Averaging Duct Temperature Sensors

Installation and Operation

#20903 – 2/15/18

Overview

The Averaging Sensor is for duct mounting and temperature measurement of stratified air across the duct to give the average temperature along the length of the sensor. The flexible probe is made of aluminum and made in different lengths for a custom duct fit. Enclosure mounting styles come in plastic or metal for both NEMA 1 and NEMA 4 applications and are all plenum rated.

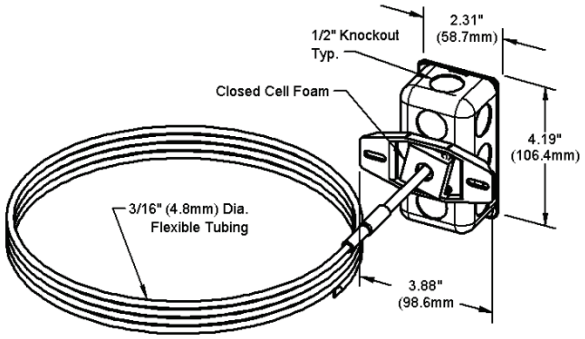

Figure1: Duct Unit with J-Box (Standard)
Part #s NSB-10K-2-A-8 (8' probe)
NSB-10K-2-A-12 (12' probe)
NSB-10K-2-A-24 (24' probe)

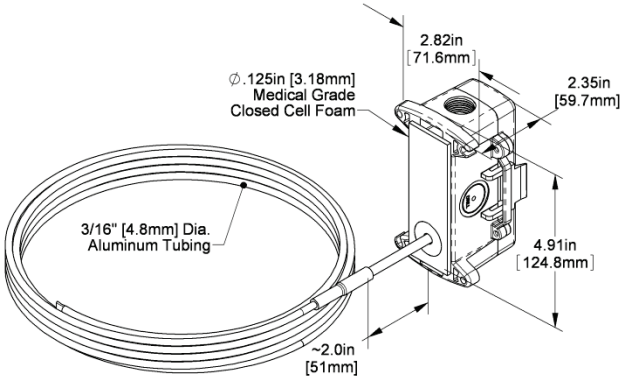

Figure 2: BB2 Enclosure Duct Unit
Part #s NSB-10K-2-A-8-BB2 (8' probe)
NSB-10K-2-A-12-BB2 (12' probe)
NSB-10K-2-A-24-BB2 (24' probe)

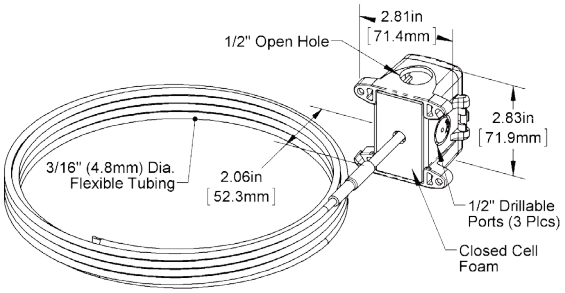

Figure 3: BB4 Enclosure Duct Unit
Part #s NSB-10K-2-A-8-BB4 (8' probe)
NSB-10K-2-A-12-BB4 (12' probe)
NSB-10K-2-A-24-BB4 (24' probe)
A Pierceable Knockout Plug (Part # NSB-PKP-100) is available for the open port in the BB4.

Specifications

Sensor	Passive
Thermistor	4 sensors in < 24' probes 9 sensors in ≥24' probes
Thermistor	Thermal resistor (NTC)
Temp. output	Resistance, 10k Type 2
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)
Lead Wire	22AWG stranded, Etched Teflon, Plenum rated
Probe	Flexible Aluminum tube, 0.19" OD
Probe Length	8', 12', 24' per order
Duct Gasket	1/4" Closed cell foam (impervious to mold)
Mounting	Extension tabs (ears), 3/16" holes

Enclosure Types	
J-Box	With eight ½" knockouts
BB2 Box	With three ½" NPSM and three 1/2"
drillouts BB4 Box	With three ½" drill-outs, one ½" open port
Enclosure Ratings	
J-Box	NEMA 1
BB2 Box	NEMA 4X, IP66
BB4 Box	IP10 (IP44 with Knockout Plug installed)
Enclosure Materials	
J-Box	Galvanized steel, UL94H-B
BB2 Box	Polycarbonate, UL94V-0, UV rated
BB4 Box	Polycarbonate and Nylon, UL94V-0
Ambient (Enclosure)	0 to 100% RH, Non-condensing
J-Box	-40ºF to 212ºF, (-40º to 100ºC)
BB2, BB4	-40ºF to 185ºF, (-40º to 85ºC)
Agency	RoHS, CE

Specifications subject to change without notice.

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Mounting

1. Place the sensor in the middle or top of the duct as shown in Figure 4 or Figure 5 so the flexible probe can enter the duct in a convenient place. Drill the probe and mounting holes as depicted for the enclosure being used.

2. Insert the probe by unrolling the sensor into the duct carefully to avoid kinking the sensor. Serpentine the duct with the sensor at least twice across the stratified air in the duct to achieve the best average temperature reading. At the sensor reversing points a turning bracket can be used to support the sensor and to avoid kinking the sensor.

