FESTO

Water was the beginning

10 years of modular automation – A retrospective 2016–2026

“2016 was the start.”

“Festo can do modular automation. We knew that.”

Tobias Peschel,
Industry Segment Management Water/Wastewater

“Modular automation means customised solutions off the shelf. Festo has significantly driven modular automation forward. We were able to do so because we had the experience and expertise, both at the field and the process level.”

“Many thought a revolution was breaking out!”

Patricia Soppelsa-Fandino,
Technical Support, Process Automation

“Shifting functions down from higher levels was new territory for many long-established engineers. They were more used to a top-down style. Luckily, this way of thinking has all but disappeared. Modular automation has won through.”

More information and more topics:

Interviews with experts:

www.festo.com/experts

Ask the experts:

modular@festo.com

→ **The interview**

10 years of modular automation – A retrospective

10 years of modular automation at Festo

2016 is the year when modular automation came into its own. It started with the development of new, flexible and intelligent water treatment systems, also known as skids. That enabled process automation to meet the requirements for greater flexibility, shorter time to market and more individual solutions. Festo drove this technology on from the outset, and it became and remained indispensable in fine chemical production and biotech/pharma. Today, modular automation is standard. At the time, it was uncharted territory. We look back.

“Modular automation is the right variant for all situations.”

Tobias Brucker,
Sales Germany Process Automation

“The head of a water utilities association once said to me: ‘Everything we planned then was wrong!’ What he meant was that they bought a sports car before modular automation and noticed a year later that they really needed child seats. Modular automation can turn a sports car into a van. And vice versa.”

“In 2016, I was certain that modular automation would be the next big thing.”

Dr.-Ing. Eckhard Roos,
Global Industry Segment Process Automation Management

“Modular systems are the future. They are crucial for success when production changes all the time. For example in fine chemicals, in the pharmaceutical industry, in water treatment. Wherever flexibility and variability are essential.”

Roos: Modular systems have won through. The advantages and technical opportunities that became possible around 2016 were simply impressive. Even for process automation, which is sometimes a little “cautious”.

Brucker: Yet at first there was a lot of work to do. A bit like when mobile phones were first introduced, and many asked themselves:“Do I need one? I got along fine without it until now.”

Soppelsa: I had the impression that it troubled many people’s self-image, that a process engineering system should no longer be viewed top-down.

10 years ago:

When 4.0 wasn't yet run-of-the-mill

Festo introduces DataGlasses: maintenance and service with 3D glasses. The central unit forwards error messages directly to the glasses. The screens in the glasses show plans and detailed views of the system, facilitating troubleshooting and speeding up maintenance processes.

2016

The topic of IFAT, the world's leading trade fair for water and sewage management: modular automation and the solutions from Festo. Centre stage: Festo CPX, the first real platform for integrated automation.

2019

2017

Delivery of the first skids with Festo expertise. Plug and produce with hardware and software for standardised module interfaces.

At Hannover Messe 2020, Festo exhibits the remote maintenance and diagnostic tool RemotePlant. For the first time, diagnostic information from individual valves can be queried at field level, enabling predictive maintenance.

2020

RemotePlant

Brucker: Even 10 years ago it was almost standard in factory automation to modify machines based on customer-specific orders. But it was uncharted territory for process automation.

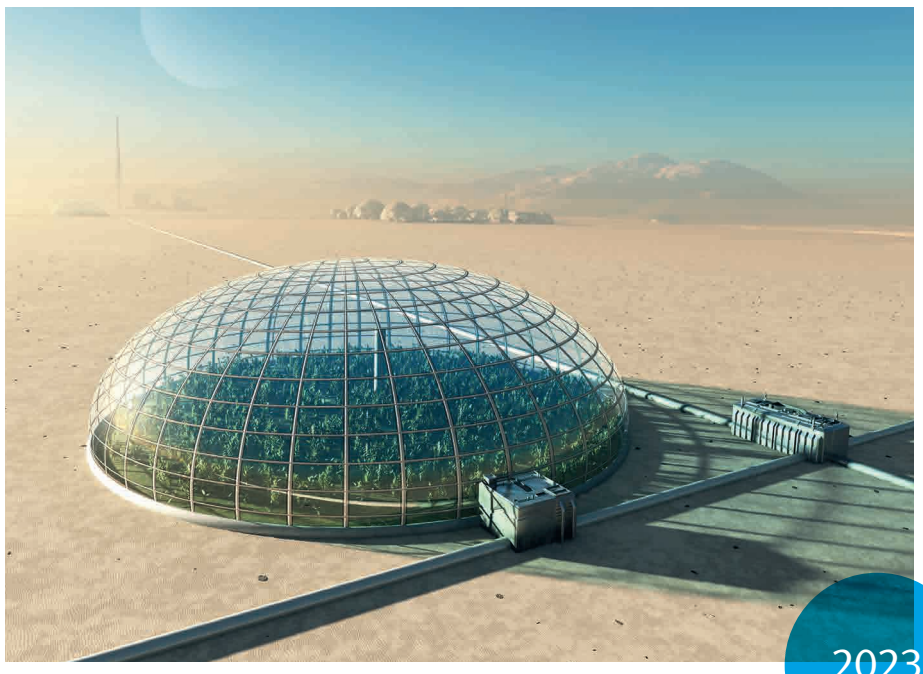
Soppelsa: But then everything moved very fast. The time was just right. We could feel it.

