



STE-9000 Series NetSensors

Digital Room Sensors

DESCRIPTION

KMC Conquest™ STE-9000 series NetSensors are wall-mounted digital space temperature sensors designed for use with KMC Conquest BAC-5900/9000/9300 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 (on models with a display, i.e. **non-NDL** models) provides system and IAQ monitoring and adjusting for occupants.
- The upper (default) LCD display (on non-NDL models) 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 (on non-NDL models) 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 (for models with a display) 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 STE-9000 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 BAC-5900/9000/9300 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 (for models with a display) 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

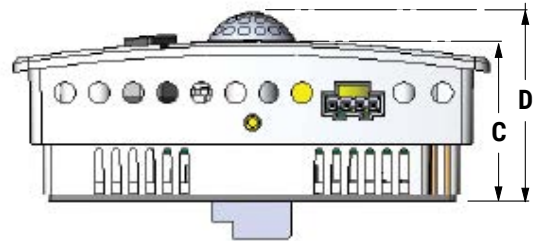
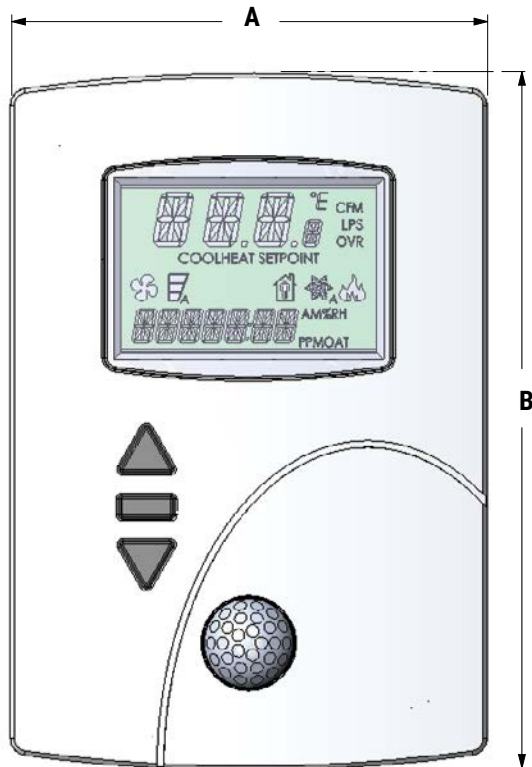
APPLICATIONS: TEMPERATURE CONTROL PLUS...	INTEGRATED SENSORS*				Display	MODEL**
	Temp.	Humidity	Motion	CO ₂		
Temperature control only					✓	STE-9001W
Temperature control only						STE-9001W-NDL
Humidity control for dehumidification/humidification		✓			✓	STE-9021W
Humidity control for dehumidification/humidification		✓				STE-9021W-NDL
Enhanced occupancy-based control (lighting/setback/self-learning)			✓		✓	STE-9201W
Humidity and occupancy control	✓	✓	✓		✓	STE-9221W
DCV (Demand-Control Ventilation)				✓	✓	STE-9301W
DCV (Demand-Control Ventilation)				✓		STE-9301W-NDL
Humidity and ventilation control		✓		✓	✓	STE-9321W
Humidity and ventilation control		✓		✓		STE-9321W-NDL
Occupancy and ventilation control			✓	✓	✓	STE-9501W
Humidity, occupancy, and ventilation control		✓	✓	✓	✓	STE-9521W

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

**A W at the end of the model number indicates a white case. To order the sensor with light almond color (for models with a display only) instead of white, drop the W on the end of the model number (e.g., STE-9001W is white and STE-9001 is light almond).

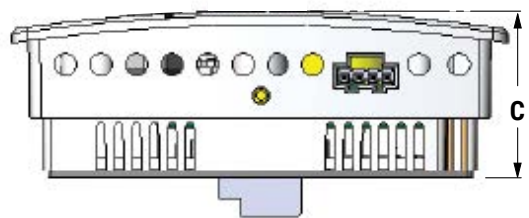
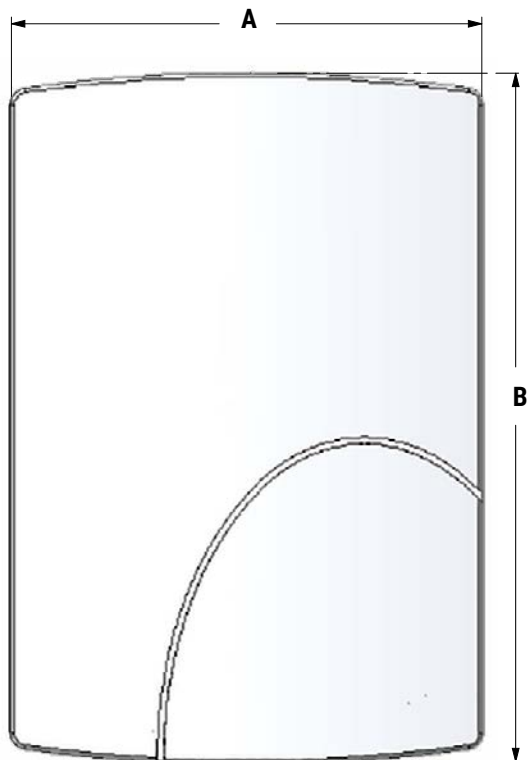
SPECIFICATIONS

