

NS Series Flush-Mount Network Sensors

Installation Instructions

NS-FTN7003-0, NS-FTN7003-2

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Refer to the [QuickLIT website](#) for the most up-to-date version of this document.

Applications

The NS Series Flush-Mount Network Sensors are wall-mounted temperature sensors designed for use with Johnson Controls® digital controllers in Heating, Ventilating, and Air Conditioning (HVAC) systems. Models in this series monitor the space temperature, typically in a room, and transmit this data to a Field Equipment Controller (FEC), a Variable Air Volume (VAV) Modular Assembly (VMA) 16, or a Network Control Engine (NCE) on the Sensor Actuator (SA) Bus. The wires connecting the network sensor to the controller must be terminated using the screw terminal block on the flush-mount sensor module.

The wall sensors include DIP switches for applications requiring multiple flush-mount sensors, each with a unique DIP switch address.

IMPORTANT: The NS Series Flush-Mount Network Sensor is intended to provide an input to equipment under normal operating conditions. Where failure or malfunction of the flush-mount 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 flush-mount sensor.

IMPORTANT : Le NS Series Flush-Mount 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 flush-mount 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 flush-mount 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 is likely to cause harmful interference, in which case the user will be required to correct the interference at his/her 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.

Mounting

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

Note: The flush-mount network sensors are shock and vibration resistant; however, be careful not to drop the unit or mount them where they could be exposed to excessive vibration.

Location Considerations

Consider the following mounting location guidelines:

- Avoid areas subject to excessive vibration, electrical noise, direct sunlight, or the effects of radiant heat.

Mounting the Flush-Mount Network Sensor

Mount the temperature sensor as follows:

1. Remove the appropriate knockout on the standard utility conduit box for the application.
2. Remove the faceplate and SA Bus board. The SA Bus board is enclosed inside the non-conductive pouch.
3. Suspend the faceplate from the utility box using the supplied rubber band. This action ensures that the weight of the faceplate does not pull on the SA Bus board when you make the wiring connections.
4. Make SA Bus wiring connections to the sensor electronics module. Table 1 describes the terminal designations.
5. Install the electronics board inside of the non-conductive pouch. Fold the pouch and place it inside the electrical utility box (Figure 1).

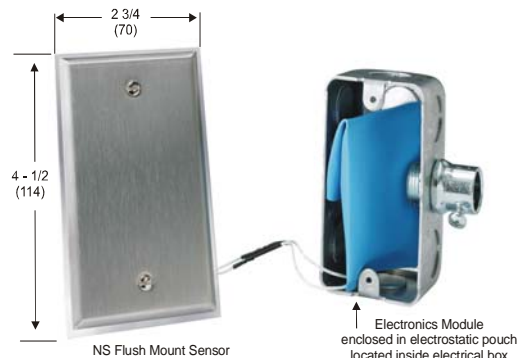


Figure 1: Installing a Flush-Mount Network Sensor to the Conduit Box
Dimensions, in. (mm)

Note: The non-conductive pouch is designed and sized to protect the electronic equipment from secondary electrostatic discharge. Do not cut or modify the pouch. Ensure that the electronics module is fully inserted down to the bottom, and that the pouch end is folded as instructed.

Note: Level the sensor for appearance; however, the sensor functions normally when not level.

6. Mount the sensor to the wall box or electrical box using the screws provided.

- Use the Controller Configuration Tool (CCT) software to commission the flush-mount sensor. Refer to the CCT *Help* for more details.

Wiring

If the NS Series Flush-Mount Network Sensor is used in an application requiring multiple temperature sensors, each with a unique DIP switch address, set the DIP switches before wiring the unit.

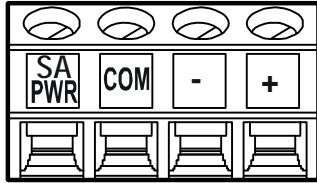


Figure 2: Wiring to the SA Bus Screw Terminal Block

Table 1: Terminal Designations

Signal Name	Terminal Label	Wire Capacity	Function
SA +	+	18 to 22 AWG (1.0 to 0.6 mm Diameter); 22 AWG (0.6 mm Recommended)	Non-Inverting RS-485 Signal
SA -	-		Inverting RS-485 Signal
BUS Common	COM		Signal Reference and Power Return
SA PWR	SA PWR		+15 VDC Power (Input) for Internal Electronics

Network Sensor Addressing

Most network sensors have a default device address of 199 on the SA Bus.

Averaging models are shipped with both switches set to ON, resulting in a device address of 203. Device addresses can be DIP switch set from 200 to 203; see Figure 3 and Table 2 for more details.

Table 2 lists the available DIP switch addresses and the DIP switch settings required to obtain them. Figure 2 shows how to wire the flush-mount sensor to the SA Bus screw terminal block.

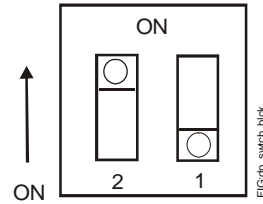


Figure 3: Setting the DIP Switch Block

Table 2: Network Sensor Addressing

DIP Switch Address	Switch 2	Switch 1
200	Off	Off
201	Off	On
202	On	Off
203	On	On

Note: For more details on wiring the Master-Slave/Token-Passing (MS/TP) Communications Bus, refer to the *MS/TP Communications Bus Technical Bulletin (LIT-12011034)*.



CAUTION: Risk of Electric Shock.

Disconnect the power supply before making electrical connections to avoid electric shock.

MISE EN GARDE : Risque de décharge électrique.

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

IMPORTANT: Failure to adhere to these wiring details causes the flush-mount sensor to function incorrectly.

Repair Information

If the NS Series Flush-Mount Network Sensor fails to operate within its specifications, replace the unit. For a replacement flush-mount sensor, contact the nearest Johnson Controls representative.

Technical Specifications

NS Series Flush-Mount Network Sensors

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 Flush Mount Network Sensor: $\pm 1.0\text{F}^\circ/\pm 0.6\text{C}^\circ$ Temperature Element Only: 0.35F° at 70°F (0.19C° 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 Europe: CE Mark – Johnson Controls, Inc. 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: C-Tick Mark, Australia/NZ Emissions Compliant
Shipping Weight	0.25 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, Inc. shall not be liable for damage resulting from misapplication or misuse of its products.



Building Efficiency

507 E. Michigan Street, Milwaukee, WI 53202

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