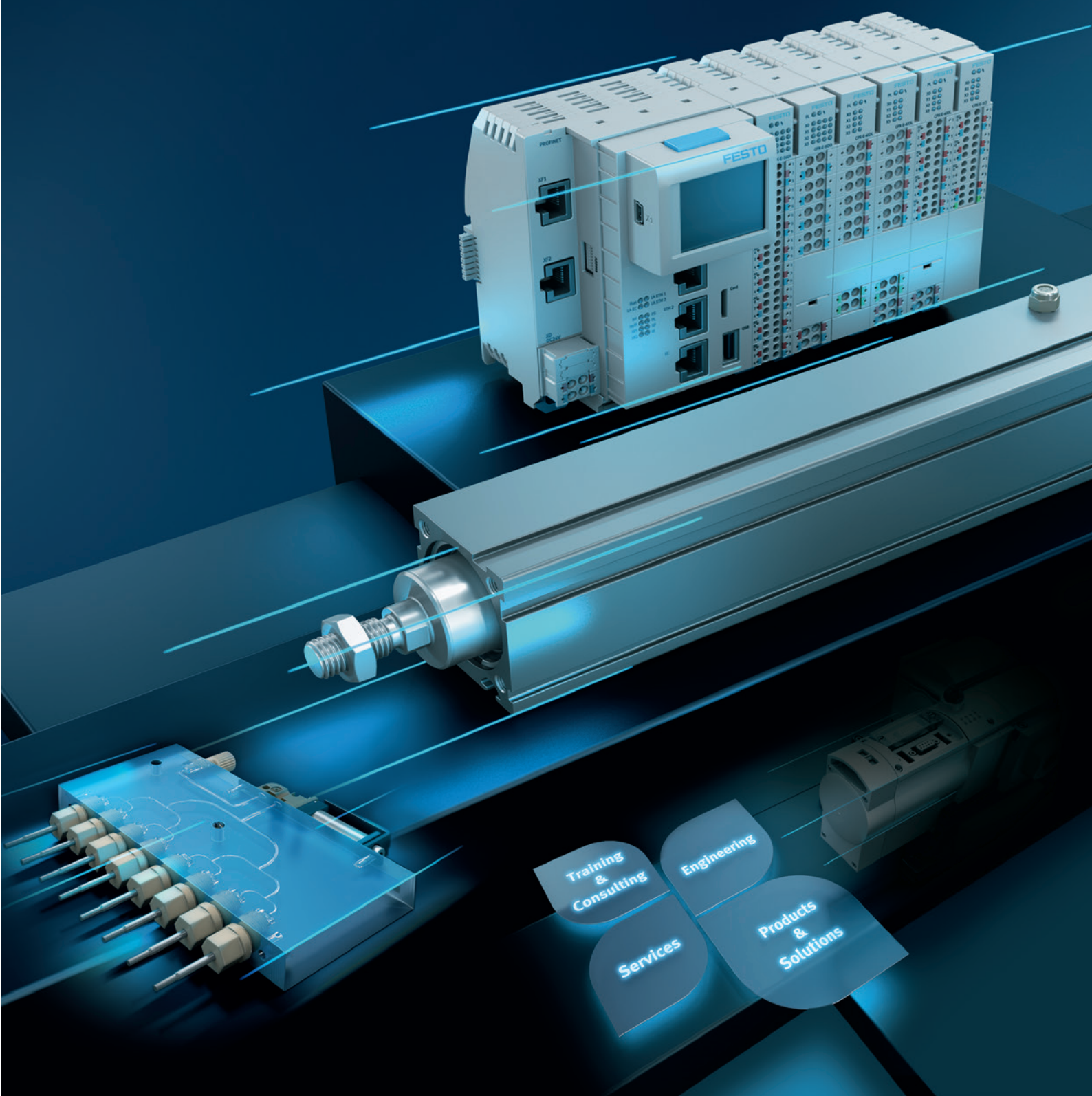


FESTO

Highlights 2021



Training
&
Consulting

Engineering

Services

Products
&
Solutions

You want to make your applications more productive.
You are looking for efficient solutions.
We are entering the digital future with you.

→ **WE ARE THE ENGINEERS
OF PRODUCTIVITY.**



Dr Ansgar Kriwet, Member of the Management Board Sales

Dear Customers,

Have you noticed that our Highlights 2021 that is in front of you has been given a new and fresh look? The design reflects what's on the inside. This includes a whole host of new products as well as interesting and inspiring applications or user reports from industry.

There are a few highlights I would like to mention. For example, our progress in terms of Industry 4.0 automation and the development of the Festo Automation Experience platform (AX) which can really boost the efficiency of your production. With the help of artificial intelligence in Festo AX, you can do more than "just" predictive maintenance; continuous improvement of product quality (predictive quality) and long-term energy savings (predictive energy) can also be easily achieved. It gives an exciting preview of what the future holds.

A common theme running through Highlights 2021 is the piezo technology that is integrated in the latest generation of our valves. Its benefits such as the high precision or the absence of noise and warming make it ideal for the LifeTech division as well as for medical technology or the electronics industry. I'm sure that in the future there will be even more applications for our proportional piezo valves.

In process automation we don't just have new products, but also lots of new tools and configurators like the actuator unit configurator KDFP that greatly simplify the engineering process for you. And with our PA Toolkit you can program your process plant quickly and easily, and achieve maximum modularity and flexibility in your plant.

The productivity of your machines, but also your processes, is our concern – we're there for you, virtually, digitally and of course also in person.

I hope you find our Highlights 2021 an inspirational read.

Dr Ansgar Kriwet, Member of the Management Board Sales

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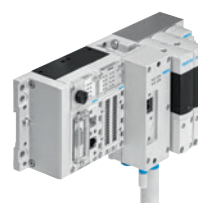
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Efficiency boosts sustainability!

Festo is serious about its environmental responsibility

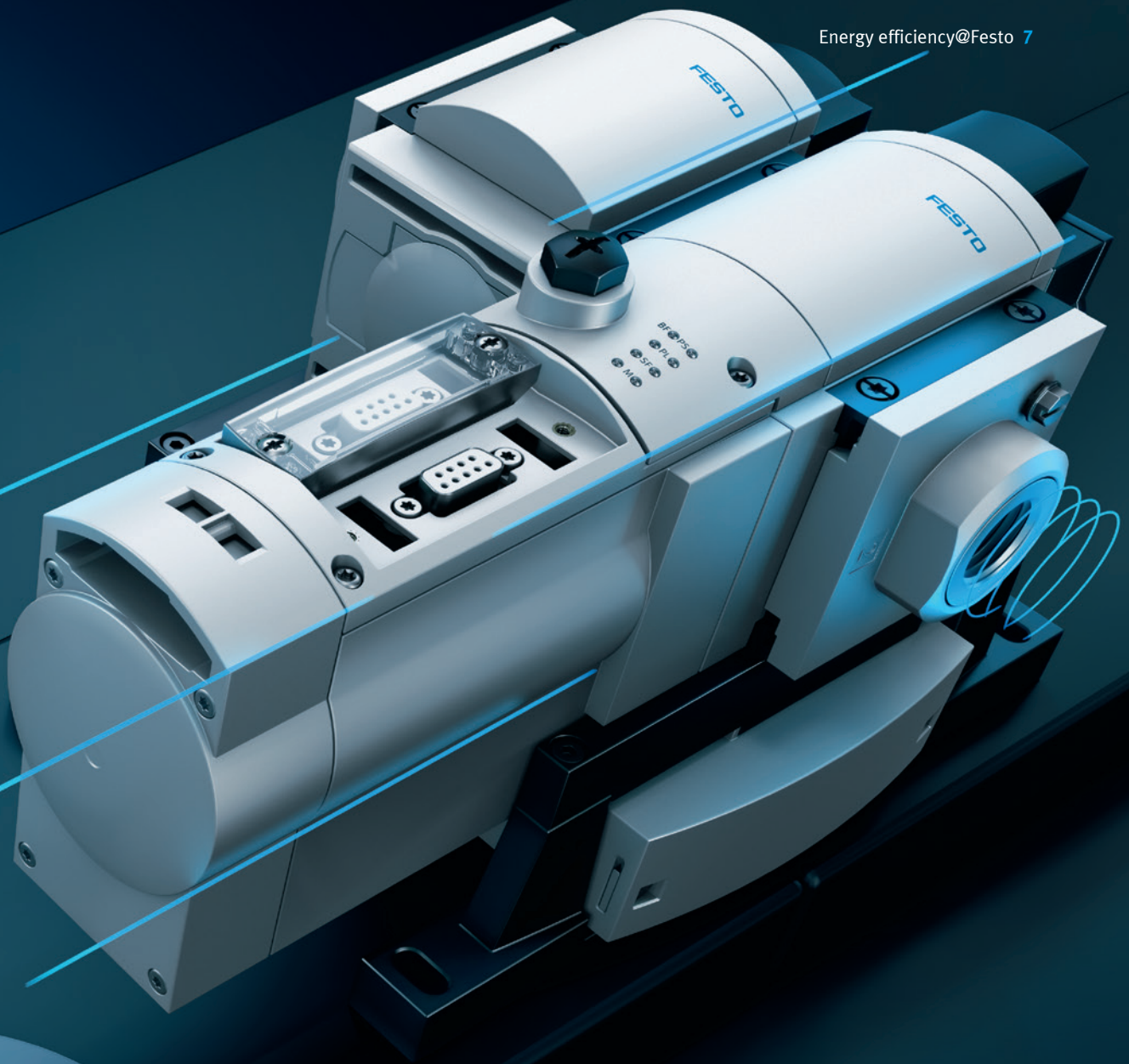
Training
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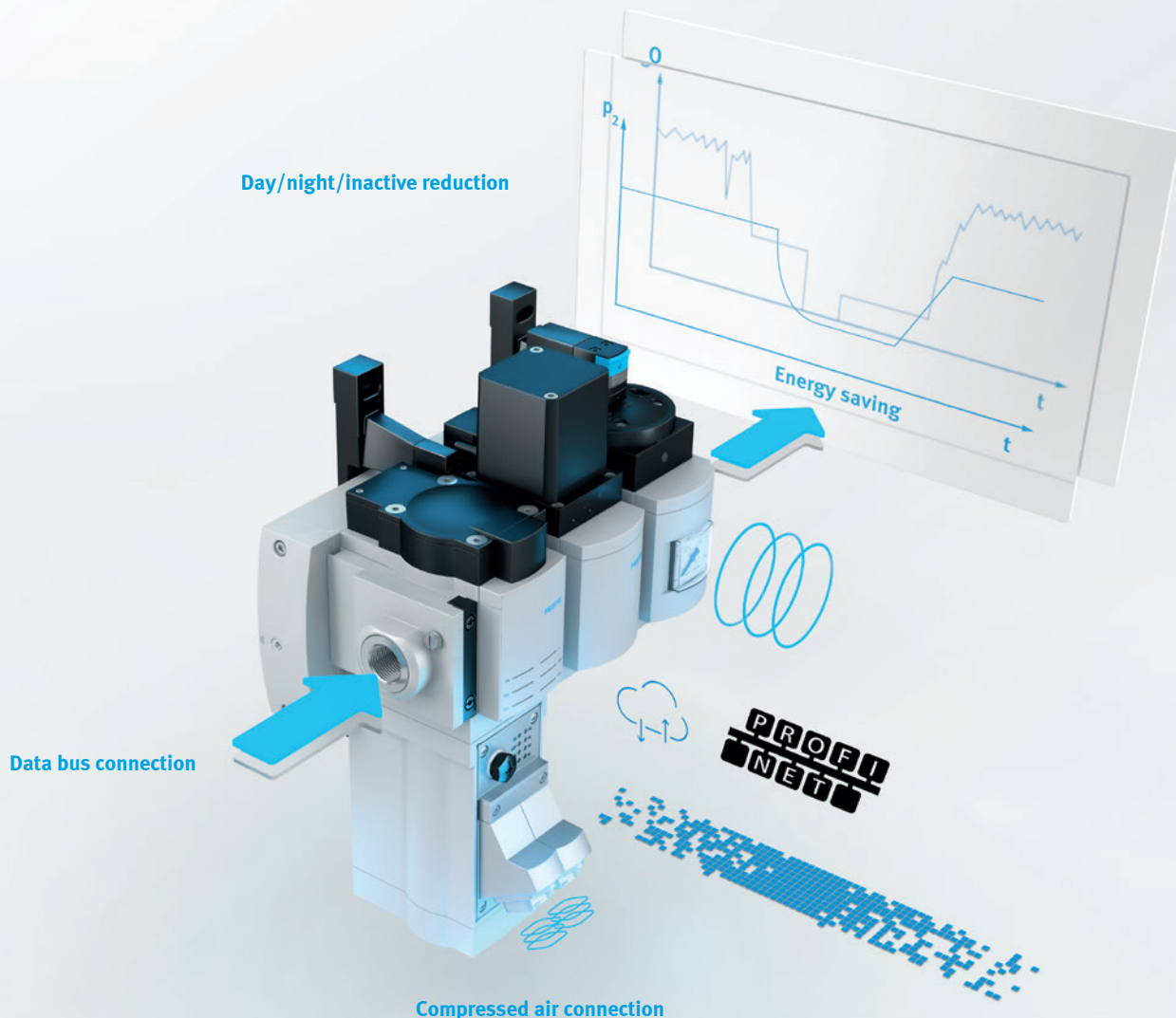
Sustainability is extremely important to us. That is why we choose to be guided by the UN Sustainable Development Goals (SDGs) that are relevant for Festo. We have therefore set ambitious targets aimed at slowing climate change and accepting our share of the responsibility for the environment. This commitment to sustainability affects all areas within Festo, from production at our sites to the use of our products. What's more, our portfolio, too, is geared towards energy efficiency. Correct sizing at the engineering stage, energy-efficient products, Energy Saving Services and the learning opportunities offered by Didactic help to reduce your CO₂ emissions and thus improve your ecological footprint.



Products
&
Solutions

Reduce your CO₂ emissions!

Unbeatable energy footprint thanks to unique technology



While condition monitoring in compressed air systems used to be limited to gathering and analysing measurement data, consumption can now be automatically reduced by actively intervening in the compressed air supply of production plants. Thanks to patented technology from Festo, you can save up to 3.2 t of CO₂ and hundreds of euros in operating costs per year. The return on investment is generally 1-2 years.

Intelligent use of energy

The MSE6-C2M combines pressure regulator, on/off valve, sensors and fieldbus communication in one unit. It monitors the compressed air consumption, shuts off

the compressed air after production has stopped for a certain amount of time, and prevents the system pressure from falling below a specific stand-by pressure level.

Ready for Industry 4.0

With the modules C2M and E2M from the MSE6 series, condition monitoring takes place via fieldbuses or PROFINET and provides measured values such as pressure and flow rate in the PLC, your energy management system or even in the cloud. The additional module MSE6-D2M is an efficient way of adding a second supply string to the C2M module.

Suitable for almost any application

The modules can be used almost anywhere, whether in existing or new systems and can also be retrofitted.

- Detecting stand-by states, automatic shut-off or stand-by pressure control
- Leakage measurement
- Condition monitoring



■ MSE6-C2M and MSE6-E2M

For full control of the compressed air supply, use the fully automatic regulation of your parameters. With the C2M module with pressure reduction and soft start for restarting the system.

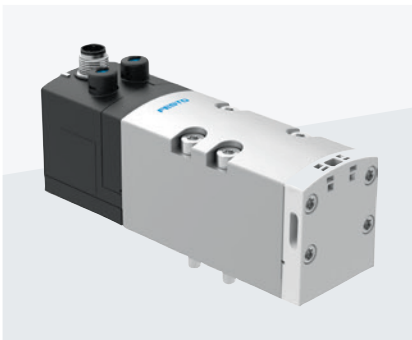
With the E2M module with complete pressure shut-off but no soft start for restarting the system.



■ MSE6-D2M

The low-cost extension for a second string on the MSE6-C2M or a CPX terminal.

→ www.festo.com/mse6



■ Pulse valve VSVA

In applications where chips or dust need to be removed or parts need to be dried and transported, the 2x3/2-way solenoid valve VSVA with pulse function is a great asset – and reduces energy consumption at the same time. When the valve is switched off, you save compressed air. When used as an air blast valve, the blast pulse is stronger. This pays off within a very short time.

- Up to 50% less energy consumption in blowing applications
- Greater cleanliness
- Amortised in less than 2 years
- Double flow rate possible
- Tamper-proof

Sustainable production at the new Festo plant in Suncun, China

Our new factory in Suncun has been up and running since October 2020. The 160,000 square metre factory was designed in accordance with an integrated sustainability concept and meets the latest standards for energy consumption and the use of renewable energies. The usage of rainwater, a wastewater treatment plant and a protective liner under the buildings to protect against contamination help to actively protect the environment.



Measures for increased energy efficiency and decreased CO₂ emissions

- Efficient energy concept with the option of regenerative energy production
- Photovoltaic system planned for 2021
- Heavily insulated building shell
- Highly efficient heating and cooling systems
- Waste heat recovery for compressors, ventilation and large production plants
- Charging stations for electric cars and bikes

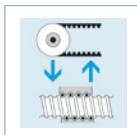
Save energy right from the word go

It couldn't be easier with these tips and tricks

-14%

Choose the right components

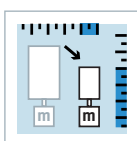
Festo engineering tools help you to select the right product for your application.



-35%

Correct sizing

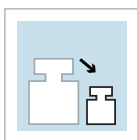
Tools like the HGO for configuring the optimum handling systems and the right design in next to no time.



-18%

Reduce weight

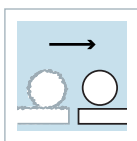
When correctly sized, the weight of the moving mass can be reduced.



-15%

Reduce friction

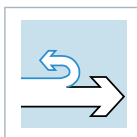
Our mini slides DGSL and DGST, for example, are designed to reduce friction to a minimum.



-10%

Recover energy

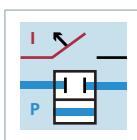
Save braking energy in the coupled intermediate circuits. The motor controller CMMP-AS helps you do this.



-10%

Switch off energy

In some work cycles, the energy supply can be temporarily stopped – for zero energy consumption and zero leakage.

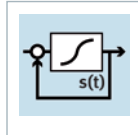


Training & Consulting

Services

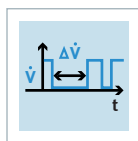
Engineering

Products & Solutions

**Efficient open-loop and closed-loop control**

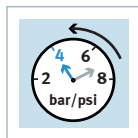
Optimum controller settings with flat acceleration ramps reduce energy consumption and minimise vibrations.

-10%

**Use air-saving circuits**

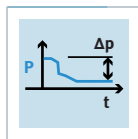
Vacuum handling with monitored switch-off, e.g. by using the energy-saving vacuum generators OVEM.

-60%

**Reduce pressure level**

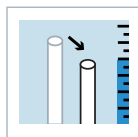
Different pressure zones in a system or a return stroke with reduced pressure at drive level are helpful.

-22%

**Reduce pressure losses**

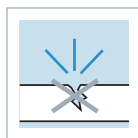
You achieve this with the MS series service unit components.

-6%

**Reduce tube lengths**

Many tubes are too long and unnecessarily increase compressed air consumption (dead volume) and have a negative effect on the system's cycle time.

-25%

**Reduce leakages**

With our Energy Saving Services, we detect leaks for you quickly and reliably – and put a stop to compressed air losses.

-20%

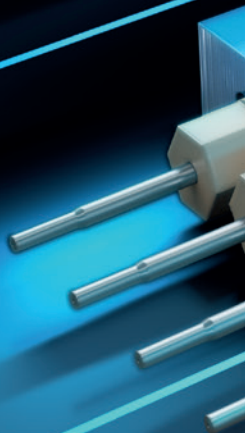
Energy efficiency in production plants isn't just another box to tick. It's a way of making equipment and systems better, more productive and even safer. You can achieve the greatest gains by paying attention to energy-efficient and correctly sized components right from the engineering stage.

