Identification and Overview

Duct Temperature Transmitters come with a 1KΩ (385) RTD sensor element with a field adjustable output of 4 to 20 mA or 1 to 5, 0 to 5, 2 to 10, 0 to 10 VDC over a selected temperature range. This transmitter can also be ordered in a variety of probe lengths and mounting enclosures as shown in the figures at right. These transmitters are available with a wired connection via flying leads or a pluggable terminal block (-TS). Special high accuracy RTD matched transmitters (M) are available which match the sensor to the transmitter for improved accuracy.

Part #s:

N1-T1K[20 TO 120F]-D-12-BB2-A
N1-T1K[20 TO 120F]-D-8-BB2-A
N1-T1K[-30 TO 130F]-D-4-BB2-A
N1-T1K[20 TO 120F]-D-4-BB2-A
N1-T1K[-30 TO 130F]-D-12-BB2-A
N1-T1K[-30 TO 130F]-D-8-BB2-A

Specifications

Transmitter Circuit

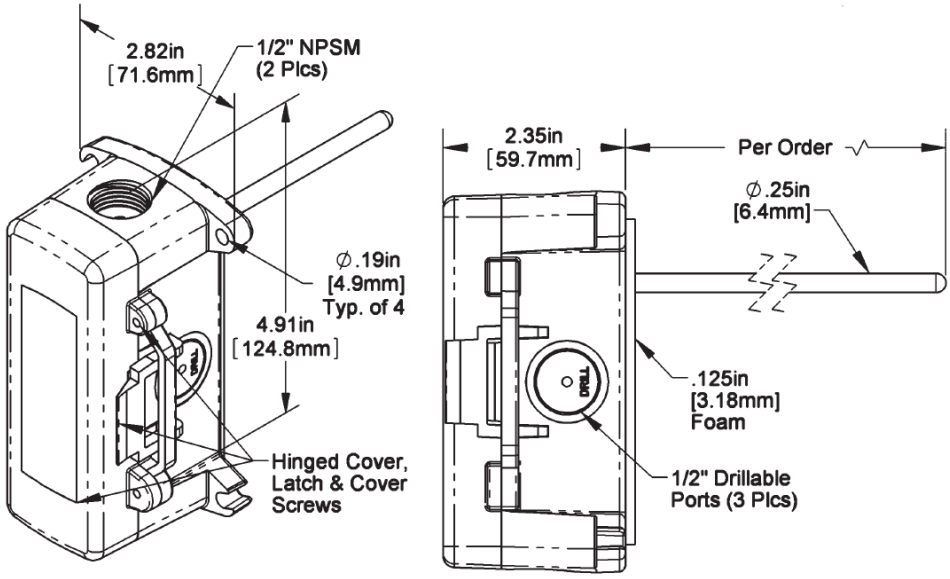
Power Required..... 12 to 40VDC
Transmitter Output:. 4 to 20mA, 0 to 5, 1 to 5, 0 to 10 or 2 to 10VDC, 850Ω@24VDC
Output Wiring..... 2 wire loop
Output Limits..... <1mA (short), <22.35mA (open)
Span ..... Min. 30ºF (17ºC), Max 1000ºF, (555ºC)
Zero ..... Min. -148°F (-100°C), Max 900ºF (482ºC)
System 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)

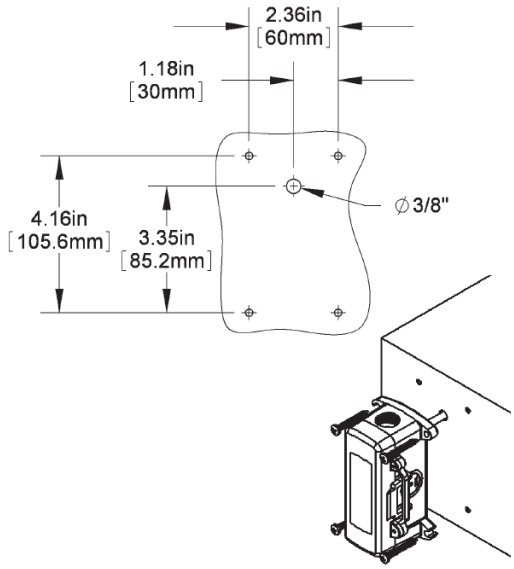
RTD Sensitivity: 3.85Ω/ºC, Approximate @ 32ºF (0ºC)
Lead Wire: 22awg stranded
Insulation: Etched Teflon, Plenum rated
Probe: 304 Stainless steel, 0.25" OD
Probe Length: 2", 4", 8", 12" or 18" or per order
Duct Gasket: 1/4" Closed cell foam (impervious to mold)
Enclosure Types:
BBox:.....BB, w/ four ½" NPSM & one ½" drill-out
Enclosure Ratings:
BBox.....BB, IP66, UV Rated
Enclosure Material:
BBox.....BB, Polycarb., UL94V-0, UV rated
Ambient (Encl.) ..0 to 100% RH, Non-condensing
BBox.....BB, -40ºF to 185ºF, (-40º to 85ºC)
Agency
RoHS / PT=DIN43760, IEC Pub 751-1983 / JIS C1604-1989

Dimensional Drawing



Mounting

1. Place the sensor in the middle of the duct away from temperature stratified air, coils or humidifiers to achieve the best temperature reading.
2. Drill the probe hole as depicted on this page for the enclosure being used. Insert the probe into the duct.
3. Mount the enclosure to the duct using #8 screws through a minimum of two opposing mounting tabs. A 1/8 inch pilot screw hole in the duct makes mounting easier through the mounting tabs. Use the enclosure tabs to mark the pilot hole locations.
4. Snug up the sensors so that the foam backing is depressed to prevent air leakage but do not over-tighten or strip the screw threads.



