FESTO

Product overview 2023

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All technical data are correct at the time of going to print.

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FESTO
FESTO
FESTO

We are pneumatic.
We are electric.
We are digital.
We are 30,000 technology-neutral solutions.

→ WE ARE THE ENGINEERS OF PRODUCTIVITY.

Dear Customers,

Here is the new product overview. It contains numerous proven top sellers, but also many new products. I am sure that these new products will also support you in your work!

Take, for example, the new valve terminal VTOP. This innovative, modular, compact complete solution for control applications can be combined as required with modules such as fail-safe, volume amplifier, etc. And it is also easy to install, as well as easy to expand and retrofit.

Or the new automation system CPX-AP-A. The modular and lightweight IO system in IP65/IP67 offers extremely high performance in real time at a transmission speed of 200 Mbps. And it is parameterisable and scalable. These are just two of our new products for 2023. You can find more of them in this product overview.

Our Controlled Pneumatics open a new chapter in the history of pneumatics. Thanks to the best control characteristics, a combination of proportional technology, sensor technology and control algorithms, solutions with Controlled Pneumatics significantly increase process reliability – and reduce compressed air consumption by up to 60%. This technology is not only interesting for controlling movements, but is also perfect when it comes to controlling pressures or flow rates. Just visit our website www.festo.com and read about Controlled Pneumatics.

By being able to offer controlled pneumatics, as well as standard pneumatics, electrical solutions or combinations of these, we are geared up for new industries that are growing worldwide, such as battery production, hydrogen generation or intralogistics. We just have one goal: to make your processes as economical and reliable as needed to stay ahead of the tough competition.

Do you know about our engineering tools? They make your work much easier. With Pneumatic Simulation or Electric Motion Sizing, you can get to the right product – and the correctly sized design – in no time at all. With the Handling Guide Online, you can plan your handling system in just 20 minutes. Also take a look at www.festo.com. Once you've used these tools a few times, you will no longer want to do without them. I am convinced of that!

I hope you will quickly find the components you are looking for in this product overview.

Kind regards,

Frank Notz
Member of the Management Board Sales of Festo SE & Co. KG

Climate-friendly production and energy savings? Festo makes it easy for you!

Take a quantum leap in automation technology. By using suitable components from Festo in an intelligent way, you can reduce the energy consumption of your systems and thus specifically lower your production's CO_2 emissions.

To achieve this goal, we have chosen a comprehensive approach that is easy to use. The right engineering design, energy-efficient and production-efficient products, Energy Saving Services, and technical training and further education all contribute to improving your ecological footprint, all the way to carbon-neutral production.

Here are some examples.

CO_2 & TCO Guide

The online tool for making sustainable decisions about technology, whether you want to automate using pneumatics or electrics. It shows the total operating costs and CO_2 consumption.

→ 01 Pneumatic drives

Vacuum generator OVEM

The intelligent vacuum generator OVEM monitors the vacuum pressure, generates vacuum only when it is needed and thus reduces energy consumption by up to 60%.

→ 07 Vacuum technology

Energy efficiency modules of the MSE6 series

You can avoid unnecessary compressed air consumption. For example, by stopping the energy supply during work cycles where possible, interrupting the compressed air supply during standstill, and detecting leakages. This saves up to 20% on compressed air.

→ 12 Compressed air preparation

Digitised pneumatics with the Motion Terminal VTEM

The Motion Terminal uses specially developed Motion Apps such as Leakage diagnostics and ECO drive, which can reduce compressed air consumption by up to 70%.

→ 10 Motion Terminal

Compressed air energy efficiency audit

The compressed air energy efficiency audit certified by the German Technical Control Board (TÜV) allows you to unlock potential savings and save up to 60% on operating costs. After the analysis, our experts will recommend an action plan.

→ 21 Services

Festo Automation Experience

Combining artificial intelligence and energy efficiency: by using artificial intelligence it is possible to continuously monitor energy consumption and predict how the system status will change.

→ **www.festo.com/ax**

Festo Learning Experience

The learning platform Festo LX offers suitable options for exploring the topics of sustainability and energy efficiency.

→ **www.festo.com/lx**

Take a look: → **www.festo.com/gb/en/e/solutions/sustainability-in-manufacturing-id_5159/**

Cleverly controlled using Controlled Pneumatics

Simple and efficient control:
In Controlled Pneumatics, Festo combines proportional technology, sensors and control algorithms to form a control loop. This technology opens up completely new application areas for pneumatics and also makes conventional production more efficient in many places. Not least because it reduces the compressed air consumption by up to 50% by accurately metering the required energy.

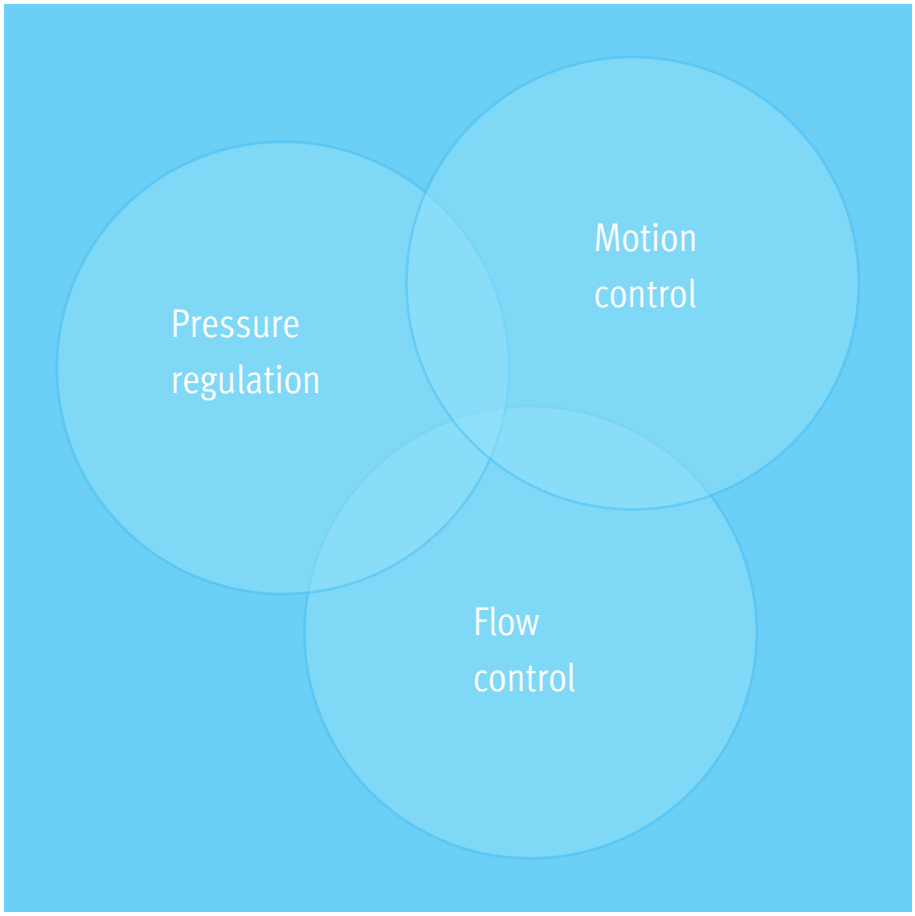
What used to involve complicated configurations and tricky programming is now quite simple. The closed-loop controller with sophisticated algorithms from Festo needs just a few parameter inputs. The most modern communication technology is used here. Another process that paved the way for Controlled Pneumatics is piezo technology, with which compressed air can be controlled very precisely.

The benefits of Controlled Pneumatics

Increased competitiveness thanks to maximum process reliability: Controlled Pneumatics enables you to control production processes, whether existing or new, with the utmost precision and absolute reproducibility, and this is further enhanced by being able to trace the data. Fast and flexible control is combined with perfect, position-dependent force and motion characteristics. The result: increased process reliability and quality when machining workpieces.

Easy commissioning and operation: Controlled Pneumatics makes complicated things very easy. For example, with the apps for the Motion Terminal VTEM multiple channels can be controlled by one piece of hardware. Thanks to the closed-loop control it is surprisingly easy to get the best results during commissioning and operation couldn't be easier.

Economical and sustainable production: Targeted metering of compressed air right from the beginning offers enormous potential for energy savings. Analysing the components' condition and detecting leaks at an early stage are further factors for a positive energy footprint.



Individually or in combination:
The strengths of Controlled Pneumatics are the control of motion, pressure and flow rate.

Some typical application areas

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

Highly precise, force-controlled polishing
The variable contact pressure of the individual polishing chambers on the polisher is controlled highly precisely using Controlled Pneumatics and ensures excellent polishing results, even when polishing wafers.

Best control for dancer rollers
Perfect timing in the event of unexpected forces improves process reliability in small and very large web control processes, for example in paper production.

Dispensing or pumping using pressure
Whether ink, adhesives or liquids for testing and analysis, with Controlled Pneumatics, liquids can be dispensed extremely precisely and according to an individual recipe. This is not possible with either electric automation or standard pneumatics.

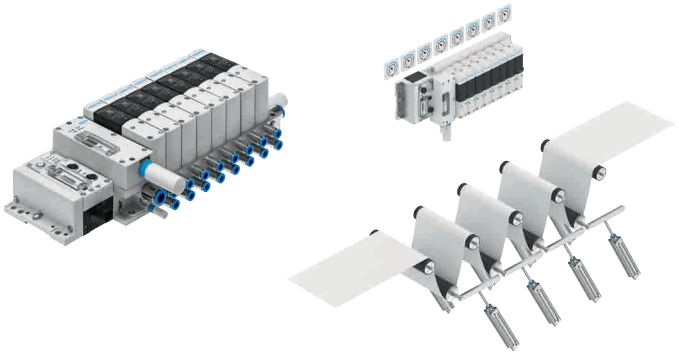
Gripping and vacuum
With Controlled Pneumatics, gripping and joining processes can be carried out with one valve, for example in end-of-arm solutions for robots, even with different workpieces.

Our product highlights

Motion Terminal VTEM
Digitised pneumatics: VTEM is the world's first to use valves whose functions are controlled by apps. This intelligent technology consisting of pneumatics, sensors, electronics and software enables many motion and monitoring tasks to be carried out.

- Individual control of motion, pressure and flow rate
- Maximum repetition accuracy
- Easy traceability

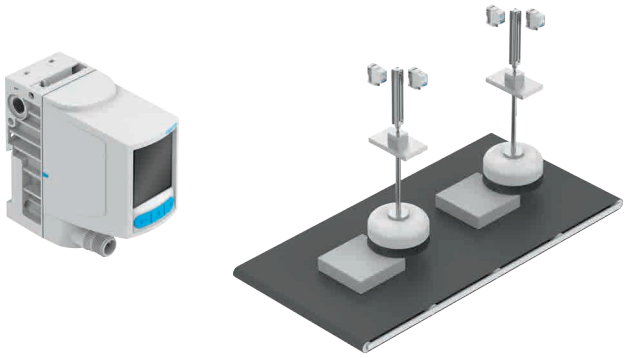
→ **www.festo.com/motionterminal**



Proportional pressure regulator VPPI
The directly actuated valve with integrated pressure compensation regulates dynamically and precisely even in large nominal widths thanks to the efficient moving-coil drive.

- Controller presets and pressure curves are individually adjustable
- Low-noise, flexible and highly dynamic
- With or without display

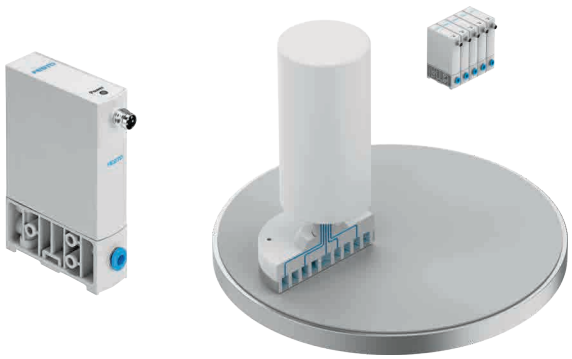
→ **www.festo.com/catalogue/vppi**



Proportional pressure regulator VEAB
For pressure ranges up to 6 bar, piezo technology makes the VEAB extremely precise and gives it a very long service life.

- Silent operation
- Low power consumption
- Very short switching times

→ **www.festo.com/catalogue/veab**



You can find more information at:
→ **www.festo.com/controlledpneumatics**

Seamless connectivity – from the workpiece to the cloud

Free and universal connectivity, integrated in future-proof and compatible concepts, with open platforms, also for Industry 4.0:
On your journey to seamless automation of machines and systems, Festo offers mechanical, electrical and intelligent automation modules that fit together perfectly and do not impose any technical limitations.

Everything from a single source

The comprehensive solution portfolio from Festo ranges from mechanics, complete servo drive systems, state-of-the-art communication and control concepts to digitalisation with the right cloud solutions. It is complemented by innovative engineering tools for engineering, configuration and commissioning.

Electrical connectivity

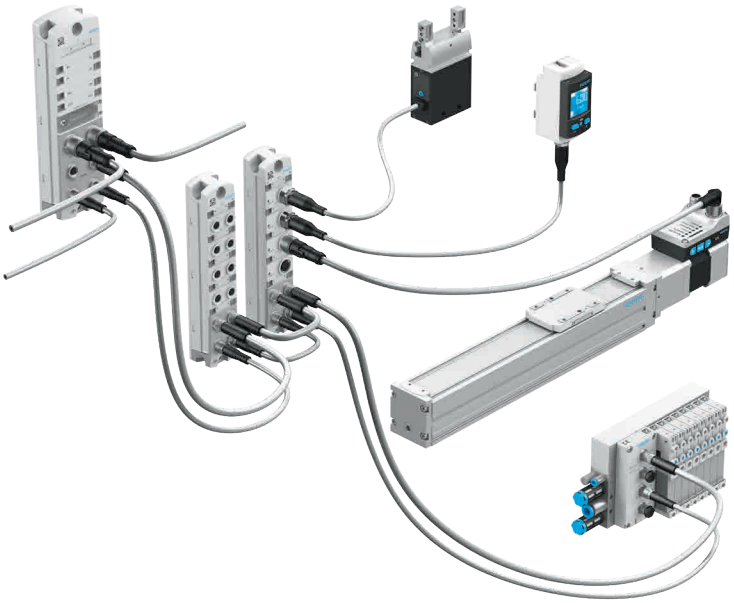
Mechanical systems and control technology can be easily combined with servo drives such as CMMT-AS and servo motors EMMT-AS from Festo. Simple engineering, perfectly matched hardware and full flexibility are integrated through direct integration into almost any automation environment. Commissioning takes just a few steps in the Festo Automation Suite software.

Servo drive CMMT
The compact, multi-protocol-capable CMMT-AS and the CMMT-ST are suitable for different Ethernet-based networks and can be integrated directly into the system environments of various controller manufacturers. The protocol can be selected in the Festo Automation Suite or directly on the servo drive.

Servo and stepper motors
Powerful servo motors EMMT-AS with single-cable technology for quick and easy connection to the servo drive.

Mechanical connectivity

The electromechanical axes and modules from Festo can be used for linear motion, swivelling, gripping or stopping tasks in the majority of standard automation applications in machines and systems, and are compatible with the servo motors or any in-house devices.



Spindle axis unit ELGS-BS
Highly compact and low-cost – the precise, load-bearing inner slide guide is permanently protected by a stainless steel cover strip.

Toothed belt axis unit ELGS-TB
Compact, durable, low-cost – the precise, load-bearing inner slide guide is permanently protected by a stainless steel cover strip.

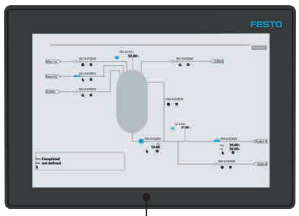
Toothed belt axis unit ELGE-TB
The very attractively priced toothed belt axis ELGE-TB has very smooth running characteristics that make it ideal for simple tasks.

As part of the Simplified Motion Series, the axis units are easy to configure and commission directly without any software. Including IO-Link and digital I/O (DIO).

➔ **www.festo.com/x/simplified-motion-series**

Intelligent connectivity

Intelligent connectivity is based on free, flexible communication and direct, complete integration into higher-level control concepts. It enables automation tasks and machine architectures to be made more flexible and modular with integrated, decentralised motion control and remote I/O solutions, supported by innovative software solutions.



With wide-screen technology

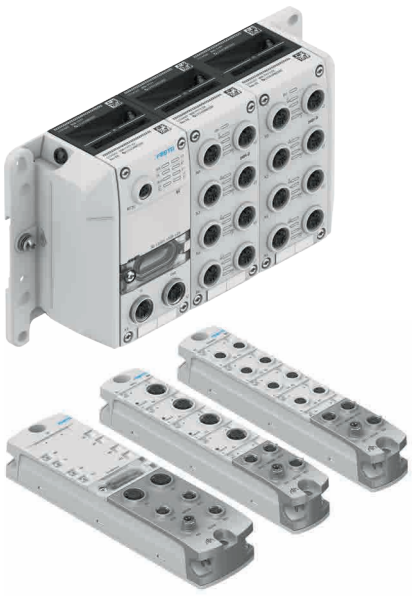
Operator units CDPX

As a human-machine interface, the new generation of operator units CDPX delivers enhanced performance, offers more functions and comes in three higher-resolution versions:

- Cost-optimised for simple visualisation tasks, e.g. of process data
- With high computing performance and multi-touch display, CODESYS, EtherCAT® and PROFINET master
- Explosion-proof and rated to IP65 for the requirements of process automation

Remote I/O system CPX-AP-A and CPX-AP-I

On the basis of the Festo Automation Platform, the modular CPX-AP-A and the decentralised CPX-AP-I offer unique flexibility and performance.



Performance in real time: modular remote I/O system CPX-AP-A

The system architecture in line, tree or star topology combines a modular remote I/O system with valve terminals, and communicates with many other products via an IO-Link® master.

Some technical features:

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

Built-in performance: decentralised remote I/O system CPX-AP-I

Individual, powerful I/O modules are integrated into the network using a fieldbus module, or they are connected directly to CPX-AP-A via the AP communication system. This offers greater choice in machine concepts when connecting valve terminals or electric drives, and results in increased cost efficiency.

- Very sturdy line topology with up to 80 ultralight and compact modules in one or two lines
- Best price/performance ratio by combining valve terminals and decentralised I/Os

You can find more information at:
→ **www.festo.com/ea**

Safe battery production with reliable automation

Batteries are the powerhouses of electromobility. Gigafactories are being built around the world to meet the huge demand for batteries.

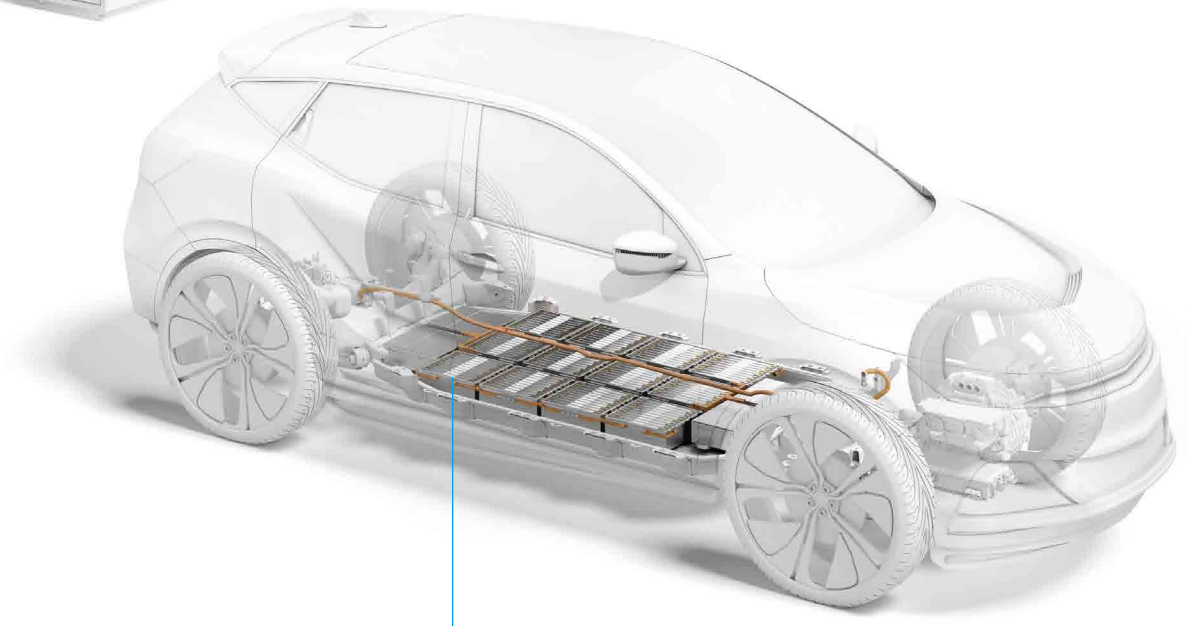
With a cross-technology automation portfolio, Festo ensures reliable and profitable battery production. Whether for degassing and sealing in cell production, module and pack assembly, or motor assembly and platform integration, Festo has suitable handling solutions.

A factory with an annual capacity of 24 gigawatt hours processes up to 400 metric tons of material per day, equivalent to the payload of more than ten articulated lorries. Day after day, about 500,000 battery cells leave a gigafactory.

The challenge is to produce these quantities without losing sight of quality and profitability. Efficiency is the main focus here. Because the only way to achieve this goal is by ensuring that the plants are working productively and reliably, in other words with great speed, maximum throughout and the highest repetition accuracy.

Demanded: Quality, safety and profitability

Key to achieving this goal is the automation of production. To be able to produce high-quality batteries reliably and cost-effectively, the processes should be automated from the outset. Festo offers suitable automation solutions, from processing the raw materials right up to the subsequent processes, for example the fully automated production of the battery cells or the precise assembly of the battery parts with transport and assembly systems.



Find out more about precise and reliable automation solutions for battery and electric motor assembly.
➔ **www.festo.com/electromobility**

Highlight products for battery manufacturing

Complex requirements need reliable solutions

Producing battery cells is an extremely sensitive process. On the one hand, the automation components are exposed to challenging ambient conditions such as drying rooms. On the other hand, they have a direct influence on the quality of the produced battery cells through the emission of particles.

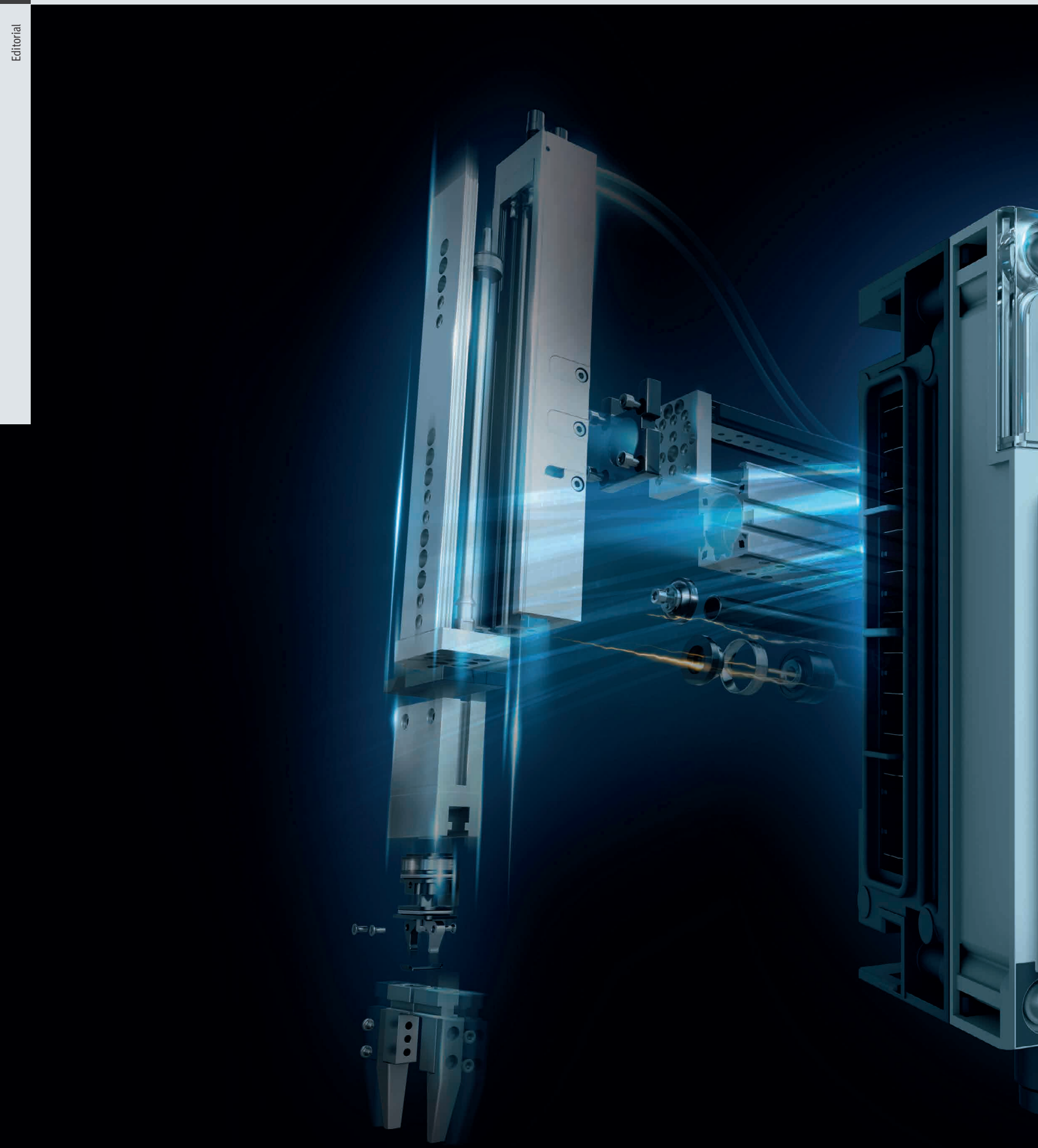
Depending on the application, products in battery cell production must not emit any copper, zinc or nickel particles. Otherwise there is a risk that the quality of the batteries will be reduced or even that they will be unusable.
Festo offers an extensive product range for battery cell production that takes these requirements into account.

You can find more information at:
→ **www.festo.com/battery**

Gaining expertise

Efficient battery production requires extensive expertise. The Didactic division of Festo teaches the skills that are needed in highly automated production environments. It offers, among other things, practical training solutions supported by digital training content for factory and process automation, electrical engineering, industrial maintenance and more.

→ **www.festo.com/didactic**



Smart. Flexible. Digital.

For your sustainable solution. For your sustainalbe solution.

Build with engineering excellence.

Use our ingredients for quick and easy engineering: extremely simple and suitable product selection, smart engineering and simulation processes, also with a digital twin, and a unique Product Key for complete product information. And procurement? It couldn't be easier.

Operate your systems smartly.

Connectivity to the cloud ensures reliable processes with greater productivity. Condition monitoring lets you see immediately when a service or repair is due – our MyDashboards will tell you. And with the Smartenance digital maintenance manager you have the servicing of all systems under control – even third-party systems.

Prepare to be inspired.

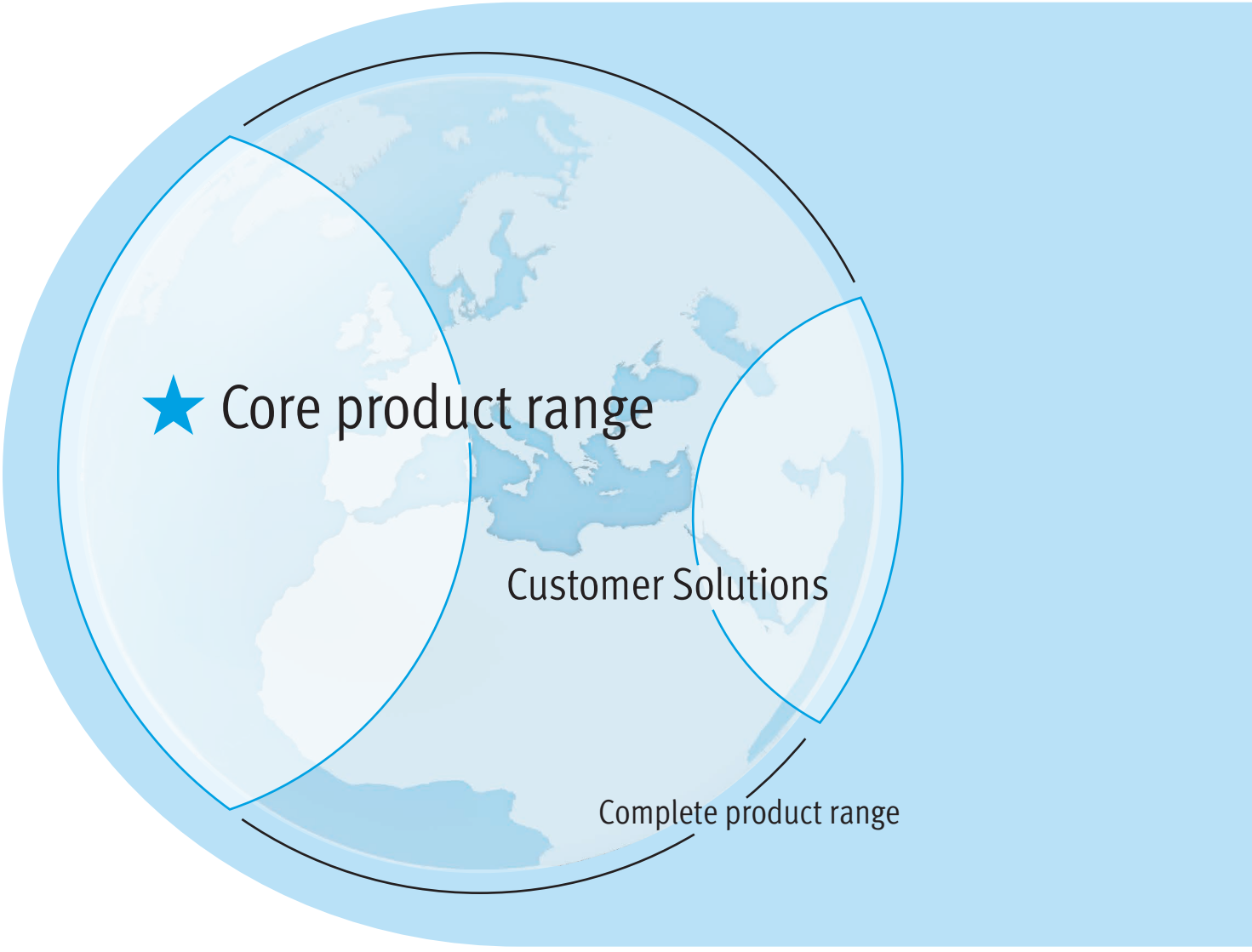
What does the automation of tomorrow look like? What are the trends? And what will make my production highly flexible, while also offering standardisation? You can find the answers right now with our Festo Motion Terminal VTEM, the first app-controlled pneumatic component. Future Concepts and our bionic studies show you how the world of tomorrow might look.

Never stop learning.

The market and global competition are accelerating steadily – and require constant learning if you want to maintain your competitive edge. You and your employees will benefit from the offer of Festo Didactic. Knowledge that pays off.

You rely on factory automation. You rely on process automation. We are technology and education.

→ WE ARE THE ENGINEERS OF PRODUCTIVITY.



Product range

Producere – implement in advance.
Until the turn of the millennium, production was essentially still synonymous with building up a stock of an item. Now it is better described as “being prepared”, since needs, parameters and processes change rapidly and require thinking and action on several fronts at the same time.
Festo is facing these challenges too, and offers you different levels of solutions in its range.

1

Core Range

Our Core Range offers you special benefits – selected products that solve the majority of your automation tasks. They can be ordered by part number and are particularly attractively priced.

- **Quickest delivery, worldwide – wherever, whenever**
- Best value
- Easy and fast to select

Just look for the star!

2

Total product range

You will find solutions for more specific requirements in our total product range, which we will deliver on the indicated date. This part of the range is not specifically identified and also covers innovative cross-technology combinations of products right up to products that carry the seeds of digitalisation within them.

3

Customer solutions

If you cannot find the right products for your task in our range, our specialists in the Customer Solutions department are always available to provide support.

Your partner for all automation questions.
Get in touch with us at → **www.festo.com**

Digital products and services

Comprehensive digitalisation concepts: AI becomes the new standard

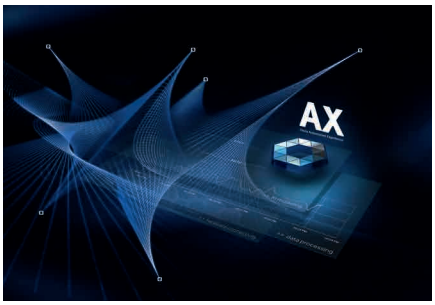
All our development activities for digitalised automation revolve around one question: how can we make you more productive along the entire value chain?

From initial engineering, procurement and commissioning to maintenance and operation? At Festo you will find the right digital offer for your needs.

Below you will see a selection that we have compiled for you.

→ www.festo.com/engineeringtools

The Festo Automation Experience (Festo AX)



You can already optimise your processes right now with data analytics, machine learning and artificial intelligence from Festo.

- Smart maintenance
- Predictive maintenance
- Predictive quality
- Predictive energy

This is how customers can achieve optimisations of 25%, e.g. thanks to reduced unplanned downtime.

Smartenance, for example, is suitable for simple digital maintenance. We use Festo AX to optimise your applications based on data, either as part of a project or with a standard app.

→ www.festo.com/Smartenance
→ www.festo.com/AX

Pneumatic Sizing

You may have already asked yourself if there is quicker and more accurate way to calculate the optimal pneumatic control chain. Yes, there is! With Pneumatic Sizing, you are offered not just one design option, but up to three that are suitable for your application. By entering three application parameters such as load, stroke and positioning time, you will get up to three suggestions: the precise result as well as the performance and eco versions.

Pneumatic Sizing allows you to benefit from:

- Optimal air consumption
- The ideal travel time per cycle
- Direct connections to the Festo Online Shop.

→ www.festo.com/pneumaticsizing

Festo Design Tool 3D

Festo Design Tool 3D is a 3D product configurator for creating Festo-specific CAD product combinations. It will make your search for matching accessories for standard products with fast delivery, such as the pneumatic cylinder series DSBC, DSNU and ADN, faster, more reliable and easier in the future. At the same time documentation requires less effort and traceability is easy.

The benefits for design, purchasing and commissioning:

- Quick and easy automated generation of product combinations
- Shorter bills of materials, fewer sources of error and optimised ordering processes
- Native CAD models for retaining CAD/component links (CAD constraints, CAD mates)
- Simplified, accelerated warehousing and assembly processes

→ www.festo.com/fdt-3d-online

CO2 & TCO Guide

Before choosing the technology for your system, you should make sure you know how high the CO2 consumption will be during operation and what you can expect the total cost of ownership (TCO) to be in the future.
Our CO2 TCO tool enables you to compare electric and pneumatic drives from our product portfolio. It provides a clear comparison of the energy consumption, CO2 emissions, the procurement costs and the total cost of ownership and so offers you a valuable decision-making support based on the key factors.

- Guide for selecting the right technology
- Comparison of pneumatic and electric actuators
- Comparison of energy consumption, CO2 emissions, procurement costs and total cost of ownership

→ www.festo.com/x/co2-tco

Simplified Motion Series – Solution Finder

The simplicity of pneumatics is now combined for the first time with the advantages of electric automation thanks to the Simplified Motion Series.
These integrated drives are the perfect solution for all users who are looking for an electric alternative for very simple movement and positioning tasks, but don't want the commissioning process for traditional electric drive systems that can often be quite complex.

- Configure the right product for any simple linear or rotary movement.
- Select product and order in the Online Shop

→ www.festo.com/x/simplified-motion-series

Schematic Solution for EPLAN projects

This circuit diagram service for complete EPLAN projects is unique to Festo: EPLAN Schematic Solution documents your individually configured solutions in next to no time! 3D CAD data and product information for standard catalogue products have been available for 15 years. With EPLAN Schematic Solution, you simply enter the order code and receive the complete plan in just a few minutes – error-free and trouble-free. There is no need for tedious searches, downloading and piecing together individual parts.

- Intuitive, fast and reliable: error-free documentation at the push of a button
- Complete mechatronic representation of configured products such as CPX, VTSA, MPA
- Reliably automated according to the standards IEC 61355, IEC 81346, ISO 1219

→ www.festo.com/eplan

FluidDraw – circuit diagrams for complete systems

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 FluidDraw 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

Configurator for process valve units and quarter turn actuator units

The configurator for process valve units (KVZA and KVZB) and quarter turn actuator units (KDFP-DFPD) simplifies the engineering and procurement processes many times over. The tool ensures quick and successful project management by taking all relevant factors into account: from initial product search, configuration, sizing and documentation right through to ordering and delivery of the ready-to-install units – everything is combined in one tool, including customer-specific requests.
All components come from a single source, are pre-assembled and perfectly compatible with each other.

- Tailored and ready-to-install solutions
- Increased reliability for your specific application
- CAD data for configuration and documentation for direct download
- The system ID can also be used for subsequent orders
- Reliable planning with immediate price and delivery time information

→ www.festo.com/kvza
→ www.festo.com/kvzb
→ www.festo.com/kdfp-dfpd

A wide variety of industry segments? A competent partner!

