BELIMO SENSORS

Zero Failures

Belimo Helps Trane Technologies Streamline Sensor Installation and Commissioning

Built in 1999 and located in Madison, Alabama, Heritage Elementary School serves grades K-5 and enrolls more than 800 students. In 2021, Trane Technologies' Huntsville, Alabama branch was contracted to overhaul the school's existing building automation systems (BAS) as part of an overall HVAC system renovation and upgrade. The scope of work included replacing 73 water source heat pumps, adding an additional hot water boiler, hot water circulating pump, and upgrading the existing control system. As part of the project, Trane also needed to install 79 new temperature and humidity sensors – one for each heat pump and six additional sensors for make-up air units. Due to time constraints and the need to minimize potential rework caused by sensor failures, they turned to Belimo.

TYPE OF BUILDING
Elementary School

PROJECT
Retrofit

SECTOR
Education

PRODUCTS
Duct Humidity Sensors

BELIMO®

Initial Situation

When installing new sensors (regardless of type), calibration is a critical step necessary to ensure safe and efficient HVAC system operation. It can also be a very intensive process – requiring countless hours on the part of technicians. Although a small percentage of defective sensors in a large order is not uncommon, a high ratio can add significant costs to a project. Often an inordinate amount of time and effort is spent trying to identify truly bad sensors and those that need to be calibrated.

With 30+ years of experience working in the HVAC industry, this is something Victor Keeling of Trane Technologies knows all too well. Victor was the lead BAS project manager on the Heritage Elementary School project and a proponent of using Belimo's sensors.

"Whenever we are doing these large jobs where a lot of new sensors are being installed, it's common practice to order a few extra units because it is inevitable that a few will be inoperable right out of the box," he said. "But we had some serious issues with suppliers on other jobs where sensor failure rates were as high as 15-20%. The warranty covered the cost of the defective sensors but not the cost of sending our technicians back to the site to swap them out. For the Heritage school project, we were looking for a more reliable option."

"Over the years, I've become accustomed to the reliability and performance of Belimo products, but to have zero defective sensors out of 79 is truly remarkable."

Victor Keeling, Trane Technologies

Solution

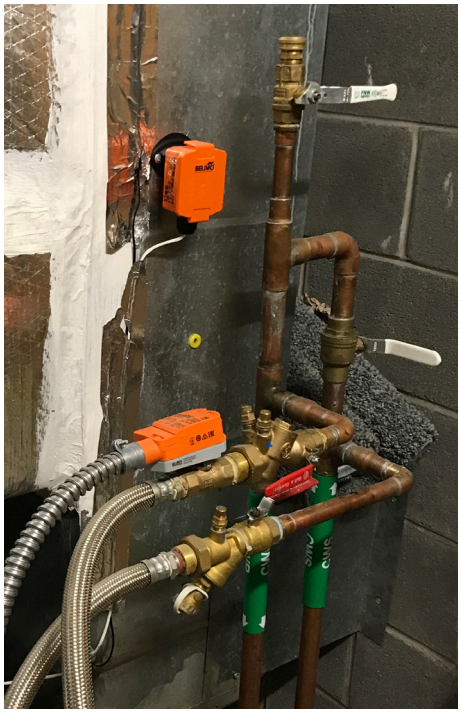
Having had success with Belimo products in the past, including actuators, valves, and temperature and CO2 sensors, Keeling made the decision to spec Belimo's duct-mounted combined temperature/ humidity sensors throughout the school. The sensors would communicate with the building automation system (BAS) and allow school maintenance personnel to monitor humidity levels in each room via a remote workstation. This capability was currently unavailable with the existing room thermostats and was essential to ensuring efficient operation of water source heat pumps when in "dehumidification" mode.

Belimo's duct humidity-temperature sensors feature a snap-on NEMA 4X, IP 65 enclosure, which enables easy installation and commissioning. Additional features include:

- Complementary metal oxide semiconductor (CMOS)-based polymer capacitance sensor with an accuracy of ±2% relative humidity as standard and long-term drift <±0.25% (unaffected by high humidity and contaminants)
- Multi-sensor with selectable output measurement values: relative humidity, absolute humidity, enthalpy, and dew point.
- Up to four active temperature measurement ranges for simplified field selection and reduced stock storage, providing flexibility for change requests during commissioning.
- BACnet and Modbus communication protocols provide superior application data access and enable easy commissioning and configuration.

"Belimo has received reports from several customers that our sensors have allowed for total installation cost savings of nearly 50% when compared to other alternatives", said Eddie Kelley, Product Manager at Belimo. "The sensors come standard with removable, spring-loaded terminal blocks and are also compatible with Belimo's new 'Duct Sensor Assistant App'. These features, and others, facilitate ease of installation and commissioning."

"The duct humidity sensors were a perfect fit for the project and helped us streamline installation and commissioning, which was critical given the short period of time we had to complete the job", said Keeling. "They allowed us to take readings directly from the air stream, as opposed to being located on the wall next to the thermostat, which would have required more installation work, since each WSHP is located in a small mechanical closet which contains the unit and the controls."



Customer Satisfaction

In total, 79 sensors were installed with zero failures.

"Over the years, I've become accustomed to the reliability and performance of Belimo products, but to have zero defective sensors out of 79 is truly remarkable", Keeling added. "Among the 79 sensors installed, they all reported readings within 1% to 2% of each other and within 2% of calibration when compared to the calibration equipment used." "At Trane Technologies, manufacturing quality, service, and support are all important factors we consider when working with suppliers because it directly impacts our ability to meet our customers' needs. The Belimo devices have a professional look, as well as an easy and durable mounting and installation setup. We are proud to work with Belimo and their support staff and will continue to specify their products on future projects."

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