NOTES

- Do not drill into the water tight enclosures which will violate the NEMA and/or IP rating.
- Use caulk or Teflon tape for your conduit entries to maintain the appropriate NEMA or IP rating for your application.
- Conduit entry for outdoor or wet applications should be from the bottom of the enclosure.

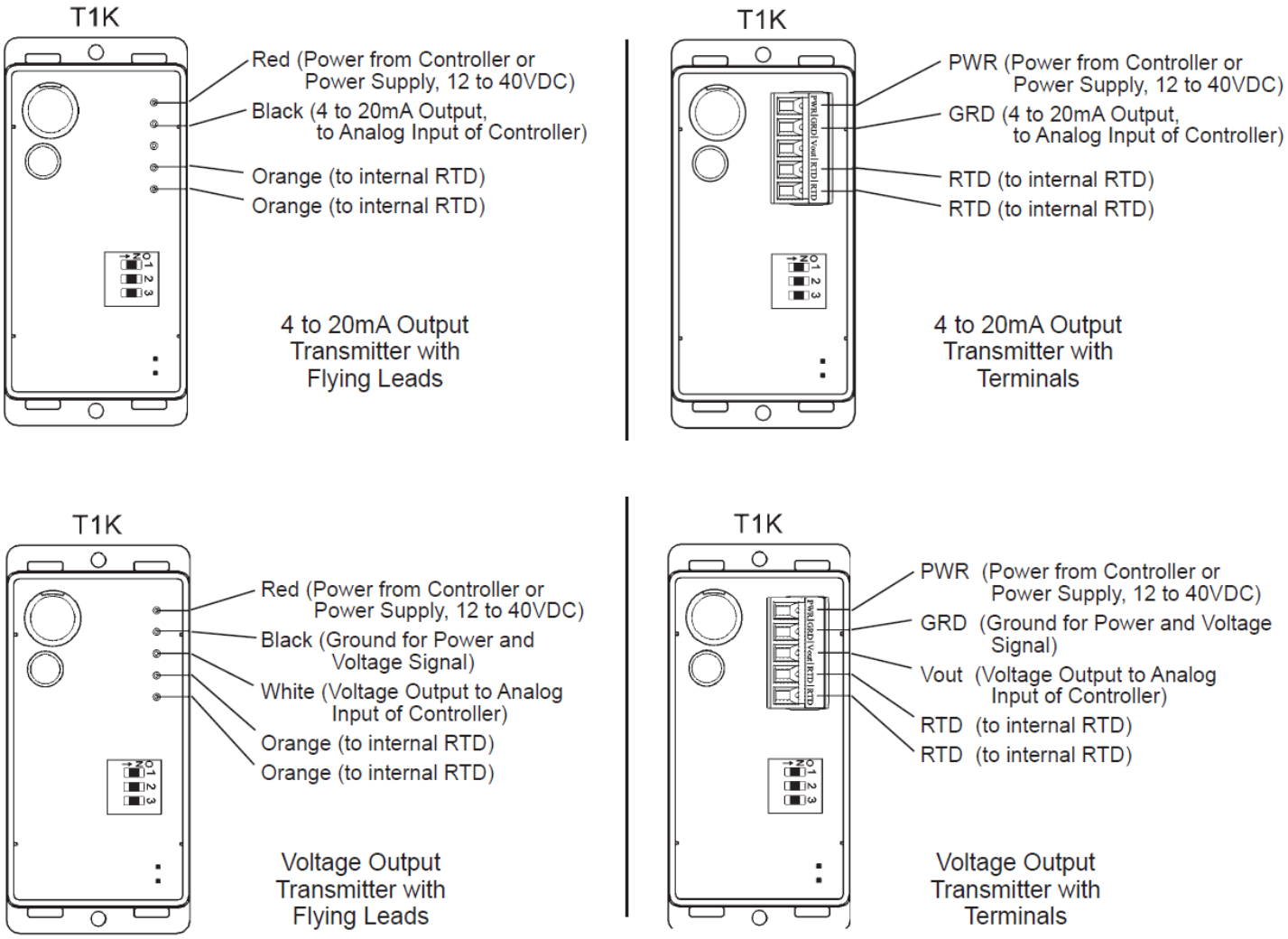
Termination

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.

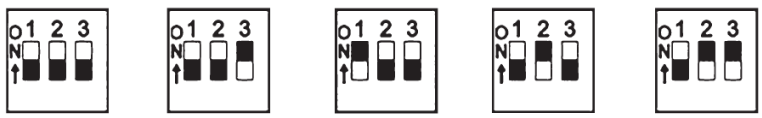
Tip	• We recommend using twisted pair of at least 22AWG and sealant filled connectors for all wire connections. Larger gauge wire may be required for long runs. • Keep transmitter at least 5 feet from any radio wave-emitting device (i.e.: 2 way radio). Transmitters that are less than 5 feet from a radio 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.