NS Series Network Sensors

Product Bulletin

NS-AHx7x0x-x, NS-APx7x0x-0, NS-ATx700x-x, NS-BCN7004-x, NS-BHx7x0x-0, NS-BPx700x-0, NS-BTx700x-x, NS-DTN70x3-x, NS-FTN7003-x, NS-MHx700x-x, NS-MNN700x-x, NS-MTx700x-x, NS-ATB7F03-x, NS-BTB7F03-x, NS-ATA700x-x

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Refer to the QuickLIT website for the most up-to-date version of this document.

The NS Series Network Sensor offering includes NS Series Network Zone Sensors and NS Series Network Discharge Air Sensors. The NS Series Network Sensors are designed to function directly with *Metasys*® system Field Equipment Controllers (FECs), Input/Output Modules (IOMs), VAV Modular Assembly (VMA16) Controllers, and Facility Explorer FX-PC Series Programmable Controllers (FX-PCGs, FX-PCVs, and FX-PCXs). The sensors are also compatible with Verasys™ and Johnson Controls Smart Equipment.

The majority of NS Series Network Zone Sensors monitor room temperature; however, options are available to also monitor zone humidity, carbon dioxide (CO_2), local temperature setpoint adjustments, and other variables. This data is transmitted to a controller on the Sensor Actuator (SA) Bus.

Some models of NS Series Network Zone Sensors include an onboard passive infrared (PIR) occupancy sensor that detects motion to determine if a space is occupied. This feature maximizes up to 30% energy savings in high-energy usage environments such as schools, dormitories, offices, hospitals, and hotels by adjusting the temperature of the space based on the occupancy status. In addition, the PIR occupancy sensor facilitates trending of floor space usage in these environments.

The NS Series Network Zone Sensors include models with either a temperature setpoint dial or setpoint pushbuttons and LCD that allows occupants to view the zone temperature, Relative Humidity (RH), and view and adjust the zone temperature setpoint. Some temperature and humidity models include an RH pushbutton to toggle between temperature and RH on the display. These models also have the capability to set the default display to either temperature or RH. Some models also include an °F/°C pushbutton to toggle between degrees Fahrenheit (F) and degrees Celsius (C).

A fan mode pushbutton is included to set the desired fan speed (AUTO-OFF-low-medium-high). An occupancy override function allows the user to signal to the controller that the zone is occupied to override the scheduled mode. Some models have DIP switches to set a unique address for applications that require multiple sensors.

Figure 1: NS Series Network Sensors

For communication wiring flexibility, the wires connecting the network zone sensor to a controller can be terminated using a modular jack or screw terminals.

Note: Mixing of phone jack and screw terminal devices on the same SA bus segment must be avoided.

Each network sensor includes an SA Bus access port to allow accessories to access the SA Bus. This plug allows accessories to service or commission the connected controller or gain access to any other controller on the same Field Controller (FC) Bus.

The NS Series Network Zone Sensor offering includes models that can be surface mounted, vertical wallbox mounted, or flush mounted to meet the requirements of the specific application. Some NS Series Sensor models are designed to assist with the California Energy Code (Title 24). Select models offer stylish black enclosures to suit specific architectural and interior design needs.

The NS Series Network Discharge Air Sensors monitor the duct temperature, typically at the discharge of the VAV box, and transmit this data to a local controller on the SA Bus using the 10 ft (305 cm) wiring lead included with the unit. The 10 ft (305 cm) wiring lead consists of four 22 AWG (0.6 mm) trade size color-coded wires encased in a plenum-rated jacket. Each of the wires is stripped and tinned for easy connection to the SA Bus screw terminal block.

The NS Series Network Discharge Air Sensors are available with either a 4- or 8-in. (102 or 203 mm) temperature probe. All models include DIP switches for applications requiring multiple discharge air sensors, each with a unique DIP switch configurable address.

Table 1: Features and Benefits

Features	Benefits
BACnet® Master-Slave/Token-Passing (MS/TP) Protocol Communication	Provides compatibility with *Metasys* system field controllers and Facility Explorer programmable controllers in a proven communication network.
Backlit LCD Available on Some Models	Provides real-time status of the environment with backlighting activated during user interaction.
Simple Temperature Setpoint Adjustment Available on Some Models	Enables you to change the setpoint with the turn of a dial or press of a button.
Onboard PIR Occupancy Sensor Available on Some Models	Maximizes up to 30% energy savings in high-energy usage environments, and facilitates trending of floor space usage.
Temporary Occupancy Available on Some Models	Provides a timed override command, which temporarily initiates an alternate mode.
Field-Selectable Default Display Setting on Some Models	Allows you to toggle between temperature and RH on the display, and set the desired default for continuous viewing.
Fahrenheit/Celsius (°F/°C) Button Available on Some Models	Toggles the display temperature between degrees Celsius and degrees Fahrenheit.

Ordering Information

Table 2 through Table 7 list the various NS Series Network Zone Sensors available, and Table 8 lists the various NS Series Network Discharge Air Sensors available.

IMPORTANT: The NS Series Network Sensor is intended to provide an input to equipment under normal operating conditions. Where failure or malfunction of the network sensor could lead to personal injury or property damage to the controlled equipment or other property, additional precautions must be designed into the control system. Incorporate and maintain other devices, such as supervisory or alarm systems or safety or limit controls, intended to warn of or protect against failure or malfunction of the network sensor.

Note: Some NS Series Network Sensor features are not supported in previous releases of *Metasys* or Facility Explorer system software; therefore, it is recommended that the system software be kept up to date.

Repair Information

If the NS Series Network Zone Sensor or the NS Series Network Discharge Air Sensor fails to operate within its specifications, replace the unit. For a replacement sensor, contact the nearest Johnson Controls® representative.

