Bayer F3 Project

Valve islands and remote I/O systems for chemical plants of the future

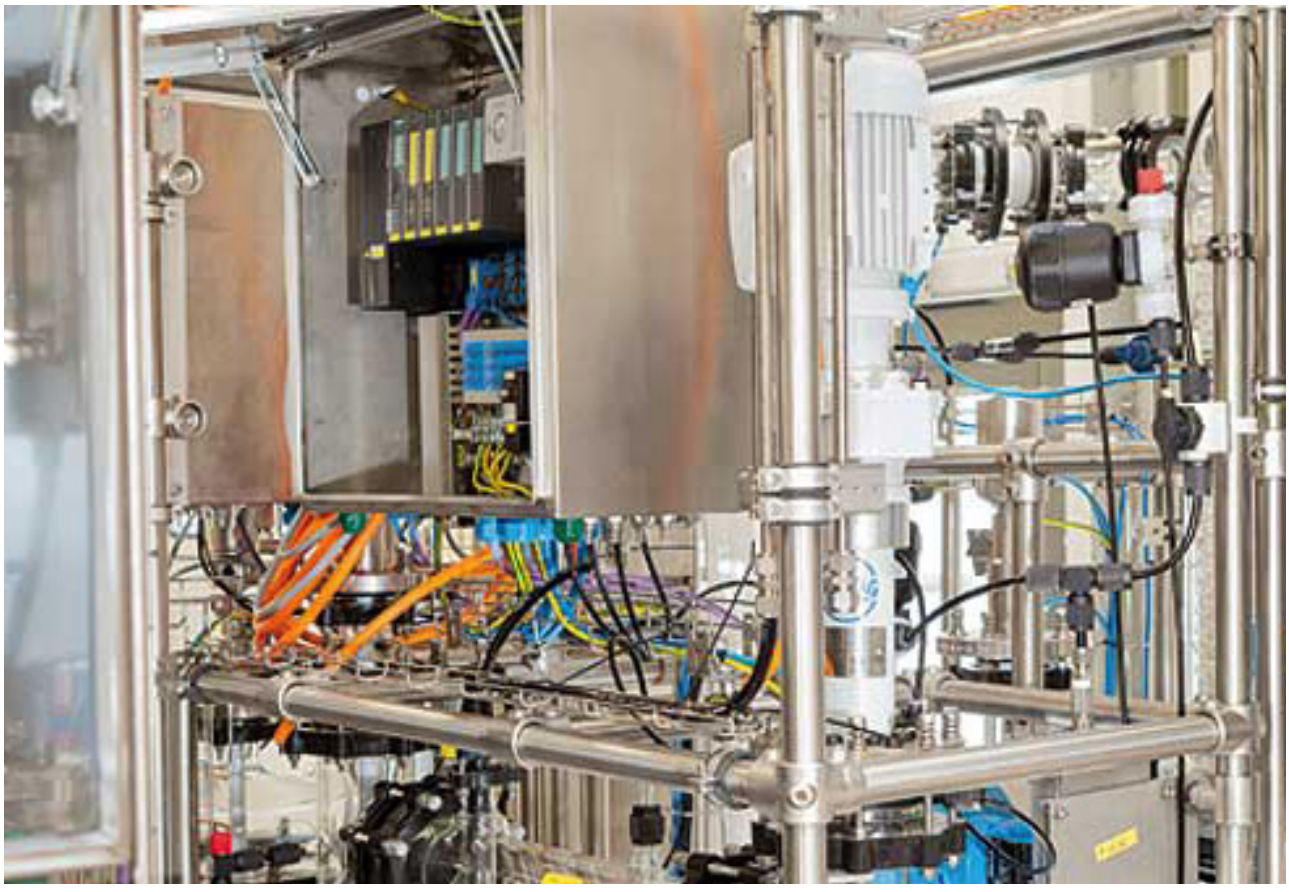
We make ideas flow.

bürkert
FLUID CONTROL SYSTEMS

Automation with valve islands and remote I/O systems for chemical plants of the future

THE COLLABORATION WITH BAYER

“Flexible, Fast and Future Factory” – the chemical production of the future: That is what the F3 Factory Project stands for. Within the scope of this project, a consortium of 25 partners from nine EU countries has been working since 2009 on the development of standardized and modularized production systems for the chemical industry. The EU subsidizes the project, which aims to conserve resources through more efficient processes, with a total of 18 million Euros. The partners of the consortium, which is coordinated by Bayer Technology Services, include not only industria enterprises such as Bayer, BASF and Evonik, but also scientific research institutes such as the Technical University of Dortmund and the RWTH Aachen University.



