

The Festo logo is displayed in a bold, blue, sans-serif font. The background of the entire page is a dark blue with a complex, abstract pattern of glowing white dots and lines, resembling a digital or particle network. A bright, curved light streak is visible in the lower-left quadrant.

FESTO

 Highlights
2024/25

The next step into the future.

VTUX

Connectivity at its best – for flexibility like never before.

> www.festo.com/vtux-animation



Contents

Contents 3

Highlights 2024/25

Interview 6

We are “Motion Experts”

Frank Notz, Member of the Management Board Sales, and Dr. Ansgar Kriwet (p. 9), Member of the Management Board Research and Development

- > Festo Blue World 4
- > New Valve Terminal VTUX 10
- > Product Overview 36
- > Imprint 42



Sustainable Automation 12

Reducing CO₂ Emissions for Climate Protection | Product Shopping Basket for Reducing CO₂ | Automation Solutions for Green Hydrogen Production

Circular Economy 18

Safe Disassembly and Environmentally Friendly Recycling of Batteries

01

02

Controlled Pneumatics 20

Compact Multi-Channel Pressure Control, Even for Small Volumes | Automated Patch Clamping in Drug Development



03

LifeTech 24

New Products and Product Features | Extracting DNA on an Industrial Scale

Electric Automation 28

Seamless Connectivity from the Workpiece to the Cloud | Modular Remote I/O System CPX-AP-A

04

05

Artificial Intelligence 32

Standardized AI Apps for Immediate Use and Added Value | Festo GripperAI in the Würth Logistics Center



06

Festo Blue World

Our blue planet presents us with major challenges. How can automation technology and technical education help us to resolve these challenges?

Festo has made its solutions expertise an integral part of its Blue World approach. With pneumatic and electric automation technology, process automation, digitization, and artificial intelligence, Festo is enabling the transformation of industrial production into an efficient and more climate-friendly way of manufacturing. Biological transformation, too, will become a new focal point for technology in the future.

Automation technology and technical education from Festo:
Enabler for sustainable solutions to tackle the greatest challenges facing humankind.

Focus on people

> Challenge:

Population growth and demographic change

> Objective:

Safe supply for the population

With our **people-centered** approaches, we are lightening the workload of employees. Our LifeTech technologies and our learning systems are supporting the LifeTech sector by encouraging and empowering people to learn and use new technologies more efficiently.

- **Assist people at work** Human-machine collaboration
- **Improve health** Technologies for the life sciences
- **Lifelong learning** Technical education

Focus on the planet

> Challenge:

Climate change and limited resources

> Objective:

CO₂-neutral production, circular economy

As part of our **resource-centered approaches**, we are using automation technology to support structural change in certain sectors, such as the automotive industry, and to demonstrate how automation technology can be used to better protect our most important resources such as water, soil, and air. This also includes shortening transport routes and value chains through increased localization, which also minimizes emissions at the same time.

- **Industrial transformation** Driving structural change
- **Ecological innovations** Saving resources, protecting nature
- **Resilience in value chains** Deglobalization, safeguard supply chains



Find out more about the Festo Blue World:
> www.festo.com/blueworld

We are “Motion Experts”

For **Frank Notz, Member of the Management Board Sales**, Festo is still too often associated purely with the topic of “pneumatics”. Yet electric automation solutions and digital products have long been important areas of business too. **Dr. Ansgar Kriwet, Member of the Management Board Research and Development**, talks about challenges, milestones, and trends.

» Festo and pneumatics – for many people, the connection between the two goes back a long way. Which association would you prefer to hear?

Frank Notz: We are an all-round automation partner with an extensive portfolio for generating and controlling motion. In addition to pneumatics, we have expanded electric automation and digital products into important business areas with a broad portfolio. We are therefore very well positioned when it comes to intelligent and extensively networked systems.

The aim of our sales experts is to consistently demonstrate to our customers that we are “motion experts” – and that goes far beyond pneumatics. But, of course, pneumatics is very much part of our DNA. We are constantly setting new standards in this area, for example by digitizing pneumatics. With “controlled pneumatics”, we have achieved huge improvements in performance, which in turn translates into considerable improvements in precision and energy efficiency, among other things.

» What are the benefits of having such a broad portfolio?

Frank Notz: Of course, having a broad portfolio alone is not a guarantee of success: seamless connectivity is the key. Let’s stick with the example of digital products: Data – whether from electric or pneumatic systems – is transformed into a usable format throughout the entire automation pyramid in a hardware-neutral way. This opens up new opportunities, especially, of course, when combined with AI. Good examples of this are predictive maintenance, or smart energy and quality management. These are all important factors when it comes to taking our customers’ productivity to a new level.

» Is there a rule of thumb: Which solution is the right one for which application?

Frank Notz: It always depends on the specific production task. Efficient and optimized automation often depends on the right mix. But how do you discover it? What sets us apart is our high level of consulting expertise. It is impressive to see how deeply our application engineers immerse themselves in the needs of our customers. Their premise is to precisely understand the requirements of the various industries, as well as the individual customer needs, in order to find the best customer-specific solution. Thanks to our broad portfolio, our application engineers can approach the consultation phase without any preconceived ideas and just focus completely on individual customer benefits. It is ultimately all about increasing productivity!

» So, the question of the perfect solution is not an “either/or” decision?

Frank Notz: Exactly! I believe that we should never draw a line between electric automation and classic pneumatics or controlled pneumatics. On the contrary, our systems are so smart, networked, and compatible that it often takes a mix of technologies to find the best solution for an application. And not only is it all completely seamless, everything is from a single source, because our extensive portfolio covers the entire automation spectrum.

» How do you guide the customer to the ideal solution?

Frank Notz: Our Festo Experience Centers *, which we have established in many regions around the world, are a prime example of how we work with our customers to find the best solution without any preconceived ideas.

What’s special about this is our very practical approach to finding solutions on site together with our customers. In a “sandbox environment”, various applications can be set up, tested, evaluated, and adapted directly on site using a wide selection of components from our portfolio. The end result is always the best possible solution for an individual automation task, whether pneumatic, electric, or even a suitable combination of both drive technologies. In many cases, however, our customers can also make the right choice quickly and easily online.



* The interview took place in the newly opened Festo Engineering Center (FEC) in Esslingen, Germany.



» What can customers do online in order to “find the best solution”?

Frank Notz: A lot! They have access to digital engineering and design tools on our website. This provides them with a transparent comparison of our technological alternatives that consider various aspects, from power and controllability to economic feasibility. As for sustainability, there are also smart tools that use various parameters to provide specific information about environmental effects during the operating phase. The carbon footprint or ideal energy consumption can thus be included in the decision-making process.

» What are the key challenges for the future – what are Festo and its customers facing?

Frank Notz: The next major industrial transformation is in full swing: our customers’ industrial automation tasks are becoming increasingly more diverse and complex. While digitalization is now affecting the entire value chain, new requirements such as sustainability and climate-neutral production are emerging. At the same time, the pace of production processes is becoming faster, which means that they need to be as flexible as possible.

Our customers appreciate that, as a complete automation partner, we can offer an extremely broad range of solutions, and ensure simple and seamless networking between systems. I know from many personal conversations that this variety from a single source makes it easier for our customers to quickly find the solution that meets their needs.

“Festo long ago expanded classic pneumatics to include electric automation and controlled pneumatics as well as software and AI applications.”

Frank Notz, Member of the Management Board Sales, Festo



Dr. Ansgar Kriwet, Member of the Management Board Research and Development, Festo

» Festo is the only supplier on the market with a comprehensive product portfolio for pneumatic and electric drive technology. What role does research and development play in this?

Dr. Ansgar Kriwet: Our background is classic pneumatics, but we recognized the trend towards electric drive technology at an early stage and were able to help shape the move toward automation technology in this direction. We have also taken pneumatics to a new level and made it controllable, something that was previously reserved for electric drive technology. For years, our research and development activities at Festo have focused on the development of solutions for electric, pneumatic, and servo-pneumatic motion in machines and systems. The challenge for our developers was to create a standardized solution that covers all motion requirements in order to make it as easy as possible for the customer.

» Can you give us a concrete example of such an innovative solution that combines pneumatics and electrics?

Dr. Ansgar Kriwet: Our new valve terminal VTUX with CPX-AP-A controller is a milestone. It enables us to fulfil any motion requirements customers may have, whether these are pneumatic, servo-pneumatic, or electric, and all using a standardized platform. The functionality of VTUX will continue to grow as new modules are added. For example, at the end of the year it will be available with AI. This new generation of valve terminals and manifolds meets a key demand from our customers for maximum production flexibility.

» How will the market develop and how are you preparing for this?

Dr. Ansgar Kriwet: The trend towards servo-pneumatics or controlled pneumatics and electric drive technology will continue. That is why we are actively investing in this area. At the same time, smart functions and AI are becoming more important. The topic of sustainability and energy efficiency will also increasingly take center stage. And in the future, new drive principles will complement our current solutions. Hence, we are carrying out research into piezo actuators and superconducting servo motors, for instance. We are all set to continue on our path to be and remain an all-round technological partner for motion. Because this ultimately makes things easy for our customers – simply Festo!

VTUX

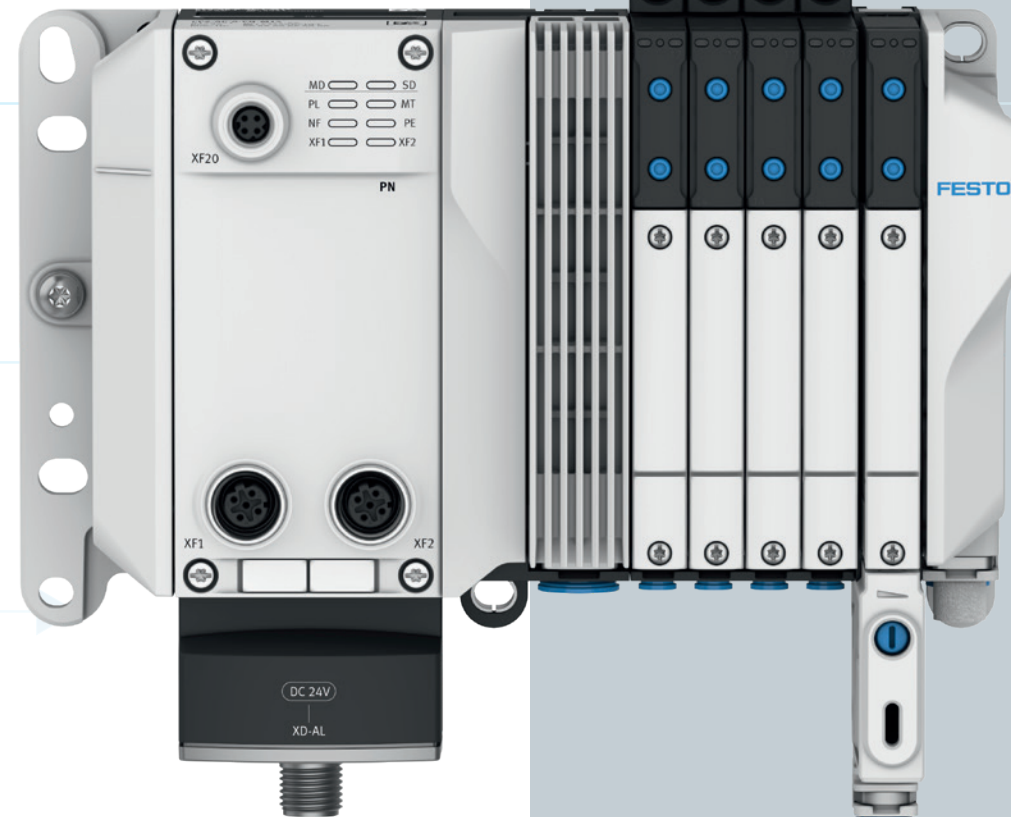
The Adaptable Valve

Modern design and seamless integration into the AP platform enable unprecedented flexibility. The high-performance and future-oriented valve terminal platform VTUX is the right choice from the outset.