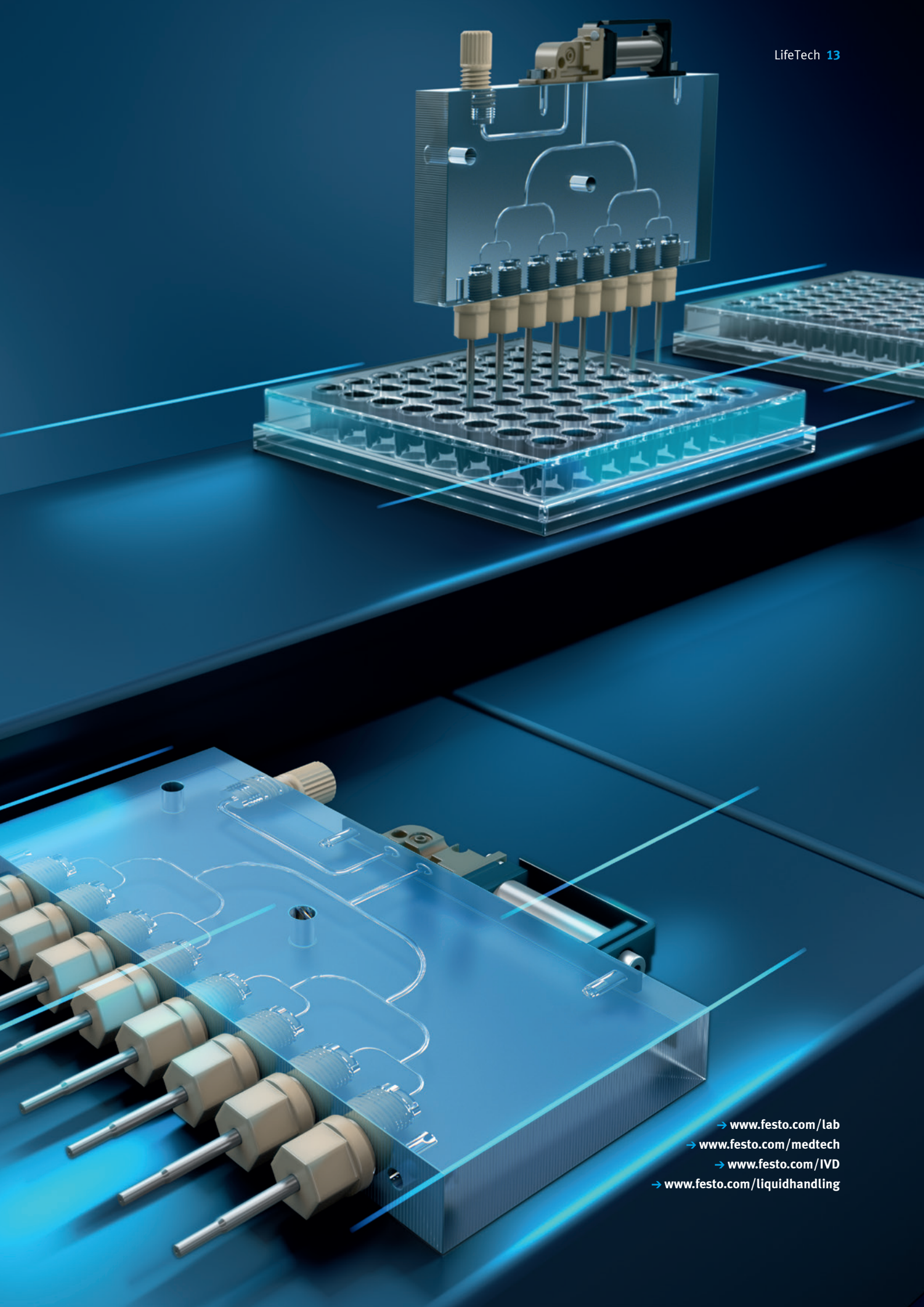
Having the right technology is important too. Pneumatics, for example, is ideally suited for holding tasks. Even in existing plants, there is a lot you can do to improve operational efficiency. We can help you!

Health moves us!

Combine flexibility, quality and reliability
with the best possible economic efficiency!

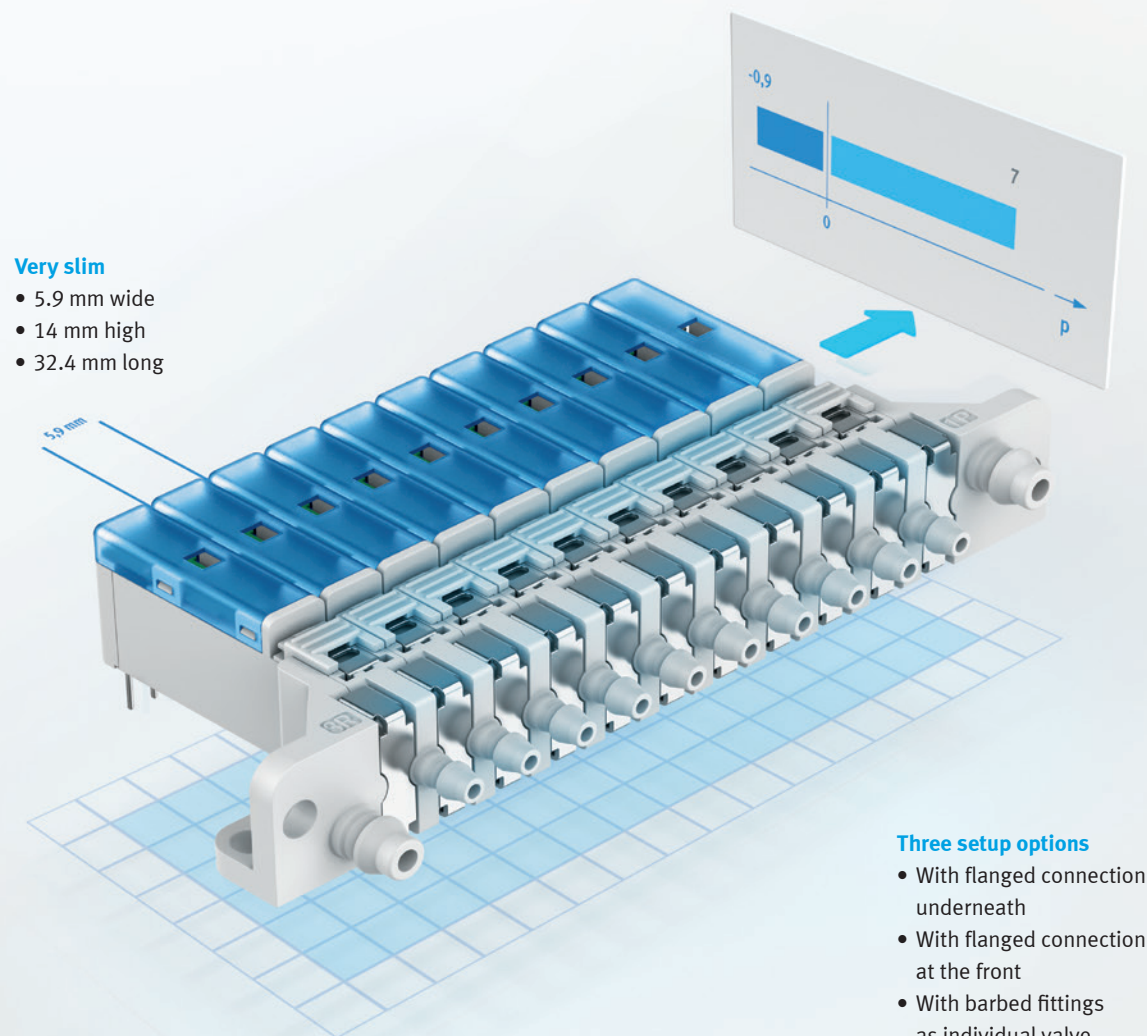
Festo offers you an attractive mix of standard automation components and specially developed industry-specific solutions, whether for laboratory processes, manufacturing medical equipment or in vitro diagnostics. Our state-of-the-art fluid and motion technology is perfectly tailored to the needs of modern laboratory environments. And our innovative products, systems and services for the diagnostic market reduce your validation time and speed up your time to market. All in all, our products, systems and services give you precisely the flexibility, quality and reliability your industry demands. Not to mention maximum efficiency.





Gas handling in medical technology

Proportional closed-loop control of even the smallest gas flows



Very slim

- 5.9 mm wide
- 14 mm high
- 32.4 mm long

Three setup options

- With flanged connection underneath
- With flanged connection at the front
- With barbed fittings as individual valve

Miniature valves VOVK

At a width of just 5.9 mm, the VOVK is ideal for operating a large number of switching valves side by side in the smallest of spaces. The 3/2-way NC valve with a flow rate of up to 5.8 l/min can even be expanded to a valve block with up to 20 positions. It lends itself to applications such as in vitro

diagnostics (IVD) for small point-of-care (PoC) devices, as a pilot valve or for direct open-loop control of small gas flows in production. Its extremely low energy consumption of just 0.5 W and a switching time of 6 ms also enable an extremely compact design and switching of a large number of small gas flows side by side.

- Very wide pressure range $-0.9 \dots 7$ bar
- Vacuum operation up to 0.9 bar possible
- Suitable as a pilot valve or for direct control

→ www.festo.com/vovk



Lightweight and compact proportional valve VPWS

The proportional cartridge valve VPWS safely and precisely regulates gas flows, whether oxygen, carbon dioxide, air, nitrogen dioxide or inert gases. The valve can be used in a variety of ways, for example in ventilator breathing and anaesthetic systems where respiratory gases need to be mixed with oxygen. However, it is also

suitable for other application areas and industry segments in which gas flows of up to 270 l/min have to be regulated.

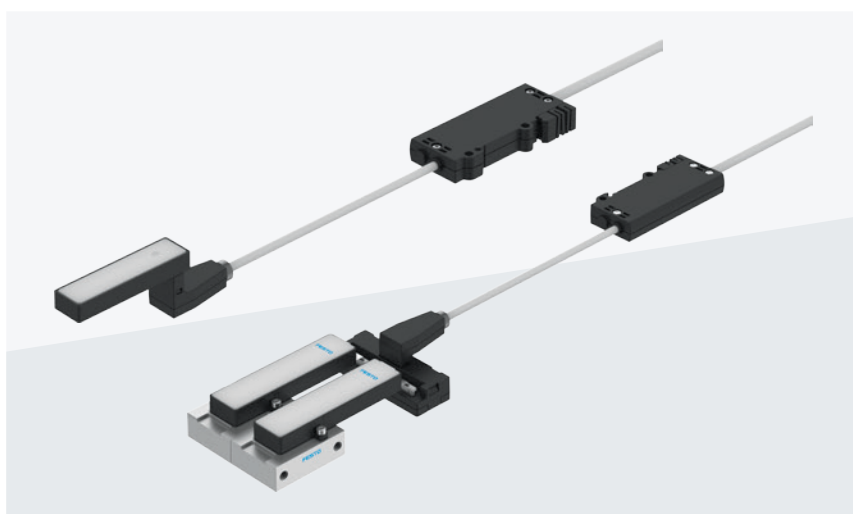
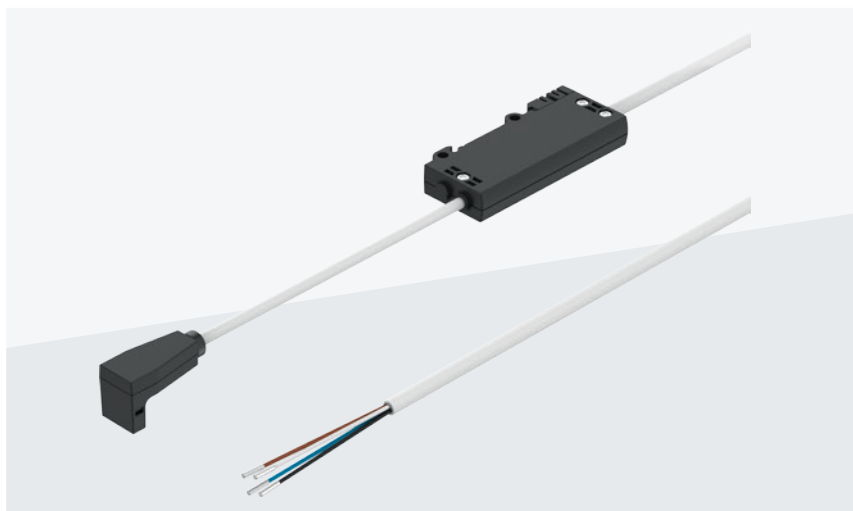
- Diameter: 15 mm
- Length: 30 mm
- Full proportional characteristics
- VPWS-6: 270 l/min at 3 bar

→ www.festo.com/vpws

Piezo E-box VAVE-P

Take advantage of the benefits of piezo technology and simply replace proportional solenoid valves with piezo valves from Festo and the compact piezo E-box VAVE-P for control. Piezo technology is characterised by proportional behaviour, extreme durability, very quiet operation, high precision, very low power consumption and as a result almost no heat build-up. It is ideal in applications where energy efficiency or avoiding heat development is important. The simple open-loop control electronics are suitable for the Festo portfolio of piezo valves. Voltage generation and the 2-channel driver stage with current limitation for the piezo valves are built in.

- For all Festo piezo valves VEMR, VEMC, VEMP, VEAE
- Two channels, for two 2/2-way piezo valves (VEMR, VEAE) or one 3/3-way piezo valve (VEMC, VEMP)
- Two analogue inputs 0 ... 10 V or pulse width modulation of 10 V, 0 ... 100% pulse width
- Flexible power supply of 12 ... 24 V $\pm 10\%$



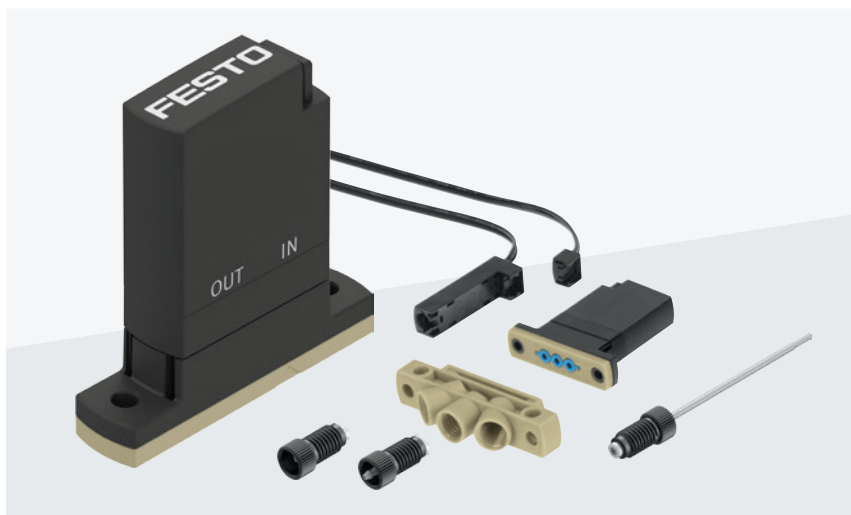
Liquid handling in laboratory automation

Control even the smallest flows with precision

Media separated valves VYKA/VYKB

With media separated valves from Festo, you can use three operating modes at once! These compact, powerful valves dispense and aspirate any quantity, right from the very smallest, with great precision. Their uniquely impressive pressure and nominal width specifications also make them perfect for flow control. While with the VYKA the 12 ... 26 V DC actuation of the plug-in E-box VAVE or the valve control module VAEM reduces the holding current, the E-box is right on board in the VYKB and can be actuated with 12 V or 24 V.

- Perfect for use with microwell plates
- FDA-listed materials
- Developed to ISO 13485
- Very easy to clean and suitable for aggressive fluids thanks to safe media separation
- Widths of 7, 10 and 12 mm



VYKA

- For dosing and for continuous flow applications
- Kv value 1: 0.35 l/min

Product-specific accessories and spare parts

- Connecting cables NEBV
- PEEK connection module VABS
- Plug-in electronic connecting component VAVE for VYKA

→ www.festo.com/vyka



VYKB

- For dosing, aspirating and for continuous flow applications
- Kv value 1: 0.35 l/min (F10) and 0.97 l/min (F12)
- Holding current reduction included
- Connecting cables NEBV included

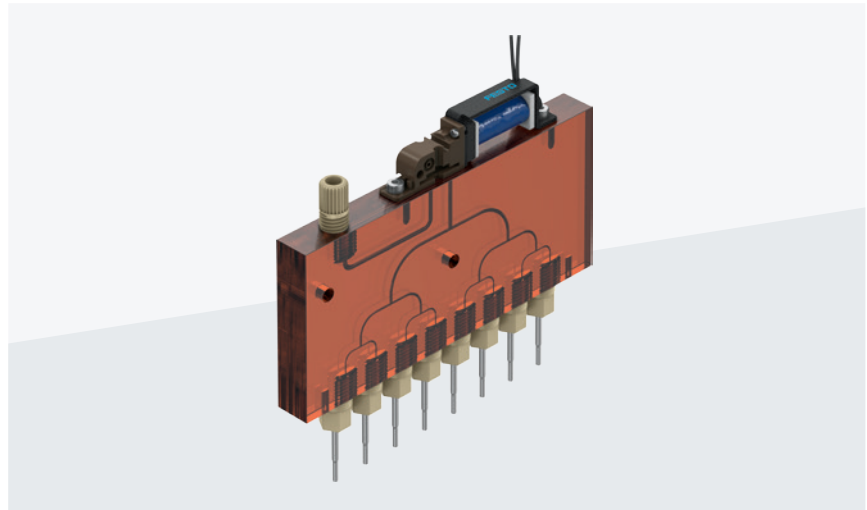
Product-specific accessories and spare parts

- PEEK connection module VABS
- Seals VAVC as spare parts

Dispense head VTOI increases dispensing and aspirating throughput

Thanks to the 9 mm grid dimension and one valve for eight outputs, the VTOI is an extremely precise 8-channel dispense head for microwell plates. It is optimised for applications that require a high throughput. The vacuum function enables you to use the VTOI not just for dispensing but also for aspirating, right down to the smallest micro-litre range. The simple design enables it to be mounted side-by-side so that simultaneous dispensing of 96 wells can be achieved with only 12 valves.

- Minimum dispensing volume of 1 µl
- Dispensing precision CV ≤3% (intra-run) and ≤5% (tip-to-tip)
- Also suitable for aggressive media
- Perfect for use in a pressure-controlled dispensing system
- Complete dispense head using just a few components



Pick-up and holding currents under control with the valve control module VAEM

Do you want to utilise the switching behaviour of solenoid valves for high-precision applications like dosing or pipetting? With the VAEM, the control signal's time resolution of just 0.2 ms means that different volumes can be set very precisely.

- Less energy consumption and self-heating
- Independent and easy parameterisation of one to eight solenoid valves

→ www.festo.com/vaem



Push-in fitting NLFA and dosing nozzles VAVN for liquid media, especially in laboratory applications

Fluidic connections now couldn't be easier with the push-in fitting NLFA and optional dosing nozzle VAVN. The innovative technology connects the two individual parts of the fitting, meaning they no longer need to be ordered or installed separately.

- Suitable for aggressive liquids
- FDA-listed materials
- Very good rinsability
- Large selection of dosing nozzles

Robots for training purposes

Piezo technology from Festo simulates lifelike movements



To help future dentists and dental assistants practise dealing with young children, the Japanese company tmsuk has developed a humanoid robot that can realistically simulate the behaviour of children, complete with fidgeting, flinching or closing the mouth. The dummy's realistic movements are produced using proportional pressure regulators with piezo technology from Festo.

This kind of simulation robot is more than practical when preparing for young patients who experience anxiety, loss of blood pressure and shock. After all, it is not really feasible to practise on real people when teaching dentistry and oral surgery.

Pneumatic robot

The Pedia Roid is 110 cm tall and weighs 23 kg, equivalent to a five-year-old, and sometimes needs to be held by the limbs during treatment simulations. While this could damage the gear unit and spindles of electric drives, the Pedia Roid's pneumatic design has proven itself to be extremely sturdy and flexible.

Smooth movements with piezo technology

The secret to the smooth, lifelike movements is the piezo technology of the proportional pressure regulators VEAA and VEAB from Festo used in the robot. They control most of the robot's 24 pneumatic cylinders and deliver the deceptively realistic movements of the arms, legs and fingers as well as the mouth, eyelids and irises. Virtually silent and with low energy consumption, they do not make the clicking sounds that classic pneumatic solenoid valves make when they switch.

01: Whether it's fidgeting, flinching or suddenly closing the mouth, the humanoid training robot simulates the possible behaviour of children during a dental treatment. (photo: tmsuk)

02: The Pedia Roid robot for training dentists and dental assistants with piezo technology for simulating realistic movements. (photo: tmsuk)



“We would not have been able to realise this humanoid robot without piezo technology,” explains Yusuke Ishii, Director of tmsuk. The proportional pressure regulators VEAA/VEAB are 3/3-way valves with a pressure sensor and control electronics. Thanks to piezo technology, they require virtually no energy to maintain an active state compared with solenoid valves.

Long service life, small footprint

The design of the proportional pressure regulators VEAA/VEAB makes them resistant to wear and capable of achieving a high number of cycles. Thanks to their low intrinsic weight and space-saving installation, they are particularly suitable for pressure regulation applications with low to very low cylinder air consumption, and for applications requiring high dynamic response.