Selection Charts

Table 2: Network Zone Sensor Ordering Information—Temperature Only Models (Part 1 of 2)

Product Code Number	Size (mm), Height x Width	Vertical Wallbox-Mounted (WB) or Surface-Mounted (SM)	Johnson Controls Logo	LCD Display	Temperature Adjustment: Setpoint Dial (Set), Warmer/ Cooler Dial (W/C), or Setpoint Pushbuttons (PB)[1]	Occupancy Override[2], PIR Occupancy Sensor	°F/°C Scale Toggle	Fan Control	Screw Terminals (ST) or Modular Jack (MJ)	Address Switches	VAV Balancing Feature
NS-ATA7001-0	80 x 80	SM	Yes	Yes	Set	Yes, No	No	No	MJ	No	No
NS-ATA7002-0	80 x 80	SM	Yes	Yes	Set	Yes, No	No	No	ST	No	No
NS-ATA7002-3[3]	80 x 80	SM	Yes	Yes	Set	Yes, No	No	No	ST	No	No
NS-ATA7003-0	80 x 80	SM	Yes	Yes	Set	Yes, No	No	No	ST	Yes	No
NS-ATA7004-2	80 x 80	SM	No	Yes	Set	Yes, No	No	No	ST, MJ	Yes	No
NS-ATB7001-0	80 x 80	SM	Yes	Yes	Set	Yes, No	Yes	No	MJ	No	No
NS-ATB7002-0	80 x 80	SM	Yes	Yes	Set	Yes, No	Yes	No	ST	No	No
NS-ATB7003-0	80 x 80	SM	Yes	Yes	Set	Yes, No	Yes	No	ST	Yes	No
NS-ATC7001-0	80 x 80	SM	Yes	Yes	Set	Yes, No	No	Yes	MJ	No	No
NS-ATC7002-0	80 x 80	SM	Yes	Yes	Set	Yes, No	No	Yes	ST	No	No
NS-ATC7005-2	80 x 80	SM	No	Yes	Set	Yes, No	No	Yes	ST, MJ	No	No
NS-ATD7001-0	80 x 80	SM	Yes	Yes	Set	Yes, No	Yes	Yes	MJ	No	No
NS-ATD7002-0	80 x 80	SM	Yes	Yes	Set	Yes, No	Yes	Yes	ST	No	No
NS-ATF7001-0	80 x 80	SM	Yes	Yes	W/C	Yes, No	Yes	No	MJ	No	No
NS-ATF7002-0	80 x 80	SM	Yes	Yes	W/C	Yes, No	Yes	No	ST	No	No
NS-ATN7001-0	80 x 80	SM	Yes	No	N/A	No, No	No	No	MJ	No	No
NS-ATN7001-2	80 x 80	SM	No	No	N/A	No, No	No	No	MJ	No	No
NS-ATN7003-0	80 x 80	SM	Yes	No	N/A	No, No	No	No	ST	Yes	No
NS-ATN7003-2	80 x 80	SM	No	No	N/A	No, No	No	No	ST	Yes	No
NS-ATN7004-2	80 x 80	SM	No	No	N/A	No, No	No	No	ST, MJ	Yes	No
NS-ATP7001-0	80 x 80	SM	Yes	No	W/C	Yes, No	No	No	MJ	No	No
NS-ATP7001-2	80 x 80	SM	No	No	W/C	Yes, No	No	No	MJ	No	No
NS-ATP7002-0	80 x 80	SM	Yes	No	W/C	Yes, No	No	No	ST	No	No
NS-ATP7002-2	80 x 80	SM	No	No	W/C	Yes, No	No	No	ST	No	No
NS-ATP7003-0	80 x 80	SM	Yes	No	W/C	Yes, No	No	No	ST	Yes	No
NS-ATP7003-2	80 x 80	SM	No	No	W/C	Yes, No	No	No	ST	Yes	No
NS-ATV7001-0	80 x 80	SM	Yes	Yes	Set	Yes, No	Yes	No[4]	MJ	No	Yes
NS-ATV7002-0	80 x 80	SM	Yes	Yes	Set	Yes, No	Yes	No[4]	ST	No	Yes
NS-BTB7001-0	120 x 80	WB, SM	Yes	Yes	Set	Yes, No	Yes	No	MJ	No	No
NS-BTB7001-2	120 x 80	WB, SM	No	Yes	Set	Yes, No	Yes	No	MJ	No	No
NS-BTB7001-3[3]	120 x 80	WB, SM	Yes	Yes	Set	Yes, No	Yes	No	MJ	No	No
NS-BTB7002-0	120 x 80	WB, SM	Yes	Yes	Set	Yes, No	Yes	No	ST	No	No
NS-BTB7003-0	120 x 80	WB, SM	Yes	Yes	Set	Yes, No	Yes	No	ST	Yes	No
NS-BTB7003-2	120 x 80	WB, SM	No	Yes	Set	Yes, No	Yes	No	ST	Yes	No
NS-BTF7001-0	120 x 80	WB, SM	Yes	Yes	W/C	Yes, No	Yes	No	MJ	No	No
NS-BTF7002-0	120 x 80	WB, SM	Yes	Yes	W/C	Yes, No	Yes	No	ST	No	No
NS-BTJ7001-0	120 x 80	WB, SM	Yes	Yes	PB	Yes, No	Yes	No	MJ	No	No
NS-BTJ7001-2	120 x 80	WB, SM	No	Yes	PB	Yes, No	Yes	No	MJ	No	No
NS-BTJ7002-0	120 x 80	WB, SM	Yes	Yes	PB	Yes, No	Yes	No	ST	No	No
NS-BTJ7002-2	120 x 80	WB, SM	No	Yes	PB	Yes, No	Yes	No	ST	No	No
NS-BTJ7003-0	120 x 80	WB, SM	Yes	Yes	PB	Yes, No	Yes	No	ST	Yes	No
NS-BTJ7003-2	120 x 80	WB, SM	No	Yes	PB	Yes, No	Yes	No	ST	Yes	No
NS-BTK7001-0	120 x 80	WB, SM	Yes	Yes	PB	Yes, No	Yes	Yes	MJ	No	No