- Highly modular and with Festo AP communication technology – the new standard for higher performance and lower costs
- All requirements for predictive maintenance, security features, and data exchange are integrated in the cloud (IIOT)
- Compact and lightweight – saves time, space, and weight in the machine
- Ideal for centralized and decentralized machine concepts

“Our new valve terminal VTUX is a milestone.”

Dr. Ansgar Kriwet, Member of the Management Board Research and Development, Festo



Electrics

Infrastructure for technology modules – the new remote I/O system CPX-AP-A

Serial modular remote I/O in protection class IP65/67

- Real-time communication with Ethernet-based fieldbus and internal AP communication
- Direct connection of input and output signals (digital and analog) with connection technology for every application (M8, M12, terminal strip)
- Wide range of options for voltage supply and power transmission
- Interface for application programming

Integrated, space-saving switching position feedback directly assigned to the valve position

Digital inputs with internal serial links

- Detachable M8 plug adapter (IP6x) for extremely high packing density and easy installation, alternatively terminal strip (IP40)
- PNP or NPN
- 2 inputs per valve position
- For manifold sub-base with four valves

Pneumatics

Vacuum solutions with air saving function

Complete vacuum integration for individual configuration

- Vacuum and ejector pulse can be individually controlled
- Solutions for high vacuum or high vacuum flow
- Two power levels with a grid size of 12.5 mm: nominal width 0.7 mm / 1.0 mm
- Vacuum only terminal or mixed with pressure switching valves

You can find more information at:

> www.festo.com/vtux

01 Sustainable Automation

Reducing CO₂ Emissions for Climate Protection

Thinking about future generations and responsible, long-term management are deeply ingrained in the family-owned company that is Festo.

Festo has been pushing the issue of energy efficiency in all areas for decades – in Festo itself, through research projects, in cross-industry committees, and with a range of solutions geared towards sustainability.

Sustainability at Festo includes areas of action such as reducing the carbon footprint, initiating a capability shift, and facilitating technical education, and further training. It is an integral component of the corporate strategy, and a clear guiding principle for all our actions.

Reducing the carbon footprint

Sustainability is the work of many hands at Festo. It is something that is relevant for all areas of the company, as well as our suppliers and customers.

Since 2024, the entire Festo Group has been CO₂-compensated in Scope 1 and already CO₂-neutral in Scopes 2 and 3.8 – two years earlier than planned. Festo also plans to reduce around 30% of Scope 1 emissions by around 2030 and to achieve the net-zero target by 2040.

95% of all carbon emissions are generated during the operating phase of products. The right portfolio with CO₂-optimized products together with needs-based advice throughout the operating phase are the key to securing a sustainable future for Festo and for our customers.



The **Festo Sustainability Report** provides annual information on the sustainable development of the company. Scan the code to read the latest edition.
> www.festo.com/sustainability-report



More on the area of action
Reducing the carbon footprint
can be found in this video:
> www.festo.com/sustainability

“Only by working with our customers can we make production CO₂-neutral in the future.”

Julia Bikidis, Head of Corporate Sustainability, Festo



CO₂ savings worldwide Festo has been investing in generating its own electricity using photovoltaic (PV) systems since 2004. PV systems were added at 20 further locations in 2023.

The total PV output at Festo has thus increased by over 60% and now amounts to 13.8 megawatts peak. At the end of 2023, all PV systems around the world generated a total of 15,651 megawatt hours of electricity.

This translates into 10,600 fewer tons of CO₂ per year that are emitted by the electricity suppliers.

Capability Shift

Megatrends such as sustainability, demographic change, and digitalization are leading to changes in market needs, and will also change the way companies work.

Festo is engaged in a continuous learning process together with its employees in order to remain an attractive employer for new talent, and to systematically train employees at an early stage.

The social skills of employees are just as important as their technical skills. Respect for human rights throughout the Festo Group is therefore a crucial component of the sustainability strategy at Festo.



“By working together with our employees, we will continue to be a company driven by technology and innovation in the future, and promote sustainable change for ourselves and for our customers.”

Dr. Sebastian Beck, Member of the Management Board Finance and Human Resources, Festo



Find out more about our **Capability Shift** area of action in the video: > www.festo.com/peopleatfesto

Technical Education

Environmentally friendly skills – green skills – will be relevant for all professions in the future. Technical professionals in all industries need to develop an environmentally conscious mindset that will have a positive impact on the ecological footprint of their employers, partners, and customers.

The training activities offered by Festo Didactic provide sustainable training solutions, all the way from vocational training to university and into the professional world. Festo Didactic supports customers in building a well-qualified and environmentally aware workforce, especially in areas such as water management, sustainable production, renewable energy generation, and the production of electric vehicles and batteries.



“With our new innovative teaching and learning concepts, we help our customers to build and shape a sustainable future.”

Dr. Oliver Niese, Member of the Board at Festo Didactic



More on the **Technical education and further training** area of action can be found in this video: > www.festo.com/sustainableeducation

Sustainable Automation

Product Shopping Basket for Reducing CO₂

Machine and system builders can generally use pneumatic and electro-mechanical automation solutions to implement an automation task.

By bringing together pneumatics and electrics using smart innovations, it is possible to provide technology-neutral advice, design customer applications efficiently, and minimize carbon emissions wherever possible. In addition, relevant services are available throughout the operating phase. You can opt for a particular solution, or you can combine pneumatics and electrics to create a solution that is precisely tailored to your requirements, while also taking into consideration energy efficiency and costs for the entire operating phase.

Festo supports its customers in four core areas to achieve greater sustainability in automation:

1. Engineering for greater energy efficiency

It is the design of a machine or system that lays the foundation for the smallest possible carbon footprint. The free engineering tools from Festo such as “Pneumatic sizing” and the “CO₂ & TCO Guide” support the customers with their selection of the right components in the right sizes. The tools provide transparent information about energy consumption during operation of the product, and thus enable the optimum design of a machine or system.

2. Products for sustainable operation

It is part of the Festo strategy to make product-specific assessments available that evaluate the CO₂ emissions produced by the products. The continuous further development of products with innovative solutions is seen by Festo as the key to a CO₂-neutral future.

The blue path to higher efficiency

Your way to zero emissions

3. Saving more energy with Festo Services

In the operating phase of a product, it is all about keeping energy consumption at an optimum level in the long term and identifying deviations in good time. Digital solutions for energy monitoring and Festo Energy Saving Services, a compressed air energy efficiency audit that is carried out worldwide and is TÜV-certified, help the manufacturing industry to do this.

4. Sustainability in basic and further training

As a leading specialist in technical training, Festo Didactic provides the specialists of today and tomorrow with the knowledge and skills they need to identify potential savings in their work and systematically implement them.



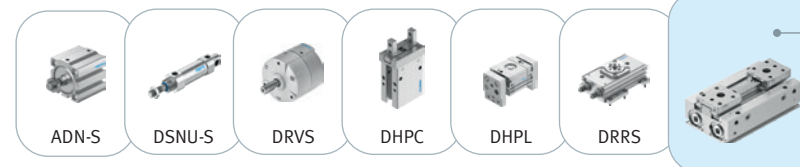
Festo Energy Saving Services: In 2023, 425 projects were implemented worldwide with a total savings potential of 20,974 tons of CO₂.



Product shopping basket for reducing CO₂:
You can find the product selection in the Online Shop using the filter “Specific catalogs > Sustainability”.

Examples of...

...lighter weight products

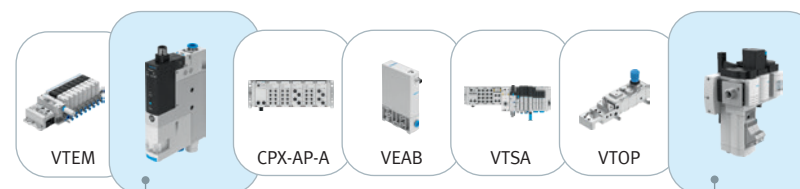


Parallel gripper

HPPF

Sustainable in production thanks to a reduced use of materials and in operation thanks to integrated control, leading to energy savings of up to 80%.

...products with energy-saving function



Vacuum generator

OVEM

Up to 60% less energy consumption:

The intelligent vacuum generator OVEM ensures a safe shut-off and avoids permanent air consumption thanks to an air-saving circuit.

Energy efficiency module

MSE6-C2M

Regulates the compressed air supply

when the system is in stand-by mode, prevents waste caused by possible leaks, monitors the flow rate and pressure, and enables predictive energy management in combination with the AI software solution “Festo AX” for energy savings of up to 70%.

Optimizing the pressure level

On the Festo website, you will find energy-saving tips for pneumatic and electric automation solutions such as “Optimizing the pressure level”. Energy savings of up to 10% can be achieved by reducing system pressure by 1 bar. The **new pressure regulator MS-LR-B** (p. 36) – lightweight and robust thanks to modern polymer materials – is also part of the product range. If individual applications require higher pressure levels, this can be done decentrally, for example, with the pressure booster DPA.

Sustainable Automation

Automation Solutions for Green Hydrogen Production

The sustainable generation of energy is one of the greatest challenges of our time – and green hydrogen is one aspect of the solution.