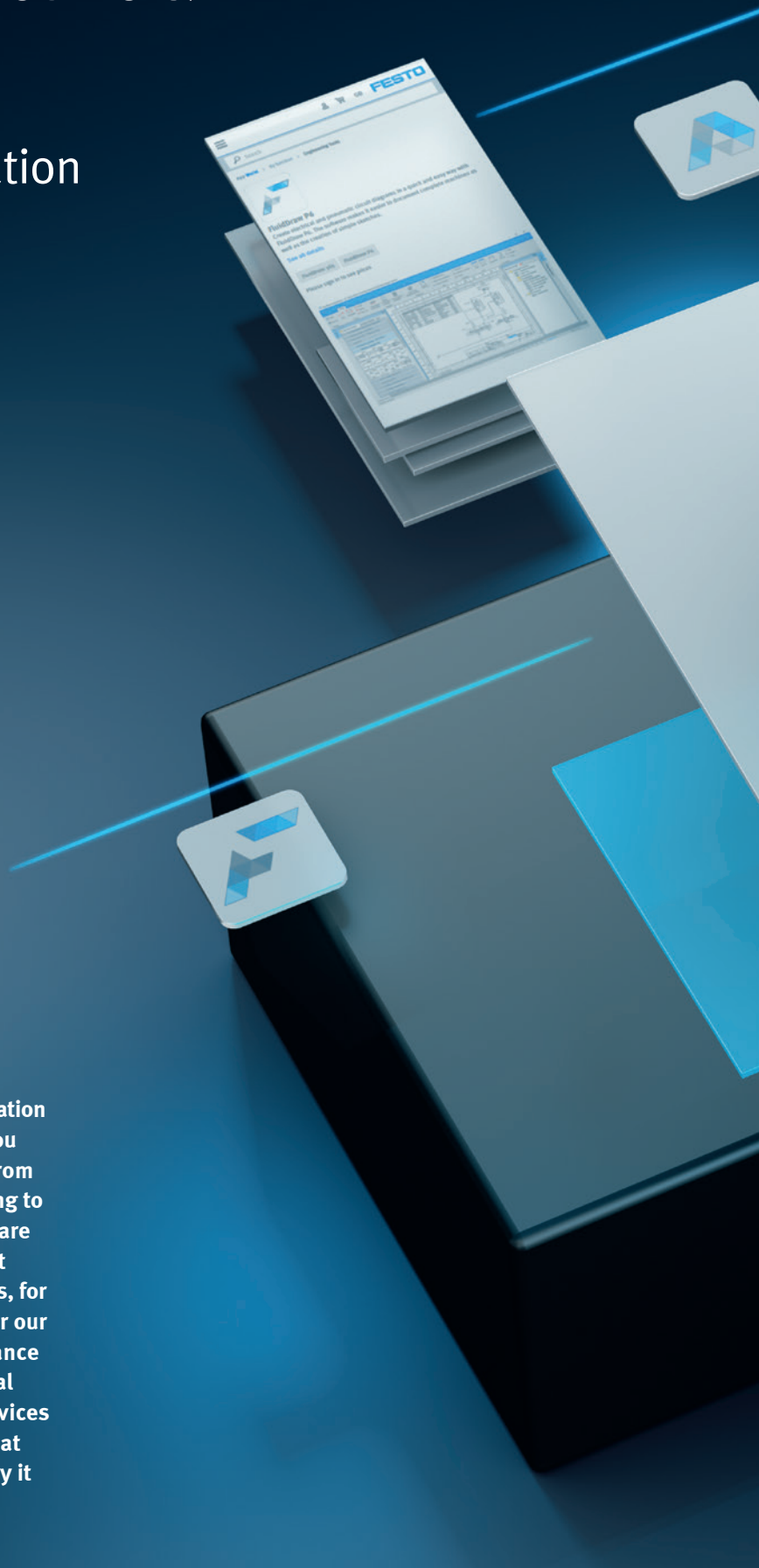


Silent, smooth and fast thanks to piezo technology: the proportional pressure regulators VEAA/VEAB. (photo: Festo SE & Co. KG)

Harness the potential of data

Comprehensive digitalisation concepts

All our development activities for digitalised automation revolve around one question: how can we make you more productive across the entire value chain? From initial engineering, procurement and commissioning to maintenance and operation? No matter where you are in this value chain, at Festo you will find the right digital offer for your needs. Take our software tools, for example, that help you to find the right product, or our digital solutions that enable predictive maintenance and predictive quality when combined with artificial intelligence. And last but not least, the many services and learning opportunities offered by Didactic that will support you on your journey to Industry 4.0. Try it for yourself!





Festo Automation Experience

Boost your productivity with artificial intelligence (AI)



Increase productivity, reduce energy costs, avoid quality losses, optimise your shop floor and create new business models – all by analysing your data with the Festo Automation Experience, or Festo AX for short. The easy-to-use solution allows you to obtain great added value from analysing the data produced by your assets through the application of AI and machine learning.

And it allows us to continually combine our in-depth expertise in industrial automation with our experience in data science and software development. As a result, you can expect much more than just a regular IoT solution. Predictive maintenance, predictive energy and predictive quality – together we implement your individual solution.

The benefits to you at a glance

Digitalisation and the use of AI greatly increase the overall equipment effectiveness (OEE):

- Reduced downtime in production
- Reduced energy costs
- Increased daily output
- Reduced rejects
- Reduced production costs
- All the information you need at your fingertips, customised to your needs



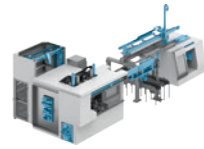
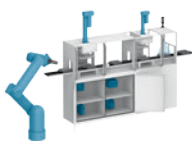
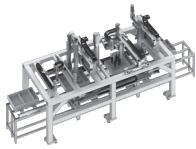
Asset management

Visualisation

Monitoring

Prediction/AI

Machines



Components



What Festo AX offers you

- Artificial intelligence and real-time detection of anomalies
- Flexible integration into all systems with common protocols such as OPC-UA, MQTT
- Can be run in the cloud, on your servers (on-premises) or directly on the asset (on-edge). We support you in whichever environment you prefer!
- Human-in-the-loop: Festo AX learns both from our algorithms and your valuable knowledge. Continuous analysis helps you to learn more about the state of your assets – continuous learning enhances the algorithm. But it's up to you to make the right decision.
- Last but not least: your data is solely your data!

Festo AX for end customers

Predictive quality

Festo AX helps you to avoid quality losses and reduces the number of rejects. The system calculates which process parameters are responsible for the quality losses and how they must be adjusted in order to achieve the specified product quality again.

Predictive energy

Festo AX helps you to use energy efficiently. You can proactively switch off relevant consumers, connect your own generators or reorganise production before the load limit is exceeded. By eliminating load peaks and reducing grid charges, you lower your production costs.

Predictive maintenance

Festo AX helps you to avoid production downtimes. By detecting anomalies very early on, you can avoid unexpected downtimes, ensure spare parts are at the ready and carry out scheduled maintenance.

Festo AX for OEMs

Benefit from the data your assets are producing with artificial intelligence (AI) on your own shop floor. Or expand your own offer with new AI products. Then your customers can utilise the potential of the data they have collected themselves – or you offer them AI-based products as an “all-round carefree package”.

Connection to existing systems

Connecting Festo AX to your existing systems, like maintenance management or spare parts management, creates integrated end-to-end solutions, from the application to the business process. In the area of predictive maintenance, direct connection to the Smartenance maintenance manager or another maintenance management tool of your choice enables seamless integration into your maintenance process. Maximise the efficiency of your maintenance – with just a few clicks.

Digital assistants for your work!

Faster, more reliable, more productive thanks to digital support



Smartenance for paperless, transparent and efficient maintenance management

Smartenance lets production managers, system operators and maintenance staff schedule autonomous maintenance tasks, report faults on the move and document all their measures. While the web-based application provides administrative support, the app gives access to maintenance schedules and attachments from anywhere.

- Digital maintenance management directly on the shop floor
- Mobile access to all information means less toing and froing
- Complete documentation of all activities

→ www.festo.com/smartenance



A real time saver: Schematic Solution for EPLAN projects

The circuit diagram service from Festo provides complete documentation for your configured solutions in next to no time. Simply enter your order code and receive the complete plan in a few minutes – error-free and trouble-free. This reduces your time investment from several hours to just a few minutes.

- Supports EPLAN version 2.7 and most recently version 2.9
- Intuitive, fast and reliable
- Complies with standards 61355, IEC 81346, ISO 1219

→ www.festo.com/eplan



Circuit diagrams for complete systems with the FluidDraw engineering tool

Planning and documenting electric and pneumatic components in your system have never been easier. FluidDraw gives you direct access to the catalogue and any online baskets you saved at Festo, as well as letting you import additional databases and use a standardised symbol library. For maximum convenience choose the 365 software subscription with regular updates and the latest upgrades.

- IMX and EPLAN interfaces
- Tube lengths, wire and cable lengths
- Standardised hydraulic symbols to ISO 1219

→ www.festo.com/fluiddraw



■ The right drive online:

Electric Motion Sizing

This sizing and simulation tool helps you to find the right electric or electromechanical servo drive for your application. The calculation is performed on the basis of a small number of parameters like mass, stroke/ travel distance, cycle time, and promptly tells you which solution is the most economical for your requirements, whether servo drive and motor or servo drive, motor and mechanical system.

- Quick, easy and reliable calculation
- Free access to the Festo website – with no need to register or download and install software
- Registered users can carry out detailed simulations and get further information, such as an analysis of the overshoot behaviour



■ A handling system in just 20 minutes with the online engineering tool HGO

From 1D to 3D handling systems to highly dynamic and compact systems, HGO helps you to select, configure and order your handling system and guides you to the right solution in record time. With documentation and commissioning files included. Our service technicians can also commission your axis system on site on request – quickly, reliably and optimally configured.

- Minimum engineering effort
- Immediate net price
- Maximum performance

→ www.festo.com/handling-guide



■ Automation Suite for parameterisation, programming and maintenance

Automate the entire drive package, from the mechanical system to the controller. Commissioning all components is easy, efficient and seamless since the basic functionalities of the components are already integrated into the software and can be customised using plug-ins and extensions.

- Only five steps to get a drive system up and running
- Greatly simplified integration into the control program
- Optional CODESYS extension

→ www.festo.com/AutomationSuite

Save time with engineering tools

Smart engineering for the optimal solution

Our goal is to increase your productivity. Our engineering tools play an integral part in this. They help you size your system correctly, tap into unimagined productivity reserves and generate additional productivity along the entire value chain. In every phase of your project, from the initial contact to the modernisation of your machine, you will come across a number of different tools which will be of use to you.

Discover our world of engineering tools:
→ www.festo.com/support



■ Festo Design Tool 3D –

CAD models at the push of a button

The Festo Design Tool 3D is a 3D product configurator for generating Festo-specific CAD product combinations. It will make your search for matching accessories, e.g. for pneumatic cylinder series DSBC, DSNU and ADN, faster, more reliable and easier in the future.

→ www.festo.com/fdt-3d-online

■ Tools for process automation.

The right control cabinet in record time: control cabinet configurator CGO

Configure and order the right control cabinet in just a few minutes – as a ready-to-install solution – with the Cabinet Guide Online. The CAD model and EPLAN circuit diagram can be integrated into your documentation. This helps you save valuable time when planning and designing water treatment plants. And you can simply use the order ID for repeat orders when needed.

- Simple, intuitive to use
- Application-specific sizing
- Planning certainty thanks to instant net prices

→ www.festo.com/cabinetguide

■ Configurator for

butterfly valve units KVZA

Wafer or lug versions of butterfly valves, whether they are manually actuated or fully automated, can be easily configured in just a few steps using the configurator KVZA.

→ www.festo.com/kvza

■ Configurator for ball valve units KVZB

Quickly and easily configure ball valves, whether they are manually actuated or fully automated, and choose between thread, flange or clamp connection.

→ www.festo.com/kvzb

Reach your goals more quickly with smart engineering

Smart engineering means using digitalisation and online engineering tools to achieve

your objectives faster. Festo helps you to find the right products while taking all the relevant standards and guidelines into account and transfers CAD/ECAD data

directly to your plans. This avoids undersizing or oversizing and lets you plan with efficiency and confidence.



Sizing and simulation

Pneumatic Sizing

Size pneumatic control chains quickly, easily and energy efficiently.

Pneumatic Simulation

Helps you with selecting and configuring the entire pneumatic control sequence.

Service units

Find service units based on your application, ISO code or by selecting air filters directly.

Simplified Motion Series Solution Finder

Linear or rotary? Combine the simplicity of pneumatics with the advantages of electric automation.

Product configurators

Rotary indexing table

Shock absorber

Suction cup with connection

Feed separator

Grippers (three-point, angle, parallel, radial)

Calculation tools

Conversion of technical and physical units

Conversion: length, area, volume, pressure, flow rate, temperature, dimension, speed, density.

Calculation: flow rate, force by pressure and area.

Mass moment of inertia

This tool calculates all mass moments of inertia for you. Simply save, send or print out.

PPS Check

This tool estimates the functionality of your cylinder with PPS cushioning.

Soft Stop

Soft Stop cuts the travel times for pneumatic drives by up to 30% and greatly reduces vibrations.

→ www.festo.com/engineeringtools

Quick Search Plus – all technical information from a single source!

With Quick Search Plus, you can access data sheets, documentation, CAD data, the spare parts catalogue and other important information for 51 countries with just one click. Combine Quick Search Plus with your own identifiers/material numbers or create your own favourites.

From actuators to accessories, the user-friendly interface with zoom feature greatly simplifies the search process for all product areas. Standard products are clearly indicated, and there's just one search box for part number, type code and ID code. The match code and live ID code searches are built in. You can choose between product comparison, shopping basket and FluidDraw, and

copy your search results to the clipboard. Last but not least, you will find the accessories you need next to the product.

System requirements

Windows 7 or higher and a fast internet connection.

→ www.festo.com/quicksearch

Artificial intelligence in wafer production ...

... delivers 100,000 euros of savings per year

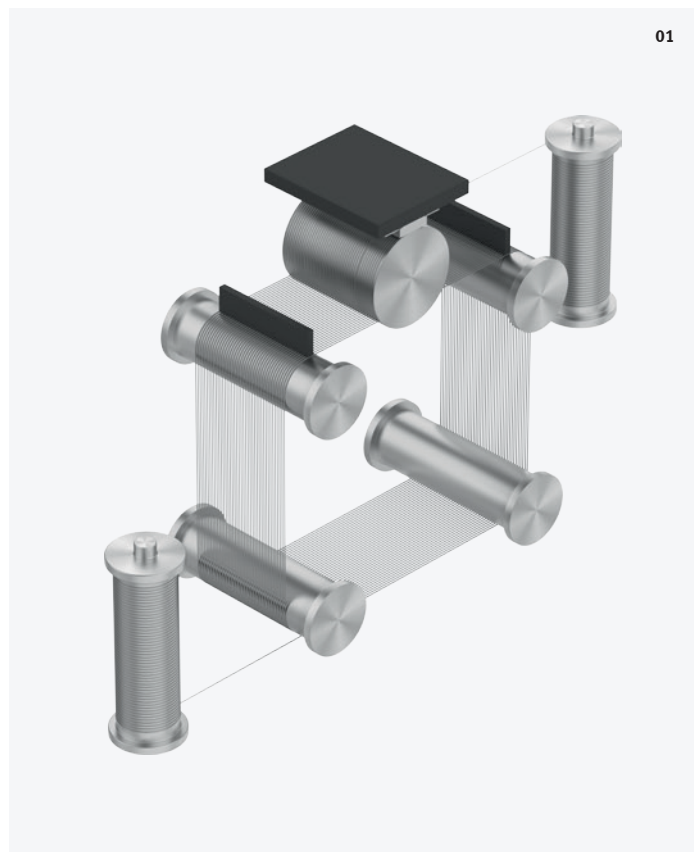
When producing wafers in the semiconductor industry, wire saws are used to slice the so-called ingot into a large number of thin wafers. Although the specialised systems used for this are very reliable, quality losses are a regular occurrence, e.g. when prescribed tolerances for the smoothness of the surface are not met. A customer wanted to be able to trace these quality losses back to error patterns using data-driven algorithms. The customer now uses the Festo Automation Experience (Festo AX) to prevent gradual deteriorations during production while making the quality inspection more specific at the same time.

Predictive quality with machine learning and Festo AX

As part of a pilot project, the historical production data was first correlated with the measurement data generated by the quality inspections. Sawing operations that produced good quality served as a model to train the standardised operation. The algorithm demonstrated its high sensitivity during live monitoring in a simulation using past good and bad cuts. The use of new, specific sensors that enable the error patterns in the system to be pinpointed very precisely also played a role. At the end of the pilot project, the solution was rolled out to other systems with minimal effort. Festo AX was installed in an on-premises environment, with OPC-UA used for data transfer.

Monitoring using a selection of Festo sensors

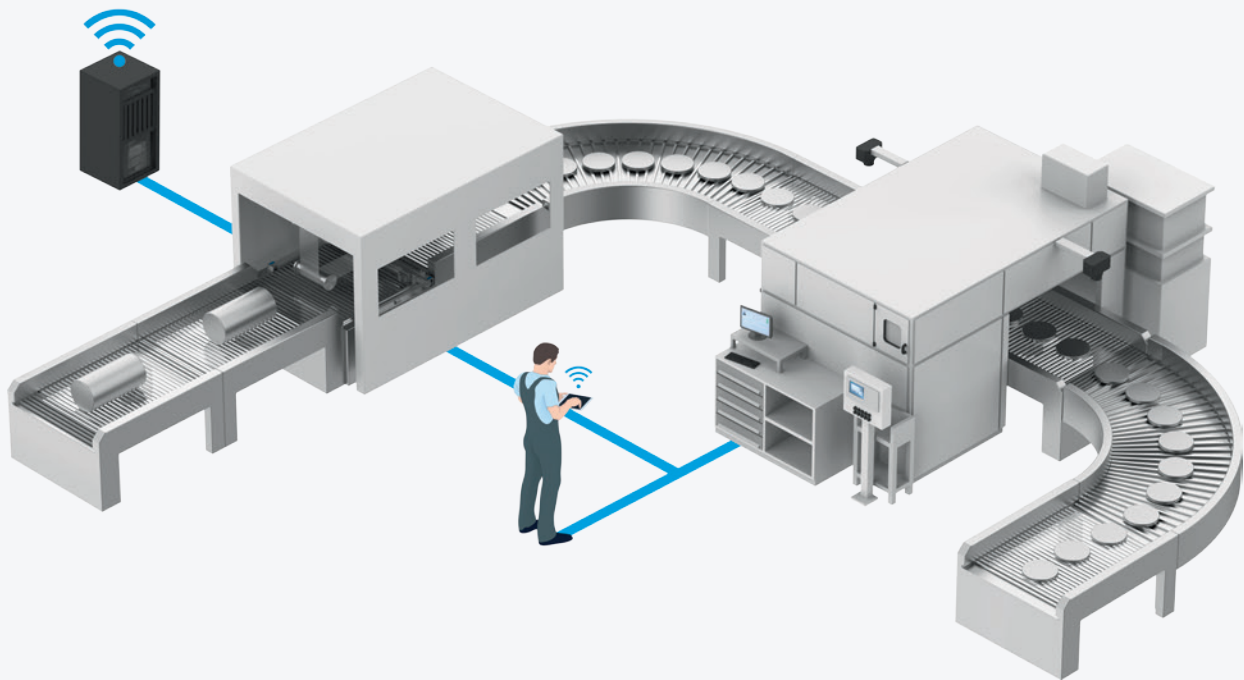
The tasks carried out by the sensor solutions range from measuring different temperatures at sensitive components to vibration at the fixed and floating bearings. At the same time, they track the outcomes of the quality inspections so that a clear link can be shown between decreasing quality and the measured production data. Having the ability to trace error patterns back to specific sensors in order to define concrete recommendations for action to avoid rejects helps to achieve five-figure cost savings. This is equivalent to losing one whole ingot. Without preventative measures, this happens around once a month in each system.



01: Sensors continuously monitor the wire saws within the module. Appropriate measures can be taken as soon as the algorithm discovers deviations.

02: Artificial intelligence monitors the sawing operation. This avoids rejects and achieves consistently high quality. The savings are up to 100,000 euros a year.