Food, drink and packaging industry

From continuous processes through food and splash zones to end line packaging:
- Solutions for controlling special media flows
- Automation components in easy-to-clean design and with food-safe materials
- Handling systems with suitable gripper solutions
- Technology mix: electric, pneumatic and servo-pneumatic

→ **www.festo.com/food**

Automotive industry and Tier 1 suppliers

- Flexible automation solutions for electromobility
- Intelligent and energy-efficient technologies
- Safety-related concepts and components
- Matching product portfolio – electric, pneumatic, servo-pneumatic
- Engineering and industry competencies along the entire process chain

→ **www.festo.com/automotive**

Small parts assembly and electronics industry

Expertise along the entire process chain:
- From wafer production at the front end to finished chips at the back end
- For quality inspection and assembly of the finished products
- In small parts assembly, electronics or non-electronics

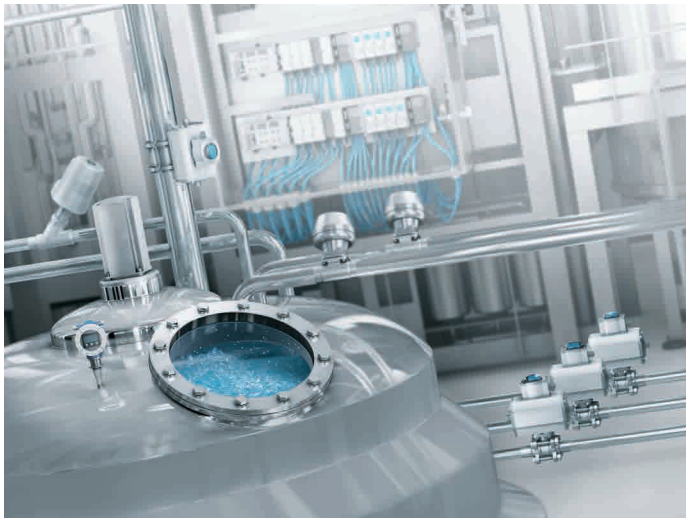
→ **www.festo.com/electronics**

LifeTech – technologies for the life sciences

- Delivery of automation components for key processes:
  - Laboratory automation
  - Medical technology
  - In vitro diagnostics
  - Point-of-care applications
- Kinematics for sample handling
- Liquid handling with dispensing and pipetting systems
- Precise regulation of medical gases

→ **www.festo.com/lifetech**

Biotech, pharma and cosmetics industry



- Delivery of automation components for key processes:
  - API manufacturing
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- Customer-oriented consulting and engineering
- Compressed air quality analyses
- Energy Saving Services

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  - Wastewater treatment
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- Compressed air quality analyses
- Energy Saving Services

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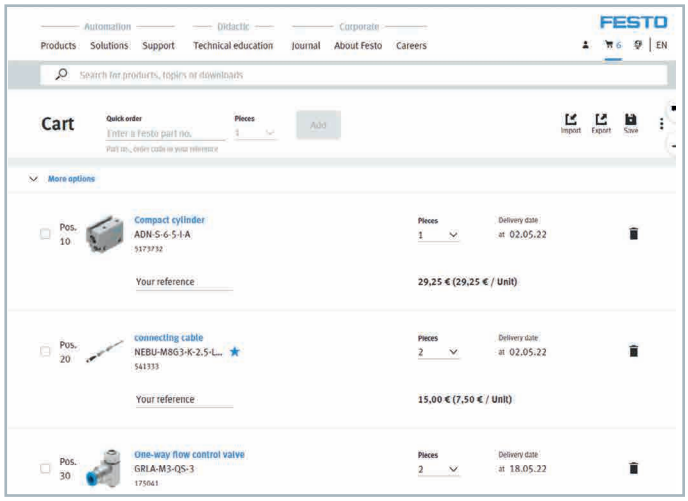

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Our offer

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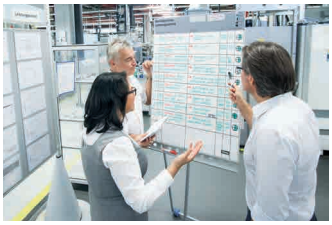

+ Organisation
Driving continuous improvement: strategic planning and process optimisation along the value chain

+ People
Development of behaviour and attitude: teamwork, communication skills and leadership qualities

+ Innovations
Developing skills for the future: learning, managing and being ready for future production in line with Industry 4.0

+ Overview of topics

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- Process automation
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- Water management
- Maintenance
- Supply Chain Management
- Lean production
- Process optimisation
- Service and sales competence
- Industry 4.0

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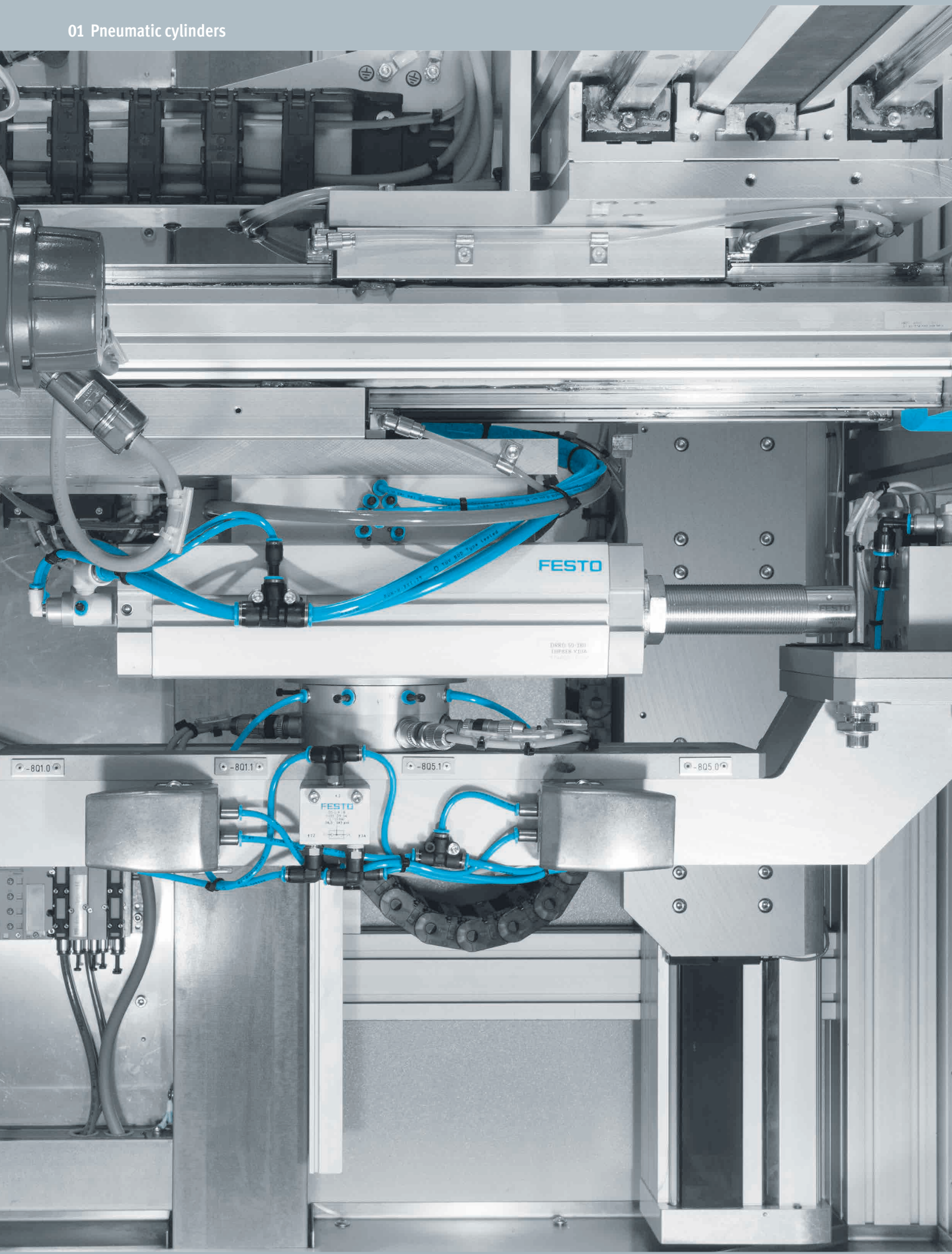
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Software tools

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This tool can be found at
➔ **www.festo.com/x/pneumatic-sizing**

Air consumption of cylinders

Calculate your system's air consumption.
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This tool can be found at
➔ **www.festo.com/x/air-consumption**

Pneumatic simulation

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Piston rod cylinder >

Round cylinders

	Standards-based cylinder DSNU ★	**Round cylinders DSNU**	**Round cylinders DSNU-S** ★	**Standards-based cylinder CRDSNU, CRDSNU-B**
Mode of operation	Double-acting	Double-acting	Double-acting	Double-acting
Piston diameter	8 mm, 10 mm, 12 mm, 16 mm, 20 mm, 25 mm	32 mm, 40 mm, 50 mm, 63 mm	8 mm, 12 mm, 16 mm, 20 mm, 25 mm	12 mm, 16 mm, 20 mm, 25 mm
Theoretical force at 0.6 MPa (6 bar, 87 psi), advancing	23 ... 295 N	482.5 ... 1870.3 N	30.2 ... 294.5 N	68 ... 295 N
Stroke	1 ... 500 mm	1 ... 500 mm	1 ... 200 mm	1 ... 500 mm
Cushioning	Elastic cushioning rings/plates at both ends, Self-adjusting pneumatic end-position cushioning, Pneumatic cushioning, adjustable at both ends	Elastic cushioning rings/plates at both ends, Self-adjusting pneumatic end-position cushioning, Pneumatic cushioning, adjustable at both ends	Elastic cushioning rings/plates at both ends, Self-adjusting pneumatic end-position cushioning	Elastic cushioning rings/plates at both ends, Self-adjusting pneumatic end-position cushioning, Pneumatic cushioning, adjustable at both ends
Description	• ISO 6432 • Wide range of variants for customised applications • Good running performance and long service life • Self-adjusting pneumatic end-position cushioning saves time during commissioning and adapts optimally to load and speed changes • Piston rod with female or male thread • For position sensing • Variants recommended for production systems for manufacturing lithium-ion batteries	• Wide range of variants for customised applications • Good running performance and long service life • Self-adjusting pneumatic end-position cushioning saves time during commissioning and adapts optimally to load and speed changes • Piston rod with female or male thread • For position sensing • Variants recommended for production systems for manufacturing lithium-ion batteries	• Short variant of ISO cylinder DSNU • Quick and easy installation, even in tight spaces • Light weight • Self-adjusting pneumatic end-position cushioning saves time during commissioning and adapts optimally to load and speed changes • Piston rod with male thread • For position sensing • Variants recommended for production systems for manufacturing lithium-ion batteries • Sustainable in production thanks to reduced use of materials	• ISO 6432 • Corrosion resistant against aggressive ambient conditions • Easy-to-clean design • Long service life thanks to optional dry-running seal • Wide range of variants for customised applications • Self-adjusting pneumatic end-position cushioning saves time during commissioning and adapts optimally to load and speed changes • For position sensing
online: →	dsnu	dsnu	dsnu	crdnsu

Piston rod cylinder >

Round cylinders

	Round cylinders CRDSNU, CRDSNU-B	**Standards-based cylinder ESNU**	**Round cylinders ESNU**
Mode of operation	Double-acting	Single-acting, Pushing	Single-acting, Pushing
Piston diameter	32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm	8 mm, 10 mm, 12 mm, 16 mm, 20 mm, 25 mm	32 mm, 40 mm, 50 mm, 63 mm
Theoretical force at 0.6 MPa (6 bar, 87 psi), advancing	483 ... 4712 N	19 ... 271 N	406 ... 1765 N
Stroke	1 ... 500 mm	1 ... 50 mm	1 ... 50 mm
Cushioning	Elastic cushioning rings/plates at both ends, Self-adjusting pneumatic end-position cushioning, Pneumatic cushioning, adjustable at both ends	Elastic cushioning rings/plates at both ends	Elastic cushioning rings/plates at both ends
Description	• Corrosion resistant against aggressive ambient conditions • Easy-to-clean design • Long service life thanks to optional dry-running seal • Wide range of variants for customised applications • Self-adjusting pneumatic end-position cushioning saves time during commissioning and adapts optimally to load and speed changes • For position sensing	• ISO 6432 • Wide range of variants for customised applications • Good running performance and long service life • Piston rod with female or male thread • For position sensing	• Wide range of variants for customised applications • Good running performance and long service life • Piston rod with female or male thread • For position sensing
online: →	crdsnu	esnu	esnu

Piston rod cylinder >

Round cylinders

	Round cylinders CRHD	**Round cylinders EG-PK**
Mode of operation	Double-acting	Single-acting, Pushing
Piston diameter	32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm	2.5 mm, 4 mm, 6 mm
Theoretical force at 0.6 MPa (6 bar, 87 psi), advancing	483 ... 4712 N	1.9 ... 11.8 N
Stroke	10 ... 500 mm	5 ... 25 mm
Cushioning	Pneumatic cushioning, adjustable at both ends	On one side, Not adjustable, No cushioning
Description	• Corrosion resistant against aggressive ambient conditions • Easy-to-clean design, optimised for very exacting demands • Flexible design thanks to different end caps • Piston rod with male thread • For position sensing	• Micro cylinder • Barbed fitting for plastic tubing with standard I.D. • Without position sensing
online: →	crhd	eg-pk

Piston rod cylinder >

Profile and tie rod cylinders

	Standards-based cylinders pre-configured DSBC ★	**Standards-based cylinders CRDNG, CRDNGS**	**Standards-based cylinders, Clean Design DSBF**
Mode of operation	Double-acting	Double-acting	Double-acting
Piston diameter	32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm, 125 mm	32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm, 125 mm	32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm, 125 mm
Theoretical force at 0.6 MPa (6 bar, 87 psi), advancing	415 ... 7363 N	483 ... 7363 N	415 ... 7363 N
Stroke	1 ... 2800 mm	10 ... 2000 mm	1 ... 2800 mm
Cushioning	Elastic cushioning rings/plates at both ends, Self-adjusting pneumatic end-position cushioning, Pneumatic cushioning, adjustable at both ends	Pneumatic cushioning, adjustable at both ends	Elastic cushioning rings/plates at both ends, Self-adjusting pneumatic end-position cushioning, Pneumatic cushioning, adjustable at both ends
Description	• ISO 15552 (ISO 6431, VDMA 24562) • Self-adjusting pneumatic end-position cushioning saves time during commissioning and adapts optimally to load and speed changes • Standard profile with two sensor slots • Wide range of variants for customised applications • Comprehensive range of mounting accessories for just about every type of installation • For position sensing • Variants recommended for production systems for manufacturing lithium-ion batteries	• ISO 15552 (ISO 6431, VDMA 24562) • Corrosion resistant against aggressive ambient conditions • Easy-to-clean design • Variants: through piston rod, heat-resistant design • Threaded mounting, mounting via accessories • For position sensing	• ISO 15552 • Increased corrosion protection • Easy-to-clean design • FDA-approved lubrication and sealing on the basic version • Long service life thanks to optional dry-running seal • Self-adjusting pneumatic end-position cushioning saves time during commissioning and adapts optimally to load and speed changes • For position sensing
online: →	**dsbc**	**crdng**	**dsbf**

Piston rod cylinder >

Profile and tie rod cylinders

	Standards-based cylinders DSBG	**Standards-based cylinders DSBG**
Mode of operation	Double-acting	Double-acting
Piston diameter	32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm, 125 mm	160 mm, 200 mm, 250 mm, 320 mm
Theoretical force at 0.6 MPa (6 bar, 87 psi), advancing	415 ... 7363 N	11310 ... 48255 N
Stroke	1 ... 2800 mm	1 ... 2700 mm
Cushioning	Elastic cushioning rings/plates at both ends, Self-adjusting pneumatic end-position cushioning, Pneumatic cushioning, adjustable at both ends	Elastic cushioning rings/plates at both ends, Pneumatic cushioning, adjustable at both ends
Description	• ISO 15552 (ISO 6431, VDMA 24562) • Sturdy tie rod design • Self-adjusting pneumatic end-position cushioning saves time during commissioning and adapts optimally to load and speed changes • Comprehensive range of mounting accessories for just about every type of installation • For position sensing • Variants to EU Explosion Protection Directive (ATEX)	• ISO 15552 (ISO 6431, VDMA 24562) • Sturdy tie rod design • Pneumatic end-position cushioning adjustable at both ends • Optionally without pneumatic end-position cushioning, adjustable at both ends, and position sensing, resulting in a price advantage • Optionally with spacer bolt attachment • For position sensing • Variants to EU Explosion Protection Directive (ATEX)
online: ➔	**dsbg**	**dsbg**

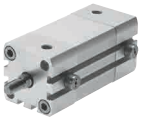
Piston rod cylinder >

Compact, short-stroke and flat cylinders

	Compact cylinders ADN ★	**Compact cylinders AEN**	**Compact cylinder ADN-S** ★	**Compact cylinders AEN-S**
Mode of operation	Double-acting	Single-acting, Pushing, Pulling	Double-acting	Pushing
Piston diameter	12 mm, 16 mm, 20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm, 125 mm	12 mm, 16 mm, 20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm	6 mm, 10 mm, 12 mm, 16 mm, 20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm	6 mm, 10 mm, 12 mm, 16 mm, 20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm
Theoretical force at 0.6 MPa (6 bar, 87 psi), advancing	51 ... 7363 N	54 ... 4416 N	17 ... 1870 N	13 ... 1780 N
Stroke	1 ... 500 mm	1 ... 25 mm	5 ... 50 mm	5 ... 25 mm
Cushioning	Elastic cushioning rings/plates at both ends, Self-adjusting pneumatic end-position cushioning	Elastic cushioning rings/plates at both ends	Elastic cushioning rings/plates at both ends, No cushioning	Elastic cushioning rings/plates at both ends, No cushioning
Description	• ISO 21287 • Up to 50% less installation space than comparable standards-based cylinders to ISO 15552 • Piston rod with female or male thread • Wide range of variants for customised applications • For position sensing • Variants recommended for production systems for manufacturing lithium-ion batteries	• ISO 21287 • Up to 50% less installation space than comparable standards-based cylinders to ISO 15552 • Piston rod with female or male thread • Wide range of variants for customised applications • For position sensing	• Minimal installation space • Very lightweight • Ideal for small movements • Piston rod with female or male thread • For position sensing • Variants recommended for production systems for manufacturing lithium-ion batteries • Sustainable in production thanks to reduced use of materials	• Minimal installation space • Very lightweight • Ideal for small movements • High forces in a compact size • Piston rod with female or male thread • For position sensing
online: →	adn	aen	adn-s	aen-s

Piston rod cylinder >

Compact, short-stroke and flat cylinders

	Compact cylinders, multimount **DPDM**	 **Compact cylinders** **ADN-EL**	**Compact cylinders, Clean Design** **CDC**
Mode of operation	Double-acting, Single-acting, Pushing, Pulling	Double-acting	Double-acting
Piston diameter	6 mm, 10 mm, 16 mm, 20 mm, 25 mm, 32 mm	20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm	20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm, 80 mm
Theoretical force at 0.6 MPa (6 bar, 87 psi), advancing	9 ... 483 N	188 ... 4712 N	141 ... 3016 N
Stroke	5 ... 50 mm	10 ... 500 mm	1 ... 500 mm
Cushioning	Elastic cushioning rings/plates at both ends	Elastic cushioning rings/plates at both ends	Elastic cushioning rings/plates at both ends
Description	• Mounting using through-hole and female thread • Compact design • Piston rod variants • For position sensing • Sustainable in production thanks to reduced use of materials	• ISO 21287 • With end-position locking at both ends, front or rear • Piston rod with female or male thread • For position sensing	• ISO 21287 • Up to 50% less installation space than comparable standards-based cylinders to ISO 15552 • Easy-to-clean design • Increased corrosion protection • Wide range of variants for customised applications • Piston rod with female or male thread • For position sensing
online: →	dpdm	adn-el	cdc

Piston rod cylinder >

Compact, short-stroke and flat cylinders

	Flat cylinders **DZF**	**Flat cylinders** **DZH**	**Flat cylinders** **EZH**
Mode of operation	Double-acting	Double-acting	Single-acting, Pushing
Piston diameter	Equivalent diameter, 12 mm, 18 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm	Equivalent diameter, 16 mm, 20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm	Equivalent diameter, 3 mm, 6 mm, 12 mm, 22 mm
Theoretical force at 0.6 MPa (6 bar, 87 psi), advancing	51 ... 1870 N	104 ... 1870 N	3.8 ... 205 N
Stroke	1 ... 320 mm	1 ... 1000 mm	10 ... 50 mm
Cushioning	Elastic cushioning rings/plates at both ends	Pneumatic cushioning, adjustable at both ends	No cushioning
Description	• Extremely flat design • Protected against rotation thanks to special piston shape • Ideal for manifold assembly • Wide variety of mounting and attachment options • Piston rod with female or male thread • For position sensing	• Flat design • Protected against rotation thanks to special piston shape • Ideal for manifold assembly • Wide variety of mounting and attachment options • Piston rod with male thread • For position sensing	• Extremely flat design • Protected against rotation thanks to special piston shape • Wide variety of mounting and attachment options • For position sensing
online: →	dzf	dzh	ezh

Piston rod cylinder >

Multimount and cartridge cylinders

	Compact cylinders, multimount **DPDM**	**Cartridge cylinders** **EGZ**
Mode of operation	Double-acting, Single-acting, Pushing, Pulling	Single-acting, Pushing
Piston diameter	6 mm, 10 mm, 16 mm, 20 mm, 25 mm, 32 mm	6 mm, 10 mm, 16 mm
Theoretical force at 0.6 MPa (6 bar, 87 psi), advancing	9 ... 483 N	13.9 ... 109 N
Stroke	5 ... 50 mm	5 ... 15 mm
Cushioning	Elastic cushioning rings/plates at both ends	No cushioning
Description	• Mounting using through-hole and female thread • Compact design • Piston rod variants • For position sensing • Sustainable in production thanks to reduced use of materials	• Minimal installation space • Installation with or without mounting components • Piston rod with male thread
online: →	dpdm	egz

Piston rod cylinder >

Cylinders with clamping unit

	Standards-based cylinders with clamping unit **DSBC-C**	**Round cylinders with clamping unit** **DSNU-KP**	**Round cylinders with clamping unit** **DSNU-KP**
Mode of operation	Double-acting	Double-acting	Double-acting
Piston diameter	32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm, 125 mm	8 mm, 10 mm, 12 mm, 16 mm, 20 mm, 25 mm	32 mm, 40 mm, 50 mm, 63 mm
Theoretical force at 0.6 MPa (6 bar, 87 psi), advancing	415 ... 7363 N	23 ... 295 N	483 ... 1870 N
Stroke	1 ... 2800 mm	1 ... 500 mm	1 ... 500 mm
Cushioning	Elastic cushioning rings/plates at both ends, Self-adjusting pneumatic end-position cushioning, Pneumatic cushioning, adjustable at both ends	Elastic cushioning rings/plates at both ends, Self-adjusting pneumatic end-position cushioning, Pneumatic cushioning, adjustable at both ends	Elastic cushioning rings/plates at both ends, Self-adjusting pneumatic end-position cushioning, Pneumatic cushioning, adjustable at both ends
Performance level (PL)			
Description	• The piston rod can be held in any position • Piston rod can be held in position for long periods even with alternating loads, fluctuating operating pressure or leaks in the system • Mounting hole pattern to ISO 15552 • Piston rod with female or male thread • For position sensing	• Based on ISO 6432 • The piston rod can be held in any position • The piston rod can also be held for long periods with alternating loads, fluctuating operation pressure or loss of pressure • For position sensing	• The piston rod can be held in any position • The piston rod can also be held for long periods with alternating loads, fluctuating operation pressure or loss of pressure • For position sensing
online: →	dsbc-c	dsnu-kp	dsnu-kp

Piston rod cylinder >

Cylinders with clamping unit

	Compact cylinders with clamping unit ADN-KP	**Cylinders with holding brake DFLC**	**Cylinders with holding brake DFLG**
Mode of operation	Double-acting	Double-acting	Double-acting
Piston diameter	20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm	40 mm, 63 mm, 100 mm	160 mm
Theoretical force at 0.6 MPa (6 bar, 87 psi), advancing	188 ... 4712 N	754 ... 4712 N	12064 N
Stroke	10 ... 500 mm	10 ... 2000 mm	10 ... 2000 mm
Cushioning	Elastic cushioning rings/plates at both ends	Pneumatic cushioning, adjustable at both ends	Pneumatic cushioning, adjustable at both ends
Performance level (PL)		Stopping, holding, blocking a movement/ category 1, Performance Level c	Stopping, holding, blocking a movement/ category 1, Performance Level c
Description	• The piston rod can be held in any position • The piston rod can also be held for long periods with alternating loads, fluctuating operation pressure or loss of pressure • Mounting hole pattern to ISO 21287 • Piston rod with female or male thread • For position sensing	• Combination of holding brake and standards-based cylinder based on ISO 15552 • Holding function: retains the piston rod by clamping with frictional locking • Emergency braking function: stops the movement of the piston rod by clamping with frictional locking • With safety functions • Variants to EU Explosion Protection Directive (ATEX) • Optional: high level of corrosion protection • For position sensing	• Combination of holding brake and standards-based cylinder based on ISO 15552 • Holding function: retains the piston rod by clamping with frictional locking • Emergency braking function: stops the movement of the piston rod by clamping with frictional locking • With safety functions • Variants to EU Explosion Protection Directive (ATEX) • Optional: high level of corrosion protection • For position sensing
online: ➔	adn-kp	dflc	dflg

Piston rod cylinder >

Stainless steel cylinders

	Standards-based cylinder CRDSNU, CRDSNU-B	**Round cylinders CRDSNU, CRDSNU-B**	**Standards-based cylinders CRDNG, CRDNGS**	**Round cylinders CRHD**
Mode of operation	Double-acting	Double-acting	Double-acting	Double-acting
Piston diameter	12 mm, 16 mm, 20 mm, 25 mm	32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm	32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm, 125 mm	32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm
Theoretical force at 0.6 MPa (6 bar, 87 psi), advancing	68 ... 295 N	483 ... 4712 N	483 ... 7363 N	483 ... 4712 N
Stroke	1 ... 500 mm	1 ... 500 mm	10 ... 2000 mm	10 ... 500 mm
Cushioning	Elastic cushioning rings/plates at both ends, Self-adjusting pneumatic end-position cushioning, Pneumatic cushioning, adjustable at both ends	Elastic cushioning rings/plates at both ends, Self-adjusting pneumatic end-position cushioning, Pneumatic cushioning, adjustable at both ends	Pneumatic cushioning, adjustable at both ends	Pneumatic cushioning, adjustable at both ends
Description	• ISO 6432 • Corrosion resistant against aggressive ambient conditions • Easy-to-clean design • Long service life thanks to optional dry-running seal • Wide range of variants for customised applications • Self-adjusting pneumatic end-position cushioning saves time during commissioning and adapts optimally to load and speed changes • For position sensing	• Corrosion resistant against aggressive ambient conditions • Easy-to-clean design • Long service life thanks to optional dry-running seal • Wide range of variants for customised applications • Self-adjusting pneumatic end-position cushioning saves time during commissioning and adapts optimally to load and speed changes • For position sensing	• ISO 15552 (ISO 6431, VDMA 24562) • Corrosion resistant against aggressive ambient conditions • Easy-to-clean design • Variants: through piston rod, heat-resistant design • Threaded mounting, mounting via accessories • For position sensing	• Corrosion resistant against aggressive ambient conditions • Easy-to-clean design, optimised for very exacting demands • Flexible design thanks to different end caps • Piston rod with male thread • For position sensing
online: →	crdnsu	crdsnu	crdng	crhd

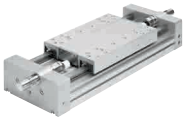
Rodless cylinders >

Mechanically coupled cylinders

	Linear drives DLGF	**Linear drives DGC-K**	**Linear drives DGC-G, DGC-GF, DGC-KF**
Mode of operation	Double-acting	Double-acting	Double-acting
Piston diameter	20 mm, 25 mm, 32 mm, 40 mm	18 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm, 80 mm	8 mm, 12 mm, 18 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm
Theoretical force at 0.6 MPa (6 bar, 87 psi), advancing	188 ... 754 N	153 ... 3016 N	30 ... 1870 N
Stroke	50 ... 1000 mm	1 ... 8500 mm	1 ... 8500 mm
Cushioning	Self-adjusting pneumatic end-position cushioning	Pneumatic cushioning, adjustable at both ends	Elastic cushioning rings/plates at both ends, Pneumatic cushioning, adjustable at both ends, Shock absorber, hard characteristic curve, Shock absorber, soft characteristic curve
Position sensing	Via proximity switch	Via proximity switch	Via proximity switch
Description	• Extremely flat design • Choice of two types of cushioning: self-adjusting pneumatic end-position cushioning or external hydraulic shock absorbers • Supply port on the left or right or at both ends or alternatively from below • Loads and devices can be directly mounted on the slide • Basic design DLGF-G without external guide for simple drive functions in small installation spaces • Recirculating ball bearing guide DLGF-KF with a standard recirculating ball bearing guide for high torques and heavy loads	• Compact design: 30% smaller than basic design DGC-G • Basic drive without guide, for simple drive functions • Low moving dead weight • Symmetrical design	• All settings accessible from one side • Available with variable end stops and intermediate position module • Optional: NSF-H1 lubricant for the food zone (see www.festo.com/certificates/DGC) • Optional: clamping unit for holding loads • Sustainable operation thanks to leakage reduction at sealing points
online: →	**dlgf**	**dgc-k**	**dgc**

Rodless cylinders >

Mechanically coupled cylinders

	 **Linear drives with heavy-duty guide DGC-HD**	**Linear drives SLG**
Mode of operation	Double-acting	Double-acting
Piston diameter	18 mm, 25 mm, 40 mm	8 mm, 12 mm, 18 mm
Theoretical force at 0.6 MPa (6 bar, 87 psi), advancing	153 ... 754 N	30 ... 153 N
Stroke	1 ... 5000 mm	100 ... 900 mm
Cushioning	Shock absorber, hard characteristic curve, Shock absorber, soft characteristic curve	Elastic cushioning rings/plates at both ends, Shock absorber, hard characteristic curve
Position sensing	Via proximity switch	Via proximity switch
Description	• For maximum loads and torques thanks to duo guide rail • Very good operating performance under torque load • Long service life • Ideal as a basic axis for linear gantries and cantilever axes • Wide range of adaptation options on the drives	• Extremely flat design • Highest precision thanks to integrated recirculating ball bearing guide • Adjustable end stops • Wide range of supply ports • Available with intermediate position module
online: ➔	dgc-hd	slg

Rodless cylinders >

Magnetically coupled cylinders

	Linear drives DGO	**Linear drive units SLM**
Mode of operation	Double-acting	Double-acting
Piston diameter	12 mm, 16 mm, 20 mm, 25 mm, 32 mm, 40 mm	12 mm, 16 mm, 20 mm, 25 mm, 32 mm, 40 mm
Theoretical force at 0.6 MPa (6 bar, 87 psi), advancing	68 ... 754 N	68 ... 754 N
Stroke	10 ... 4000 mm	10 ... 1500 mm
Cushioning	Elastic cushioning rings/plates at both ends, Pneumatic cushioning, adjustable at both ends	Elastic cushioning rings/plates at both ends, Shock absorber, hard characteristic curve
Position sensing	Via proximity switch	Via proximity switch, Via inductive sensors
Description	• Magnetic power transmission • Pressure-tight and zero leakage • Dirt-proof and dust-proof • Sustainable operation thanks to leakage reduction at sealing points	• Magnetic power transmission • Recirculating ball bearing guide: combination of slide unit and rodless linear drive • Individual choice of end-position cushioning and sensing
online: ➔	dgo	slm

Software tools

Mass moment of inertia

Juggling pencils and pocket calculators is now a thing of the past. No matter whether you have discs, blocks, push-on flanges, grippers, etc., this tool does the job of calculating all the mass moments of inertia. Just save, send or print and you're finished.