Peschel: At Festo we were extremely well prepared for this. We played a big part in driving the development in this area forward. Others had questions. We had the answers.

On the evolution of a revolution

Modular automation changed the way people think about automation in the long term. It is fascinating to look back, to recall once more the rapid development modular automation solutions have undergone. Some claim that this development was a revolution. In fact, it was the logical and inevitable consequence of the evolutionary development of existing competencies and products. Modular automation had to happen.

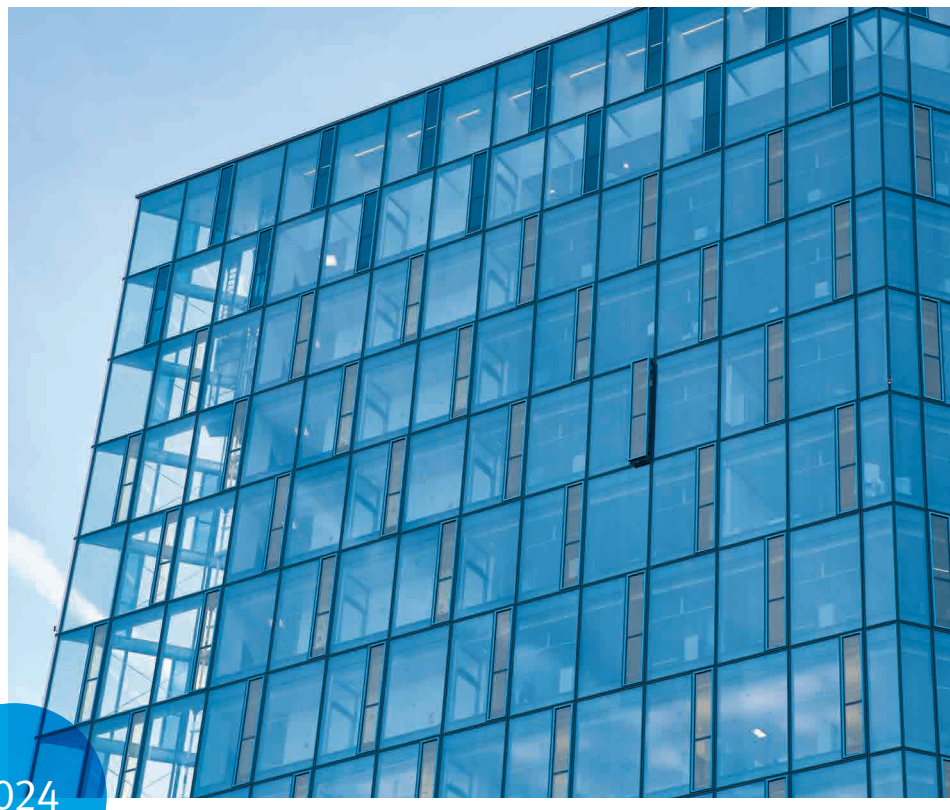
2023



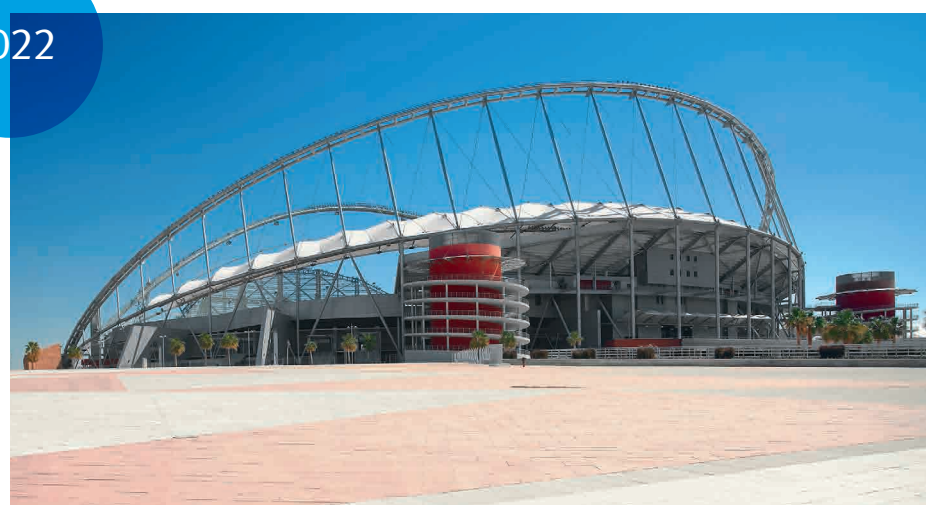
Festo technology enables high-volume water treatment in the UN's "Water Desert" project in the Atacama desert in Chile.

