
Caution	• Do NOT run this device's wiring in the same conduit as AC power wiring of NEC class1 or NEC class 2, NEC class 3 or with wiring used to supply highly inductive loads such as motors, contactors and relays. T ests show that fluctuating and inaccurate signal levels are possible when AC power wiring is present in the same conduit as the signal lines. • 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. • Keep transmitter at least 5 feet from any radio wave-emitting device (i.e.: 2 way radio). Transmitters that are less than 5 feet from a radio wave-emitting device can cause unwanted interference.

Typical Configurations

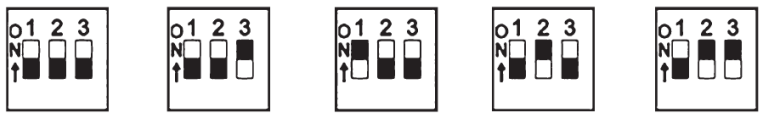






DIP Switch Settings for Field-Selectable Output

The transmitter circuit board has a three-position DIP switch that controls the temperature output value. This switch is set at the factory at the time of the order. The settings of the switch are shown below in case you want to change them in the field. Be aware that the power requirements for the unit change depending on the temperature output value. See the specifications section for power requirements.



Diagnostics

Possible Problems:	Possible Solutions:
Unit will not operate.	• Measure the power supply voltage by placing a voltmeter across the transmitter's (+) and (-) terminal. Make sure that it matches the drawings above and power requirements in the specifications. • Check if the RTD wires are physically open or shorted together and are terminated to the transmitter.
The reading is incorrect in the controller	• Determine if the input is set up correctly in the controllers and BAS software. • For a 4 to 20mA current transmitter 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 below. • For a voltage transmitter, measure the signal with a volt meter (Orange or Orange/ Black to Black). The signal should read according to the "Voltage Temperature Equation" shown below.

Voltage Temperature Equation

$$T = T_{Low} + \frac{(V \times T_{Span})}{V_{Span}}$$

T	= Temperature at sensor
T_{Low}	= Low temperature of span
T_{High}	= High temperature of span
T_{Span}	= T_{High} - T_{Low}
V_{Low}	= Low transmitter voltage usually=(0, 1 or 2v)
V_{High}	= High transmitter voltage usually=(5 or 10v)
V_{Span}	= V_{High} - V_{Low}
V	= Signal reading in volts

4 to 20mA Temperature Equation

$$T = T_{Low} + \frac{(A - 4) \times (T_{Span})}{16}$$

T	= Temperature at sensor
T_{Low}	= Low temperature of span
T_{High}	= High temperature of span
T_{Span}	= T_{High} - T_{Low}
A	= Signal reading in mA

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.