This tool can be found at
➔ **www.festo.com/x/mass-moment-of-inertia**

Semi-rotary drives >

Semi-rotary vane drives

	Semi-rotary drives DRVS ★	**Semi-rotary drives DSM**	**Semi-rotary drives DSM-B, DSM-HD-B**
Size	12, 16, 25, 32, 40, 6, 8	10, 6, 8	12, 16, 25, 32, 40, 63
Theoretical torque at 0.6 MPa (6 bar, 87 psi)	0.15 ... 20 Nm	0.15 ... 1.7 Nm	1.25 ... 80 Nm
Permissible mass moment of inertia	6.5 ... 350 kgcm²	6.5 ... 26 kgcm²	50 ... 5000 kgcm²
Position sensing	Via proximity switch	Via proximity switch, Without	Via proximity switch
Swivel angle	0 ... 270 deg	0 ... 240 deg	0 ... 270 deg
Description	• Double-acting semi-rotary drive with rotary vane • Lighter than other semi-rotary drives • Fixed swivel angle, adjustable swivel angle possible with the help of accessories • Housing protected against splash water and dust • Sustainable in production thanks to reduced use of materials	• Double-acting semi-rotary drive with rotary vane or with tandem rotary vane • Fixed or infinitely adjustable swivel angle • With spigot shaft or hollow flange shaft • With elastic cushioning rings/plates at both ends	• Double-acting semi-rotary drive with rotary vane, with tandem rotary vane or with heavy-duty bearing • Swivel angle is infinitely adjustable over the entire swivel range • With elastic cushioning rings/plates at both ends, adjustable or with shock absorbers at both ends, self-adjusting
online: ➔	drvs	dsm	dsm

Semi-rotary drives >

Semi-rotary drives with rack and pinion

	 Semi-rotary drives DRRD ★
Size	10, 12, 16, 20, 25, 32, 35, 40, 50, 63, 8
Theoretical torque at 0.6 MPa (6 bar, 87 psi)	0.2 ... 112 Nm
Permissible mass moment of inertia	15 ... 420000 kgcm²
Position sensing	Via proximity switch
Swivel angle	180 deg
Description	• Twin-piston drive, power transmission via rack and pinion principle • Extremely accurate in the end positions • Very high load bearing capacity • Very good axial run-out at the flanged shaft • Greater stability even with smaller sizes • Sustainable in production thanks to reduced use of materials
online: ➔	drrd

Semi-rotary drives >

Swivel/linear drive units

	 Swivel/linear units DSL-B
Piston diameter	16 mm, 20 mm, 25 mm, 32 mm, 40 mm
Theoretical torque at 0.6 MPa (6 bar, 87 psi)	1.25 ... 20 Nm
Permissible mass moment of inertia	0.35 ... 40 kgcm²
Position sensing	Via proximity switch
Swivel angle	0 ... 272 deg
Description	• Rotary and linear motion can be controlled individually or simultaneously • High repetition accuracy • With plain or recirculating ball bearing guide • Through piston rod
online: ➔	dsl

Pneumatic special cylinders >

Tandem and high-force cylinders

	High-force cylinders ADNH	Tandem cylinders DNCT
Mode of operation	Double-acting	Double-acting
Piston diameter	25 mm, 40 mm, 63 mm, 100 mm	32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm, 125 mm
Stroke	5 ... 150 mm	2 ... 500 mm
Theoretical force at 0.6 MPa (6 bar, 87 psi), advancing	1036 ... 18281 N	898 ... 14244 N
Cushioning	Elastic cushioning rings/plates at both ends	Pneumatic cushioning, adjustable at both ends
Description	• Max. 4 cylinders can be combined • Increased thrust force • Only 2 connections are required to pressurise all cylinders • Piston rod with female or male thread • For position sensing • Mounting hole pattern to ISO 21287	• Max. 2 cylinders can be combined • Thrust and return force increase • Piston rod with male thread • For position sensing • Mounting hole pattern to ISO 15552
online: →	adnh	dnct

Pneumatic special cylinders >

Multi-position cylinders

	Multi-position cylinders ADNM
Piston diameter	25 mm, 40 mm, 63 mm, 100 mm
Potential stroke of intermediate positions	1 ... 400 mm
Possible stroke of the last cylinder position	1 ... 2000 mm
Theoretical force at 0.6 MPa (6 bar, 87 psi), advancing	295 ... 4712 N
Max. total of all individual strokes	1000 mm, 2000 mm
Description	• Mounting hole pattern to ISO 21287 • Piston rod with female or male thread • 2 ... 5 cylinders can be combined • Max. 5 positions can be approached • For position sensing
online: →	adnm

Drives with guides >

Linear slides

	NEW **Mini slide** **DGSS**	 **Mini slides** **DGST** ★	 **Mini slides** **DGSL**
Piston diameter	6 mm, 10 mm, 16 mm, 20 mm	6 mm, 8 mm, 10 mm, 12 mm, 16 mm, 20 mm, 25 mm	6 mm, 8 mm, 10 mm, 12 mm, 16 mm, 20 mm, 25 mm, 32 mm
Theoretical force at 0.6 MPa (6 bar, 87 psi), advancing	17 ... 188 N	34 ... 589 N	17 ... 483 N
Stroke	5 ... 60 mm	10 ... 200 mm	10 ... 200 mm
Cushioning	Elastomer cushioning, double-sided, stroke not adjustable	Short elastic cushioning rings/pads at both ends, Elastomer cushioning, double-sided, stroke not adjustable, Elastic cushioning rings/pads at both ends with fixed stop, Elastic cushioning rings/plates at both ends, External hydraulic cushioning	Short elastic cushioning rings/pads at both ends, No cushioning, Elastic cushioning rings/plates at both ends, Elastic cushioning rings/pads at both ends with fixed stop, Self-adjusting, progressive shock absorber at both ends, with reducing sleeve, Progressive shock absorber at both ends
Position sensing	Via proximity switch	Via proximity switch	Via proximity switch
Description	• Recommended for production systems for manufacturing lithium-ion batteries • Slim design • Excellent positioning accuracy • Precise and resilient roller bearing guide • Optimum price/performance ratio • Slide and yoke plate from one component • Can be operated without additional cushioning elements • Optional: stroke adjustment and external cushioning using accessories	• Powerful twin-piston drive • Shortest mini slide on the market • Precise recirculating ball bearing guide • Versatile mounting options • Version with mirrored supply port configuration and sensor slots for compact assembly available to order using the configurator • Variants recommended for production systems for manufacturing lithium-ion batteries • Sustainable in production thanks to reduced use of materials	• High load capacity and positioning accuracy • Maximum movement precision thanks to ground-in ball bearing cage guide • Maximum flexibility thanks to 8 sizes and a large selection of cushioning variants • Variants with clamping unit or end-position locking for fixing the guide slide • Wide variety of mounting and attachment options • Compact design
online: →	dgss	dgst	dgsl

Drives with guides >

Linear slides

	Mini slides DGSC	**Mini slides SLF**	**Mini slides SLS**
Piston diameter	6 mm	6 mm, 10 mm, 16 mm	6 mm, 10 mm, 16 mm
Theoretical force at 0.6 MPa (6 bar, 87 psi), advancing	17 N	17 ... 121 N	17 ... 121 N
Stroke	10 mm	10 ... 80 mm	5 ... 30 mm
Cushioning	Elastic cushioning rings/plates at both ends	Elastic cushioning rings/plates at both ends	Elastic cushioning rings/plates at both ends
Position sensing	Without	Via proximity switch	Via proximity switch
Description	• Smallest guided slide unit on the market • Precision ball bearing cage guide for a reliable and high-quality process • Long service life thanks to housing made from high-alloy steel • Low break-away pressure and uniform movement thanks to minimal friction of guide and seal	• Flat design • Ball bearing cage guide • Versatile mounting options • Easy adjustment of end positions	• Slim design • Ball bearing cage guide • Versatile mounting options
online: →	dgsc	slf	sls

Drives with guides >

Drives with guide rods

	Twin cylinder DGTZ	**Guided drives DFM, DFM-B** ★	**Guided drive, NPT DFM**	**Guided drives DGRF**
Piston diameter	6 mm, 10 mm, 16 mm, 20 mm, 25 mm, 32 mm	6 mm, 10 mm, 12 mm, 16 mm, 20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm	20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm	20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm
Theoretical force at 0.6 MPa (6 bar, 87 psi), advancing	18.6 ... 966 N	17 ... 4712 N	188 ... 1870 N	189 ... 1870 N
Stroke	10 ... 200 mm	5 ... 400 mm	20 ... 400 mm	10 ... 400 mm
Cushioning	Elastic cushioning rings/plates at both ends	Elastic cushioning rings/plates at both ends, Pneumatic cushioning, adjustable at both ends, Shock absorber, soft characteristic curve	Elastic cushioning rings/plates at both ends, Pneumatic cushioning, adjustable at both ends, Shock absorber, soft characteristic curve	Elastic cushioning rings/plates at both ends, Self-adjusting pneumatic end-position cushioning, Pneumatic cushioning, adjustable at both ends
Position sensing	Via proximity switch	Via proximity switch	Via proximity switch	Via proximity switch
Description	• Minimal space requirement • Minimal mounting time • High resistance to torques and lateral forces • High rigidity thanks to its guide rods with large diameter and two plain-bearing bushes • Wide range of mounting options • Drive and guide unit in a single housing • Plain bearing	• Drive and guide unit in a single housing • High resistance to torques and lateral forces • Plain or recirculating ball bearing guide • Wide variety of mounting and attachment options • Wide range of variants for customised applications • Variants recommended for production systems for manufacturing lithium-ion batteries	• High resistance to torques and lateral forces • Plain or recirculating ball bearing guide • Wide variety of mounting and attachment options • Wide range of variants for customised applications • Drive and guide unit in a single housing	• Easy-to-clean design • Increased corrosion protection • FDA-approved lubrication and sealing on the basic version • Hygienic mounting of the sensors possible • Compact design with high guide precision and load capacity • Long service life thanks to optional dry-running seal • Self-adjusting pneumatic end-position cushioning saves time during commis-sioning and adapts optimally to load and speed changes
online: →	dgtz	dfm	dfm	dgrf

Drives with guides >

Drives with guide rods

	Compact cylinders ADNGF	**Mini guided drives DFC**	**Twin cylinders DPZ**	**Twin cylinders DPZJ**
Piston diameter	12 mm, 16 mm, 20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm	4 mm, 6 mm, 10 mm	10 mm, 16 mm, 20 mm, 25 mm, 32 mm	10 mm, 16 mm, 20 mm, 25 mm, 32 mm
Theoretical force at 0.6 MPa (6 bar, 87 psi), advancing	68 ... 4712 N	7.5 ... 47 N	60 ... 966 N	60 ... 724 N
Stroke	1 ... 400 mm	5 ... 30 mm	10 ... 100 mm	10 ... 100 mm
Cushioning	Elastic cushioning rings/plates at both ends, Self-adjusting pneumatic end-position cushioning	Elastic cushioning rings/plates at both ends	Elastic cushioning rings/plates at both ends	Elastic cushioning rings/plates at both ends
Position sensing	Via proximity switch	Via proximity switch, Without	Via proximity switch	Via proximity switch
Description	• ISO 21287 • Piston rod secured against rotation by a guide rod and yoke plate • Plain bearing • Optionally with through piston rod • Higher load capacity thanks to guide rod and yoke plate • For position sensing	• Smallest guided drive • Precise and resilient • Minimal space requirement • Drive and guide unit in a single housing • Plain or recirculating ball bearing guide	• Twin pistons provide twice the force in half the space • Plain or recirculating ball bearing guide • Precision stroke adjustment in the end position	• With yoke plate on rear of cylinder for higher lateral forces and precision • Twin pistons provide twice the force in half the space • Plain or recirculating ball bearing guide • Precision stroke adjustment in the end position
online: ➔	adngf	dfc	dpz	dpzj

Stopper cylinders and feed separators >

Stopper cylinders

	Stopper cylinders DFSP	**Stopper cylinders DFST-G2**	**Stopper cylinders STAF**
Piston diameter	16 mm, 20 mm, 32 mm, 40 mm, 50 mm	32 mm, 50 mm, 63 mm, 80 mm	80 mm
Permissible impact force on the advanced piston rod	710 ... 6280 N	1000 ... 6000 N	13300 ... 14600 N
Stroke	5 ... 30 mm	20 ... 40 mm	30 ... 40 mm
Position sensing	Via proximity switch	Via proximity switch	Via proximity switch
Toggle lever position sensing		Via inductive sensors	
Description	• Trunnion version with/without protection against rotation, with/without female thread • Roller version with protection against rotation • Compact design • Sensor slots on 3 sides • Long service life thanks to very good cushioning characteristics and sturdy piston rod guide • Safe stopping of workpiece carriers, pallets and packages weighing up to 90 kg	• Toggle lever design • Integrated, adjustable shock absorber for smooth and adapted stopping • Up to 800 kg impact load • For position sensing on the piston • Adjustable active direction thanks to rotatable toggle lever set-up (90°, 180°, 270°) • Lever locking mechanism • Toggle lever deactivator • Roller version made of polyamide or steel	• Roller version • Absorption of high lateral forces • Direct mounting of solenoid valves on flange plate
online: →	**dfsp**	**dfst**	**staf**

Software tools

Feed separator

This tool helps you to select the right feed separator of the type HPV from Festo for your application.
Let yourself be guided by the program and enter the general parameters. You will receive at least one suggestion for the product best suited to your application.

This tool can be found at
➔ **www.festo.com/x/feed-separator-selection-tool**

Stopper cylinders and feed separators >

Feed separators

	Feed separators HPVS	**Feed separators HPV**
Mode of operation	Double-acting	Double-acting
Piston diameter	10 mm, 14 mm, 22 mm	10 mm, 14 mm, 22 mm
Stroke	10 ... 60 mm	10 ... 60 mm
Theoretical force at 0.6 MPa (6 bar, 87 psi), advancing	45 ... 225 N	45 ... 225 N
Description	• Version with one plunger • With non-rotating piston rod • Proximity sensor SME/SMT-8 can be integrated in the housing	• Version with two plungers • With twin piston, non-rotating piston rod and locking mechanism • Cost-effective: replaces at least two drives in the feed process • Proximity sensor SME/SMT-8 can be integrated in the housing
online: ➔	hpvs	hpv

Clamping cylinders >

Clamping modules

	Clamping modules EV
Clamping area	10x30, 15x40, 15x63, 20x75, 20x120, 20x180, Ø16 mm, Ø20 mm, Ø25 mm, Ø32 mm, Ø40 mm, Ø50 mm, Ø63 mm, Ø12 mm
Stroke	3 ... 5 mm
Description	• Compact rodless cylinder with diaphragm • Single-acting, with reset function • Flat design • Hermetically sealed • Pressure plates and foot mounting as accessories
online: ➔	ev

Clamping cylinders >

Linear/swivel clamps

	 Linear/swivel clamps **CLR**
Piston diameter	12 mm, 16 mm, 20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm
Theoretical clamping force at 0.6 MPa (6 bar, 87 psi)	51 ... 1682 N
Clamping stroke	10 ... 50 mm
Swivel angle	90° +/- 2°, 90° +/- 3°, 90° +/- 4°
Description	• Swivelling and clamping in one step • Adjustable swivel direction • Available with clamping fingers as accessories • Available with dust and welding spatter protection • Double-acting • For position sensing
online: ➔	clr

Clamping cylinders >

Hinge cylinders

	 Hinge cylinders **DWA, DWB, DWC**
Piston diameter	50 mm, 63 mm, 80 mm
Stroke	10 ... 200 mm
Theoretical force at 0.6 MPa (6 bar, 87 psi), advancing	1178 ... 3016 N
Position sensing	Via proximity switch, Without
Cushioning	Pneumatic cushioning, adjustable at both ends
Description	• For clamping components during the welding process • Double-acting • Easy to mount thanks to swivel bearing on the bearing cap • Integrated flow control • Integrated end-position cushioning • Rod wiper seal to protect against welding spatter • Asian automotive standard for car body production
online: ➔	dw

Diaphragm actuators & pneumatic spring systems >

Bellows actuators

	 Bellows cylinder **EB**
Size	145, 165, 215, 250, 325, 385, 80
Stroke	20 ... 230 mm
Description	• Use as a spring element or for reducing oscillations • Single- or double-bellows cylinder • High forces with a short stroke • Uniform movement: no stick-slip effect • Use in dusty environments or in water • Maintenance-free
online: ➔	eb

Diaphragm actuators & pneumatic spring systems >

Fluidic muscles

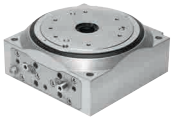
	 Fluidic muscles **DMSP**
Size	10, 20, 40, 5
Theoretical force at 0.6 MPa (6 bar, 87 psi)	140 ... 6000 N
Nominal length	30 ... 9000 mm
Max. contraction	20% of nominal length, 25% % of the nominal length
Description	• With press-fitted connection • Up to 30% less weight: a superb force/weight ratio • Single-acting, pulling • 3 integrated adapter variants • 10 times the initial force of a comparable pneumatic cylinder • Uniform movement: no stick-slip effect • Hermetically sealed design offers protection against dust, dirt and moisture
online: ➔	dmsp

Software tools

Rotary indexing table		This tool helps you to select the right rotary indexing table of the type DHTG from Festo for your application. Let yourself be guided by the program and enter the general parameters. You will receive at least one suggestion for the product best suited to your application. This tool can be found at ➔ **www.festo.com/x/rotary-indexing-table-selection**

Rotary indexing tables >

Rotary indexing tables

	 **Rotary indexing tables** **DHTG**
Size	140, 220, 65, 90
Theoretical torque at 0.6 MPa (6 bar, 87 psi)	2.1 ... 58.9 Nm
Cushioning	Shock absorber, hard characteristic curve, adjustable
Position sensing	Via inductive sensors
Indexing stations	2 ... 24
Description	• For swivelling or separating tasks • Sturdy mechanical system • Easy planning and commissioning • Rotary table diameters: 65, 90, 140, 220 mm • Free control of rotational direction
online: ➔	**dhtg**

Software tools

Shock absorber

All types of cushioned movements, whether diagonal or vertical, curved or straight, lever or disc, are taken into account. The software tool always recommends the best shock absorber.

This tool can be found at
➔ **www.festo.com/x/shock-absorber-selection-tool**

Industrial shock absorbers

	Shock absorber DYSD	**Shock absorbers DYSS** ★	**Shock absorbers DYSR**	**Shock absorbers YSR-C**
Size	12, 16, 20, 25, 32, 5, 7, 8	10, 12, 2, 3, 4, 5, 7, 8	12, 16, 20, 25, 32, 8	10, 12, 16, 20, 25, 32, 4, 5, 7, 8
Stroke	5 ... 25 mm	4 ... 12 mm	8 ... 60 mm	4 ... 60 mm
Max. energy absorption per stroke	2 ... 270 J	0.1 ... 10 J	4 ... 384 J	0.6 ... 380 J
Cushioning	Self-adjusting	Self-adjusting	Adjustable	Self-adjusting
Description	• Hydraulic shock absorber with path-controlled flow control function • Especially for applications in the pressure chamber • Short cushioning stroke • Suitable for rotary drives • Maintenance-free • Rapidly increasing cushioning force curve • Through mounting thread • With fixed stop on the housing and hexagon socket for stroke adjustment • With additional return spring for compensation in the pressure chamber	• Hydraulic shock absorber with path-controlled flow control function • Rapidly increasing cushioning force curve • Short cushioning stroke • Suitable for low-vibration operation • Variants recommended for production systems for manufacturing lithium-ion batteries	• Hydraulic shock absorber with spring return • Adjustable cushioning hardness	• Hydraulic shock absorber with path-controlled flow control function • Rapidly increasing cushioning force curve • Short cushioning stroke • Suitable for rotary drives
online: ➔	dysd	dyss	dysr	ysr-c

Industrial shock absorbers

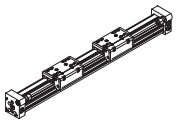
	Shock absorbers YSRW	**Shock absorbers YSRW-DGC**	**Shock absorbers YSRWJ**	**Shock absorbers DYEF-Y1, DYEF-Y1F** ★
Size	10, 12, 16, 20, 5, 7, 8	12, 18, 25, 32, 40, 50, 63, 8	5, 7, 8	M10, M12, M14, M16, M22, M4, M5, M6, M8
Stroke	8 ... 34 mm		8 ... 14 mm	0.9 ... 7 mm
Max. energy absorption per stroke	1.3 ... 70 J		1 ... 3 J	0.005 ... 1.2 J
Cushioning	Self-adjusting, Soft characteristic curve	Self-adjusting, Soft characteristic curve	Self-adjusting, Soft characteristic curve	Elastic cushioning rings/pads at both ends with metal fixed stop, Elastic cushioning rings/pads at both ends without metal fixed stop
Description	• Hydraulic shock absorber with path-controlled flow control function • Gently increasing cushioning force curve • Long cushioning stroke • Suitable for low-vibration operation • Short cycle times possible	• For linear drives DGC • Gently increasing cushioning force curve	• Cushioning with self-adjusting, progressive hydraulic shock absorber • Gently increasing cushioning force curve • Adjustable cushioning stroke • End-position sensing with proximity sensor SME/SMT-8 • Precision end-position adjustment	• Mechanical shock absorber with flexible rubber buffer • Flexible rubber buffer allows a defined metal end position • Adjustable cushioning hardness • Ideal for cushioning low energy • With precise metal end position • Variants recommended for production systems for manufacturing lithium-ion batteries
online: →	ysrw	ysrw-dgc	ysrwj	dyef

Industrial shock absorbers

	Shock absorbers DYSC	**Shock absorbers DYSW**	**Hydraulic cushioning cylinders DYHR**
Size	12, 16, 20, 25, 4, 5, 7, 8	10, 12, 4, 5, 7, 8	16, 20, 25, 32
Stroke	4 ... 25 mm	6 ... 20 mm	20 ... 60 mm
Max. energy absorption per stroke	0.6 ... 100 J	0.8 ... 12 J	32 ... 384 J
Cushioning	Self-adjusting	Self-adjusting, Soft characteristic curve	Adjustable
Description	• Hydraulic shock absorber with path-controlled flow control function • Rapidly increasing cushioning force curve • Short cushioning stroke • Suitable for rotary drives • With metal fixed stop	• Hydraulic shock absorber with path-controlled flow control function • Gently increasing cushioning force curve • Long cushioning stroke • Suitable for low-vibration operation • Short cycle times possible • With metal fixed stop	• Hydraulic cushioning cylinder for constant, slow braking speeds across the entire stroke • Braking speed can be precisely adjusted • A built-in compression spring returns the piston rod to the initial position • Suitable for slow feed speeds in the range up to 0.1 m/s
online: →	dysc	dysw	dyhr

Cylinder mounting parts and accessories

Accessories for pneumatic drives

	Mounting components ★	**Piston-rod attachments** ★	 **Guide axes DGC-FA**	**Guide units FEN, FENG**
Size	100, 100/125, 12, 12/16, 12/18, 125, 16, 160, 160/200, 18, 18/25, 20, 20/25, 200, 25, 25/32, 250, 30, 32, 32/40, 320, 40, 40/50, 50, 50/63, 6, 63, 63/80, 8, 8/10, 8/12, 80, AA 1 to VDI/VDE 3845, AA 2 to VDI/VDE 3845, AA 3 to VDI/VDE 3845, M10x1, M18x1.5, M22x1.5, M30x1.5, M8	10, 10x30, 12, 15x40, 15x63, 16, 20, 20/25, 20x120, 20x180, 20x75, 25, 32, 32/40, 35, 40, 50, 50/63, 6, 63, 8, M10, M10x1.25, M12, M12x1.25, M16, M16x1.5, M20x1.5, M27x2, M36x2, M4, M42x2, M48x2, M5, M6, M8		100, 12/16, 20, 25, 32, 40, 50, 63, 8/10, 80
Stroke			1 ... 8500 mm	1 ... 500 mm
Round material to be clamped				
Static holding force				
Performance level (PL)				
Description	• Mounting kits • Direct mountings • Foot mountings • Flange mountings • Swivel mountings • Clevis feet, trunnion supports • Multi-position kits • Slot nuts • Centring pins/sleeves	• Rod clevises • Rod eyes • Coupling pieces • Self-aligning rod couplers • Adapter	• Without drive • With recirculating ball bearing guide • With guide and freely movable slide unit • High torsional resistance • Reduced vibrations with dynamic loads • For supporting forces and torques in multi-axis applications	• For protecting standards-based cylinders against rotation at high torque loads • Plain or recirculating ball bearing guide • High guide precision for workpiece handling
online: →	n_015001	n__03150	dgc-fa	fen

Cylinder mounting parts and accessories

Accessories for pneumatic drives

	Clamping cartridges KP	**Clamping units KPE**	**Clamping units, clamping components DADL**	**Holding brakes DACS**
Size			16, 20, 25, 32, 35, 40, 50, 63	
Stroke				
Round material to be clamped	4 ... 32 mm	4 ... 32 mm		16 ... 40 mm
Static holding force	80 ... 7500 N	80 ... 7500 N		1350 ... 17000 N
Performance level (PL)				Stopping, holding, blocking a movement/category 1, Performance Level c
Description	• For in-house assembly of clamping units • Not certified for use in safety-related control systems	• Ready-to-install combination of clamping cartridge KP and housing • Wide range of mounting options	• Clamping unit DADL-EL for semi-rotary drive DRRD, for mechanical locking in the end positions to prevent unwanted movement when unpressurised • Clamping component DADL-EC: for semi-rotary drive DRRD, for securing an intermediate position in combination with the clamping unit DADL-EL • Without drive	• Holding function: retains the piston rod by clamping with frictional locking • Emergency braking function: stops the movement of the piston rod by clamping with frictional locking • With safety functions • Compact design • Optional: high level of corrosion protection • For position sensing
online: ➔	**kp**	**kpe**	**dadl**	**dacs**

Customised components – for your specific requirements

Drives with customised designs

Can't find the pneumatic drive you need in our catalogue?

We can offer you customised components that are tailored to your specific requirements.

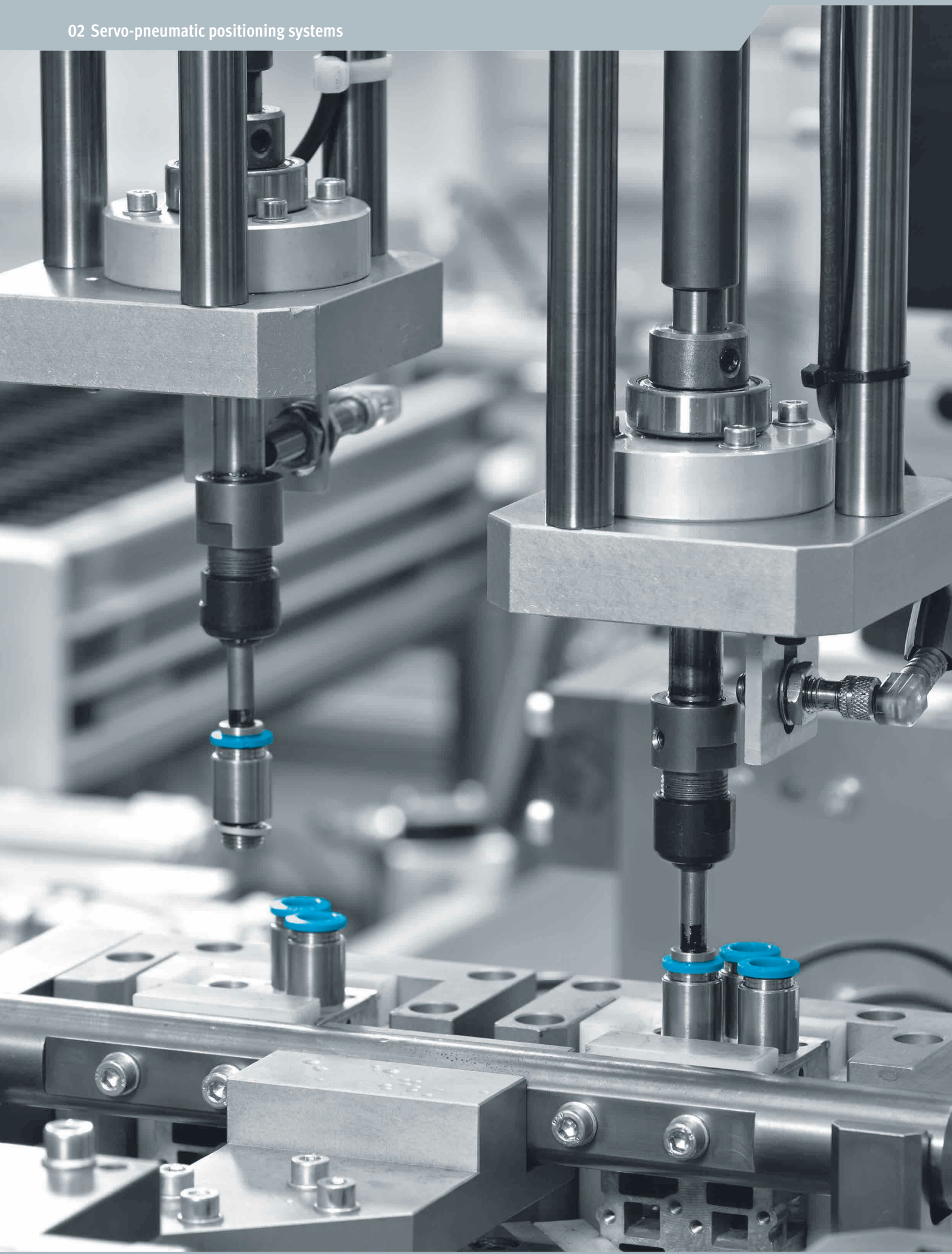
Common product modifications:
- Materials for special environmental conditions
- Customised dimensions
- Special strokes
- Customised mounting options
- Implementation of special cylinder functions (cylinder/valve combinations, single-acting principle, etc.)

Many additional variants are possible.

Ask your Festo sales engineer, who will be happy to help you:
➔ **www.festo.com/contact**

Telescopic cylinder

Festo can also supply special variants like telescopic cylinders on request – please contact us.



Drives with displacement encoder >

Linear actuators with displacement encoder

	Linear drives with displacement encoder DDLI	**Standards-based cylinders with displacement encoder DDPC**	**Standards-based cylinders with displacement encoder DNCI**
Piston diameter	25 mm, 32 mm, 40 mm, 63 mm	80 mm, 100 mm	32 mm, 40 mm, 50 mm, 63 mm
Theoretical force at 0.6 MPa (6 bar, 87 psi), advancing	295 ... 1870 N	3016 ... 4712 N	415 ... 1870 N
Max. load, horizontal	2 ... 180 kg	300 ... 450 kg	45 ... 180 kg
Max. load, vertical	2 ... 60 kg	100 ... 150 kg	15 ... 60 kg
Stroke	100 ... 2000 mm	10 ... 2000 mm	10 ... 2000 mm
Description	• Based on linear drive DGC-K • Without guide • With displacement encoder for contactless measurement • Suitable for positioning with axis controller CPX-CMAX • Suitable for end-position control with end-position controller CPX-CMPX or SPC11 • Measures absolute values • Can be used as a measuring cylinder • Degree of protection IP67 • For attachment to customer's own guide • Supply ports on end face	• Standards-based cylinder to ISO 15552 • With displacement encoder for contactless measurement • Suitable for positioning with axis controller CPX-CMAX • Suitable for end-position control with end-position controller CPX-CMPX or SPC11 • Can be used as a measuring cylinder • Piston rod variants • Fixed cushioning • With optional recirculating ball bearing guide, clamping unit	• Standards-based cylinder to ISO 15552 • With integrated displacement encoder for relative analogue, contactless measurement • Suitable for servo-pneumatic applications with axis controller CPX-CMAX, end-position controller CPX-CMPX or SPC11 and measuring module CPX-CMIX • Piston rod with male thread • Piston rod variants • With optional recirculating ball bearing guide, clamping unit
online: →	ddli	ddpc	dnci

Drives with displacement encoder >

Linear actuators with displacement encoder

	Linear drives with displacement encoder DGCI	**Linear drives with displacement encoder DFPI**
Piston diameter	18 mm, 25 mm, 32 mm, 40 mm, 63 mm	100 mm, 125 mm, 160 mm, 200 mm, 250 mm, 320 mm
Theoretical force at 0.6 MPa (6 bar, 87 psi), advancing	153 ... 1870 N	4712 ... 48255 N
Max. load, horizontal	1 ... 180 kg	
Max. load, vertical	1 ... 60 kg	
Stroke	100 ... 2000 mm	40 ... 990 mm
Description	• With guide • With displacement encoder for absolute, contactless measurement • Suitable for servo-pneumatic applications with axis controller CPX-CMAX, end-position controller CPX-CMPX or SPC11 and measuring module CPX-CMIX • Choice of supply ports on end face or front	• Mounting interfaces to ISO 15552 on bearing and end caps • Sturdy tie rod design • Integrated air supply • Optionally with integrated displacement encoder or fully integrated positioner • IP65, IP67, IP69K, NEMA4 • To EU Explosion Protection Directive (ATEX)
online: →	dgci	dfpi

Drives with displacement encoder >

Swivel modules with displacement encoder

	 Semi-rotary drives with angular displacement encoder **DSMI-B**
Piston diameter	40 mm
Theoretical torque at 0.6 MPa (6 bar, 87 psi)	20 Nm
Max. mass moment of inertia, horizontal	0.12 kgm²
Max. mass moment of inertia, vertical	0.12 kgm²
Position sensing	Via proximity switch, Via integrated angular displacement encoder
Swivel angle	0 ... 272 deg
Cushioning	Elastic cushioning rings/plates at both ends
Description	• With rotary vane • Integrated rotary potentiometer • Suitable for servo-pneumatic applications with axis controller CPX-CMAX, end-position controller CPX-CMPX or SPC11 and measuring module CPX-CMIX • Compact design
online: ➔	dsmi

Axis controllers

	 Axis controllers **CPX-CMAX**	 **End-position controllers** **CPX-CMPX**	 **End-position controllers** **SPC11**
No. of axis strings	1	1	
Axes per string	1	1	
Digital inputs			8, To IEC 61131-2, Positive logic (PNP), No galvanic isolation
Digital outputs			5
Description	• Axis controller as CPX module, supports pneumatic drives with piston rod, rodless drives and semi-rotary drives • Force and position control • Use with all fieldbuses/Ethernet and controllers CEC available on CPX • Easy commissioning thanks to auto identification function • Rapid commissioning and comprehensive diagnostics with FCT configuration software (Festo Configuration Tool)	• Electronic end-position control for pneumatic drives • Soft Stop for smooth braking and quick acceleration • Use with all fieldbuses/Ethernet available on CPX • Easy commissioning with Festo plug plug & work • Approx. 30% shorter travel times and 30% less air consumption than with comparable standard pneumatics • End positions with 2 additional, freely positionable intermediate positions	• Quickly and smoothly into the end position with 2 additional intermediate positions • Electronic end-position cushioning • Quick and easy commissioning: configure, teach, done • Supports pneumatic drives with piston rod, rodless drives and semi-rotary drives
online: ➔	cpx-cmax	cpx-cmpx	spc11

Displacement encoders

	Displacement encoders MLO-POT-TLF	**Displacement encoders MLO-POT-LWG**	**Displacement encoders MME-MTS-TLF**
Stroke	225 ... 2000 mm	100 ... 750 mm	225 ... 2000 mm
Measuring principle of displacement encoder	Analogue	Analogue	Digital
Output signal	Analogue	Analogue	CAN protocol type SPC-AIF
Displacement resolution	0.01 mm	0.01 mm	<0.01 mm
Description	• Conductive plastic potentiometer • Absolute measurement with high resolution • High travel speed and long service life • Plug-in connections	• Connecting rod potentiometer • Absolute measurement with high resolution • Long service life • Degree of protection IP65 • Plug-in connections	• Measuring principle: magnetostrictive • Contactless with absolute measurement • High travel speed • System product for servo-pneumatic positioning technology and Soft Stop • Degree of protection IP65
online: →	mlo	mlo	mme

Proportional directional control valves

Proportional valves

	Proportional directional control valves VPWP	**Proportional directional control valves MPYE**	**Proportional directional control valves VPWS**
Valve function	5/3-way proportional directional control valve, closed	5/3 closed	2/2 proportional directional control valve, closed
Pneumatic connection 1	G1/4, G1/8, G3/8	G1/4, G1/8, G3/8, M5	Cartridge 7.5 mm, Cartridge 15 mm
Operating pressure for positioning/Soft Stop	4 ... 8 bar		
Operating pressure [MPa]	0 ... 1 MPa	0 ... 1 MPa	0 ... 1 MPa
Operating pressure	0 ... 10 bar	0 ... 10 bar	0 ... 10 bar
Standard nominal flow rate	350 ... 2000 l/min	100 ... 2000 l/min	
Description	• Controlled piston spool valve • Digitally actuated • Integrated pressure sensors for monitoring function and force control • With auto identification • Diagnostic function • Integrated digital output, e.g. for a clamping/brake unit • Suitable for servo-pneumatic applications with axis controller CPX-CMAX and end-position controller CPX-CMPX	• Controlled piston spool valve • Analogue actuation • Setpoint input as analogue voltage signal (0 ... 10 V) • Suitable for servo-pneumatic applications with end-position controller SPC11	• Directly actuated poppet valve • Operating medium: air, oxygen, inert gases • Extremely small and lightweight • Compact and cost-effective • Mounting: on sub-base
online: →	vpwp	mpye	vpws

Sensor interfaces

	Sensor interfaces CASM	**Measured-value transducers DADE**
Diagnostic function	Display via LED	Display via LED
Electrical connection, displacement encoder	Socket, 8-pin, 5-pin, M12	Socket, 8-pin, M12
Electrical connection, control interface	Plugs, 5-pin, M9	
Control interface	Digital, CAN bus with Festo protocol, Without terminating resistor	
Description	• For controlling pneumatic positioning drives with the latest servo-pneumatic systems such as CPX-CMAX, CPX-CMPX and CPX-CMIX • Short cables for analogue signals, secure digitised bus transmission • Convenient plug and work concept with auto identification and comprehensive diagnostics • High degree of protection IP67	• For standards-based cylinders DNCI and DDPC • Converts sensor signals into voltage or current signals • Mounting via through-holes
online: ➔	**casm**	**dade**

Cables and accessories >

Connecting cables for valves

	Connecting/plug sockets with cable KMPYE-AIF, KMPYE-5
Electrical connection, connection type	Socket, Cable, Plugs
Electrical connection, cable outlet	Straight
Electrical connection, design	Round
Electrical connection, connection technology	M9x0.5, M12x1, A-coded to EN 61076-2-101, Open end
Electrical connection, number of pins/wires	4, 7
Cable length	0.3 ... 5 m
Description	• For solenoid coils with thread M12x1 A-coded according to EN 61076-2-101 • For connecting proportional directional control valves MPYE with end-position controller SPC11 • Cable length 0.3 ... 5 m • With PVC or PUR cable • Ambient temperature -25 ... +80 °C
online: ➔	**kmpye**

Cables and accessories >

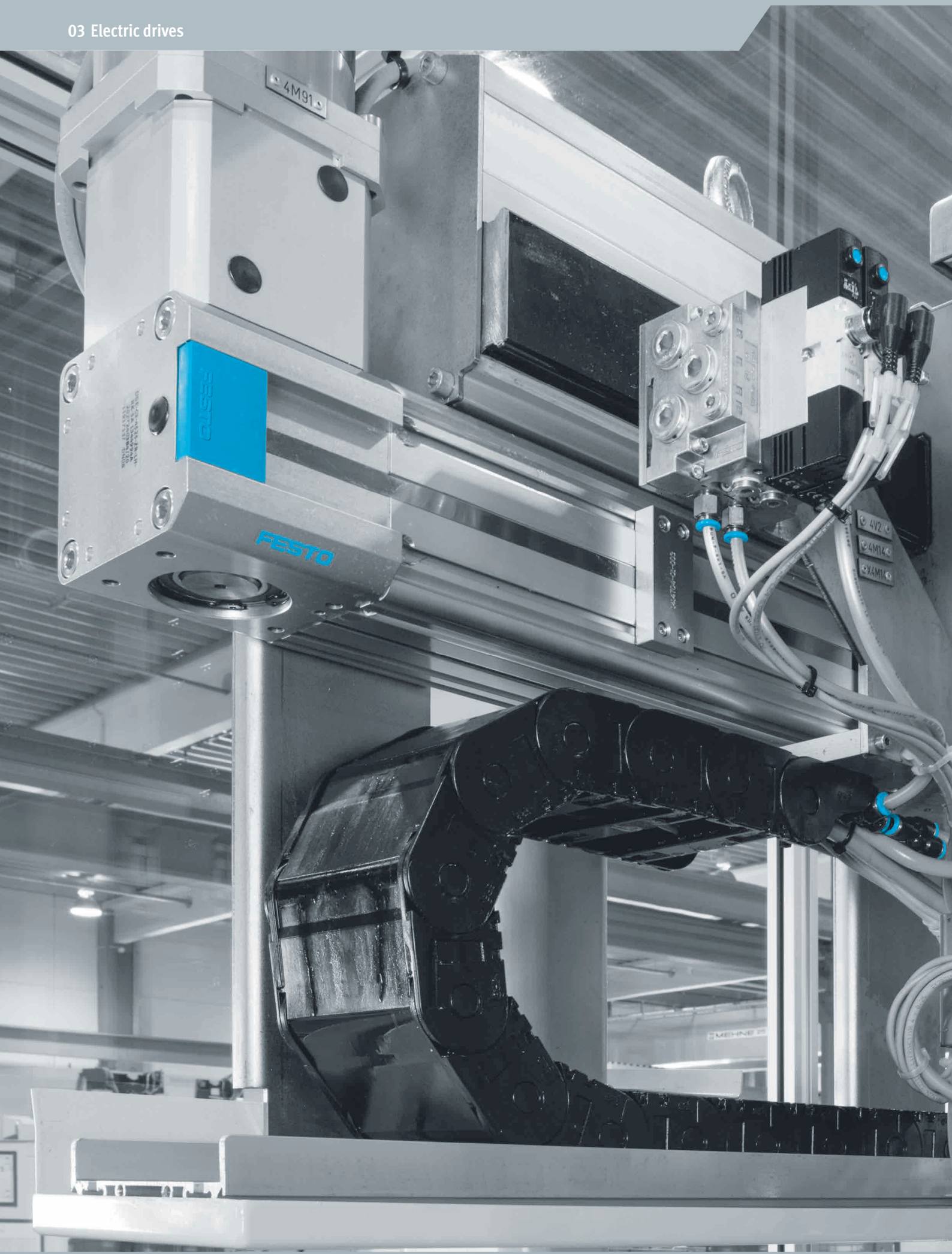
Connecting cables for valve terminals

	 Connecting cables KVI
Electrical connection, connection type	Socket, Plugs
Electrical connection, cable outlet	Straight, Angled
Electrical connection, design	Round
Electrical connection, connection technology	M9x0.5
Electrical connection, number of pins/wires	5
Cable length	0.25 ... 8 m
Description	• For fieldbus connection with thread M9x0.5 • Connecting cable between valve terminal and controller • Connecting cable between valve terminal and input/output modules • Connecting cable between controller and input/output modules • Pre-assembled at both ends • Suitable for use with energy chains • With PUR cable • Ambient temperature -20 ... +80 °C
online: →	**kvi**