2024

The Festo AutomationCenter is now also home to FEMAG (Festo Modular Automation Group). It quickly established itself as the think-tank on modular automation.



2022



The World Cup will be held in Qatar. All water treatment systems rely on technology "Made by Festo". Modularity allows systems to be used temporarily and so after the world cup they were reinstalled in countries with water shortages as part of a humanitarian campaign.

2026

A virtual training factory was opened under the leadership of FEMAG in Festo's AutomationCenter. In a kind of "Holodeck," the brain-computer interface allows complete processes, even entire systems, to be controlled by thought.

Roos: That was the result of the expertise we built up in factory automation.

Brucker: At Festo we succeeded in positioning ourselves completely differently. Especially in engineering. And an increasing level of trust was placed in us.

Soppelsa: Of course this was also because we were among the first to really drive Industry 4.0 forward.

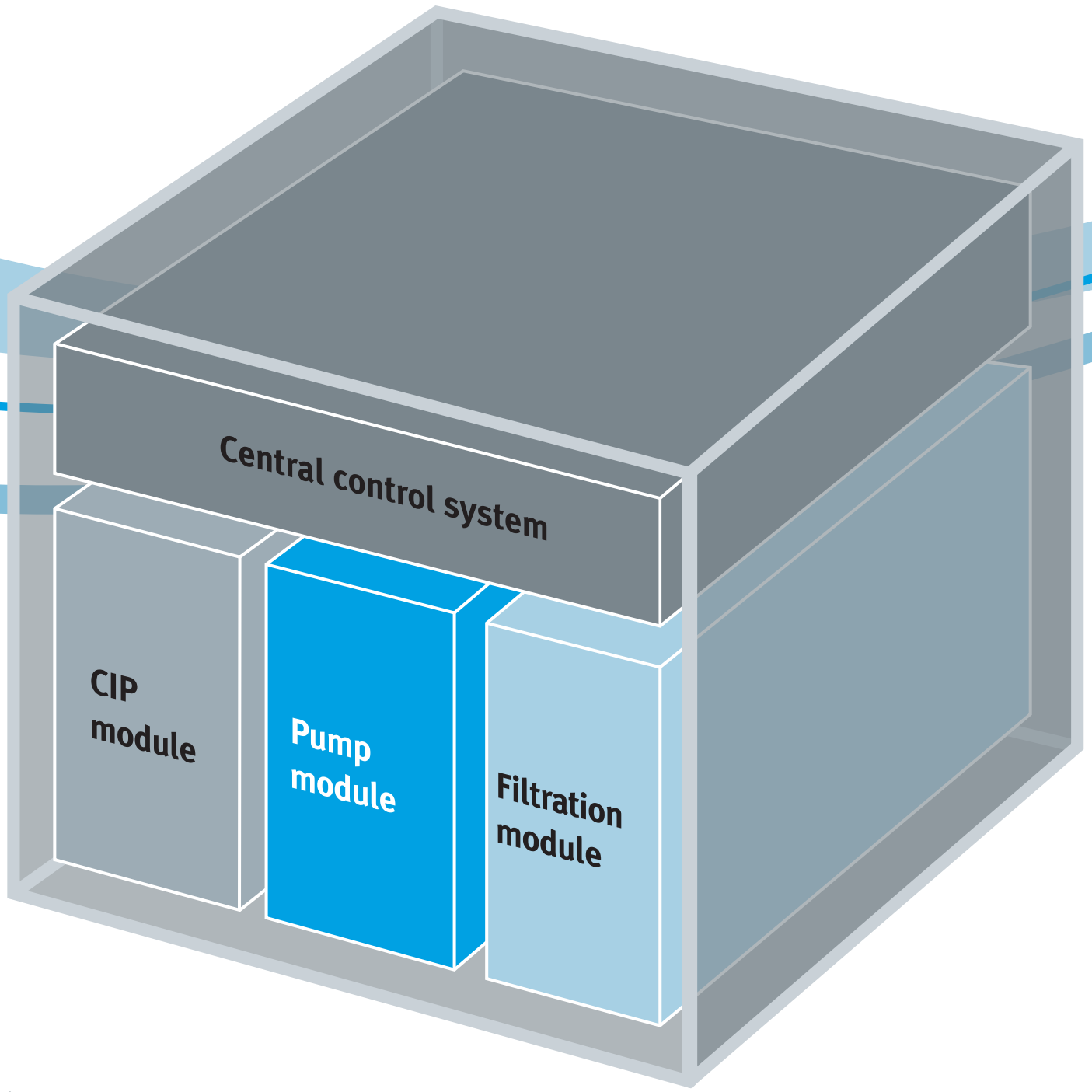
Modular automation:
Systems based on the LEGO® principle