Table 2: Network Zone Sensor Ordering Information—Temperature Only Models (Part 2 of 2)

Product Code Number	Size (mm), Height x Width	Vertical Wallbox-Mounted (WB) or Surface-Mounted (SM)	Johnson Controls Logo	LCD Display	Temperature Adjustment: Setpoint Dial (Set), Warmer/ Cooler Dial (W/C), or Setpoint Pushbuttons (PB)[1]	Occupancy Override[2], PIR Occupancy Sensor	°F/°C Scale Toggle	Fan Control	Screw Terminals (ST) or Modular Jack (MJ)	Address Switches	VAV Balancing Feature
NS-BTK7001-2	120 x 80	WB, SM	No	Yes	PB	Yes, No	Yes	Yes	MJ	No	No
NS-BTK7002-0	120 x 80	WB, SM	Yes	Yes	PB	Yes, No	Yes	Yes	ST	No	No
NS-BTK7002-2	120 x 80	WB, SM	No	Yes	PB	Yes, No	Yes	Yes	ST	No	No
NS-BTL7003-0	120 x 80	WB, SM	Yes	No	N/A	Yes, No	No	No	ST	Yes	No
NS-BTN7001-0	120 x 80	WB, SM	Yes	No	N/A	No, No	No	No	MJ	No	No
NS-BTN7001-2	120 x 80	WB, SM	No	No	N/A	No, No	No	No	MJ	No	No
NS-BTN7003-0	120 x 80	WB, SM	Yes	No	N/A	No, No	No	No	ST	Yes	No
NS-BTN7003-2	120 x 80	WB, SM	No	No	N/A	No, No	No	No	ST	Yes	No
NS-BTP7001-0	120 x 80	WB, SM	Yes	No	W/C	Yes, No	No	No	MJ	No	No
NS-BTP7001-2	120 x 80	WB, SM	No	No	W/C	Yes, No	No	No	MJ	No	No
NS-BTP7002-0	120 x 80	WB, SM	Yes	No	W/C	Yes, No	No	No	ST	No	No
NS-BTP7002-2	120 x 80	WB, SM	No	No	W/C	Yes, No	No	No	ST	No	No
NS-BTP7003-0	120 x 80	WB, SM	Yes	No	W/C	Yes, No	No	No	ST	Yes	No
NS-BTV7001-0	120 x 80	WB, SM	Yes	Yes	Set	Yes, No	Yes	No[4]	MJ	No	Yes
NS-BTV7002-0	120 x 80	WB, SM	Yes	Yes	Set	Yes, No	Yes	No[4]	ST	No	Yes
NS-MTB7001-0	120 x 80	WB, SM	Yes	Yes	Set	Yes, Yes	Yes	No	MJ	No	No
NS-MTB7002-0	120 x 80	WB, SM	Yes	Yes	Set	Yes, Yes	Yes	No	ST	No	No
NS-MTB7004-2	120 x 80	WB, SM	No	Yes	Set	Yes, Yes	Yes	No	ST, MJ	Yes	No
NS-MTJ7001-0	120 x 80	WB, SM	Yes	Yes	PB	Yes, Yes	Yes	No	MJ	No	No
NS-MTJ7001-2	120 x 80	WB, SM	No	Yes	PB	Yes, Yes	Yes	No	MJ	No	No
NS-MTJ7002-0	120 x 80	WB, SM	Yes	Yes	PB	Yes, Yes	Yes	No	ST	No	No
NS-MTJ7002-2	120 x 80	WB, SM	No	Yes	PB	Yes, Yes	Yes	No	ST	No	No
NS-MTL7001-0	120 x 80	WB, SM	Yes	No	N/A	Yes, Yes	No	No	MJ	No	No
NS-MTL7002-0	120 x 80	WB, SM	Yes	No	N/A	Yes, Yes	No	No	ST	No	No
NS-MTN7004-2	120 x 80	WB, SM	No	No	N/A	No, Yes	No	No	ST, MJ	Yes	No

1. Use the setpoint dial or pushbuttons to adjust the absolute temperature setpoint.
2. An Occupancy Override button is available on NS-xxP and NS-xxL models. Other models allow Occupancy Override through the setpoint adjustment interface.
3. These models feature a black enclosure.
4. In the VAV balancing models, the fan control button is replaced by a light bulb button used in the VAV balancing process.

Table 3: Network Zone Sensor Ordering Information—Temperature and Humidity Models without RH Display (Part 1 of 2)

Product Code Number	Size (mm), Height x Width	Vertical Wallbox-Mounted (WB) or Surface-Mounted (SM)	Johnson Controls Logo	LCD Display, RH Display	Humidity Element Accuracy	Temperature Adjustment: Setpoint Dial (Set) or Warmer/ Cooler Dial (W/C)	Occupancy Override[1], PIR Occupancy Sensor	°F/°C Scale Toggle	Screw Terminals (ST) or Modular Jack (MJ)	Address Switches
NS-AHA7001-0	80 x 80	SM	Yes	Yes, No	3%	Set	Yes, No	No	MJ	No
NS-AHA7002-0	80 x 80	SM	Yes	Yes, No	3%	Set	Yes, No	No	ST	No
NS-AHA7004-2	80 x 80	SM	No	Yes, No	3%	Set	Yes, No	No	ST, MJ	Yes
NS-AHB7001-0	80 x 80	SM	Yes	Yes, No	3%	Set	Yes, No	Yes	MJ	No
NS-AHB7002-0	80 x 80	SM	Yes	Yes, No	3%	Set	Yes, No	Yes	ST	No
NS-AHB7003-0	80 x 80	SM	Yes	Yes, No	3%	Set	Yes, No	Yes	ST	Yes
NS-AHN7001-0	80 x 80	SM	Yes	None	3%	N/A	No, No	No	MJ	No

