

# clarity<sup>3</sup> NetSensors

## NS 100/200 Series Digital Room Sensors

### DESCRIPTION

Taco100/200 series NetSensors are wall-mounted digital space temperature sensors designed for use with Taco Clarity<sup>3</sup> series controllers. Key features include the following:

- Up to four sensors in a single package minimizes labor, wiring, and wall space, while optional humidity, motion, and CO<sub>2</sub> sensors allow expanded energy-efficient control of humidity, temperature setback, lighting, and ventilation.
- A user-friendly three-button integrated operator interface provides system viewing and adjusting for occupants.
- The upper (default) LCD display shows room temperature and setpoints. A lower (default) display shows local time and can be enabled to show (dependent on sensors and controller configuration) % relative humidity, CO<sub>2</sub> ppm, and outside air temperature (°F or °C) in rotation. Both displays can be configured to show any controller default or calculated analog or binary values (such as airflow or energy consumption), and multiple values can show in rotation.
- It allows up to two separate passwords for adjusting set-points and configuring/commissioning/balancing.
- Up to 32 additional command points can be configured for user control and monitoring of a connected system (e.g., lighting, fan, or AHU control) from the display
- It connects to a controller via a modular jack connection using standard Ethernet patch cables.
- It installs permanently as a room sensor or temporarily as a service tool; as a service tool, it commissions controllers without software, configures communication and application settings, and balances VAV air flow.
- An HPO-9001 NetSensor® distribution module allows up to eight 100/200 series NetSensors to be linked to one controller or allows one STE-6010/6014/6017 analog temperature sensor to be connected with up to seven NetSensors.



### APPLICATIONS

Temperature sensing to Clarity<sup>3</sup> series controllers for such applications as RTUs, HPU, FCUs, AHUs, VAV terminal units, and unit ventilators.

Optional humidity sensing is for **dehumidification and/or humidification** sequences.

Optional motion sensing **enhances occupancy-based control** for lighting control, temperature setback, or self-learning schedules.

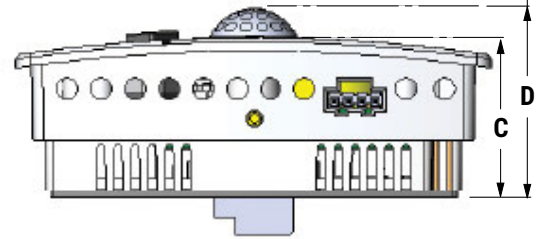
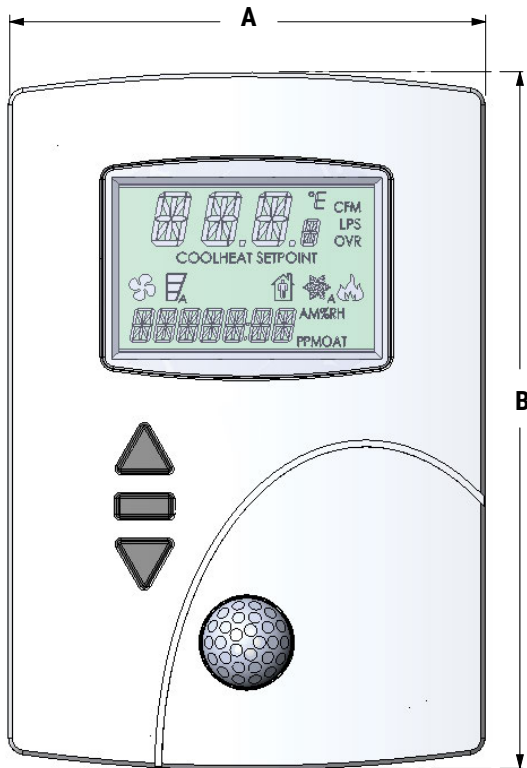
Optional CO<sub>2</sub> sensing enables **demand-control ventilation (DCV)** for optimizing ventilation and energy efficiency.