Cables and accessories >

Plugs for control systems

	 Plug connectors FBS-SUB-9-WS
Electrical connection, connection type	Plug
Electrical connection, design	Straight
Electrical connection, connection technology	Type A, M12x1, screw terminal
Description	• Plug connector for CAN bus and PROFIBUS bus connection • Cable connection 2x horizontal or 2x vertical • PCB terminal block with screw connector
online: →	**fbs-sub-9-ws**


4M91
FESTO
4V2
4M14
X4M1

Software tools

Electric Motion Sizing		Find the right electric or electromechanical servo drive. This is how you can quickly and easily find the right electromechanical drive solution for your application: Electric Motion Sizing, the online sizing and simulation tool for electric drives (servo drives and motors = servo drive package) as well as for electromechanical drive solutions (= electromechanical servo drive package consisting of servo drives and motors as well as mechanics) helps you do this. This tool can be found at ➔ **www.festo.com/x/electric-motion-sizing**
Simplified Motion Series – Solution Finder		The simplicity of pneumatics is now combined for the first time with the advantages of electric automation thanks to the Simplified Motion Series. These integrated drives are the perfect solution for all users who are looking for an electric alternative for very simple movement and positioning tasks, but don't want the commissioning process for traditional electric drive systems that can often be quite complex. This tool can be found at ➔ **www.festo.com/x/simplified-motion-series**
CO2 & TCO Guide		CO2 values and TCO for your application. Take a quantum leap in automation technology. By using suitable components from Festo in an intelligent way, you can reduce the energy consumption of your systems and thus specifically lower your production's carbon emissions. This tool can be found at ➔ **www.festo.com/x/co2-tco**

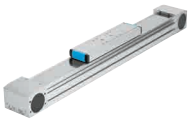
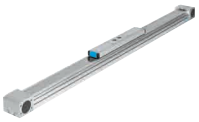
Electric axes

	Toothed belt axes EGC-TB-KF ★	**Spindle axes EGC-BS-KF** ★	**Toothed belt axes EGC-HD-TB**	**Spindle axes EGC-HD-BS**
Size	120, 185, 50, 70, 80	120, 185, 70, 80	125, 160, 220	125, 160, 220
Max. feed force Fx	50 ... 2500 N	400 ... 3000 N	450 ... 1800 N	400 ... 1500 N
Repetition accuracy	+/-0.08 mm, +/-0.1 mm	+/-0.02 mm		+/-0.02 mm
Working stroke	50 ... 8500 mm	50 ... 3000 mm	50 ... 5000 mm	50 ... 2400 mm
Description	• Axis for high speeds and acceleration • Recirculating ball bearing guide for high loads and torques • Optionally with clamping unit, at one or both ends • Profile with optimised rigidity • 22 types in stock with short delivery times and modular products for custom variants	• Axis for high repeat accuracy • Recirculating ball bearing guide for high loads and torques • Optionally with clamping unit, at one or both ends • Profile with optimised rigidity • Various spindle pitches • The optional spindle support enables maximum travel speed • Axial or parallel motor mounting	• With heavy-duty guide • Axis for high speeds and acceleration • For high loads and torques, high feed forces • Precise and resilient DUO guide rail • Motor can be mounted on 4 sides • For maximum lateral load up to 900 Nm	• With heavy-duty guide • Axis for high repeat accuracy • With integrated ball screw • For maximum loads and torques • Precise and resilient DUO guide rail • For maximum lateral load up to 900 Nm • Ideal as a basic axis for linear gantries and cantilever axes • The optional spindle support enables maximum travel speed
online: ➔	egc	egc	egc	egc

Electric axes

	Toothed belt axes **ELGC-TB-KF**	**Spindle axes** **ELGC-BS-KF**	**Spindle axes** **ELGT-BS**	**Spindle axes** **ELGA-BS-KF**
Size	45, 60, 80	32, 45, 60, 80	120, 160, 90	120, 150, 70, 80
Max. feed force Fx	75 ... 250 N	40 ... 350 N	805 ... 1575 N	650 ... 6400 N
Repetition accuracy	+/-0.1 mm	+/-0.01 mm, +/-0.015 mm	+/-0.02 mm	+/-0.02 mm
Working stroke	200 ... 2000 mm	100 ... 1000 mm	50 ... 1400 mm	50 ... 3000 mm
Description	• Precision guide rail with high load capacity • Internal guide and toothed belt • Flexible motor mounting • The toothed belt axes, spindle axes ELGC and mini slides EGSC form a scalable modular system for compact automation • Variants recommended for production systems for manufacturing lithium-ion batteries	• Internal guide and ball screw drive • Space-saving position sensing • Flexible motor mounting • The toothed belt axes, spindle axes ELGC and mini slides EGSC form a scalable modular system for compact automation • Variants recommended for production systems for manufacturing lithium-ion batteries	• Great resilience and rigidity due to double-acting guide • Compact design • With ball screw drive • Optimal ratio between installation space and working space due to the optimised axis design • Simple integration of motors with mounting kits • Optimised for use in the electronics and automotive industry	• Internal, precision recirculating ball bearing guide with high load capacity for high torque loads • Guide and ball screw protected by cover strip • For the highest requirements in terms of feed force and accuracy • Speeds up to 2 m/s with high acceleration up to 15 m/s² • Space-saving position sensing • Flexible motor mounting • 34 preconfigured types and modular product system for custom variants
online: →	elgc-tb	elgc-bs	elgt	elga

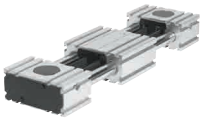
Electric axes

				
	Toothed belt axes ELGA-TB-G	**Toothed belt axes ELGA-TB-KF**	**Toothed belt axes ELGA-TB-RF**	**Toothed belt axis units ELGS-TB-KF**
Size	120, 70, 80	120, 150, 70, 80	120, 70, 80	45, 60
Max. feed force Fx	350 ... 1300 N	260 ... 2000 N	260 ... 1000 N	65 ... 75 N
Repetition accuracy	+/-0.08 mm	+/-0.08 mm	+/-0.08 mm	+/-0.1 mm
Working stroke	50 ... 8500 mm	50 ... 8500 mm	50 ... 7400 mm	50 ... 2000 mm
Description	• Integrated plain-bearing guide • For small and medium loads • Low guide backlash • Drive component for external guides • Speeds up to 5 m/s with high acceleration up to 50 m/s² • Flexible motor mounting • Motor can be mounted on 4 sides	• Recirculating ball bearing guide for high loads and torques • High feed forces • Precision guide rail with high load capacity • Speeds up to 5 m/s with high acceleration up to 50 m/s² • Optional: Food-safe (for further information, see www.festo.com/certificates/ELGA_KF) • Flexible motor mounting • Guide and toothed belt protected by cover band • 22 types in stock with short delivery times and modular products for custom variants	• Integrated roller bearing guide • High speeds up to 10 m/s with high acceleration up to 50 m/s² • Guide backlash = 0 mm • Very good operating performance under torque load • Sturdy alternative for the recirculating ball bearing guide • As an actuator for external guides, especially for high speeds • Motor can be mounted on 4 sides	• Complete solution consisting of integrated drive, motor and servo drive • Resilient toothed belt with long service life • Ideal for precise XY movements, e.g. in assembly plants or when handling small parts as well as for test and inspection systems • Protected against external influences by internal guide • Clean look design: easy to clean and less prone to soiling • Integrated end position sensing • Two control options integrated as standard: digital I/O and IO-Link • Easy commissioning according to the plug and work principle: all parameters are manually adjustable directly on the drive without requiring any software or special expertise • Two sizes with speeds of up to 1.3 m/s at a max. stroke of 2000 mm • Product of the Simplified Motion Series: doesn't need any external servo drive or any control cabinet for the installation
online: →	**elga**	**elga**	**elga**	**elgs-tb**

Electric axes

	Spindle axis units **ELGS-BS-KF**	**Toothed belt axis units** **ELGE-TB**	**Toothed belt axes** **ELGG**
Size	32, 45, 60	35	35, 45, 55
Max. feed force Fx	40 ... 200 N	50 N	50 ... 350 N
Repetition accuracy	+/-0.01 mm, +/-0.015 mm	+/-0.1 mm	+/-0.1 mm
Working stroke	100 ... 800 mm	50 ... 800 mm	50 ... 1200 mm
Description	• Complete solution consisting of integrated drive, motor and servo drive • Powerful ball screw drive • Ideal for precise XY movements, e.g. in assembly plants or when handling small parts as well as for test and inspection systems • Protected against external influences by internal guide • Clean look design: easy to clean and less prone to soiling • Integrated end position sensing • Two control options integrated as standard: digital I/O and IO-Link • Easy commissioning according to the plug and work principle: all parameters are manually adjustable directly on the drive without requiring any software or special expertise • Three sizes for a payload of up to 20 kg at a max. stroke of 800 mm • Product of the Simplified Motion Series: doesn't need any external servo drive or any control cabinet for the installation	• Complete solution consisting of integrated drive, motor and servo drive • Cost-optimised design for easy motion and positioning tasks between two mechanical end positions as well as intermediate positions • Running performance of 5000 km • Freely selectable motor mounting position on four sides • Integrated end position sensing • Two control options integrated as standard: digital I/O and IO-Link • Easy commissioning according to the plug and work principle: all parameters are manually adjustable directly on the drive without requiring any software or special expertise • Product of the Simplified Motion Series: doesn't need any external servo drive or any control cabinet for the installation	• Toothed belt axis with two opposing slides • With low-cost plain bearing and precise ball bearing guide • Optional central support improves the rigidity • Motor can be mounted on 4 sides
online: ➔	elgs-bs	elge-tb	elgg

Electric axes

	 **Toothed belt axes** **ELGR-TB**	**Cantilever axes** **ELCC-TB-KF**
Size	35, 45, 55	110, 60, 70, 90
Max. feed force Fx	50 ... 350 N	300 ... 2500 N
Repetition accuracy	+/-0.1 mm	+/-0.05 mm
Working stroke	50 ... 1500 mm	50 ... 2000 mm
Description	• Optimum price/performance ratio • Ready-to-install unit for quick and easy design • With plain or recirculating ball bearing guide • Motor can be mounted on 4 sides	• Stationary drive head • Toothed belt drive with recirculating ball bearing guide • High rigidity thanks to innovative design principle • Very small moving mass • Able to move high loads of up to 100 kg vertically
online: ➔	elgr	elcc

Electric cylinders and slides

	Electric cylinder units EPCS-BS	**Electric cylinder units EPCE-TB**	**Electric cylinder EPCC-BS** ★	**Electric cylinders ESBF** ★
Size	32, 45, 60	45, 60	25, 32, 45, 60	100, 32, 40, 50, 63, 80
Max. feed force Fx	150 ... 900 N	85 ... 150 N	75 ... 1000 N	600 ... 17000 N
Repetition accuracy	+/-0.02 mm	+/-0.05 mm	+/-0.02 mm	+/-0.01 mm, +/-0.015 mm, +/-0.05 mm
Stroke	25 ... 500 mm	10 ... 80 mm	25 ... 500 mm	30 ... 1500 mm
Description	• Complete solution consisting of integrated drive, motor and servo drive • Extremely cost-effective, yet powerful and very flexible • Ideal for individual linear movements in every installation position and especially for vertical Z movements • Precise positioning thanks to smoothly running ball screw drive • Compact dimensions • Safe movement through flexible position sensing • Integrated end position sensing • Two control options integrated as standard: digital I/O and IO-Link • Easy commissioning according to the plug and work principle: all parameters are manually adjustable directly on the drive without requiring any software or special expertise • Product of the Simplified Motion Series: doesn't need any external servo drive or any control cabinet for the installation	• Complete solution consisting of integrated drive, motor and servo drive • Cost-optimised design for easy motion and positioning tasks between two mechanical end positions as well as intermediate positions • Minimal zero stroke and extremely compact design make this product the perfect choice for applications where space is at a premium • Two sizes with 5 ... 80 mm stroke, can be selected in 5 mm increments • Innovative interpretation of toothed belt technology for maximum dynamic response and minimal positioning times • Ideal for fast movement in sorting, distribution and testing applications • Up to two piston rods per electric cylinder unit can be selected at the same time in four different mounting positions and different combinations • Integrated end position sensing • Two control options integrated as standard: digital I/O and IO-Link • Easy commissioning according to the plug and work principle: all parameters are manually adjustable directly on the drive without requiring any software or special expertise • Product of the Simplified Motion Series: doesn't need any external servo drive or any control cabinet for the installation	• Low-cost: optimum price/performance ratio • Flexible: wide range of mounting options for the motor • Dynamic: lower internal friction • Non-rotating piston rod with plain-bearing guide, stroke up to 500 mm • Weight-optimised design – ideal for handling systems • Unique: "One-size-down" assembly system for the best use of space in combination with toothed belt/spindle axis ELGC • Variants recommended for production systems for manufacturing lithium-ion batteries	• Available with ball screw drive (size 32 ... 100) or lead screw (size 32 ... 50) • Ball screw: with three spindle pitches for selecting the optimal force-speed ratio • Optional: high corrosion protection, degree of protection IP65, food-safe (see www.festo.com/certificates/ESBF), piston rod extension • Axial or parallel motor mounting • 68 types in stock with short delivery times and modular products for custom variants • Variants recommended for production systems for manufacturing lithium-ion batteries
online: →	epcs	epce	epcc	esbf

Electric cylinders and slides

	Mini slides EGSC-BS-KF	**Mini slide units EGSS-BS-KF**	**Mini slides EGSL-BS**	**Electric slides EGSK**
Size	25, 32, 45, 60	32, 45, 60	35, 45, 55, 75	15, 20, 26, 33, 46
Max. feed force Fx	20 ... 250 N	60 ... 250 N	75 ... 450 N	19 ... 392 N
Repetition accuracy	+/-0.015 mm	+/-0.015 mm	+/-0.015 mm	+/-0.003 - +/-0.004 mm, +/-0.003 - +/-0.01 mm, +/-0.01 mm
Stroke	25 ... 200 mm	25 ... 200 mm	50 ... 300 mm	25 ... 840 mm
Description	• Precise guide and ball screw drive • Compact dimensions • Flexible motor mounting • The toothed belt axes, spindle axes ELGC and mini slides EGSC form a scalable modular system for compact automation • Variants recommended for production systems for manufacturing lithium-ion batteries	• Complete solution consisting of integrated drive, motor and servo drive • For precise vertical Z movements or individual guided linear movements • Very high-quality ball screw drive with low internal friction • Rigid, high load-bearing and precise linear guide for absorbing lateral forces and increased anti-twist protection • Integrated end position sensing • Two control options integrated as standard: digital I/O and IO-Link • Easy commissioning according to the plug and work principle: all parameters are manually adjustable directly on the drive without requiring any software or special expertise • Product of the Simplified Motion Series: doesn't need any external servo drive or any control cabinet for the installation	• Very high rated slide load, ideal for vertical applications such as press-fitting or joining • Reliable: the completely closed spindle stops dirt or stray small parts getting into the guide area • Axial or parallel motor mounting	• Electromechanical linear axis with ball screw drive • Recirculating ball bearing guide and ball screw without caged ball bearings • Standardised mounting interfaces • Compact design • High rigidity • 22 types in stock with short delivery times and modular products for custom variants
online: →	egsc-bs	egss	egsl	egsk

Electric semi-rotary drives

	Rotary drive units **ERMS**	**Rotary drives** **ERMO**	**Rotary modules** **ERMB**
Size	25, 32	12, 16, 25, 32	20, 25, 32
Max. driving torque	2.7 ... 5.6 Nm	0.15 ... 5 Nm	0.7 ... 8.5 Nm
Max. input speed			900 ... 1350 rpm
Max. rotational speed	100 ... 150 rpm	100 ... 200 rpm	
Rotation angle	90°, 180°	Infinite	Infinite
Description	• Complete solution consisting of integrated drive, motor and servo drive • Cost-effective solution package for simple swivel tasks, but also for applications with high loads • Sealed hollow shaft for the integrated through-feed of cables and tubing • Standardised mounting interface for direct connection to the electric mini slides EGSL, EGSC and EGSS • Integrated end position sensing • Two control options integrated as standard: digital I/O and IO-Link • Easy commissioning according to the plug and work principle: all parameters are manually adjustable directly on the drive without requiring any software or special expertise • Product of the Simplified Motion Series: doesn't need any external servo drive or any control cabinet for the installation	• Electric rotary drive with stepper motor and integrated gear unit • ServoLite – closed-loop operation with encoder • Heavy-duty bearing for high forces and torques • Backlash-free, pre-stressed rotating plate with very good axial eccentricity and concentricity properties • Quick and accurate installation • For simple rotary indexing table applications and as a rotary axis in multi-axis applications	• Electromechanical rotary module with toothed belt • Compact design • Mounting interfaces on all sides • Stable output shaft bearings • Unlimited and flexible rotation angle
online: →	erms	ermo	ermb

Electric stoppers

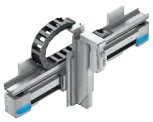
Electric stopper cylinders

	Stopper cylinders, electric **EFSD**
Design	Electric stopper cylinder
Size	100, 20, 50
Position sensing	With Hall sensor
Cushioning length	11.5 ... 18.2 mm
Description	• Fast and simple set-up of transfer systems without compressed air • For stopping conveyed goods weighing between 0.25 kg and 100 kg • Status and error messages for visual error diagnostics • Controlled via digital I/O of a higher-order controller, e.g. terminal CPX, makes commissioning easier • Mounting interface for ease of mounting on transfer systems • Adjustable cushioning power
online: →	efsd

Electric handling modules

	Rotary/lifting modules EHMB	Rotary gripper modules EHMD	Handling modules EHMX
Size	20, 25, 32	40	
Stroke per gripper jaw		5 mm, 15 mm	
Working stroke	0 ... 200 mm		200 ... 4500 mm
Max. output torque		0.3 Nm	
Max. driving torque	0.7 ... 6.7 Nm		
Max. input speed	900 ... 1350 rpm		
Max. acceleration			15 ... 50 m/s2
Max. speed			0.8 m/s, 1 m/s, 3 m/s, 5 m/s
Rotation angle	Infinite	Infinite	
Repetition accuracy			+/-0.01 mm, +/-0.08 mm, +/-0.1 mm
Description	• Complete module with combined and configurable rotary/lifting movement • Dynamic, flexible, economical thanks to the modular drive concept for the linear movement • Hollow axis with large internal diameter makes laying power supply lines easy, convenient and safe	• Ideal for small objects in laboratory automation • Infinite electrical rotation and electrical or pneumatic gripping • Gripping and turning to open and close covers on vials • Optional: mounting with Z-compensation compensates for the thread pitch of covers on vials during opening and closing	• For creating 3D gantries for the YXCR series • For X-axis movements in 3-dimensional gantries
online: ➔	**ehmb**	**ehmd**	**ehmx**

Electric handling modules

	 Handling modules EHMY	Handling modules EHMZ
Size		
Stroke per gripper jaw		
Working stroke	50 ... 4500 mm	50 ... 2000 mm
Max. output torque		
Max. driving torque		
Max. input speed		
Max. acceleration	15 ... 50 m/s2	15 ... 50 m/s2
Max. speed	0.6 m/s, 0.8 m/s, 1 m/s, 1.5 m/s, 3 m/s, 5 m/s	0.3 m/s, 0.4 m/s, 0.5 m/s, 0.6 m/s, 0.65 m/s, 1 m/s, 1.3 m/s, 1.5 m/s, 5 m/s
Rotation angle		
Repetition accuracy	+/-0.01 mm, +/-0.015 mm, +/-0.08 mm, +/-0.1 mm	+/-0.015 mm, +/-0.02 mm, +/-0.05 mm
Description	• For creating 3D gantries for the YXCR series • For Y-axis movements in 3-dimensional gantries	• For creating 2-dimensional and 3-dimensional gantries for the YXCL and YXCR series • For Z-axis movements in 2-dimensional and 3-dimensional gantries
online: ➔	**ehmy**	**ehmz**

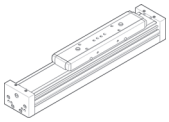
Electric grippers >

Parallel grippers

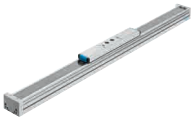
	 Parallel grippers, electric **EHPS**
Size	16, 20, 25
Stroke per gripper jaw	10 ... 16 mm
Max. force on gripper jaw Fz, static	200 ... 450 N
Gripper repetition accuracy	0.01 mm, 0.03 mm
Position sensing	Via proximity switch, With Hall sensor, With integrated displacement encoder, Via IO-Link interface
Description	• Electric version of the pneumatically actuated parallel gripper DHPS • Ideal for use as a front-end actuator thanks to its low dead weight • Controller-free actuation using digital signals • Gripping force (4 settings) adjustable via ratchet switch or via IO-Link® interface • RA1 version with robot connection, enables fast integration in lightweight robot environments
online: ➔	ehps

Accessories for electric drives >

Linear guides

	 Guide axes **ELFC**	 **Guide units** ★ **EAGF**	 **Guide axes** **ELFA-KF**
Size	32, 45, 60, 80	100, 16, 25, 32, 40, 45, 50, 60, 63, 80	120, 70, 80
Stroke	100 ... 2000 mm	1 ... 550 mm	50 ... 8500 mm
Guide	Recirculating ball bearing guide	Recirculating ball bearing guide	Recirculating ball bearing guide
Description	• Driveless linear guide unit with guide and freely movable slide unit • High torsional resistance • Reduced vibrations with dynamic loads	• For electric cylinders EPCO and ESBF • For absorbing high process forces and torques • High guide precision	• For spindle/toothed belt axes ELGA-BS/ ELGA-TB (drive axes) • Driveless linear guide unit with guide and freely movable slide unit • For supporting forces and torques in multi-axis applications • High torsional resistance • Reduced vibrations with dynamic loads
online: ➔	elfc	eagf	elfa

Linear guides

	 **Guide axes ELFA-RF**	**Guide axes ELFR**	**Guide axes EGC-FA**
Size	70, 80	35, 45, 55	120, 185, 70, 80
Stroke	50 ... 7000 mm	50 ... 1500 mm	50 ... 8500 mm
Guide	Roller bearing guide	Plain-bearing guide, Recirculating ball bearing guide	Recirculating ball bearing guide
Description	• For toothed belt axis ELGA-TB (drive axes) • Driveless linear guide unit with guide and freely movable slide unit • For supporting forces and torques in multi-axis applications • High torsional resistance • Reduced vibrations with dynamic loads	• For toothed belt axes ELGR (drive axes) • For spindle/toothed belt axes ELGA (drive axes) • For supporting forces and torques in multi-axis applications • High torsional resistance	• For spindle/toothed belt axes ELGA (drive axes) • For supporting forces and torques in multi-axis applications • High torsional resistance
online: ➔	elfa	elfr	egc

Customised components – for your specific requirements

Drives with customised designs

Can't find the electromechanical drive you need in our catalogue?

We can offer you customised components that are tailored to your specific requirements.

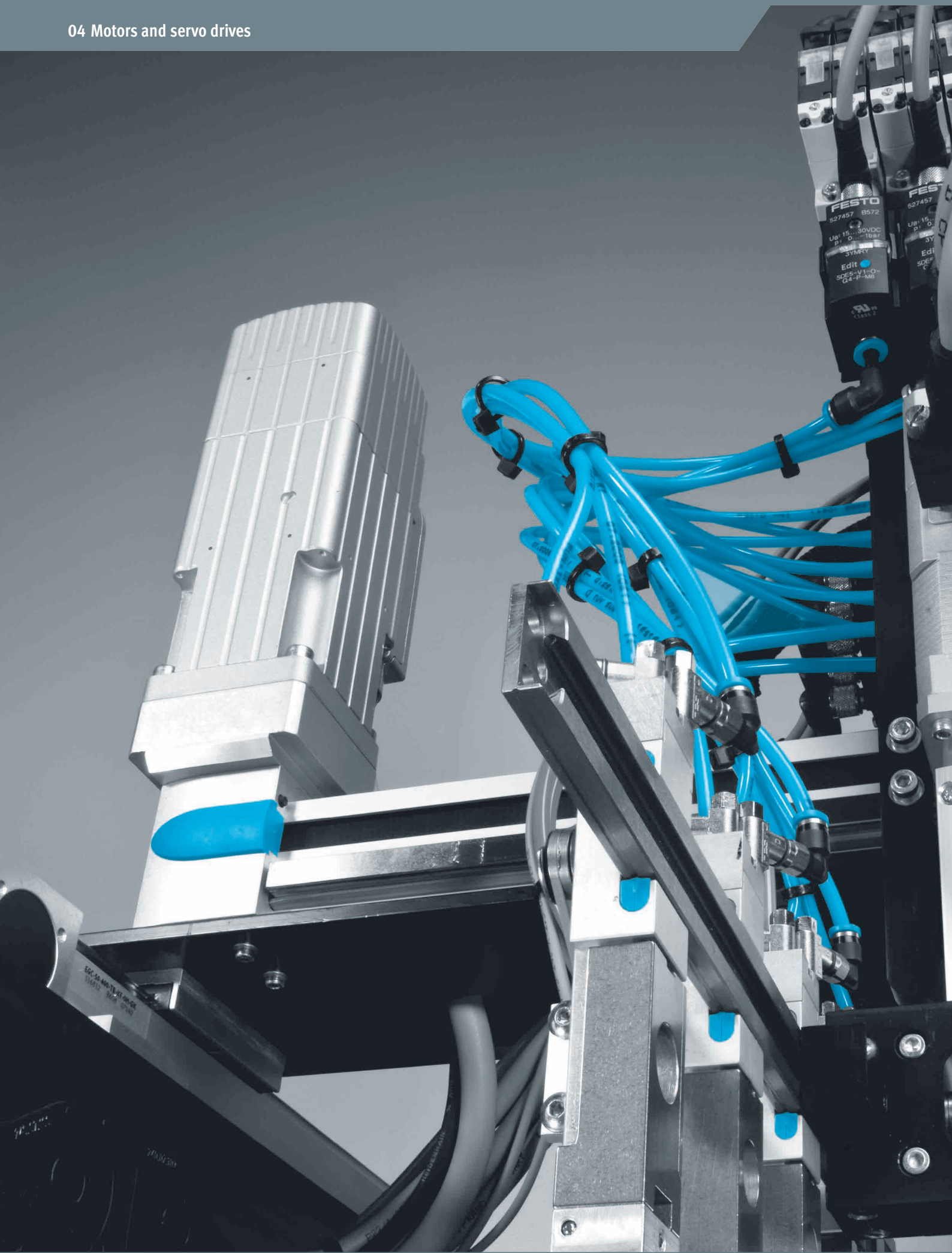
Common product modifications:
- Special strokes
- Design for special environmental conditions
- Design optimised for the installation space
- Design with opposing carriages
- Design with absolute encoder

Many additional variants are possible.

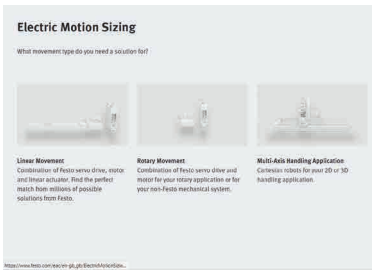
Ask your Festo sales engineer, who will be happy to help you:

➔ **www.festo.com/contact**

Product overview


FESTO
527457 B572
Ub: 15...30VDC
p: 0...10bar
3YMRY
Edit
SDE5-V1-O-Q4-P-M8

Software tools

Festo Configuration Tool (FCT)		The “Festo Configuration Tool” is a configuration and parameterisation software program that supports all Festo devices, in particular motor controllers. The software is extremely flexible, provides full support for the device properties and is simple and intuitive to operate. The user is guided step-by-step through the commissioning process while each individual step is checked. The “Festo Configuration Tool” parameterisation software can be found at ➔ **www.festo.com/fct > section “Other useful tools for the first start”**
Electric Motion Sizing		Find the right electric or electromechanical servo drive. This is how you can quickly and easily find the right electromechanical drive solution for your application: Electric Motion Sizing, the online sizing and simulation tool for electric drives (servo drives and motors = servo drive package) as well as for electromechanical drive solutions (= electromechanical servo drive package consisting of servo drives and motors as well as mechanics) helps you do this. This tool can be found at ➔ **www.festo.com/x/electric-motion-sizing**
Simplified Motion Series – Solution Finder		The simplicity of pneumatics is now combined for the first time with the advantages of electric automation thanks to the Simplified Motion Series. These integrated drives are the perfect solution for all users who are looking for an electric alternative for very simple movement and positioning tasks, but don’t want the commissioning process for traditional electric drive systems that can often be quite complex. This tool can be found at ➔ **www.festo.com/x/simplified-motion-series**

Servo motors

	Servo motors EMMB-AS	**Servo motors EMMT-AS**	**Servo motors EMME-AS**
Nominal torque	0.32 ... 2.39 Nm	0.6 ... 82.4 Nm	0.12 ... 6.4 Nm
Nominal rotary speed	3000 rpm	1000 ... 3500 rpm	3000 ... 9000 rpm
Nominal motor power	100 ... 750 W	190 ... 8629 W	110 ... 2000 W
Peak torque	0.96 ... 7.17 Nm	1.6 ... 183.3 Nm	0.7 ... 30 Nm
Max. rotational speed	5000 ... 6000 rpm	1654 ... 15000 rpm	3910 ... 10000 rpm
Description	• Very cost-effective • Brushless, permanently magnetized synchronous servo motor • Digital absolute displacement encoder, single turn; multi-turn optional • Reliable, dynamic, precise • Especially designed for simple positioning tasks in the electronics industry, small parts assembly and in test stations • Optimised connection technology • Degree of protection IP40 (motor shaft without rotary shaft seal), IP54 (motor shaft with rotary shaft seal), IP65 (motor housing without connection technology) • Different winding variants • Optionally with holding brake	• Brushless, permanently magnetized synchronous servo motor • Digital absolute displacement encoder, single turn or multi-turn • Extremely low cogging torque – supports high synchronisation even at low rotational speeds • Simple connection technology (OCP: one cable plug) – one connecting cable for supply and encoder • Rotatable plug with adjustable angle (310°) • Optionally with holding brake	• Brushless, permanently magnetized synchronous servo motor • Digital absolute displacement encoder, single turn or multi-turn • Reliable, dynamic, precise • Optimised connection technology • Variants with safety encoder absolute, multi turn, HIPERFACE® • Degree of protection IP54 (on the motor shaft without radial shaft seal), IP65 (on the motor shaft with radial shaft seal), IP65 (for motor housing and power/ encoder connections) • Optionally with holding brake
online: →	emmb	emmt	emme

Stepper motors

	Stepper motors EMMS-ST ★
Nominal motor current	1.4 ... 9.5 A
Max. rotational speed	430 ... 6000 rpm
Motor holding torque	0.09 ... 9.3 Nm
Description	• Small increments and high driving torques thanks to 2-phase hybrid technology • Optimised connection technology • Four sizes with flange sizes 28, 42, 57 and 87 • 28 types in stock • With incremental encoder for closed-loop operation • Degree of protection IP40 (motor shaft), IP54 (sizes 42, 27, 87: motor housing and plug connection), IP65 (size 28: motor housing and plug connection) • Optionally with holding brake
online: →	emms

Software tools

Festo Automation Suite commissioning software

Quickly and reliably to a ready-to-use drive system – the Festo Automation Suite combines the parameterisation, programming and maintenance of complete drive systems, from the mechanical to the control system, in just one software program.
Perfect for making industrial automation simple, efficient and seamless.