Models with a Display



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

Models without a Display (NDL Models)



DIMENSIONS		
A	3.500 inches	89 mm
B	5.124 inches	130 mm
C	1.125 inches	29 mm

Sensors

Temperature Sensor (without humidity sensor)

Sensor type	Thermistor, 10K Type II
Accuracy	$\pm 0.36^\circ\text{ F}$ ($\pm 0.2^\circ\text{ C}$)
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	$\pm 0.9^\circ\text{ F}$ ($\pm 0.5^\circ\text{ C}$) 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)

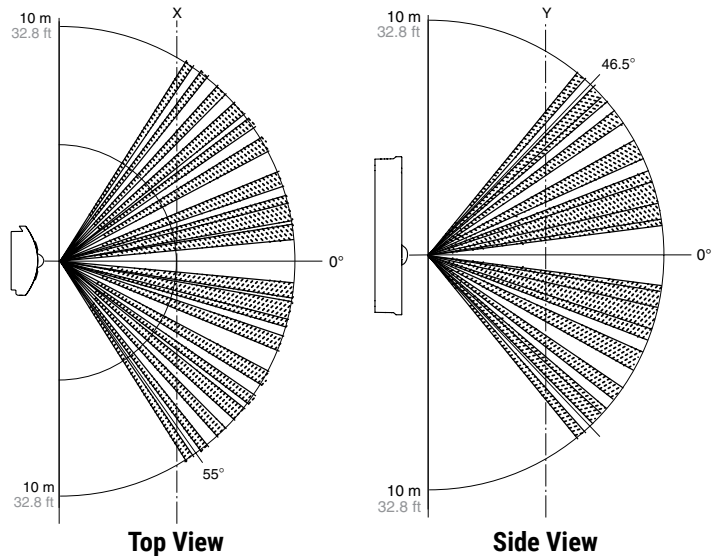
Sensor type	CMOS
Range	0 to 100% RH
Accuracy @ 25° C	$\pm 2\%$ RH (10 to 90% RH)
Response time	Less than or equal to 4 seconds

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, $\pm 3\%$ 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.

Optional (for models with a display) Motion Sensing Coverage



Motion Sensor (optional for models with a display)

Detector type	Passive infrared
Range and Coverage	33 feet (10 meters)

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 (on non-NDL models)

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 $^\circ\text{ F}$, $^\circ\text{ C}$, 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 3**.

Warranty, Protocol, and Approvals

Warranty

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

Controller Protocol Compatibility

BACnet BAC-5900/9000/9300 series

Regulatory Approvals

UL	UL 916 Energy Management Equipment listed
CE	CE compliant
RoHS 2	RoHS 2 compliant
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 HPO-9001 NetSensor distribution module allows up to eight STE-9000 series NetSensors to be linked to one BAC-5900/9000/9300 series controller (see [Sample Installation on page 6](#)).

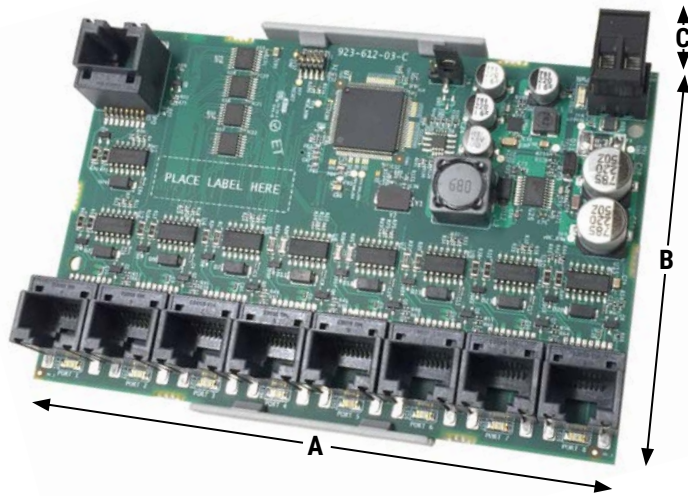
The module provides power (from a connected 24 VAC transformer) and addressing (according to the connected port) for each NetSensor. It also allows one STE-6010/6014/6017 analog temperature sensor to be connected to a controller along with up to seven NetSensors.

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.

Using the HPO-9001 requires custom configuration of objects and custom Control Basic code. See the [HPO-9001 installation guide and sample programs](#) for more information. One sample application selects the average temperature, highest temperature, or lowest temperature among three NetSensors. Another sample application is for eight NetSensors in eight zones with eight individual (HW valves for baseboard) heating setpoints but a combined single setpoint for (RTU) cooling.