Technology – 20th century

The monolithic solution – central automation of a system

Facts:

- Capacity adjustments virtually impossible
- Laborious engineering processes
- Hardly any upgrade options
- High investment costs
- Low flexibility
- Long planning periods



*LEGO® is a trademark and/or copyrighted by the LEGO Group.

Roos: The advantages were too obvious. We couldn't pass them up.

Soppelsa: The opportunity to produce modules at a low cost, to encapsulate them and make them transparent online in the event of faults, both for the system builder and the end user... that had to catch on.

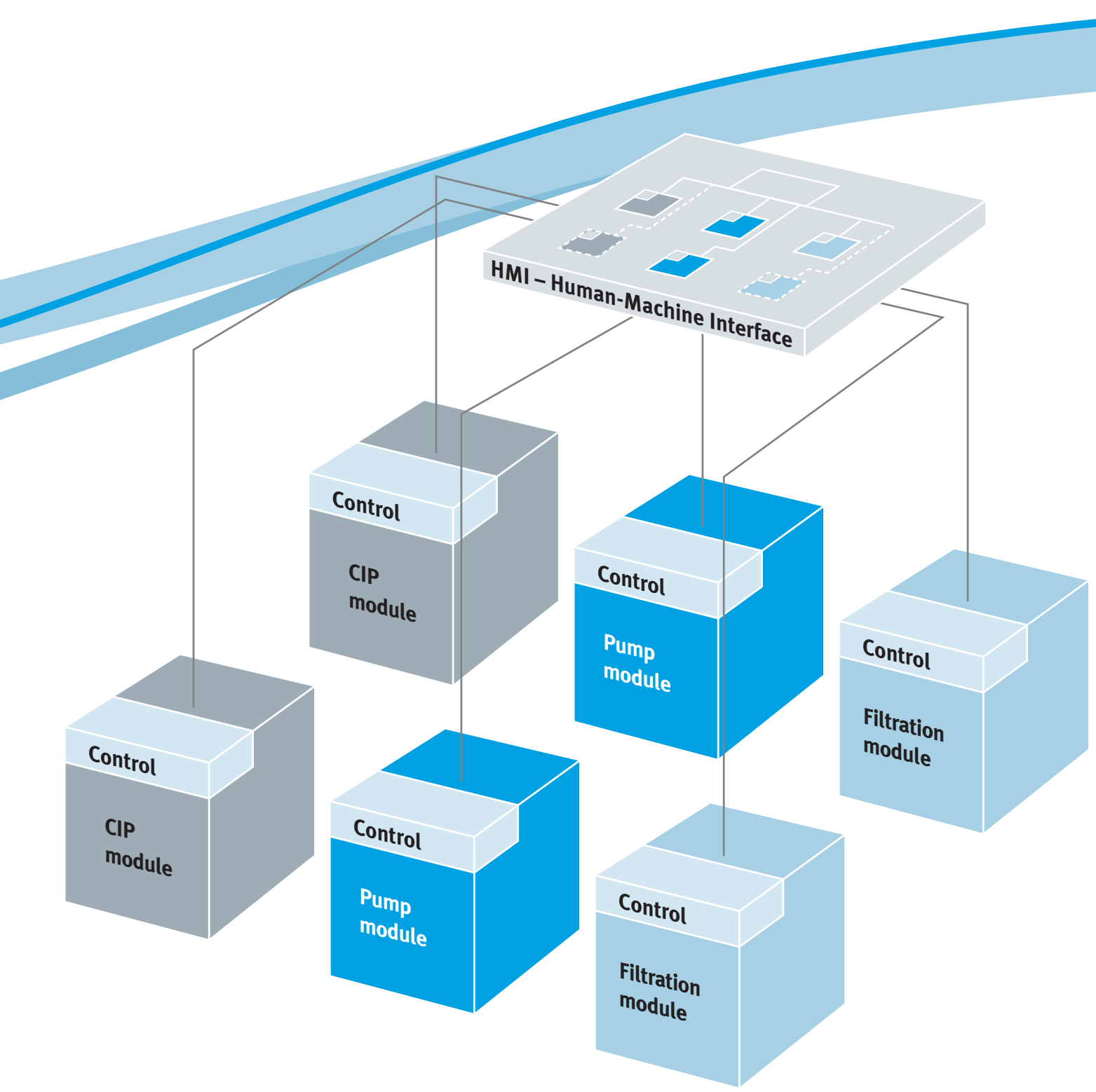
Roos: Modular automation really is a win-win: a win for the manufacturers who were and are able to develop standardised system modules...