02

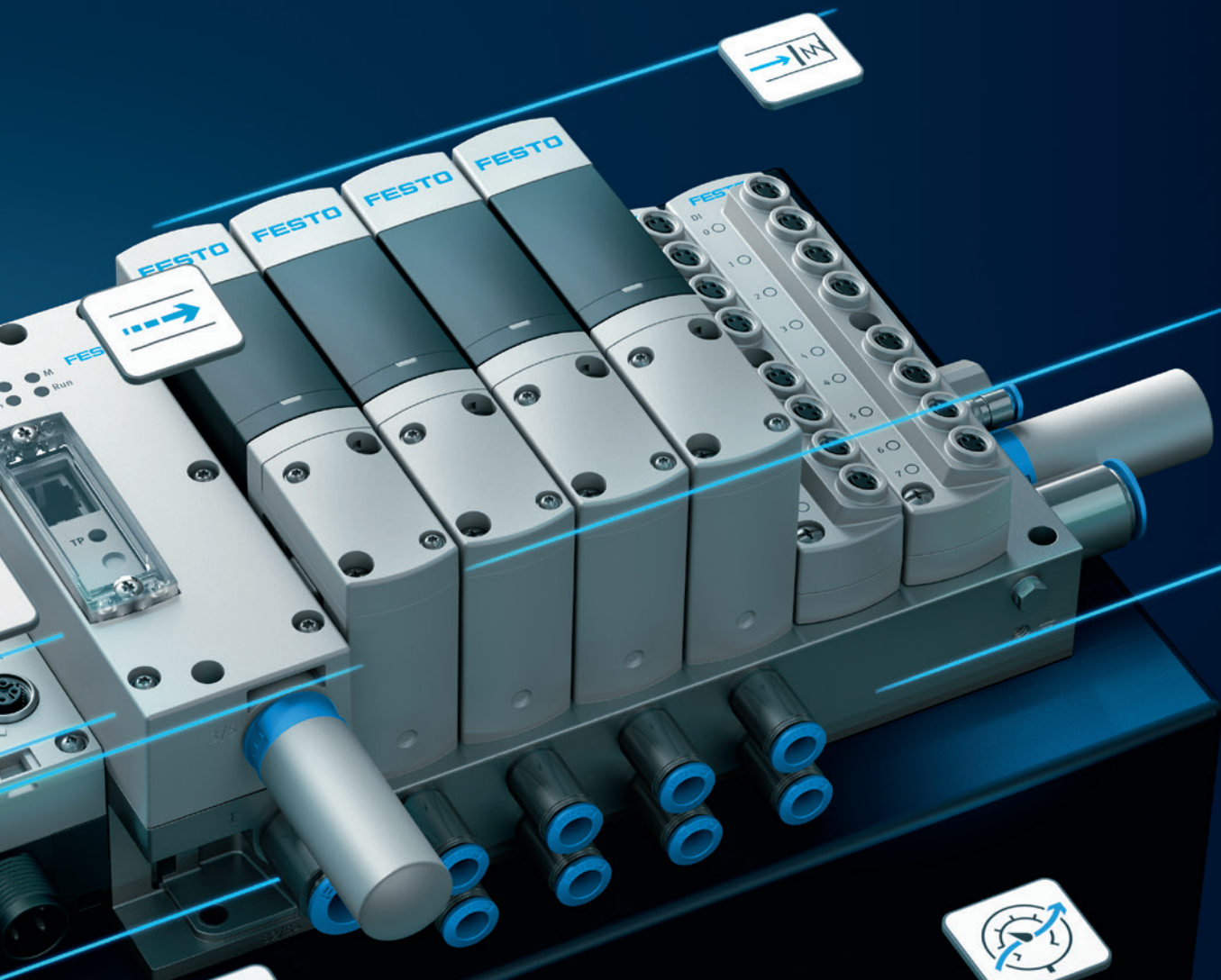


Digitised pneumatics!

Less hardware, more functions



The Festo Motion Terminal really demonstrates its digital strengths in pneumatic regulation of motion, pressure and flow rate. Pneumatics controlled via apps, a valve design with many more degrees of actuation freedom and the integrated data acquisition and data processing make pneumatics fit for the future, especially for Industry 4.0. The benefits of this digitalisation can be found in all stages of the value chain, both for OEMs as well as for end users.



App
World

Control several flow rates with one piece of hardware!

Fast, reliable, economical

Leakage diagnostics

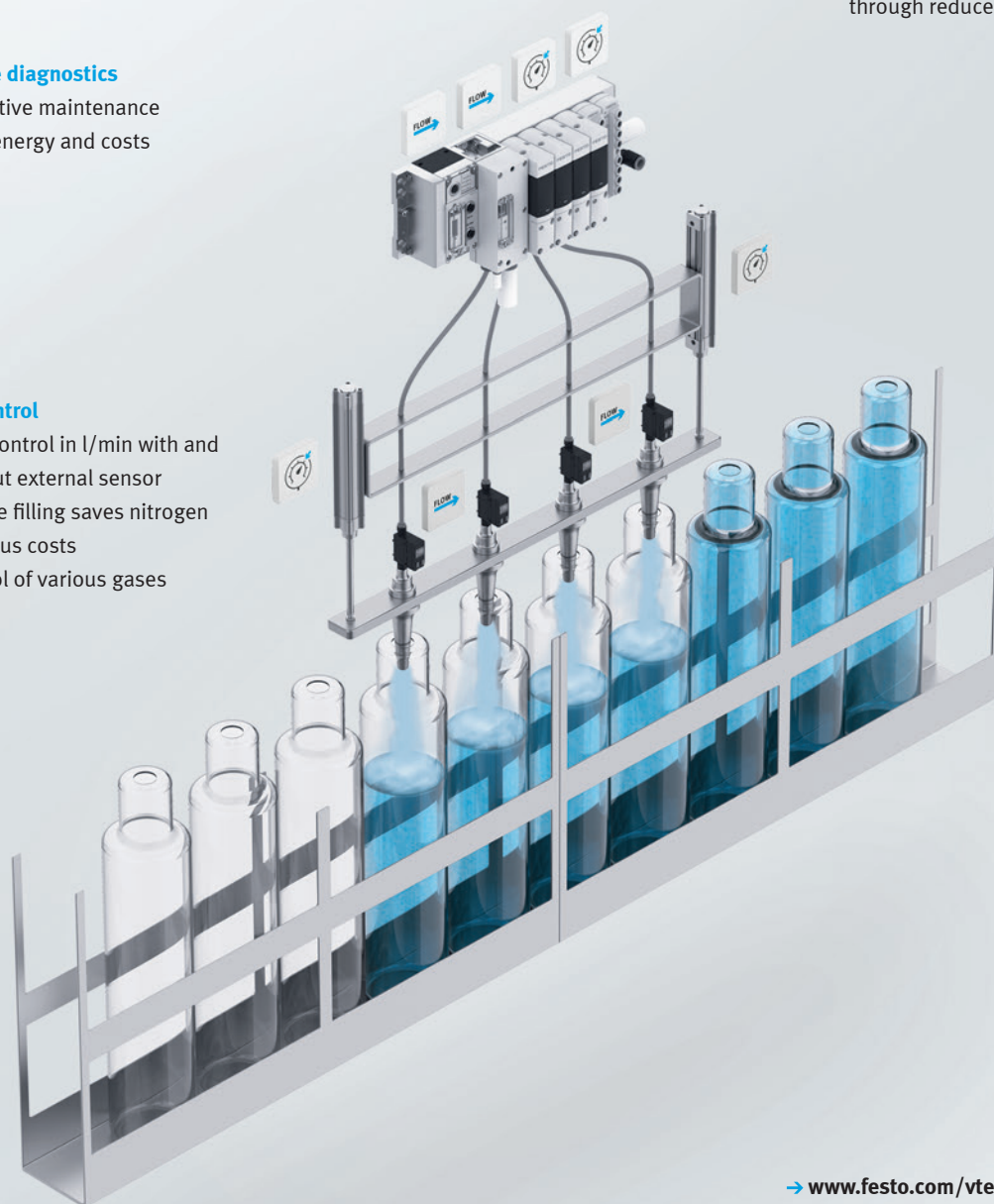
- Predictive maintenance
- Save energy and costs

Flow control

- Flow control in l/min with and without external sensor
- Precise filling saves nitrogen and thus costs
- Control of various gases

Selectable pressure level

- Shorter cycle times thanks to flexible parameterisation
- Fast travel to the working area
- Energy-saving motion through reduced pressure



The Motion Terminal makes filling containers such as bottles with nitrogen or other gases more economical. This is all down to the app “Flow control”. It controls up to 8 channels simultaneously. Thanks to precise dosing, you also save a significant amount of nitrogen. This highly flexible, digitised nitrogen control is tamper-proof. At the same time, the app “Selectable pressure level” even shortens cycle times.

Nowadays containers for products are often rinsed and filled using gases. The VTEM can be used with various gases. The flow in litres per minute is controlled using the app “Flow control”, which enables the gas to be dosed extremely precisely. The more precisely the filling quantity is defined, the more accurate the filling will be since the percentage deviation from the target quantity can be optimally detected. The fill levels are monitored by external sensors. When you want to measure the flow rate with even greater accuracy, you can use an additional external sensor. The measurement data is evaluated directly in the Motion App.

The app “Selectable pressure level” moves the filling nozzles to the bottles quickly and accurately, and the flexible parameterisation shortens the cycle times. After filling, the filling nozzles are retracted with reduced pressure to save energy.

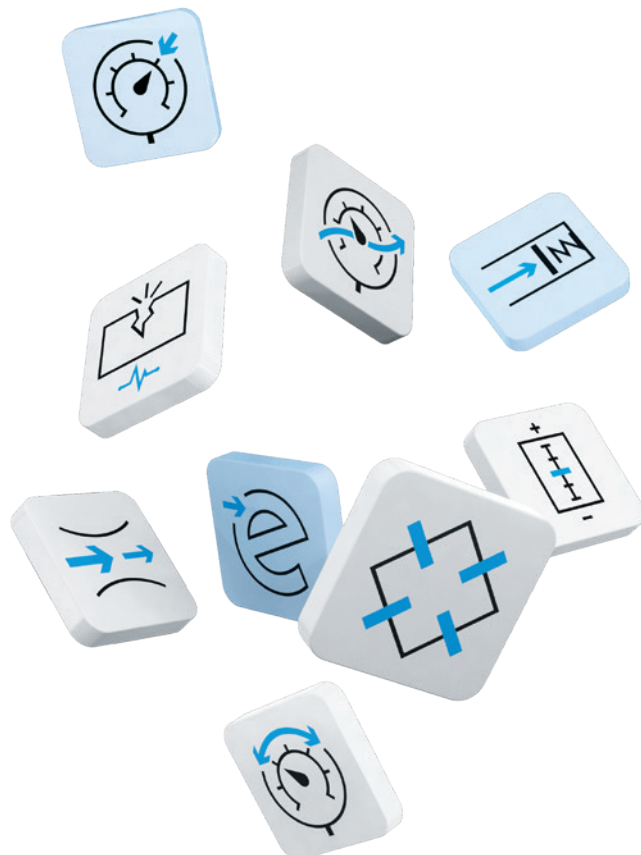


NEW: App “Flow control”

Control the flow rate of compressed air and gases in the range up to 600 l/min digitally – simultaneously on several independent channels. Simply combine the integrated sensors with external flow sensors to ensure precise dosing. This saves energy and costly gases.

Take advantage of the demo licence

If you choose to purchase a Festo Motion Terminal, you will receive a 30-day demo licence free of charge. This can be used to try out additional Motion Apps, from “Directional control valve functions” to “ECO drive”.



Slurry is the new gold

Farmers now produce their own fertilisers

N2 Applied, a Norwegian tech company, is bringing the production of fertiliser back to the farmyard. The engineers have developed a pioneering system that stops emissions from slurry and converts them into a very efficient liquid fertiliser. This is done by adding nitrogen from the air. The Festo Motion Terminal VTEM ensures the nitrogen is precisely dosed.

No more ammonia emissions

N2 Applied's system needs three ingredients to produce a nitrogen-enriched organic fertiliser (NEO): livestock slurry, air and electricity to operate the system. The technological heart of the system is a plasma reactor. The jet separates the nitric oxide (NO) in the air into nitrogen (N) and oxygen (O). At 78%, nitrogen is the main constituent of our air. The livestock slurry is then enriched with the optimum amount of nitrogen, which stops the volatilisation of ammonia (NH₃). It is then available as a valuable nutrient for agricultural crops. Treating the slurry using the N2 system increases the fertilising effect, stops the environmentally harmful emissions and also means that the farmer no longer has to purchase chemical fertilisers.

Responsible for optimum dosing: the VTEM

It took three attempts to find the technology behind the stable infusion process: digitised pneumatics with the Motion Terminal VTEM controls the process in real time.

For an optimum yield, the infusion process needs to be really precise. The Motion App "Flow control" controls the addition of the nitrogen to the mixture extremely precisely by continuously comparing the target/actual value and making the necessary adjustments. Good for the farmer: there is no need for additional settings or readjustments of the Motion App as would be necessary with conventional proportional solutions. The intuitive operation makes it easy to implement the correct settings during commissioning.

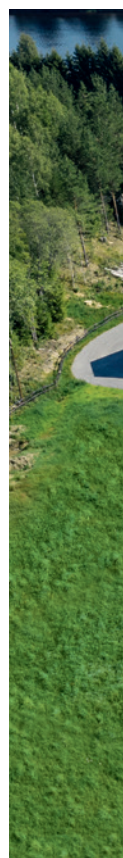


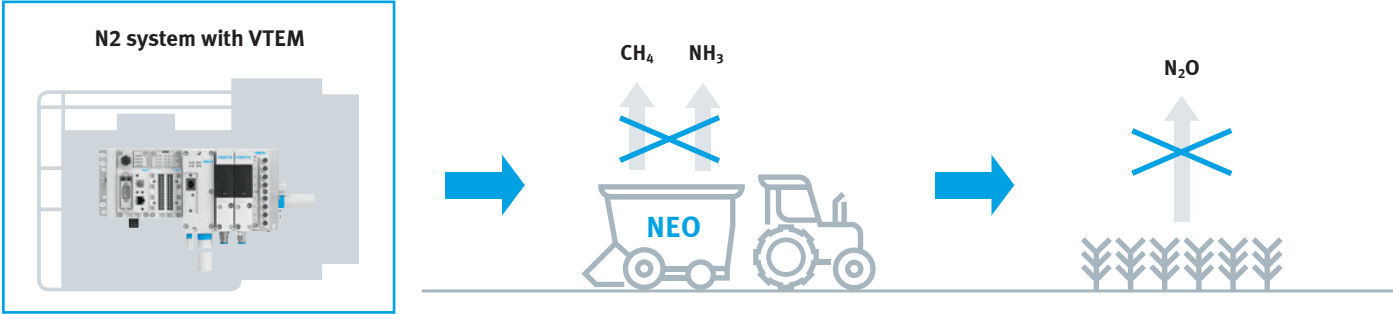
The farmer is not the only one to benefit, the environment does too

The benefits of the modular and scalable system are obvious: the farmers make better use of their local resources and at the same time are spared the cost of artificial fertilisers produced from fossil materials. The organic fertiliser increases crop yields while significantly reducing ammonia and greenhouse gas emissions. This sustainable cycle ensures the future viability of agriculture for farmers.

"Thanks to the excellent cooperation with Festo, we've found a superb pneumatic platform in the VTEM that is both affordable and can be developed further."

Lars Krogstad Lien, Product Engineer at N2 Applied





Slurry can now be converted into valuable NEO organic fertiliser directly on the farm with the N2 system. The Motion Terminal VTEM adds the perfect amount of nitrogen.



Groundbreaking innovations are put through their paces at the N2 Applied Test Centre.

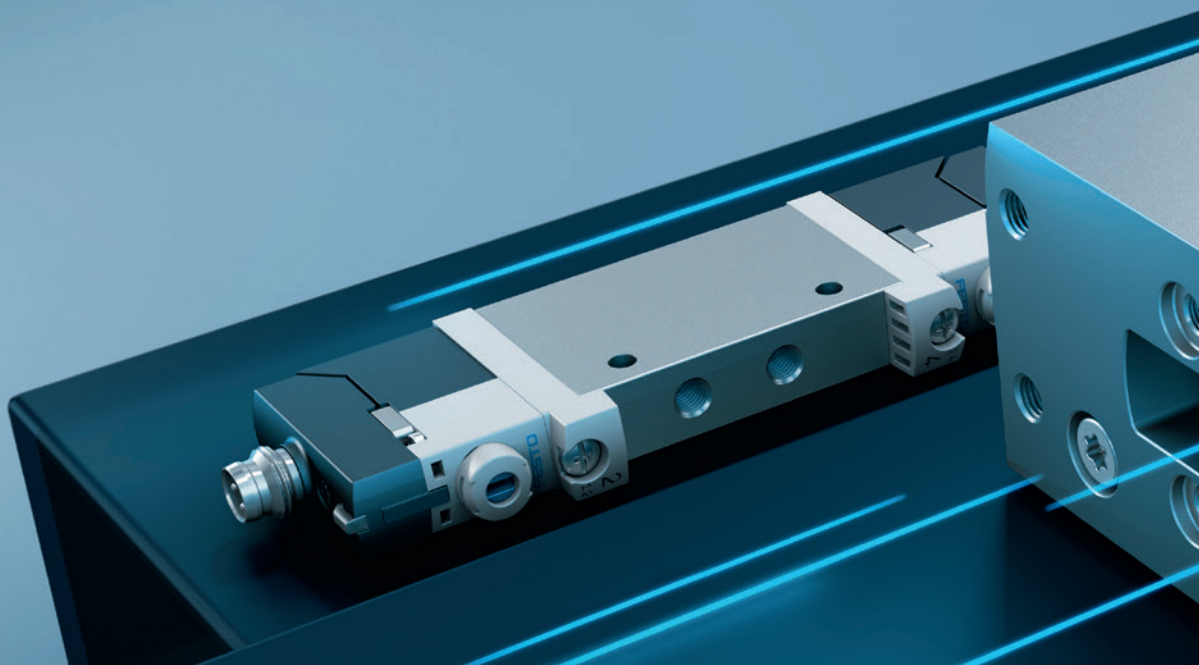
Simply part of the solution

The Festo ★ Core Range

Rethinking the obvious – that was our goal when our engineers put the Core Range under the microscope one more time. We wanted to incorporate products from process automation, from the electric and pneumatic control chain, in each case below the control level, into the Core Range.

The end result is a selection from our portfolio that offers the best value for money for every function with the expected high quality. And where the experts spot that the value for money could be even better, they set to work again to make these products even more economical, even more well-engineered and even more efficient.

You too can benefit from our Core Range.



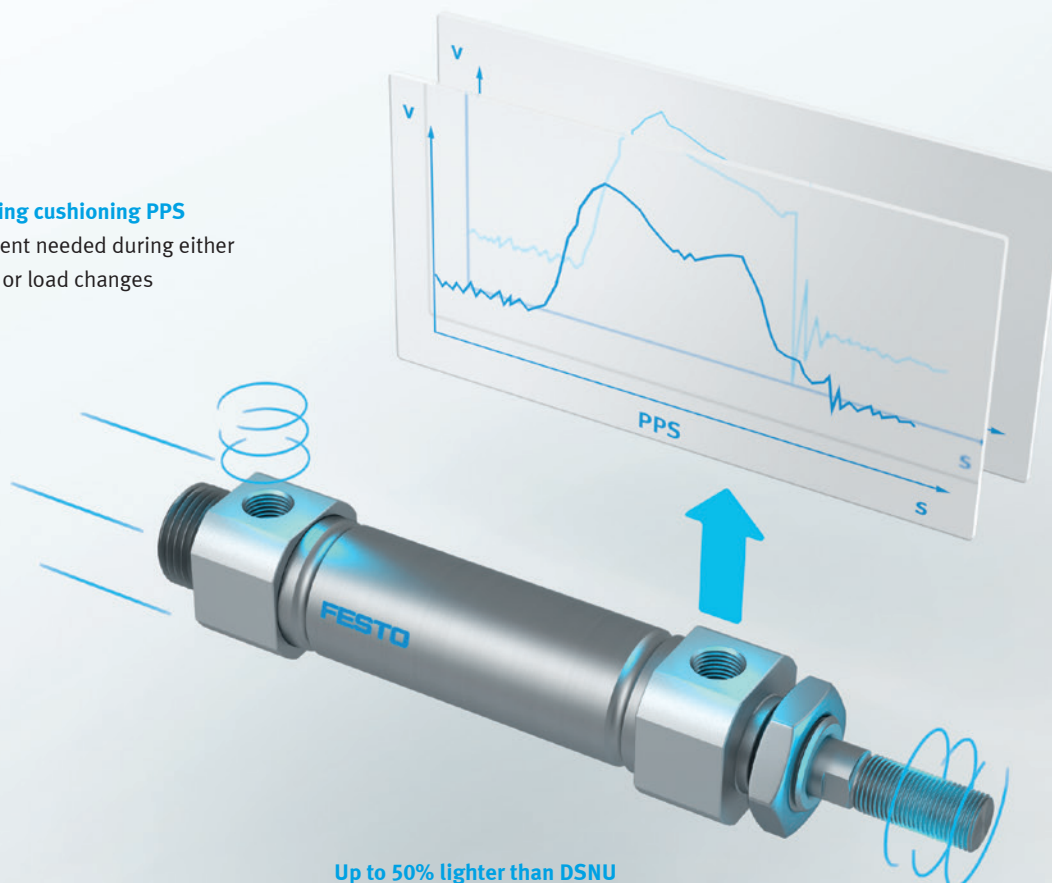


Reduced size and weight, improved operation ...