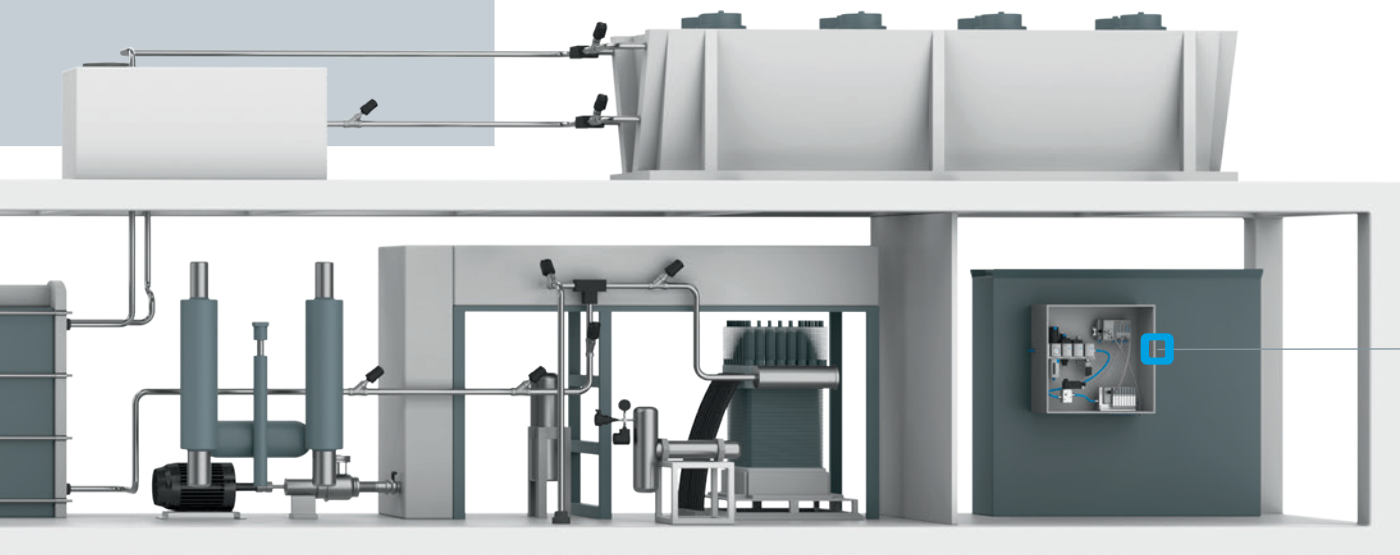
Hydrogen will play a key role in the future energy landscape and in the decarbonization of energy-intensive industries. Many safety requirements must be taken into account when setting up production and infrastructure.

Depending on the type and nature of your production, you can decide whether centralized and/or decentralized automation concepts, space-saving control cabinet solutions, or modular concepts are best.

A successful transition from fossil fuels to renewable energies is key to achieving the goal of net zero. In energy-intensive production facilities, such as those in the chemical, steel and cement industries, sustainably produced hydrogen is playing an increasingly important role. It is crucial to make sure that the gas is harvested using electricity from renewable resources; however, the process must also be as efficient as possible and, above all, safe.

Safe production of hydrogen using electrolysis

The electrolyzer is the central element along the hydrogen value chain. Regardless of where the hydrogen is ultimately used, it must first be produced. Electrolysis powered by sustainable electricity is already an established technology to produce hydrogen completely emissions-free.



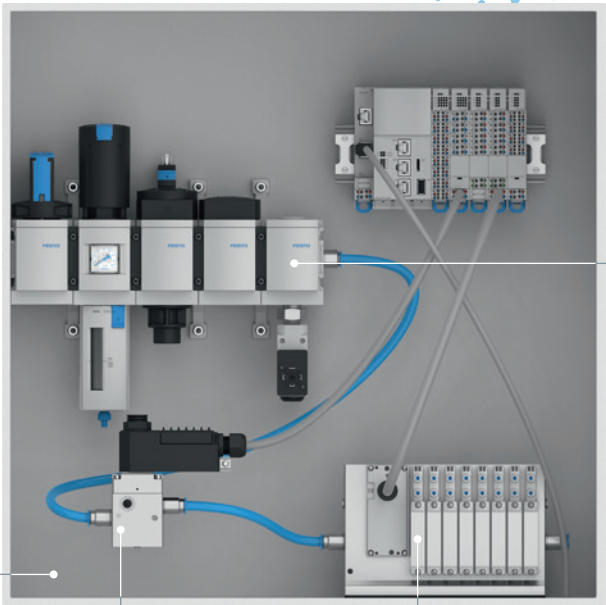
Schematic diagram of an electrolyzer.

An automation concept that is perfectly matched to the electrolyzer is the key to its efficient, safe, and long-term operation. An extensive portfolio of components provides the basis for an ideal solution. These include products that are certified for SIL and for use in hazardous areas.

Customized and ready to install

Control cabinets that precisely meet specifications protect components against environmental influences and foreign matter. The customer decides whether to use hose or pipe connections, depending on their requirements. Regardless of whether pneumatic, electric, or electropneumatic components are used, the end result is a fully assembled control cabinet that is precisely adapted to the application.

On request, Festo can also carry out a SIL assessment for the entire control cabinet. For applications in potentially explosive atmospheres, control cabinets can be designed, assembled, and certified in accordance with international and regional standards.



Service units

MS series

- Series of modular and flexible maintenance devices for the most stringent demands
- Wide range of configuration options, suitable for potentially explosive atmospheres
- The most common combinations are pre-assembled and available from stock worldwide
- Further components for outdoor applications available, such as the PCRP regulator

Valve terminal

VTUG

Solenoid valve

VOFC

- Extremely robust and corrosion-resistant
- Global and regional approvals for potentially explosive atmospheres, functional safety (SIL)
- Ignition protection types for solenoid coils: Ex ia, Ex me, Ex m

- Up to 48 valves per valve terminal
- Direct installation on a control cabinet wall thanks to pneumatic multiple connector plate
- Global and regional certification for potentially explosive atmospheres
- Hot swap function

> www.festo.com/hydrogen

More information about the products can be found on [page 36](#)

More and more vehicles with electric drive systems are on our roads. These vehicles make a significant contribution to the decarbonization of road traffic.

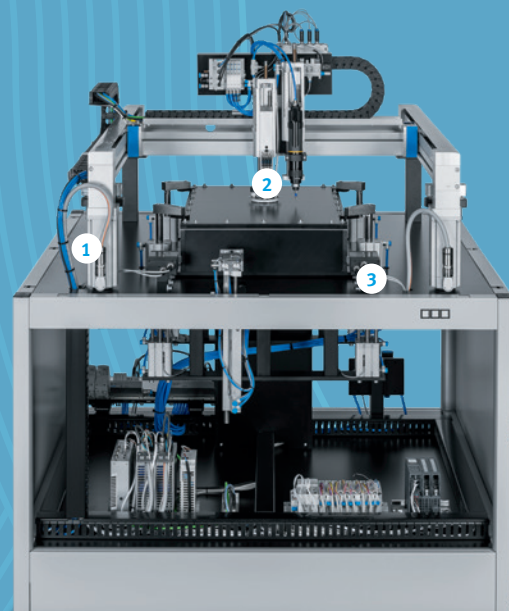
However, at the end of the lifecycle of an electric vehicle battery, after around 15,000 charging and discharging cycles, the question of how to recycle the materials inside the battery raises its head.

An estimated 600,000 tons of used batteries are already due for recycling in 2025. These volumes can only be handled economically when a high degree of automation is used in the disassembly and recycling process. Festo is driving this development forward in line with its vision of a sustainable, circular economy. It already has a portfolio of solutions for the clean and economical disassembly and recycling of used batteries.

Fully automated: disassembly

In the first step, the packs are mechanically disassembled into modules, battery cells, and other components. This usually involves four stages: First, the cooling circuit is checked, and then the adhesive beading, which creates a layer of sealant between the top and bottom parts of the housing, is cut open. Linear/swivel clamps then reliably fix the housing top part in place. In the final stage, the top part of the housing is lifted.

Disassembly requires great flexibility because each manufacturer and vehicle model have their own battery design. A space-saving, three-dimensional gantry also enables different battery types to be removed.



1 Linear/swivel clamp

CLR



Precisely fixes the housing top part of the battery in place.

2 Suction cup with connection

VAS



Gently and reliably lifts the top part of the housing.

3 Stopper cylinder

EFSD

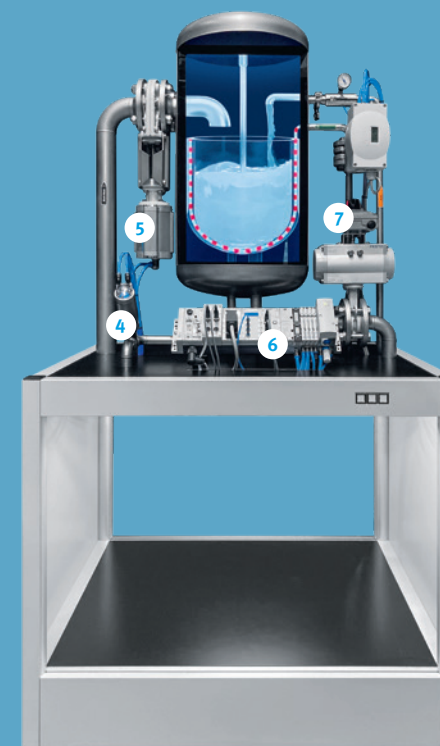


Cushions and stops horizontal movements of the transport system quickly and safely.

Recycling and reusing rare minerals

Nowadays, the vast majority of batteries in electric cars are lithium-ion batteries. If they are not disposed of properly, they are dangerous for people, and damage the environment. This is why the recycling of batteries is becoming mandatory in many states and countries. In Europe, the EU Battery Directive stipulates that manufacturers must recycle or return batteries.

The hydrometallurgical recycling process involves a chemical precipitation method using acid. This recovers rare minerals from the black mass as metal salt, which is then supplied to battery manufacturers and reused for the production of new batteries.



5 Linear actuator

DFPC



For actuating process valves such as knife gate valves or process valves without housing; robust and corrosion-resistant.

4 Angle seat valve (

VZXA



Perfectly suited for shutting off gaseous or liquid media in piping systems.

7 Butterfly valve unit

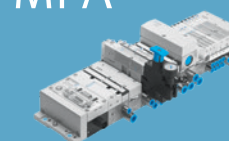
KVZA



For precisely dispensing fluid flows, quick to configure, manual or automated operation.

6 Valve terminal and terminal

CPX-MPA



Ideal for decentralized automation solutions. Fully modular, customizable at any time.

