

Festo technology simplifies piezo valve integration and dramatically reduces energy consumption

Automation specialist Festo has developed piezo valve technology for gas handling that simplifies the replacement of traditional solenoid valves, facilitates integration and can reduce energy consumption by as much as 95%.

Extremely low energy consumption, coupled with silent, no-heat operation, makes piezo valve technology particularly attractive for laboratory and medical device applications. Low noise is prized for bedside medical instruments and devices and is also desired in the laboratories where a lot of instruments may be deployed. However, it has not been possible to simply replace standard magnetic solenoid valves with piezo technology because they operate very differently (see box-out). For example, most of today's control solenoid valves are designed to operate at a voltage between 5 and 24V, whilst a piezo valve requires 310V and special control electronics.

To overcome this potential barrier to adoption, Festo has developed piezo technology that enables piezo valves to be easily integrated into systems architectures using a standard 12 to 24V supply. Historically, consistent manufacture of piezo valves has been difficult. Festo assures reliability by producing piezo cartridges that can be incorporated into the various components on fully automated, high output production machinery. The cartridges consist of the fragile ceramic bender mounted within a housing incorporating the injection-moulded port nozzles. The gas flows in or out through these nozzles.

Festo's VAVE-P piezo valve incorporates everything needed for easy actuation. The VAVE-P is operated as normal with 12 to 24V and generates the required piezo voltage internally. It includes simple, open-loop actuation electronics, 310V voltage generation and a 2-channel piezo driver stage with current limitation. The two-channel electronics in the VAVE-P makes it possible to actuate two valves for regulating the flow rate passing through the valve or a 3/3-way valve function for regulating the pressure, using separate piezo valves for pressurisation and exhausting. This 3/3 way option is a very easy way of controlling pressure and is unique to piezo technology. The interface for the VAVE-P is always the same: two analogue inputs and the flexible power supply of 12 to 24V. There is no easier way to replace a proportional solenoid valve.

Using Festo piezo technology, it is easy to set up a complete flow rate and pressure regulation system. Another example is the compact VEMD flow control valve combining a piezo valve, flow sensor and control electronics. This allows you to achieve a linear ratio between input voltage and output flow rate. Its counterpart for regulating pressure is the VEAB proportional pressure regulator. This is equipped with two piezo valves, again each with one piezo bender for pressurisation and one for exhausting, plus the necessary electronics and a pressure sensor. The VEAB therefore provides a complete closed-loop pressure control solution in the smallest installation space.

The ability to purchase piezo valves as standard off-the-shelf components which are simple to integrate is opening up applications and uptake within laboratory instruments and medical

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Festo GB & IE

About Festo

Festo is a leading international supplier of automation technology with a turnover in 2024 of around €3.45 billion. Festo employs over 20,000 people worldwide and is a proven innovator and problem solver in pneumatic and electrical automation, where it is the performance leader. Festo offers around 36,000 pneumatic and electric products in hundreds of thousands of variants for factory and process automation technology, many of which can be tailored to specific customer needs. Sustainability, reducing its CO₂ footprint, digital learning, innovation, performance and speed are the key drivers for the company's future. Festo GB operates as a carbon neutral organisation and uses the PAS 2060 standard externally audited by NQA to validate this claim to customers, employees and other stakeholders.

Festo Industrial Automation's innovative strength is demonstrated through the launch of around 100 new products every year. The company invests over 8.5% of its turnover in R&D, resulting in over 2,600 patents held worldwide. For more information about the company's products and UK / Irish services, please visit: www.festo.com/gb and www.festo.com/ie

Festo and Industry 4.0 - Festo has engaged with the Industry 4.0 initiative from its inception: as a user, manufacturer and trainer. As a member of the steering group, the company has taken an active role in defining the core standards such as the RAMI model and the Administration Shell. Festo Didactic has installed Industry 4.0 Cyber-Physical Factory training hardware systems in many leading universities and training centres. It also provides Industry 4.0 training courses for change managers and practical workshops for employees. Industry 4.0 technologies such as OPC-UA communications are embedded in the latest generation products. For more information, go to www.festo.com/digitalisation

Festo Didactic training delivers training for industry – by industry. Combining Festo's industrial heritage with its future-focused manufacturing and engineering expertise to deliver courses for greater productivity and competitiveness. Offering a wide range of open courses, structured development programmes and tailor-made, customer-specific projects on technology and Industry 4.0 and the industry-leading online training suite, Festo LX. Festo also provides state-of-the-art training equipment solutions for industrial companies and educational institutions around the world. Festo Didactic has around 56,000 education customers worldwide. More information on Festo training and consulting services can be found at: www.festo.com/didactic

Festo Bionic Learning Network encapsulates the innovative nature of Festo, raising awareness and attracting talent to the company. Exploring the links between nature and technology opens new areas of innovation and demonstrates complex ideas in a stimulating and enjoyable way. Festo works with an alliance of internal R&D, external educational establishments and specialist companies to advance bionic solutions for automation applications of the future. The objective is to benefit from bionics as a source of inspiration and to realise these in

industrial automation. For more information about Festo's Bionic Learning Network, please visit: www.festo.com/bionics