

# How intelligent control heads enable complete decentral automation of hygienic production processes



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**In the food and beverage industry, and also in the production of medicines and cosmetics, excellent hygiene in processes and around the plant plays a key role. This is ensured by stringent legislative regulations. Standards such as HACCP (Hazard Analysis and Critical Control Points) for food processing and GMP (Good Manufacturing Practise) for FDA-compliant processes in the pharmaceutical industry define extremely stringent requirements for cleanliness, safety and product quality. In addition, legislation requires that all processes must be constantly monitored and documented in these areas. In an increasingly competitive global environment, companies of this industry are at the same time forced to make their production processes as efficient and cost-effective as possible, in addition to optimizing processes. As a consequence, there is an ever increasing demand for automation at all process and auxiliary circuit levels.**

Pneumatically actuated process and control valves play a key role in the manufacture of foods and beverages, in milk processing and in the pharmaceutical and cosmetic industries. They are the core element of practically every production plant, where they perform numerous different tasks. However, the economical and hygienic aspects of these process fittings in a centrally controlled automation process are not unproblematic. Classical control systems using switch cabinets with valve terminals, an I/O system and field bus interface involve considerable expense especially in complex facilities. With this technology, the fittings at the field level are connected to the control units in

the switch cabinets through a large number of long control air lines and discrete feedback connections. Apart from planning and installation requirements for such solutions, they are not entirely optimal as regards hygiene. According to HACCP, every additional control air and feedback line within the production plant is a potential source of contamination and other risks and must therefore be monitored, serviced, cleaned and documented regularly, which is a costly undertaking.

In shop floor practice the control air lines can be quite long, which increases air consumption and has a negative effect on the switching times of the fittings. The situation is worsened even more by the high power requirement – e.g. for evacuation of air from chambers and hoses – which is undesirable in terms of energy efficiency. The fact that the pilot valve operating level is at a distance from the fitting makes it even more difficult to commission, maintain and extend the plant. This also applies to the monitoring of processes.

#### Intelligent valve systems make switch cabinets superfluous

A viable alternative to the use of central switch cabinets is the integration of the required automation functions in the fittings themselves. In this case, the process control system is only in charge of control and status monitoring. At field level, pneumatically operated valves are used. These can be equipped with all required automation components such as pilot valves with manual actuation, electrical feedback units and optical status indicators, field bus interfaces and even positioners and process controllers. By integrating an AS interface as a field bus interface, the entire range of advantages of this approach can be fully utilised. All that is required for power supply, feedback and communication is a two-wire line connecting the PLC with up to 62 valves. Each process valve is individually connected to the main compressed air supply line installed in the field, whereby these connections are kept as short as possible. This minimizes the number and length of hose and wire connections.

For auxiliary circuits such as steam, compressed air or cleaning media, the valve specialist Bürkert offers fluid control systems with the intelligent valve systems of the ELEMENT series for creating decentral automation solutions. The latest addition to this solution portfolio is the new control head Type 8681, which was designed especially for use with pneumatically actuated hygienic media valves. The features of a decentral automation solution in hygienic production processes can be used to good advantage not only in the auxiliary circuits, but throughout the plant at all process levels. In the planning of new plants, the use of conventional switch cabinets can be eliminated consistently. Existing plants can be converted from central to decentral automation step-by-step, using the existing media valves.

#### New universal control head for hygienic process fittings

The Type 8681 control head is universally adaptable by means of adapters and can be combined with all commercially available valve types, such as flap valves, ball valves and single and double-seat valves, regardless of the manufacturer. Within the framework of a decentral automation concept the control head, as a central unit for the hygienic process valves, performs all pneumatic actuation, feedback and diagnostic functions, as well as bus communication.

Depending on the process valve, as many as three pneumatic driver chambers can be controlled separately.

The switching positions of the hygienic process valve are measured by the control head via an inductive analog distance sensor for monitoring strokes of up to 80 mm and then transmitted to a master controller. After installation of the control head on the valve actuator the switching positions are automatically determined by a fast and reliable teach-in function, which eliminates the need for time-consuming manual configuration. If a fourth switching position is required, it can be read in by an externally mounted inductive proximity switch.