> www.festo.com/battery

More information about the products can be found on **page 37**

Compact Multi-Channel Pressure Control, Even for Small Volumes

Controlled Pneumatics greatly expands the reach of pneumatics when it comes to motion, pressure, and flow rate.

Piezo technology in valves, state-of-the-art communication technology, sensor technology, and sophisticated algorithms are combined to create a highly precise and extremely dynamic control loop.

Not only can tried-and-tested processes be improved with Controlled Pneumatics, but completely new application areas can also be realized, such as the polishing of wafers or the patch clamp process. These highly complex processes are supported by the new proportional valve terminal VTEP with its extremely sensitive pressure control to below 1 mbar.

The first compact proportional valve terminal from Festo

VTEP

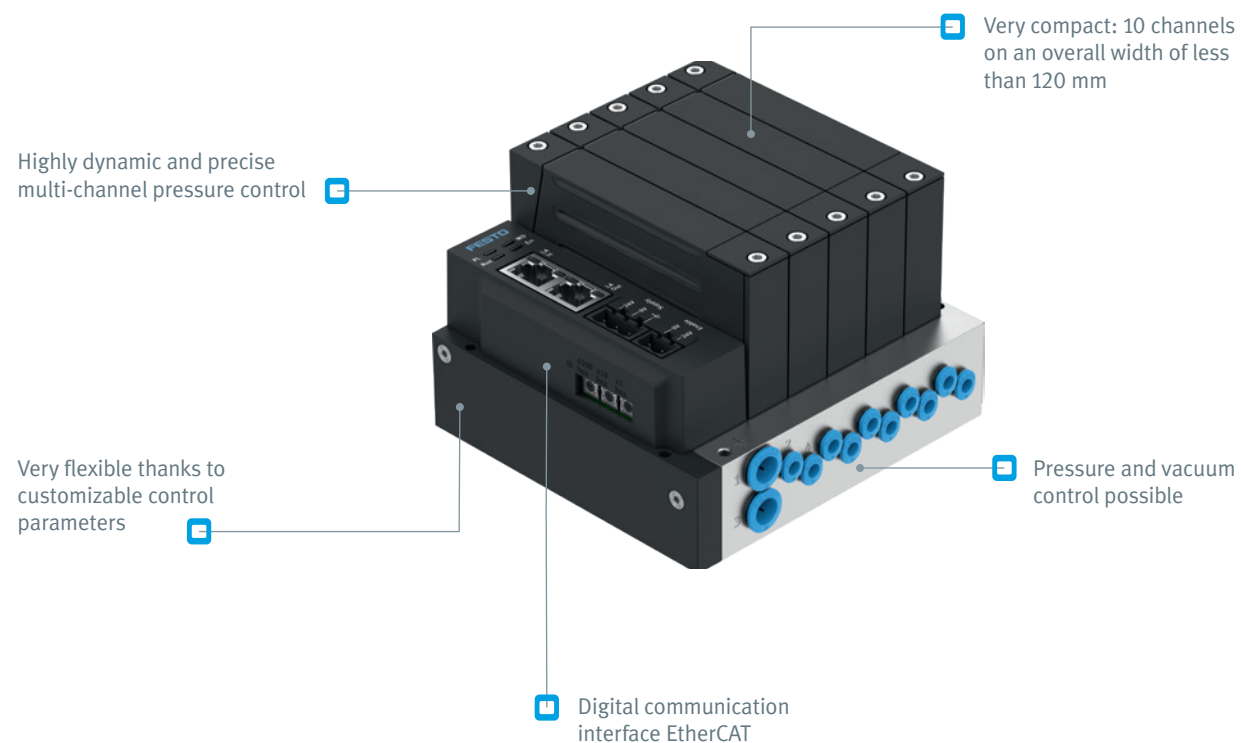
High precision and dynamic response for compact multi-channel pressure control:

These are the features of the VTEP that enable it to improve production, and increase the quality of the finished products too.

At less than 120 mm wide, VTEP is the most compact proportional valve terminal for 10 working channels on the market. There are three versions, 2-, 3- and 5-way, which can all be easily integrated for multi-channel applications. It can be used for pressure or vacuum operation, or a combination, with a maximum control range of 6 bar. Since VTEP is free of copper, nickel, and zinc, it can also be used in battery production, and other industrial segments in which these materials are disruptive.

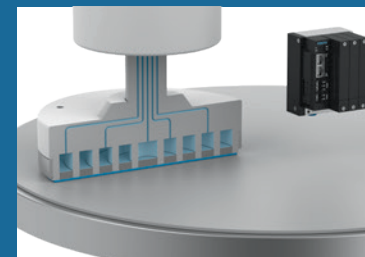
Piezo inside

The directly controlled VTEP uses piezo valves arranged in the form of a valve bridge. It is this piezo technology that gives the VTEP its compact shape and its control precision. Additional advantages include: silent, wear-free valves that do not cause any particle abrasion and do not generate heat.



VTEP – perfect for many applications

Controlled Pneumatics opens up a wide range of applications in pressure and flow control, where both standard pneumatics and electric automation fall short.



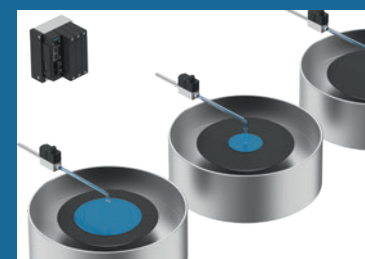
High-precision, force-controlled polishing

The variable contact pressure of the individual polishing chambers on the polisher is controlled extremely precisely using Controlled Pneumatics. With the VTEP, the even pressure ensures excellent results over the entire surface to be processed, even when polishing extremely sensitive wafers.



Best control for dancer rollers

Perfect timing in the event of unexpected forces improves process reliability in small and very large web control processes. This requires a technology that communicates almost in real time as well as valves that react at lightning speed. That is why the VTEP is suitable for the web control of battery foils, for example.



Pilot valve for process automation

Valves such as VTEP can also be used as pilot valves for media valves. In photolithography, for example, wafers have to be sealed very precisely with a light-resistant coating. A suck-back function ensures that no excess photoresist escapes.



Other top products for Controlled Pneumatics

Proportional pressure regulator

VEAB



- Up to 6 bar
- Extremely precise and durable
- Fast control behavior
- Quiet operation
- Low energy consumption

Motion Terminal

VTEM



- Individual control of motion, pressure, and flow rate
- Highly flexible and excellent repeat accuracy
- For a wide range of fieldbus protocols
- Easy traceability

Proportional pressure regulator

VPPI



- Regulator presets and pressure curves are individually adjustable
- Highly dynamic thanks to plunger coil actuators
- Low noise and flexible

> www.festo.com/controlledpneumatics

More information about the products can be found on [page 37](#)

Controlled Pneumatics

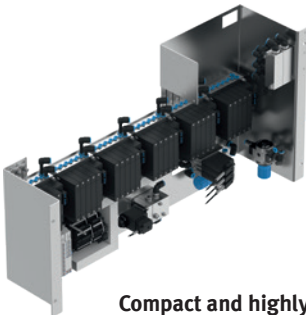
Automated Patch Clamping in Drug Development

Real-life application



Pressure control valves from Festo have been an integral part of the automated patch clamp solutions from Danish company Sophion Bioscience for over 15 years. Thanks to the high precision of the new proportional valve terminal VTEP, the ion channels of human cells can be studied even more accurately.

The resulting high degree of standardization of the tests enables faster development of drugs, and research into possible side effects.



Compact and highly precise:
VTEP maintains the pressure around 2 mbar for hours without deviation.

“Proportional valve terminals with piezo technology such as VTEP are ideal for sensitive work on human cells.”

Jens Hennecke, Head of Hardware Development, Sophion

Almost a third of all diseases are caused by malfunctions in the ion channels of cells. Ion channels comprise a diverse and extensive category of membrane proteins that function as so-called transducers for electrical signals, and regulate the electrical properties of all living cells. For example, ion channels play a central role in the generation of action potentials in excitable cells, such as those found in the heart and brain.

Automation for faster and more precise results

With its patch clamp systems, Sophion is accelerating the development of drugs that can alleviate or eliminate channelopathies such as cystic fibrosis, epilepsy, or heart arrhythmia.

The automated solution replaces the traditional, very time-consuming manual method of patch clamping. Patch clamping is used to directly measure the movement of ions through cell membranes via ion channels. The cell membrane is tightly sealed with a pipette or a small hole in the surface. By applying a slight vacuum, the inner contents of the cell and the solution come into direct contact so that electrodes can measure very small electrical currents passing over the cell membrane through the ion channels. This examination process can not only be significantly accelerated by automation, but the high precision of the processes also means that the results of the examination are much more stable.

The new systems allow the simultaneous measurement of 8, 16, 48 or 384 cells, giving researchers more replicates, and more data for research, characterization, or even screening.

VTEP is an integral part of the system

Sophion and Festo have been working together successfully for many years. For its newly introduced semi-automatic 8-channel system, Festo was a project partner right from the start. The proportional valve terminal VTEP with its extremely fast communication protocols and high precision in the range of ± 2 mbar precisely fulfilled the requirements of the developers for the new system. This is because maximum precision is fundamental to making the experiments work. If too little pressure is applied, the cell membrane will not break. If the pressure is too high, the cell collapses. Proportional valve terminals with piezo technology such as VTEP are therefore ideal for sensitive work on human cells.

Compactness as an advantage

Another advantage of the proportional valve terminal is its compactness, which is all down to the piezo valves used. The small and compact pressure regulators are perfectly suited for installation in Sophion's instruments. Depending on the configuration, automated patch clamp systems use 12 to 54 independent pressure channels that are controlled by up to six valve terminals.

The systems are convincing: according to Sophion, 75% of the world's 20 largest pharmaceutical companies and many universities use Sophion's solutions for drug development.

Automation components and solutions in the LifeTech sector generally need to meet demanding requirements.

They have to be precise and compact, work well in a confined space, avoid heat and noise generation, and be available at an economical price too. The portfolio from Festo is designed precisely for these requirements to ensure that the automation of your processes is a complete success.

Be inspired!