Table 3: Network Zone Sensor Ordering Information—Temperature and Humidity Models without RH Display (Part 2 of 2)

Product Code Number	Size (mm), Height x Width	Vertical Wallbox-Mounted (WB) or Surface-Mounted (SM)	Johnson Controls Logo	LCD Display, RH Display	Humidity Element Accuracy	Temperature Adjustment: Setpoint Dial (Set) or Warmer/ Cooler Dial (W/C)	Occupancy Override[1], PIR Occupancy Sensor	°F/°C Scale Toggle	Screw Terminals (ST) or Modular Jack (MJ)	Address Switches
NS-AHN7001-2	80 x 80	SM	No	None	3%	N/A	No, No	No	MJ	No
NS-AHN7003-0	80 x 80	SM	Yes	None	3%	N/A	No, No	No	ST	Yes
NS-AHN7004-2	80 x 80	SM	No	None	3%	N/A	No, No	No	ST, MJ	Yes
NS-AHP7001-0	80 x 80	SM	Yes	None	3%	W/C	Yes, No	No	MJ	No
NS-APA7001-0	80 x 80	SM	Yes	Yes, No	2%	Set	Yes, No	No	MJ	No
NS-APA7002-0	80 x 80	SM	Yes	Yes, No	2%	Set	Yes, No	No	ST	No
NS-APB7001-0	80 x 80	SM	Yes	Yes, No	2%	Set	Yes, No	Yes	MJ	No
NS-APB7002-0	80 x 80	SM	Yes	Yes, No	2%	Set	Yes, No	Yes	ST	No
NS-APB7003-0	80 x 80	SM	Yes	Yes, No	2%	Set	Yes, No	Yes	ST	Yes
NS-BHB7001-0	120 x 80	WB, SM	Yes	Yes, No	3%	Set	Yes, No	Yes	MJ	No
NS-BHB7002-0	120 x 80	WB, SM	Yes	Yes, No	3%	Set	Yes, No	Yes	ST	No
NS-BHB7003-0	120 x 80	WB, SM	Yes	Yes, No	3%	Set	Yes, No	Yes	ST	Yes
NS-BHN7001-0	120 x 80	WB, SM	Yes	None	3%	N/A	No, No	No	MJ	No
NS-BHN7001-2	120 x 80	WB, SM	No	None	3%	N/A	No, No	No	MJ	No
NS-BHN7003-0	120 x 80	WB, SM	Yes	None	3%	N/A	No, No	No	ST	Yes
NS-BHP7001-0	120 x 80	WB, SM	Yes	None	3%	W/C	Yes, No	No	MJ	No
NS-BHP7003-0	120 x 80	WB, SM	Yes	None	3%	W/C	Yes, No	No	ST	Yes
NS-BPB7001-0	120 x 80	WB, SM	Yes	Yes, No	2%	Set	Yes, No	Yes	MJ	No
NS-BPB7002-0	120 x 80	WB, SM	Yes	Yes, No	2%	Set	Yes, No	Yes	ST	No
NS-BPB7003-0	120 x 80	WB, SM	Yes	Yes, No	2%	Set	Yes, No	Yes	ST	Yes
NS-MHB7004-2	120 x 80	WB, SM	No	Yes, No	3%	Set	Yes, Yes	Yes	ST, MJ	Yes
NS-MHL7001-0	120 x 80	WB, SM	Yes	No, No	3%	N/A	Yes, Yes	No	MJ	No
NS-MHL7002-0	120 x 80	WB, SM	Yes	No, No	3%	N/A	Yes, Yes	No	ST	No
NS-MHN7004-2	120 x 80	WB, SM	No	None	3%	N/A	No, Yes	No	ST, MJ	Yes

1. An Occupancy Override button is available on NS-xxP and NS-xxL models. Other models allow Occupancy Override through the setpoint adjust interface.

Table 4: Network Zone Sensor Ordering Information—Temperature and Humidity Models with Temperature or RH Display (Field-Selectable Default Display) (Part 1 of 2)

Product Code Number	Size (mm), Height x Width	Vertical Wallbox-Mounted (WB) or Surface-Mounted (SM)	Johnson Controls Logo	LCD Display, RH Display	Humidity Element Accuracy	Temperature Adjustment: Setpoint Dial (Set) or Setpoint Pushbuttons (PB)[1]	Occupancy Override[2]	°F/°C Scale Toggle	Screw Terminals (ST) or Modular Jack (MJ)	Address Switches
NS-AHR7101-0	80 x 80	SM	Yes	Yes, Yes	3%	Set	Yes	Yes	MJ	No
NS-AHR7102-0	80 x 80	SM	Yes	Yes, Yes	3%	Set	Yes	Yes	ST	No
NS-AHR7103-0	80 x 80	SM	Yes	Yes, Yes	3%	Set	Yes	Yes	ST	Yes
NS-APR7101-0	80 x 80	SM	Yes	Yes, Yes	2%	Set	Yes	Yes	MJ	No
NS-APR7102-0	80 x 80	SM	Yes	Yes, Yes	2%	Set	Yes	Yes	ST	No
NS-BHM7101-0	120 x 80	WB, SM	Yes	Yes, Yes	3%	PB	Yes	Yes	MJ	No
NS-BHM7101-2	120 x 80	WB, SM	No	Yes, Yes	3%	PB	Yes	Yes	MJ	No
NS-BHM7102-0	120 x 80	WB, SM	Yes	Yes, Yes	3%	PB	Yes	Yes	ST	No
NS-BHM7102-2	120 x 80	WB, SM	No	Yes, Yes	3%	PB	Yes	Yes	ST	No
NS-BHM7103-0	120 x 80	WB, SM	Yes	Yes, Yes	3%	PB	Yes	Yes	ST	Yes
NS-BHM7103-2	120 x 80	WB, SM	No	Yes, Yes	3%	PB	Yes	Yes	ST	Yes
NS-BHR7101-0	120 x 80	WB, SM	Yes	Yes, Yes	3%	Set	Yes	Yes	MJ	No

