

#9938 – 2/15/18

Overview

The H200 is a 2% accurate relative humidity sensor that includes a thermistor temperature sensor. The sensor can be ordered for duct or outside air applications. The transmitter can be wired for either a 0 to 5 VDC output or a loop powered 4 to 20 mA output.

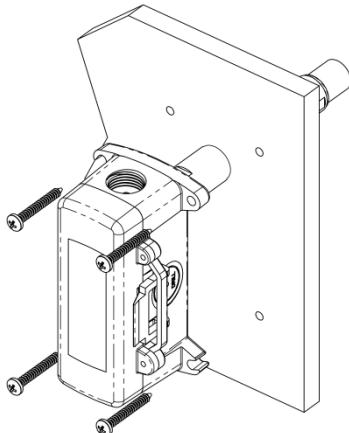


Figure 1: Duct Humidity Sensor
Part # NSB-10K-2-H200-D-BB2

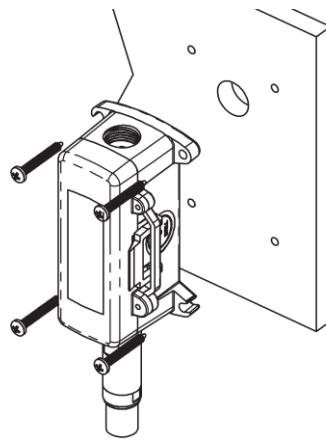


Figure 2: Outside Humidity Sensor
Part # NSB-10K-2-H200-O-BB2

Specifications

Power

10 to 35 VDC	For 0 to 5 VDC or 4 to 20 mA Humidity Outputs
12 to 27 VAC	For 0 to 5 VDC Humidity Output

Power Consumption

22 mA max. DC	For 0 to 5 VDC or 4 to 20 mA Humidity Outputs
0.53 VA max. AC	For 0 to 5 VDC Humidity Output

Sensor

Humidity	Factory corrected @17 RH points (10 to 90% RH)
RH Accuracy	Capacitive Polymer ±2% @ 73°F (23°C) from 10 to 90%
Drift	0.5% per year
Response time	< 5 seconds in moving air
RH Linearity	Negligible, factory corrected liner from 10 to 90%
RH Hysteresis	Factory corrected to <1%
Temperature	Thermistor, 10K Type 2

Filter

80 micron sintered stainless steel filter

Calibrated Accuracy	Calibration @17 RH points, (10% to 90%)
RH 2%	2% from 10 to 90% @ 73°F (23°C), Non-condensing
Thermistor	±0.36°F (0.2°C) from 32 to 158°F (0 to 70°C) - High accuracy units are available

Output

Humidity	Selectable via wiring detail 0 to 5VDC or 4 to 20mA at 0 to 100% RH
Temperature	Thermistor

Humidity Output Impedance

Current	700Ω@ 24VDC, Voltage drop is 10VDC (Supply Voltage DC – Transmitter voltage drop 10VDC) / 0.02 Amps = Max load Impedance
Voltage	10KΩ

Probe Length

Duct	5.3" (13.5cm) Duct Insertion, 1" diameter
Outside Air	2.4" (6.1cm) Below Enclosure, 1" dia.

Dimensions

4.9"W x 2.8"H x 2.35"D, (124.8 x 71.6 x 59.7mm)

Termination

Crimp	18 to 26 AWG with Sealant Filled Crimp Connector (BA/SFC1000-x00)
Wire Nut	26 to 16 AWG with Sealant Filled Wire Nut (BA/SFC2000-x00)

Enclosure Material

Polycarbonate, UV resistant

Enclosures Ratings

NEMA-4, IP66, UL94V-0

Environmental Operation Range

-40° to 158°F (-40° to 70°C) • 0% to 100% RH

Approvals

RoHs

Specifications subject to change without notice.

#9938 – 2/15/18

Duct Unit Mounting

Mount at least 3 duct diameters from humidifiers in the center of the duct wall. Drill a 1 inch hole for the probe in the duct and use two number 8 sheet metal screws to attach the sensor to the duct. Center the probe in its mounting hole. Be sure that the foam seals the hole. Do not over tighten the screws.

Outside Air Mounting

Mount in a permanently shaded area away from windows and doors. Do not mount in direct sunlight. Mount with the sensor probe pointed down. Drill a hole large enough for your sensor cable through your mounting surface. Mount the unit to the surface with the wiring knockout centered over the wiring hole. Pull the wiring into the unit and terminate using sealant filled connectors. Best practice is to seal the wiring hole with caulk after the wiring is installed. Be sure that the foam on the back of the unit makes a good weather tight seal.

Wiring and Termination

Carrier recommends using twisted pair of at least 22 AWG and sealant filled connectors 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 AC power wiring of NEC class 1, NEC class 2, NEC class 3 or with wiring used to supply highly inductive loads such as motors, contactors and relays. Tests show that fluctuating and inaccurate signal levels are possible when AC power wiring is present in the same conduit as the signal lines.



Carrier recommends wiring 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.