Solution competence in laboratory analysis and medical technology:

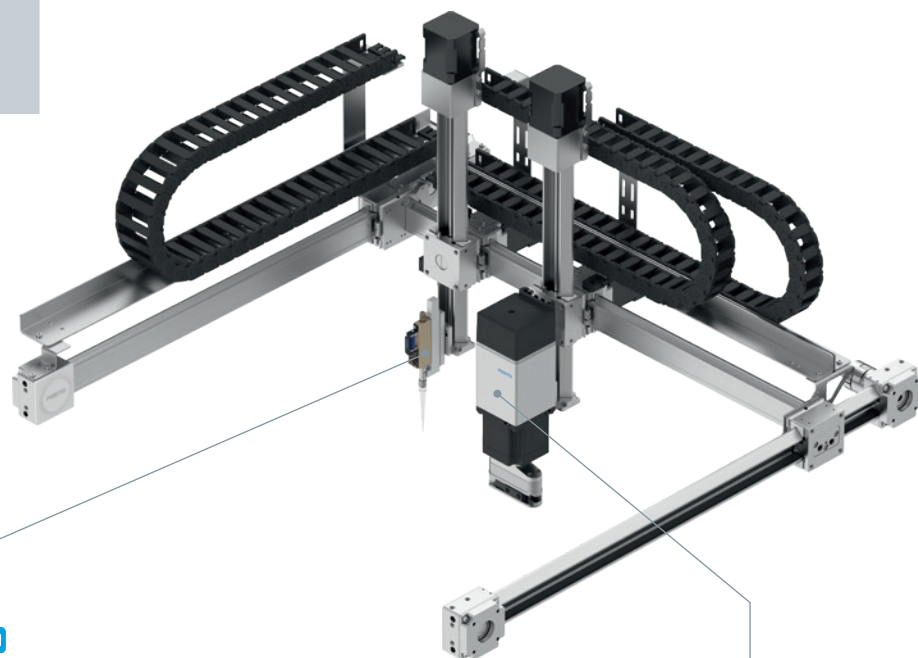
> www.festo.com/lifetech

Three-dimensional gantry

EXCL

The three-dimensional gantry is ideal for analytical processes where sample vessels need to be opened and liquid samples are pipetted in the same three-dimensional gantry. The optional second Z-axis enables two front units, such as the rotary gripper module EHMD and the pipette head DHOE, to move independently of each other. The three-dimensional gantry with stepper motors and optional motion controller can be easily integrated in desktop systems.

- Max. stroke: X/Y-axis: 1000 x 700 mm; Z-axis: 50, 100, 150 or 200 mm with 1 or 2 Z-axes
- Max. payload: 1.5 kg (with 2 Z-axes together max. 2 kg)
- Optional 6-axis motion controller
- Programmable via G-code



Pipetting system

DHOE

- Pipetting volume: 5 µl ... 10 ml (depending on the max. size of the pipette head)
- Dimensions: 8.1 x 76.2 x 30 mm
- Grid dimension: 9 mm
- Pressure/vacuum-controlled pipetting system
- Suitable disposable pipette tips DHAP to avoid cross-contamination

Rotary gripper module

EHMD

- Fully electric: max. torque 0.3 N or 1.0 N
- Optional module to compensate for the cap thread pitch
- Easy configuration of the Festo motor controller CMMT-ST

Pressure/vacuum generator

PGVA

The pressure and vacuum generator PGVA consists of a compressor, air preparation including filtration, and a buffer reservoir. The supply of pressure and vacuum is either individually controlled or via preset values.



- Ideal supply option for pressure-controlled liquid handling solutions
- Small box suitable for control cabinets or table solutions
- Easy to operate via GUI
- Only 24 V power supply required

Decentralized pressure/vacuum generation for ranges below 1 bar

Media-separated valve

VYKC

- Dispensing, aspirating, and continuous flow
- Nominal width: 1.2, 1.6 and 2.0 mm
- Very cost-efficient



High-performance polymers: EPDM, FKM and FFKM

Mass flow controller

VEMD

- High dynamic response at an extremely favorable price
- Many flow rate ranges: 10, 20, 50, 100 and 200 l/min
- Analog and digital interfaces built in
- Linear control response
- Sturdy and durable
- Optional display

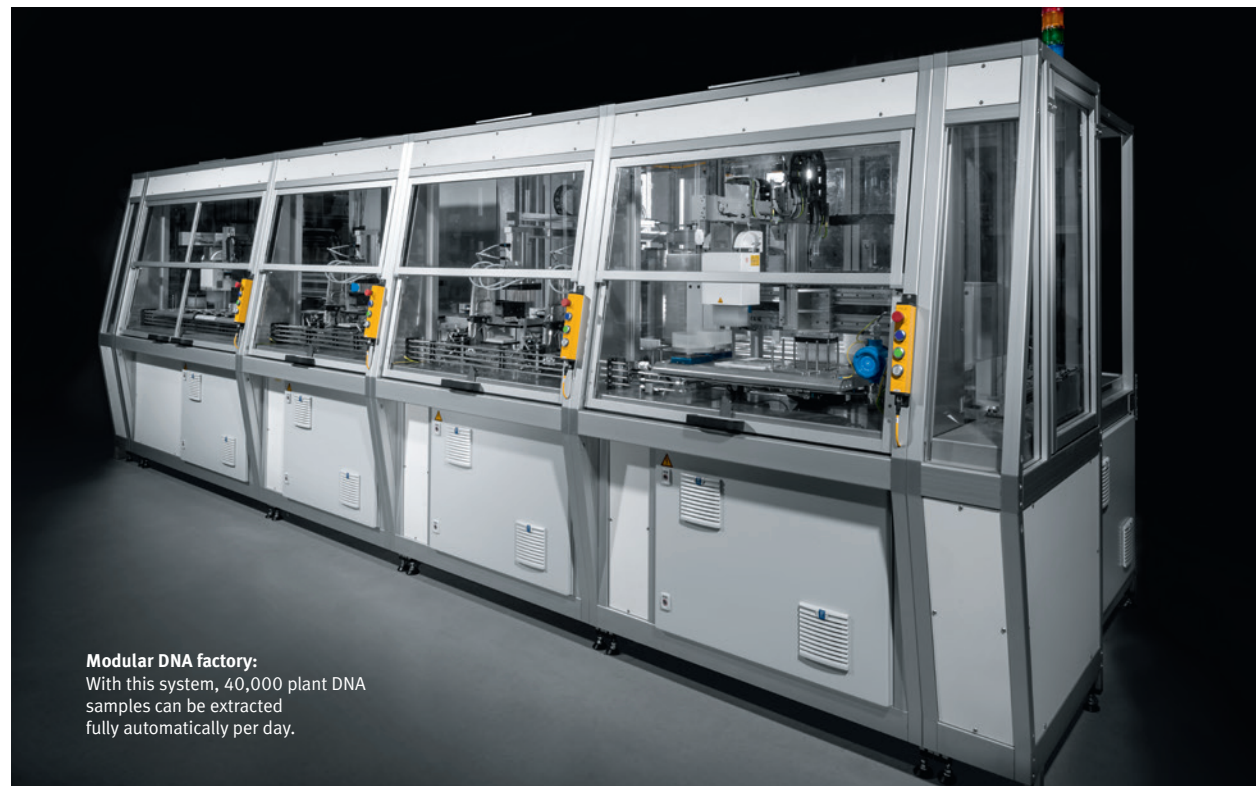


> www.festo.com/lab

More information about the products can be found on [page 38](#)



Real-life application



Modular DNA factory:
With this system, 40,000 plant DNA samples can be extracted fully automatically per day.

Plant breeders are developing more resilient seeds for farmers so that plant foods can withstand climate change, pests, and diseases. To do this, they need vast amounts of DNA.

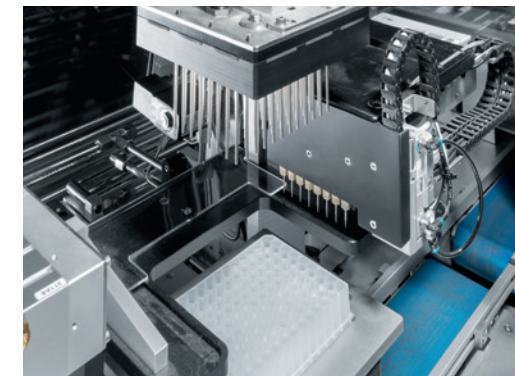
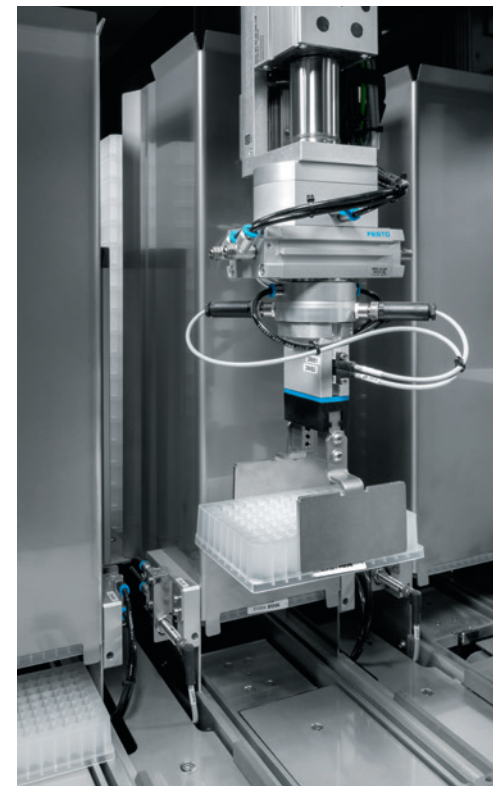
With Synchron Lab's "DNA Factory", up to 40,000 samples can be extracted in 24 hours thanks to automation using handling gantries, electric linear actuators, pneumatic grippers, and sensors.

400 microwell plates per day

The demand for DNA samples has long been so high that the required throughput can no longer be achieved manually. The system from Dutch company Synchron Lab meets the requirements for increased output. With the "DNA factory", 400 microwell plates per day can be processed. It only requires one operator to load and unload the microwell plates; the highly qualified laboratory assistants can therefore concentrate on their core competency, analyzing the results.

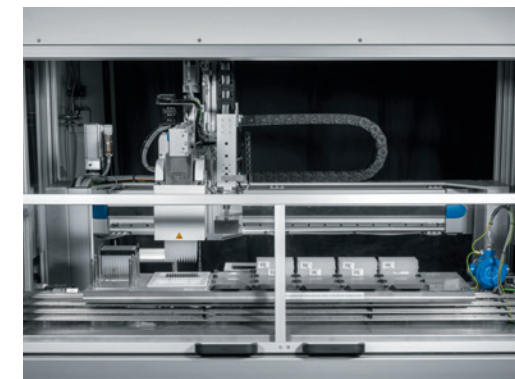
Automated sample preparation

The system extracts DNA from shredded plant material. The process begins with a microwell plate magazine that accommodates up to 400 plates – 200 for input and 200 for output. The bar code reader SBSI scans all the microwell plates at the start of a run. Electric linear actuators EGC in combination with the semi-rotary actuator DRRD and the pneumatic gripper DHPS pick up the microwell plates, and place them on workpiece carriers that move from one station to the next on a transport system.