Table 4: Network Zone Sensor Ordering Information—Temperature and Humidity Models with Temperature or RH Display (Field-Selectable Default Display) (Part 2 of 2)

Product Code Number	Size (mm), Height x Width	Vertical Wallbox-Mounted (WB) or Surface-Mounted (SM)	Johnson Controls Logo	LCD Display, RH Display	Humidity Element Accuracy	Temperature Adjustment: Setpoint Dial (Set) or Setpoint Pushbuttons (PB)[1]	Occupancy Override[2]	°F/°C Scale Toggle	Screw Terminals (ST) or Modular Jack (MJ)	Address Switches
NS-BHR7103-0	120 x 80	WB, SM	Yes	Yes, Yes	3%	Set	Yes	Yes	ST	Yes

1. Use the setpoint dial or pushbuttons to adjust the absolute temperature setpoint.
2. An Occupancy Override button is available on NS-xxP and NS-xxL models. Other models allow Occupancy Override through the setpoint adjust interface.

Table 5: Network Zone Sensor Ordering Information—Motion Detection Only Models (No Temperature or Humidity Sensing)

Product Code Number	Size (mm), Height x Width	Vertical Wallbox-Mounted (WB), or Surface-Mounted (SM)	Johnson Controls Logo	LCD Display	PIR Occupancy Sensor	Screw Terminals (ST), or Modular Jack (MJ)	Address Switches
NS-MNN7001-0	120 x 80	WB, SM	Yes	No	Yes	MJ	No
NS-MNN7003-0	120 x 80	WB, SM	Yes	No	Yes	ST	Yes
NS-MNN7004-2	120 x 80	WB, SM	No	No	Yes	ST, MJ	Yes

Table 6: Network Zone Sensor Ordering Information—CO_2 Models

Product Code Number	Size (mm) Height x Width	Vertical Wallbox-Mounted (WB), or Surface-Mounted (SM)	LCD Display	CO_2 Measurement Range	Johnson Controls Logo	Screw Terminals (ST), or Modular Jack (MJ)	Sensor Addressing
NS-BCN7004-0	120 x 80	WB, SM	No	0 to 2,000 ppm	Yes	ST, MJ	DIP Switch (212 to 219)
NS-BCN7004-2	120 x 80	WB, SM	No	0 to 2,000 ppm	No	ST, MJ	DIP Switch (212 to 219)

Table 7: Network Zone Sensor Ordering Information—Flush-Mount Temperature Only Models

Product Code Number	Faceplate Dimensions, Height x Width	Mounting	LCD Display	Temperature Measurement Range	Johnson Controls Logo	Terminations	Sensor Addressing
NS-FTN7003-0	4-1/2 in. x 2-3/4 in. (114 mm x 70 mm)	Flush-Mount	No	32.0°F/0.0°C to 104.0°F/40.0°C	Yes	Screw Terminal Block	DIP Switch (200 to 203)
NS-FTN7003-2	4-1/2 in. x 2-3/4 in. (114 mm x 70 mm)	Flush-Mount	No	32.0°F/0.0°C to 104.0°F/40.0°C	No	Screw Terminal Block	DIP Switch (200 to 203)

Table 8: Network Discharge Air Sensor Ordering Information

Product Code Number	Dimensions, Height x Width x Depth	Johnson Controls Logo	Temperature Probe Length	10 ft (305 cm) Wiring Lead Included	Terminations	Sensor Addressing
NS-DTN7043-0	3 in. x 3 in. x 2 in. (76 mm x 76 mm x 51 mm)	Yes	4 in. (102 mm)	Yes	Screw Terminal Block	DIP Switch (204 to 211)
NS-DTN7043-2	3 in. x 3 in. x 2 in. (76 mm x 76 mm x 51 mm)	No	4 in. (102 mm)	Yes	Screw Terminal Block	DIP Switch (204 to 211)
NS-DTN7083-0	3 in. x 3 in. x 2 in. (76 mm x 76 mm x 51 mm)	Yes	8 in. (203 mm)	Yes	Screw Terminal Block	DIP Switch (204 to 211)
NS-DTN7083-2	3 in. x 3 in. x 2 in. (76 mm x 76 mm x 51 mm)	No	8 in. (203 mm)	Yes	Screw Terminal Block	DIP Switch (204 to 211)

Table 9: Network Sensors with Fault Code Capability Ordering Information (Title 24 Models for Economizer Fault Detection Diagnostics [FDD])

Product Code Number	Size (mm), Height x Width	Vertical Wallbox-Mounted (WB)	LCD Display, °F/°C Scale Toggle	Screw Terminals	Address Switches	Temperature Adjustment: Setpoint (Set) or Warmer/ Cooler Dial (W/C)	Johnson Controls Logo	VAV Balancing Feature
NS-ATB7F03-0	80 x 80	Yes	Yes, Yes	Yes	Yes	Set	Yes	No
NS-ATB7F03-1	80 x 80	Yes	Yes, Yes	Yes	Yes	Set	No	No
NS-BTB7F03-0	80 x 120	Yes	Yes, Yes	Yes	Yes	Set	Yes	No
NS-BTB7F03-1	80 x 120	Yes	Yes, Yes	Yes	Yes	Set	No	No

NS Sensors with Fault Code Capability Error Codes

The fault indication comes through the Network Sensor Bus when a Network Sensor is used in the Zone. The LCD indicates the code number for all the required state of California Title 24 economizer fault conditions.

