

# Robolux Valves and ELEMENT Control Heads:

A Combination to Facilitate the Next-Generation of Plants



White Paper  
January 2014

# Robolux Valves and ELEMENT Control Heads: A Combination to Facilitate the Next-Generation of Plants

Marc Klingler, Segment Manager Hygienic Processing

**Maintaining sterile process conditions is a vital but daunting task for manufacturers. Separation processes like filtration and chromatography place considerable demands on sterile systems and must be done properly to ensure the purity of media. The consequences of failure are huge.**

For customers and regulators, nothing less than perfect purity is acceptable when mixing different media during fermentation. Failure to meet these expectations can prove fatal to a business. On a more mundane level, the use of flawed plant designs affects the life span of production equipment, with pipe systems, valve manifolds, and tank installations all prone to contamination in pharmaceutical manufacturing.

At biologics and pharmaceutical manufacturing facilities, the perfect functioning of each piece of the production process is essential. Robolux valves are built to thrive in such tough conditions. The multiport design addresses the three essential characteristics of an effective valve: cleanability, drainability, and low internal volumes. This combination of traits translates into a compelling business proposition.

The valves have proven their worth in real-world applications over the past several years, notably by increasing the yields achieved by manufacturers. Now Burkert has taken the technology to the next level by combining the Robolux valves with its ELEMENT series of control heads.



### Size Matters: How Robolux Makes Cleaning Faster and Cheaper

The far-reaching benefits of this system are underpinned by a valve so small its dimensions are measured in millimeters. This compact design is achieved by placing two seats under one diaphragm. A single actuator operates two independent pistons, one for each seat. This compact, multiport design takes up 40 percent less space than traditional manifolds that use conventional diaphragm valves.

Many of the benefits of Robolux valves derive directly from their size. Being smaller causes the stainless steel body to heat up faster than traditional valves. This cuts the time and energy taken to reach the temperature needed to kill microorganisms during sterilization. Robolux valves' smaller internal volumes also enable faster cleaning turnaround times and a host of related cost savings and efficiency gains.

The smaller internal volume means there is physically less material to clean and less water, chemicals, and energy are needed. This results in multiple benefits. Manufacturers reduce their use of three consumables that can add significantly to costs while also furthering their sustainability initiatives. Forward-thinking manufacturers are pushing hard to reduce the environmental footprint of their plants.

Robolux can facilitate these ambitions and help offset rising prices for energy and other consumables. The amount commercial organizations in the United Kingdom paid for electricity rose 115 percent from 2004 to 2011, compared to general price inflation of 22 percent. By 2020, electricity prices are expected to rise a further 45 percent in real terms. Cutting energy use can therefore have a significant effect on profit margins.

Smaller valves also cut waste by reducing the volume of media that must be drained before cleaning. Working in an industry in which media is worth up to €100,000 per liter means every millimeter matters, and even small reductions in wastage can have a notable impact on a plant's profitability. When Robolux needs draining, the process is quick and simple and wastes as little of the media as is currently possible.

Valve designers have long recognized the benefits of reducing the internal volumes of their products and have tried a variety of approaches to achieve the goal. Robolux is by far the most successful of these initiatives. Welding valves together results in an internal volume of 90 milliliters. Adopting the block solution cuts it down to 53 milliliters. Robolux has an internal volume of just 22 milliliters.



### Integrated Thinking: How ELEMENT Control Heads Improve Process Flexibility

The faster cleaning this compact design enables has multiple knock-on effects. Manufacturers can reduce downtime between batches, making their plants more productive. Over the lifetime of a facility even a small time saving will translate into significantly greater output and quickly deliver a return on the investment in Robolux. Faster turnaround times also make multi-function sites viable.

Installing Robolux valves to realize these benefits goes some way towards optimizing the process flexibility of a plant. Combining the valves with the ELEMENT series of control heads goes further still by enabling automation of processes. This guarantees the reproducibility of the production process by automatically ensuring all the valves are positioned correctly. The risk of costly errors is reduced.