Changing market requirements need modular plants and automation concepts

In 2016, flexibility, individualisation and easy maintenance were still visions of the future for process automation. The entire process was centrally controlled by a single management system. The design and engineering were precisely tailored for a particular function. Changing market requirements called for a new approach. The solution was to break a complete system down into functional units, and base systems on the “LEGO® principle”*. However, that is a principle that only works with modular automation.

Technology today

The modular solution – in modular automation, adding autonomously operating modules means that a system can be expanded and adapted virtually infinitely.



Facts:

- Automated modules operate autonomously and in a network
- Reduced software complexity
- Process control system becomes leaner or superfluous
- Standardisation of the modules possible
- Numbering-up/down instead of scaling-up/down
- Plug and produce

Brucker: ... and a win for the operators who get exactly what they need.

Peschel: Especially given the advantage that systems would never be under or oversized again.

Roos: And we also benefitted as the automation supplier. It made module quality ever more important.

The success model 2016

1

Visualisation and operation

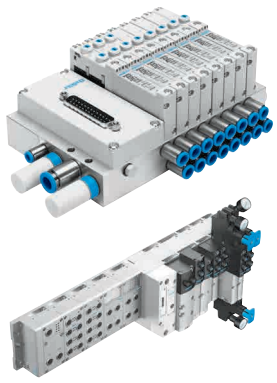
Control and graphic visualisation of processes and information: control panel CDPX.

2

Decentralised/ modular control

CPX – the platform for integrated automation. With CODESYS V3, OPC UA can be used as a communication interface and information protocol that allows electrical and pneumatic functions to be integrated.

3



Pneumatic and electrical function integration

Valve terminals CPX/MPA, CPX/VTSA and VTUG combine maximum modularity with maximum pneumatic power. A modular design allows individual combinations, depending on the function.

4

Peschel: We had lots of expertise, particularly at field level. Automation platform CPX - need I say more. Units from 2016 are still running.

Roos: The vital component of the CPX is its pneumatics which, compared with other solutions, reduces the bus nodes and configuration workload.

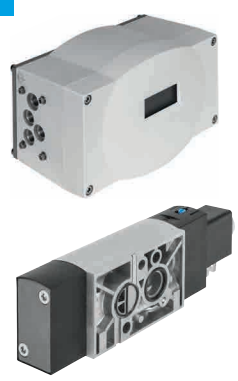
Soppelsa: For a long time, it was still controlled via remote I/O.

Roos: That proved to be wrong: modules with their own control systems were the future. And that has now become the standard.

Maximum flexibility with modular automation

Numbering-up instead of scaling-up: this concept of platform-based, modular automation has been ensuring maximum flexibility as well as reproducibility and high system efficiency for 10 years now. Festo was a pioneer in modular automation with automation solutions for water treatment skids.
An experience-based advantage which continues to pay off.

4



Control

The positioner CMSX for closed-loop control of pneumatic actuators for process valves. For simple opening/ closing movements e.g. the standard NAMUR valve VSNC.