Table 10: Network Sensors with Fault Code Capability Error Codes

Display Text	California Title 24 Economizer Fault Condition	Possible Problem
EF1	Air temperature sensor failure/fault	Problem with one of the air temperature sensors. Check Outdoor Air, Return Air, or Supply Air sensors.
EF5	Not economizing when it should	The economizer is not using outdoor air when it should.
EF6	Economizing when it should	The economizer is allowing outdoor air inside when the conditions are not suitable for economizer operation.
EF8	Damper not modulating	The economizer damper is not able to modulate properly. Check damper, linkage to actuator, or the actuator.
EF9	Excess outdoor air	The economizer is allowing excess outdoor air inside.

Technical Specifications

NS Series Network Zone Sensors—Temperature Only Models and Temperature and Humidity Models (Part 1 of 2)

Supply Voltage	9.8 to 16.5 VDC; 15 VDC nominal (from SA bus)
Current Consumption	**Temperature only models with LCD display:** 21 mA maximum (non-transmitting)
	Temperature only models without LCD display: 13 mA maximum (non-transmitting)
	Temperature and humidity models with LCD display: 25 mA maximum (non-transmitting)
	Temperature and Humidity models without LCD display: 17 mA maximum (non-transmitting)
Terminations	Modular jack or screw terminal block
Sensor Addressing	**NS-AHx7003-0, NS-APB7003-0, NS-ATx7003-0, NS-BHx7003-0, NS-BPB7003-0, NS-BTB7003-0, NS-BTN7003-0, and NS-BTP7003-0 Models:** DIP switch set from 200 to 203; factory set at 203
	All other models: Fixed address of 199
Wire Size	**Modular jack models:** 24 AWG or 26 AWG (0.5 or 0.4 mm diameter) recommended; three twisted pair (six conductors)
	Screw terminal block models: 18 to 22 AWG (1.0 to 0.6 mm diameter); 22 AWG (0.6 mm diameter) recommended
Communication Rate	**Auto-detect:** 9.6k, 19.2k, 38.4k, or 76.8k bps
Mounting	**Surface-mounted:** 80 x 80 mm
	Surface-mounted or vertical wallbox-mounted: 120 x 80 mm

NS Series Network Zone Sensors—Temperature Only Models and Temperature and Humidity Models (Part 2 of 2)

Temperature Measurement Range		32.0°F/0.0°C to 104.0°F/40.0°C
Humidity Measurement Range		**Full range:** 0 to 100% RH
		Calibrated range: 10 to 90% RH
Temperature Sensor Type		Local 1k ohm Platinum Resistance Temperature Detector (RTD); Class A per IEC 60751
Humidity Sensor Type		Thin film capacitive sensor
Temperature Resolution (Models with LCD)		±0.5F°/±0.5C°
Temperature Accuracy		**NS Series Network Zone Sensor:** ±1.0F°/±0.6C°
		Temperature element only: 0.35F° at 70°F (0.2C° at 21°C)
Humidity Element Accuracy		**NS-APx700x-0 and NS-BPB700x-0 models:** ±2% RH for 20 to 80% RH; ±4% RH for 10 to 20% and 80 to 90% RH
		NS-AHx700x-x, NS-BHx700x-0, and NS-MHx700x-x models: ±3% RH for 20 to 80% RH; ±6% RH for 10 to 20% and 80 to 90% RH
Time Constant		10 minutes nominal at 10 fpm airflow
Default Temperature Setpoint Adjustment Range		**With LCD display:** 50.0°F/10.0°C to 86.0°F/30.0°C in 0.5° increments
		Without LCD display: ±5.0F°/±3.0C°
PIR Occupancy Sensor Motion Detection (Models with PIR Occupancy Sensor)		Minimum 94 angular degrees up to a distance of 15 ft (4.6 m); based on a clear line of sight
Ambient Conditions		**Operating:** 32 to 104°F (0 to 40°C); 10 to 90% RH, noncondensing; 85°F (29°C) maximum dew point
		Storage with LCD display: -4 to 140°F (-20 to 60°C); 5 to 95% RH, noncondensing
		Storage without LCD display: -40 to 158°F (-40 to 70°C); 5 to 95% RH, noncondensing
Compliance	**BACnet International**	BACnet Testing Laboratories™ (BTL) 135-2004 Listed BACnet Smart Sensor (B-SS) **Note:** Excludes the NS-ATV700x-0 and NS-BTV700x-0 models.
	United States	UL Listed, File E107041, CCN PAZX, Under UL 916, Energy Management Equipment; FCC Compliant to CFR 47, Part 15, Subpart B, Class A
	Canada	UL Listed, File E107041, CCN PAZX7, Under CAN/CSA C22.2 No. 205, Signal Equipment; Industry Canada, ICES-003
	Europe	CE Mark – Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive 2004/108/EC.
CE	**Australia and New Zealand**	RCM Mark, Australia/NZ Emissions Compliant
Accessory (Order Separately)		**NS-WALLPLATE-0:** adapts an 80 x 80 mm NS Series Network Zone Sensor to a standard 80 x 120 mm wallbox
Shipping Weight		0.20 lb (0.09 kg)

NS Series Network Zone Sensors—Motion Detection Only Models (No Temperature or Humidity Sensing)

