



## **Mod-Tronic Instruments Provides Guidance on Types of HVAC Temperature Sensors**

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MOD-TRONIC Instruments Ltd., a Canadian distributor of temperature measurement and process control instrumentation, has published expanded technical guidance explaining the differences between the main types of HVAC temperature sensors and how each performs in commercial and residential heating, ventilation, air conditioning, and refrigeration systems. The guidance, available through the company's HVAC/R sensor resource page, is intended for building automation contractors, mechanical engineers, and facility maintenance personnel responsible for specifying temperature measurement equipment.

The material addresses a recurring source of confusion in the field: three distinct sensing technologies are commonly grouped under the same category, yet each behaves differently in service. Resistance temperature detectors, thermocouples, and thermistors all convert thermal conditions into an electrical signal, but they differ in accuracy, stability, response time, and usable temperature range.

Platinum and nickel-iron RTDs are described as the preferred choice where long-term stability and repeatable accuracy are required, which makes them common in building automation systems and air handling units. Thermocouples cover the widest temperature span and are typically applied where conditions exceed the

practical limits of other sensing elements. Thermistors, generally supplied in 2252 or 10K ohm configurations, offer rapid response in duct temperature monitoring and zone control applications where speed matters more than absolute precision.

"Contractors frequently ask us whether one sensor type is simply better than the others, and that isn't the right question," said Steven Ruple, President of MOD-TRONIC Instruments Ltd. "An RTD that performs beautifully in a chilled water loop may be the wrong specification for a duct application where response time drives the control sequence. What we want people to walk away with is a clear sense of how each technology behaves so they can match it to the job in front of them."

The guidance also covers form factor, which the company identifies as an equally consequential decision. Duct sensors are available in averaging and point-sensing configurations, with averaging elements suited to large cross-sections where stratification would otherwise distort a single-point reading. Outside air sensors, room air sensors, pipe surface sensors, fluid immersion probes, sump tank sensors, and refrigeration and freezer sensors each carry different mounting requirements and environmental ratings.

Freeze protection receives particular attention. Combination freeze-stat sensors are used to detect low-temperature conditions across a coil face and trigger protective action before damage occurs, a function the company notes is often specified late in a project despite its consequences for equipment reliability.

Installation practice forms a further section of the material. Sensor placement away from direct sunlight, supply air drafts, and adjacent heat sources is described as fundamental to accurate temperature measurement, since a correctly specified sensor installed in an unrepresentative location will report readings that mislead the control system. Adherence to manufacturer mounting guidance, appropriate immersion depth for fluid applications, and proper thermal contact for pipe surface sensors are each identified as factors that materially affect measured accuracy.

Calibration is addressed as an ongoing requirement rather than a one-time step. NIST-traceable calibration establishes a documented reference at commissioning, and periodic verification allows sensor drift to be identified before it degrades climate control performance or energy efficiency. The company also notes that matched system calibration, in which a transmitter and sensor are calibrated together as a pair, can improve overall loop accuracy in applications with tight tolerances.

Environmental conditions further narrow the selection. Humidity, condensation, chemical exposure, vibration, and temperature extremes all influence which sensor construction and enclosure rating will survive in a given location, and hazardous area installations introduce additional approval requirements such as CSA and FM explosion-proof and flame-proof ratings.

"Energy performance in a building is only as good as the data the control system receives," Ruple said. "A half-degree error in the wrong place compounds across an entire season of operation. Getting the sensor selection right at the specification stage costs almost nothing compared with correcting it after the building is occupied."

MOD-TRONIC Instruments Ltd. distributes temperature sensors, transmitters, controllers, and related instrumentation from sixteen manufacturers, serving building automation, industrial process, and climate control markets across Canada. The company operates from Brampton, Ontario, with branch coverage in Halifax, Montreal, Winnipeg, Regina, Calgary, Edmonton, and Vancouver, and maintains stocking inventory of commonly specified HVAC sensor configurations.

For more information on HVAC temperature sensors and related products, visit <https://www.mod-tronic.com/hvac-r-sensors.html>.

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*MOD-TRONIC is a distributor of fourteen high-quality manufacturers of industrial Sensors, Transducers, Heaters, Controls, and Instrumentation. We are very proud to say that the majority of the products we sell are made in the USA.*

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