Maximum functionality and consistent design go hand in hand with affordability

Self-adjusting cushioning PPS

No adjustment needed during either installation or load changes



Up to 50% lighter than DSNU

Up to 35 mm shorter and up to 40% slimmer

Round cylinder DSNU, new and improved

Streamlined, straightened spanner flats, injection-moulded polymer bearing – the upgrades to the DSNU are obvious to see. Overall, the round ISO cylinder is now clearly much more streamlined and user-friendly.

- Space-saving
- Time-saving installation with PPS self-adjusting cushioning
- Easy identification and reordering with the Festo Product Key

→ www.festo.com/dsnu

Our Core Range is perfect whenever you need high-level functionality in the expected Festo quality at a low price.

The 2,200 products solve the majority of your automation tasks and are generally ready to be shipped in 24 hours, even if you need large quantities.



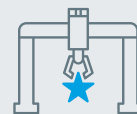
Quickest delivery,
worldwide – wherever,
whenever



Easy selection



Best value for money



Solves the majority
of your automation
tasks



Powerful duo: mini slide DGST

The smallest mini slide on the market now also comes in a version with a symmetrical longitudinal axis. Both DGST move very closely to each other without the compressed air supply getting in the way.

- Compact and highly precise
- Power with a high packing density

→ www.festo.com/dgst



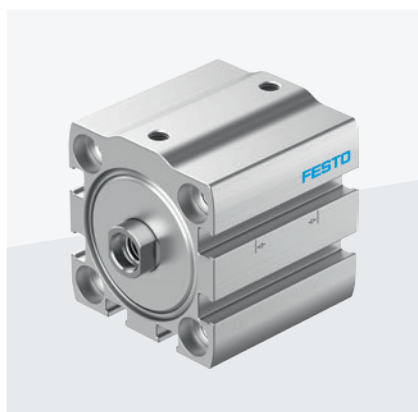
Simply copy the values:

pressure sensors SPAN ★ and SPAN-B

With the baby brother of the SPAN from the Core Range, you transfer the parameter records to many other identically designed sensors via the master device. The copy and paste feature saves a huge amount of time, as do the intuitive operation, high-contrast display and freely selectable pressure units.

- Excellent value for money
- Compact housing 30 x 30 mm
- Electrical compatibility with all controllers
- Choice of pressure units in bar, kPa, MPa, psi, mmHg and inchHg

→ www.festo.com/span



Now also in new sizes:

compact cylinder ADN-S

Even more precision, more space and weight savings thanks to a smaller housing made from one piece. Ideal for extremely tight spaces. Includes sensor markings and various slots.

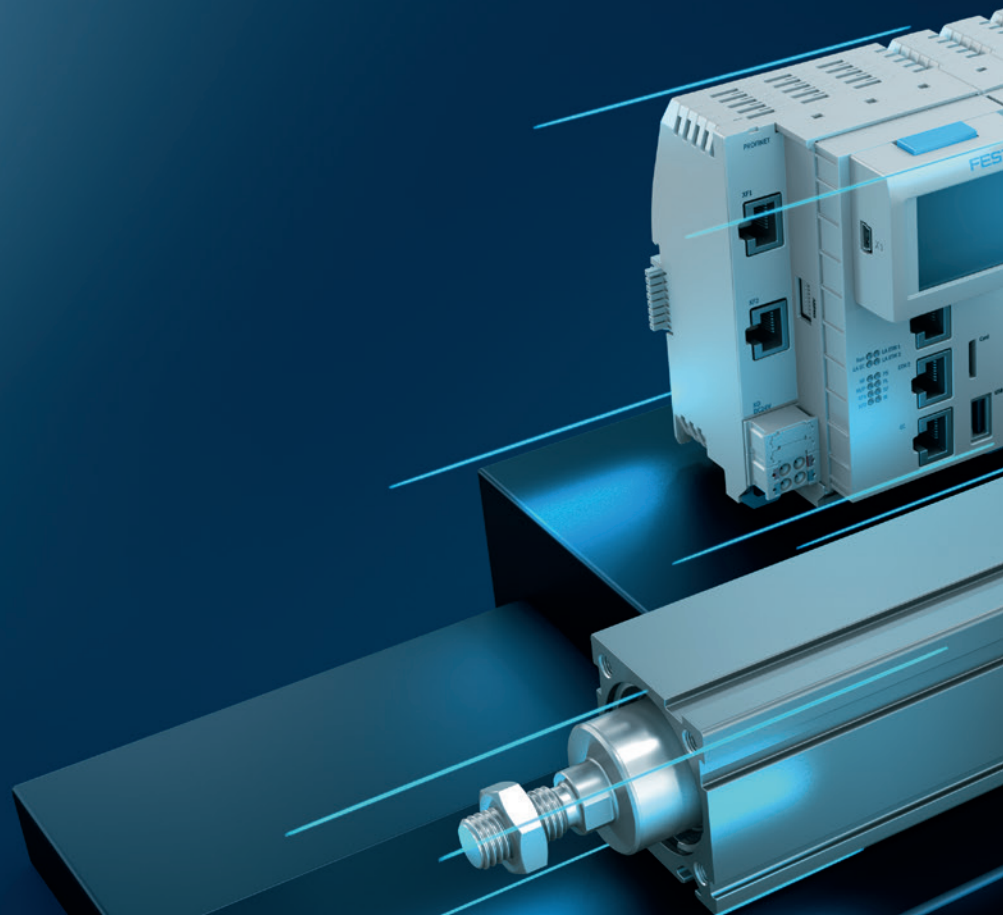
- Now also in sizes 12 ... 63 mm
- Copper-free variants available
- Fast delivery, even in large quantities

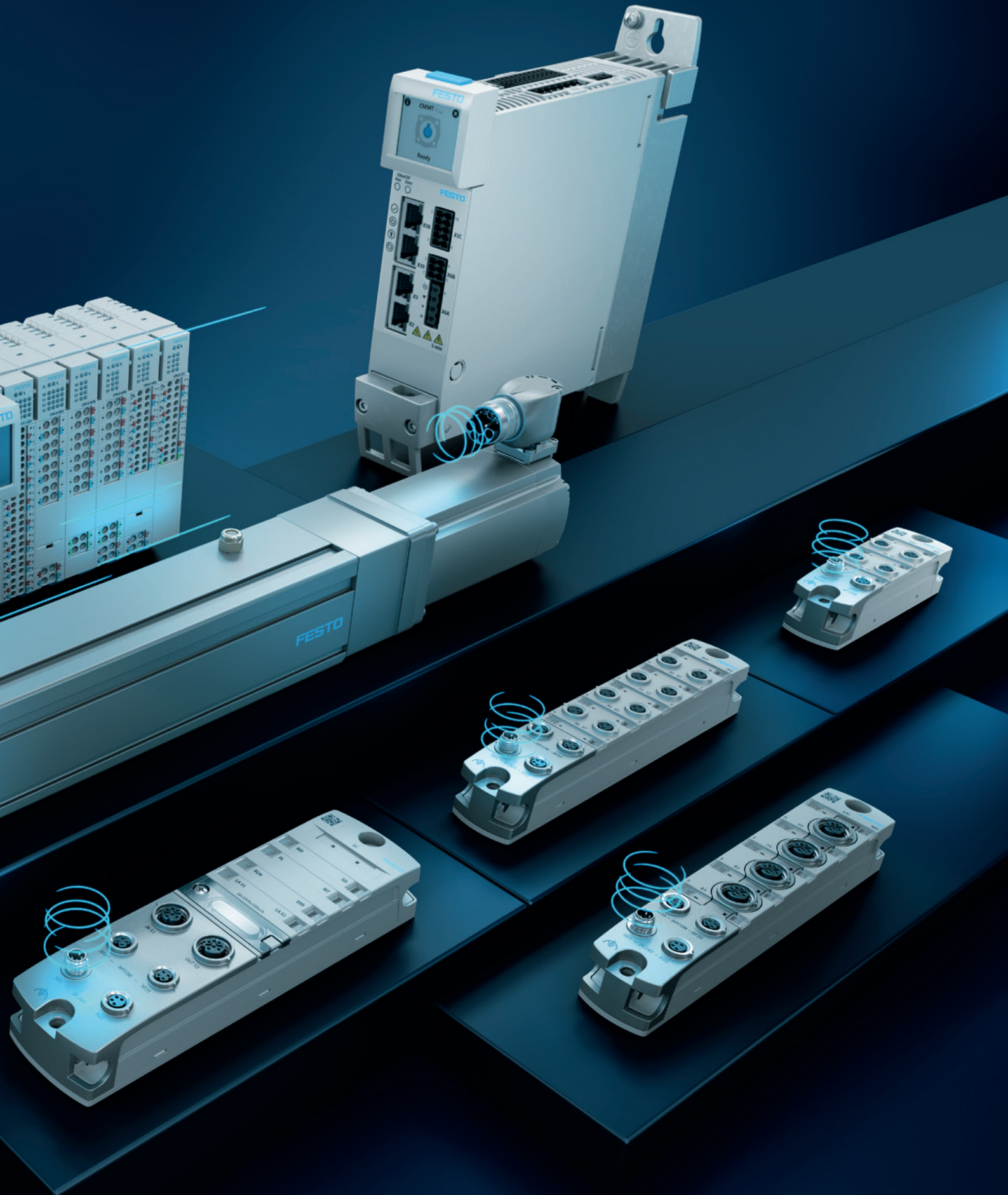
→ www.festo.com/adn-s

Seamless connectivity – from the workpiece to the cloud

All-round and perfectly coordinated
electric automation

The electric automation offer has greater breadth and variety than ever before. Horizontally, it ranges from cost-effective and simple movement between two end positions using the Simplified Motion Series to highly complex and flexible servo drive solutions with synchronised movements over many axes or dynamic Cartesian robots. Vertically, this portfolio offers outstanding and unparalleled seamless connectivity: mechanical, electrical and intelligent. From the shop floor to the master controller, everything fits together. State-of-the-art communication and control concepts can be realised with innovative servo drive technology and direct integration into networks as well as with clever software solutions. Discover the astonishing variety of electric automation at Festo!





Servo drives and motors. Perfectly integrated!

Complete drive system consisting of a servo drive and servo motor
with seamless connectivity of the hardware and software

Flexible communication

and direct integration into
Ethernet-based host systems

Quick commissioning

via Festo Automation Suite

Space-saving one-cable solution

for encoder signal and
load current

Can be connected in series

for low and extra-
low voltage

We help you to connect your automation components and modules so that they interact perfectly at all times, mechanically, electrically and intelligently.

Mechanical connectivity

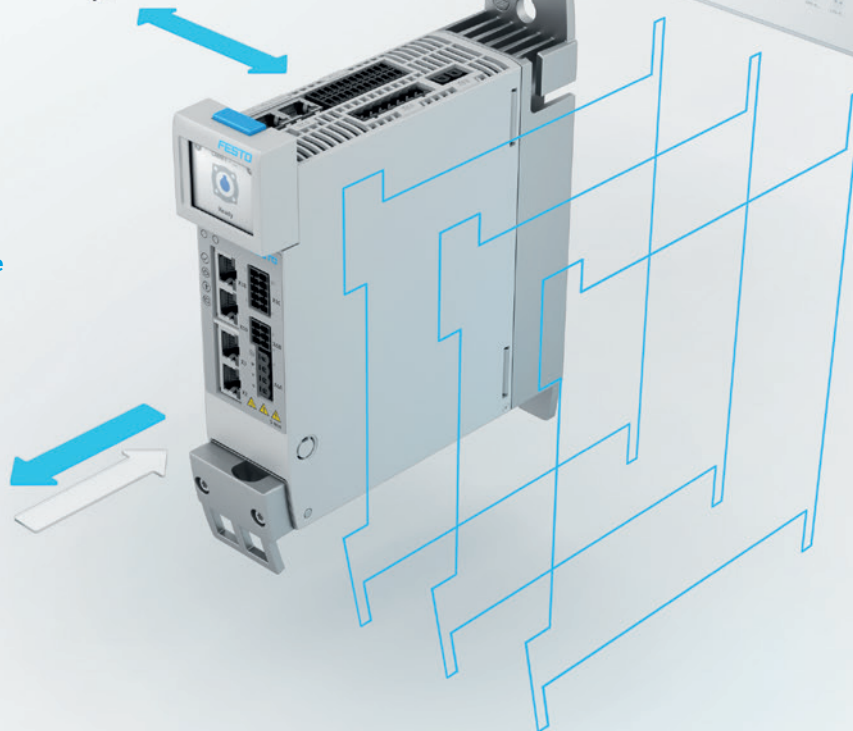
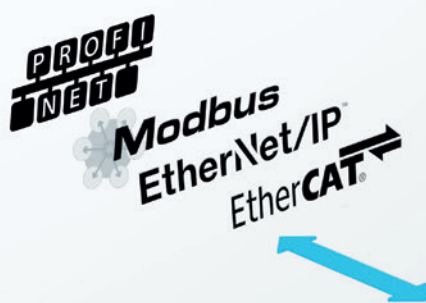
The extensive portfolio of mechanical linear axes and rotary modules offers you almost infinite variety for automating motion, compatible with your in-house standard.

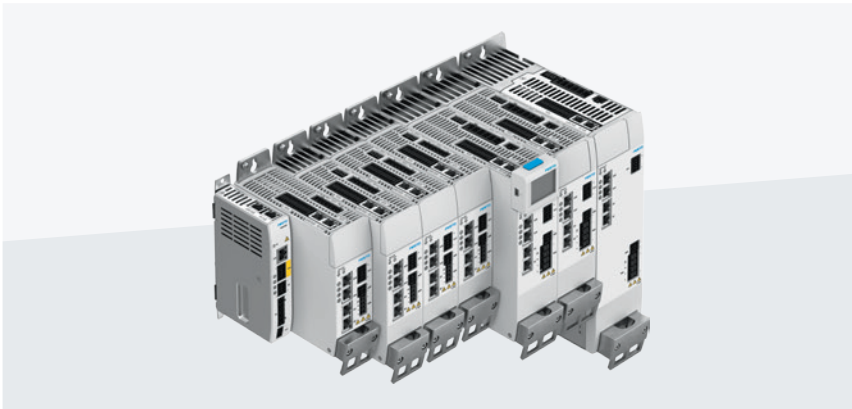
Electrical connectivity

Our range of servo motors and servo drives is the ideal link between your mechanical system and your control technology.

Intelligent connectivity

The decentralised control of individual process modules, the free and flexible communication with other control devices and the integrated motion control solutions from Festo enable a wide range of solutions for industrial automation tasks.





For high performance and unbeatable efficiency: servo drives CMMT-AS and CMMT-ST combined

A common platform concept makes low-voltage controllers and extra-low-voltage controllers the perfect combination. When sized and operated correctly, the CMMT-ST covers the power spectrum up to 300 W and the CMMT-AS between 350 W and 6 kW (in future 12 kW). They can be seamlessly integrated into the system environment of many controller manufacturers, are easy and convenient to engineer and operate, and require minimum space in the control cabinet.

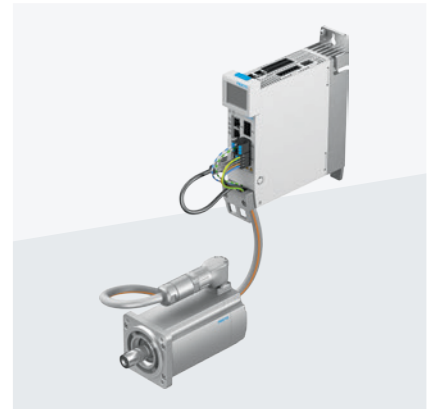
CMMT-AS with increased performance capabilities

The servo drive CMMT-AS comes in several sizes and seven performance classes.

NEW: 4 and 6 kW variants

CMMT-ST even more compact and affordable

The servo drive CMMT-ST is an inexpensive alternative for positioning tasks and movements with power requirements of up to 300 W.



Servo drive CMMT-AS and servo motor EMMT-AS: one of the most compact servo drive solutions on the market

The price- and size-optimised servo drive CMMT-AS for point-to-point and interpolating motion can be directly integrated into Ethernet-based bus systems from a wide range of manufacturers. It can be commissioned with the servo motor EMMT-AS in just a few minutes without any controller-specific expertise using the Festo Automation Suite. Its extremely low cogging torque ensures good control and path accuracy for positioning tasks, while the one-cable solution enables easy and space-saving installation.

→ www.festo.com/cmmt



Servo motor EMMB-AS for highly economical positioning

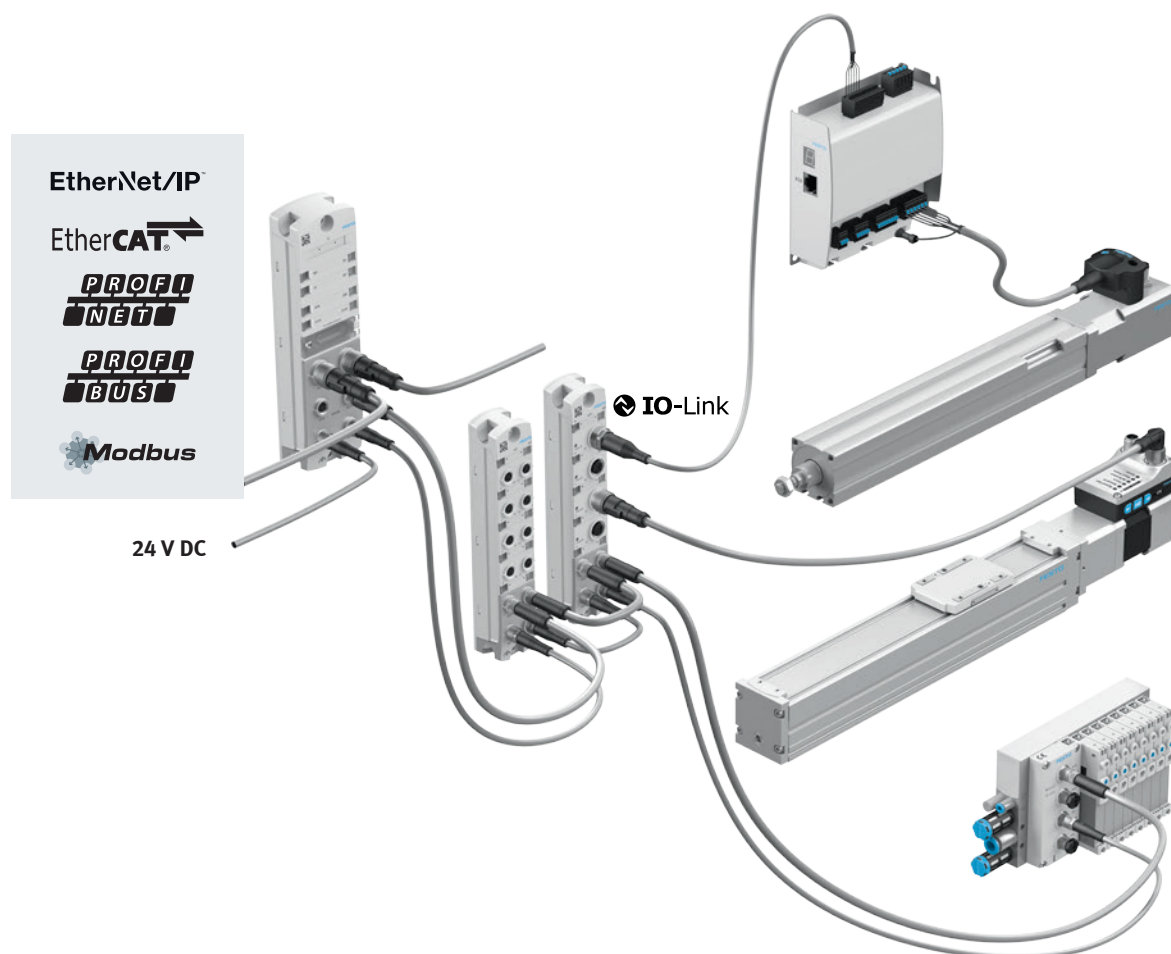
This compact and particularly economical synchronous servo motor in four power classes is perfect for simple positioning tasks, particularly in the electronics industry and small parts assembly as well as in test stations.