Table 2: Humidity Transmitter with 0 to 5 VDC Output

Wire Color	Purpose	Note
White	Humidity Output	0 to 5 VDC, To Analog Input of Controller
Black	GND (Common)	Ground for Power and Humidity Output
Red	Power	10 to 35 VDC or 12 to 27 VAC

Table 3: Temperature Sensor Lead Wire Colors

Thermistors	
10K-2Ω	Yellow/Yellow

Table 1: Humidity Transmitter with 4 to 20 mA Output

Wire Color	Purpose	Note
White	Not Used	Not Used (Cap Wires)
Black	Humidity Output	4 to 20 mA, To Analog Input of Controller
Red	Power	10 to 35VDC

#9938 – 2/15/18

Wiring and Termination (continued)

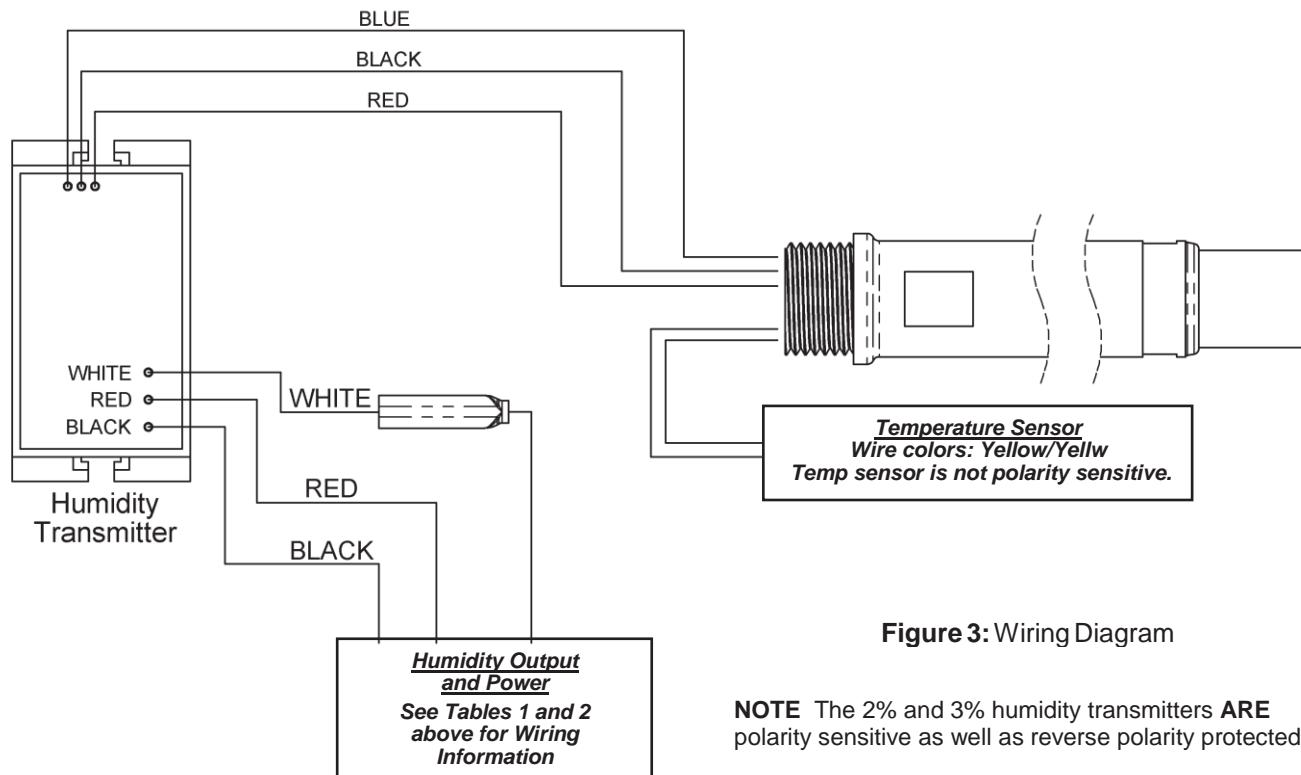


Figure 3: Wiring Diagram

NOTE The 2% and 3% humidity transmitters **ARE** polarity sensitive as well as reverse polarity protected

Filter Care

A sintered filter protects the humidity sensor from various airborne particles and may need periodic cleaning. To do this, gently unscrew the filter from the probe. Rinse the filter in warm soapy water and rinse until clean. A nylon brush may be used if necessary. Gently replace the filter by screwing it back into the probe. The filter should screw all the way into the probe. Hand tighten only.



Humidity Diagnostics

Possible Problems:

Unit will not operate

Humidity output is at its maximum value of 5V or 20mA

Humidity output is at its minimum value of 0V or 4mA

Humidity reading in controller's software appears to be off by more than the specified accuracy

Possible Solutions:

- Check for proper supply power. (See page 2 for wiring diagram and power specifications)

- Make sure the humidity sensor is wired properly.

- Make sure the humidity sensor is wired properly.

- Check all software parameters

- Determine if the sensor is exposed to an external air source different from the intended measured environment or reference device.

- Check the Humidity transmitter output against a calibrated reference such as a 2% accurate hygrometer. Measure the humidity at the sensor's location using the reference meter, then calculate the humidity transmitter output using the humidity formula at left. Compare the calculated output to the actual humidity transmitter output (see the wiring diagram on page 2 for the humidity transmitter output wire colors).

Output	Humidity Formula
4 to 20 mA	$\%RH = (mA - 4)/0.16$
0 to 5 VDC	$\%RH = V/0.05$

Temperature Diagnostics

Possible Problems:

Controller reports incorrect temperature

Possible Solutions:

- Confirm the input is set up correctly in the controller's software.

- Verify that the sensor wires are not physically shorted or open.

- Check wiring for proper termination.

- 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. Compare the temperature sensor's resistance to the appropriate temperature sensor table.