Flexible, Centralised, Decentralised & Local Solutions for Automation of Hygienic Processes

White Paper
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In pharmaceutical and biotechnology industries, typically processing plants, the key to finding the best possible automation solution is a thorough analysis of each individual part of the plant or installation. In this way, the question of where plant intelligence should rest can be answered: i.e. does the nature of the application require centralised control interfacing to non-intelligent nodes, or does the physical size of the system mean that control has to be decentralised – using a fieldbus system and intelligent valves and actuators.

The best solution for large and complex plants is usually not a single, one-dimensional automation concept covering the entire process of production. In fact, each different part and section of the process, down to machine level, has its specific requirements. Consequently, an intelligent combination of different automation concepts will provide the best results. In order to achieve this goal, Bürkert is deploying three equally important automation approaches in parallel: centralised and decentralised automation, as well as locally installed, compact pneumatic valve block automation systems.

The centralised control concept is the most traditional of these, and although somewhat displaced in many larger plants, centralised cabinet solutions with automation systems for electrical and pneumatic signals have certainly not lost their importance.

The major drawbacks of centralised systems are extended control air lines that increase air consumption and have a negative effect on the switching times of the valves. In addition, there are also concerns as regards hygiene. According to HACCP, every additional control air and feedback line within the production plant is a potential source of contamination and risk, and must therefore be monitored, serviced and cleaned regularly, which is a costly undertaking.

Classic control cabinet with valve terminal and automation system in a centralized solution

Decentralised automation is a more recent concept. It employs intelligent pneumatic process and control valves for all production processes, and utility circuits such as steam, cleaning and temperature control media. The result is a maximum of flexibility for project planning, installation and maintenance, as well as transparency for process control.

The use of decentralised automation systems, employing innovative intelligent process valves, eliminates the problems of centralised systems, because automation functions - pilot valves, electrical and optical position feedback and fieldbus interfaces - are integrated directly, as part of the process valves.

This approach minimises the number of cables and compressed air lines. In addition, the concept is extremely flexible and provides further key features.

By integrating an AS interface as a fieldbus interface, the entire scope of advantages of the intelligent valve approach can be fully utilised. All that is required for the power supply, feedback and communications is a two-wire connection, interfacing the PLC with up to 62 valves.

Control head ELEMENT for decentral automation of process valves

Universally adaptable control head for hygienic processes

Each process valve is connected directly to the main compressed air supply line in the field, reducing the number and length of tube and cable connections, as well as the number of required control cabinets to a minimum. The ELEMENT range of process valves are themselves designed according to the guidelines for hygienic design and easy cleaning: they feature the high IP protection required by the actual application, and are made exclusively of detergent-proof materials. As a result, they are not affected by prolonged use in environments with high levels of humidity, or by frequent cleaning cycles with aggressive chemicals.

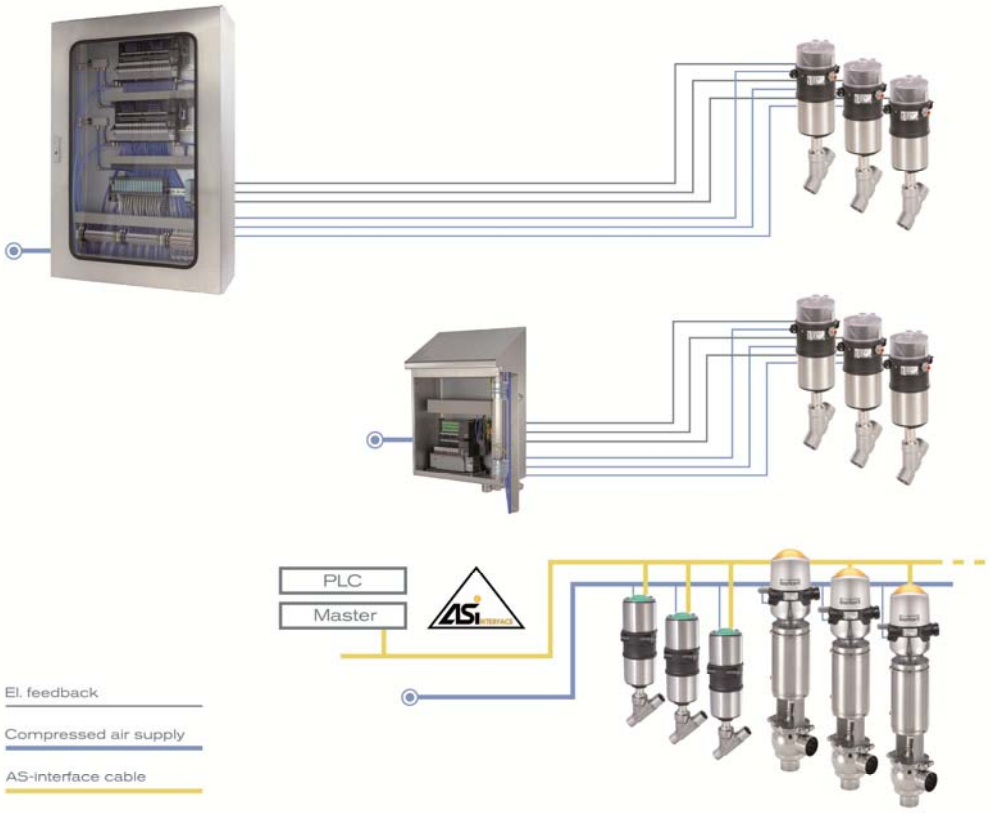
Flexible pneumatic valve units and compact automation systems bridge the gap between centralised and decentralised automation concepts. Using stainless steel attachments plates, these units are wall-mounted directly inside small, hygienically designed cabinets that can be installed close to process. These small, pre-configured and standardised units eliminate the long runs to valves and field devices, and can be easily kept clean.

Bürkert's new AirLINE Quick is pioneering this concept. The AirLINE Quick adapter is a complement to Bürkert's valve terminals and automation systems, which are designed for use in many different areas of hygienic processes and readily fulfil the high standards demanded by hygienic applications.

This compliance is ensured by the integrated process safety features of the type 8640 valve terminals and type 8644 automation system: features that are especially important in hygienic processes.

With AirLINE Quick, all pneumatic connections, the Fieldbus interface and the I/O modules can be mounted directly on the control cabinet base or side. This facility allows for an altogether smaller design of control cabinets. Additional components such as pipes, cables or control cabinet connections are eliminated, due to direct mounting, further reducing the time needed for installation and commissioning.

Modular valve island AirLINE Quick in HD switching cabinet



Automation Concept

Conclusion

By employing its three-tier automation approach, Bürkert is able to provide independent consulting and flexible hygienic processing control solutions from a single source. With a high degree of standardisation and state-of-the-art design, these solutions can make the engineering and commissioning of automation systems much easier and less costly. In addition, end-users benefit from plant standardisation, with easier plant monitoring and diagnosis, as well as reduced costs for maintenance and ownership of their facilities.

Contact

Do you have further questions? Just contact us:

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