- Single-turn encoder
- **NEW:** Multi-turn encoder with battery adapter
- Degree of protection:
 - IP65 for motor housing and cable connections
 - IP50 on the motor shaft without and IP54 with shaft seal ring
- Compatible with shafts and flanges on the EMMT-AS

→ www.festo.com/emmb

Fast, flexible and decentralised. Remote I/O system CPX-AP-I

The I/O system in IP65/IP67 enables powerful input/output modules and existing valve terminals to be seamlessly integrated in the most important host systems



Faster than Ethernet networks: remote I/O system CPX-AP-I

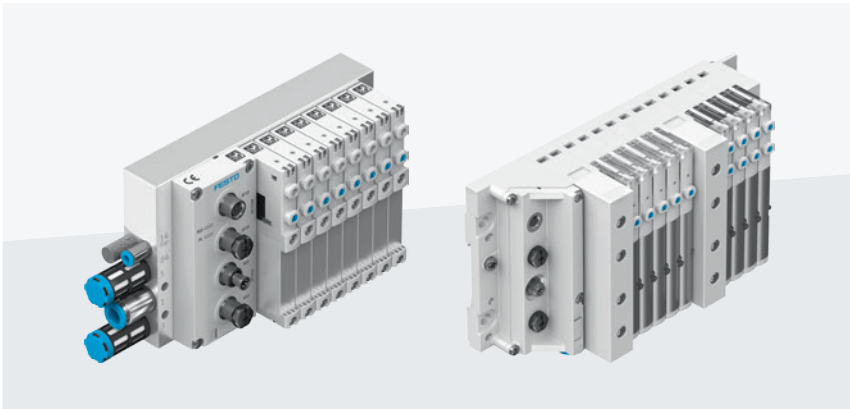
Equipped with up to 80 modules, CPX-AP-I can be flexibly integrated into applications of any size. With its real-time capability and short bus cycles, it is particularly suitable for fast production processes and high-speed data transfers. Finally, its transmission speed of 200 Mbit full duplex is twice that of current Ethernet-based networks. Robust yet compact and ultra-lightweight,

the system can also be used in tight installation spaces such as in handling and tool changing systems or mobile applications. And if large distances are required in plants or intralogistics, the remote I/O system enables cable lengths of up to 50 m between the individual modules.

CPX-AP-I modules

- Bus interfaces for Ethernet-based bus systems
- Digital I/O modules with eight inputs or with four inputs and four outputs
- Analogue 4x input module
- IO-Link master (for four devices)

→ www.festo.com/cpx-api



Valve terminals directly integrated into the CPX-AP-I system

The AP system communication, included in all future valve terminals from Festo, makes it easy to incorporate these valve terminals into your application. Right now, existing valve terminal series like VTUG or MPA-L can already be easily integrated directly into the system via their AP interface.

Electrical interface (AP interface):

- Synchronous real-time connection to the controller
- Temperature and load voltage monitoring
- Error state parameterisation and short circuit shutdown
- Separate load voltage supply for connected valves, can be shut down separately



NEW: Even faster and more space-saving installation

New, angled cables for AP communication and power supply have been developed for improved installation of the CPX-AP-I modules, even when space is tight. They optimise the layout and simplify maintenance. The top priority is the appropriate, flexible installation and positioning in the application, whether in a machine or a control cabinet!

NEW: Even faster and easier configuration

The parameter and master port settings can be conveniently carried out via the software's graphic interface with the help of the Festo IO-Link tool.

What's more, the IO device descriptions of connected IO-Link devices are automatically loaded from the IODDfinder portal so parameterisation can take place with just a few clicks.



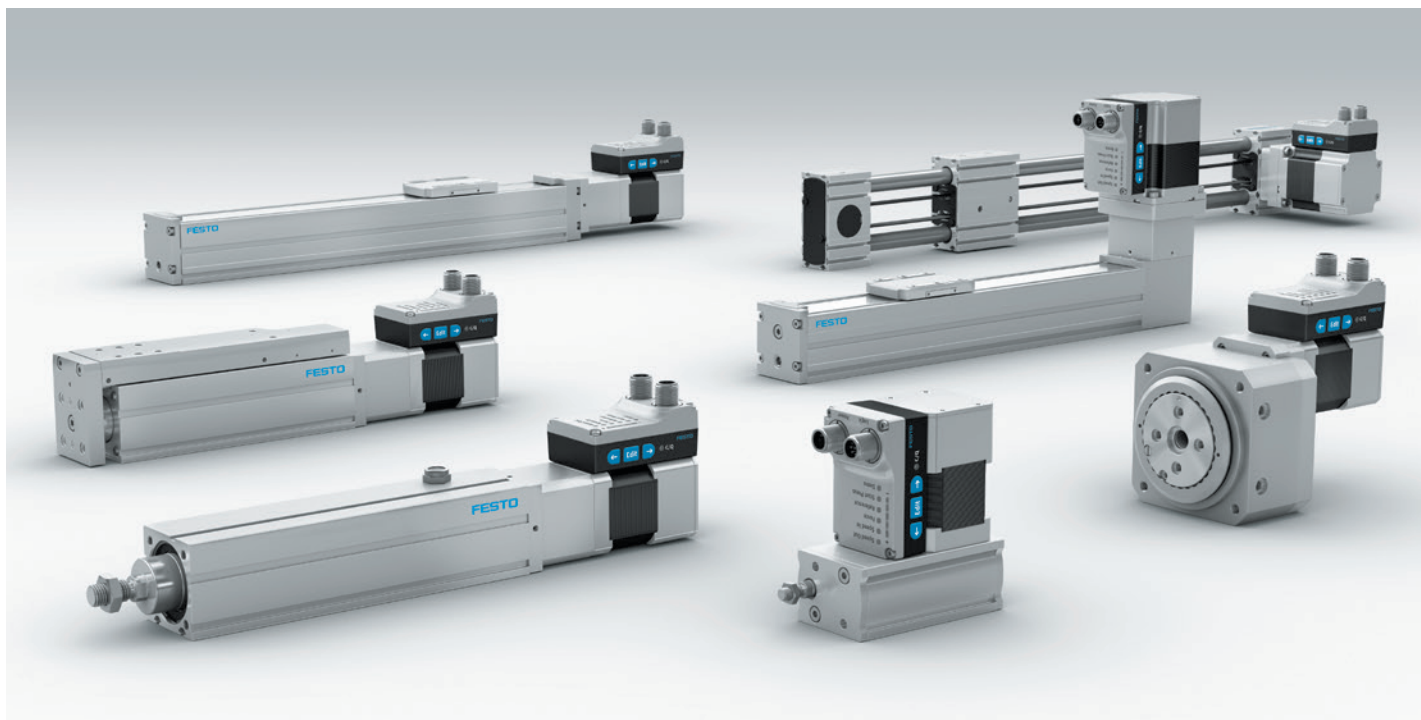
Seamless connectivity with IO-Link

CPX-AP-I enables electric and pneumatic components to be connected to form an integrated network. The IO-Link master is connected to the bus interface via the AP protocol for this. This enables seamless digitalisation down to the drives and sensors at the field level.

Right now up to 316 IO-Link devices per bus interface can already be realised, to be extended in the future to as many as 1024, and valve terminals are either integrated directly into the AP system communication or into the network via IO-Link.

A simple concept. A big impact. The Simplified Motion Series

The simplicity of pneumatics with the advantages of electrics for cost-effective movement from end position to end position!



Our experts aim to bring simplicity to electric drive technology by making it easy to connect and operate the integrated drive and ensuring it can be commissioned without the use of software. And you can still count on state-of-the-art technology. Digital I/O (DIO) and IO-Link are therefore integrated as standard.

The drives of the Simplified Motion Series combine the simplicity of pneumatics with the advantages of electric automation and are ideal for simple movements between two mechanical end positions. Operation without any software in accordance with the plug and work principle via digital I/O (DIO) includes all basic functionalities of adjusting speed and force for press-fitting/clamping and selecting the reference end position and cushioning path. Extended functions are possible via IO-Link.

Additional features:

- Integrated products can be used without a control cabinet
- Quick and easy commissioning without software
- No special expertise required for commissioning

→ www.festo.com/sms

NEW: Electric cylinder unit EPCE for extremely short strokes from 5 mm

The space-saving electric cylinder EPCE is optimised for speed and is thus ideal for the requirements of testing and inspection systems, for labelling, for simple centring tasks and for aligning workpieces. It can also be used as a low-cost alternative to pneumatic solutions.

- Innovative toothed belt/cylinder concept
- Wide range of variants
- Stroke 5 ... 80 mm in 5 mm increments
- Actuation and communication via digital I/O (DIO) and IO-Link
- Maximum component density

→ www.festo.com/epce



Simplified Motion Series basic functions

- Speed for "out" and "in" movement
- Force of the drive in the "out" position
- Setting the reference end position
- Setting the position "Start force-controlled movement"
- Manually starting the "demo"

Extended functions via IO-Link

IO-Link makes the Simplified Motion Series even more flexible. All motion parameters can be set remotely, copied to other drives and saved as a backup. Parameters such as distance covered and number of movements can be read out and transferred to the cloud or used for preventive maintenance.

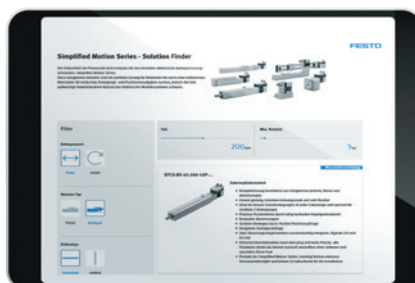
NEW: Intermediate position

With the intermediate position that can be freely configured via IO-Link, movements can be stopped at a freely defined point between the end positions, without the need for external stops.



NEW: Variants with parallel mounting of the integrated drive

- Spindle axis unit ELGS-BS
- Mini slide unit EGSS
- Electric cylinder unit EPCS



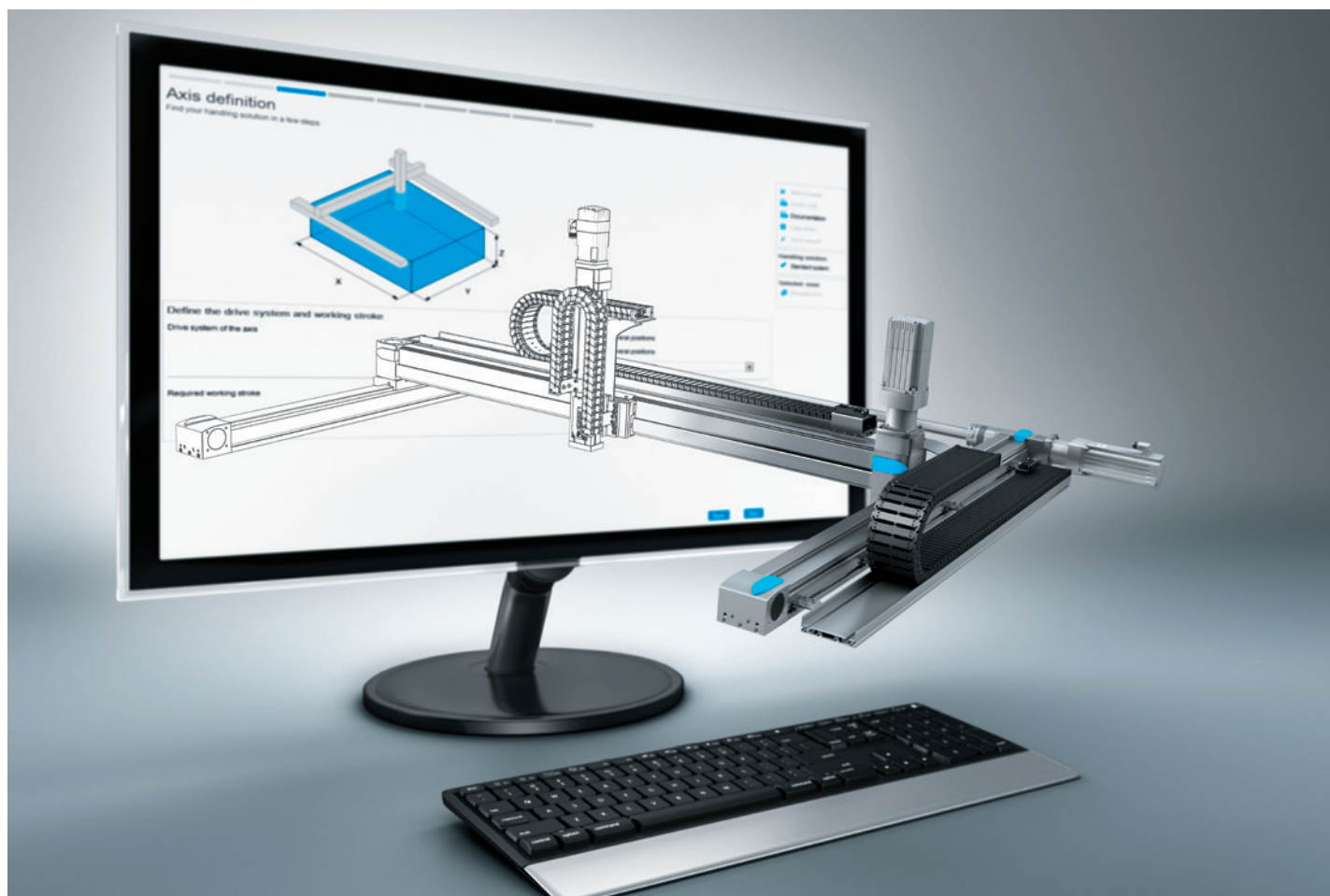
Online selection tool

With the Solution Finder, you can configure the correct product for every simple linear or rotary motion. Just configure the application parameters, select the project and place your order in the Online Shop.

→ www.festo.com/solutionfinder

Configured and ordered in record time. State-of-the-art handling systems

The Handling Guide Online significantly increases your engineering efficiency



It couldn't be easier with the Handling Guide Online

Create your perfectly fitting, economical, dynamic and flexible solution using the extensive range of handling systems and Cartesian robots from Festo. And our ready-to-install systems, software and services reduce engineering time and effort. We support you from the design stage through to installation and commissioning so that you can concentrate entirely on your core business and increase your productivity.

- The right handling system, including CAD model and commissioning file, in 20 minutes
- Intuitive to use, with minimised engineering time and effort
- Planning certainty thanks to immediate display of net prices
- Shorter time-to-market, now even with highly dynamic and compact handling systems

NEW and even more versatile: energy chains made from ESD material

Energy chains can now also be used for handling systems in applications in the electronics industry (ELA) thanks to ESD.

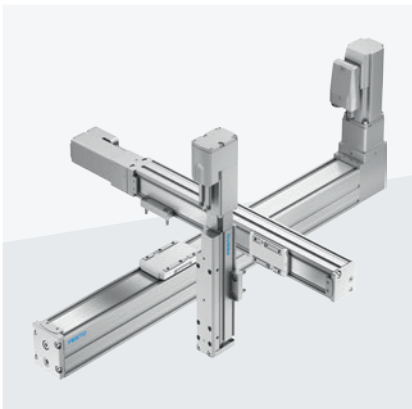
→ www.festo.com/handling-guide



**NEW and perfectly integrated:
servo drive technology for Cartesian
handling systems**

The extremely compact servo drives CMMT-AS and -ST for connection in series as well as the servo motors EMMT and EMMB expand the Handling Guide Online for even greater flexibility, more compact solutions and easier installations as well as the direct integration of 2D and 3D solutions into Ethernet-based host systems.

→ www.festo.com/cmmt



**NEW: Even more compact: handling
systems with ELGC/EGSC**

An optimal installation space to working space ratio is especially important in the electronics industry and in small parts handling. The ELGC and EGSC combine cost-effective positioning and flexibility in design thanks to the scalable modular system and the unique “one-size-down” assembly system.

→ www.festo.com/elgc

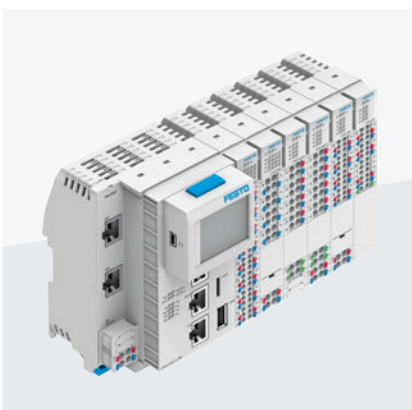
**Always in a class of its own: spindle
and toothed belt axes ELGC**

The ELGC-BS (spindle) and ELGC-TB (toothed belt) with internal recirculating ball bearing guide are protected by a permanent stainless steel cover strip.

**Highly precise pushing, picking and
inserting with the mini slide EGSC**

With integrated and precise linear guide with high load capacity for an extremely compact design, high load bearing and quiet operation.

→ www.festo.com/egsc



**NEW: CPX-E motion with “Motion and
robotics” software licence**

Create handling applications for the CPX-E-CEC-M1 in industrial and process automation quickly and conveniently using two licences available in the Festo AppWorld

→ www.festo.com/appworld

→ www.festo.com/cpx-e

PTP licence

- Point-to-point interpolation
- Actuation of simple kinematic systems
- Simple applications, e.g. pick & place
- Graphical visualisation
- Teach-in function

CART licence

- Cartesian linear and circular interpolation as well as interpolation of orientation
- Actuation of complex kinematic systems
- Complex movements and contour applications

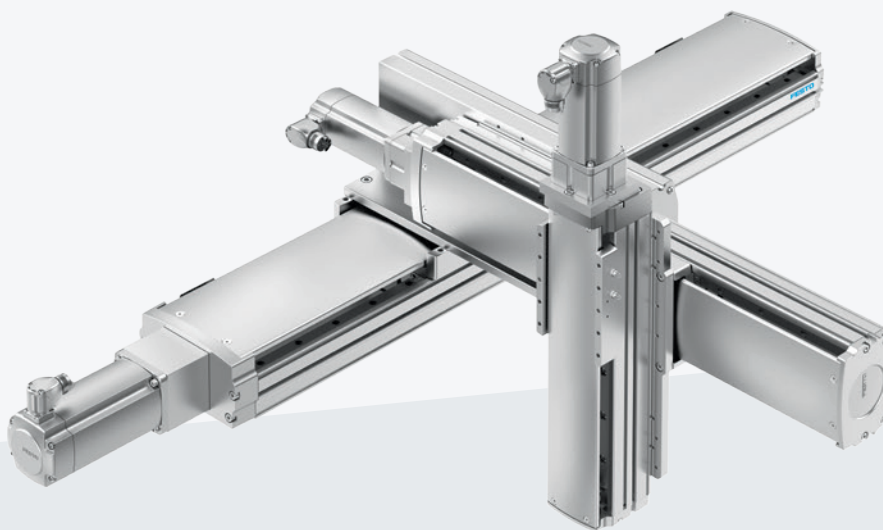
- Graphical visualisation
- Teach-in function

Supported kinematic systems

- Linear gantries
- Planar surface gantries
- Three-dimensional gantries

Unrestricted range of motion, even under harsh conditions

Designed for high payloads and long strokes: electric axes ELGx



Tried-and-tested time and again: spindle axis ELGT

The compact and low-cost spindle axes ELGT with integrated double guide are perfect for combining into 2D and 3D cantilever systems. The spindle axes ELGC-BS or mini slides EGSC can be combined directly with ELGT as an alternative Z-axis. Developed for applications in the electronics industry, for desktop applications or battery production (e.g. Li-ion batteries), they are also ideal for use in testing and inspection systems, in small parts handling and in assembly lines.

- High load-bearing capacity and rigidity with compact dimensions
- Powerful 3D cantilever system with e.g. 20 kg at 0.5 m/s
- Extremely sturdy connectors for high payloads and strokes up to 1400 mm
- Material with reduced copper, zinc and nickel content for use in battery production
- Flexible, simple and customer-friendly mounting options



Withstands cooling lubricants and chips: electric toothed belt axis ELGW

The ELGW's internal polyurethane toothed belt and the recirculating ball bearing guide, which is installed facing downwards, are securely protected against chips. This also goes for the roller carriages that can be connected to a lubrication system, with integrated or optionally with additional wiper seals. Smooth surfaces as well as service and drainage openings in both end caps and the drip edge of the axis provide further protection.

- Attachment of high loads of up to 410 kg
- Long strokes from 50 ... 5700 mm with two slides and 50 ... 5300 mm with three slides
- Maximum feed force F_x 2500 N
- Maximum acceleration 6 m/s^2

→ www.festo.com/machinetools



Parameterising the air gap sensors SOPA with IO-Link

In the IO-Link variant of SOPA, teach points can be parameterised directly on the device via the machine's control panel or via the PLC. What's more, by automatically parameterising the switching points, the switching distance suitable for changing workpieces can be stored in the PLC routine once the correct setpoint value has been uploaded via IO-Link.

- Lightweight and compact product
- Switching points can be changed via the PLC while the machine is running
- Remote parameterisation possible
 - All parameters are automatically loaded when the sensor is changed
- New, easier-to-use buttons with simple parameter configuration via teach-in or with numeric settings (three-button operation)
- Blow-out and sensing function to remove dirt and cooling liquid from the nozzles

→ www.festo.com/sopa

A new part every 2.5 seconds

Primon Automazioni relies on Festo expertise

Many system integrators are asking themselves whether they should be using electric drive technology instead of traditional pneumatic drives. This is a strategy the Italian company Primon Automazioni has been following for many years. In doing so, Primon has gained valuable experience in terms of reliability, flexibility and modularity. The most recent example is the new production line for assembling hydraulic connectors for automotive applications.