Supply Voltage		9.8 to 16.5 VDC; 15 VDC nominal (from SA bus)
Current Consumption		13 mA maximum (non-transmitting)
Terminations		Modular jack or screw terminal block
Sensor Addressing (NS-MNN7003-0 Model)		DIP switch set from 200 to 203; factory set at 203
Wire Size		**Modular jack model:** 24 AWG or 26 AWG (0.5 or 0.4 mm diameter) recommended; three twisted pair (six conductors)
		Screw terminal block model: 18 to 22 AWG (1.0 to 0.6 mm diameter); 22 AWG (0.6 mm diameter) recommended
Communication Rate		**Auto-detect:** 9.6k, 19.2k, 38.4k, or 76.8k bps
Mounting		**Surface-mounted or vertical wallbox-mounted:** 120 x 80 mm
PIR Occupancy Sensor Motion Detection		Minimum 94 angular degrees up to a distance of 15 ft (4.6 m); based on a clear line of sight
Ambient Conditions		**Operating:** 32 to 104°F (0 to 40°C); 10 to 90% RH, noncondensing; 85°F (29°C) maximum dew point
		Storage: -40 to 158°F (-40 to 70°C); 5 to 95% RH, noncondensing
Compliance	**BACnet International**	BACnet Testing Laboratories™ (BTL) 135-2004 Listed BACnet Smart Sensor (B-SS)
	United States	UL Listed, File E107041, CCN PAZX, Under UL 916, Energy Management Equipment; FCC Compliant to CFR 47, Part 15, Subpart B, Class A
	Canada	UL Listed, File E107041, CCN PAZX7, Under CAN/CSA C22.2 No. 205, Signal Equipment; Industry Canada, ICES-003
CE	**Europe**	CE Mark – Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive 2004/108/EC.
	Australia and New Zealand	RCM Mark, Australia/NZ Emissions Compliant
Shipping Weight		0.24 lb (0.11 kg)

NS Series Network Zone Sensor—CO_2 Models

Supply Voltage		**Non-isolated:** 20 to 30 VAC (18 to 30 VDC), Class 2 or Safety Extra-Low Voltage (SELV)
		Isolated: 9.8 to 16.5 VDC; 15 VDC nominal (from SA bus)
Current Consumption		**Non-isolated:** 22 mA average at 24 VAC; 28 mA average at 24 VDC
		Isolated: 5 mA maximum, non-transmitting (from SA bus)
Power Consumption		**Non-isolated:** less than 0.7 W average
Terminations		**Non-isolated supply:** screw terminal block
		SA bus: Modular jack or screw terminal block
Sensor Addressing		DIP switch set from 212 to 219; factory set at 212
Wire Size		**Modular jack:** 24 AWG or 26 AWG (0.5 or 0.4 mm diameter) recommended; three twisted pair (six conductors)
		Screw terminal block: 18 to 22 AWG (1.0 to 0.6 mm diameter); 22 AWG (0.6 mm diameter) recommended
Communication Rate		**Auto-detect:** 9.6k, 19.2k, 38.4k, or 76.8k bps
CO_2 Measurement Range		0 to 2,000 ppm
CO_2 Sensing Accuracy		Plus or minus the sum of 40 ppm and 2.0% of the CO_2 reading at 77°F (25°C) and 978 hPa or an altitude of 1,000 ft/300 m **Note:** All accuracy specifications reflect the testing of the device using high-grade certified gases. This device is intended for an altitude range of 0 ft/0 m to 2,000 ft/600 m above sea level without compensation.
		Temperature dependence of output: -0.35% of the CO_2 reading per 1.8F°/1C° typical
		Pressure dependence of output: +0.15% of the CO_2 reading per 1 hPa typical
CO_2 Sensing Resolution		1 ppm
CO_2 Sensing Response Time		1 minute (0 to 90%)
CO_2 Sensing Warm-Up Time		Less than 1 minute; less than 10 minutes for full accuracy
CO_2 Sensing Long-Term Stability		Less than ±100 ppm over 5 years
Mounting		**Surface-mounted or vertical wallbox-mounted:** 120 x 80 mm
Ambient Conditions		**Operating:** 32 to 104°F (0 to 40°C); 10 to 90% RH, noncondensing; 85°F (29°C) maximum dew point; 700 to 1,200 hPa
		Storage: -40 to 158°F (-40 to 70°C); 0 to 95% RH, noncondensing
Compliance	**BACnet International**	BACnet Testing Laboratories™ (BTL) 135-2004 Listed BACnet Smart Sensor (B-SS)
	United States	UL Listed, File E107041 CCN PAZX, Under UL 916, Energy Management Equipment; FCC Compliant to CFR 47, Part 15, Subpart B, Class A
	Canada	UL Listed, File E107041, CCN PAZX7, Under CAN/CSA C22.2 No. 205, Signal Equipment; Industry Canada, ICES-003
CE	**Europe**	CE Mark – Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive 2004/108/EC.
	Australia and New Zealand	RCM Mark, Australia/NZ Emissions Compliant
Shipping Weight		0.35 lb (0.16 kg)

NS Series Network Zone Sensor—Flush-Mount Temperature Only Models

Supply Voltage		9.8 to 16.5 VDC; 15 VDC Nominal (from SA bus)
Current Consumption		12 mA maximum (non-transmitting) per flush-mount network sensor
Terminations		Screw terminal block **Note:** Wire leads are field supplied and are not tinned.
Sensor Addressing		DIP switch set from 200 to 203; factory set at 203
Wire Size		18 to 22 AWG (1.0 to 0.6 mm diameter); 22 AWG (0.6 mm diameter) recommended; 10 ft (304.8 cm) wiring lead Included with the unit
Communication Rate		**Auto-detect:** 9.6k, 19.2k, 38.4k, or 76.8k bps
Temperature Measurement Range		32.0°F/0.0°C to 104.0°F/40.0°C
Temperature Sensor Type		Local 1k ohm Platinum Resistance Temperature Detector (RTD); Class A per IEC 60751
Temperature Accuracy		**NS Series Network Zone Sensor:** ±1.0F°/±0.6C°
		Temperature Element Only: 0.35F° at 70°F (0.2C° at 21°C)
Ambient Conditions		**Operating:** 32 to 104°F (0 to 40°C); 10 to 90% RH, noncondensing; 85°F (29°C) Maximum Dew Point
		Storage: -40 to 158°F (-40 to 70°C); 5 to 95% RH, noncondensing
Compliance	**BACnet International**	BACnet Testing Laboratories™ (BTL) 135-2004 Listed BACnet Smart Sensor (B-SS)
	United States	UL Listed, File E107041, CCN PAZX, Under UL 916, Energy Management Equipment; FCC Compliant to CFR 47, Part 15, Subpart B, Class A
	Canada	UL Listed, File E107041, CCN PAZX7, Under CAN/CSA C22.2 No. 205, Signal Equipment; Industry Canada, ICES-003
CE	**Europe**	CE Mark – Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive 2004/108/EC.
	Australia and New Zealand	RCM Mark, Australia/NZ Emissions Compliant
Shipping Weight		0.25 lb (0.11 kg)

