Digital upgrade: a seamless approach to convert pneumatic control valves

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Upgrading pneumatic control valves with digital capabilities can enhance process quality and efficiency. Though a full digital control system redesign might be prohibitive, integrating digital positioners and process controllers can offer many of the same benefits without requiring a complete overhaul. To achieve this transition, Bürkert's SideCONTROL series offers a seamless retrofit solution for existing pneumatic control valves.

Kieran Bennett, Industry Manager, Food & Beverage at Bürkert, explains how legacy systems can be enhanced cost-effectively.

Upgrading pneumatic control valves to digital communication and control can optimise precision and repeatability, as well as opening access to real-time process data. While redesigning to a full digital control system could be advantageous, the initial time and cost requirements might be prohibitive. As an alternative, integrating digital positioners and process controllers for pneumatic control valves can fulfil many of the advantages without committing to a complete digital transition. This approach is ideal to modernise existing systems as well as improve new designs involving pneumatic control valves.

To offer a seamless transition, Bürkert has introduced the SideCONTROL series of electropneumatic positioners and controllers. The range achieves universal mounting to virtually any existing pneumatic control valve actuator, including part-turn and linear actuators that comply with NAMUR standards. An interface for non-standard actuators is also available, including a special adapter kit for Type 3277

Samson actuators, enabling a digital upgrade for valve strokes from 7.5 mm to 30 mm.

IO-Link and Ethernet

The simplest approach to digital retrofit is via IO-Link connectivity, a standardised protocol for connecting sensors and actuators with automation systems. Unlike analogue communications, IO-Link enables bidirectional data exchange. The advantages of two-way, high-speed communications include rapid feedback for precise valve positioning[AB1.1], as well as detailed diagnostics and parameterisation of devices.

IO-Link connectivity through a positioner like Bürkert's Type 8791 Digital electropneumatic positioner SideCONTROL is fast and simple to integrate. It relies on standard cabling, provides plug-and-play connection with IO-Link master modules, and point-to-point connectivity between the positioner and controller removes the need for additional switches.

Optimising the digital transition further still, real-time Ethernet-based connectivity is also available for pneumatic control valve retrofits. Bürkert's Type 8792 positioner, as well as the Type 8793 Digital electropneumatic Process Controller, add connectivity via protocols including EtherNet/IP, PROFINET, Modbus TCP, PROFIBUS DP-V1 or the CAN-based Bürkert system bus (büS). These advantages typically require an Ethernet gateway in coordination with a PLC.

Industry 4.0 advantages

Whether IO-Link or an Ethernet protocol is integrated, digitisation not only improves valve control precision, but it also enhances monitoring to deliver the benefits of Industry 4.0. This level of data analysis can improve process quality, as well as optimising process efficiency. A new level of diagnostics can also be achieved,

aided by built-in functions within the positioners and controllers, enabling proactive maintenance that can reduce unplanned downtime and increase productivity.

The SideCONTROL products can be retrofitted with no intervention or downtime required to the fluidic process. Meanwhile, the X.Tune commissioning tool offers automated valve tuning by optimising the valve's response time, stability, and accuracy by automatically adjusting the control parameters for the specific actuator and process conditions. It’s also possible to switch from single- to double-acting actuators at any time.

Bürkert’s SideCONTROL series provides a cost-effective solution for upgrading pneumatic control valves with digital capabilities. By integrating IO-Link or Ethernet-based connectivity, manufacturers can embrace many of the advantages of digital control, including precision, efficiency, and real-time monitoring, without the cost and complexity of a full system overhaul.

Image captions:

Image 1: Bürkert's SideCONTROL series provides a cost-effective solution for upgrading pneumatic control valves with digital capabilities.

About Bürkert

Bürkert Fluid Control Systems is one of the leading manufacturers of control and measuring systems for fluids and gases. The products have a wide variety of applications and are used by breweries and laboratories as well as in medical engineering and space technology. The company employs over 2,200 people and has a comprehensive network of branches in 35 countries world-wide.

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