

# Keeping up with the current of time Electric valves – a better alternative?

A growing trend towards electrification is also noticeable in the processing industry. There is an ever-increasing demand for more energy-efficient alternatives to compressed air systems. Yet every actuator type has its own advantages and disadvantages. Therefore, the general question is not which actuator type is the „best“, but rather a question of which actuator system is the most suitable for which application. Consequently, for each application, not only a suitable valve type must be selected, but also an optimum actuator type – as per the slogan „the right actuator for every application“. As an expert partner with many years of experience in the field of electrical, pneumatic and manual actuators, GEMÜ is ready to assist its users in selecting a suitable actuator. The main factors for consideration when selecting the ideal actuator type tend to be cost, risk, performance and availability.

## Cost reduction

“Energy efficiency” has gained prominence as a guiding concept. Significantly higher efficiency, and consequently a better energy balance, can be achieved with state-of-the-art electric valves as opposed to pneumatic systems. The absence of any need for time-consuming installation processes or maintenance of compressed air systems also allows for additional cost savings. The steadily increasing level of automation is more and more frequently resulting in a coexistence of pneumatic and electrical networks. Electrical auxiliary devices are frequently used for actuation, control and feedback in pneumatic actuators, which require electrical energy and signal transmission along with the pneumatics for the process valve. Therefore, in addition to the installation and maintenance of a compressed air network, an electrical network must be available and suitably maintained. The reduction to a single energy form results in cost savings through lower installation and maintenance requirements, for example, or a reduced need for specialists. Additionally, the system availability is increased, since potential faults are reduced.

## Risk reduction

The risk of contamination from compressed air is a frequently discussed issue in the pharmaceutical and biotechnology industries. Critical process steps require sterile compressed air. In this regard, it is not only the generation of sterile compressed air that is a complex process, but the sterilising capability of the entire system must also be taken into consideration. Electrical

valves can eliminate the risk of contamination. Yet, in industrial applications as well, system availability can also be increased through the use of electrical valves. The responsibility for compressed air preparation often lies with the plant operator. Accordingly, this matter is handled differently. If contaminated compressed air gets into the system, it can lead to (often) irreparable malfunctioning of pneumatic components such as pilot valves and positioners. Fluctuations in the compressed air network, for example through simultaneous switching of multiple valves, can lead to the malfunctioning of pneumatic components.

## Performance increase

Thanks to their precise control systems with no overshooting and independence from the medium pressure, motorized valves are a fitting choice for control applications. However, in ultra-fast applications such as filling processes as well, the clock rate can be increased further through the use of motorized actuators. In conjunction with an extremely high positioning accuracy, this leads to considerable increases in productivity. A wide range of parameterization and diagnostic facilities that form the basis for increasing digitalization are often part of electrical valves. These are an important prerequisite for Industry 4.0 applications.

## Availability

Very often, it is also the pure availability that is the decisive factor. In many areas of application, there is simply no compressed air available for a wide variety of reasons. In contrast to this, electricity is practically ubiquitous. Whether in small plants such as test rigs, mobile plants, applications in outdoor areas or even decentralized systems with occasional or widely distributed valves – electrically operated valves can be used almost anywhere.

### The right choice of valve

A number of different electrical actuators are available to customers from GEMÜ. The appropriate actuator for the application is specified by the process requirements. In this regard, performance (power, service life, actuating speed and duty cycle), functions (range of functions, parameterization options, service/diagnosis options) and price are crucial criteria. Figure 1 provides an overview of the GEMÜ linear valves with a motorized actuator. A low-cost diaphragm valve for simple and cost-sensitive applications is available in the form of the GEMÜ R629 eSyLite. It constitutes a cost-effective alternative to

solenoid valves made of plastic or motorized plastic ball valves.

The GEMÜ eSyStep valves are designed for standard open/closed and simple control applications. With regard to the actuator, this is a compact spindle actuator with step motor. Via the interface in the housing cover, additional accessories such as diverse electrical position indicators or travel sensors can be mounted. The following valve types are available with the GEMÜ eSyStep actuator:

- GEMÜ 533 eSyStep globe valve
- GEMÜ 543 eSyStep angle seat globe valve
- GEMÜ 639 eSyStep stainless steel diaphragm valve
- GEMÜ R639 eSyStep plastic diaphragm valve

The GEMÜ eSyDrive valves are available for variable and complex open/closed and control applications in conjunction with high requirements on performance and service life. Designed on the basis of the hollow shaft principle in conjunction with technology that does not use brushes or sensors, the GEMÜ eSyDrive actuator sets new standards in terms of service life, compactness, actuating speed and energy efficiency. The self-locking actuator also offers a high level of reproducibility for positioning and is therefore ideal for use in control applications. GEMÜ offers the following diaphragm and/or globe valves with the GEMÜ eSyDrive actuator:

- GEMÜ 539 eSyDrive globe valve
- GEMÜ 549 eSyDrive angle seat globe valve
- GEMÜ 649 eSyDrive stainless steel diaphragm valve
- GEMÜ R649 eSyDrive plastic diaphragm valve
- GEMÜ 567 BioStar control valve

In the area of foodstuff and pharmaceutical filling, there are often extreme requirements with regard to actuating speed, positioning accuracy and service life of the actuator. This is why GEMÜ offers the GEMÜ F60 filling valve with motorized actuator, which fulfils these special requirements.

In addition to the motorized actuators, solenoid valves play an important role in the product range. Particularly in the small nominal size range, a solenoid valve can put its advantages to good use, which include a defined safety position, compact size, high switching speed and long service life. New to the market is the GEMÜ M75 process solenoid valve with complete pressure compensation, which can also be used at high pressures and nominal sizes via a doubled bellows system. In the area of metal solenoid valves, the GEMÜ range comprises the following types:

- GEMÜ 8253 solenoid valve with positive lift diaphragm
- GEMÜ 8257 solenoid valve with positive lift diaphragm
- GEMÜ 8258 pilot-operated solenoid valve
- GEMÜ 8259 directly controlled solenoid valve

### Equipped for the future

Electrical valves have particular appeal on account of their cost efficiency and performance. The reduced risk of contamination and the application in a wide variety of plants are also positives in favour of electrically operated valves. With this expanded product range, GEMÜ is offering an extensive range of electrical valves in addition to manual and pneumatic variants and consequently reacting to the growing demand in this area.

There are also a variety of electrical versions available for GEMÜ quarter turn valves. For more information on this, please read the article on motorized quarter turn actuators.