Servo drive plug-in CMMT-AS
- An operational drive system in just 5 steps – parameterisation is almost fully automatic with the commissioning wizard
- Advanced editing with the expert view gives you full access to all device parameters
- Conveniently install the plug-in using the software

This tool can be found
- on our website at www.festo.com/AutomationSuite

Electric servo drives >

Servo drive

	Servo drives CMMT-AS ★	**Motor controllers CMMP-AS**
Nominal current		2 ... 13 A
Nominal operating voltage AC	230 ... 400 V	230 ... 400 V
Nominal operating voltage phases	Single-phase, 3-phase	Single-phase, 3-phase
Rated output controller	350 ... 12000 VA	500 ... 9000 VA
Fieldbus coupling	EtherCAT, EtherNet/IP, Modbus/TCP, PROFINET	CANopen, DeviceNet, EtherCAT, EtherNet/IP, Modbus/TCP, PROFINET, PROFIBUS DP
Safety function	Safe brake control (SBC), Safe torque off (STO), Safe Stop 1 (SS1)	Safe torque off (STO), Safe Stop 1 (SS1)
Performance level (PL)	Safe brake control (SBC)/category 3, performance level e, Safe Torque Off (STO)/category 4, performance level e	Safe Torque Off (STO)/category 4, performance level e
Description	• One of the most compact servo drives on the market • Precise force, speed and position control • Auto-tuning supports easy commissioning and automatically optimises the control behaviour of rotary and linear motions • The latest generation of servo drive systems with optimised prices and sizes • With safety functions • Configuration of standard safety functions without software • MP variant with multi-protocol: the required bus protocol can be selected using the commissioning software Festo Automation Suite or directly on the servo drive • Optimally with servo motor EMMT-AS • Universal applications • Sustainable operation thanks to energy recovery	• Many interfaces and functions for decentralised motion functions (flying saw, flying measurement, modulo function, etc.) • Optional: integrated cam disk controllers and highly dynamic movements • Standardised interfaces allow seamless integration in mechatronic multi-axis modular systems • Reliable and easy commissioning and parameterisation with the Festo Configuration Tool (FCT) • Optionally with 3 slots for extension modules • Variants with safety functions • 255 positioning records
online: →	cmmt-as	cmmp

Stepper motor controllers

	Servo drives CMMT-ST ★	**Motor controllers CMMS-ST**
Nominal current load supply	8 A	8 A
Nominal voltage, load supply DC	24 V, 48 V	48 V
Fieldbus coupling	Modbus/TCP, PROFINET, EtherNet/IP, EtherCAT	CANopen, PROFIBUS DP
Performance level (PL)	STO/Cat. 3, PLe (stepper motor/EC motor with diagnostics), STO/ Cat. 3, PLd (EC motor without diagnostics)	Safe Torque Off (STO)/category 3, performance level d
Description	• Very efficient for tasks with low power requirements • Ideal for positioning tasks and point-to-point and interpolating motion solutions • 50% more compact than the smallest servo drive CMMT-AS • 150 W at 24 V DC, 300 W at 48 V DC • With safety functions • Optimised for use with stepper motors like the tried-and-tested EMMS-ST	• For controlling stepper motors EMMS-ST and Optimised Motion Series (for electric cylinders EPCO, toothed belt axes ELGR, rotary drives ERMO) • Easy and convenient commissioning and firmware updates via SD card slot • Reliable and easy commissioning and parameterisation with the Festo Configuration Tool (FCT) • Integrated process interface: digital I/O, CAN, RS485 • With safety functions • Optional: PROFIBUS and DeviceNet®
online: ➔	cmmt-st	cmms

Industrial gear units

	Gear unit EMGA-A	**Gear units EMGA-P-EAS** ★	**Gear units EMGA-P-SAS** ★	**Gear units EMGA-P-SST** ★
Gear ratio	3:1, 5:1, 8:1, 12:1, 20:1	3:1, 5:1, 8:1, 12:1, 20:1	3:1, 5:1, 8:1, 12:1, 20:1	3:1, 5:1, 8:1, 12:1
Continuous output torque	4.5 ... 120 Nm	6 ... 120 Nm	22 ... 450 Nm	6 ... 120 Nm
Max. drive speed	7000 ... 18000 rpm	7000 ... 18000 rpm	6500 ... 13000 rpm	7000 ... 18000 rpm
Torsional rigidity	0.7 ... 5.1 Nm/arcmin	0.85 ... 10.4 Nm/arcmin	2.3 ... 38 Nm/arcmin	0.8 ... 10.4 Nm/arcmin
Torsional backlash	0.22 ... 0.41 deg	0.12 ... 0.31 deg	0.1 ... 0.17 deg	0.12 ... 0.31 deg
Mass moment of inertia, gear unit	0.032 ... 1.409 kgcm²	0.015 ... 0.77 kgcm²	0.078 ... 12.14 kgcm²	0.015 ... 0.77 kgcm²
Max. efficiency	92%, 93%, 94%, 95%	96%, 97%, 98%	96%, 97%, 98%	96%, 97%, 98%
Description	• Bevel gear for servo motors EMME-AS, EMMT-AS, EMMS-AS • Life-time lubrication • Degree of protection IP54	• Planetary gear unit, straight, for servo motors EMME-AS, EMMT-AS • Eco AC synchronous interface • Life-time lubrication • Degree of protection IP54	• Planetary gear unit, straight, for servo motors EMME-AS • AC synchronous interface • Life-time lubrication • Degree of protection IP54	• Planetary gear unit, straight, for stepper motors EMMS-ST • Life-time lubrication • Degree of protection IP54
online: ➔	emga	emga	emga	emga

Accessories for open- and closed-loop position controllers >

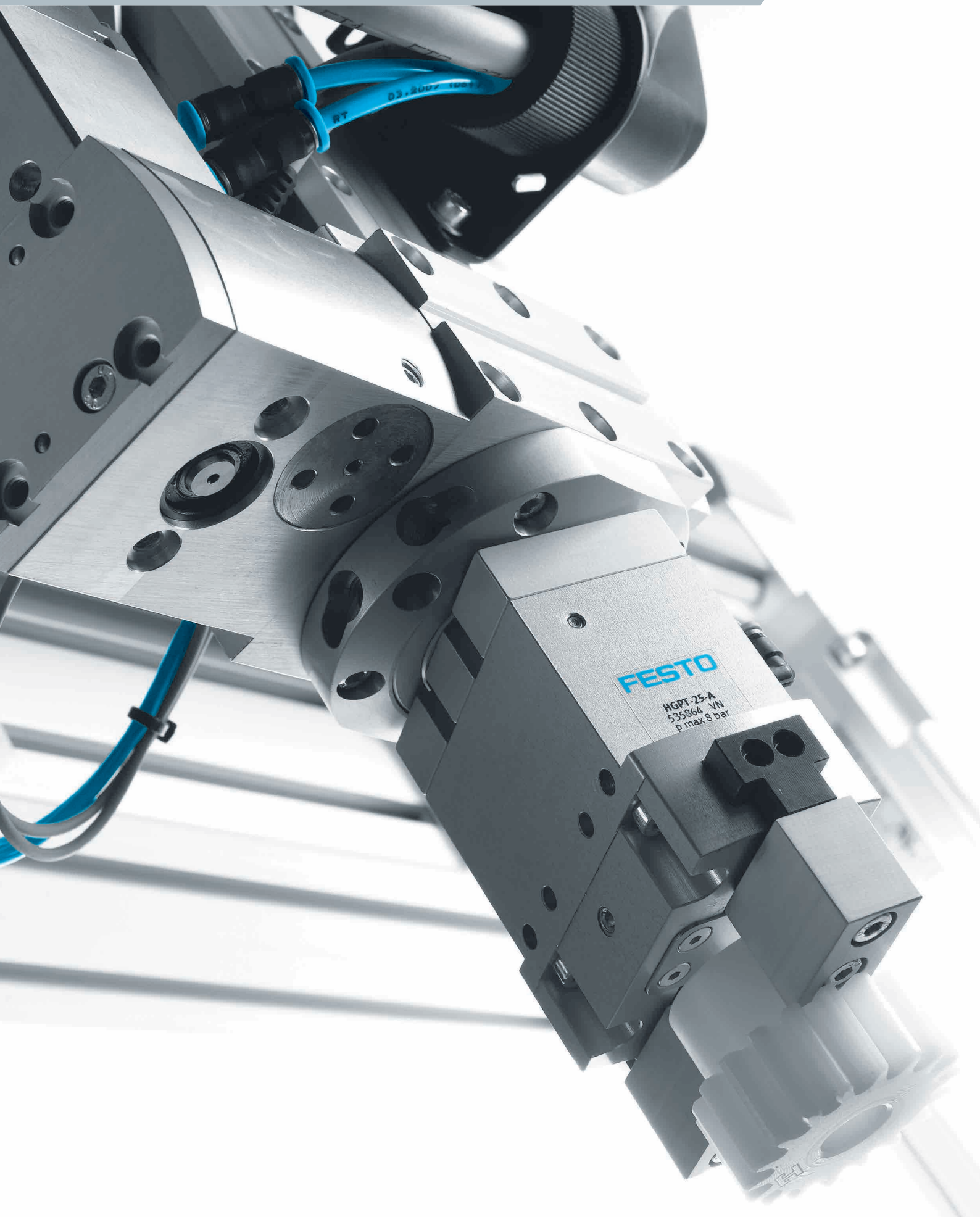
Accessories for servo drives

	Safety modules CAMC-G-S1	**Safety modules CAMC-G-S3**
Safety function	Safe torque off (STO)	Safe brake control (SBC), Safe Speed Range (SSR), Safe Speed Monitor (SSM), Safe torque off (STO), Safely limited speed (SLS), Safe Operating Stop (SOS), Safe Stop 1 (SS1), Safe Stop 2 (SS2)
Safety integrity level (SIL)	Safe torque off (STO)/SIL 3/SILCL 3	Safe stop 2 (SS2)/SIL 3, Safe stop 1 (SS1)/SIL 3, Safe brake control (SBC)/SIL 3, Safely limited speed (SLS)/SIL 3, Safe operating stop (SOS)/SIL 3, Safe speed monitor (SSM)/SIL 3, Safe Speed Range (SSR)/SIL 3, Safe torque off (STO)/SIL 3
Characteristics of logic inputs	Galvanically isolated	4 safe, 2-channel inputs Equivalent/antivalent switching Test pulses configurable Function configurable, 6 safe, 1-channel inputs Test pulses configurable
No. of digital logic inputs	2	10
Digital output design	Potential-free signal contact	Potential-free signal contact, 3 safe, 2-channel semiconductor outputs
Description	• With safety functions • For motor controller CMMP-AS-M3 • Plug-in module	• With safety functions • For motor controller CMMP-AS-M3 • Plug-in module
online: →	camc	camc

Accessories for open- and closed-loop position controllers >

Power supply units

	Power supply units CACN
Nominal output voltage DC	24 ... 48 V
Nominal output current	5 ... 20 A
Input voltage range AC	100 ... 500 V
Power failure buffering	15 ... 100 ms
Description	• H-rail mounting • Mounting position: free convection
online: →	cacn


FESTO
HGPT-25-A
5358864 VN
p max 8 bar

Software tools

Product Finder for grippers

A secure grip is a question of the right calculation. In this case, calculation of weight, direction of movement, distances, etc.
The software tool immediately determines which type of gripper – parallel, three-point, angle or swivel gripper – and which size best matches your requirements.

These tools can be found at
➔ **www.festo.com/x/gripper-parallel**
➔ **www.festo.com/x/gripper-3-point**
➔ **www.festo.com/x/gripper-angle**
➔ **www.festo.com/x/gripper-radial**

Mechanical grippers >

Parallel grippers

	NEW **Parallel gripper HEPP**	**Parallel gripper HPPF**	**Parallel grippers DHPL**	**Parallel grippers DHPS** ★
Size	28, 36, 42	12, 16, 20, 8	10, 16, 20, 25, 32, 40	10, 16, 20, 25, 35, 6
Stroke per gripper jaw	15 ... 28 mm	4 ... 40 mm	10 ... 100 mm	2 ... 12.5 mm
Total gripping force at 0.6 MPa (6 bar, 87 psi), closing		60.32 ... 377 N	38 ... 992 N	25 ... 910 N
Max. force on gripper jaw Fz, static	680 ... 1100 N	58 ... 294 N	40 ... 750 N	10 ... 450 N
Gripping force backup		None	None	During opening, During closing, None
Gripper repetition accuracy	≤0.01 mm, ≤0.02 mm	≤0.02 mm, ≤0.03 mm, ≤0.06 mm	≤0.03 mm	≤0.02 mm
Position sensing	Motor encoder	Via proximity switch	Via proximity switch	Via Hall sensor, Via proximity switch
Description	• Powerful and flexible • Dynamic motor for adjustable motion response • Easy, adjustable parameterisation • Compact thanks to integrated controller • High precision thanks to cross-roller guide • Control via PROFINET®, EtherNet/IP®, EtherCat®	• Optimal: compact and flat design • Durable: integrated guide and sturdy design • Economical: best price/ performance ratio • Can be combined: available in many sizes and strokes • Sustainable thanks to reduced material use and maintenance-free over the entire service life.	• High torque resistance due to guided gripper jaw • Compact and sturdy design • Ideal for gripping larger parts • Double-acting piston drive • Suitable for external and internal gripping • Mounting: direct fastening via thread, with through-hole • For position sensing with proximity sensor for T-slot and for C-slot • Sustainable in production thanks to reduced use of materials	• Sturdy and precise T-slot guidance of the gripper jaws • High gripping force and compact size • Max. repetition accuracy • Can be used as a double- and single-acting gripper • Single-acting variant or with gripping force backup, normally open (NO) or normally closed (NC) • Suitable for external and internal gripping • Wide range of adaptation options on the drives
online: ➔	**hepp**	**hppf**	**dhpl**	**dhps**

Mechanical grippers >

Parallel grippers

	Parallel gripper DHPC ★	**Parallel grippers HGPD**	**Parallel grippers HGPT-B** ★	**Parallel grippers HGPL-B** ★
Size	10, 16, 20, 25, 32, 40, 6	16, 20, 25, 35, 40, 50, 63, 80	16, 20, 25, 35, 40, 50, 63, 80	14, 25, 40, 63
Stroke per gripper jaw	2 ... 15 mm	3 ... 20 mm	1.5 ... 25 mm	20 ... 150 mm
Total gripping force at 0.6 MPa (6 bar, 87 psi), closing	7.8 ... 717.2 N	94 ... 3716 N	106 ... 6300 N	158 ... 2742 N
Max. force on gripper jaw Fz, static	5 ... 245 N	150 ... 6000 N	200 ... 7000 N	500 ... 9000 N
Gripping force backup	During opening, During closing, None	During opening, During closing, None	During opening, During closing, None	None
Gripper repetition accuracy	≤0.02 mm	≤0.03 mm, ≤0.04 mm, ≤0.05 mm	≤0.03 mm, ≤0.04 mm, ≤0.05 mm	≤0.03 mm
Position sensing	Via proximity switch	Via proximity switch	Via proximity switch	Via proximity switch
Description	• Resilient and precise ball guide • High gripping force and compact size • Max. repetition accuracy • Can be used as a double-acting or single-acting gripper • Single-acting variant or with gripping force retention normally open (NO) or normally closed (NC) • Suitable for external and internal gripping • Wide variety of mounting and attachment options • Sustainable in production thanks to reduced use of materials	• Ideal for very harsh environments • Precise gripping even at high torque load • Max. gripping force at optimum installation space/force ratio • 8 sizes with total stroke of up to 40 • Can be used as a double- and single-acting gripper • Single-acting variant or with gripping force backup, normally open (NO) or normally closed (NC) • Suitable for external and internal gripping	• Sturdy and powerful • With T-slot guide • Gripper jaw guide protected by sealing air against dust • High-force variant available • Can be used as a double- and single-acting gripper • Single-acting variant or with gripping force backup, normally open (NO) or normally closed (NC) • Suitable for external and internal gripping	• Space-saving, high forces and torques • Controlled, precise and centred gripping • Long stroke: long guide length for the gripper jaws • Opening stroke can be adjusted to optimise time • Double-acting gripper with two pistons operating in parallel and in opposite directions • Suitable for external and internal gripping
online: →	**dhpc**	**hgpd**	**hgpt**	**hgpl**

Mechanical grippers >

Parallel grippers

	Parallel grippers HGPP	**Parallel grippers HGP**	**Parallel grippers HGPM**	**Parallel grippers, electric EHPS**
Size	10, 12, 16, 20, 25, 32	16, 25	12, 8	16, 20, 25
Stroke per gripper jaw	2 ... 12.5 mm	5 ... 7.5 mm	2 ... 3 mm	10 ... 16 mm
Total gripping force at 0.6 MPa (6 bar, 87 psi), closing	80 ... 830 N	160 ... 340 N	16 ... 35 N	Please refer to documentation in the Internet
Max. force on gripper jaw Fz, static	40 ... 720 N	90 ... 240 N	10 ... 30 N	200 ... 450 N
Gripping force backup	During opening, During closing, None	None	None	
Gripper repetition accuracy	≤0.02 mm	≤0.04 mm	≤0.05 mm	≤0.01 mm, ≤0.03 mm
Position sensing	Via inductive sensors, Via Hall sensor	Via proximity switch	Without	Via proximity switch, With Hall sensor, With integrated displacement encoder, Via IO-Link interface
Description	• High-precision gripper jaw guide • Very flexible thanks to versatile attachment, mounting and application options • Can be used as a double- and single-acting gripper • Single-acting variant or with gripping force backup, normally open (NO) or normally closed (NC) • Suitable for external and internal gripping	• High gripping force and compact size • Self-centring • With protective dust cap for use in dusty environments (degree of protection IP54) • Max. repetition accuracy • Internal fixed flow control • Versatile thanks to externally adaptable gripper fingers • Double-acting piston drive • Suitable for external and internal gripping • Wide range of adaptation options on the drives	• Micro gripper: compact, handy design • Versatile thanks to externally adaptable gripper fingers • Single-acting gripper, optionally with open (NO) or closed (NC) gripper jaws • Mounting options with clamping flange, with flange mounting, with Z-stroke compensation	• Electric version of the pneumatically actuated parallel gripper DHPS • Ideal for use as a front-end actuator thanks to its low dead weight • Controller-free actuation using digital signals • Gripping force (4 settings) adjustable via ratchet switch or via IO-Link® interface • RA1 version with robot connection, enables fast integration in lightweight robot environments
online: →	**hgpp**	**hgp**	**hgpm**	**ehps**

Mechanical grippers >

Three-point grippers

	Three-point grippers DHDS	**Three-point grippers HGDD**	**Three-point grippers HGDT**
Size	16, 32, 50	35, 40, 50, 63, 80	25, 35, 40, 50, 63
Stroke per gripper jaw	2.5 ... 6 mm	4 ... 12 mm	1.5 ... 10 mm
Total gripping force at 0.6 MPa (6 bar, 87 psi), closing	87 ... 750 N	336 ... 2745 N	207 ... 2592 N
Gripping force backup	During closing	During opening, During closing	During opening, During closing
Gripper repetition accuracy	≤0.04 mm	≤0.03 mm, ≤0.05 mm	≤0.03 mm
Position sensing	Via Hall sensor, Via proximity switch	Via proximity switch	Via proximity switch
Description	• Sturdy and precise T-slot guidance of the gripper jaws • High gripping force and compact size • Max. repetition accuracy • Can be used as a double- and single-acting gripper • Single-acting variant or with gripping force backup, normally closed (NC) • Suitable for external and internal gripping • Wide range of adaptation options on the drives	• Precise gripping with centric movements despite high torque loads • Ideal for very harsh environments • 5 sizes with stroke/jaw of up to 12 mm • Can be used as a double- and single-acting gripper • Single-acting variant or with gripping force backup, normally open (NO) or normally closed (NC) • Suitable for external and internal gripping	• Synchronous movement of the gripper jaws • Gripper jaw guide protected by sealing air against dust • High-force variant available • With T-slot guide • Can be used as a double- and single-acting gripper • Single-acting variant or with gripping force backup, normally open (NO) or normally closed (NC) • Suitable for external and internal gripping
online: →	**dhds**	**hgdd**	**hgdt**

Mechanical grippers >

Angle grippers

	Angle gripper DHWC	**Angle grippers DHWS**	**Angle grippers HGWM**
Size	10, 16, 20, 25, 32, 6	10, 16, 25, 32, 40	12, 8
Total gripping torque at 0.6 MPa (6 bar, 87 psi), closing	5.4 ... 578.6 Ncm	30 ... 1362 Ncm	22 ... 64 Ncm
Max. opening angle	30 deg	40 deg	14 ... 18.5 deg
Gripping force backup	During opening, None	During closing	None
Gripper repetition accuracy	≤0.1 mm	≤0.04 mm	≤0.02 mm
Position sensing	Via proximity switch	Via Hall sensor, Via proximity switch	Without
Description	• Lateral gripper jaw support for high torque loads • Max. repetition accuracy • Can be used as a double-acting or single-acting gripper • Single-acting variant with gripping force backup, normally open (NO) • Suitable for external and internal gripping • Wide range of adaptation options on the drives	• Improved gripper jaw guide • Internal fixed flow control, does away with the need for external flow control in 80% of applications • Slotted guide • Max. repetition accuracy • Can be used as a double- and single-acting gripper • Single-acting variant or with gripping force backup, normally closed (NC) • Suitable for external and internal gripping • Wide range of adaptation options on the drives	• Micro gripper: compact, handy design • Versatile thanks to externally adaptable gripper fingers • Single-acting gripper, optionally with open (NO) or closed (NC) gripper jaws • Suitable for external and internal gripping • Mounting options with clamping flange, with flange mounting, with Z-stroke compensation
online: →	**dhwc**	**dhws**	**hgwm**

Mechanical grippers >

Radial grippers

	Radial gripper DHRC	**Radial grippers DHRS**	**Radial grippers HGRT**
Size	10, 16, 20, 25, 32, 6	10, 16, 25, 32, 40	16, 20, 25, 32, 40, 50
Total gripping torque at 0.6 MPa (6 bar, 87 psi), closing	4.8 ... 600.1 Ncm	15 ... 660 Ncm	158 ... 7754 Ncm
Max. opening angle	180 deg	180 deg	180 deg
Gripping force backup	During opening, None	During closing	During closing
Gripper repetition accuracy	≤0.1 mm	≤0.1 mm	≤0.02 mm
Position sensing	Via proximity switch	Via Hall sensor, Via proximity switch	Via proximity switch, Via inductive sensors
Description	• Lateral gripper jaw support for high torque loads • Can be used as a double-acting or single-acting gripper • Single-acting variant with gripping force backup, normally open (NO) • Suitable for external and internal gripping • Wide range of adaptation options on the drives	• Lateral gripper jaw support for high torque loads • Self-centring • Internal fixed flow control • Max. repetition accuracy • Slotted guide • Can be used as a double- and single-acting gripper • Single-acting variant or with gripping force backup, normally closed (NC) • Wide range of adaptation options on the drives	• Sturdy and precise kinematics for very high torque resistance and long service life • Secure gripping thanks to precise, polished plain-bearing guide • Slotted guide • Optimum cycle times thanks to freely adjustable opening angle up to a maximum of 90° per gripper finger. This prevents possible collisions due to the gripper jaws opening too far • Can be used as a double- and single-acting gripper • Single-acting variant or with gripping force backup, normally closed (NC) • Suitable for external and internal gripping • Wide range of adaptation options on the drives
online: →	dhrc	dhrs	hgrt

Mechanical grippers >

Swivel/gripper units

	Swivel/gripper units HGDS
Size	12, 16, 20
Total gripping force at 0.6 MPa (6 bar, 87 psi), closing	74 ... 168 N
Stroke per gripper jaw	2.5 ... 7 mm
Swivel angle	210 deg
Position sensing, gripper	Via proximity switch
Description	• Combination of parallel gripper and swivel module • Swivel angle infinitely adjustable • Precise end stop with elastic cushioning or integrated shock absorber
online: →	hgds

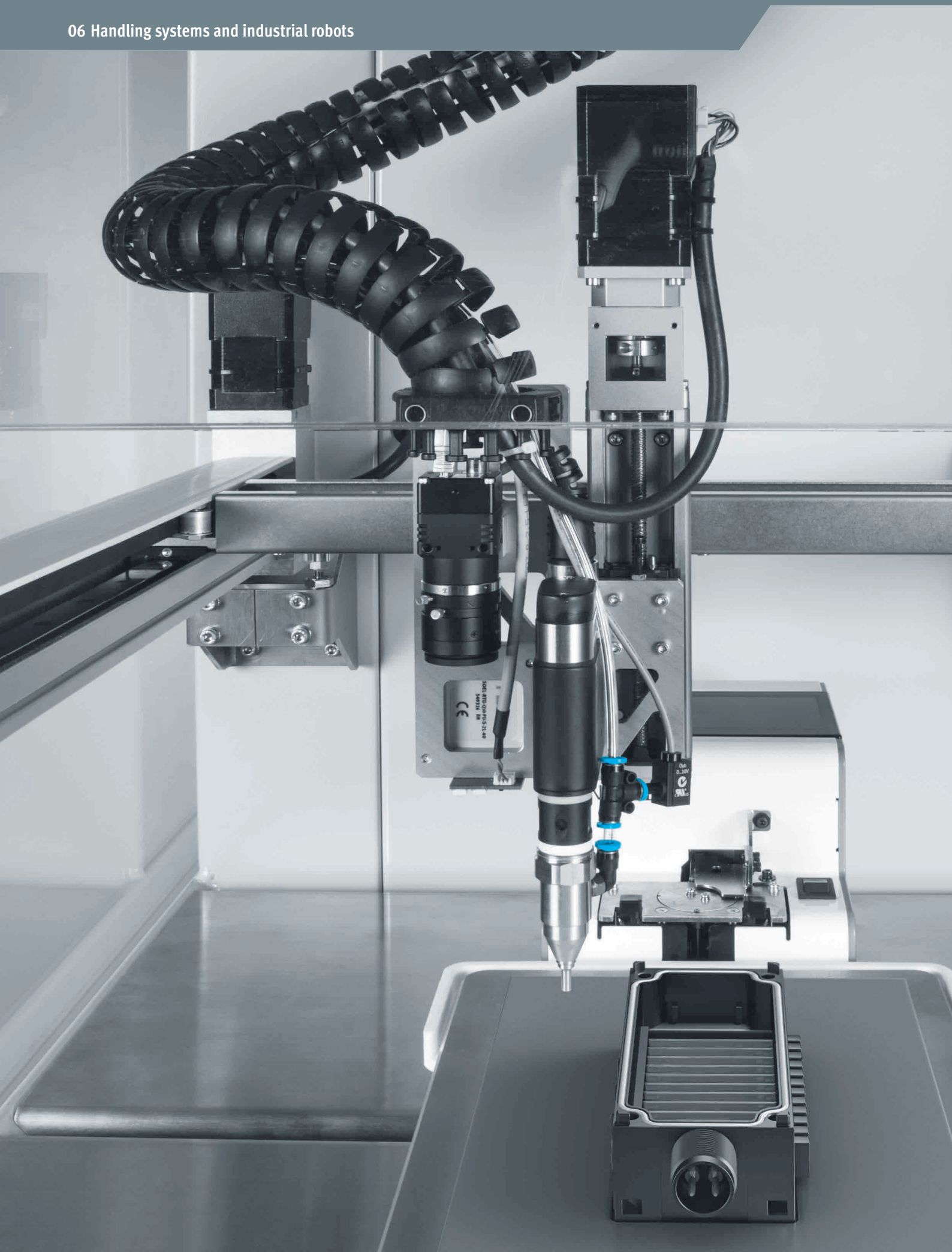
Bellows gripper

Bellows grippers

	Adaptive shape gripper DHEF	**Bellows grippers DHEB**
Size	20	10, 12, 14, 18, 22, 27, 33, 41, 51, 63, 8
Stroke	66 mm	
Bellows stroke		3.5 ... 25 mm
Max. operating frequency of gripper	1 Hz	≤4 Hz
Min. diameter to be gripped	12 mm	8 ... 66 mm
Max. diameter to be gripped	38 mm	11 ... 85 mm
Position sensing	Via proximity switch	Via proximity switch, Without
Description	• Gripping of parts with undefined positions and shapes • Form-fitting gripping of products with different geometries • Form-fitting gripping with suction cup effect • Gentle gripping of delicate products of varying sizes • RA1 version with robot connection, enables fast integration in lightweight robot environments	• 11 sizes for gripping diameter from 8 to 85 mm • Direction of movement: bellows upwards or downwards • Different bellows materials: EPDM or silicone • Air connection on the side or from above • Optimised process sequence with increased quality: prevents the workpieces from being scratched • Additional reliability: optional sensing via proximity or position sensor • For gentle internal gripping of delicate workpieces
online: →	**dhef**	**dheb**

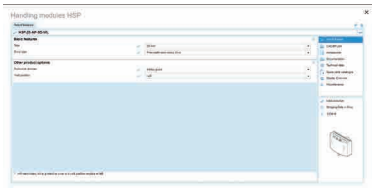
Accessories for grippers

	Adaptive gripper fingers DHAS-GF	**Gripper jaw DHAS-GG**
Size	120, 60, 80	16 mm
Description	• Self-adapting to different workpiece shapes • Adaptive gripper fingers for gentle and flexible gripping using the Fin Ray Effect® modelled on a fish's tail fin • For workpiece diameters from 6 to 120 mm	• Process-reliable gripping, e.g. for microtiter plates in the life sciences sector • Easy assembly
online: →	**dhas**	**dhas**



Software tools

Configurator



Design a product with numerous features reliably and quickly with the help of the configurator.

Select all the required product features step-by-step. The use of logic checks ensures that only correct configurations are available for selection.

You will find the configurator for the required product
- at www.festo.com/catalogue/handling
- Select the product you want
- Click on the blue “Configure product” button

Pneumatic handling systems

	Handling modules HSP	**Handling modules, pneumatic HSW-AP, HSW-AS**
Size	12, 16, 25	10, 12, 16
Y-stroke	52 ... 170 mm	
Z-stroke	20 ... 70 mm	80 ... 100 mm
Repetition accuracy	+/-0.01 mm, +/-0.02 mm	
Min. cycle time	0.6 ... 1 s	0.6 ... 1 s
Theoretical force at 0.6 MPa (6 bar, 87 psi)	40 ... 65 N	30 ... 55 N
Description	• Function module for automatically repositioning, feeding and removing small parts in extremely confined spaces • Guided vertical and horizontal motion sequence • High precision and rigidity • Compact design • Extremely short cycle times • Cost-optimised • Stroke adjustment along Y- and Z-axes	• Function module for automatically repositioning, feeding and removing small parts in extremely confined spaces • Guided swivel and linear motion • High precision and rigidity • HSW-AP: pneumatic, with swivel module DSM; HSW-AS: without drive, with drive shaft • Fast and compact • Low cost and ideal for universal use
online: →	**hsp**	**hsw**

Software tools

Engineering tool: Handling Guide Online (HGO)

Planning and designing complex handling systems, e.g. for pick & place applications, generally takes a lot of time.

With the innovative Handling Guide Online (HGO) you can design a tailor-made system in just a few steps. Simply enter your application data such as the load mass, travel and cycle time.

Benefits:
- 1D- ... 3D kinematics
- Tailor-made system solution within just a few minutes
- CAD model available immediately
- Fully automatic selection of all relevant components
- Fully automatic processing including ordering function
- Fully assembled or unassembled systems

This tool can be found at
➔ **www.festo.com/x/handling-guide-online**

Cartesian robots >

Single-axis robots

Single-axis systems YXCS

Description	• Ready-to-install single-axis solution including energy chain for cables or tubing as well as suitable motor and servo drive package • For any single-axis movement • For horizontal mounting position • Based on the axis series EGC-TB (toothed belt axis) and EGC-HD-TB (toothed belt axis with heavy-duty guide) • High mechanical rigidity and sturdy design • Ideal for long gantry strokes and heavy loads
online: ➔	yxcs

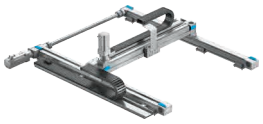
Cartesian robots >

Linear gantries

	Linear gantry, highly dynamic **YXML**	**Two-dimensional linear gantries** **YXCL**	**Linear gantries** **EXCT**
Description	• Parallel kinematic drive concept for maximum dynamic response • Ready-to-install complete system including energy chain for cables or tubing as well as suitable motor and servo drive package • For two-dimensional movements in vertical working areas • Flexible working area due to scalable strokes in the Y and Z directions • Based on linear gantry EXCT • Maximum dynamic response and efficient operation up to mx. 95 picks/min. • For rapid processes with high cycle rates like pick & place, feeding parts, stacking, packaging tasks	• Ready-to-install complete system including energy chain for cables or tubing as well as suitable motor and servo drive package • For two-dimensional movements in vertical working areas • Flexible working area due to scalable strokes in the Y and Z directions • Choice of vertical axis – pneumatic or electric • Y-axis based on the toothed belt axis EGC-TB and toothed belt axis with heavy-duty guide EGC-HD-TB. • Z-axis based on mini slide DGSL (pneumatic), EGSL (electromechanical) and spindle axis EGC-BS (electromechanical) • High mechanical rigidity and sturdy design • Ideal for long gantry strokes and heavy loads	• Short cycle times thanks to high dynamic response • Perfectly matched drive and controller package for quick commissioning • Especially economical due to the low moving dead weight
online: →	yxml	yxcl	exct

Cartesian robots >

Planar surface gantries

			
	Planar surface gantry, compact **YXMF**	**Planar surface gantry, highly dynamic** **YXMF**	**Two-dimensional planar surface gantries** **YXCF**
Description	• Parallel kinematic drive concept with minimal space requirements • Ready-to-install complete system including energy chain, suitable motors and dual servo drive • For two-dimensional movements in horizontal working areas • Flexible working area due to scalable strokes in the X and Y directions • Based on the planar surface gantry EXCM • For extremely small working areas • For desktop applications in small parts assembly, electronics manufacturing and laboratory processes	• Parallel kinematic drive concept for maximum dynamic response • Ready-to-install complete system, including energy chain and suitable motor and servo drive package • For two-dimensional movements in horizontal working areas • Flexible working area due to scalable strokes in the X and Y directions • Based on the planar surface gantry EXCH • Maximum dynamic response and efficient operation up to max. 100 picks/min. • For rapid processes with high cycle rates like pick & place, feeding parts, stacking, packaging tasks • Cost-saving alternative to two Scara robots due to large working area and high dynamic response	• Ready-to-install complete system including energy chain for cables or tubing as well as suitable motor and servo drive package • For two-dimensional movements in horizontal working areas • Flexible working area due to scalable strokes in the X and Y directions • X-axis based on toothed belt axis EGC-TB • Y-axis based on the toothed belt axis EGC-TB and toothed belt axis with heavy-duty guide EGC-HD-TB. • Especially suitable for very long strokes
online: →	yxmf	yxmf	yxcf

Cartesian robots >

Planar surface gantries

	Two-dimensional planar surface gantries **EXCM**	**Two-dimensional planar surface gantries** **EXCH**
Description	• Excellent functionality in small installation spaces • Low moving dead weight • Actuation via two stepper motors with an integrated optical encoder and a two-axis controller • With recirculating ball bearing guide • Sustainable operation due to weight-optimised axes	• Optimal dynamic response when compared with other Cartesian gantry systems • Drive concept with low moving dead weight • Flat system design • High acceleration in both axial directions • Large working space • Sustainable operation due to weight-optimised axes
online: →	excm	exch

Cartesian robots >

Three-dimensional gantries

	NEW			
	Three-dimensional gantries EXCL	**Three-dimensional gantry, compact YXMR**	**Three-dimensional gantry, highly dynamic YXMR**	**Three-dimensional gantries YXCR**
Description	• Multi-axis gantry with small footprint • Ideal for analytical processes where sample vessels are to be opened and liquid samples are pipetted in the same three-dimensional gantry • Selectable as 2D or 3D gantry • 2D planar surface gantry: optionally with one or two slides on the Y-axis • 3D gantry: one or two Z-axes can be selected • With the optional second Z-axis, two front units – e.g. rotary gripper module EHMD and pipetting unit DHOP – can be moved independently of each other • X, Y workspace configurable in 1 mm increments up to 1000 mm x 700 mm • Z-axis stroke can be selected between 50, 100, 150 and 200 mm • Optional 6-axis motion controller • Programmable via G-code	• Parallel kinematic drive concept with minimal space requirements • Ready-to-install complete system including energy chain, suitable motors and dual servo drive • For three-dimensional movements in horizontal working areas • Flexible working area due to scalable strokes in the X and Y directions • Based on the planar surface gantry EXCM • Choice of vertical axis – pneumatic or electric • For extremely small working areas • For desktop applications in small parts assembly, electronics manufacturing and laboratory processes	• Parallel kinematic drive concept for maximum dynamic response • Ready-to-install complete system, including energy chain and suitable motor and servo drive package • For three-dimensional movements in horizontal working areas • Flexible working area due to scalable strokes in the X and Z directions • Based on the planar surface gantry EXCH • Maximum dynamic response and efficient operation up to max. 100 picks/min. • Choice of vertical axis – pneumatic or electric • For rapid processes and high cycle rates e.g. assembling, packaging and sorting	• Ready-to-install complete system including energy chain for cables or tubing as well as suitable motor and servo drive package • For three-dimensional movements in vertical working areas • Flexible working area due to scalable strokes in the X, Y and Z directions • Choice of vertical axis – pneumatic or electric • X-axis based on toothed belt axis EGC-TB • Y-axis based on the toothed belt axis EGC-TB and toothed belt axis with heavy-duty guide EGC-HD-TB. • Z-axis based on mini slide DGSL (pneumatic), EGSL (electromechanical) and spindle axis EGC-BS (electromechanical) • High mechanical rigidity and sturdy design • For universal use • Especially suitable for long strokes in all directions
online: →	excl	yxmr	yxmr	yxcr

	 Cantilever system YXCA
Description	• Extremely space-saving 3D system with attractive price-performance ratio • Axial or parallel motor connection freely selectable for optimum use of the installation space • Pneumatic and electric components can be freely combined • For horizontal installation position • For simple assembly tasks and small parts handling in the electronics industry • Ideal for use in line assembly processes or desktop applications
online: →	yxca

Parallel kinematic system robots

	 Parallel kinematic systems, tripod **EXPT**
Maximum rated load	5 kg
Working space nominal diameter	950 ... 1200 mm
Working space nominal height	100 mm
Max. picking rate	140 picks/min in 12" cycle
Description	• Low moving mass – ideal for demanding requirements on dynamic response in three dimensions • High path accuracy with a range of path profiles, even for very dynamic operation • Optional rotary unit as 4th axis, on request with pneumatic rotary through-feed for vacuum or gauge pressure
online: →	expt

Control cabinets

	 Control systems **CMCB**
Design	Mounting plate, Control cabinet, Built-in safety relay unit
Electrical connection	Spring-loaded terminal, Push-in
Mains voltage AC	
Mains frequency	50 ... 60 Hz
Nominal operating voltage phases	
Performance level (PL)	Category B, Performance Level b, Category 3, Performance Level d
Description	• Ready-to-install control system • Available on a mounting plate with or without control cabinet housing • Variants with safety functions • Adapted for balancer kit YHBP • With connecting cables for balancer kit YHBP connected
online: →	cmcb

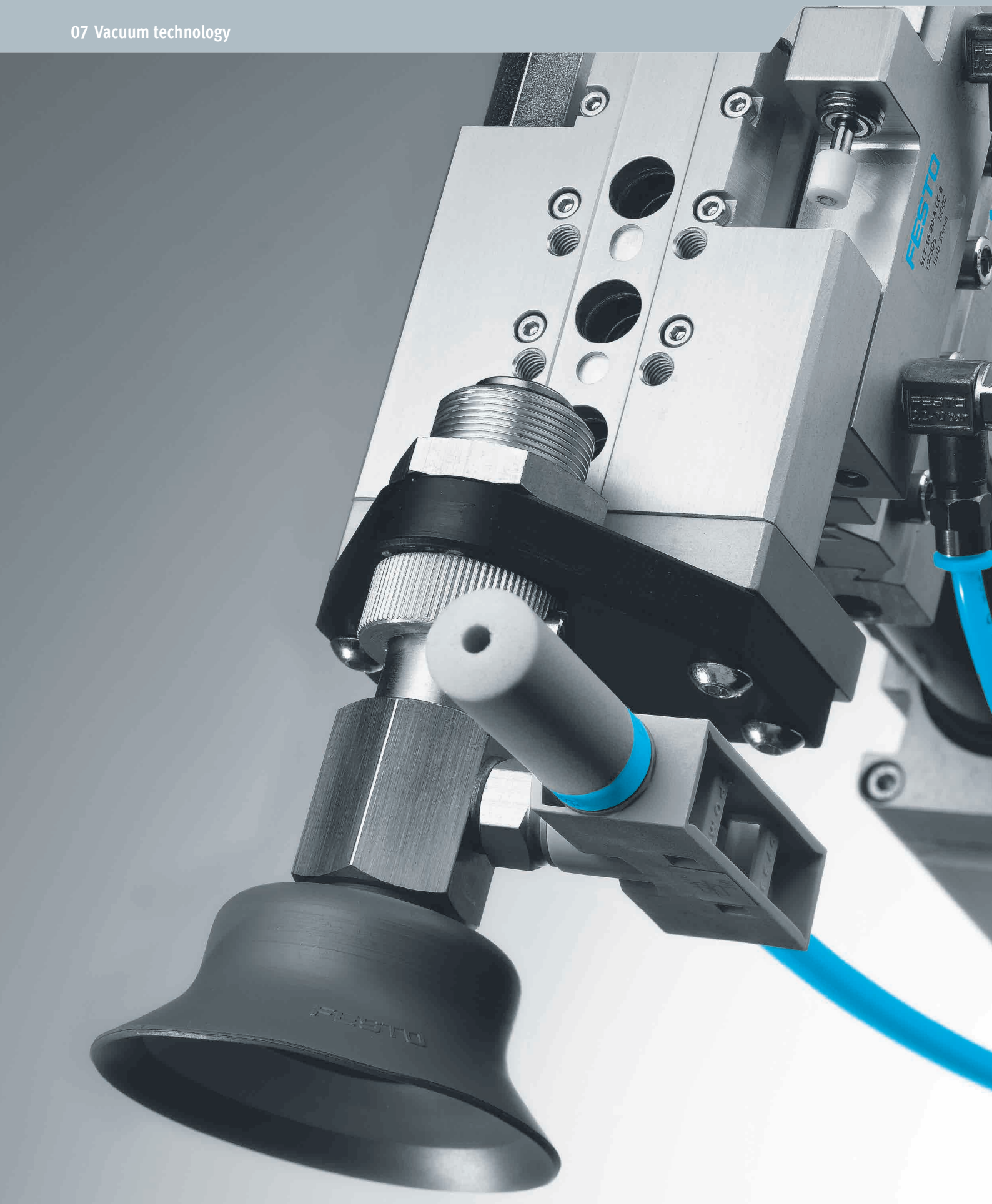
Customised components – for your specific requirements

Compact handling system for desktop applications

- Modular system kit comprising operating software and planar surface gantry EXCM-30
- Quick and easy programming and commissioning using the predefined function elements from the Positioning Desktop Lib
- One basic platform for a wide range of applications (screwing in, dispensing, testing, soldering, gripping, machine vision and much more)
- Predefined function elements from the software library make for easy programming and commissioning
- Easy integration, even in the most compact of installation spaces
- Fit for Industry 4.0 thanks to the OPC UA interface at the controller

Many additional variants are possible.