From station to station
Electric linear actuators EGC combined with a semi-rotary actuator DRRD and a gripper DHPS place the microwell plates on the workpiece carriers of the transport system. (Left)

Intensive washing process
In a subsequent station, the dispense head VTOI repeatedly dispenses a buffer solution to remove salts and ethanol from the DNA. (Top)



Achieving economies of scale
In the final step, the DNA is separated from the magnetic beads by rinsing several microwell plates simultaneously with a washout buffer solution. (Bottom)

To separate the DNA from other materials, coded metallic microspheres called magnetic beads are added at the first station; the DNA attaches itself to these beads while the rest of the material floats in the microwell plates. A buffer solution of pure isopropanol is aspirated from rotary containers with coated silica magnet and pipetted into the microwell plates. The pipette heads are moved by a planar surface gantry EXCH and an electric linear actuator EGC-HD in the Z-axis. Electric actuators with servo motors EMMT-AS, meanwhile, ensure precise motion sequences.

Intensive washing process

Following this, the binder buffer solution is aspirated. The magnet forms a ring with the buffer solution. The DNA remains in the microwell plate. A buffer solution is then used to remove salts and ethanol from the DNA. The dispense head VTOI is used for this. The efficiently controllable 8-channel dispense head for microwell plates is equipped with only one valve for eight outlets.

In the final step, the DNA is separated from the beads using a wash-out buffer solution, with four microwell plates being subjected to the process at the same time. Axes ELGC are used in the X direction and actuators EGSC in the Y direction. Likewise, pneumatic grippers DHPS are used for lifting the microwell plates and the semi-rotary actuator DRRD for moving the plates.

The high degree of automation of the system makes it possible to process the current and future demand for plant DNA samples for further analysis. One example of this is the development of resistant seeds.



You can find more information about this customer application here:
> www.festo.com/synchron

Mechanical, electric, and intelligent automation modules ensure seamless connectivity in electric automation.

This seamless connectivity ranges from the latest generation of axes ELGD and the complete, flexible all-in-one servo drive systems CMMT-ST to digitalization, including suitable cloud solutions. This can be used to create sustainable and compatible concepts. These solutions are networked using state-of-the-art communication and architecture concepts. The best example is the modular remote I/O system CPX-AP-A.

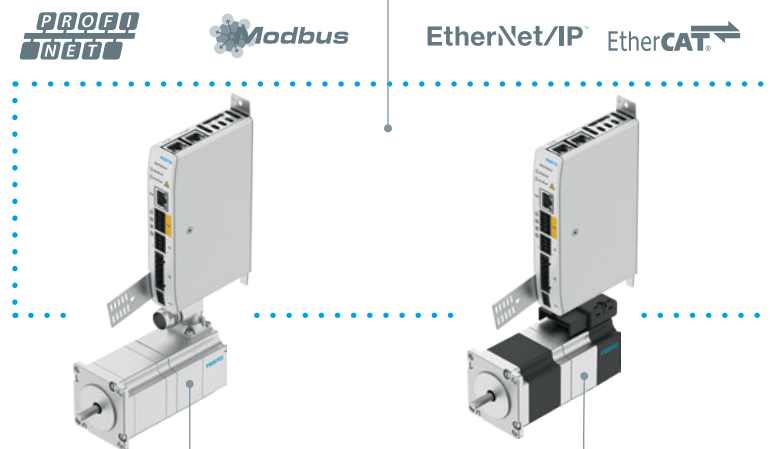
Innovative engineering tools make design, configuration, and commissioning very easy.

Servo drive with multiprotocol

CMMT-ST

As part of the CMMT family, the low-voltage controller CMMT-ST is an extremely economical solution for positioning tasks and movements, with low power requirements up to 300 W at 48 V DC. Like its big brother CMMT-AS, it is also multi-protocol-capable. This means that CMMT-ST can be integrated directly into Ethernet-based networks from various control system manufacturers. In the future, the new stepper motors EMMT-ST and EMMB-ST can also be integrated into system solutions.

- **Economical:** Operation with 24 V DC for max. 150 W continuous power reduces costs
- **Flexible:** Multi-protocol-capable for several Ethernet protocols
- **Convenient:** Manually set the bus protocol on the servo drive or in the Festo Automation Suite



Stepper motor

EMMT-ST

- High performance in IP65
- Rotatable plug (290°)

Stepper motor

EMMB-ST

- Basic performance in IP20
- Plug outlet direction can be changed to front or rear

New generation of stepper motors

The upcoming stepper motor series EMMT-ST and EMMB-ST are developed and produced in-house. They are available in three sizes and two lengths. The one cable plug OCP ensures easier handling, simpler cabling, and improved installation.

Watch this video to find out more about the servo drives of the CMMT series:



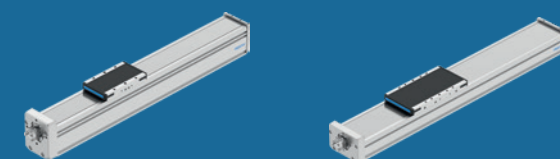
The new generation of electric ball screw and toothed belt actuators

The axis series ELGD with the ball screw linear actuator ELGD-BS and toothed belt actuator ELGD-TB is perfect for a wide range of electromechanical automation tasks. The comprehensive portfolio with different sizes in both standard and wide versions (WD) stands out thanks to its excellent rigidity, large feed forces, and a durable guide system.

Ball screw linear actuators

ELGD-BS and ELGD-BS-WD

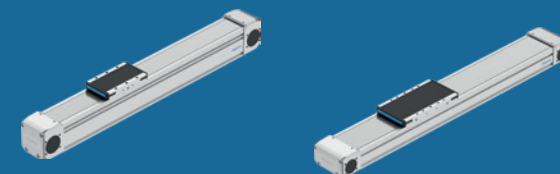
The heavy-duty axes with a durable and high-precision ball screw offer a maximum stroke of up to 2.5 meters. The motor position can be selected as axial or parallel and can be rotated 4 x 90° around its own axis.



Linear actuators with toothed belt

ELGD-TB and ELGD-TB-WD

With an almost vibration-free movement of the slide, the axes ELGD-TB have a high dynamic response and offer a maximum stroke of up to 8.5 meters. Steel tension members reinforce the toothed belts made of different types of polyurethane. The motor position at the end of the axis can be freely selected and retrofitted.

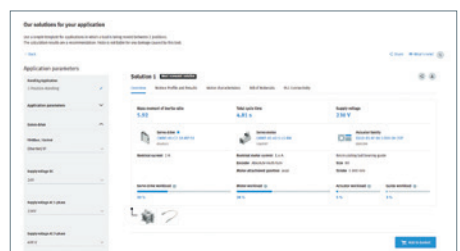


A look at the portfolio

- 6 standard sizes with square cross-section, 4 wide with widths from 30 to 220 mm
- Already available: main series 60/80/100 WD
- Further sizes and variants to follow in the second half of 2024 and 2025

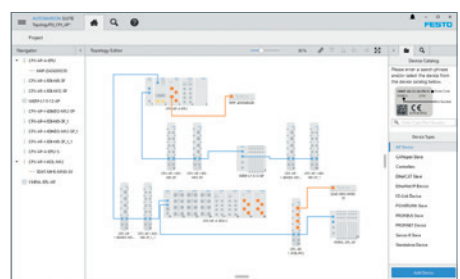
Consistent expertise and innovative engineering tools

With Festo, systems with mechanics, motor, and servo drive are quick, easy, and convenient to configure and commission, even when components from third-party suppliers are used.



Electric Motion Sizing

The **video** demonstrates how quickly the perfect servo drive solution can be configured, using just a few application parameters, to meet individual requirements. It can then be ordered directly in the Online Shop.



Festo Automation Suite

This **video** clearly shows you how easy it is to commission an electromechanical servo drive solution in just a few steps.



> www.festo.com/ea

More information about the products can be found on [page 39](#)

Electric Automation

Modular Remote I/O System CPX-AP-A

Performance in real time: CPX-AP-A

The modular remote I/O system CPX-AP-A enables a flexible system architecture in star and line topology. It communicates in real time with up to 79 modules and devices on an AP-A bus node. CPX-AP-A integrates a wide variety of valve terminals into Ethernet networks via AP. Proportional valves, vacuum suction nozzles, and sensors can also be easily and efficiently connected to the remote I/O.

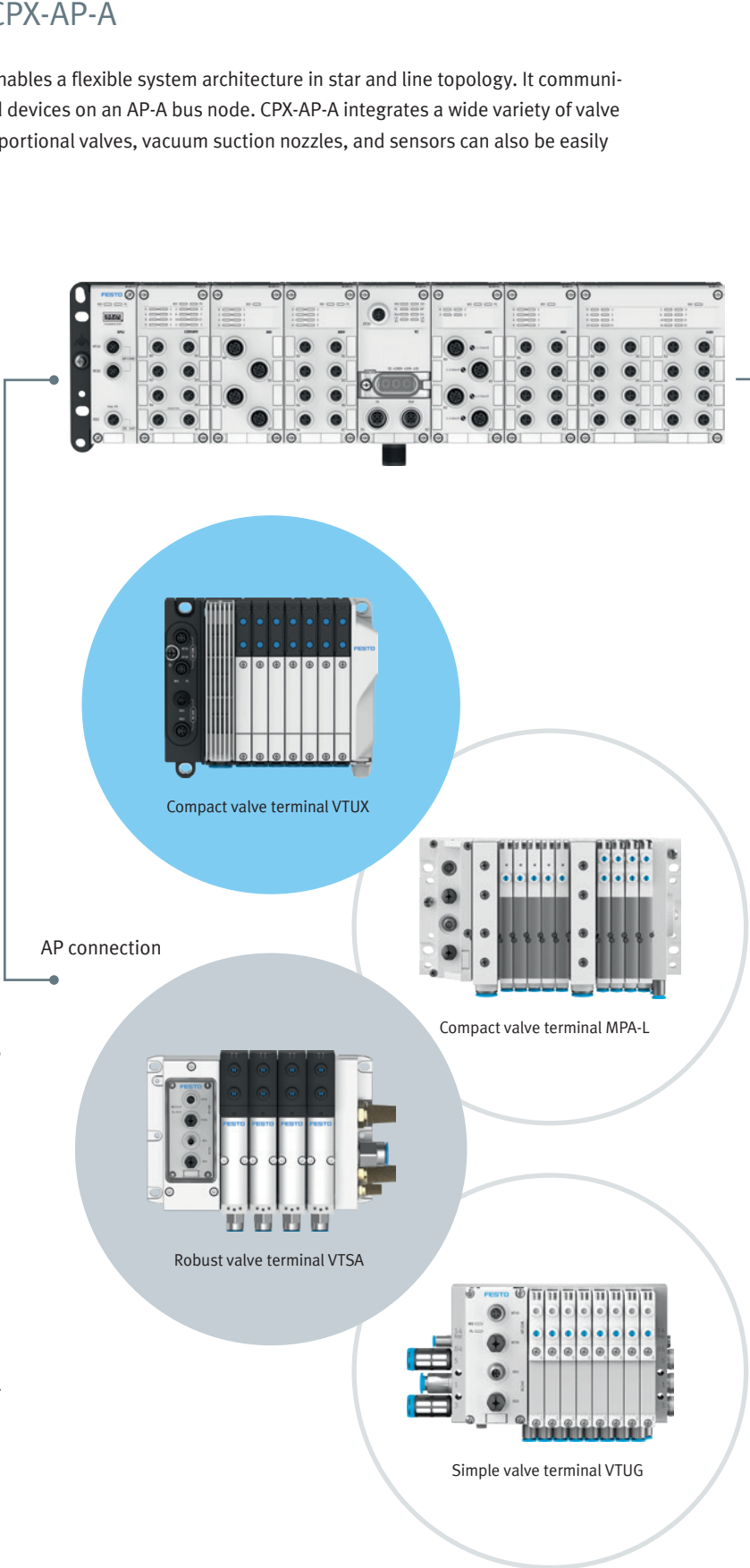
Technical features:

