Applications
The vertical wallbox-mounted or surface-mounted occupancy sensing NS Series Network Sensor with LCD is an electronic zone sensor designed to function directly with Johnson Controls® BACnet® Master-Slave/Token-Passing (MS/TP) digital controllers in HVAC systems. Models in this series monitor the temperature setpoint and zone temperature, and transmit this data to a field controller on the Sensor Actuator (SA) Bus.

All models 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, residence halls, 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.

An LCD and, depending on the model, either a temperature setpoint dial or setpoint adjustment buttons are featured on all models to make adjusting the temperature setpoint and viewing the zone temperature easier.

A °F/°C pushbutton is available on all models to provide temperature scale options for display. An occupancy override function is featured on all models, which allows you to signal the controller that the space is occupied or to request an override of time-of-day scheduling. Rotating the setpoint dial or pressing either setpoint adjustment button signals occupancy. See Temperature Setpoint Adjustment/Occupancy Override for more information.

Depending on the model chosen, you can terminate the wires that connect the network sensor to the controller using either a modular jack or screw terminal block, which offers wiring flexibility.

Note: The model featuring a modular jack is not intended for installations where daisy chaining to the MS/TP Bus is required.

All models include an SA Bus access port for connecting accessories to access the SA Bus. This feature allows a technician to commission or service the controller through the network sensor.

Note: Since some NS Series Network Sensor features are not supported in previous releases of Metasys® or Facility Explorer system software, we recommend that you keep the system software up to date.

IMPORTANT: The occupancy sensing 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.

IMPORTANT: Le occupancy sensing NS Series Network Sensor est destiné à transmettre des données entrantes à un équipement dans des conditions normales de fonctionnement. Lorsqu'une défaillance ou un dysfonctionnement du network sensor risque de provoquer des blessures ou d'endommager l'équipement contrôlé ou un autre équipement, la conception du système de contrôle doit intégrer des dispositifs de protection supplémentaires. Veiller dans ce cas à intégrer de façon permanente d'autres dispositifs, tels que des systèmes de supervision ou d'alarme, ou des dispositifs de sécurité ou de limitation, ayant une fonction d'avertissement ou de protection en cas de défaillance ou de dysfonctionnement du network sensor.
North American Emissions Compliance

United States

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.

Canada

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.

Installation

Special Tools Needed
A 1/16 in. (1.5 mm) Allen wrench or a Johnson Controls T-4000-119 Allen-Head Adjustment Tool is required during installation.

Mounting

Note: For wallbox-mounted installations, the occupancy sensing NS Series Network Sensor is intended to be mounted on a vertically roughed-in wallbox only; do not attempt to mount the network sensor on a horizontally roughed-in wallbox.

Location Considerations
Locate the network sensor:

• on a partitioning wall, approximately 5 ft (1.5 m) above the floor in a location of average temperature
• away from direct sunlight, radiant heat, outside walls, outside doors, air discharge grills, or stairwells; and from behind doors
• away from steam or water pipes, warm air stacks, unconditioned areas (not heated or cooled), or sources of electrical interference
• in a clear path between the PIR occupancy sensor and the space being monitored

Note: The network sensor is shock and vibration resistant; however, be careful not to drop the unit or mount it where it could be exposed to excessive vibration.

The following ambient operating conditions apply:

• Temperature: 32 to 104°F (0 to 40°C)
• Humidity: 10 to 90% Relative Humidity (RH), noncondensing; 85°F (29°C) maximum dew point

To mount the network sensor:
1. Use a 1/16 in. (1.5 mm) Allen wrench or Johnson Controls T-4000-119 Allen-Head Adjustment Tool to loosen the security screw on the top of the unit.
2. Insert a coin into the slot next to the security screw location, then carefully pry the top edge of the sensor assembly away from its mounting base and remove.

IMPORTANT: Do not remove the Printed Circuit Board (PCB). Removing the PCB voids the product warranty.
3. For vertical wallbox-mounted installations, proceed to Step 4. For surface-mounted installations, proceed to Step 7.

4. Pull out approximately 6 in. (152 mm) of cable from the wallbox and insert the cable through the hole in the mounting base.

5. Align the mounting base on the wallbox.

   **Note:** Confirm that the mounting base is positioned with the proper edge up. The mounting base is positioned properly when the security screw is located on the top edge of the base.

6. Secure the mounting base to the wallbox using the two No. 6 pan-head mounting screws included with the unit. Proceed to Step 9.

7. Align the mounting base on the wall and use the base as a template to mark the location of the two mounting holes on the surface.

   **Note:** Confirm that the mounting base is positioned with the proper edge up. The mounting base is positioned properly when the security screw is located on the top edge of the base.

8. Secure the mounting base to the wall using the appropriate mounting hardware (field furnished). Proceed to Step 9.

9. Wire the network sensor. For more details on wiring the MS/TP Communications Bus, refer to the *MS/TP Communications Bus Technical Bulletin* (LIT-12011034) or the *FX-PC Series Controllers MS/TP Communications Bus Technical Bulletin* (LIT-12011670).

   For the model featuring a modular jack, simply snap the wiring plug into the jack. See Figure 1 for modular jack pin number assignments. The modular jack model requires a straight-through, one-to-one connection (not a crossover). For the model featuring a screw terminal block, wire the unit as illustrated in Figure 2.

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**CAUTION**

**Risk of Electric Shock.**
Disconnect the power supply before making electrical connections to avoid electric shock.

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**ATTENTION**

**Risque de décharge électrique.**
Débrancher l'alimentation avant de réaliser tout raccordement électrique afin d'éviter tout risque de décharge électrique.