5

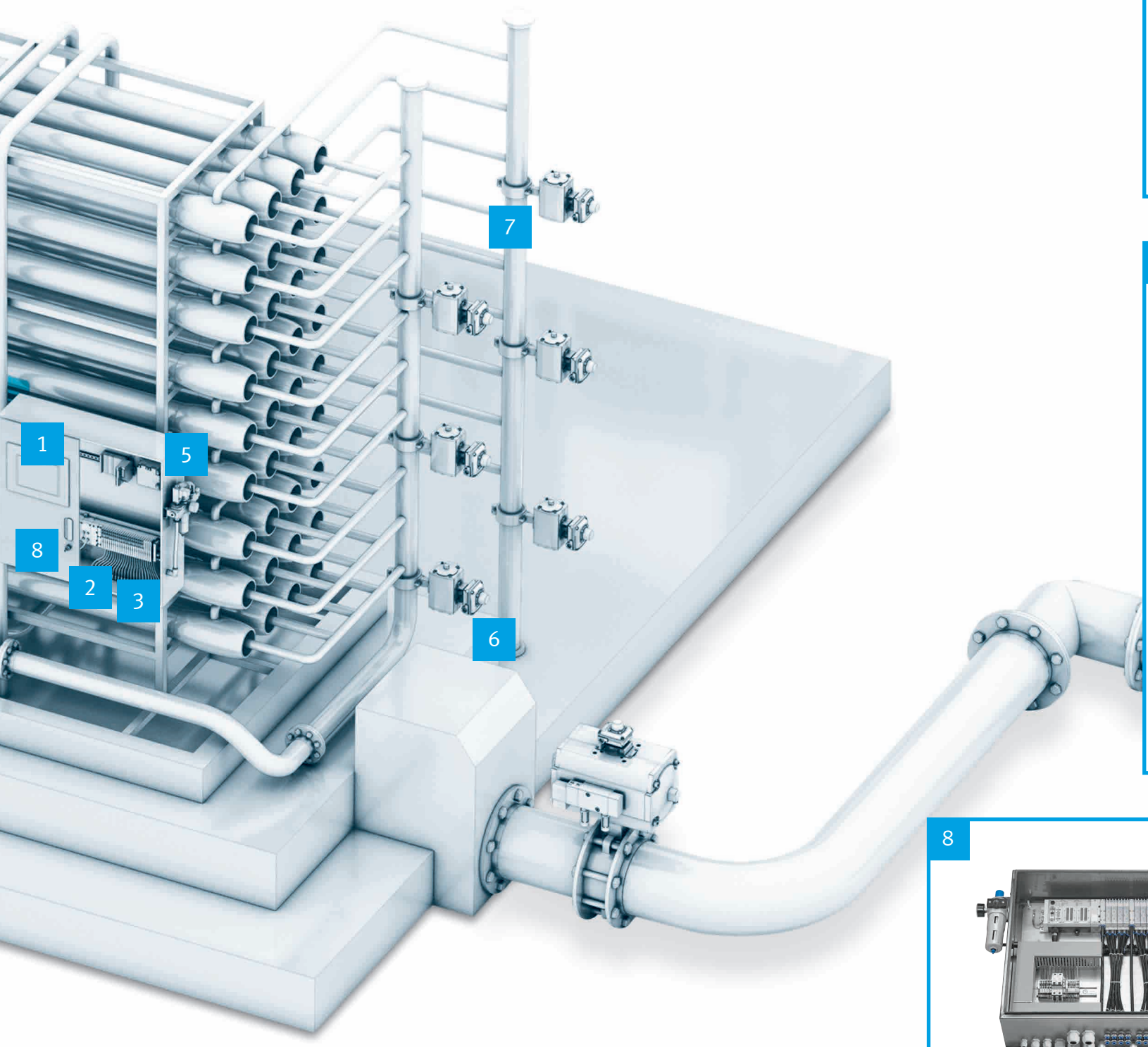
Air preparation and connection technology

Service units, matching tubing and connection technology for optimal connections to the compressed air supply network.

6

Moving and monitoring

Quarter turn actuators (DAPS, DFPB, DFPD) and linear actuators (DLP, DFPI) provide pneumatic motion. Position sensing with the analogue sensor box SRAP. Digital end position sensing with SRBC.

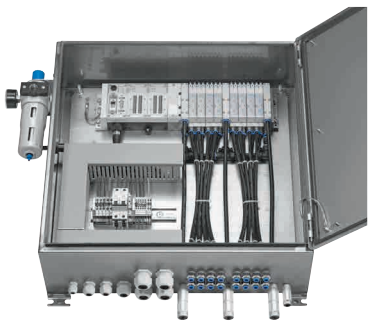


7

Regulating

Globe valves, butterfly valves and knife gate valves, angle seat valves and pinch valves regulate flow rates and pressure conditions.

8



Protecting

Control cabinets protect electric and pneumatic components.

Soppelsa: That was a challenge for our service.

Peschel: If operators can no longer influence every last bit in the module themselves, we or the module suppliers must be able to support them worldwide.

Brucker: Sounds more dramatic than it is. Modular automation creates low-maintenance systems which would have seemed impossible 10 years ago.

Soppelsa: And if there is actually a problem, we are available at any time.

2026: Automatic success

The terminal CPX from Festo. Here with MPA for serial interlinking and pressure control/proportional pneumatics.