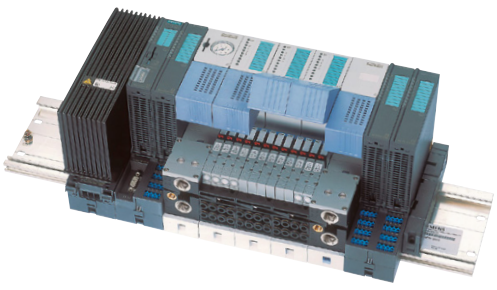
High Technology for minimum Footprint – Automation from Bürkert

”The biggest challenge for us was to integrate the control cabinets into the existing, already defined and very compact grid dimensions of the process containers.”

Heiko Kurtz, National Key Account Manager for chemical and explosion-proof technology, Bürkert

Project scope

The goal of the project is to develop faster, more flexible and more efficient production methods for chemical and pharmaceutical products. It was necessary to combine the benefits of flexible yet inefficient batch production with the cost advantages of continuous production. This is achieved by small to mid-sized production systems in standardized container construction. The companies involved develop highly modular “plug and produce”-capable systems in easily transportable containers. They can be tested in the new INVITE research center in the Leverkusen Chempark for initial production runs under realistic conditions. The focus is on shorter development times for new products by consistent standardization and modularization of the container units used. Chemical production facilities can then easily be planned, installed, commissioned and, if necessary, expanded based on practice-tested, standardized modules.



AirLINE Ex valve island type 8650

ATEX control cabinets that fit the grid

Bürkert is a supplier for the F3 Factory Project. In close cooperation with Bayer Technology Services, the fluid technology specialist developed a comprehensive concept for the automation of processes with valve islands and remote I/O systems. Special ATEX control cabinets were designed for the different container modules. “The biggest challenge for us was to integrate the control cabinets into the existing, already defined and very compact grid dimensions of the process containers,” says Heiko Kurtz, National Key Account Manager for chemical and explosion-proof technology at Bürkert. Based on the container type, a control cabinet is used in which all electric and pneumatic signals can be processed. Due to the very small space requirements, the chosen solution was a combination of the Siemens ET 200iSP remote I/O system and the integrated valve island AirLINE Ex Type 8650 from Bürkert. The valve island is completely integrated in the remote I/O system and is controlled by means of the same power supply and Profibus interface. This combination creates a uniquely compact and flexible solution for automation tasks in Zone 1 explosion-proof areas. The compact 2x3/2-way valves, with a size of only 11 mm, made it possible to implement the number of valves required by Bayer in the compact control cabinets.

High modular Cabinet building concept – Engineeed by Bürkert

Highest standards for functional safety

The owner‘s high requirements for functional safety of the valve islands presented another difficulty. Here again Bürkert cooperated with Bayer Technology Services to find a space-saving solution for integration in the compact control cabinets. The safety shut-off function of a valve island was achieved by using time-tested SIL-certified, intrinsically safe valves. Bayer required a simple yet efficient, robust and standardizable solution, which above all had to be reliable. The possibility of integrating fail-safe signals on the ET200iSP station from Siemens made it possible to implement the SIL interconnection within the control cabinet. This reduces the wiring to the control cabinet while reliably preventing sources of errors. External signals from a safety control circuit are no longer needed in the Ex area and therefore are eliminated from the control cabinet. All other intrinsically safe analog and binary signals from corresponding field devices in the respective container module, as well as the pneumatic signals, can likewise be processed in the control cabinet.