The company, which is based in Verbania, northern Italy, was established in the 1970s and specialises in developing machines that are tailored to customer needs: synchronous and asynchronous pallet transfer lines, rotary tables, test islands for leak testing as well as robotic assembly and testing stations.

Greatly accelerated cycle times

The Italian machine builder's latest system development is a completely autonomous assembly line for hydraulic connectors for automotive applications. It consists of several fully automatic assembly stations featuring electric axes, brushless motors and servo drives from Festo and can produce a part every 2.5 seconds.

The machine stores the programs for all 30 possible connector configurations in its memory so the production line can automatically configure itself, based on the workpiece that's been loaded, by adjusting the working strokes of all axes. This high flexibility is all thanks to the in-house developed software that also ensures the machine is easy to operate for the customer, while fast technical updates continuously optimise the solution's function and efficiency.

From traditional pneumatics to electric drive technology

Festo has been a leading provider of electromechanical drives for many years. Alongside its partners, Festo is actively shaping technological change, as shown by the new servo drives CMMT, the servo motors EMMT-AS, the brushless stepper motors EMMS-ST and the Festo Automation Suite which was introduced in 2018.

Primon Automazioni's strategic vision for fully electric automation is reflected in the combination of the new compact axes ELGC/EGSC and the high performance of the new servo drive CMMT. By gathering, monitoring and analysing the data provided by the CMMT and integrating it perfectly into the host systems, the company is taking a huge step forward in its digitalisation journey.

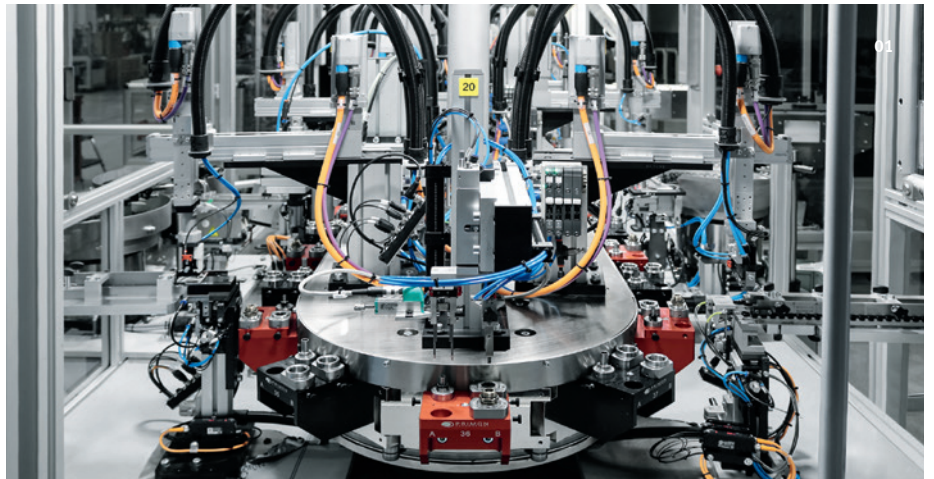
At Primon Automazioni, remote management and remote assistance are established practices. Using the Festo Automation Suite via a VPN connection set up by the customer, the operation of the assembly line can be continuously monitored and adapted, without having to be present on site.



"We've used the Automation Suite in a series of projects with good results."

Fulvio Primon, General Manager of Primon Automazioni

01: Electric automation: a strategy Primon Automazioni has been following for many years. With Festo, Primon has gained valuable experience in terms of reliability, flexibility and modularity.



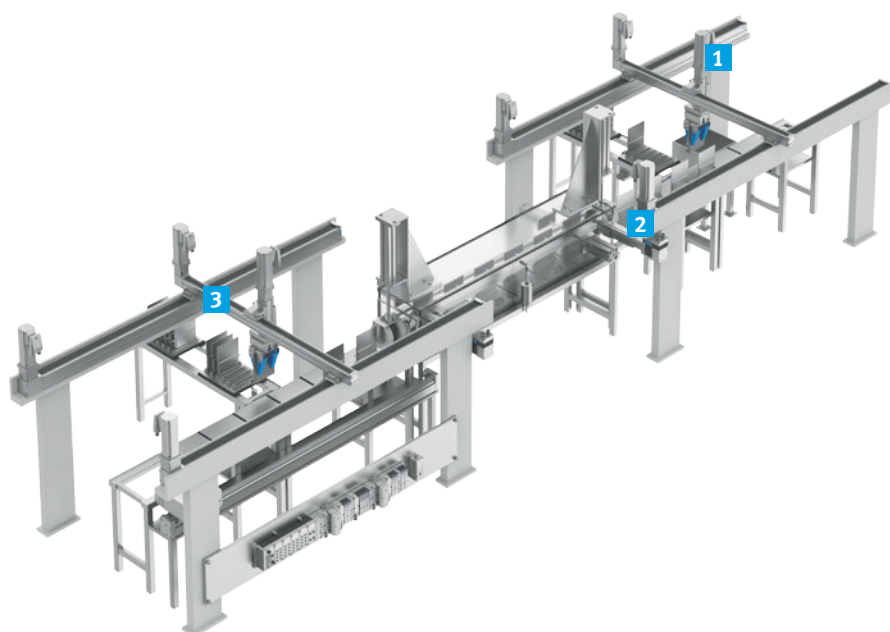
02: For maximum productivity: electric automation on a grand scale.

From battery production to the vehicle

The focus is always on you and your specific requirements

From small, fast and dynamic ...

High throughput and repetition accuracy are not just important in battery cell production; this also applies to many different areas, from material conveying, feeding and distributing aggressive media to precise parts handling. The gas produced during formation in the battery cell must be evacuated from the cells. Handling systems from Festo help with loading the battery cells onto the workpiece carriers for insertion into the process camera and then unloading them again afterwards. After degassing, the battery cells are put through the aging process and can then be sent to the packing and assembly station.



Mini slide EGSC

For highly precise pushing, picking and inserting.



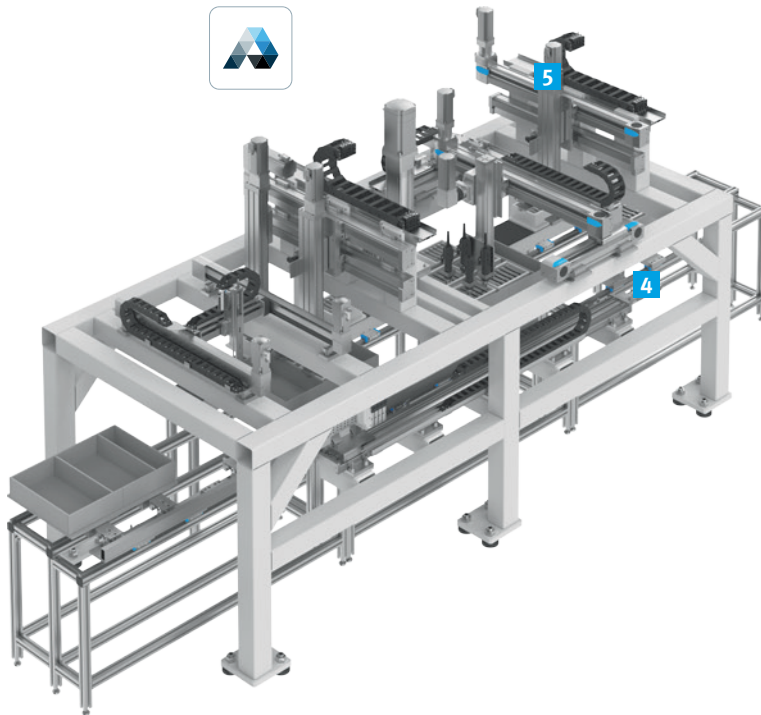
Mini slide unit EGSS

The powerful and resilient EGSS with smooth-running spindle is the precise solution for guided individual linear movements or vertical Z-movements.



Spindle and toothed belt axes ELGC

ELGC-BS: precise and smooth-running, horizontally and vertically. ELGC-TB: for high acceleration and speed with good rigidity.



... to reliable, precise and sturdy

Safety and precision are important when assembling the battery modules into a pack. Thermal management in high-voltage systems is achieved by applying thermal paste between the modules. This ensures an efficient thermal transfer. Dispensing is all about the steady and controlled guidance of the dispensing systems. The modules are then inserted and pressed in with precise, position-corrected gripper systems. This maximises the module's contact surface with the thermal conductor and guarantees that the pack is correctly positioned so that it can be screwed in and sealed later on. Finally, the pack is mechanically attached to the car underbody and the high-voltage system is sent to the next process step.



■ Servo drive CMMT-AS and servo motor EMMT-AS

For precise force, speed and position control and with a choice of bus protocols such as EtherCAT®, PROFINET, EtherNet/IP and Modbus TCP.



■ Spindle axis ELGT

The compact and low-cost spindle axes ELGT with integrated double guide can be combined directly into 2D and 3D cantilever systems with the axes ELGC and the mini slide EGSC.



Festo Automation Suite

For easy, seamless and efficient commissioning of the entire drive package, from the mechanical system to the controller.

Mastering pandemic times with Festo

Mini factories in containers help reduce mask shortages

Protective masks are in short supply in these times of coronavirus. With a system from Mikron, producing 50 to 100 face coverings per minute is almost within everyone's reach. Thanks to the engineering support from Festo, the Berlin-based company managed to develop the solution in just six weeks.

"Normally you'd need six months for systems of this size," explains Nils Rödel, General Manager of Mikron Berlin. But this is time that is not available in the current coronavirus pandemic.

Festo as a project accelerator

The project was greatly accelerated by the engineering support provided by Festo. "Even in this period of crisis, the electric and pneumatic components from Festo were available quickly. The fact that integrating and commissioning the electric drive solutions in the system as well as connecting them to the Beckhoff PLC was so easy was also helpful," says Rödel, adding: "the Festo Automation Suite software made integrating and commissioning the servo drive CMMT child's play, and we were able to quickly make decisions about the correct sizes."

Mini factories in containers

Mikron's system fits in a 20-foot shipping container, which can also act as a clean room. Depending on the raw materials, it can operate autonomously for more than two hours. "This reduces the number of people required, and as a result the risk of infection," explains Rödel. The integrated air-conditioning system with air purification filters means that production is even possible in crisis zones under challenging hygiene conditions. And still be productive. Two million protective mouth-nose masks can be produced each month with just one system. Another plus is that eliminating the need for transport makes the end product cheaper, since it can be sold right where it is produced.



Reliable supply of system components

Electric and pneumatic components from Festo ensure the reliable transport of the mask parts or perform clamping tasks in all process steps. The servo drives CMMT for controlling the servo motors EMMT are used in the application, since they can be easily connected to PLCs from other manufacturers such as Beckhoff, Siemens and Rockwell. And thanks to its international production and sales network, products from Festo are quickly available in 176 countries.

The system for producing 50 to 100 protective masks a minute fits in a 20-foot shipping container.



Independent, decentralised and ... virtual

"The system needed to be as easy to commission as it is to build." Given the current travel restrictions, Mikron came up with a digitised solution: "We use the HoloLens for this, so that commissioning can also be done virtually using an interactive 3D projection," explains Rödel.

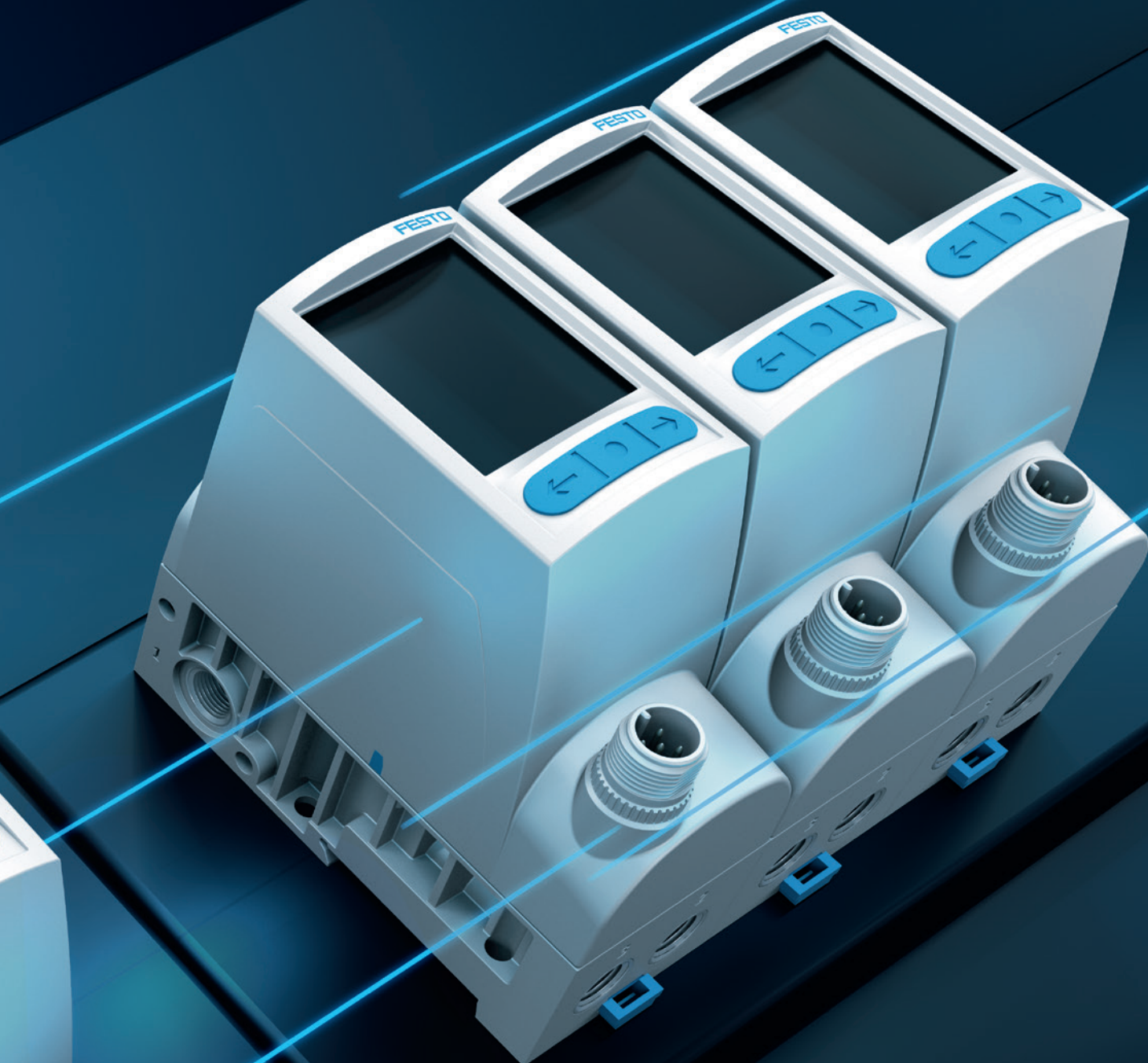
Valves and valve terminals

The entire world of valve technology
is ready for you

When it comes to ensuring that you are optimally equipped for all your automation tasks, our portfolio of valves and valve terminals is unrivalled. From the simple and very affordable solenoid valve VUVG to complex valve terminals VTSA with integrated controller for centralised or decentralised requirements, we have it all. And we make it easy for you to find – despite the huge range.

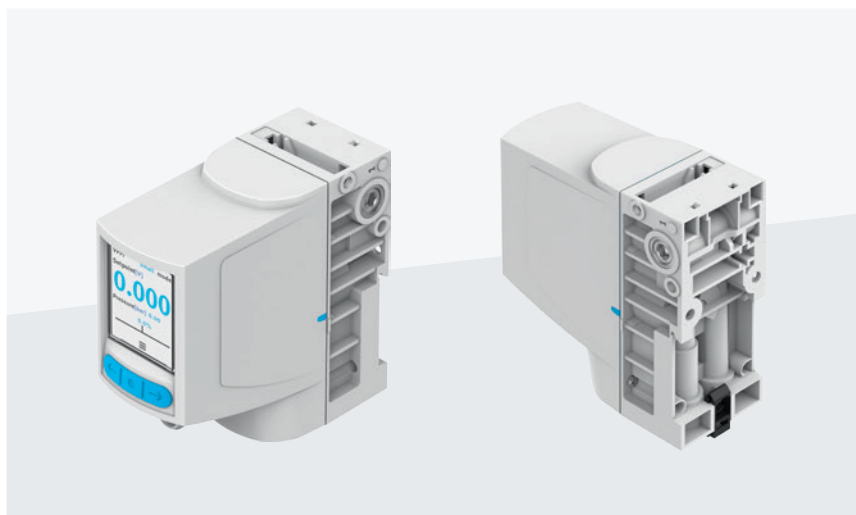
Our latest development, the piezo valves, can only be found at Festo. Quiet. Low-energy. Highly precise. Durable. Discover the rest of the benefits of this new generation of valves!





Highly precise and reliable regulation

State-of-the-art proportional technology



- Silent
- Flexible
- Highly dynamic up to 30 Hz
- Precise and stable
- Lots of pressure ranges from –1 ... 12 bar

Proportional pressure regulator VPPI: silent and dynamic regulation.

The new, precise and highly dynamic proportional pressure regulator VPPI is directly actuated in all nominal widths, without the need for preliminary stages or pilot valves. The secret to its dynamic response is the powerful and low-friction moving coil actuator. Thanks to the pressure compensating element, even the larger nominal widths of the valve provide dynamic and precise regulation.

Simple: three default controller presets

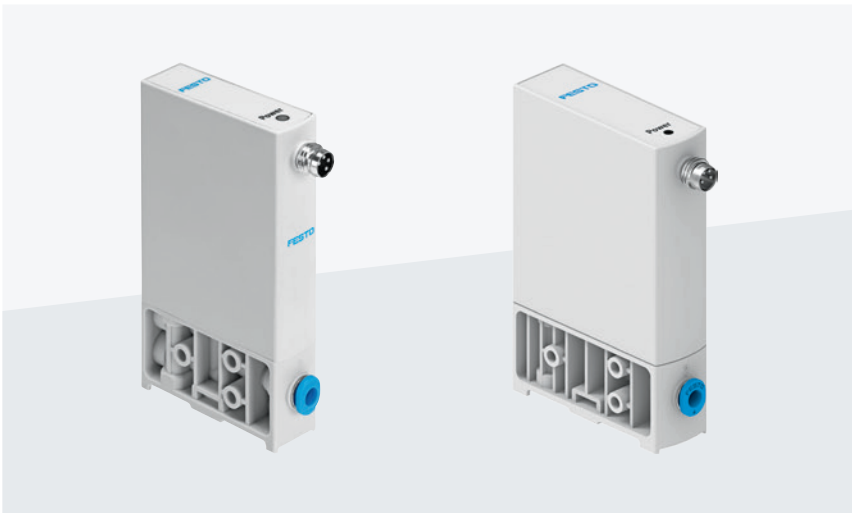
The VPPI lets you regulate a pressure dynamically and precisely by directly specifying a setpoint. Three preset values are possible: for small or large volumes or continuous flow.

A customer-specific preset value enables you to achieve a suitable, independent control behaviour. This also speeds up the adjustment of the setpoint value, since the regulator adapts to the application.

Full graphic display

The new, full graphic display can be rotated depending on the mounting position so it is always easy to read. Apart from setpoint value and pressure, it also shows various diagnostic messages.

→ www.festo.com/vppi



- Silent
- Long service life
- Very low energy consumption
- No heat generation
- Extremely precise
- Wide pressure range: -1 ... 10 bar

Piezo – the valve technology of the future! Proportional pressure regulators VEAA/VEAB

Piezo benders as an innovative drive element in valves are something you'll only find at Festo. The proportional pressure regulators VEAA and VEAB feature this drive element for good reason. The valves offer high-precision control – with low hysteresis, high repetition accuracy and very low energy consumption. The low wear also means they have a long service life.

Silent operation

The proportional valves VEAA and VEAB are completely silent in operation, making them particularly interesting for biotech/ pharmaceutical applications, in laboratory environments, in medical devices (e.g. oxygen therapy machines) and many other industries.

