Overview

The Duct Temperature Sensor is a passive resistive sensor. It comes in a variety of probe lengths and optional mounting enclosures shown below. The sensors come with standard accuracy.

Figure 1: Duct Unit with no box
Part #s NSB-10K-2-D-4-NB-5 (4" probe, 5' leads)
NSB-10K-2-D-4-NB-10 (4" probe, 10' leads)
NSB-10K-2-D-4-NB-15 (4" probe, 15' leads)
NSB-10K-2-D-8-NB-10 (8" probe, 10' leads)

Figure 2: Duct Unit with BB4 Enclosure
Part #s NSB-10K-2-D-4-BB4 (4" probe)
NSB-10K-2-D-8-BB4 (8" probe)
A Pierceable Knockout Plug (Part # NSB-PKP-100) is available for the open port in the BB4.

Figure 3: Duct Unit with BB2 Enclosure
Part #s NSB-10K-2-D-4-BB2 (4" probe)
NSB-10K-2-D-8-BB2 (8" probe)
NSB-10K-2-D-12-BB2 (12" probe)

Figure 4: Duct Unit with standard J-Box
Part #s NSB-10K-2-D-4 (4" probe)
NSB-10K-2-D-8 (8" probe)
NSB-10K-2-D-12 (12" probe)

Specifications subject to change without notice.
# Duct Temperature Sensors

## Installation and Operation

## Specifications

<table>
<thead>
<tr>
<th><strong>Sensor</strong></th>
<th>Passive, NTC, 2 wire</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Thermistor</strong></td>
<td>Thermal resistor</td>
</tr>
<tr>
<td><strong>Temp. Output</strong></td>
<td>Resistance, 10k Type 2</td>
</tr>
<tr>
<td><strong>Accuracy (Std)</strong></td>
<td>±0.36°F, (±0.2°C)</td>
</tr>
<tr>
<td><strong>Stability</strong></td>
<td>&lt; 0.036°F/Year, (&lt;0.02°C/Year)</td>
</tr>
<tr>
<td><strong>Heat dissipation</strong></td>
<td>2.7 mW/°C</td>
</tr>
<tr>
<td><strong>Temp. Drift</strong></td>
<td>&lt;0.02°C per year</td>
</tr>
<tr>
<td><strong>Probe range</strong></td>
<td>-40° to 221°F (-40° to 105°C)</td>
</tr>
<tr>
<td><strong>Sensitivity</strong></td>
<td>Approximate @ 32°F (0°C)</td>
</tr>
<tr>
<td><strong>Thermistor</strong></td>
<td>Non-linear</td>
</tr>
<tr>
<td><strong>Lead wire</strong></td>
<td>22AWG stranded</td>
</tr>
<tr>
<td><strong>Wire Insulation</strong></td>
<td>Etched Teflon, Plenum rated</td>
</tr>
<tr>
<td><strong>Probe</strong></td>
<td>304 Stainless steel, 0.25” OD</td>
</tr>
<tr>
<td><strong>Probe Length</strong></td>
<td>4’, 8’ or per order</td>
</tr>
<tr>
<td><strong>Mounting</strong></td>
<td>Extension tabs (ears), 3/16” holes</td>
</tr>
<tr>
<td><strong>Duct Gasket</strong></td>
<td>1/4” Closed cell foam (impervious to mold)</td>
</tr>
</tbody>
</table>

### Enclosure Types
- **No Box (NB)**: Intended for open wiring
- **J-Box (JB)**: With eight ½” knock-outs
- **BB2 box**: With three ½” NPSM and three ½” drill-outs
- **BB4 box**: With three ½” drill-outs, one ½” open port

### Enclosure Ratings
- **No Box (NB)**: No rating
- **J-Box (JB)**: NEMA 1
- **BB2 box**: NEMA 4, IP66, UV Rated
- **BB4 box**: IP10 (IP44 with Knockout Plug in open port)

### Enclosure Material
- **No Box (NB)**: Nylon 66, UL94H-B
- **J-Box (JB)**: 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**
- **Temp. Range**: -40 to 212°F (-40 to 100°C)

### Agency
- **RoHS**
- **PT= DIN43760, IEC Pub 751-1983, JIS C1604-1989**

Specifications subject to change without notice.
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.

Figure 5: Junction Box or No Box Mounting Holes

Figure 6: BB2 Enclosure Mounting Holes

Figure 7: BB4 Enclosure Mounting Holes
Wiring and Termination

Carrier recommends using twisted pair of at least 22 AWG 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.

![Diagram of 2 Wire Lead Wire Termination for Thermistor](image)

Figure 8: 2 Wire Lead Wire Termination for Thermistor

Diagnostics

**Problems:**
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 and continuity. (shorted or open)
- Disconnect wires and measure sensor resistance and verify the "Sensor" output is correct.