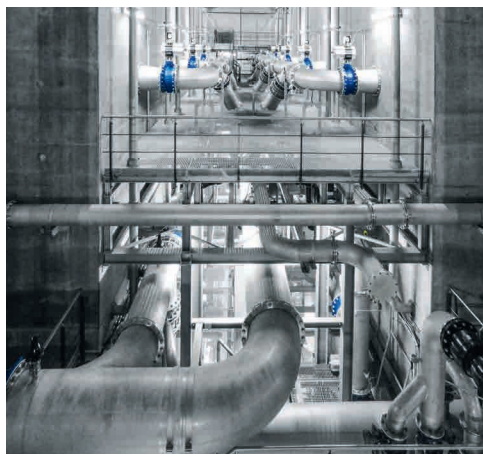
The first platform for integrated automation: the terminal CPX

Even now, 10 years later, the terminal CPX remains the basis for forward-looking industry 4.0 concepts. Ideal as a valve terminal partner or remote I/O: it is electric, open and direct. CPX integrates pneumatic or electrical control chains simply, quickly, flexibly and seamlessly into all automation concepts and company-specific standards.

Solar panels supply the control system of the stormwater retention tank in Esslingen with electricity.

Controlling the rain for over 10 years

Stormwater retention tanks are often located in remote areas where there is no regular power supply. Until 10 years ago, these facilities could not be automated and employees had to actuate gate valves in a laborious, manual process. Festo's solution: energy autonomous, automated and remotely controlled handling of the knife gate valve. The pilot system (left) still runs trouble free after 10 years.



View of the pipe basement: full of Festo technology.

Roos: You have to admit, modular automation has brought about fundamental changes in the context of "Industry 4.0" for design and process engineering systems.

Brucker: Now, it is difficult for us to imagine how it could ever have worked without modular automation!

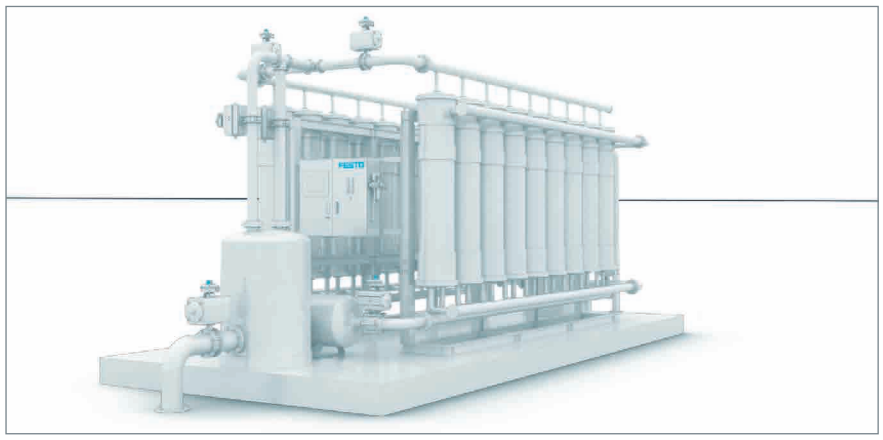
Peschel: Well, water technology clearly shows how automation concepts have developed in recent years. Starting with autonomous systems like the stormwater retention tank in Esslingen.

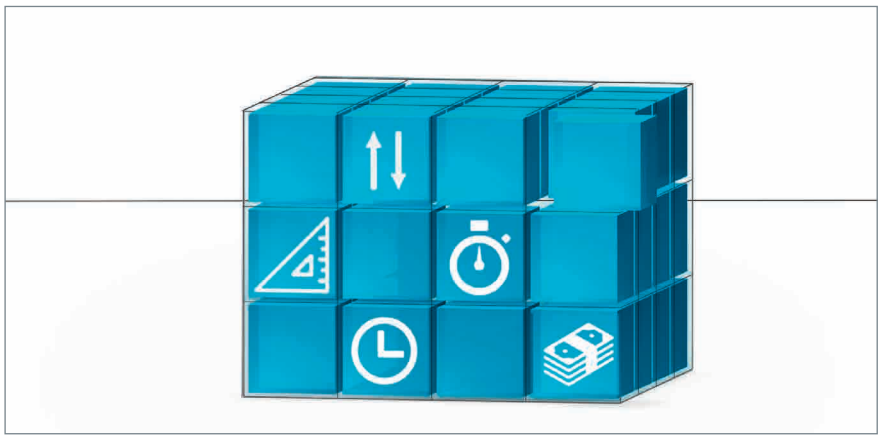
Festo water technology: highlights and news