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**IMPORTANT:** Failure to adhere to these wiring details causes the network sensor to function incorrectly. You will not be able to connect to the system using the wireless commissioning converter or the handheld VAV balancing tool, and you will not be able to expand the system with future offerings.
10. Align the tabs on the bottom edge of the mounting base with the slots on the bottom edge of the network sensor assembly and rotate the assembly onto its mounting base.

**Note:** On the model featuring a screw terminal block, be certain that the terminal block pins align with the holes in the terminal block.

11. Use a 1/16 in. (1.5 mm) Allen wrench or Johnson Controls T-4000-119 Allen-Head Adjustment Tool to tighten the security screw and fasten the network sensor assembly to the mounting base.

**Note:** Do not overtighten the security screw to avoid damaging the unit.

12. Before use, clean the lens of the PIR occupancy sensor with a soft, dry cloth.

**Note:** Do not use water or other solvents to clean the lens.
13. Use the Metasys Controller Configuration Tool (CCT) or Facility Explorer Programmable Controller Tool (FX-PCT) software to commission the network sensor. Refer to the Controller Tool Help (LIT-12011147) for more details.

Setup and Adjustments

**Figure 3: LCD on Temperature Only Models**

![LCD on Temperature Only Models](image)

**Temperature Setpoint Adjustment/Occupancy Override**

Depending on the model, you can use either the large temperature setpoint adjustment dial or the temperature setpoint adjustment buttons on the face of the network sensor to change the controller mode from unoccupied to occupied, or to adjust the temperature setpoint.

To change the occupancy mode using the dial, rotate the dial slightly, so the backlight on the LCD lights up. If you rotate the dial slightly again and the controller is in the unoccupied mode, the controller changes from the after-normal-working-hours setback mode to the normal-working-hours comfort mode. Alternatively, you can use the pushbuttons to change the controller mode from unoccupied to occupied.

To adjust the setpoint using the dial, continue rotating the dial until the current setpoint is displayed and flashing. Turn the dial clockwise to increase the setpoint and counterclockwise to decrease the setpoint. Stop turning the dial once the preferred setpoint is reached. The new setpoint stops flashing and becomes fixed after a few seconds. To use the pushbuttons instead, press the up arrow button to increase the setpoint or the down arrow to decrease it.

**°F/°C Temperature Mode Selection**

All models include a °F/°C pushbutton on the face of the network sensor to provide temperature scale options for display. Pressing the pushbutton toggles the temperature mode between Fahrenheit and Celsius on the LCD.

**Network Sensor Addressing**

All occupancy sensing NS Series Network Sensors with LCD have a default device address of 199 on the SA Bus.

**Repair Information**

If the occupancy sensing NS Series Network Sensor fails to operate within its specifications, replace the unit. For a replacement network sensor, contact the nearest Johnson Controls representative.
### Technical Specifications

**Vertical Wallbox-Mounted or Surface-Mounted Occupancy Sensing NS Series Network Sensors with LCD (Part 1 of 2)**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
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</thead>
<tbody>
<tr>
<td><strong>Supply Voltage</strong></td>
<td>9.8 to 16.5 VDC; 15 VDC nominal (from SA Bus)</td>
</tr>
<tr>
<td><strong>Current Consumption</strong></td>
<td>21 mA maximum (non-transmitting)</td>
</tr>
<tr>
<td><strong>Terminations</strong></td>
<td>Modular jack or screw terminal block</td>
</tr>
<tr>
<td><strong>Network Sensor Addressing</strong></td>
<td>Fixed address of 199</td>
</tr>
</tbody>
</table>
| **Wire Size** | **Modular Jack Models**: 24 or 26 AWG (0.5 or 0.4 mm diameter); 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 |
| **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 Resolution** | ±0.5°F/±0.5°C |
| **Temperature Accuracy** | **NS Series Network Zone Sensor**: ±1.0°F/±0.6°C  
**Temperature Element Only**: 0.35°F at 70°F (0.2°C at 21°C) |
| **Humidity Accuracy** | **NS-MHB7004-x Models**: ±3% RH for 20% to 80% RH at 77°F (25°C); ±6% RH for 10% to 20% RH and 80% to 90% RH at 77°F (25°C) |
| **Time Constant** | 10 minutes nominal at 10 fpm airflow |
| **Default Temperature Setpoint Adjustment Range** | 50.0°F/10.0°C to 86.0°F/30.0°C in 0.5° increments |
| **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**: -4 to 140°F (-20 to 60°C); 5 to 95% RH, noncondensing |
## Compliance

<table>
<thead>
<tr>
<th>Compliance</th>
<th>BACnet International</th>
<th>United States</th>
<th>Canada</th>
<th>Europe</th>
<th>Australia and New Zealand</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BACnet Testing Laboratories™ (BTL) 135-2004 Listed BACnet Smart Sensor (B-SS)</td>
<td>UL Listed, File E107041, CCN PAZX, Under UL 916, Energy Management Equipment</td>
<td>UL Listed, File E107041, CCN PAZX7, Under CAN/CSA C22.2 No. 205, Signal Equipment</td>
<td>CE Mark – Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive.</td>
<td>Regulatory Compliance Mark (RCM), Australia/NZ Emissions Compliant</td>
</tr>
</tbody>
</table>

### Dimensions

| Dimensions (Height x Width x Depth) | 4-23/32 x 3-5/32 x 1-3/8 in. (120 x 80 x 35 mm) |
| Shipping Weight | 0.24 lb (0.11 kg) |

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 damage resulting from misapplication or misuse of its products.

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