Ask your Festo sales engineer, who will be happy to help you:
➔ **www.festo.com/contact**


FESTO

Software tools

Vacuum design		Which suction cup is used for which surface and which movement? Don't experiment – calculate! The vacuum selection program helps you select the right suction cups, tubing and venturi nozzles. It also calculates the distribution of the forces acting on the individual suction cups, as well as the evacuation time. This software tool even enables a distinction to be made between linear and rotary movements. This tool can be found at ➔ **www.festo.com/x/vacuum-sizing**

Vacuum generators

	Vacuum generators OVTL	**Vacuum generators OVEL** ★	**Vacuum generators OVEM**
Nominal width of Laval nozzle	0.45 ... 0.95 mm	0.45 ... 0.95 mm	0.45 ... 3 mm
Ejector characteristics	High suction rate, High vacuum, Standard	High suction rate, High vacuum, Standard	High suction rate, High vacuum, Standard
Integrated function	Electric ejector pulse, Flow control, Pressure sensor, Pressure transmitter, Electric on-off valve, Filter, Open silencer	Electric ejector pulse, Flow control, Pressure sensor, Pressure transmitter, Electric on-off valve, Filter, Open silencer, Silencer closed	Electric ejector pulse valve, Flow control, Electric on-off valve, Filter, Air saving function, electrical, Check valve, Open silencer, Vacuum switch
Max. suction rate with respect to atmosphere	4 ... 45 l/min	4 ... 21 l/min	6 ... 348 l/min
Description	• Module consisting of vacuum generator OVEL, manifold rail and accessories • Select, size and order quickly, easily and reliably with the configurator • Supplied fully assembled	• Low-cost, compact vacuum generator • Light weight • Various performance levels and vacuum types • Short switching times thanks to integrated solenoid valves • Quick, precise and safe placement of the workpiece via the ejector pulse • Easy assembly • Minimal installation costs • Sustainable operation thanks to reduced pressure level • RA1 version with robot connection, enables fast integration in lightweight robot environments	• Compact design • Monitoring with vacuum sensor with IO-Link® • Central electrical connection via an M12 plug • Maintenance-free operation and reduced noise level through an integrated, open silencer • Integrated filter with inspection window • Optionally with air-saving function and LCD display • Short switching times thanks to integrated solenoid valves • Adjustable ejector pulse: precise and safe depositing of the workpiece • Sustainable operation with air-saving circuit
online: ➔	ovtl	ovel	ovem

Vacuum generators

	Vacuum generators, pneumatic **VN** ★	**Vacuum generators, electropneumatic** **VN** ★	**Vacuum generator cartridges** **VN**
Nominal width of Laval nozzle	0.45 ... 3 mm	0.45 ... 3 mm	0.45 ... 2 mm
Ejector characteristics	High suction rate, High vacuum, Standard, Inline, High negative pressure, High suction volume	Standard, High negative pressure, High suction volume	Standard, High negative pressure, High suction volume
Integrated function	Ejector pulse valve, pneumatic, Pressure sensor, Open silencer	Ejector pulse valve, pneumatic, Electric on-off valve, Open silencer	
Max. suction rate with respect to atmosphere	6.1 ... 339 l/min	7.2 ... 186 l/min	7.2 ... 184.4 l/min
Description	• Can be used directly in the work space • Available as straight type (in-line: vacuum port in line with the supply port) or T-shape (standard: vacuum port at 90° to the supply port) • Compact and cost-effective • Maintenance-free operation and reduced noise level through an integrated, open silencer • Variants recommended for production systems for manufacturing lithium-ion batteries	• Can be used directly in the work space • Low cost • Maintenance-free operation and reduced noise level through an integrated, open silencer • With solenoid valve vacuum on/off	• For fitting into customised housing for decentralised vacuum generation
online: →	vn	vn	vn

Suction cup with connection

	Suction cup OGVM	**Bernoulli grippers OGGB**	**Suction grippers ESG**
Suction cup size	16x55 mm, 20x65 mm, 30x65 mm, 30x80 mm, 30x95 mm, 40x85 mm, 40x90 mm, 50x105 mm, 55x115 mm, 60x125 mm, 70x145 mm, 20x60 mm		4x20 mm, 6x10 mm, 6x20 mm, 8x20 mm, 8x30 mm, 4x10 mm, 10x30 mm, 15x45 mm, 20x60 mm, 25x75 mm, 30x90 mm
Gripper diameter		60 ... 140 mm	
Suction cup diameter	20 ... 125 mm		2 ... 200 mm
Holding force at nominal operating pressure	15 ... 630 N	6 ... 10 N	
Design			Vacuum port on top, Vacuum port on side, With height compensator, With long height compensator
Information on suction cup materials	HNBR, NBR		BR, FPM, NBR, PUR, VMQ (silicone), Vulkollan
Spacer material		NBR, POM	
Description	• Extremely energy efficient, very high transverse forces, minimal suction times • Optimum suction ergonomics for maximum process reliability • Ideal for workpieces with complex contours • Accessories available for a wide range of applications • Suction cup shape round or oval, in various designs	• Ideally suited to transporting thin, extremely delicate and brittle workpieces • Minimised workpiece contact, gentle workpiece handling • Low energy costs thanks to minimised air consumption • The ideal solution for low-contact gripping and for gripping pliable, porous and brittle workpieces	• Modular system of suction cup holders and suction cups with over 2000 variants • Optionally with angle compensator, height compensator, filter • Suction cup shape round or oval, in various designs • 6 suction cup designs • 15 suction cup diameters • Suction cup volume: 0.002 ... 245 cm³ • Min. workpiece radius: 10 ... 680 mm • Vacuum connection: push-in connector or barbed fitting for plastic tubing, threaded connection
online: →	ogvm	oggb	esg

Suction cup with connection

	Suction cups ESS	**Suction cups ESV**	**Suction cups VAS, VASB** ★
Suction cup size	4x20 mm, 6x10 mm, 6x20 mm, 8x20 mm, 8x30 mm, 4x10 mm, 10x30 mm, 15x45 mm, 20x60 mm, 25x75 mm, 30x90 mm		
Gripper diameter			
Suction cup diameter	2 ... 200 mm	20 ... 200 mm	2 ... 125 mm
Holding force at nominal operating pressure	0.1 ... 1610 N	8.2 ... 1610 N	0.14 ... 700 N
Design	Round, bell-shaped	Bellows, Round, bell-shaped	
Information on suction cup materials	BR, FPM, NBR, PUR, VMQ (silicone), Vulkollan	BR, FPM, NBR, PUR, VMQ (silicone), Vulkollan	NBR, PUR, TPE-U(PU), VMQ (silicone)
Spacer material			
Description	• Suction cup consisting of the suction cup itself, plus the support plate with mounting • Suction cup volume: 0.002 ... 245 cm³ • Min. workpiece radius: 10 ... 680 mm • Mounting for suction cup holder: female thread, male thread, push-in connector • Suction cup with mounting thread	• Wearing part for suction cup • Easily interchangeable • Suction cup volume: 0.318 ... 245 cm³ • Min. workpiece radius: 10 ... 680 mm	• Sturdy and reliable • Suction cups with fixed connecting thread • 11 suction cup diameters • Round suction cup, bellows • Vacuum connection on top, on side • Screw-in thread
online: ➔	ess	esv	vas

Accessories for vacuum >

Assembly and connecting components

	Suction cup holders ESH
Design	Vacuum port on top, Vacuum port on side, With height compensator
Description	• With or without height compensator • 6 holder sizes • 8 holder types • 3 different types of vacuum connections: push-in connection, barbed fitting, threaded connection
online: ➔	esh

Accessories for vacuum >

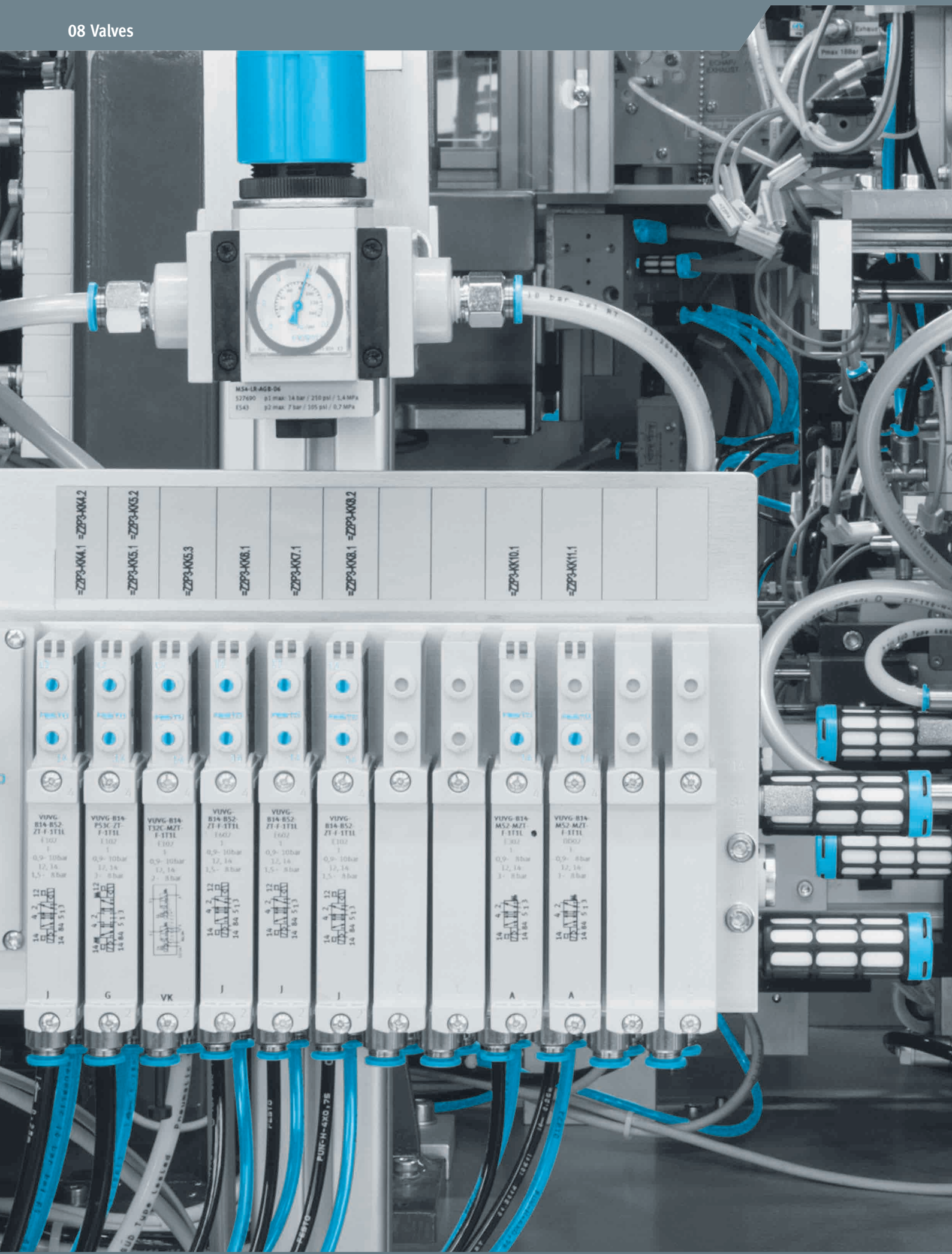
Vacuum-specific accessories

	Length compensator VAL ★	**Angle compensators ESWA**	**Vacuum gauges VAM, FVAM**	**Vacuum filters ESF, VAF, OAFF**
Vacuum connection	M5, G1/8, G1/4			M4, M6, G1/4, G3/8, G1/2
Pneumatic connection		M10, M4, M6	G1/4, G1/8, R1/4, R1/8	G1/2, G1/4, G3/8, M4, M6, PK-3 Via union nut, PK-4 Via union nut, PK-6 Via union nut
Type of mounting	With male thread M16x1, With male thread M22x1.5, With male thread M26x1.5	Via male thread	Front panel mounting, Screw-in	In-line installation, Push-on, Snapping in, Via male thread, Via wall/surface bracket, Via vacuum port
Grade of filtration				10 µm, 40 µm, 50 µm, 80 µm
Description	• For suction cup VAS/VASB • Vacuum port M5, G1/8, G1/4 • To compensate for a possible excess stroke of the handling device • To compensate for tolerance differences in the workpiece thickness	• For suction gripper ESG • Vacuum port M4x0.7, M6x1, M10x1.5 • For mounting between suction cup holder and suction cup	• Designs based on DIN EN 837-1, available with red-green range • Pneumatic connection via R or G thread • Double or single scale • Display units bar, in Hg, psi	• Vacuum filter ESF: for suction gripper ESG • Vacuum filter VAF: with transparent housing or bowl to allow users to assess contamination level • Vacuum filter OAFF: for vacuum generators OVEL
online: ➔	val	eswa	vam	vaf

Accessories for vacuum >

Vacuum-specific accessories

	Vacuum security valves ISV	**Silencers UO**	**Silencers UOM, UOMS**
Vacuum connection			
Pneumatic connection		G1/4, G1/8, M5, M7	G1/4, G3/8
Type of mounting	Screw-in		Snapping in, Screw-in
Grade of filtration			
Description	• For maintaining the vacuum when using multiple suction cups and one fails • Gripping of randomly placed products • Saves compressed air and energy	• Special open minimal resistance silencer • For vacuum generators • Facilitates trouble-free operation of the vacuum generator • Operating medium compressed air	• Special open minimal resistance silencer • For vacuum generators • Facilitates trouble-free operation of the vacuum generator • Silencer extension for extending the silencer for further noise reduction • Operating medium compressed air
online: ➔	isv	uo	uom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=ZP3-KK11.1
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Software tools

Pneumatic sizing

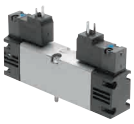
Size pneumatic control loop systems quickly and energy-efficiently.
In order to survive in a tough competitive environment, many companies are looking for ways to make savings in their production.

Such savings can often be made in their existing compressed air systems, which have generally been in use for years. By optimising the compressed air supply at both plant and system level, up to 60% of energy costs can be saved.

This tool can be found at
➔ **www.festo.com/x/pneumatic-sizing**

Electrically and pneumatically actuated directional control valves >

Standards-based directional control valves

	Solenoid valves VSNC ★	NEW **Solenoid valves VSNC-G1/8**	**Standards-based valves with central plug VSVA-R5, VSVA-R2**	 **Standards-based valves with individual plug VSVA-C1, VSVA-P1**
Actuation type	Electric	Electric	Electric	Electric
Pneumatic connection 1	1/4 NPT, G1/4, QS-1/4, QS-10, QS-3/8, QS-5/16, QS-6, QS-8	G1/8	Sub-base Size 1 ISO 5599-1, Size 2 ISO 5599-1	Sub-base Size 1 ISO 5599-1, Size 18 mm ISO 15407-1, Size 26 mm ISO 15407-1
Operating pressure [MPa]	0.15 ... 1 MPa	0.25 ... 0.8 MPa	-0.09 ... 1.6 MPa	-0.09 ... 1.6 MPa
Operating pressure	1.5 ... 10 bar	2.5 ... 8 bar	-0.9 ... 16 bar	-0.9 ... 16 bar
Standard nominal flow rate	800 ... 1350 l/min	400 l/min	400 ... 2800 l/min	400 ... 1400 l/min
Valve function	5/2 double solenoid, 5/2-way or 3/2-way, convertible, 5/3-way, pressurised, 5/3 exhausted, 5/3 closed	3/2-way, closed, monostable, 5/2-way, monostable, Connections swapped	2x2/2-way, monostable, closed, 2x3/2-way, monostable, closed, 2x3/2-way, open, monostable, 2x3/2-way, open/closed, monostable, 5/2 double solenoid, 5/2-way, bistable, dominant, 5/2-way, monostable, 5/3-way, pressurised, 5/3 exhausted, 5/3 closed	2x2/2-way, monostable, closed, 2x3/2-way, monostable, closed, 2x3/2-way, open, monostable, 2x3/2-way, open/closed, monostable, 5/2 double solenoid, 5/2-way, bistable, dominant, 5/2-way, monostable, 5/3-way, pressurised, 5/3 exhausted, 5/3 closed
Electrical connection	3-pin, Type A, Type B, Cable connector M20x1.5, M12x1, A-coded to EN 61076-2-101, Plugs, To EN 175301-803, To industry standard (11 mm)	Type C	3-pin, 4-pin, Central plug, Round design, M8x1, M12x1	Type B, Type C, With protective earth conductor, To DIN EN 175301-803, To EN 175301-803, To industry standard (11 mm), Without protective earth conductor
Description	• Namur connection pattern to VDI/VDE 3845 • Rotatable seal for 3/2- or 5/2-way valve • Wide choice of EX solenoid systems • Sturdy and powerful • Extended temperature range • Excellent value for money • All solenoid coils can be used on an armature tube • The VSNC-...FN variant achieves greater energy efficiency with reduced power consumption	• Namur connection pattern to VDI/VDE 3845 • Compact, cost-effective, powerful • Especially suitable for rotary actuators DAPS and DFPD with connection pattern according to VDI/VDE 3845 • Extended temperature range • Electrical connection with plug pattern type form C, according to EN 175301-803 • Solenoid coil 24 V integrated • Excellent value for money	• Conforms to ISO 5599-1 • Electrical connection with central plug • Robust metal housing • Manifold assembly with mixed sizes possible	• Corresponds to ISO 15407-1 and to ISO 15218 for pilot valve with interface • Electrical connection via plug type C • Robust metal housing • Manifold assembly with mixed sizes possible
online: →	vsnc	vsnc	vsva	vsva

Electrically and pneumatically actuated directional control valves >

Standards-based directional control valves

	Standards-based valves, plug-in VSVA-T1	**Pneumatic valves to ISO 15407-1 VSPA**	**Solenoid valves to ISO 5599-1 MN1H, MFH, MDH, MEBH, JMN1H, JMN1DH, JMFH, JMFDH, JMDH, JMEBH, JMEBDH, JMDDH**
Actuation type	Electric	Pneumatic	Electric
Pneumatic connection 1	Sub-base Size 1 ISO 5599-2, Size 2 ISO 5599-2, Size 18 mm ISO 15407-2, Size 26 mm ISO 15407-2	Sub-base Size 18 mm ISO 15407-1, Size 26 mm ISO 15407-1	Sub-base Size 1 ISO 5599-1, Size 2 ISO 5599-1, Size 3 ISO 5599-1, Size 4 ISO 5599-1
Operating pressure [MPa]	-0.09 ... 1 MPa		-0.09 ... 1.6 MPa
Operating pressure	-0.9 ... 10 bar	-0.9 ... 16 bar	-0.9 ... 16 bar
Standard nominal flow rate	125 ... 2900 l/min	400 ... 1100 l/min	1200 ... 6000 l/min
Valve function	2x2/2-way, monostable, closed, 2x3/2-way, monostable, closed, 2x3/2-way, open, monostable, 2x3/2-way, open/closed, monostable, 3/2-way, closed, monostable, 5/2 double solenoid, 5/2-way, bistable, dominant, 5/2-way, monostable, 5/3-way, pressurised 1 to 2, 4 to 5 closed, 5/3-way, pressurised, 5/3 exhausted, 5/3 closed, 5/3-way, port 2 pressurised, 4 exhausted, 5/3-way, port 4 pressurised, 2 exhausted	2x3/2-way, monostable, closed, 2x3/2-way, open, monostable, 2x3/2-way, open/closed, monostable, 5/2 double solenoid, 5/2-way, bistable, dominant, 5/2-way, monostable, 5/3-way, pressurised, 5/3 exhausted, 5/3 closed	5/2 double solenoid, 5/2-way, bistable, dominant, 5/2-way, monostable, 5/3-way, pressurised, 5/3 exhausted, 5/3 closed
Electrical connection	2-pin, 4-pin, Plug-in, Plugs, To ISO 15407-2, To ISO 5599-2		Central plug, To DIN EN 175301-803, Round design, Via F coil, to be ordered separately, Via N1 coil, to be ordered separately, M12x1
Description	• For valve terminal VTSA/VTSA-F • Robust metal housing	• Conforms to ISO 15407-1 • Pneumatic control • Manifold assembly with mixed sizes possible	• Conforms to ISO 5599-1 • Robust metal housing • Manifold assembly with mixture of ISO sizes 1, 2 and 3 possible • Extensive range of electrical connection options • Wide range of vertical stacking modules: pressure regulator, flow control valve, vertical pressure shut-off plate, etc. • Also available as a valve terminal
online: →	vsva	vspa	iso 5599-1

Electrically and pneumatically actuated directional control valves >

Standards-based directional control valves

	Pneumatic valves to ISO 5599-1 VL, J, JD	**Pilot valves, ISO 15218 (CNOMO) MDH, MGXDH, MGXIAH**	**Standards-based valves to ISO 15218 (CNOMO) VSCS**
Actuation type	Pneumatic	Electric	Electric
Pneumatic connection 1	Sub-base Size 1 ISO 5599-1, Size 2 ISO 5599-1, Size 3 ISO 5599-1, Size 4 ISO 5599-1	Sub-base	Sub-base
Operating pressure [MPa]	-0.09 ... 1.6 MPa	-0.09 ... 1.6 MPa	0 ... 1 MPa
Operating pressure	-0.9 ... 16 bar	-0.9 ... 16 bar	0 ... 10 bar
Standard nominal flow rate	1200 ... 6000 l/min	50 l/min	13.5 ... 18 l/min
Valve function	5/2 double solenoid, 5/2-way, bistable, dominant, 5/2-way, monostable, 5/3-way, pressurised, 5/3 exhausted, 5/3 closed	3/2-way, closed, monostable	3/2-way, closed, monostable
Electrical connection		Type A, To DIN EN 175301-803	Type C, Plug pattern type C to industry standard, 9.4 mm, To DIN EN 175301-803, To IEC 61076-2-101, M12x1
Description	• Conforms to ISO 5599-1 • Pneumatic control	• CNOMO connection pattern, to ISO 15218 • Detenting or non-detenting manual override • Variants to EU Explosion Protection Directive (ATEX)	• Valve actuator for electrical actuation of valve bodies • CNOMO connection pattern, to ISO 15218 • Detenting or non-detenting manual override
online: →	**iso 5599-1**	**iso 15218**	**VSCS**

Electrically and pneumatically actuated directional control valves >

Universal directional control valves

	Solenoid valves, for individual connection ★ **VUVG**	**Solenoid valves, plug-in VUVG-T1**	NEW **Solenoid valves, plug-in VUVG-B-F1A**	**Solenoid valves VUVG-L-F1A**
Actuation type	Electric	Electric	Electric	Electric
Pneumatic connection 1	G1/4, G1/8, M3, M5, M7			
Pneumatic working port	Flange, G1/4, G1/8, M3, M5, M7, QS-1/4, QS-1/8, QS-10, QS-3, QS-3/16, QS-3/8, QS-4, QS-5/16, QS-5/32, QS-6, QS-8	Flange, G1/4, G1/8, M5, M7	Flange	G1/8, M5, M7
Operating pressure [MPa]	-0.09 ... 1 MPa	-0.09 ... 1 MPa	-0.09 ... 1 MPa	0.15 ... 0.7 MPa
Operating pressure	-0.9 ... 10 bar	-0.9 ... 10 bar	-0.9 ... 10 bar	1.5 ... 7 bar
Standard nominal flow rate	80 ... 1380 l/min	130 ... 1200 l/min	130 ... 510 l/min	180 ... 660 l/min
Valve function	2x3/2-way, monostable, closed, 2x3/2-way, open, monostable, 2x3/2-way, open/closed, monostable, 5/2 double solenoid, 5/2-way, monostable, 5/3-way, pressurised, 5/3 exhausted, 5/3 closed	2x3/2-way, monostable, closed, 2x3/2-way, open, monostable, 2x3/2-way, open/closed, monostable, 3/2-way, closed, monostable, 3/2 open, single solenoid, 5/2 double solenoid, 5/2-way, monostable, 5/3-way, pressurised, 5/3 exhausted, 5/3 closed	2x3/2-way, monostable, closed, 2x3/2-way, open, monostable, 2x3/2-way, open/closed, monostable, 5/2 double solenoid, 5/2-way, monostable, 5/3-way, pressurised, 5/3 exhausted, 5/3 closed	2x3/2-way, monostable, closed, 5/2 double solenoid, 5/2-way, monostable
Electrical connection	2-pin, 3-pin, Plug pattern H, horizontal connection, M8x1, A-coded, to EN 61076-2-104, Plugs, Via electrical sub-base, Via electric pilot valve	Via sub-base	Via sub-base	2-pin, Plug pattern H, horizontal connection, Plugs
Description	• Compact universal valve • Connection technology via electrical connection box (E-box) • High flow rate relative to its size • In-line valves can be used as individual valves or manifold valves	• Sub-base valve, semi in-line valve • For valve terminal VTUG with multi-pin, fieldbus interface • Variants to EU Explosion Protection Directive (ATEX)	• Sub-base valve • For valve terminal VTUG with multi-pin, fieldbus interface • Recommended for production systems for manufacturing lithium-ion batteries	• Compact universal valve • Connection technology via electrical connection box (E-box) • High flow rate relative to its size • In-line valves can be used as individual valves or manifold valves • Recommended for production systems for manufacturing lithium-ion batteries
online: →	vuvg	vuvg	vuvg_t1_f1a	vuvg_s_f1a

Electrically and pneumatically actuated directional control valves >

Universal directional control valves

	Pneumatic valves VUWG	**Solenoid valves VUVS** ★	**Pneumatic valves VUWS**
Actuation type	Pneumatic	Electric	Pneumatic
Pneumatic connection 1	G1/4, G1/8, M3, M5, M7	1/8 NPT, G1/4, G1/8, G3/8	G1/4, G1/8, G3/8
Pneumatic working port	G1/4, G1/8, M3, M5, M7, QS-1/4, QS-1/8, QS-10, QS-3, QS-3/16, QS-3/8, QS-4, QS-5/16, QS-5/32, QS-6, QS-8	1/8 NPT, 1/4 NPT, 3/8 NPT, G1/4, G1/8, G3/8, QS-1/2, QS-1/4, QS-10, QS-12, QS-3/8, QS-4, QS-5/16, QS-5/32, QS-6, QS-8	1/8 NPT, 1/4 NPT, 3/8 NPT, G1/4, G1/8, G3/8, QS-1/4, QS-10, QS-3/8, QS-4, QS-5/16, QS-5/32, QS-6, QS-8
Operating pressure [MPa]		-0.09 ... 1 MPa	-0.09 ... 1 MPa
Operating pressure	-0.9 ... 10 bar	-0.9 ... 10 bar	-0.9 ... 10 bar
Standard nominal flow rate	80 ... 1380 l/min	500 ... 2400 l/min	500 ... 2400 l/min
Valve function	2x3/2-way, monostable, closed, 2x3/2-way, open, monostable, 2x3/2-way, open/ closed, monostable, 5/2 double solenoid, 5/2-way, monostable, 5/3-way, pressurised, 5/3 exhausted, 5/3 closed	2x3/2-way, monostable, closed, 2x3/2-way, open, monostable, 2x3/2-way, open/ closed, monostable, 3/2-way, closed, monostable, 3/2 open, single solenoid, 5/2 double solenoid, 5/2-way, monostable, 5/3-way, pressurised, 5/3 exhausted, 5/3 closed	2x3/2-way, monostable, closed, 2x3/2-way, open, monostable, 2x3/2-way, open/ closed, monostable, 3/2-way, closed, monostable, 3/2 open, single solenoid, 5/2 double solenoid, 5/2-way, monostable, 5/3-way, pressurised, 5/3 exhausted, 5/3 closed
Electrical connection		3-pin, Socket, Type B, Type C, Screw terminal, To EN 175301-803, To industry standard (11 mm)	
Description	• Compact universal valve • Pneumatically actuated • High flow rate relative to its size • In-line valves can be used as individual valves or manifold valves • Can be combined on manifold rail with electric individual valves	• Universal valve, sturdy and durable • Low cost with no performance limitations • Can be used as individual valves or manifold valves VTUS	• Universal valve, sturdy and durable • Pneumatically actuated • Can be used as individual valves or manifold valves VTUS
online: →	vuwg	vuvs	vuws

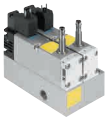
Electrically and pneumatically actuated directional control valves >

Universal directional control valves

	Solenoid valves VMPA1, VMPA14, VMPA2	**Solenoid and pneumatic valves, Tiger Classic MFH, MOFH, MOCH, JMFH, JMFDH, VL/O, VL, JH, JDH**	**Solenoid valves, supplementary product range BMCH, BMFH, MC, MCH, MFH, MOCH, MOFH**
Actuation type	Electric	Electric, Pneumatic	Electric
Pneumatic connection 1	Internal, G1/8, M7	G1/2, G1/4, G1/8, G3/4	G1/4, G1/8, M5
Pneumatic working port	G1/8, M7	G1/2, G1/4, G1/8, G3/4	G1/8, M5
Operating pressure [MPa]	-0.09 ... 1 MPa	-0.095 ... 1 MPa	-0.095 ... 0.8 MPa
Operating pressure	-0.9 ... 10 bar	-0.95 ... 10 bar	-0.95 ... 8 bar
Standard nominal flow rate	140 ... 870 l/min	500 ... 7500 l/min	46 ... 300 l/min
Valve function	2x2/2-way, monostable, closed, 2x3/2-way, monostable, closed, 2x3/2-way, open, monostable, 2x3/2-way, open/closed, monostable, 3/2-way, closed, monostable, 3/2 open, single solenoid, 5/2 double solenoid, 5/2-way, monostable, 5/3-way, pressurised, 5/3 exhausted, 5/3 closed	3/2-way, closed, monostable, 3/2 open, single solenoid, 3/2-way, monostable, open/closed, 5/2 double solenoid, 5/2-way, bistable, dominant, 5/2-way, monostable	2/2-way, closed, monostable, 2x3/2-way, monostable, closed, 3/2-way, closed, monostable, 3/2 open, single solenoid, 3x3/2-way, monostable, closed
Electrical connection	4-pin, Plugs, To EN 60947-5-2, M8x1	Via F coil, to be ordered separately	Plugs
Description	• For valve terminal MPA • As individual valve mounted on sub-base • Comprehensive range of valves	• Sturdy and reliable • Poppet valve • All-metal version • Principle with armature tube	• Manifold mounting or individual valve • Valves for special applications • With or without manual override
online: →	vmpa1	tiger classic	bmch

Electrically and pneumatically actuated directional control valves >

Application-specific directional control valves

				
	Control blocks VOFA	**Solenoid valves VOFD**	**Solenoid valves VOFC**	**Solenoid valves VOVG**
Design	Piston gate valve	Directly actuated poppet valve	Piston gate valve, Piloted piston poppet valve	Piston gate valve
Valve function	3/2-way, closed, monostable, 5/2-way, monostable	3/2-way, closed, monostable, semi-automatic, 3/2-way, closed, monostable	3/2-way, closed, monostable, 5/2 double solenoid, 5/2-way, monostable	3/2-way, closed, monostable, 3/2 open, single solenoid, 5/2-way, monostable
Operating pressure [MPa]	0 ... 1 MPa	0 ... 1.2 MPa	0 ... 1 MPa	-0.09 ... 0.8 MPa
Operating pressure	0 ... 10 bar	0 ... 12 bar	0 ... 10 bar	-0.9 ... 8 bar
Ambient temperature	-5 ... 50°C	-50 ... 60°C	-25 ... 60°C	-5 ... 50°C
Pneumatic connection 1	G1/4	1/4 NPT, NAMUR port pattern, G1/4, G1/2, 1/2NPT	1/4 NPT, 1/2 NPT, NAMUR port pattern, G1/2, G1/4	Sub-base, M5, M7
Standard nominal flow rate	950 ... 1050 l/min	52 ... 1900 l/min	595 ... 2794 l/min	180 ... 200 l/min
Performance level (PL)	Exhausting/up to category 4, performance level e, Protection against manipulation, prevention of unexpected start-up/up to category 4, Performance Level e, Reversing a movement/up to category 4, Performance Level e			
Description	• Redundantly designed valve block, can be used for safe reversing of a hazardous movement • Can be selected as a decentralised individual connection variant with electrical and pneumatic individual connection or as a feature integrated in the valve terminal VTSA/VTSA-F • Equipped with valves VSVA • Switching position sensing by sensors • With safety functions • Suitable for use as a press safety valve to EN 692	• Suitable for process automation in the chemical and petrochemical industries • Suitable for outdoor use under harsh ambient conditions • Especially suitable for quarter turn actuators thanks to NAMUR flange pattern • Variants with safety functions • Variants to EU Explosion Protection Directive (ATEX)	• Suitable for process automation in the chemical and petrochemical industries • Suitable for outdoor use under harsh ambient conditions • Especially suitable for quarter turn actuators thanks to NAMUR flange pattern • Valve can switch between internal and external pilot air • Variants with safety functions • Variants to EU Explosion Protection Directive (ATEX)	• Very compact valve for solutions with high component density • For soft-start/quick exhaust valves MS6-SV, MS series • In-line, semi in-line and sub-base valve • Manifold rail for 2 ... 10 valves
online: →	vofa	vofd	vofc	vofg

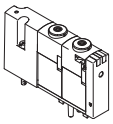
Electrically and pneumatically actuated directional control valves >

Application-specific directional control valves

	Solenoid valves MHA1, MHP1	**Solenoid valves MHE2, MHP2, MHA2, MHE3, MHP3, MHA3, MHE4, MHP4, MHA4**	**Solenoid valves CDVI5.0**	**Fast-switching valves MHJ9, MHJ10**
Design	Poppet valve with spring return	Pressure-relieved poppet valve	Piston gate valve	Poppet valve without spring return
Valve function	2/2-way, closed, monostable, 2x2/2-way, monostable, closed, 3/2-way, closed, monostable, 3/2 open, single solenoid	3/2-way, closed, monostable, 3/2 open, single solenoid, 5/2-way, monostable	2/2-way, closed, monostable, 2/2 open, single solenoid, 2x3/2-way, monostable, closed, 2x3/2-way, open, monostable, 3/2-way, closed, monostable, 3/2 open, single solenoid, 5/2 double solenoid, 5/2-way, monostable, 5/3-way, pressurised, 5/3 exhausted, 5/3 closed	2/2-way, closed, monostable
Operating pressure [MPa]	-0.09 ... 0.8 MPa	-0.09 ... 0.8 MPa		0.05 ... 0.8 MPa
Operating pressure	-0.9 ... 8 bar	-0.9 ... 8 bar	-0.9 ... 10 bar	0.5 ... 8 bar
Ambient temperature	-5 ... 50°C	-5 ... 60°C	-5 ... 50°C	-5 ... 60°C
Pneumatic connection 1	Sub-base, Prepared for QSP10, QS-3, QS-4	Sub-base, G1/4, G1/8, M7, QS-4, QS-6, QS-8	Sub-base	Sub-base, QS-4, QS-6
Standard nominal flow rate	10 ... 30 l/min	90 ... 400 l/min	300 ... 650 l/min	50 ... 160 l/min
Performance level (PL)				
Description	• Directly actuated poppet valve • Miniature valve: grid dimension 10 mm • Switching times down to 4 ms • Sub-base valve • Manifold block for 2 ... 10 valves • Use as a pilot valve • UL certification; same connections and cables as for the VUVG	• Directly actuated poppet valve • Fast-switching valve: switching times down to 2 ms • Direct mounting, individual sub-base, manifold assembly • Manifold block for 2 ... 10 valves	• Clean design sub-base valve • Easy-to-clean design • Individual valve for clean design • Can be used in the food zone (based on standard EN 1672-2)	• Directly actuated poppet valve • Identical basic valves for direct mounting or manifold installation • Individual valve with integrated plug connection • Switching frequencies up to 1000 Hz • Very good reproducibility • MHJ9: Valve manifold assembly with individual outputs or with air nozzle output • MHJ9: Electrical connection via connecting cable MHJ9-KMH with integrated control electronics • MHJ10: Valve manifold assembly with individual outputs • MHJ10: Electrical connection via moulded-in cable, control electronics included in the valve
online: →	mh1	mh2	cdvi5.0	mhj9

