BELIMO RetroFIT+

Western Wyoming Community College Improves HVAC Efficiency with Belimo RetroFIT+

Belimo CCVs, Sensors, VAVs Help College Achieve Efficiency Goals

Western Wyoming Community College is a public community college located in Rock Springs, Wyoming that was established in the fall of 1959. Commonly known as "Western," the college started with just forty students and five faculty members, offering courses in the evening. Since then, the school has undergone significant growth, with 2400 undergraduate students enrolled as of the 2021-22 academic year.

Western offers a range of educational programs, including certificates, associate degrees, and a bachelor's degree. The school's facilities reflect the local area's rich paleontological history, including five life-sized dinosaur models displayed in public areas across the campus.

TYPE OF BUILDING
Various

PROJECT
Retrofit

SECTOR
Education

PRODUCTS
CCVs, Sensors, Airflow Measurement & Control

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Belimo RetroFIT+ helps existing buildings uncover energy savings.

Project Overview and Motivation

In the early 2000s, Western upgraded their pneumatically controlled air handlers to direct digital control (DDC). However, the pneumatic control valves and actuators for the hot and chilled water coils, as well as the single and dual-duct VAVs, were left untouched. Digitally controlled valves and actuators are more efficient than their pneumatically controlled equivalents, plus finding replacement parts for aging pneumatic equipment is becoming increasingly difficult. In 2021 the legacy pneumatic equipment was beginning to fail, and the school embarked on a new retrofit project to fully upgrade to digital control. After a competitive bid between three different control contractors, the job was awarded to LONG Building Technologies, and contracted through local mechanical contractor Vaughn's Plumbing & Heating Co. LONG Building Technologies, Inc. is a DDC controls contractor and HVAC service and equipment representative that has served the Wyoming market locally for 27 years. LONG also has locations in CO, MT, UT, WA, OR, and AK.

"When we started work on the project, the plan was to upgrade all of the actuation, control valves, and VAVs to DDC, but the school wanted to try to salvage the air handler controllers from the last retrofit. During the course of the project, it was quickly determined that the air handler controllers were well past due for an upgrade, so through a change order process, we were able to secure a contract to replace all the controls in the entire facility," said Todd Kuhl, Operations Manager for LONG.

This meant that in addition to upgrading all of the airflow measurement & control actuators (VAVs), discharge sensors, and the chilled and hot water control valves and actuators, the building's 70 air handlers would also require retrofitting. Considering the scope of the retrofit, the extreme weather of the area, and the fact that the school could not afford to shut down for any substantial length of time, product availability became a major factor.

"It gets very cold in Wyoming, and the heating system needs to be up and running when students are in the building. This project needed to be complete before the cold season started. Fast lead times and on-time deliveries were crucial, and we knew from experience that Belimo really shines on that front. Also, Belimo's outstanding build quality, competitive pricing, and helpful sales support team helped push it over the line for us," Todd said. "We've used Belimo control valves and actuators exclusively in Wyoming for several years now, but this was the first large job we also used Belimo temperature sensors, and everything went very smoothly."

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Solution

Belimo's RetroFIT+ program, which offers a complete approach to upgrading HVAC systems in existing buildings, was instrumental in helping Western become more energy efficient. In total, Belimo was able to deliver over 300 CCV ball valves, 260 spring return actuators, 230 airflow measurement & control actuators (VAV Compact), and 570 temperature sensors for the retrofit.

The Belimo Characterized Control Valve (CCV) was a key component in the retrofit, chosen because it merges the high close-off capabilities of a ball valve with a specially designed disc, allowing it to maintain an equal percentage flow characteristic. This valve provides a comprehensive Cv range, making it versatile for applications including air handlers, heating and cooling coils, fan coil units, and more.

In order to ensure precise control and stability, a control valve with an equal percentage characteristic produces a linear variation in thermal output as the valve opens. Conventional ball valves, with their S-shaped characteristic, can lead to unstable regulation because they allow too much flow, making it hard to control thermal capacity. Belimo's Characterized Control Valve (CCV) solves this problem with a special disc that creates an equal percentage characteristic. This valve's flow is carefully regulated through a combination of the ball's hole and the characterized disc, ensuring a slow and controlled increase in flow as the valve opens. The Belimo CCV contributed to WWCC's enhanced performance at part-loads, increased system stability, and optimized energy consumption.

Belimo damper actuators are engineered for a broad range of HVAC applications, providing reliable performance and low power consumption. With a wide torque range, from 9 to 1400 inch-pounds, they accommodate damper sizes as small as 4-inch rounds. These actuators can be directly mounted on standard damper shafts or jackshafts. They are ideal for use in control dampers, air handlers, economizer units, VAV terminal units, fan coil units, fan shutters, and unit ventilators.

Belimo VAV Compact is a range of self-contained, networked airflow measurement and control actuators with built-in differential pressure sensors. This design ensures pressure-independent, consistent airflow with minimal energy consumption, even with pressure fluctuations in the system. The VAV Compact is designed for straightforward installation and commissioning in small to mid-sized setups. Using tools like the Belimo Assistant App, the ZTH handheld device, or the PC-Tool with a graphical trend display, setting up, commissioning, monitoring, or troubleshooting Belimo actuators is simple.

BELIMO CHARACTERIZED CONTROL VALVES

The Characterized Control Valve combines the high close-off capabilities of a ball valve with a characterized disc that ensures a true equal percentage flow characteristic to achieve superior light load flow control.

- Equal percentage flow characteristic.
- Excellent control stability assured with the characterizing disc.
- Cv values equal to Cv values of globe valves the same size.
- The need for multiple pipe reduction is usually eliminated.
- Better control prevents "hunting" of the control loop, increasing life span of actuator and valve.

Belimo's HVAC sensors, detectors, and meters are known for their superior reliability, easy installation, and compatibility with major Building Automation Systems (BAS). This sensor lineup can measure a variety of conditions, including temperature, humidity, air pressure, water leaks, CO_2, and volatile organic compounds (VOCs). They are suitable for pipes, ducts, and outdoor applications.

During LONG's first ever Belimo sensor installation, LONG was able to install all 570 temperature sensors into the air ducts quickly and easily without any issues or delays, highlighting the value of the sensors' ease of installation using the included mounting flanges.

"Our relationship with LONG has really progressed over the years. They've become an important strategic partner and one of our largest accounts nationwide," said Kayla Gosz, Belimo District Sales Manager for Denver and the Rocky Mountain Region. "This retrofit to Western's main campus has lined LONG up for additional work at the school's other locations, and we're eager to support them in any way we can going forward."

Customer Satisfaction

"The school was having a lot of freezing coils and other problems, but bringing in new actuation and the digital control, we've been able to eliminate those issues. Now we can control the air handler dampers, and make sure we're bringing in the appropriate amount of outside air. We're seeing a lot of increased efficiency with their coils as well as enhanced comfort for occupants," Todd explained. "There's a lot of work we've been able to secure with Western using Belimo product and working with the team. We're looking forward to doing a lot more work with Belimo in the future."

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