Maintenance and tests during normal operation

The intrinsically safe valve technology used resulted in a customized concept that also allows maintenance work and tests during normal operation. The hot-swap function of the valves and the electronic modules of the AirLINE Ex valve island make it possible to exchange them also under process conditions. This is essential to increasing plant availability and minimizing production downtimes. The integration of the valve technology in the PCS 7 process control system is also facilitated by the hardware interfaces to the I/O system and corresponding software. Thanks to this unique combination of valve island and I/O system, the integration of pneumatic signals in a modern process control system all the way up to Zone 1 is now possible. In addition, the extensive diagnostic functions of the valve island can be used to respond to errors at the site more quickly.

Bürkert supplements the high requirements for availability, quality and safety of Bayer Technology Services with the design of the control cabinets. For example, stainless steel tubes are used instead of plastic hoses in the air supply lines of all Bürkert control cabinets to be used in Ex areas. In Bürkert‘s in-house ATEX-certified control cabinet construction facilities in Menden, the control cabinets are configured, mounted and then certified in close coordination with Sales and the customer. This makes it possible for Bürkert, as a specialist for fluid control systems, to also produce complete control cabinet concepts.

Control cabinet assembly at the Bürkert Systemhaus in Menden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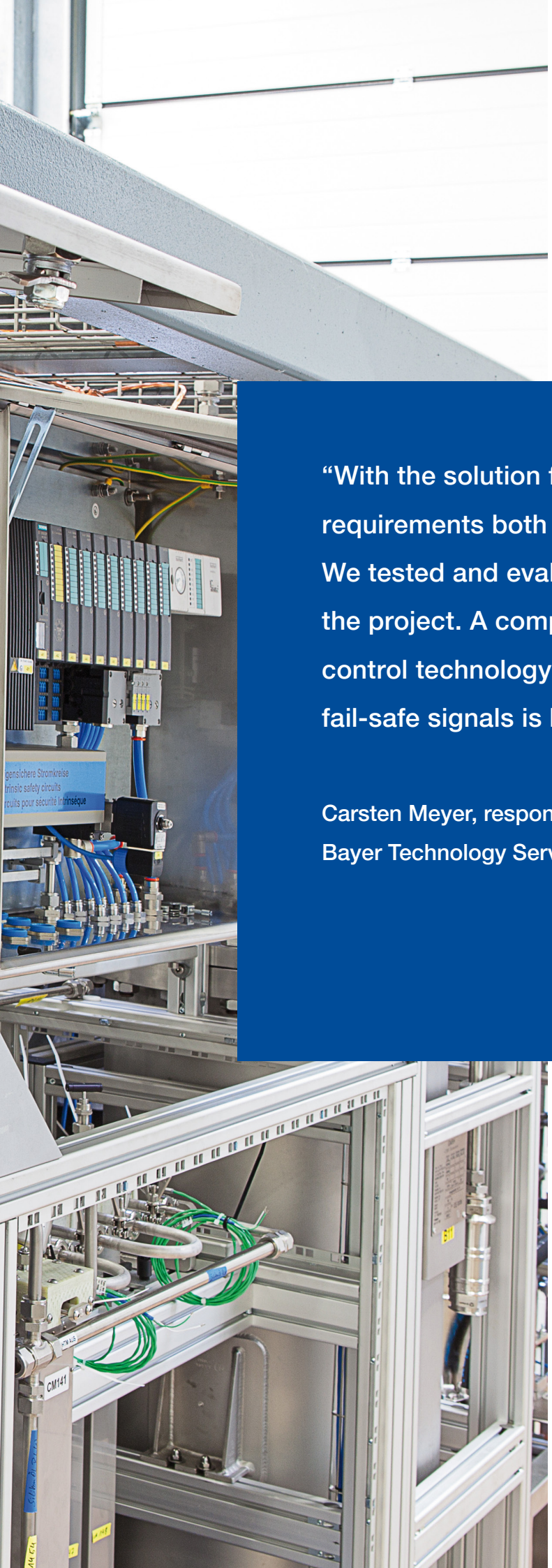

Bürkert cabinet for
different containers

“With the solution from Bürkert we were able to fulfil the requirements both for functional safety and for Zone 1. We tested and evaluated different alternatives during the project. A comparable compact solution for the control technology in Zone 1 that can also integrate fail-safe signals is hard to find on the market.”

Carsten Meyer, responsible for process control engineering,
Bayer Technology Services

You can find out more about this project at:
www.buerkert.com

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