### MODELS

APPLICATIONS: TEMPERATURE CONTROL PLUS...	INTEGRATED SENSORS*				MODEL**
	Temp.	Humidity	Motion	CO <sub>2</sub>	
Temperature control only					CLAR-NS-101
Humidity control for dehumidification/humidification		✓			CLAR-NS-201
Enhanced occupancy-based control (lighting/setback/self-learning)			✓		CLAR-NS-102
Humidity and occupancy control	✓	✓	✓		CLAR-NS-202
DCV (Demand-Control Ventilation)				✓	CLAR-NS-111
Humidity and ventilation control		✓		✓	CLAR-NS-211
Occupancy and ventilation control			✓	✓	CLAR-NS-112
Humidity, occupancy, and ventilation control		✓	✓	✓	CLAR-NS-212

\*All units have a temperature sensor (standard). See above for additional sensor options.

# SPECIFICATIONS



DIMENSIONS		
<b>A</b>	3.500 inches	89 mm
<b>B</b>	5.124 inches	130 mm
<b>C</b>	1.125 inches	29 mm
<b>D</b>	1.336 inches	34 mm

## Sensors

### Temperature Sensor (without humidity sensor)

Sensor type	Thermistor, 10K Type II
Accuracy	±0.36° F (±0.2° C)
Resistance	10,000 ohms at 77° F (25° C)
Operating range	48 to 96° F (8.8 to 35.5° C)

### Temperature Sensor (with humidity sensor)

Sensor type	CMOS
Accuracy	±0.9° F (±0.5° C) offset from 40 to 104° F (4.4 to 40° C)
Operating range	36 to 120° F (2.2 to 48.8° C)

### Humidity Sensor (optional)

Sensor type	CMOS
Range	0 to 100% RH
Accuracy @ 25°C	±2% RH (10 to 90% RH)
Response time	Less than or equal to 4 seconds

### CO<sub>2</sub> Sensor (optional)

Detector type	Non Dispersive Infrared (NDIR), with solid-state source and detector
Sample method	Diffusion
Rated life	15 years minimum

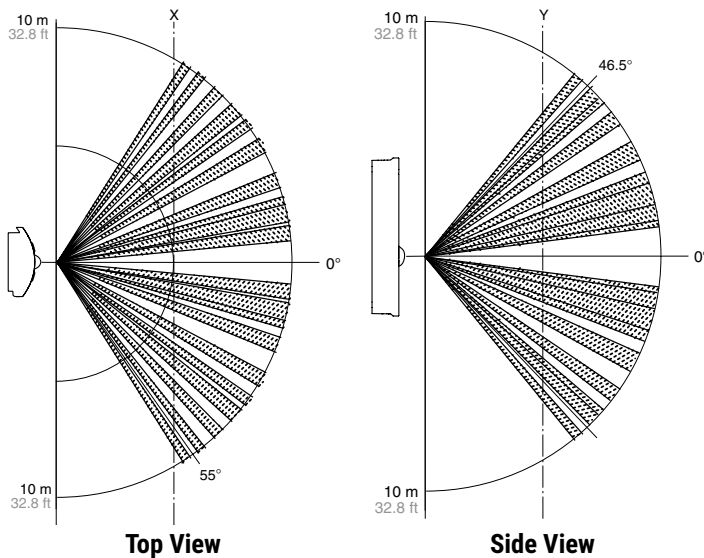
Operating limits	34° to 122° F (1.1 to 50° C)
Shipping limits	-22° to 140° F (-30° C to 60° C)
CO <sub>2</sub> range	0 to 2000 ppm, 0-1%
Accuracy	±50 ppm, ±3% of reading*
Non-linearity	< 1% of full scale
Calibration	Automatic calibration built-in*
Pressure dependence	0.13% of reading per mm Hg
Oper. pressure range	950 to 1050 bar
Warm-up time	10 seconds

**\*NOTE:** The CO<sub>2</sub> sensor uses a self-calibration technique designed to be used in applications where **CO<sub>2</sub> concentrations will periodically drop to outside ambient conditions** (approximately 400 ppm), typically during unoccupied periods. The sensor will typically reach its operational accuracy after 25 hours of continuous operation if it was exposed to ambient reference levels of air at 400 ±10 ppm CO<sub>2</sub>. The sensor will maintain accuracy specifications if it is exposed to the reference value at least four times in 21 days.