Stable and reliable control

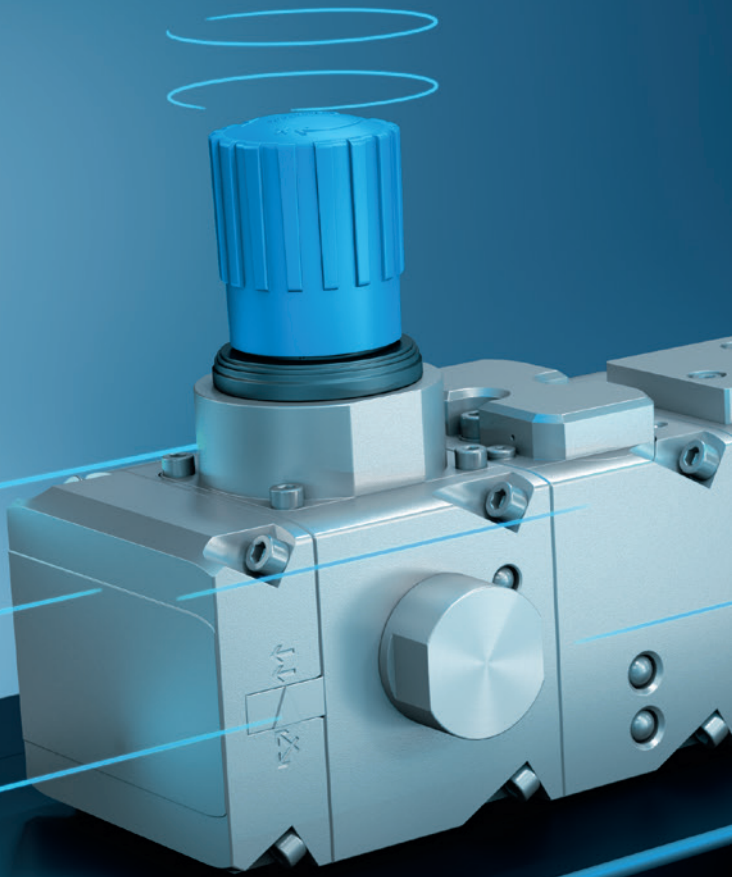
The proportional characteristics of the piezo bender with direct actuation ensure stable and reliable regulation – and a stepless pressure rise at flow rates up to 20 l/min.

→ www.festo.com/veaa

→ www.festo.com/veab

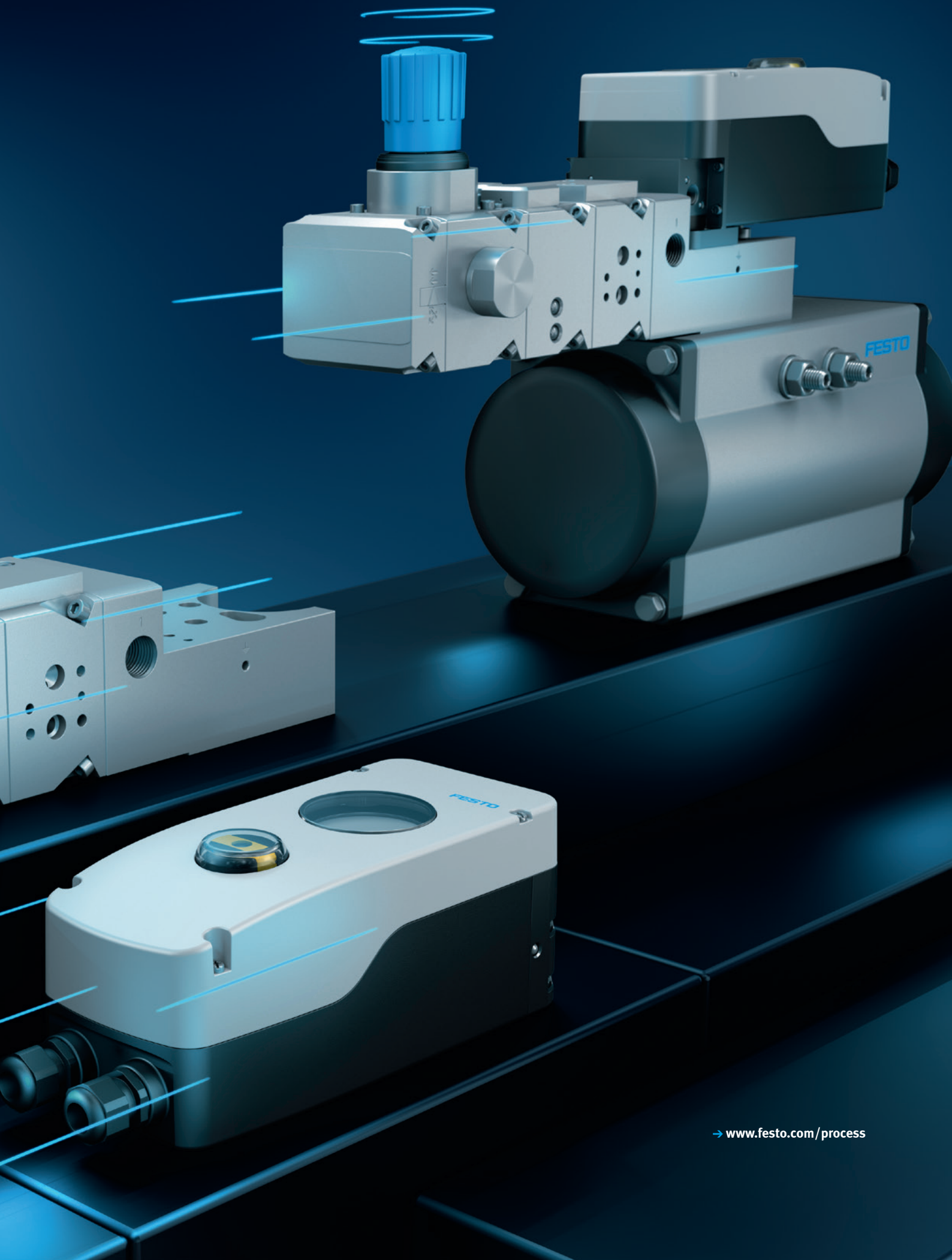
Tailored solutions for process automation

We support you from engineering through to operation!



From the individual component to the complete automation solution, you'll find the entire package for process automation at Festo. The portfolio ranges from process, media and solenoid valves as well as actuators, sensors and controllers to ready-to-install systems and integrated automation concepts, with learning opportunities included. There is a particular focus on modularity of the plants for maximum flexibility – with an integrated architecture that makes it easier for you to work on and with the automation solutions. And last but not least: maximum productivity and reliability.

Our software tools, like the actuator unit configurator KDFP or the PA Toolkit, speed up your engineering and increase your operating reliability. Take a look!



Versatile and reliable: positioner CMSH

Everything from a single source



The CSH is a highly dynamic, low-wear positioning system boasting high air output and a long service life. You now only need one device for the fast and precise control of large and small actuators in a wide range of applications. Together with the low internal air consumption, this reduces your costs.

Integrated self-monitoring and diagnostics

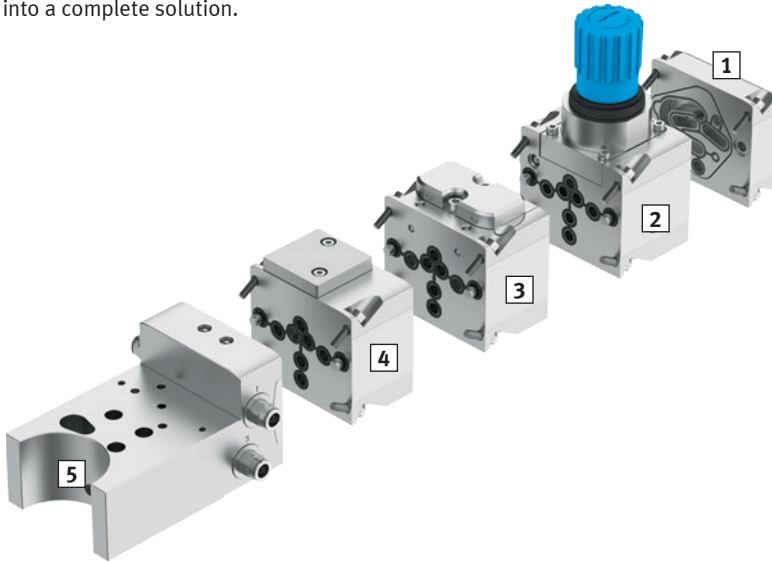
Alongside numerous standard diagnostic options, pressure sensors that monitor the supply air and actuator chamber pressures open up further intelligent diagnostic functions. Monitoring the process valve's break-away pressure is a reliable means of partial stroke testing. The large display

with plain text and rotatable reading direction makes it easier to quickly check the status of the unit by means of status feedback to NE 107. Commissioning takes next to no time thanks to the setup assistant or one-push initialisation.

→ www.festo.com/process

Ideal for CSMH: pneumatic extension modules VTOP

The new and innovative installation concept with patented, integrated air guide saves you the tedious task of having to connect lots of components from different providers into a complete solution.



1 End plate

Closes off the module towards the back.

2 Filter regulator

Guarantees the correct compressed air quality and regulates the pressure.

3 Booster

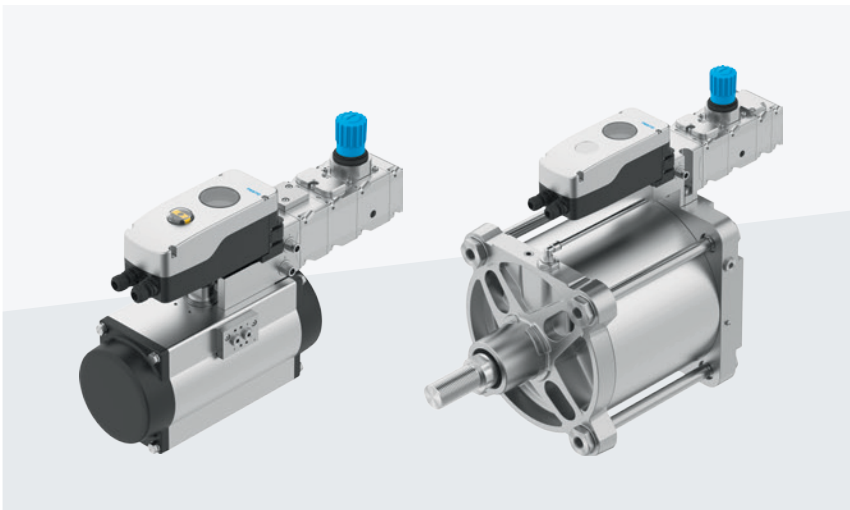
Faster travel speeds through increased flow rate.

4 Fail safe (single-acting or double-acting)

In the event of an error, the actuator travels into the safe position you have predefined.

5 Pneumatic bridge

Reliably connects the actuator and extension modules when mounting directly on the CSMH to VDE/VDI 3847-2.



Benefits along the entire value chain

- Time and cost savings from engineering to operation
- Flexible function integration
- Flexible safety architecture
- Easy and reliable installation
- High operational reliability
- High availability
- Easy maintenance

You, too, can benefit from the complete solution

Combine the high performance of the CSMH with the advantages of the modular design of the VTOP! You will benefit from a

reliable and optimised complete solution for controlling quarter turn and linear actuators over the entire product lifecycle.

Everything under control!

Clever open-loop and closed-loop media flow control



Angle seat valves VZXA in a wide range of variants

Modular angle seat valves VZXA make it possible to freely combine valve bodies and actuators using standard interfaces, creating the perfect solution for the task in hand. It comes in a clean design version made entirely from stainless steel – also in accordance with ATEX directives – or for less demanding applications now with polymer actuator. The valve body is now also available in a brass version.

Hot forged with no cavities or pores, this extremely affordable entry-level model is suitable for maximum media temperatures of 180 °C.

- Extended modular product series
- All components can be freely combined
- Accessories compatible both with stainless steel and polymer actuators
- Lead-free brass housing

→ www.festo.com/vzxa

Brand-new accessory for the VZXA

Pilot valve VOFX (24 V DC) for reliable angle seat valve actuation

The VOFX is the perfect pilot solution for you wherever valve terminals or other central solutions are not technically or economically viable.

- Compact and flexible
- Precisely matched with the VZXA series
- Easy to mount

Simple, electric position feedback with SAMH-F12

Using the common top interface on the actuators of the VZXA, you can determine the precise position of the actuator quite easily using just one or two T-slot sensors.

- Visual feedback via LED indicator or analogue via cable
- Fits all VZXA actuator sizes

You determine the flow rate: opening stroke limiter VAVA-F12

Compact, compatible and suitable for the top interface of the VZXA actuators, the VAVA-F12 permits the flow rate that is required in the opening state to be set individually. The cushioned version minimises opening impacts when the inflow direction is over the seat.

- Minimum adjustment effort
- No special tools required for assembly



Tough performer: filter regulator PCRP

The corrosion-resistant stainless steel filter regulator excels at high flow rates, reliable pressure regulation and is amazingly sturdy. It comes in 1/4" and 1/2" sizes with G or NPT thread. Thanks to its temperature resistance from -60 to +80 °C, it can be exposed to even extreme cold or heat. Its patented sealing technology protects against return flow and ensures reliable exhausting. And the new cost-effective

compact version PCRP-44 needs even less installation space for flow rates up to max. 1750 l/min.

- UV-resistant
- Suitable for use in potentially explosive areas in zones 1, 2, 21 and 22
- Easy-to-read pressure gauge indicates problems, such as pressure drop, in good time

→ www.festo.com/pcrp



Easy process programming and visualisation with the PA Toolkit and CDPX

The set comprising function blocks and the matching visualisation elements supports you with the programming of the automation logic for your process plants. With the new human-machine interface (HMI) of the CDPX series, the web visualisation can be displayed via the controller without any trouble. More complex and memory-intensive visualisations, e.g. displaying trends or progress, can be visualised natively.

- Intuitive IEC 61131-3 modules for popular field devices
- Visualisation elements with native programming in CODESYS
- MTP standard (module type package) makes it easier to connect to higher-order systems
- Straightforward visualisation and operation via CDPX touchscreen

→ www.festo.com/pa-toolkit



Perfect for demanding applications: NAMUR valve VSNC with common explosion-proof solenoids

Modern design, durable quality, fully tested technology and materials, and excellent value for money: these are the minimum requirements for NAMUR valves today. The variable interface of the VSNC now enables the connection of solenoids via device plugs or a terminal box too. A CNOMO interface to ISO 15218 is also available for electropneumatic pilot valves or purely

pneumatic actuation. There is also an extensive selection of adapter plates as accessories.

- IECEx-certified for zone 1/21 and 2/22, CL I-Div. I to NEC 500
- Rotatable seal for 3/2-way or 5/2-way function
- Sturdy and with high flow rates
- Suitable for a broad range of applications
- Extended temperature range of -20 ... +60 °C

→ www.festo.com/vsnc



Configurator KDFP-DFPD: actuator units for process valves of your choice

With the KDFP-DFPD you can now also configure an actuator unit without process valve for automating existing process valves. You simply enter the parameters for your process valves and a configurator provides suggestions for the right actuator units. Everything is combined in one tool, from the product search, configuration, sizing and documentation to ordering and delivery of the ready-to-install unit.

- Tailored and ready-to-install solutions
- Increased reliability for specific applications
- CAD data for configuration and documentation for direct download
- Reliable planning with immediate price and delivery time information

→ www.festo.com/kdfp

The dock that "thinks" for itself

Decentralised control in bulk material handling with the AZO CleanDock

When docking and undocking containers at weighing stations, cross-contamination can occur and dust can escape. But not with the AZO CleanDock. The intelligent system increases process reliability and reduces commissioning times – thanks to the control system CPX-CEC from Festo docked directly to it.

"Our systems transport and dose all conceivable types of bulk materials – from milk powder to different plastics and pigments, for example for wet paint production," explains Frank Pahl, Head of Development at AZO. "Product purity and employee protection are a priority for chemical, pharmaceutical and food producers."

Product purity, employee protection, flexibility

"We therefore want to avoid cross-contamination and dust escaping at our plants at all costs," says Pahl. Attention must also be paid to explosion prevention and protection. The target containers and dosing device must therefore be hermetically closed before docking takes place. That is precisely why AZO developed the CleanDock. For a wide range of plant designs depending on the container, whether in big bags, drums, sacks or mobile containers.

Pioneering in every respect

AZO enhanced the CleanDock together with its long-standing automation partner Festo, focusing on faster commissioning, error reduction and greater safety during filling. The integrated controller CPX-CEC allows the system to "think for itself" and actuates the pneumatic actuators decentrally via valve terminals CPX/MPA. As a uniform interface for decentralised intelligence, it enables the complete control of machines or more complex subsystems or pneumatic and electric control chains via CODESYS. CleanDock can also be customised easily, quickly and flexibly for different automation systems and company-specific standards.

Modularity as an important advantage

Nowadays automation functions are already increasingly distributed across individual plant modules. All the process control level does is set the pace. While the process control system calls up a function, it doesn't need to have a detailed knowledge of the stored process steps. The benefits speak for themselves: reduced interfaces, simplified engineering and handling processes and increased machine and plant reliability.

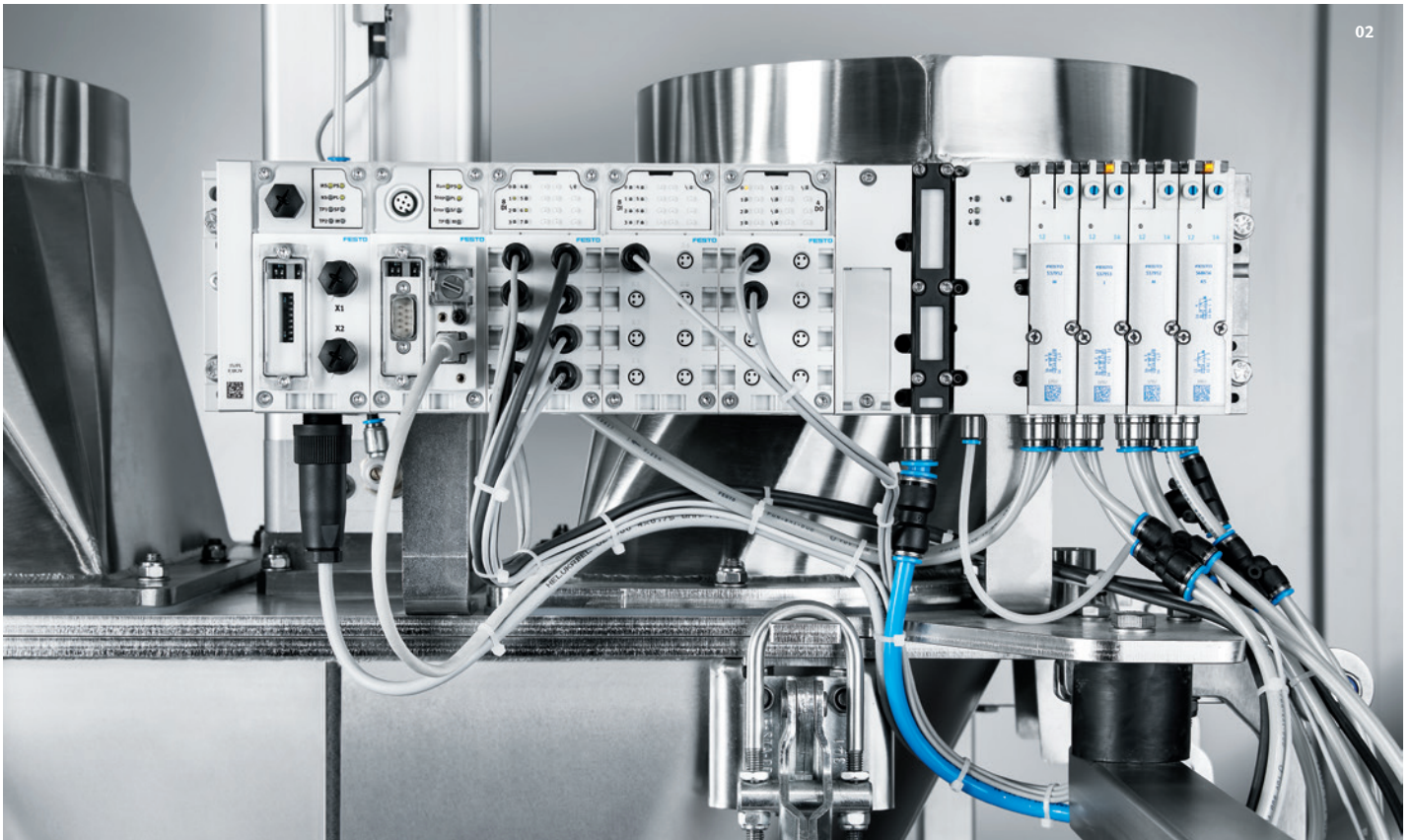


Working together for success

The implementation of AZO together with Festo follows the recommendation of NAMUR/ZVEI, system builders and operators as well as renown research institutes. The innovative concept shortens the time to market and makes it possible to produce individual modules for stock and adapt them or add additional modules at a reasonable cost.

01: Docking and undocking is controlled decentrally and autonomously by the CPX-CEC from Festo.

02: AZO CleanDock – controlled by the automation platform CPX.



02