Electrically and pneumatically actuated directional control valves >

Application-specific directional control valves

	Solenoid valves VOVK	 **Solenoid valves VOVC**	**Pilot valves VOFX**
Design	Connection direction downwards, Connection orientation forwards, Poppet valve with spring return	Poppet valve with spring return	Directly actuated poppet valve
Valve function	3/2-way, closed, monostable	2x3/2-way, monostable, closed	3/2-way, closed, monostable
Operating pressure [MPa]	-0.1 ... 0.7 MPa	0 ... 0.8 MPa	-0.09 ... 0.8 MPa
Operating pressure	-1 ... 7 bar	0 ... 8 bar	-0.9 ... 8 bar
Ambient temperature	5 ... 50°C	-5 ... 50°C	-10 ... 50°C
Pneumatic connection 1	Sub-base, For tubing I.D. 1.5 mm, For tubing I.D. 2 mm	Sub-base	G1/8
Standard nominal flow rate	5.5 l/min		50 l/min
Performance level (PL)			
Description	• Very narrow: 5.9 mm grid dimension • Extremely small and lightweight • Very low power consumption • Variable connection concepts: flanged connection underneath or at the front, barbed fitting connection at the front • Ideal for control of small air flows	• For valve terminal VTOC • Optimal use of the installation space yet maximum performance • Detenting or non-detenting manual override	• For angle seat valves VZXF and VZXA • For use wherever valve terminals are not economically or technically viable • Manual override, detenting
online: ➔	vovk	vovc	vofx

Electrically and pneumatically actuated directional control valves >

Application-specific directional control valves

	Solenoid and pneumatic valves, M5 Compact System J, JD, JMFH, MFH, MUFH, VD, VL, VL/O, VLL	**Pneumatic valves VOGM**	**Pneumatic valves VOGI**
Design	Piston gate valve, Poppet seat	Sub-base valve, Diaphragm valve, Piloted piston poppet valve	Sub-base valve, Piloted piston poppet valve
Valve function	3/2 double solenoid, 3/2 open, single solenoid, 5/2 double solenoid, 5/2-way, bistable, dominant, 5/2-way, monostable	Proportional 3/3-way valve	4/2-way, single solenoid, Fail safe
Operating pressure [MPa]	0.18 ... 0.8 MPa	0.14 ... 0.8 MPa	0.33 ... 0.8 MPa
Operating pressure	-0.9 ... 8 bar	1.4 ... 8 bar	3.3 ... 8 bar
Ambient temperature	-10 ... 60°C	-40 ... 80°C	-20 ... 80°C
Pneumatic connection 1	PK-3		G1/2
Standard nominal flow rate	100 ... 105 l/min	1240 l/min	1093 l/min
Performance level (PL)			
Description	• Control elements with all functions for pneumatic sequence controls • For control cabinet installation • Fast replacement of components	• Pneumatic extension module for valve terminal VTOP • Volume booster for shortening the actuating times of the process valve • Precise positioning of the pneumatic actuator even with fast positioning times through direct integration into the control loop	• Pneumatic extension module for valve terminal VTOP • Fail-safe modules for approaching a defined end position in the event of pressure failure
online: →	m5-compact	vogm	vogi

Manually actuated directional control valves >

Swivel lever valves

	Hand lever valves VHEF-H	**Hand lever valves VHER** ★
Valve function	3/2 double solenoid, 3/2-way, monostable, open/closed, 5/2 double solenoid, 5/2-way, monostable, 5/3 exhausted, 5/3 closed	4/3-way, pressurised, 4/3 exhausted, 4/3 closed
Type of control	Direct	Direct
Standard nominal flow rate	530 ... 1200 l/min	170 ... 3800 l/min
Pneumatic working port	G1/4, G1/8	G1/2, G1/4, G1/8, M5
Operating pressure [MPa]	-0.095 ... 1 MPa	
Operating pressure	-0.95 ... 10 bar	0 ... 10 bar
Description	• With hand lever at the side • Durable thanks to tried-and-tested piston slide and disc seat valve technology • Robust metal housing • Attractive price • Ergonomic and safe operation • Minimal actuating forces • Modern design • Reverse operation possible	• Lever in metal or polymer design • Front panel mounting, through holes or mounting holes
online: ➔	vhef	vher

Manually actuated directional control valves >

Pushbutton valves

	Pushbutton valves VHEF-P ★	**Pushbutton valves K/O-3**	**Pushbutton valves K-3**	**Pushbutton valves F-3**
Valve function	3/2 double solenoid, 3/2-way, monostable, open/closed, 5/2 double solenoid, 5/2-way, monostable	3/2-way, monostable, open/closed	3/2-way, closed, monostable	3/2-way, closed, monostable
Type of control	Direct, Pilot actuated	Direct	Direct	Direct
Standard nominal flow rate	750 ... 1200 l/min	80 l/min	80 l/min	80 l/min
Pneumatic working port	G1/4, G1/8	PK-3	M5	M5
Operating pressure [MPa]	-0.095 ... 1 MPa			
Operating pressure	-0.95 ... 10 bar	0 ... 8 bar	-0.95 ... 8 bar	-0.9 ... 8 bar
Description	• With button switch • Durable thanks to tried-and-tested piston slide and disc seat valve technology • Robust metal housing • Attractive price • Ergonomic and safe operation • Minimal actuating forces • Modern design • Reverse operation possible	• With button switch • Polymer design • Ducted exhaust air	• With button switch • Suitable for vacuum operation • Sturdy die-cast zinc design	• With pedal • Suitable for vacuum operation • Sturdy die-cast zinc design
online: ➔	vhef	k	k-3	f-3-m5

Manually actuated directional control valves >

Finger lever valves

	Finger lever valves VHEF-L ★	**Finger lever valves TH/O-3**	**Finger lever valves TH-3, THO-3, TH-5**	**Finger lever valves H-4/3**
Valve function	3/2-way, monostable, open/closed, 5/2-way, monostable	3/2-way, monostable, open/closed	3/2-way, closed, monostable	4/3 exhausted
Type of control	Direct	Direct	Direct	Pilot actuated
Standard nominal flow rate	750 ... 1200 l/min	80 l/min	80 l/min	125 l/min
Pneumatic working port	G1/4, G1/8	PK-3	M5	M5
Operating pressure [MPa]	-0.095 ... 1 MPa			
Operating pressure	-0.95 ... 10 bar	0 ... 8 bar	-0.95 ... 8 bar	0 ... 8 bar
Description	• With finger lever • Durable thanks to tried-and-tested piston slide and disc seat valve technology • Robust metal housing • Attractive price • Ergonomic and safe operation • Minimal actuating forces • Modern design • Reverse operation possible	• With finger lever • Polymer design • Ducted exhaust air	• With finger lever • Die-cast zinc or die-cast aluminium design	• With detenting finger lever • Front panel mounting or mounting on sub-base • Aluminium design
online: →	**vhef**	**th**	**th-3-m5**	**h-4**

Manually actuated directional control valves >

Toggle lever valves

	Toggle lever valves VHEF-V	**Toggle lever valves KH/O-3**
Valve function	3/2 double solenoid, 3/2-way, monostable, open/closed, 5/2 double solenoid, 5/2-way, monostable	3/2-way, monostable, open/closed
Type of control	Direct	Direct
Standard nominal flow rate	750 ... 1200 l/min	80 l/min
Pneumatic working port	G1/4, G1/8	PK-3
Operating pressure [MPa]	-0.095 ... 1 MPa	
Operating pressure	-0.95 ... 10 bar	0 ... 8 bar
Description	• With toggle lever • Durable thanks to tried-and-tested piston slide and disc seat valve technology • Robust metal housing • Attractive price • Ergonomic and safe operation • Minimal actuating forces • Modern design • Reverse operation possible	• With toggle lever • Polymer design • Ducted exhaust air
online: →	**vhef**	**kh**

Manually actuated directional control valves >

Foot valves

	Foot valves F-3, FO-3, F-5	**Foot valves with detent FP-3, FPB-3, FP-5, FPB-5**
Valve function	3/2-way, closed, monostable, 3/2 open, single solenoid, 5/2-way, monostable	3/2 double solenoid, 5/2 double solenoid
Type of control	Direct	Direct
Standard nominal flow rate	550 ... 600 l/min	550 ... 600 l/min
Pneumatic working port	G1/4	G1/4
Operating pressure	-0.95 ... 10 bar	-0.95 ... 10 bar
Description	• With foot pedal • Sturdy die-cast zinc design	• With foot pedal with detent • Sturdy die-cast zinc design
online: ➔	fo-3	fpb-3

Manually actuated directional control valves >

Selector switches

	Selector valves VHEF-ES ★	**Selector switches HW-6-38**
Valve function	3/2 double solenoid, 3/2-way, monostable, open/closed, 5/2 double solenoid, 5/2-way, monostable, 5/3 exhausted, 5/3 closed	8/6 double solenoid
Type of control	Direct	Direct
Standard nominal flow rate	530 ... 1200 l/min	180 l/min
Pneumatic working port	G1/4, G1/8	M5
Operating pressure [MPa]	-0.095 ... 1 MPa	
Operating pressure	-0.95 ... 10 bar	0 ... 8 bar
Description	• With selector switch on the side or on top • Durable thanks to tried-and-tested piston slide and disc seat valve technology • Robust metal housing • Attractive price • Ergonomic and safe operation • Minimal actuating forces • Modern design • Reverse operation possible	• With rotary knob and arrow • Front panel mounting or mounting on sub-base • With six switching positions
online: ➔	vhef	hw-6

Manually actuated directional control valves >

Front panel valves

	Front panel valves SV/O-3	**Front panel valves SVS-3, SVS-4, SVOS-3**	**Front panel valves SV-3, SV-5**
Valve function	2x3/2-way, monostable, closed	3/2-way, closed, monostable, 3/2 open, single solenoid, 4/2-way, single solenoid	3/2-way, closed, monostable, 5/2-way, monostable
Type of control	Direct	Direct, Pilot actuated	Direct
Standard nominal flow rate	70 l/min	120 l/min	65 ... 95 l/min
Pneumatic working port	PK-3	G1/8	M5
Operating pressure [MPa]		0.35 ... 0.8 MPa	-0.095 ... 0.8 MPa
Operating pressure	0 ... 8 bar	3.5 ... 8 bar	-0.95 ... 8 bar
Description	• For actuator attachments such as toggle and selector switches • Reliable coupling system for quick mounting and dismounting • Polymer design	• For actuator attachments such as pushbutton actuators, mushroom pushbuttons, selector switches, toggle switches, key actuators • Reliable coupling system for quick mounting and dismounting	• For actuator attachments such as pushbutton actuators, mushroom pushbuttons, mushroom pushbuttons with detent, selector switches or toggle switches • Reliable coupling system for quick mounting and dismounting • Polymer design
online: →	sv	svos	sv-3

Mechanically actuated directional control valves >

Stem actuated valves

	Stem actuated valves VMEF-S ★	**Stem actuated valves V/O-3**	**Stem actuated micro valves S-3, SO-3**
Valve function	3/2-way, closed, monostable, 5/2-way, monostable	3/2-way, closed, monostable, 3/2-way, monostable, open/closed	3/2-way, closed, monostable, 3/2 open, single solenoid
Type of control	Direct, Pilot actuated	Direct	Direct
Standard nominal flow rate	750 ... 1200 l/min	80 l/min	60 l/min
Pneumatic working port	G1/4, G1/8	M5, PK-3	PK-3
Operating pressure [MPa]	-0.095 ... 1 MPa		
Operating pressure	-0.95 ... 10 bar	-0.95 ... 8 bar	-0.95 ... 8 bar
Description	• Durable thanks to tried-and-tested piston slide and disc seat valve technology • Robust metal housing • Outstanding pneumatic performance • Attractive price • Ergonomic and safe operation • Minimal actuating forces • Modern design • Reverse operation possible	• Through-holes in housing • Polymer, aluminium or die-cast zinc design	• Dimensions to DIN 41635, type A • Polymer design • Various actuator attachments
online: →	vmef	v/o	so

Mechanically actuated directional control valves >

Stem actuated valves

	Limit switches with push-in connector SDK, SVK	**Limit stop signal generators with push-in connector SDV**
Valve function	3/2-way, closed, monostable	3/2-way, closed, monostable
Type of control	Direct	Direct
Standard nominal flow rate	16 ... 50 l/min	8 ... 16 l/min
Pneumatic working port	PK-3	PK-3
Operating pressure [MPa]		
Operating pressure	-0.9 ... 8 bar	0 ... 8 bar
Description	• For end-position sensing and position control • High accuracy • Stainless steel design	• For end-position sensing and position control • High precision and low actuating forces • Sturdy design
online: ➔	sdk	sdv

Mechanically actuated directional control valves >

Roller lever valves

	Roller lever valves VMEF-R ★	**Roller lever valves R/O-3-PK-3**	**Roller lever valves R-3, R-5, RO-3**
Valve function	3/2-way, single solenoid, 5/2-way, monostable	3/2-way, monostable, open/closed	3/2-way, closed, monostable
Type of control	Direct	Direct	Direct
Standard nominal flow rate	750 ... 1200 l/min	80 l/min	80 l/min
Pneumatic working port	G1/4, G1/8	PK-3	M5
Operating pressure [MPa]	-0.095 ... 1 MPa		
Operating pressure	-0.95 ... 10 bar	0 ... 8 bar	-0.95 ... 8 bar
Description	• Durable thanks to tried-and-tested piston slide and disc seat valve technology • Robust metal housing • Outstanding pneumatic performance • Attractive price • Ergonomic and safe operation • Minimal actuating forces • Modern design • Reverse operation possible	• With roller lever • Polymer design • Ducted exhaust air	• With roller lever • Die-cast aluminium design
online: ➔	vmef	r/o	ro-3

Mechanically actuated directional control valves >

Roller lever valves

	Roller lever valves VMEF-K	**Toggle lever valves L/O-3**	**Roller lever valves with idle return L-3, L-5, LO-3**
Valve function	3/2-way, single solenoid, 5/2-way, monostable	3/2-way, monostable, open/closed	3/2-way, closed, monostable
Type of control	Direct	Direct	Direct
Standard nominal flow rate	750 ... 1200 l/min	80 l/min	80 l/min
Pneumatic working port	G1/4, G1/8	PK-3	M5
Operating pressure [MPa]	-0.095 ... 1 MPa		
Operating pressure	-0.95 ... 10 bar	0 ... 8 bar	-0.95 ... 8 bar
Description	• Durable thanks to tried-and-tested piston slide and disc seat valve technology • Robust metal housing • Outstanding pneumatic performance • Attractive price • Ergonomic and safe operation • Minimal actuating forces • Modern design • Reverse operation possible	• With roller lever with idle return • Polymer design • Ducted exhaust air	• With roller lever • Die-cast aluminium design
online: →	vmef	l/o	lo-3

Mechanically actuated directional control valves >

Swivel lever valves

	Swivel lever valves RW/O-3	**Swivel lever valves RW-3**
Valve function	3/2-way, monostable, open/closed	3/2-way, closed, monostable
Type of control	Direct	Direct
Standard nominal flow rate	80 l/min	80 l/min
Pneumatic working port	PK-3	M5
Operating pressure	0 ... 8 bar	-0.95 ... 8 bar
Description	• Basic valve for actuator attachments such as short or long swivel lever, swivel lever rod • Aluminium design	• With swivel lever • Sturdy die-cast zinc design • Various actuator attachments
online: →	rw	rw-3

Pneumatic shut-off valves >

Check valves

	Check valves, piloted HGL ★	**Manual override tools HAB**	**Check valves, piloted VBNF**	**Non-return valves H, HA, HB**
Pneumatic connection 1	G1/2, G1/4, G1/8, G3/8, M5, QS-10, QS-12, QS-4, QS-6, QS-8	G1/2, G1/4, G1/8, G3/8	QS-6, QS-8	G1/2, G1/4, G1/8, G3/4, G3/8, M5, QS-10, QS-12, QS-4, QS-6, QS-8, R1/2, R1/4, R1/8, R3/8
Standard nominal flow rate			120 ... 260 l/min	115 ... 2230 l/min
Standard nominal flow rate, exhaust 0.6->0.5 MPa (6->5 bar, 87->72.5 psi)		165 l/min		
Standard nominal flow rate 1->2 (0.6->0.5 MPa, 6->5 bar, 87->72.5 psi)	130 ... 1600 l/min		130 ... 620 l/min	1000 ... 5900 l/min
Operating pressure [MPa]	0.05 ... 1 MPa			0.04 ... 1.2 MPa
Operating pressure	0.5 ... 10 bar	0 ... 10 bar	0.2 ... 10 bar	-1 ... 12 bar
Operating pressure for entire temperature range			0.2 ... 10 bar	
Description	• Valve function: piloted non-return function • Screw-in with male thread • Pneumatically piloted • Pilot air connection: M5, G1/8, G1/4, G3/8, QS-4 • Manually actuated exhaust possible with separate accessory	• Valve function: exhaust component • For check valve HGL • For manual exhausting air trapped in a cylinder	• Valve function: piloted non-return function • Minimal height • High flow rate • Can be rotated horizontally through 360° in assembled state • Manually actuated exhaust possible	• Valve function: non-return function • Screw-in or in-line installation • With connecting thread at both ends, push-in connector at both ends, thread/push-in connector
online: ➔	**hgl**	**hab**	**vbnf**	**h-qs**

Pneumatic shut-off valves >

Quick exhaust valves

	Quick exhaust valves VBQF	**Quick exhaust valves SE, SEU**
Pneumatic connection 1	G1/4, G1/8, QS-6, QS-8	G1/2, G1/4, G1/8, G3/4, G3/8
Standard nominal flow rate, exhaust 0.6->0.5 MPa (6->5 bar, 87->72.5 psi)	850 ... 2500 l/min	550 ... 7500 l/min
Standard nominal flow rate, pressurisation 0.6->0.5 MPa (6->5 bar, 87->72.5 psi)	350 ... 960 l/min	300 ... 4560 l/min
Operating pressure	0.2 ... 10 bar	0.2 ... 10 bar
Description	• Minimal height • High flow rate • Reduced noise emission • Available with silencer • Available with ducted or unducted exhaust air • For higher cycle times	• Valve function: quick exhaust • Shut-off valve, piloted • Screw-in • With or without silencer
online: →	vbqf	se

Pneumatic shut-off valves >

Shut-off valves and ball valves

	Hand slide valves VBOH	**Shut-off valves HE**	**Ball valves QH-QS, QHS-QS**	**Ball valves QH**
Valve function	3/2 double solenoid	2/2 double solenoid, 3/2 double solenoid	2/2 double solenoid	2/2 double solenoid
Pneumatic connection 1	G1/2, G1/4, G1/8, G3/4, G3/8, M5	QS-10, QS-12, QS-6, QS-8, R1/2, R1/4, R1/8, R3/8	QS-4, QS-6, R1/8	G1, G1 1/2, G1/2, G1/4, G3/4, G3/8
Standard nominal flow rate	236 ... 7691 l/min	256.5 ... 834.3 l/min	148 ... 560 l/min	3400 ... 84000 l/min
Operating pressure [MPa]	-0.095 ... 1.2 MPa	-0.095 ... 1 MPa	-0.1 ... 1 MPa	
Operating pressure	-0.95 ... 12 bar	-0.95 ... 10 bar	-1 ... 10 bar	
Description	• Used as a shut-off function for pressurising and exhausting compressed air systems, for example upstream of service units, for air guns and also for exhausting pneumatic cylinders • Non-overlapping, so no pressure losses when switching • Minimal installation effort	• Shut-off valve, manually operated • Connection: thread at both ends, push-in connector at both ends, thread/push-in connector • Different mounting options	• Shut-off valve, manually operated • In-line installation, can be screwed in, bulkhead fitting • Variants: thread at both ends, push-in connector at both ends, thread/push-in connector	• Shut-off valve, manually operated • In-line installation • Female thread at both ends • With hand lever • Pipe thread to ISO 2281
online: →	vboh	he	qh	qh

Logic valves

	Logic components OS	Amplifier modules VK	NOT modules VLO	Logic components ZK
Valve function	OR function			AND function
Pneumatic connection 1	G1/2, G1/4, G1/8, PK-3, PK-4	M5	M5	G1/8, PK-3, PK-4
Standard nominal flow rate	100 ... 5000 l/min	80 l/min	80 l/min	100 ... 550 l/min
Operating pressure	0.001 ... 10 bar	0.001 ... 6 bar	0.001 ... 6 bar	0.001 ... 10 bar
Description	• Pneumatic control system • Mounting via through-holes	• For pneumatic sensors	• For pneumatic sensors	• Dual-pressure valve • Connects two input signals in the AND function • Mounting via through-holes
online: →	os	vk	vlo	zk

Pressure regulators

	Differential pressure regulators LRL, LRLL	Pressure regulator VRPA
Design	Directly actuated piston regulator, With through compressed air supply	
Pressure regulation range	2 ... 6 bar	1 ... 8 bar
Standard nominal flow rate		80 ... 130 l/min
Nominal flow rate, closed	30 ... 730 l/min	
Nominal flow rate, open	30 ... 760 l/min	
Pneumatic connection 1	G1/2, G1/4, G1/8, G3/8, M5	M5, QS-4, QS-6, QS-8, R1/4, R1/8
Pneumatic connection 2	QS-10, QS-12, QS-4, QS-6, QS-8	QS-4, QS-6, QS-8
Ambient temperature	0 ... 60°C	0 ... 60°C
Description	• Piston regulator with through pressure supply • Constant pressure differential between the input and output • Connections: thread/push-in connector on top or on side • Without secondary exhaust • Without pressure gauge	• Regulates the operating pressure independently of the fluctuating inlet pressure • With secondary exhaust and with return flow function • Piston regulator with through pressure supply • Greater energy efficiency thanks to movement-specific pressure adjustment • Directly actuated • Available with pressure gauge • Connections: push-in connector at both ends, thread/push-in connector • Sustainable operation thanks to reduced pressure level
online: →	lrl	vrpa

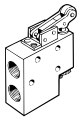
Flow control valves >

One-way flow control valves

	One-way flow control valves VFOE-L ★	**One-way flow control valves GRLA, GRLZ, GRLSA, CRGRLA** ★	**One-way flow control valves VFOH**	**One-way flow control valves VFOF**
Valve function	Exhaust air one-way flow control function, Supply air one-way flow control function	Exhaust air one-way flow control function, One-way flow control function, Supply air one-way flow control function	Exhaust air one-way flow control function	Exhaust air one-way flow control function
Pneumatic connection 1	QS-10, QS-12, QS-4, QS-6, QS-8	Female thread G1/4, For barbed connector I.D. 4 mm Via union nut, 6 mm Via union nut, G1/2, G1/4, G1/8, G3/4, G3/8, M3, M5, PK-3, PK-3 Via union nut, PK-4, PK-4 Via union nut, PK-6 Via union nut, QS-10, QS-12, QS-3, QS-4, QS-6, QS-8	QS-10, QS-4, QS-6, QS-8	QS-6, QS-8
Standard nominal flow rate in flow control direction	85 ... 1200 l/min	0 ... 4320 l/min	180 ... 530 l/min	120 ... 590 l/min
Adjusting element	Rotary knob with detent	Internal hexagon, Knurled screw, Slotted head screw	External hex	Internal hexagon
Description	• Low-cost solution for standard applications • Simple and reliable adjustment of pneumatic cylinder speed • Extremely easy assembly • Fast commissioning • Compact dimensions	• Functional combination of one-way flow control valve and piloted check valve • Flow control valve, flow control at one end • Polymer, metal or stainless steel design • Standard, mini, in-line variants with different flow rates • Connections: thread at both ends, push-in connector at both ends, thread/push-in connector	• Easy-to-clean design • Increased corrosion protection • Can be rotated horizontally through 360° in assembled state	• Functional combination of one-way flow control valve and piloted check valve • High flow rate • Can be rotated horizontally through 360° in assembled state • Compact and can be operated from the side
online: →	vfoe	grla	vfoh	vfof

Flow control valves >

One-way flow control valves

	One-way flow control valves GR, GRA	 One-way flow control valves GG, GGO, GRR	Precision one-way flow control valves GRP	One-way flow control valves, M5 Compact System GRF
Valve function	One-way flow control function	One-way flow control function	One-way flow control function	One-way flow control function
Pneumatic connection 1	G1/2, G1/4, G1/8, G3/4, G3/8, M3, M5, QS-3, QS-4, QS-6, QS-8	G1/2, G1/4	G1/8, PK-3, PK-4	PK-3
Standard nominal flow rate in flow control direction	29.5 ... 3300 l/min	870 ... 1300 l/min	3.8 ... 75.8 l/min	45 l/min
Adjusting element	Knurled screw	Roller lever	Rotary knob with scale	Knurled screw
Description	• Non-return and flow control valve • In-line installation	• Non-return and flow control valve • With roller lever	• Non-return and flow control valve • Mounting on sub-base or for front panel mounting	• Complete system offering control components with all the functions required for pneumatic sequence control • For control cabinet installation • Fast replacement of components
online: ➔	gra	gg	grp	m5-compact

Flow control valves >

Flow control valves

	Flow control/silencers VFFK	Flow control valves GRLO	Flow control valves, barbed Y-connector with restrictor GRO, Y-PK3
Valve function	Sound pressure control function	Flow control function	Flow control function
Pneumatic connection 1	M5, M7, R1/4, R1/8	M3, M5	G1/4, G1/8, M5, PK-3, QS-3, QS-4, QS-6
Standard flow rate in flow control direction 6 -> 0 bar		33 ... 169 l/min	
Standard nominal flow rate in flow control direction		18 ... 95 l/min	85 ... 350 l/min
Standard flow rate 0.6->0 MPa (6->0 bar, 87->0 psi)	0 ... 420 l/min		
Adjusting element	Knurled screw	Slotted head screw	Knurled screw
Description	• With polymer silencer	• Flow control valve, flow control at both ends • Standard or mini flow control valve • Precision adjustment for low and medium speeds • Connections: thread at both ends, thread/push-in connector • Connections: L-outlet • Metal version	• Flow control valve, flow control at both ends • In-line flow control valve • Connections: push-in connector at both ends • Connections: in-line, Y-shape • Polymer design
online: ➔	vffk	grlo	gro

Flow control valves >

Flow control valves

	Precision flow control valves GRPO	**Exhaust air flow control valves, flow control/silencers GRE, GRU**
Valve function	Flow control function	Sound pressure control function
Pneumatic connection 1	G1/8, PK-3, PK-4	G1/2, G1/4, G1/8, G3/4, G3/8
Standard flow rate in flow control direction 6 -> 0 bar	5.2 ... 129 l/min	
Standard nominal flow rate in flow control direction	3.8 ... 75.8 l/min	520 ... 3600 l/min
Standard flow rate 0.6->0 MPa (6->0 bar, 87->0 psi)		0 ... 8000 l/min
Adjusting element	Rotary knob with scale	Slotted head screw
Description	• Connections: threaded connection at both ends, push-in connector at both ends • Metal version	• Exhaust air flow control valve GRE: sintered metal • Flow control/silencer GRU: polymer
online: →	grpo	gre

Flow control valves >

Time delay valves

	Time delay valves, M5 Compact System VLK, VZ, VZO
Pneumatic connection	PK-3
Standard nominal flow rate	60 ... 90 l/min
Adjustable delay time	0.25 ... 5 s
Operating pressure	2.5 ... 8 bar
Type of mounting	Either:, Front panel mounting, On mounting frame
Description	• Complete system offering control components with all the functions required for pneumatic sequence control • For control cabinet installation • Fast replacement of components
online: →	m5-compact

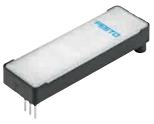
Proportional valves >

Flow control valves

	Proportional directional control valves MPYE	Proportional directional control valves VPWP	Proportional directional control valves VPWS	Proportional flow control valves VEMD
Valve function	5/3 closed	5/3-way proportional directional control valve, closed	2/2 proportional directional control valve, closed	2-way proportional flow control valve
Pneumatic connection 1	G1/4, G1/8, G3/8, M5	G1/4, G1/8, G3/8	Cartridge 7.5 mm, Cartridge 15 mm	Female thread M5
Flow rate control range				0 ... 20 l/min
Operating pressure [MPa]	0 ... 1 MPa	0 ... 1 MPa	0 ... 1 MPa	0 ... 0.25 MPa
Operating pressure	0 ... 10 bar	0 ... 10 bar	0 ... 10 bar	0 ... 2.5 bar
Standard nominal flow rate	100 ... 2000 l/min	350 ... 2000 l/min		
Description	• Controlled piston spool valve • Analogue actuation • Setpoint input as analogue voltage signal (0 ... 10 V) • Suitable for servo-pneumatic applications with end-position controller SPC11	• Controlled piston spool valve • Digitally actuated • Integrated pressure sensors for monitoring function and force control • With auto identification • Diagnostic function • Integrated digital output, e.g. for a clamping/brake unit • Suitable for servo-pneumatic applications with axis controller CPX-CMAX and end-position controller CPX-CMPX	• Directly actuated poppet valve • Operating medium: air, oxygen, inert gases • Extremely small and lightweight • Compact and cost-effective • Mounting: on sub-base	• Compact module with integrated control electronics • Dynamic regulation with short response time • Mass flow controller (MFC) • Operating medium: air, oxygen, inert gases, nitrogen • Minimal power consumption thanks to piezo technology • Silent: ideal for mobile applications and those close to patients • Direct mounting via thread • Ideal for life sciences applications • Sustainable operation thanks to efficient control
online: →	mpye	vpwp	vpws	vemd

Proportional valves >

Flow control valves

				
	Proportional flow control valves VPCF	**Valve units VPCB**	**Piezo valves VEMP**	**Piezo valves VEAE**
Valve function	3-way proportional flow control valve	3-way proportional pressure regulator	2/2-way, closed, monostable, 3/3-way, closed, monostable	2/2-way, closed, monostable
Pneumatic connection 1	G3/8	G3/8	Flange	Flange
Flow rate control range	20 ... 1500 l/min			
Operating pressure [MPa]	0.1 ... 1 MPa	0.4 ... 0.8 MPa		0 ... 0.6 MPa
Operating pressure	1 ... 10 bar	4 ... 8 bar	0 ... 1.7 bar	0 ... 6 bar
Standard nominal flow rate		725 l/min	18 ... 28 l/min	50 ... 81 l/min
Description	• Linear characteristic curve for easy programming • To EU Explosion Protection Directive (ATEX) • Highly dynamic • Piston spool with integrated sensor • Electrical connection via M12x1 plug, 8-pin	• Valve unit for controlling a pneumatic cylinder in balancer applications • Comprising 3/3-way proportional pressure regulator with special pressure control and shut-off valve actuation as well as two 2/2-way stop valves • Diagnostic display for fast error detection	• Very low power consumption • No self-heating • Low leakage • Highly precise • Operating medium: air, oxygen, inert gases, nitrogen • Integrated piezo technology • Long service life • Light weight • Mounting: on sub-base, on manifold rail	• Silent operation • Very low power consumption • No self-heating • Integrated piezo technology • Extremely long service life • Operating medium: air, oxygen, inert gases • Small and lightweight • High throughflow • Mounting via through-holes
online: →	vpcf	vpcb	vemp	veae

Proportional valves >

Pressure regulators

	Proportional pressure regulators MPPES	**Proportional pressure regulators VPPE** ★	**Proportional pressure regulators VPPM**	**Proportional-pressure regulators, NPT VPPM**
Valve function	3-way proportional-pressure regulator, closed	3-way proportional pressure regulator, 3-way proportion-al-pressure regulator, closed	3-way proportional pressure regulator	3-way proportional pressure regulator
Pneumatic connection 1	G1/2, G1/4, G1/8	G1/8	Sub-base, G1/2, G1/4, G1/8	1/8 NPT, 1/4 NPT, 1/2 NPT
Pressure regulation range [MPa]	0 ... 1 MPa	0.002 ... 1 MPa	0.002 ... 1 MPa	0.006 ... 1 MPa
Pressure regulation range	0 ... 10 bar	0.02 ... 10 bar	0.02 ... 10 bar	0.02 ... 10 bar
Operating pressure [MPa]	≤1.2 MPa	0.8 MPa		
Operating pressure	≤12 bar	8 bar		
Standard nominal flow rate		310 ... 1250 l/min	380 ... 7000 l/min	380 ... 7000 l/min
Description	• Directly actuated (G1/8), pilot actuated (G1/4, G1/2) • Setpoint value input as analogue voltage or current signal • Choice of pressure regulation ranges • Available with setpoint module • Electrical connection via plug, round design to DIN 45326, M16 x 0.75, 8-pin • With proportional solenoid	• Piloted pressure regulator • Setpoint input as analogue voltage signal (0 ... 10 V) • Electrical connection via M12x1 plug, 4 or 5-pin • Available with setpoint module • Variant with display with three retrievable presets and digital controller electronics • For simple control tasks • Variants recommended for production systems for manufacturing lithium-ion batteries	• Piloted pressure regulator • Multi-sensor control (cascade control) • Three default presets for fast commissioning • Integration in valve terminal MPA • User interface with LED displays, LCD display, adjustment/selection buttons • Integrated pressure sensor • Electrical connection via plug connector, round design, 8-pin, M12 or terminal linking	• Piloted pressure regulator • Multi-sensor control (cascade control) • Three default presets for fast commissioning • Integration in valve terminal MPA • User interface with LED displays, LCD display, adjustment/selection buttons • Integrated pressure sensor • Electrical connection via plug connector, round design, 8-pin, M12 or terminal linking
online: →	mppes	vppe	vppm	vppm

Proportional valves >

Pressure regulators

	Proportional pressure regulators VPPX	**Proportional pressure regulator VPPL**	**Proportional-pressure regulators VEAB**
Valve function	3-way proportional pressure regulator	3-way proportional-pressure regulator, closed	3-way proportional pressure regulator
Pneumatic connection 1	Sub-base, G1/2, G1/4, G1/8	Flange, G1/4	Flange, QS-4
Pressure regulation range [MPa]		0.02 ... 4 MPa	
Pressure regulation range	0.1 ... 10 bar	0.2 ... 40 bar	
Operating pressure [MPa]		≤5 MPa	
Operating pressure		≤50 bar	
Standard nominal flow rate	1400 ... 7000 l/min	245 l/min	≥4.5 l/min
Description	• Pressure regulator with additional sensor input • Programmable, freely adjustable PID controller • Multi-sensor control (cascade control) • Control characteristic adjustable via software FCT (Festo Configuration Tool) • Integrated pressure sensor with separate output • Pressure is maintained if the controller fails	• For high-pressure applications • Directly actuated piston regulator • Available in three variants: flanged valve, flanged valve with external pilot air supply, in-line valve	• Silent operation • Very low power consumption • Highly precise • Integrated piezo technology • Short switching times • Mounting: using through-holes, H-rail mounting
online: →	vppx	vppl	veab

Proportional valves >

Pressure regulators

	Proportional-pressure regulators VEAA	**Proportional-pressure regulators VPPI**
Valve function	3-way proportional pressure regulator	3-way proportional pressure regulator
Pneumatic connection 1	Flange, QS-4	G1/8
Pressure regulation range [MPa]		-0.1 ... 1.2 MPa
Pressure regulation range		-1 ... 12 bar
Operating pressure [MPa]		
Operating pressure		0 ... 13 bar
Standard nominal flow rate	≥7 l/min	150 ... 1630 l/min
Description	• Silent operation • Very low power consumption • Highly precise • Integrated piezo technology • Durable • Mounting: via through-holes, H-rail mounting, on mounting plate or sub-base	• Select between three predefined and one customer-specific controller preset • With or without display • Low-noise, flexible and highly dynamic • Precise and stable changeover, rapid switching of setpoint by high-performance moving coil actuator • Control via analogue current or voltage signal, digital pattern for adjustable setpoint values or pulse-width modulation signal
online: →	veaa	vppi