Installation



Dimensions		
A	5 inches	127 mm
B	3-1/2 inches	89 mm
C	1-3/8 inches	35 mm

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)
Required power	12 VA
Wire size	12-24 AWG, copper, in removable screw terminal block

Enclosure and Mounting

Weight	3.2 ounces (91 grams)
Mounting	Provided with 3.25 x 4 inch (83 x 102 mm) Snap Track
Enclosures	An HCO-1034/1035/1036 or an HCO-1101

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

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

Controller Compatibility

KMC Conquest BAC-5900/9000/9300 series

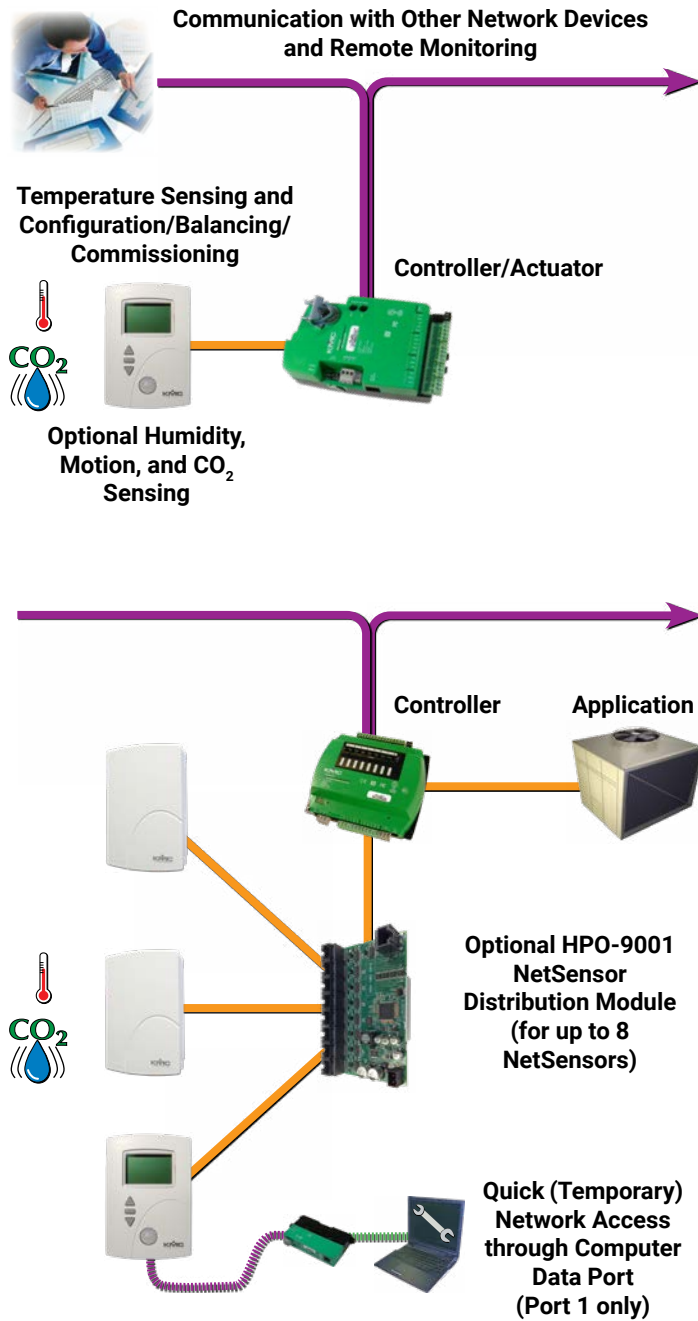
Regulatory

UL	UL Recognized, US and Canada
RoHS 2	RoHS 2 compliant
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.



SAMPLE INSTALLATION



For more information about installation and operation, see:

- [STE-9000 Series NetSensors Installation Guide](#)
- [Room Sensor and Thermostat Mounting and Maintenance Application Guide](#)
- [KMC Conquest Controller Application Guide](#)

ACCESSORIES

NOTE: For accessory details, see the respective product data sheets and installation guides.

HMO-10000	Light almond mounting plate, allows mounting to horizontal 2 x 4 or 4 x 4 inch electrical boxes
HMO-10000W	White version of HMO-10000
HPO-0044	Replacement cover hex screw
HPO-9001	NetSensor distribution module (see HPO-9001 Distribution Module on page 5)
HPO-9002	Foam insulating gasket (mounts between the black backplate and the electrical box)
HSO-9001	Ethernet patch cable, 50 feet
HSO-9011	Ethernet patch cable, 50 feet, plenum rated
HSO-9012	Ethernet patch cable, 75 feet, plenum rated
SP-001	Screwdriver (KMC branded) with hex end (for NetSensor cover screws) and flat blade end (for controller terminals)

SUPPORT

Additional resources for installation, configuration, application, operation, programming, upgrading, and much more are available on the web at www.kmccontrols.com. Log-in to see all available files.

