

clarity³ 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 Clarity³ 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 CO₂ 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, CO₂ 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 setpoints 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 Clarity³ 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.

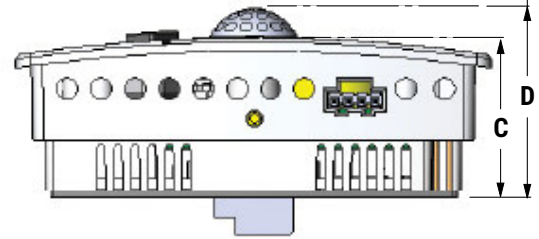
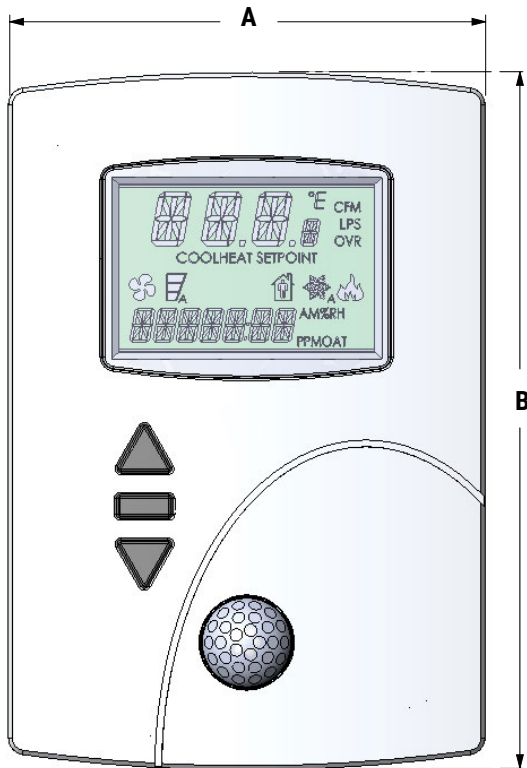
Optional CO₂ sensing enables **demand-control ventilation (DCV)** for optimizing ventilation and energy efficiency.

MODELS

| APPLICATIONS: TEMPERATURE CONTROL PLUS... | INTEGRATED SENSORS* | | | | MODEL** |
|---|---------------------|----------|--------|-----------------|-------------|
| | Temp. | Humidity | Motion | CO ₂ | |
| 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 | | |
|------------|--------------|--------|
| A | 3.500 inches | 89 mm |
| B | 5.124 inches | 130 mm |
| C | 1.125 inches | 29 mm |
| D | 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 |

CO₂ Sensor (optional)

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

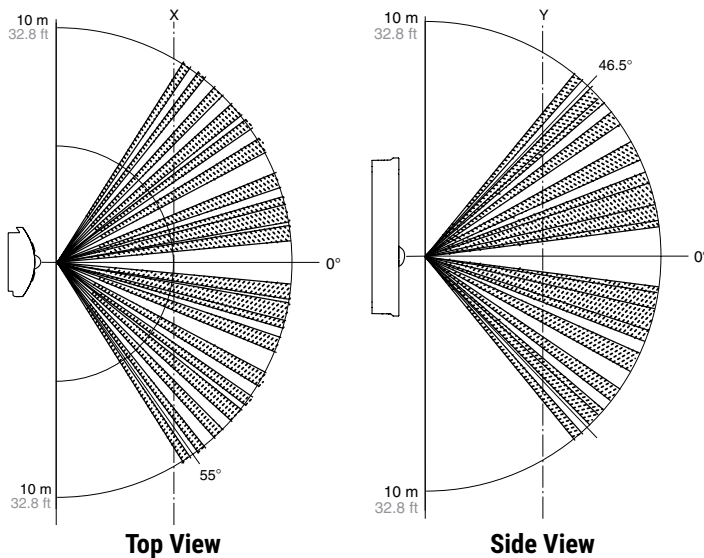
| | |
|-----------------------|----------------------------------|
| Operating limits | 34° to 122° F (1.1 to 50° C) |
| Shipping limits | -22° to 140° F (-30° C to 60° C) |
| CO ₂ range | 0 to 2000 ppm, 0-1% |
| Accuracy | ±50 ppm, ±3% of reading* |
| Non-linearity | < 1% of full scale |
| Calibration | 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 CO₂ sensor uses a self-calibration technique designed to be used in applications where **CO₂ 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 CO₂. 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 (Optional) Motion Sensing Coverage on page 3 |

(Optional) Motion Sensing Coverage



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 Specifications on page 2) 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 |

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 CO₂ sensor, see the reduced range in the operating and shipping limits in [CO₂ Sensor \(optional\) on page 2](#).

Warranty, Protocol, and Approvals

Warranty

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

Controller Protocol Compatibility

| | |
|--------|---------------------|
| BACnet | Clarity Controllers |
|--------|---------------------|

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.

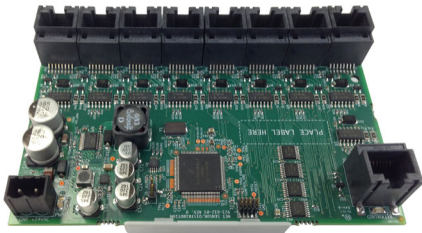
HPO-9001 DISTRIBUTION MODULE

The (future release) HPO-9001 NetSensor distribution module allows up to eight STE-9000 series NetSensors to be linked to one Clarity³ 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 |
|----------|--|

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 ³ series |
|--------|-----------------------------|

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.