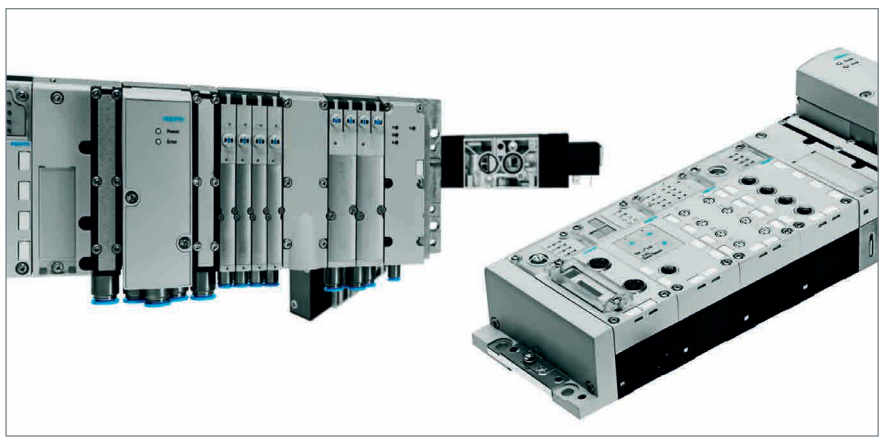
In the mid 2010s, we could not have foreseen how rapidly and positively modular automation would develop in the years to come. However, the first projects already suggested that it just combined too many advantages.

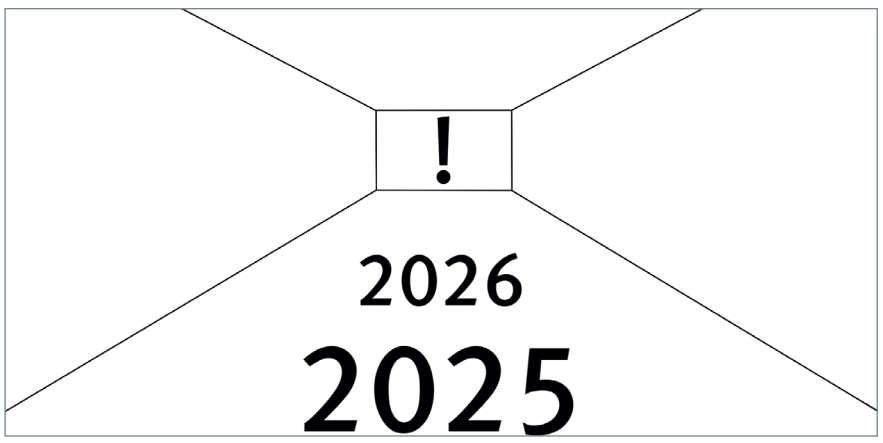
Modular automation – the movie

Become a modular automation expert in two minutes.
Simply scan the code to watch the video!
Or go to **www.festo.com/clipmodular**



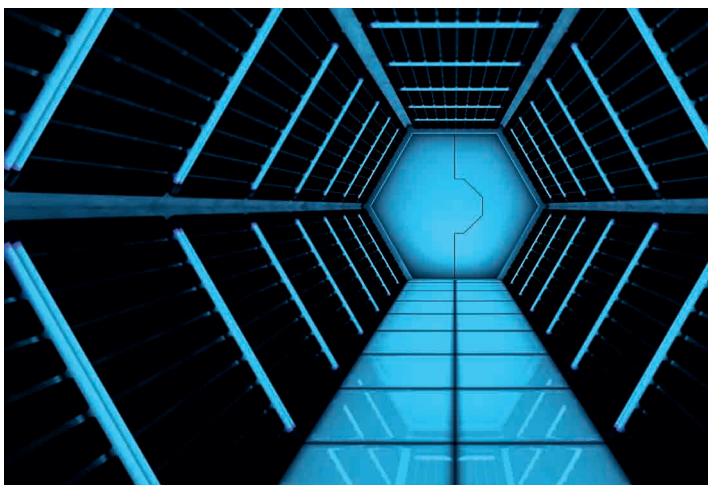






This is where water is made

For over 50 years, roughly 30 million cubic metres of water are removed from the Danube near Leipheim. 10 years ago, when rebuilding the groundwater filtration, the operators chose Festo expertise. Result: the cost advantages offered by pneumatic operation are in the six figure range.



Fascinating spatial experiences in the new Festo Holodeck.

Festo virtual training factory – a huge success

From mid-2026 on, Festo will also allow customers and suppliers to optimise the shared engineering process in the new Holodeck.

Soppelsa: The advantages were obvious: greater safety with reduced workload with reliable Festo technology.

Brucker: Anyone who chose modular automation back then and relied on our products and engineering competency, is now clearly reaping the benefits.

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