KMC CONTROLS
In touch.

Sensors

In Touch with Your Senses

Sensors and Their Relatives

In today's buildings, sensors are essential devices in maintaining efficient operation and healthy, comfortable environments for occupants. "Sensors" are used in diverse HVAC and building automation applications and are closely related to several other types of devices.

- **Sensors** measure a physical characteristic of an environment and provide a signal corresponding to those properties. Sensors may be stand-alone or integrated within a control device (e.g., a thermostat).
- **Transmitters** are also sensors, but take the relatively small (and passive) sensor signal (e.g., the resistance of a thermistor in response to a temperature) and convert it into an active voltage (e.g., 0–5 VDC) or active current (e.g., 4–20 mA). Boosting the signal allows greater distance between the sensor and the controller.
- **Transducers** convert one kind of energy into another. The physics may be different, but they can function as sensors. In building automation, transducers may convert pressure into voltage or current (or vice versa) or voltage signals into current signals (or vice versa).
- In building automation applications, many sensors, transmitters, and transducers perform essentially the same function, sensing a physical characteristic and providing a signal to an external control device. **Thermostats**, on the other hand, contain a sensor integrated with a control device. Thermostats may be as simple as a bimetallic switch or sophisticated digital devices. FlexStats, for example integrate a native BACnet controller with a temperature sensor and optional humidity, motion, and/or CO_2 sensors.

In building automation systems, sensors monitor air (temperature, humidity, CO_2 levels, CO levels, smoke, flow rate or pressure), water (temperature or pressure), or even motion/occupancy of people.

KMD-12x1 NetSensor with Motion Sensor

STE-6000 Series Room Temperature Sensors

Temperature and Humidity

Temperature sensors are the most familiar and most common types of sensors in building automation. The **STE-6000** series compact room temperature sensors offer various setpoint, override, and display options. The **STE-1400** series contains a variety of temperature sensors for a multitude of applications, including the temperature of air inside rooms, inside ducts, and outdoors, as well as the temperature of the heating/cooling water inside pipes.

Depending on the climate, however, temperature alone doesn't tell the whole story about human comfort. A (dry bulb) sensor temperature of 72° would feel very different to us at 10% relative humidity than it would at 90% relative humidity. Too much or too little humidity can be uncomfortable for people or even damaging to materials. KMC's **THE-1xxx** series humidity sensors can measure humidity in rooms or ducts. **NetSensors** and **FlexStats** with the optional humidity sensor measure and display room temperature as well as humidity.

STE-1400 Series Temperature Sensors

Carbon Dioxide and Motion

How much ventilation and conditioning of the air is needed for a space depends on how many people are occupying that space...if any at all. For spaces with variable occupancy (such as meeting rooms, classrooms, theaters, gyms, retail stores, and hotels), considerable energy savings can be obtained by determining the actual, real-time level of occupancy (compared to the "worst-case" design occupancy) and reducing the ventilation and conditioning accordingly (to just the right amount but no more).

Motion sensors can determine a simple yes-or-no occupancy state. **NetSensors** and **FlexStats** with the optional motion sensor (with an effective range of up to 33 feet) provide a convenient means of concluding if anybody's home inside a room.

A complementary and far more sophisticated approach senses the gas that people breathe out. By measuring the levels of CO_2, Demand Control Ventilation (DCV) estimates the amount of occupancy and required (healthy) levels of ventilation and adjusts the ventilation accordingly. **SAE-1000** series CO_2 detectors provide CO_2 measurements in rooms or ducts to external controllers. **FlexStats** with the CO_2 sensor option integrate demand control ventilation with temperature and optional humidity control.

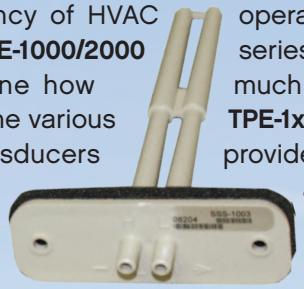
FlexStats, Integrated Temperature Sensors and Controllers, with Optional Humidity, Motion, and (above only) CO_2 Sensors

Carbon Monoxide and Smoke

Excessive levels of CO or combustion particulates mean not just discomfort, but danger! **SAE-1100** series CO detectors watch for this deadly and invisible gas. Also, where there's smoke, there's fire, and early detection is critically important. **CAE-1003/1103** detectors watch for smoke inside HVAC ducts.

Flow and Pressure

Although behind the scenes, the amount of and pressure of air and/or water flow are important factors in the efficiency of HVAC operation. **SSS-1000** series and **SSE-1000/2000** series flow sensors help determine how much air is flowing in the system. The various **TPE-1xxx** series pressure transducers provide pressure readings of air or water.



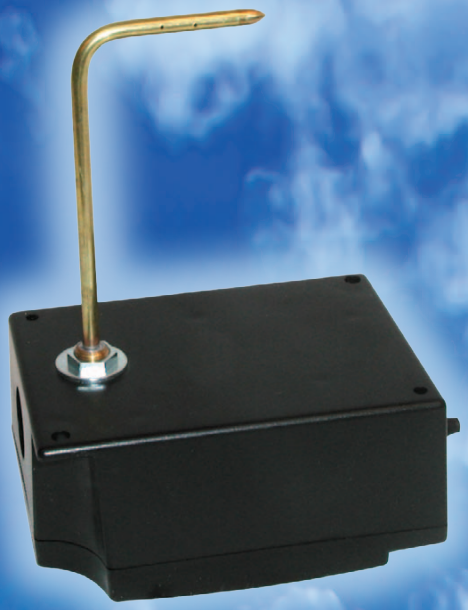
SSS-1003 Airflow Sensor

Sample Model Series	Sensing Types							Mounting Types	
	Temperature	Humidity	Motion	CO_2	CO	Smoke	Flow/Pressure	Wall	Duct/Other
FlexStat	X	X	X	X				X	
NetSensor	X	X	X					X	
CAE-1003/1103						X			X
SAE-1000				X				X	X
SAE-1100					X			X	X
SSE-1000/2000	X						X		X
SSS-1000							X		X
STE-1400	X							X	X
STE-5200/5300	X							X	
STE-6000	X							X	
THE-1xxx	X	X						X	X
TPE-1xxx							X	X	X

For details on these and other sensors, see their data sheets as well as the KMC product catalogs.

More Information

- For more information about KMC Controls, see our **Corporate Capabilities Brochure (SB-052).**
- To see sensors as part of a building automation system, see **Controlling Your Green Building Brochure (SB-048).**
- All these documents and more can be downloaded from the award-winning **KMC Controls web site (www.kmccontrols.com).**



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