- Real-time communication with 200 MBaud and a cycle time of up to 15 µs
- Decentralized architecture with a cable length of up to 50 m between stations
- IP65/67 degree of protection for direct installation in the machine
- Wide variety of modules with digital I/O and IO-Link® master

Decentralized installation of valve terminals via AP interface

The modular stand-alone remote I/O and the pneumatic valve terminals communicate in real time via AP.

- **Tailored to your needs:** Electric and pneumatic machine and system structure
- **Clear layout:** Decentralized installation of the valve terminal close to the consumer
- **Cost-efficient:** All AP participants communicate with the higher-level controller via 1 fieldbus node
- **Convenient:** Easy to commission all AP participants together in the Festo Automation Suite



Modular valve terminals combined with CPX-AP-A

The valve terminal VTUX

When it comes to modularity, communication, and materials, the valve terminal VTUX sets a new standard. As the successor to the established CPV, MPA-L/S and VTUG, its high flow rate, distinctive compactness, and low weight are impressive. The valves and sub-bases are very sturdy thanks to the use of glass fiber-reinforced, high-performance polymer.

- Valve width of 10 mm with different functions for flow rates of up to 670 l/min
- Valves on sub-base
 - individual sub-base for maximum modularity
 - 4-way fixed manifold block for even greater cost-efficiency

Valve terminal VTSA

The versatile, configurable standard valve terminal offers numerous safety functions, additional function integration, and has robust, durable components, making it eminently suitable for demanding industrial applications.

- High flow rate of 550 ... 2900 l/min
- Large variety of vertical stacking options

Valve terminal MPA-S

The compact, modular valve terminal with high-performance valves in a sturdy metal housing can be flexibly combined: with three valve sizes, vertical stacking, supply and exhaust options.

- Many valve functions for up to 870 l/min
- Flexible configuration of up to 32 solenoid coils

> www.festo.com/rto-cpx-apa

More information about the products can be found on [page 39](#)

Standardized AI Apps for Immediate Use and Added Value

Industrial transformation

Many industry sectors are undergoing profound change. This has massive effects on production environments, processes, and supply chains. The drivers of this transformation are technological change, digitalization, and the need to reduce the carbon footprint.

With digitalization and artificial intelligence, Festo is opening up innovative solutions for the factory of the future to pave the way for greater efficiency and sustainability, right up to a climate-neutral circular economy.

Added value from data

On the shop floor, machines not only produce products, but also large amounts of data. By using artificial intelligence, this data can be converted into information in a way that provides a tangible optimization potential.

This has already led to a number of successes. In hundreds of customer applications, unplanned downtimes have been reduced by up to 25% and rejects by 20%.

Festo AX Industrial Apps

Standardized, simple, and immediately ready for operation

With the Festo AX Industrial Apps, components can be optimized in terms of transparency, availability, performance, and quality. If the technical prerequisites are met, a retrofit is also possible.

Available in the portfolio of Festo AX

- AX Data Access – provides MQTT data access to Festo components, also available for Siemens Industrial Edge (IE)
- AX Motion Insights Pneumatic – detects faults in pneumatic actuators
- AX Motion Insights Electric (mid-2024) – detects faults in electric actuators
- AX Energy Insights (end of 2024) – reports deviations in energy consumption

Benefits

- **Safety:** Easy to commission without needing any AI knowledge; proven technology
- **Time saving:** Quick insights thanks to intuitive dashboards and reports
- **Long-term compatibility:** Easy to integrate data into third-party systems
- **Fully digital:** Direct connection to AX Smartenance for digital maintenance management



> www.festo.com/axindustrialapps

Data together with expertise from Festo in mechatronics and data science create new added value.

The new AX Industrial Apps and AX Solutions from Festo offer AI solutions for various products and applications at a fixed price and are quick and easy to install. Festo AX Smartenance also optimizes maintenance.

Festo AX Solutions

Solution packages are created based on a broad experience of similar applications, and the knowledge that has been built up while working on these generally complex solutions. Festo has created AI solutions for a wide range of requirements that can be quickly adapted for machines and systems.

Benefits

- Increased efficiency of production processes, e.g., packaging, riveting, gluing, or welding
- Reduced downtime and energy costs
- Increased quality and productivity (OEE)
- Benefit from tried-and-tested algorithms: Reliable processes, low costs, quick success



> 20 AI solution packages are already available – see our website for details.

> www.festo.com/axsolutions

Festo AX Smartenance

From fault detection to fault rectification

Festo AX Smartenance is a powerful, manufacturer-independent software that makes maintenance and servicing of systems more efficient and reduces costs. Smartenance is already being used successfully in thousands of applications.

New functions

- The SAP S4 HANA interface synchronizes machines and incident management from SAP systems with Smartenance. This solution with SAP is very easy to use.
- Spare parts management assigns spare parts to machines and malfunctions. This means that all important information is available on site and on mobile devices.
- Thanks to the new service module, all Festo components and their documentation, spare parts, and other information are quick, easy, and intuitive to find. It also eliminates the need for lengthy searches, as manual documentation becomes superfluous. The service module is integrated into Smartenance, but can also be used immediately without logging in.

> www.festo.com/axsmartenance



> www.festo.com/ax

Customized AI robot solution

Festo GripperAI in the Würth Logistics Center

Real-life application



Two years into their innovative partnership, the first phase of the collaboration between Würth and Festo is now drawing to a successful close – the prototype is working. The customized AI software solution from Festo is now being extensively tested at the Reinhold Würth Innovation Center Curio and is set to be deployed in Würth logistics centers around the world in the future.

Würth, the global market leader in developing, manufacturing and selling assembly and fastening materials, has up to 1,000,000 products in its portfolio, from small and lightweight products to heavy parts. The packaging process takes place in the logistics center in Künzelsau, Germany, at the Würth Group’s headquarters. A wide variety of products arrive in trays via so-called sorter conveyors; employees remove the objects and pack them in shipping cartons.

Parts can often weigh up to 20 kilograms, making handling them extremely stressful for the employees. The AI expertise from Festo was one of the primary reasons why it was selected by Würth to help implement its innovation project, the development of a customized and flexible solution. The GripperAI software from Festo enables all types of robots and handling systems to grip unknown and different objects without prior training.



Photos: Adolf Würth GmbH & Co. KG

Successful test setup at Würth’s innovation center: Thanks to the innovative AI software “GripperAI” from Festo, the robot can identify, grip, and pack unknown objects. A test in logistics (photo on the left) is in preparation.

Customized software solution developed

“We built a copy of Würth’s sorter conveyors in our laboratory and were thus able to develop the various capabilities of the robot: object-dependent gripper selection, gripping all types of objects from the trays, packing shipping cartons and handling the cartons and trays,” says Jan Seyler, Head of Advanced Development Analytics and Control, from the Research & Development department at Festo. One of the robot’s special features is its tool station. The robot can use various suction cups and grippers, and depending on the type of object, shape, and surface texture, GripperAI determines which tool is most suitable. An integrated camera in the robot identifies the various objects.

The Festo GripperAI solution can grip almost any object that is placed in front of it – precisely what the gripper and robot are designed to do.

The grippers, which were specially developed for this project, set new standards in robot technology; the suction cups are from the Festo portfolio. The adapted AI robot solution significantly reduces the workload of employees and increases operational efficiency. The solution also doesn’t require any teaching or training, and can function with every robot and vision system.



You can find more information about this customer application here: www.festo.com/gripperai

Product Highlights at a Glance

The Fast Way to Find More Information

Online: → www.festo.com/catalogue/...

New: valve terminal VTUX

Page 10, 31



- IO-Link®/bus communication or multipin connection
- Modular and cost-effective
- Suits many applications
- High flow rates of up to 730 l/min
- Lightweight, made of high-performance polymer

→ .../[vtux](#)



01

New: Electric parallel gripper HPPF

Page 15



→ .../[hppf](#)



02

Linear/swivel clamp CLR

Page 18



→ .../[clr](#)



Suction cup with connection VAS

Page 18



→ .../[vas](#)



Stop cylinder EFSD

Page 18



→ .../[efsd](#)



Vacuum generator OVEM

Page 15



→ .../[ovem](#)



Service unit MSE6-C2M

Page 15



New version/
additional features:

→ .../[mse6-c2m](#)



Pressure regulator MS-LR-B

Page 15



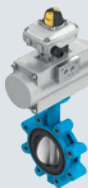
New version/
additional features:

→ .../[ms-lr-b](#)



Butterfly valve unit KVZA

Page 19



→ .../[kvza](#)



Angle seat valve VZXA

Page 19



→ .../[vzxa](#)



Linear actuator DFPC

Page 19



→ .../[dfpc](#)



Filter regulator PCRP

Page 17



New version/
additional features:

→ .../[pcrp](#)



Solenoid valve VOFC

Page 17

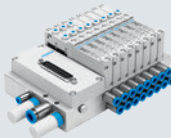


→ .../[vofc](#)



Valve terminal VTUG

Page 17

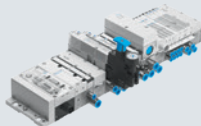


→ .../[vtug](#)



Valve terminal and terminal CPX-MPA

Page 19



→ .../[cpx%20mpa](#)



03

New: Proportional valve terminal VTEP

Page 20



- Very compact: 10 channels on an overall width of less than 120 mm
- Highly dynamic and precise control of pressure and vacuum
- Very flexible thanks to customizable control parameters

→ .../[vtep](#)



Product Highlights at a Glance

The Fast Way to Find More Information

Online: → www.festo.com/catalogue/...