Other models of automation make similar claims but create their own problems. In a centralized automation system all the valves are housed in one cabinet that acts as the control center. To enable the automatic opening and closing of the pneumatic valves, many long cables must flow in and out of this cabinet. Having these cables running through the plant is a logistical headache for manufacturers.

Using Robolux in conjunction with the ELEMENT series of control heads avoids these problems. In this decentralized model of automation, intelligent controls are integrated with the valves, freeing them from the need to be housed in a cabinet. With each valve managing itself, plant designers can put them wherever best suits the needs of production, instead of being constrained by centralized automation.

The ELEMENT control heads handle all pneumatic actuation, feedback, and diagnostic functions, as well as bus communication. Each features a three-color optical status display with high-power LEDs that allows for speedy diagnosis and maintenance of the system. Installation is similarly straightforward, with much of the process being run from a computer. Setup is cheaper and faster than in a centralized model.

### Space Saving: How Burkert Systems Enable the Manufacturing Networks of the Future

The decentralized model also eliminates the wires and tubing that complicate the alternatives. When using Robolux valves in combination with ELEMENT control heads with AS-Interface, there is just one cable that runs across the facility. All that is required for power supply, feedback, and communication is a two-wire line connecting the programmable logic controller (PLC) with up to 62 slaves.

Consequently, integrating all required automation functions into the control heads simplifies the layout of an automated plant and saves space. These space savings add to the initial benefits of using Robolux valves as opposed to traditional systems. While a typical six-seat ring system may have an inter-





nal volume of 1.1 liters, a comparable Robolux setup would contain less than 0.5 liters.

A Robolux installation also requires fewer valves, T-pieces, weld joints, and pipe runs. Combined with the decreased internal volumes, these space savings mean Robolux has a smaller footprint on the factory floor. Working with smaller valves and automation systems allows manufacturers to design more compact production plants that offer superior yield per area of floor space and better process efficiency.

Building smaller, more flexible, multiproduct plants delivers other benefits too. A company working with Robolux valves could locate multiple small production plants in key markets around the globe. Compared to the old model in which one or two huge facilities supply the whole world, this structure offers greater supply flexibility and lower transport costs.

In the fast-changing environment now faced by manufacturers, such flexibility can prove an important competitive advantage. Dr. Janet Woodcock, director of the Center for Drug Evaluation and Research at the FDA, noted wider networks of smaller plants can cut transportation costs, in a testimony to the U.S. Committee on Oversight and Government Reform in December 2013.

#### Conclusion

Giving companies the ability to reduce the transcontinental shipping of components by using a network of smaller plants is just one of several ways Robolux valves benefit businesses. Many of these efficiency gains have been proven through real-world use of the valves, with forward-thinking companies already benefiting from the cleanability, drainability, and low internal volumes of Robolux products.

Burkert has now made the case for using the valves even more compelling by integrating the parts with its ELEMENT series of control heads. In combination, the products allow manufacturers to automate production — an action that ensures greater reproducibility of processes while reducing risk — without the need to run multiple long cables through a plant. Just one cable is needed for the whole system.

With shorter installation times compared to traditional centralized models of automation, companies can begin realizing a return on their investment quickly. The Robolux valves also cut operating costs by reducing downtime between batches, slashing the volume of consumables needed to clean the system and shrinking the physical and environmental footprint of the production equipment.

Together these business benefits make Robolux valves and ELEMENT control heads an attractive proposition for any manufacturer trying to get maximum value from their production plants.



# Contact

Do you have further questions? Just contact us:

Bürkert Fluid Control Systems  
Marc Klingler | Segment Manager Hygienic Processing  
BP 21  
F 67220 Triembach au Val

Tel: +33 3 88 58 91 20

Fax: +33 3 88 57 09 61

email: [marc.klingler@burkert.com](mailto:marc.klingler@burkert.com)  
[www.burkert.com](http://www.burkert.com)