NS Series Network Discharge Air Sensors

Supply Voltage		9.8 to 16.5 VDC; 15 VDC nominal
Current Consumption		12 mA maximum (non-transmitting) per discharge air sensor
Terminations		Four color-coded wiring leads, stripped and tinned; factory-installed at the discharge air sensor screw terminal block
Sensor Addressing		DIP switch set from 204 to 211; factory set at 204
Wire Size		18 to 22 AWG (1.0 to 0.6 mm diameter); 22 AWG (0.6 mm diameter) recommended; 10 ft (305 cm) wiring lead included with the unit
Communication Rate		**Auto-detect:** 9.6k, 19.2k, 38.4k, or 76.8k bps
Mounting		**Duct-mounted:** 4 or 8 in. (102 or 203 mm) temperature probe length
Temperature Measurement Range		14°F/-10°C to 140°F/60°C
Temperature Sensor Type		Local 1k ohm Platinum Resistance Temperature Detector (RTD); Class A per IEC 60751
Temperature Accuracy		**NS Series Network Discharge Air Sensor:** ±1.0F°/±0.6C°
		Temperature element only: 0.35F° at 70°F (0.2C° at 21°C)
Ambient Conditions		**Operating:** 14 to 140°F (-10 to 60°C); 10 to 90% RH, noncondensing; 85°F (29°C) Maximum Dew Point
		Storage: -40 to 158°F (-40 to 70°C); 5 to 95% RH, noncondensing
Compliance	**BACnet International**	BACnet Testing Laboratories™ (BTL) 135-2004 Listed BACnet Smart Sensor (B-SS)
	United States	UL Listed, File E107041, CCN PAZX, Under UL 916, Energy Management Equipment; FCC Compliant to CFR 47, Part 15, Subpart B, Class A
	Canada	UL Listed, File E107041, CCN PAZX7, Under CAN/CSA C22.2 No. 205, Signal Equipment; Industry Canada, ICES-003
CE	**Europe**	CE Mark – Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive 2004/108/EC.
	Australia and New Zealand	RCM Mark, Australia/NZ Emissions Compliant
Shipping Weight		**NS-DTN7043-x:** 1.15 lb (0.52 kg)
		NS-DTN7083-x: 1.17 lb (0.53 kg)

NS Series Network Sensors with Fault Code Capability (Part 1 of 2)

Supply Voltage		9.8 to 16.5 VDC; 15 VDC nominal (from SA bus)
Current Consumption		21 mA maximum, non-transmitting (from SA bus)
Network Sensor Addressing		DIP switch set from 200 to 203; factory set at 203
Terminations		Screw terminal block
Screw Terminal Wire Size		18 to 22 AWG (1.0 to 6.0 mm diameter); 22 AWG (0.6 mm diameter) recommended
Communication Rate		Auto-detect: 9.6k, 19.2k, 38.4k, or 76.8k bps
Temperature Measurement Range		32.0°F/0.0°C to 104.0°F/40.0°C
Temperature Sensor Type		Local Platinum Resistance Temperature Detector (RTD)
Temperature Resolution		±0.5F°/±0.5C°
Temperature Accuracy	**NS Series Network Sensor**	±1.0F°/±0.6C°
	Temperature Element Only	0.35F° at 70°F (0.2C° at 21°C)
Time Constant		10 minutes nominal at 10 fpm airflow

NS Series Network Sensors with Fault Code Capability (Part 2 of 2)

Default Temperature Setpoint Adjustment Range		50.0°F/10.0°C to 86.0°F/30.0°C in 0.5° increments
Ambient Conditions	**Operating**	32 to 104°F (0 to 40°C); 10 to 90% RH, noncondensing; 85°F (29°C) maximum dew point
	Storage	-4 to 140°F (-20 to 60°C); 5 to 95% RH, noncondensing
Compliance	**United States**	UL Listed, File E107041, CCN PAZX, Under UL 916, Energy Management Equipment
		FCC Compliant to CFR 47, Part 15, Subpart B, Class A
	Canada	UL Listed, File E107041, CCN PAZX7, Under CAN/CSA C22.2 No. 205, Signal Equipment
		Industry Canada, ICES-003
CE	**Europe**	CE Mark – Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive 2004/108/EC.
	Australia and New Zealand	RCM Mark, Australia/NZ Emissions Compliant
Dimensions (Height x Width x Depth)		**NS-ATBF703-x:** 3-5/32 x 3-5/32 x 1-3/8 in. (80 x 80 x 35 mm) **NS-BTB7F03-x:** 4-23/32 x 3-5/32 x 1-3/8 in. (120 x 80 x 35 mm)
Shipping Weight		0.25 lb (0.11 kg)

European Single Point of Contact:

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45143 ESSEN
GERMANY

NA/SA Single Point of Contact:

JOHNSON CONTROLS
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USA

APAC Single Point of Contact:

JOHNSON CONTROLS
C/O CONTROLS PRODUCT MANAGEMENT
NO. 22 BLOCK D NEW DISTRICT
WUXI JIANGSU PROVINCE 214142
CHINA

The performance specifications are nominal and conform to acceptable industry standards. For application at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls shall not be liable for damages resulting from misapplication or misuse of its products.

United States Emissions Compliance

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when this equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area may cause harmful interference, in which case users will be required to correct the interference at their own expense.

Canadian Emissions Compliance

This Class (A) digital apparatus meets all the requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la Classe (A) respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

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