Proportional-pressure regulator **VEAB**

Page 21



New version/
additional features:

→ .../[veab](#)



Motion Terminal **VTEM**

Page 21



→ .../[vtem](#)



Proportional-pressure regulator **VPPI**

Page 21



New version/
additional features:

→ .../[vppl](#)



05 Servo drive **CMMT-ST**

Page 28



New version/
additional features:

→ .../[cmmst-st](#)



New: Servo motor **EMMT-ST**

Page 28



→ .../[emmt-st](#)



New: Servo motor **EMMB-ST**

Page 28



→ .../[emmb-st](#)



04 Three-dimensional gantry **EXCL**

Page 24



New version/
additional features:

→ .../[excl](#)



Rotary gripper module **EHMD**

Page 24



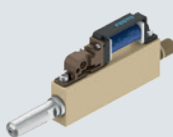
New version/
additional features:

→ .../[ehmd](#)



New: Pipetting system with
pipette head **DHOE**

Page 24

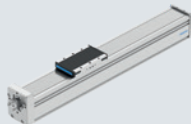


→ www.festo.com/liquidhandling



New: Ball screw linear actuator
ELGD-BS

Page 29

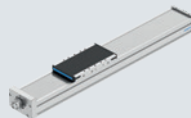


→ .../[elgd-bs](#)



New: Ball screw linear actuator
ELGD-BS-KF-WD

Page 29

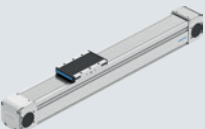


→ .../[elgd-bs-kf-wd](#)



New: Toothed belt axis
ELGD-TB

Page 29



→ .../[elgd-tb](#)



New: Pressure vacuum generator
PGVA

Page 25



→ .../[pgva](#)



New: Media separated solenoid valve
VYKC

Page 25



→ www.festo.com/vykc



Proportional flow control valve
VEMD

Page 25



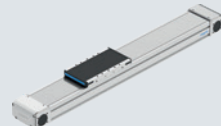
New version/
additional features:

→ .../[vemd](#)



New: Toothed belt axis **ELGD-TB-WD**

Page 29



→ .../[elgd-tb-kf-wd](#)



Modular remote I/O system **CPX-AP-A**

Page 30



- Real-time communication with 200 MBaud and a cycle time of up to 15 µs
- IP65/67 degree of protection for direct installation in the machine
- Wide variety of modules with digital I/O and IO-Link® master

→ .../[cpx-apa](#)



Product Highlights at a Glance

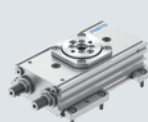
The Fast Way to Find More Information

Online: → www.festo.com/catalogue/...

» These additional new products and product features are sure to inspire you

New: Semi-rotary actuator **DRRS**

- High torque with low weight
- Mounting: simple, stable, flexible
- Variants suitable for battery production according to F1A



→ .../[drrs](#)

New: Mini slide **DGSS**

- Flat design
- Precise and loadable roller bearing guide
- Optional: stroke adjustment and external cushioning via accessories



→ .../[dgss](#)

Mini slide **DGST**

- New version/additional features:**
- Variants suitable for battery production according to F1A



→ .../[dgst](#)

One-way flow control valve **VFOF** Piloted check valve **VBNF**

- New version/additional features:**
- Inline variant enables simplified and flexible installation
 - Combination of functions with at least two functions integrated in one component



→ .../[vfof](#)



→ .../[vbnf](#)

New: Pilot valve **VOFX**

- Ideal for process valves such as the angle seat valves VZXF/VZXA
- Variants for use in potentially explosive areas
- For use where using valve terminals is not technically feasible



→ .../[vofx](#)

New: Limit switch box **SRBK**

- Robust, UV-resistant polymer housing
- Mechanical, inductive, and reed switches
- Quickly adjustable trip cams



→ .../[srbk](#)

New: Electric parallel gripper **HEPP**

- Powerful and versatile
- Dynamic motor for adaptable motion behavior
- Simple, variable parameterization



→ .../[hepp](#)

New: Pneumatic parallel gripper/valve combination **HPPH**

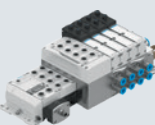
- Gripper-valve combination with integrated sensors
- Safe human-robot collaboration at pressures up to 5 bar
- Compact and lightweight for high energy efficiency and reduced cycle times



→ .../[hpph](#)

Valve terminal **VTSA**

- New version/additional features:**
- Remote I/O via CPX-AP-A
 - Conforms to ISO 15407-2 and ISO 5599-2
 - Four valve sizes can be combined
 - High flow rates



→ .../[vtsa](#)

New: Pinch valve, manual **VZQH**

- For hygienic dispensing and mixing applications
- Compact and hygienic design
- Unique NC function (spring-assisted closing)
- In nominal width DN6



→ .../[vzqh](#)

New: Position transmitter for all actuators with C-slot **SDAC-MHS**

- Two versions:**
- IO-Link® position transmitter and proximity switch with 2 switching outputs in one device.
 - Standard position transmitter with 0 ... 10 V



→ .../[sdac-mhs](#)

Digital learning Festo Learning Experience



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New: Proportional flow control valve **VEFC**

- Very compact: only 24 mm wide
- Directly controlled, dynamic piezo valve
- Flexible thanks to customizable control parameters
- Excellent value for money



→ .../[vefc](#)

New: Proportional-pressure regulator **VPPE**

- Robust pressure regulator with 1/4" connection
- Reliable control behavior
- Variants suitable for battery production according to F1A



→ .../[vppe](#)

New: Proportional 3-way control valve **VPWI**

- Stroke-controlled 3-way valve
- Very fast reaction time
- Same nominal width in both flow directions



→ .../[vpwi](#)

Flow sensor **SFAM**

- New version/additional features:**
- IO-Link® communication
 - Integrated pressure sensor
 - Quick to commission thanks to replicating function



→ .../[sfam](#)

New: Plug connector **NECB**

- One plug connector for various cable diameters and core cross-sections
- Screw terminals
- UL certified



→ .../[necb](#)

Plastic tubing **PUN-H-SF**

- New version/additional features:**
- Robustness, improved burst pressure thanks to greater wall thickness
 - High flexibility, bending and kink resistance

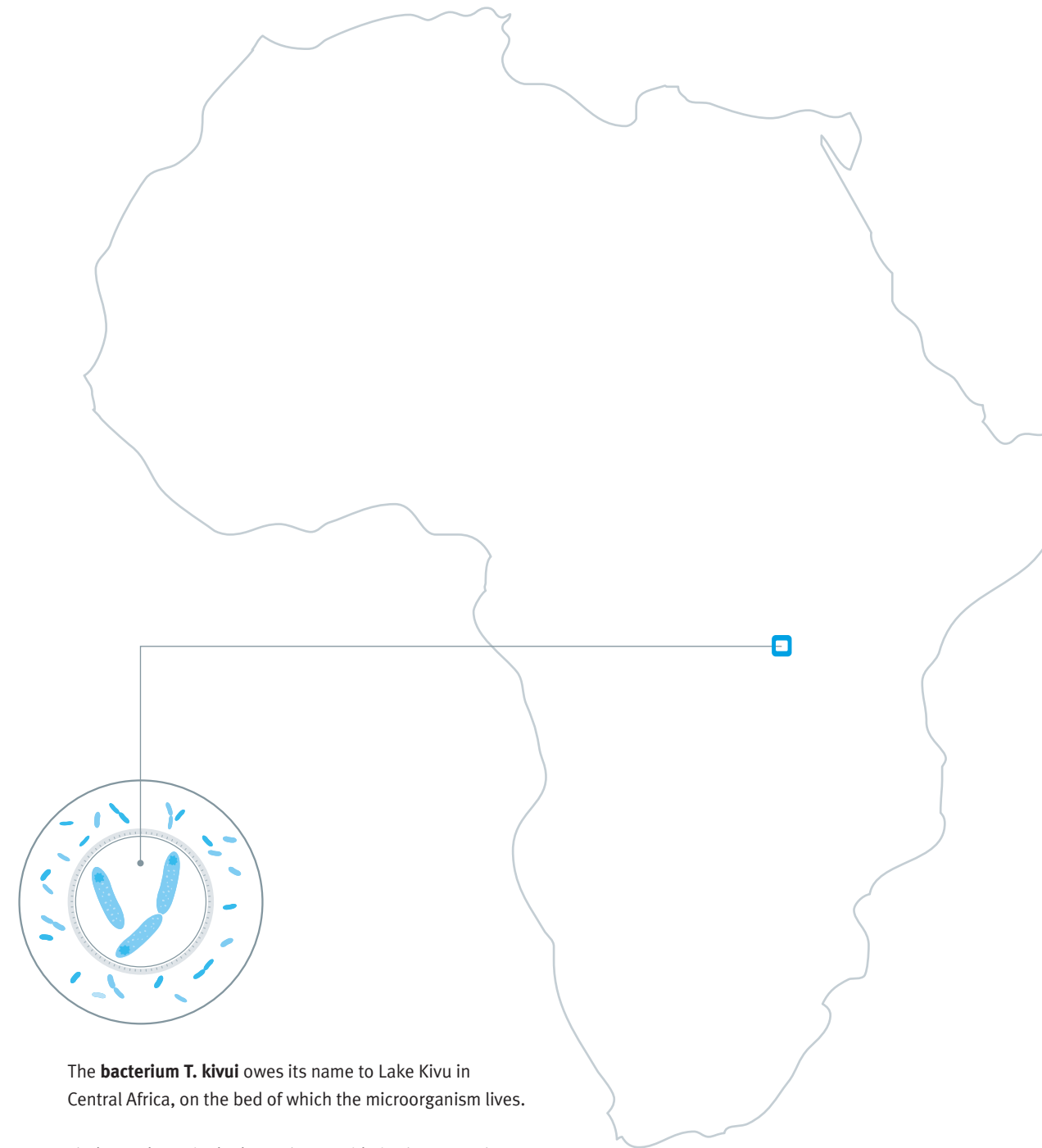


→ .../[pun-h-sf](#)

Notes

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