3. Mount the enclosure to the duct using #8 screws through a minimum of two opposing mounting tabs provided.

4. Snug up the sensors so that the foam backing is depressed to prevent air leakage but do not overtighten or strip the screw threads.

NOTES

- Be sure to 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.

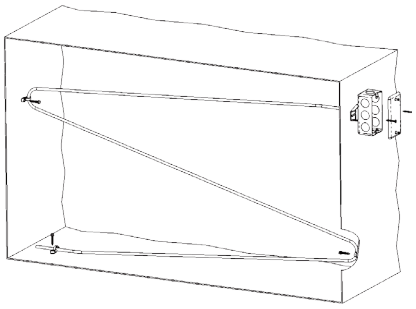


Figure 4: Flexible Sensor Horizontal Mount (Best for Vertical Stratification)

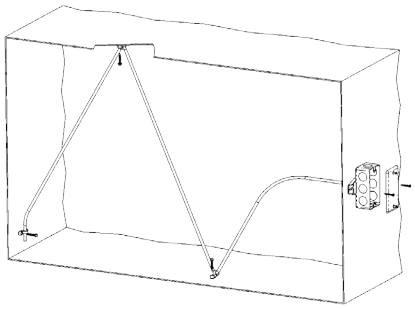


Figure 5: Flexible Sensor Vertical Mount (Best for Horizontal Stratification)

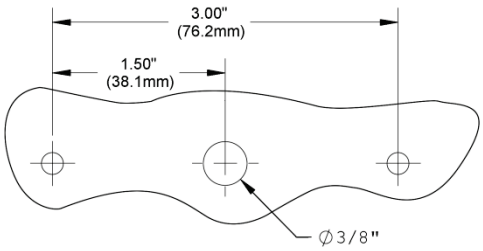


Figure 6: Junction Box Mounting Holes and installation

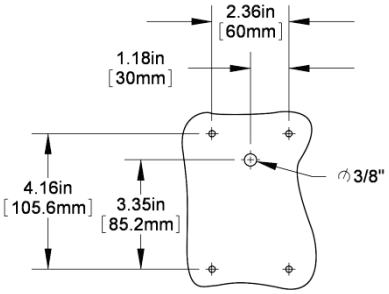


Figure 7: BB2 Enclosure Mounting Holes and installation.

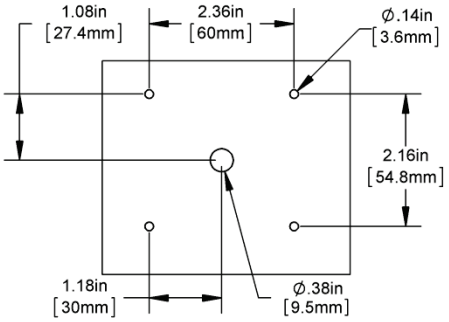
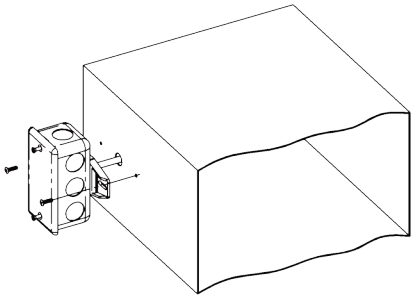
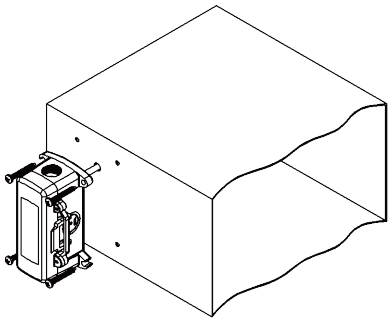
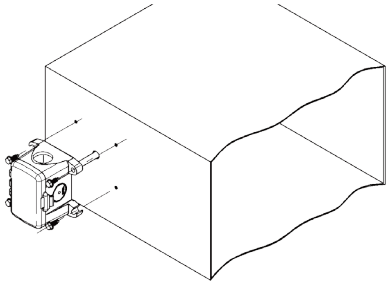


Figure 8: BB4 Enclosure Mounting Holes and Installation







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Wiring and Termination

Carrier recommends using twisted pair of at least 22AWG for all wire connections. Larger gauge wire may be required for long runs. All wiring must comply with the National Electric Code (NEC) and local codes. 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.

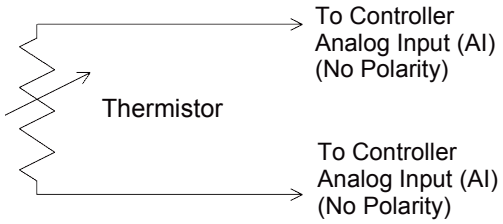

Figure 9: 2 Wire Lead Wire Termination for Thermistor

Diagnostics

Problems:	**Possible Solutions:**
Controller reports higher or lower than actual temperature.	- Confirm the input is set up correctly in the front end software - Check wiring for proper termination and continuity. (shorted or open) - Disconnect wires and measure sensor resistance and verify the "Sensor" output is correct.