For optimal adaptation to the respective valve and process, the switching speed of each driver chamber can be set individually for both directions of movement by means of a restrictor function integrated in the pilot valve. In addition, a non-return valve prevents faulty switching of other driver chambers of the process valves due to back pressure. Independent of the power supply, each pilot valve can additionally be switched manually by means of a mechanical control. Thanks to a patented magnetically coded manual control, it is possible to switch the main actuator for maintenance purposes from outside even in the case of a completely enclosed device – ensuring full IP protection at all times.



The new Type 8681 control head from Bürkert allows decentral automation of hygienic process valves regardless of the manufacturer

A highly visible three-colour optical status display with high-power LEDs, which is integrated in the control head, provides for an optimum overview at the field level. In addition to electrical feedback to the master controller, it also signals the current switching position of the process valve, facilitating diagnosis and maintenance within the system itself. Diagnostic functions such as required maintenance or errors are likewise signalled visually and can be read out in detail via a service interface. This communication can be wireless via a Bluetooth module or via the integrated USB interface.

Hygienic control valves are also suitable for decentral automation

The use of one of the positioners or process controllers of the ELEMENT series allows the decentral automation of control valves, in addition to the process valves. The ELEMENT process controllers are optimized for cleaning and use in the wet areas of hygienic processing plants; their outer geometry, mate-

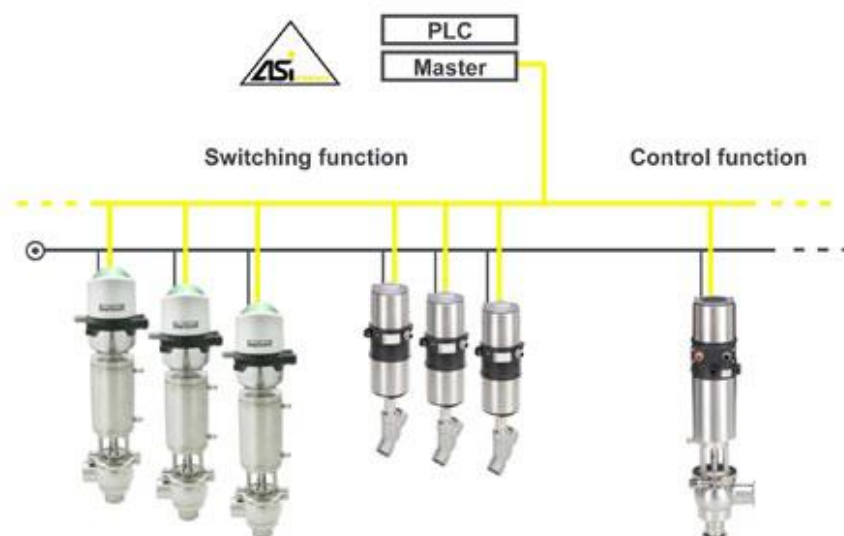


rials, surface quality and sealing properties comply with EHEDG guidelines. The compact positioners are installed directly on the pneumatic actuator to save space and require no external hoses, thanks to the internal control air supply. Installation and commissioning are facilitated by the use of intelligent positioners with automatic adaptation and process controllers with automatic control circuit detection and parameter optimization. Communication is achieved via Profibus DPV1, Device NET or the AS-Interface.

One decentral system solution for all process levels

With the addition of the new Type 8681 control head to the ELEMENT series, Bürkert now offers a complete product portfolio for decentral process automa-

### Decentral automation



Integrated concept: switching and control functions for hygienic processes and auxiliary circuits

tion in food and beverage production, breweries and the milk processing and pharmaceutical industries. The range of products extends from the process valve with an integrated pilot valve, as well as electrical and simple optical feedback all the way to the decentral control of aseptic, hygienic control valves by means of a control head and process controller in complex production plants. Decentral automation can therefore be used in all processes for entire plants and installations, enabling users from these industries to combine the requirements for hygiene and safety with a high degree of automation and efficiency. Since the new control head can be used with virtually all available fittings regardless of the manufacturer, there are practically no limits to decentral automation with uniform standards.

# Contact

We would be happy to show you how intelligent control heads can enable complete decentral automation of your hygienic production processes. Or do you have others questions?  
Just contact us:

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