### Motion Sensor (optional)

Detector type	Passive infrared
Range and Coverage	33 feet (10 meters)—see <b>(Optional) Motion Sensing Coverage on page 3</b>

### (Optional) Motion Sensing Coverage



### Enclosure and Mounting

Weight	2.8 ounces (80 grams)
Case material	Flame-retardant plastic
Mounting	Surface mount directly to any flat surface or to a 2 x 4 inch or 4 x 4 inch electrical box (mounting on a 4 x 4 box or a horizontal 2 x 4 box requires an HMO-10000/10000W mounting backplate)

### Environmental Limits

Operating	34° to 125° F (1.1 to 51.6° C)*
Shipping	-40° to 140° F (-40°C to 60° C)*
Humidity	0 to 95% relative humidity non-condensing

**\*NOTE:** For models with the optional CO<sub>2</sub> sensor, see the reduced range in the operating and shipping limits in [CO<sub>2</sub> Sensor \(optional\) on page 2](#).

## Installation

### Connections

Connector type	Eight-wire RJ-45 modular jack
Cable type	Standard T568B (Category 5 or better) Ethernet patch cable up to 150 feet (45 meters)
Power	Supplied by connected controller

### Display

Type	Multifunctional LCD with backlight
Size	1.88 x 1.25 inches (48 x 32 mm)
Icons	Language-independent symbols for mode and operating status
Features	Four-character upper display (with units of °F, °C, CFM, LPS, OVR, COOL, HEAT, and SETPOINT) for room temperature and setpoints (see the drawing under <a href="#">Specifications on page 2</a> ) Icons showing fan, speed, occupancy, heating, cooling, and auto Seven-character lower display (with units of AM, PM, PPM, %, RH, and OAT) for local time and optional analog or binary values

## Warranty, Protocol, and Approvals

### Warranty

Taco Limited Warranty 5 years (from mfg. date code)

### Controller Protocol Compatibility

BACnet	Clarity Controllers
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### Regulatory Approvals

UL	UL 916 Energy Management Equipment listed
CE	CE compliant
RoHS 2	RoHS 2 compliant (pending)
FCC	FCC Class A, Part 15, Subpart B and complies with Canadian ICES-003 Class A*

\*This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

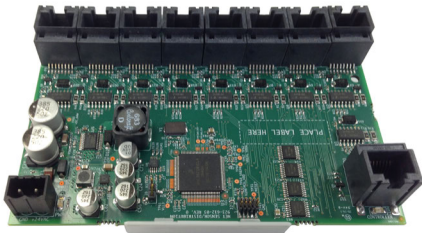
# HPO-9001 DISTRIBUTION MODULE

The (future release) HPO-9001 NetSensor distribution module allows up to eight STE-9000 series NetSensors to be linked to one Clarity<sup>3</sup> series controller.

The module provides power (from a connected 24 VAC transformer) and addressing (according to the connected port) for each NetSensor. It also allows one STE-6010/6014/6017 analog temperature sensor to be connected to a controller along with up to seven NetSensors.

The module may be connected to a controller with an Ethernet patch cable up to 150 feet (45 meters) long. Cables from the module to any NetSensors may also be up to 150 feet (45 meters) long.

The module board is mounted via supplied Snap Track.



## Installation

### Connections

Connector type	Eight-wire RJ-45 modular jacks
Cable type	Standard (Category 5 or better) Ethernet patch cable up to 150 feet (45 meters)

### Power

Supply voltage	24 VAC (-15%, +20%), 50/60 Hz, Class 2 only; non-supervised (all circuits, including supply voltage, are power limited circuits)
Wire size	12–24 AWG, copper, in removable screw terminal block

## Enclosure and Mounting

Mounting	Provided with 3.25 x 4 inch (83 x 102 mm) Snap Track
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## Environmental Limits

Operating	32 to 120° F (0 to 49° C)
Shipping	-40 to 160° F (-40 to 71° C)
Humidity	0 to 95% relative humidity (non-condensing)

## Warranty, Protocol, and Approvals

### Warranty

Taco Limited Warranty 5 years (from mfg. date code)

### Controller Compatibility

BACnet	Clarity <sup>3</sup> series
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### Regulatory

UL	UL 916 Energy Management Equipment (pending)
CE	CE compliant (pending)
RoHS 2	RoHS 2 compliant (pending)
FCC	FCC Class B, Part 15, Subpart B and complies with Canadian ICES-003 Class B (pending)*

\*This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

## SUPPORT

Additional resources for installation, configuration, application, operation, programming, upgrading, and much more are available on the web at [www.tacomfort.com](http://www.tacomfort.com).