Value Added through Miniaturization:

Advantages of significant reduction of solenoid valves in size without reducing flow rates for lab and analysis instruments

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Daniela Krahn, Segment Manager Micro

Over the course of their long existence solenoid valves have developed slowly but continuously so that they are opening up new fields of application. Today they are a central element in controlling fluids in a broad spectrum of different applications. One of the newer areas of application is in the life sciences. 17 years ago the media separated valve type 0127, with its pressure equalized, long-life and flushable rocker technology, set a milestone in the field of small media separated solenoid valves for life science applications. In 2011 Bürkert set another milestone with the new TwinPower actuation technology, which allows a significant reduction in size with no loss of performance. This resulted in the Type 6624 and 6626 valves, which feature high flow rates and a compact design in combination with the time-tested and further optimized rocker technology.

Modern lab and analysis instruments are used today in different areas, such as clinical chemistry, environmental analysis or food safety. The sample, or analyte, is examined both qualitatively and quantitatively. The result of such analyses, as in the medical examination of blood, are essential for making a diagnosis. Another area of use is environmental analysis, for example inspecting the quality of drinking water. Fluids play a central part in many of these

processes – either as a sample to be examined or in the form of reagents, washing solutions or buffer solutions, which are technical prerequisites for conducting the analyses. The handling of these different liquids is accordingly a central aspect of the lab and analysis instruments. And valves are needed for controlling these fluids.

Trend toward compact design

In the development of new analysis and lab instruments, there is an ongoing trend in the direction of miniaturization. More compact devices with a lower volume not only require less space, but also less reagents. In view of the sometimes very high prices of these substances, compact instruments with a smaller internal volume can help to save costs. Also, smaller instruments open up new areas of application.The reduced space requirements mean that they no longer have to be set up in large labs; instead, they can now be closer to the location where the sample is taken and therefore closer to the patient. Since the analysis technology can be used right in the doctor‘s office or, in the case of mobile devices, in emergency vehicles, it is directly at the Point-of-Care (PoC). The result is a faster diagnosis, which in turn can mean faster therapeutic success and better chances of recovery for the patient. This improves the quality of medical care while reducing costs at the same time.

The minimum-size TwinPower solenoid valves of types 6624 and 6626 are winners thanks to high actuator power with a compact design

High standards for valve technology

The valve technology in this area of application has to meet high standards. The valves should be media separated in any case. This is the only way to prevent the medium from being contaminated by lubricants, for example, which would distort the results of the analysis. In the life sciences or the chemical industry, the medium itself can also be aggressive, which would damage the valve over the course of time.

The most widespread valve principle used in the life sciences is the time-tested rocker technology. This design is characterized by good flushing properties, high reliability and back pressure resistance as well as a low pump effect due to a constant volume in the fluid chamber. In addition, rocker valves feature a high degree of flexibility and adaptability to a wide range of fluid requirements. The valves can be optimized at the factory for custom requirements. Depending on the requirement it is possible, for example, to use different materials, define fluid interfaces or select user-specific mounting variants for the specific installation situation. In addition, the internal volume of the valves can be optimized.

With the new Type 6624 and 6626 valves Bürkert goes one step further. The innovative TwinPower technology used in these valves continues the trend toward miniaturization in the area of lab and analysis instruments, providing users and OEMs with valves that are up to 50 % smaller with the same performance.

TwinPower: compact and highly efficient

By using two coils in the valve actuator instead of only one as in the past, the TwinPower technology developed by Bürkert increases the power density enormously. This makes it possible to reduce the size of the valves by up to 50 % while simultaneously improving energy efficiency. Thanks to an integrated hit-and-hold function, the actuator delivers the high initial power, or “hit”, needed only temporarily and then operates in “hold” state with an energy reduction of 75 %. Since the electric power in the TwinPower concept is distributed to two heat sources, the optimized coil design also reduces heat accumulation in comparison with conventional actuators.

The use of two coils instead of one in the valve actuator makes it possible to reduce the size of the valves by up to 50% while simultaneously improving energy efficiency

Two strong types: TwinPower 6624 and 6626

The new Type 6624 and 6626 valves presented by Bürkert at the Hannover Trade Show 2011 combine time-tested, reliable fluidics with an innovative actuation principle. With the same diameter and an identical pressure range, the new valves are smaller by about half. The reduction in size therefore means no compromises whatsoever with respect to the flow rate of fluids. The energy consumption is reduced by the TwinPower technology by up to 75 %, which not only reduces heat accumulation, but also operating costs. This also makes it possible to use smaller power supplies depending on the application, further reducing the installation space. Due to an optimized surface-to-volume ratio, the TwinPower technology reduces thermal transfer to the medium. The disturbance factor of temperature, which can have a negative effect on the test results of lab and analysis instruments, is therefore easier to overcome. Bürkert has also optimized the time-tested fluidics of the valves and their cleanability. This further reduces the danger of cross contamination or air bubbles in the system, which can negatively affect the dosing accuracy and lead to undesired reactions. The practical features of the new valves also include a highly visible status LED, which serves as a visual aid to determine whether the instrument is switched on or not.

System is strength

The TwinPower 6624 and 6626 valves perform optimally within the context of typical Bürkert system solutions. They are part of a customized solution developed by specialists with optimally matched components from one source. Installation of the service-friendly modules is fast and easy and the risk of leaks is reduced by fewer total interfaces. System solutions based on the new compact TwinPower valves open up new areas of application and enable the engineering of altogether more compact analysis and lab instruments. If several Type 6624 valves are used in the solution, which is frequently the case, the space saved is cumulative. Thanks to the low internal volume and shorter channels between the valves, these systems save not only space, but also expensive reagents. This makes it possible to sustainably reduce operating costs throughout the entire service life of the instruments.

The minimum-size TwinPower solenoid valves type 6624 is a winner thanks to high actuator power with a compact design

Contact

Can we show you how our TwinPower actuation technology can be used profitable in your application or do you have further questions? Just contact

Bürkert Fluid Control Systems
Bürkert Werke GmbH
Daniela Krahn
Segment Manager Micro
Christian-Bürkert-Str. 13-17
74653 Ingelfingen
Germany
Telefon: +49 7940 10 91 514
Telefax: +49 7940 10 91 204
Email: daniela.krahn@burkert.com
Website: www.burkert.com