Solenoid-actuated process and media valves

	Solenoid valves VZWD ★	**Solenoid valves VZWF** ★	**Solenoid valves VZWM** ★
Design	Directly actuated poppet valve	Diaphragm valve, Force pilot operated	Diaphragm valve, servo-controlled
Actuation type	Electric	Electric	Electric
Nominal size	1 ... 6 mm	13.5 ... 50 mm	13 ... 50 mm
Flow rate Kv	0.06 ... 0.4 m³/h	1.8 ... 28 m³/h	1.6 ... 39 m³/h
Temperature of medium	-10 ... 80°C	-10 ... 80°C	-10 ... 60°C
Medium pressure	0 ... 90 bar	0 ... 10 bar	
Medium pressure of gaseous media			0.5 ... 10 bar
Medium pressure of liquid media			0.5 ... 6 bar
Process valve connection	1/4 NPT, 1/8 NPT, G1/4, G1/8, NPT1/4	1 NPT, 1 1/2 NPT, 1 1/4 NPT, 1/2 NPT, 1/4 NPT, 2 NPT, 3/4 NPT, 3/8 NPT, G1, G1 1/2, G1 1/4, G1/2, G1/4, G2, G3/4, G3/8	G1, G1 1/2, G1 1/4, G1/2, G1/4, G2, G3/4, G3/8
Description	• Extensive pressure range • Directly actuated poppet valve • No differential pressure required • Can also be used in vacuum technology	• High flow rates • Large nominal diameters with relatively small solenoids • No differential pressure required • Can also be used in vacuum technology	• Brass or stainless steel casting design • Electrical connection via solenoid armature tube • Comprehensive range of coils • Coil can be ordered separately
online: →	vzwd	vzwf	vzwm

Solenoid-actuated process and media valves

	Solenoid valves VZWP	**Media separated solenoid valves VYKA**	**Media separated solenoid valves VYKB**
Design	Piloted piston poppet valve	Rocker valve with diaphragm seal	Electrical connection at top, Electrical connection at the side, Rocker valve with diaphragm seal
Actuation type	Electric	Electric	Electric
Nominal size	13 ... 25 mm	1.2 mm	1.6 ... 2 mm
Flow rate Kv	1.5 ... 11.5 m³/h	0.013 ... 0.021 m³/h	0.034 ... 0.056 m³/h
Temperature of medium	-10 ... 80°C		0 ... 50°C
Medium pressure	0.5 ... 40 bar	-0.5 ... 2 bar	-0.75 ... 3 bar
Medium pressure of gaseous media			
Medium pressure of liquid media			
Process valve connection	1 NPT, 1/2 NPT, 1/4 NPT, 3/4 NPT, 3/8 NPT, G1, G1/2, G1/4, G3/4, G3/8		
Description	• For all applications with a differential pressure of min. 0.5 bar • For high pressures and high flow rates with relatively small solenoids • For controlling gaseous and liquid media in open circuits	• Compact width of 7 mm • Maximum performance and precision in the smallest of spaces • High flow rate with small size • Very easy to clean thanks to media separation • Low media consumption thanks to small internal volume • FDA-listed materials • High-quality materials, therefore also suitable for aggressive media • High repetition accuracy, switching frequency and precision, therefore also suitable for extremely small volumes and dosing tasks • Very flexible in use thanks to 3/2-way and 2/2-way variants as well as 12 ... 26 V DC control • Optionally with slide-on E-box VAVE-K1 with holding current reduction as accessory • Developed according to ISO 13485 • Sustainable operation thanks to efficient control and active air shut-off	• Compact width of 10 mm or 12 mm • Very easy to clean thanks to media separation • High-quality materials, therefore also suitable for aggressive media • Very flexible in use thanks to 3/2-way or 2/2-way variants as well as 12 or 24 V DC actuation • For dosing, aspirating and for continuous flow applications • Developed according to ISO 13485 • Sustainable operation thanks to efficient control and active air shut-off
online: →	vzwp	vyka	vykb

Pneumatically and mechanically actuated industrial process valves and media valves

	Angle seat valves VZXF	**Angle seat valves VZXA** ★	**Pinch valves VZQA**	**Ball valves VZBD**
Design	Poppet valve with piston drive	Poppet valve with piston drive, Poppet valve with diaphragm actuator	Pinch valve, pneumatically actuated	2-way ball valve
Valve function	2/2-way, closed, monostable	2/2	2/2-way, closed, monostable, 2/2 open, single solenoid	2/2
Actuation type	Pneumatic	Pneumatic	Pneumatic	Mechanical
Nominal size	12 ... 45 mm			
Nominal size DN			6, 15, 25, 50	15, 20, 25, 32, 40, 50, 65, 80, 100
Process valve connection			Clamp to ASME-BPE, type A, Clamp to ASME-BPE, type B, Clamp to DIN 32676 series A, 1 NPT, 1/2 NPT, 1/4 NPT, 2 NPT, G1, G1/2, G1/4, G2	Clamp to ASME-BPE, Clamp to DIN 32676 series B, Weld-on end to ASME-BPE, Weld-on end to ISO 1127
Flow rate Kv	3.3 ... 43 m³/h	4.6 ... 77.9 m³/h	0.7 ... 72 m³/h	13 ... 1641 m³/h
Standard nominal flow rate				
Temperature of medium	-40 ... 200°C	-30 ... 200°C	-5 ... 150°C	-20 ... 200°C
Medium pressure [MPa]	-0.09 ... 4 MPa	0 ... 3 MPa	0 ... 0.6 MPa	
Medium pressure	-0.9 ... 40 bar	0 ... 30 bar	0 ... 6 bar	
Nominal pressure process valve PN	16, 40		10	16
Description	• Sturdy design • Stainless steel and gunmetal process valves with stainless steel, brass or aluminium actuators • Different actuator sizes and housing materials • Selection of different seat and shaft seals • For liquids, gases and other easily contaminated media • Easy-to-clean design	• Highly flexible, extremely high flow rates • Long service life • Stainless steel or Ecobrass process valves with stainless steel or polymer actuators • Modular design • Hygienic design, insensitive to dirt • Quick and easy maintenance • Simple and sturdy: an ideal choice for virtually all media with a viscosity of 600 mm2/s • High chemical and thermal resistance • Sustainable in production thanks to the use of alternative materials	• Modular design • Quick and easy replacement of the diaphragm • For critical, abrasive and viscous media • Easy-to-clean design • Flow direction is freely selectable • Versions with end-position sensing	• Electropolished surfaces SFV4 • PTFE seal with little dead space • The high-performance ball valve for the pharmaceutical and cosmetics industry • FDA-compliant seal to FDA 21 CFR 177.1550
online: →	**vzxf**	**vzxa**	**vzqa**	**vzbd**

Pneumatically and mechanically actuated industrial process valves and media valves

	Ball valves VZBE	**Ball valves VZBF**	**Ball valves VZBM**	**Ball valve actuator units VZBM**
Design	2-way ball valve, 2-way ball valve with hand lever, 3-way ball valve, L-hole, T-hole	2-way ball valve	2-way ball valve, 3-way ball valve, L-hole, T-hole	2-way ball valve, 3-way ball valve, Semi-rotary drive
Valve function	2/2, 3/2	2/2	2/2, 3/2	
Actuation type	Mechanical	Mechanical	Mechanical	Pneumatic
Nominal size				
Nominal size DN	8, 10, 15, 20, 25, 32, 40, 50, 65, 80, 100	15, 20, 25, 32, 40, 50, 65, 80, 100, 150, 200	8, 10, 15, 20, 25, 32, 40, 50	8, 10, 15, 20, 25, 32, 40, 50
Process valve connection	1 NPT, 1 1/2 NPT, 1 1/4 NPT, 1/2 NPT, 1/4 NPT, 2 NPT, 2 1/2 NPT, 3 NPT, 3/4 NPT, 3/8 NPT, 4 NPT, Weld-on end according to ASME B16.11	Flange to ANSI B16.5 class 150	Rp1, Rp1 1/2, Rp1 1/4, Rp1/2, Rp1/4, Rp2, Rp3/4, Rp3/8	Rp1, Rp1 1/2, Rp1 1/4, Rp1/2, Rp1/4, Rp2, Rp3/4, Rp3/8
Flow rate Kv	5.1 ... 1637 m³/h	8.5 ... 7816 m³/h	5.9 ... 243 m³/h	5.9 ... 243 m³/h
Standard nominal flow rate				
Temperature of medium	-20 ... 200°C	-20 ... 200°C	-20 ... 130°C	-20 ... 130°C
Medium pressure [MPa]				
Medium pressure				
Nominal pressure process valve PN	63	20	25, 40, 50	25, 40
Description	• 2-way manual, with lockable hand lever • 2- and 3-way with ISO 5211 head flange, with optional lockable hand lever • Stainless steel design • Pipe thread according to ASME B1.20.1 or welded end according to ASME B16.11 • Optionally with pre-assembled hand lever	• Flanged connections to ANSI B 16.5. class 150 • Static discharge ensured • API 607 Fire Safe certification • Stainless steel design • Easy to service • Optionally with pre-assembled hand lever	• Brass design • Pipe thread to EN 10226-1	• Ball valve actuator unit with double-acting or single-acting quarter turn actuator DFPD • Brass ball valve • 2-way ball valve actuator unit with pipe thread to EN 10226-1 • 3-way ball valve actuator unit with drilled L-hole and pipe thread to EN 10226-1 • 3-way ball valve actuator unit with drilled T-hole and pipe thread to EN 10226-1 • Flow is fully opened or closed in both directions
online: →	vzbe	vzbf	vzbm	vzbm

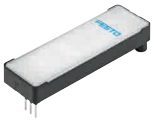
Pneumatically and mechanically actuated industrial process valves and media valves

	Ball valves VAPB	**Ball valves VZBC**	**Ball valve actuator units VZBC**	**Ball valves VZBA**
Design	2-way ball valve	2-way ball valve	2-way ball valve, Semi-rotary drive	2-way ball valve, 3-way ball valve, L-hole, T-hole
Valve function		2/2		2/2, 3/2
Actuation type	Mechanical	Mechanical	Pneumatic	Mechanical
Nominal size				
Nominal size DN	15, 20, 25, 32, 40, 50, 63	15, 20, 25, 32, 40, 50, 65, 80, 100	15, 20, 25, 32, 40, 50, 65, 80, 100	8, 10, 15, 20, 25, 32, 40, 50, 65, 80, 100
Process valve connection	Rp1, Rp1 1/2, Rp1 1/4, Rp1/2, Rp1/4, Rp2, Rp2 1/2, Rp3/4, Rp3/8	Ring housing with threaded flange	Ring housing with threaded flange	Weld-on ends/weld-on ends, Rp1, Rp1 1/2, Rp1 1/4, Rp1/2, Rp1/4, Rp2, Rp2 1/2, Rp3, Rp3/4, Rp3/8, Rp4
Flow rate Kv	5.9 ... 535 m³/h	19.4 ... 1414 m³/h	19.4 ... 1414 m³/h	7 ... 1414 m³/h
Standard nominal flow rate				
Temperature of medium	-20 ... 150°C	-10 ... 200°C	-10 ... 200°C	-10 ... 200°C
Medium pressure [MPa]				
Medium pressure				
Nominal pressure process valve PN	25, 40	16, 40	16, 40	63
Description	• Automatable 2-way ball valve • Brass design • Blow-out proof shaft • Manual operation possible using hand lever • Connecting thread to EN 10226-1 • Mounting flange to ISO 5211	• Automatable 2-way compact flanged ball valve • Stainless steel design • Short installation length • Blow-out proof shaft • Manual operation possible using hand lever • Flange to DIN 1092-1 • Mounting flange to ISO 5211 • Use in zone 1, 21, 2, 22	• Ball valve actuator unit with double- or single-acting quarter turn actuator DAPS • Stainless steel ball valve in compact design • NAMUR connection pattern for solenoid valves/limit switch attachments to VDI/VDE 3845 • Flow is fully opened or closed in both directions • Use in zone 1, 21, 2, 22	• Automatable 2-way or 3-way ball valve • Stainless steel design • Blow-out proof shaft • Manual operation possible using hand lever • Connecting thread to EN 10226-1 • Mounting flange to ISO 5211 • Use in zone 1, 21, 2, 22
online: →	vapb	vzbc	vzbc	vzba

Pneumatically and mechanically actuated industrial process valves and media valves

	Ball valve actuator units VZBA	**Ball valve actuator units VZPR**	**Pneumatic valves VLX**	**Media separated pneumatic valves VZDB**
Design	2-way ball valve, 3-way ball valve, L-hole, Semi-rotary drive, T-hole	2-way ball valve, Semi-rotary drive	Diaphragm valve	Rocker valve with diaphragm seal
Valve function			2/2-way, closed, monostable	2/2-way, closed, monostable, 3/2-way, monostable, open/ closed
Actuation type	Pneumatic	Electric, Pneumatic	Pneumatic	Pneumatic
Nominal size			13 ... 25 mm	1.6 mm
Nominal size DN	8, 10, 15, 20, 25, 32, 40, 50, 65, 80, 100	15, 20, 25, 32, 40, 50, 63		
Process valve connection	Weld-on ends/weld-on ends, Rp1, Rp1 1/2, Rp1 1/4, Rp1/2, Rp1/4, Rp2, Rp2 1/2, Rp3, Rp3/4, Rp3/8, Rp4	Rp1, Rp1 1/2, Rp1 1/4, Rp1/2, Rp1/4, Rp2, Rp2 1/2, Rp3/4, Rp3/8	G1, G1/2, G1/4, G3/4, G3/8	Male thread/male thread
Flow rate Kv	7 ... 1414 m³/h			0.034 m³/h
Standard nominal flow rate			2400 ... 14000 l/min	
Temperature of medium	-10 ... 200°C	-20 ... 150°C	-10 ... 80°C	0 ... 50°C
Medium pressure [MPa]				
Medium pressure			1 ... 10 bar	
Nominal pressure process valve PN	63	25, 40		
Description	• Ball valve actuator unit with double- or single-acting quarter turn actuator DAPS • Stainless steel ball valve • NAMUR connection pattern for solenoid valves/limit switch attachments to VDI/VDE 3845 • Flow is fully opened or closed in both directions • Use in zone 1, 21, 2, 22	• Ball valve actuator unit with double-acting quarter turn actuator DAPS • Brass ball valve • NAMUR connection pattern for solenoid valves/limit switch attachments to VDI/VDE 3845 • Flow is fully opened or closed in both directions	• Poppet valve • Indirectly actuated • Brass design • In-line mounting	• Compact width of 10 mm • Very easy to clean thanks to media separation • High-quality materials, therefore also suitable for aggressive media • For dosing, aspirating and for continuous flow applications • Developed according to ISO 13485
online: →	vzba	vzpr	vlx	vzdb

Piezo valves

	Proportional flow control valves VEMD	 **Piezo valves VEMP**	**Valves VEVM**
Valve function	2-way proportional flow control valve	2/2-way, closed, monostable, 3/3-way, closed, monostable	Can be allocated using the Motion App
Standard nominal flow rate		18 ... 28 l/min	
Operating pressure [MPa]	0 ... 0.25 MPa		0.3 ... 0.8 MPa
Operating pressure	0 ... 2.5 bar	0 ... 1.7 bar	3 ... 8 bar
Pneumatic connection 1	Female thread M5	Flange	G3/8
Nominal size	1.4 mm	1.3 ... 1.6 mm	4.2 mm
Nominal operating voltage DC	12 ... 24 V	250 ... 310 V	24 V
Control range	0 ... 20 l/min		
Description	• Compact module with integrated control electronics • Dynamic regulation with short response time • Mass flow controller (MFC) • Operating medium: air, oxygen, inert gases, nitrogen • Minimal power consumption thanks to piezo technology • Silent: ideal for mobile applications and those close to patients • Direct mounting via thread • Ideal for life sciences applications • Sustainable operation thanks to efficient control	• Very low power consumption • No self-heating • Low leakage • Highly precise • Operating medium: air, oxygen, inert gases, nitrogen • Integrated piezo technology • Long service life • Light weight • Mounting: on sub-base, on manifold rail	• Functionality can be assigned via Motion app • For Motion Terminal VTEM • Consisting of 4 wired piezo pilot-controlled piston seat valves • Extremely long service life • Very low power consumption • Low leakage with the function of a proportional-pressure regulator
online: →	vemd	vemp	vevm

Piezo valves

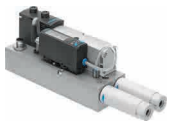
	Proportional-pressure regulators VEAA	**Proportional-pressure regulators VEAB**	**Piezo valves VEAE**
Valve function	3-way proportional pressure regulator	3-way proportional pressure regulator	2/2-way, closed, monostable
Standard nominal flow rate	≥7 l/min	≥4.5 l/min	50 ... 81 l/min
Operating pressure [MPa]			0 ... 0.6 MPa
Operating pressure			0 ... 6 bar
Pneumatic connection 1	Flange, QS-4	Flange, QS-4	Flange
Nominal size			1.2 ... 1.7 mm
Nominal operating voltage DC	24 V	24 V	300 V
Control range	0.001 ... 1 MPa	-0.1 ... 0.6 MPa	
Description	• Silent operation • Very low power consumption • Highly precise • Integrated piezo technology • Durable • Mounting: via through-holes, H-rail mounting, on mounting plate or sub-base	• Silent operation • Very low power consumption • Highly precise • Integrated piezo technology • Short switching times • Mounting: using through-holes, H-rail mounting	• Silent operation • Very low power consumption • No self-heating • Integrated piezo technology • Extremely long service life • Operating medium: air, oxygen, inert gases • Small and lightweight • High throughflow • Mounting via through-holes
online: →	veaa	veab	veae

Pneumatic control systems

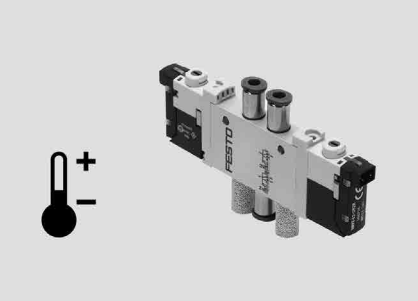
	Control blocks for two-hand start ZSB	**Pneumatic counters, M5 Compact System PZA, PZV**	**Timers, M5 Compact System PZVT**	**Electrical counters CCES**
Design		Mechanical sequence counter with pneumatic drive	Mechanical sequence counter with pneumatic drive	Electric adding counter with battery
Actuation type	Pneumatic			
Pneumatic connection		M5	Female thread M5	
Pneumatic connection 2	G1/8			
Type of mounting	Either:, With through-hole, Via female thread	Front panel mounting, With through-hole	Front panel mounting	Front panel mounting
Operating pressure	4 ... 8 bar	2 ... 8 bar	2 ... 6 bar	
Performance level (PL)	Two-hand operation/category 1, Performance Level c			
Description	• Used wherever manual actuation poses a risk of accident to operating personnel • With safety functions	• Complete system offering control components with all the functions required for pneumatic sequence control • For control cabinet installation • Fast replacement of components • Available with protective cap	• Complete system offering control components with all the functions required for pneumatic sequence control • For control cabinet installation • Fast replacement of components • Mechanical sequence counter with pneumatic drive • Adjustable delay time • Available with protective cap	• 8-digit LCD display • Independent power supply • Connection via terminal strip • Reset button
online: ➔	zsb	pza	pzvt	cces

Accessories for valves >

Function components

	 **Vacuum blocks VABF-S4-1-V2B1**	**Vacuum generators VABF-S4-2-V2B1**
Width		35 mm
Nominal width of Laval nozzle	2 mm	1.4 mm, 2 mm, 3 mm
Ejector characteristics	High vacuum, Standard	High suction rate, High vacuum, Standard
Integrated function	Electric ejector pulse valve, Flow control, Electric on-off valve, Air saving function, electrical, Check valve, Open silencer, Vacuum switch	Electric ejector pulse, Flow control, Electric on-off valve, Air saving function, electrical, Power ejector pulse valve, electric, Check valve, Open silencer, Vacuum switch
Max. vacuum		0.092 MPa
Display type		LED, LED indicator, 2-digit
Description	• In conjunction with a suction gripper to pick up, hold and place components • Can be integrated in valve terminal VTSA, VTSA-F • With air-saving function and adjustable ejection pulse	• In conjunction with a suction gripper to pick up, hold and place components • Can be integrated in valve terminal VTSA-F-CB • With air-saving function and adjustable ejection pulse • Variants with high vacuum or high suction volume flow • Variants with energy- and air-saving power ejector pulse
online: ➔	vabf-s4	vabf-s4

Customised components – for your specific requirements



Valves with customised designs

Can't find the valve you need in our catalogue?

We can offer you customised components that are tailored to your specific requirements.

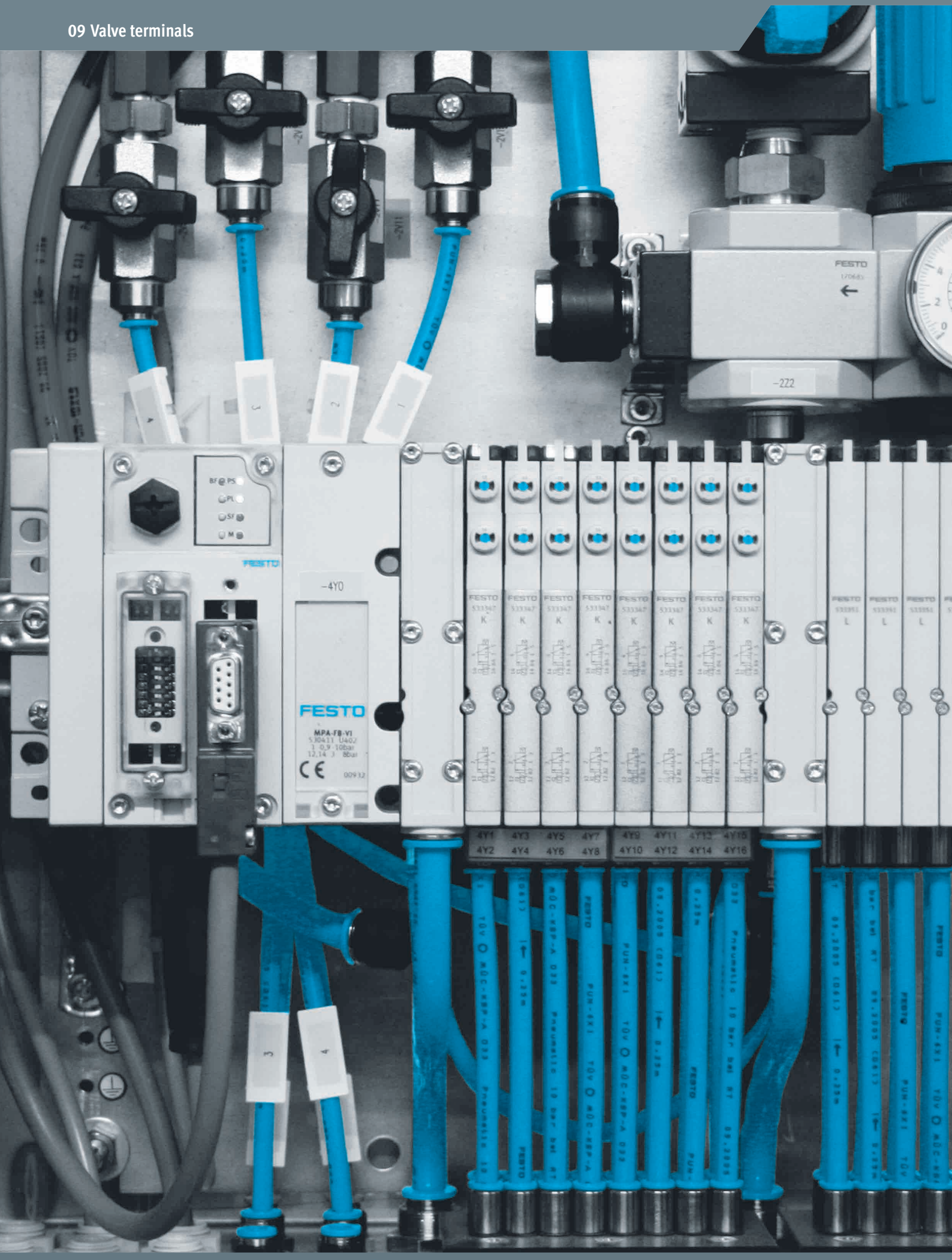
Common product modifications:
- Coatings for special ambient conditions
- Customised cables: length, pin allocation, pre-assembled with plug
- Modified actuating elements
- Modified connecting thread

Modified valve sub-bases

Many additional variants are possible.

Ask your Festo sales engineer, who will be happy to help you:

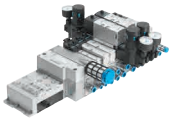
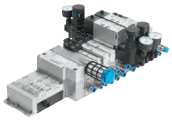
➔ **www.festo.com/contact**


FESTO
-222
-4Y0
FESTO
MPA-FB-VI
4Y1
4Y2
4Y3
4Y4
4Y5
4Y6
4Y7
4Y8
4Y9
4Y10
4Y11
4Y12
4Y13
4Y14
4Y15
4Y16

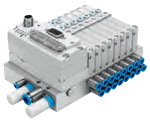
Software tools

Configurator for valve terminals		Design a product with numerous features reliably and quickly with the help of the configurator. Select all the required product features step-by-step. The use of logic checks ensures that only correct configurations are available for selection. A dynamic graphic generated on the basis of the configuration provides a visual aid for selecting the correct product features. You can find the configurator for your product 1. at www.festo.com/catalogue/valve_manifold 2. Select the product you want 3. Click on the blue “Configure product” button

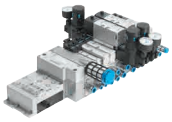
Standards-based valve terminals

	 **Valve terminals VTSA**	 **Valve terminals VTSA-NPT**	 **Valve manifolds to ISO 15407-1 VTIA**
Valve size	18 mm, 26 mm, 42 mm, 52 mm, 65 mm	18 mm, 26 mm, 42 mm, 52 mm, 65 mm	18 mm, 26 mm
Pneumatic working port	3/8 NPT, 1/8 NPT, 1/4 NPT, 1/2 NPT, G1, G1/2, G1/4, G1/8, G3/8, QS-1/2, QS-10, QS-12, QS-14, QS-16, QS-3/8, QS-5/16, QS-6, QS-8	1/8 NPT, 1/8 NPTF, 1/4 NPT, 3/8 NPT, 1/2 NPT, 1 1/2 NPT, QS-10, QS-12, QS-16, QS-6, QS-8	G1/2, G1/4, G1/8, G3/8, QS-10, QS-12, QS-16, QS-8
Valve function	2x2/2-way, monostable, closed, 2x3/2-way, monostable, closed, 2x3/2-way, open, monostable, 2x3/2-way, open/closed, monostable, 5/2 double solenoid, 5/2-way, bistable, dominant, 5/2-way, monostable, 5/2-way, monostable, safety function, 5/3-way, pressurised, 5/3 exhausted, 5/3 closed, 5/3-way, port 2 pressurised, 4 exhausted, 5/3-way, port 4 pressurised, 2 exhausted	2x2/2-way, monostable, closed, 2x3/2-way, monostable, closed, 2x3/2-way, open, monostable, 2x3/2-way, open/closed, monostable, 5/2 double solenoid, 5/2-way, bistable, dominant, 5/2-way, monostable, 5/2-way, monostable, safety function, 5/3-way, pressurised, 5/3 exhausted, 5/3 closed, 5/3-way, port 2 pressurised, 4 exhausted	2x3/2-way, monostable, closed, 2x3/2-way, open, monostable, 2x3/2-way, open/ closed, monostable, 5/2 double solenoid, 5/2-way, bistable, dominant, 5/2-way, monostable, 5/3-way, pressurised, 5/3 exhausted, 5/3 closed
Max. standard nominal flow rate	550 l/min at 18 mm, 1100 l/min at 26 mm, 1300 l/min at 42 mm, 2900 l/min at 52 mm, 4000 l/min at 65 mm, 700 l/min at 18 mm, 1860 l/min at 42 mm, 1350 l/min at 26 mm	550 l/min at 18 mm, 1100 l/min at 26 mm, 1300 l/min at 42 mm, 2900 l/min at 52 mm, 4000 l/min at 65 mm	550 l/min at 18 mm, 1100 l/min at 26 mm
Max. no. of valve positions	32	32	16
Max. no. of pressure zones	32	32	3
Electrical actuation	AP interface, Ethernet, Fieldbus, IO-Link®, Multi-pin plug, Integrated controller	AP interface, Ethernet, Fieldbus, Multi-pin plug, IO-Link®, Integrated controller	Individual connection
Valve terminal design	Modular, valve sizes can be mixed	Modular, valve sizes can be mixed	Modular, valve sizes can be mixed
Description	• Conforms to ISO 15407-2/ISO 5599-2 • Multi-pin plug connection or fieldbus connection via the CPX system • Five valve sizes can be combined on one valve terminal • Integratable safety functions	• Conforms to ISO 15407-2/ISO 5599-2 • Multi-pin plug connection or fieldbus connection via the CPX system • Five valve sizes can be combined on one valve terminal • Integratable safety functions	• Conforms to ISO 15407-1 • Wide range of individual electrical connections • Two valve sizes can be combined • Standardised electrical connection: square plug type C or individual connection with M8/M12 central plug
online: →	vtsa	vtsa	vtia

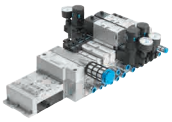
Universal valve terminals

	Valve manifolds VTUG-S	**Valve terminals with multi-pin plug/fieldbus connection VTUG**	**Valve terminal VTUG-EX with multi-pin, fieldbus interface VTUG-EX**	 **Valve terminal with multi-pin, fieldbus interface VTUG-F1A**
Valve size	10 mm, 14 mm, 18 mm	10 mm, 14 mm, 18 mm	10 mm, 14 mm, 18 mm	10 mm, 14 mm
Valve function	2x3/2-way, monostable, closed, 2x3/2-way, open, monostable, 2x3/2-way, open/closed, monostable, 5/2 double solenoid, 5/2-way, monostable, 5/3-way, pressurised, 5/3 exhausted, 5/3 closed	2x3/2-way, monostable, closed, 2x3/2-way, open, monostable, 2x3/2-way, open/closed, monostable, 3/2-way, closed, monostable, 3/2 open, single solenoid, 5/2 double solenoid, 5/2-way, monostable, 5/3-way, pressurised, 5/3 exhausted, 5/3 closed	2x3/2-way, monostable, closed, 2x3/2-way, open, monostable, 2x3/2-way, open/closed, monostable, 3/2-way, closed, monostable, 3/2 open, single solenoid, 5/2 double solenoid, 5/2-way, monostable, 5/3-way, pressurised, 5/3 exhausted, 5/3 closed	2x3/2-way, monostable, closed, 2x3/2-way, open/closed, monostable, 2x3/2-way, open, monostable, 3/2-way, closed, monostable, 3/2 open, single solenoid, 5/2 double solenoid, 5/2-way, monostable, 5/3-way, pressurised, 5/3 exhausted, 5/3 closed
Max. standard nominal flow rate	380 l/min at 10 mm, 780 l/min at 14 mm, 1380 l/min at 18 mm	330 l/min at 10 mm, 630 l/min at 14 mm, 1200 l/min at 18 mm	330 l/min at 10 mm, 630 l/min at 14 mm, 1200 l/min at 18 mm	330 l/min at 10 mm, 630 l/min at 14 mm
Max. no. of valve positions	16	24	24	24
Max. no. of pressure zones	9	13	13	13
Electrical actuation	Individual connection	AP interface, Individual connection, Fieldbus, I-Port, IO-Link®, Multi-pin plug	Fieldbus, I-Port, IO-Link®, Multi-pin plug	AP interface, I-Port, IO-Link®, Multi-pin plug
Valve terminal design	Fixed grid	Fixed grid	Fixed grid	Fixed grid
Description	• Compact with small VUVG valves • Connection technology easy to change via the E-box • Wide range of valve functions • Also with semi in-line valves	• Low-cost fixed grid • Extremely easy assembly • Exchangeable electrical control • IO-Link® capable • Valves VUVG with individual electrical connection can be integrated • Also available with pneumatic multiple connector plate • Part of the VG series • Energy-efficient thanks to reverse operation and targeted pressure reduction • Optimised and space-saving variant available for installation in control cabinets • Variants with hot-swap connections: valves can be replaced during operation • Variants recommended for production systems for manufacturing lithium-ion batteries	• To EU Explosion Protection Directive (ATEX) • Stainless-steel-coated terminal strips for extreme corrosion resistance, suitable for control cabinets and environments up to IP69k	• Recommended for production systems for manufacturing lithium-ion batteries • Low-cost fixed grid • Extremely easy assembly • Exchangeable electrical control • IO-Link® capable • Part of the VG series • Energy-efficient thanks to reverse operation and targeted pressure reduction
online: →	vtug	vtug	vtug	vtug-f1a

Universal valve terminals

	Valve manifolds VTUS	Valve terminals MPA-L	Valve terminals MPA-S	 Valve terminals VTSA-F
Valve size	21 mm, 26.5 mm, 31 mm	10 mm, 14 mm, 20 mm	10 mm, 14 mm, 20 mm	18 mm, 26 mm, 42 mm, 52 mm, 65 mm
Valve function	2x3/2-way, monostable, closed, 2x3/2-way, open, monostable, 2x3/2-way, open/closed, monostable, 3/2-way, closed, monostable, 3/2 open, single solenoid, 5/2 double solenoid, 5/2-way, monostable, 5/3-way, pressurised, 5/3 exhausted, 5/3 closed	2/2-way, closed, monostable, 2x3/2-way, monostable, closed, 2x3/2-way, open, monostable, 2x3/2-way, open/closed, monostable, 3/2-way, closed, monostable, 3/2 open, single solenoid, 5/2 double solenoid, 5/2-way, monostable, 5/3-way, pressurised, 5/3 exhausted, 5/3 closed	2/2-way, closed, monostable, 2x3/2-way, monostable, closed, 2x3/2-way, open, monostable, 2x3/2-way, open/closed, monostable, 3-way proportional pressure regulator, 3/2-way, closed, monostable, 3/2 open, single solenoid, 5/2 double solenoid, 5/2-way, monostable, 5/3-way, pressurised, 5/3 exhausted, 5/3 closed	2x2/2-way, monostable, closed, 2x3/2-way, monostable, closed, 2x3/2-way, open, monostable, 2x3/2-way, open/closed, monostable, 5/2 double solenoid, 5/2-way, bistable, dominant, 5/2-way, monostable, 5/2-way, monostable, safety function, 5/3-way, pressurised, 5/3 exhausted, 5/3 closed, 5/3-way, port 2 pressurised, 4 exhausted
Max. standard nominal flow rate		360 l/min at 10 mm, 670 l/min at 14 mm, 870 l/min at 20 mm	360 l/min at 10 mm, 550 l/min at 14 mm, 700 l/min at 20 mm	700 l/min at 18 mm, 1350 l/min at 26 mm, 1860 l/min at 42 mm, 2900 l/min at 52 mm, 4000 l/min at 65 mm
Max. no. of valve positions	16	32	24, 32, 64, 8	32
Max. no. of pressure zones	9	20	3, 7, 9, 17	16
Electrical actuation	Individual connection	Fieldbus, I-Port, IO-Link®, Multi-pin plug	AS-Interface, Fieldbus, Multi-pin plug	AP interface, Ethernet, Fieldbus, Multi-pin plug, IO-Link®, Integrated controller
Valve terminal design	Fixed grid	Valve sizes can be mixed	Modular, valve sizes can be mixed	Modular, valve sizes can be mixed
Description	• Sturdy valves VUVS with long service life • Individual electrical connection • Pilot air supply in the manifold rail • Comprehensive range of accessories	• Maximum modularity • System can be extended as required with individual sub-bases and modular tie rods • Polymer sub-bases • 3 valve sizes • Tamper-proof fixed flow restrictor • Fieldbus interface via CPX • IO-Link® capable	• Valve terminals for universal applications • High-performance valves in a sturdy metal housing • Metal linking • Two valve sizes can be combined • Excellent communication thanks to serial linking • Fieldbus interface via CPX • Max. 128 valves	• Flow rate-optimised valve terminal VTSA • Linking with increased flow rates • Functions like standard valve manifolds VTSA
online: →	vtus	mpa-l	mpa-s	vtsa

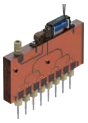
Universal valve terminals

	Valve terminals VTSA-F-CB	 **Valve terminals VTSA-F-NPT**	**Valve terminals CPV-SC**
Valve size	18 mm, 26 mm, 42 mm, 52 mm	18 mm, 26 mm, 42 mm, 52 mm, 65 mm	10 mm
Valve function	2x2/2-way, monostable, closed, 2x3/2-way, monostable, closed, 2x3/2-way, open, monostable, 2x3/2-way, open/closed, monostable, 5/2 double solenoid, 5/2-way, bistable, dominant, 5/2-way, monostable, 5/3-way, pressurised, 5/3 exhausted, 5/3 closed, 5/3-way, port 2 pressurised, 4 exhausted	2x2/2-way, monostable, closed, 2x3/2-way, monostable, closed, 2x3/2-way, open, monostable, 2x3/2-way, open/closed, monostable, 5/2 double solenoid, 5/2-way, bistable, dominant, 5/2-way, monostable, 5/2-way, monostable, safety function, 5/3-way, pressurised, 5/3 exhausted, 5/3 closed, 5/3-way, port 2 pressurised, 4 exhausted	2/2-way, closed, monostable, 3/2-way, closed, monostable, 3/2 open, single solenoid, 5/2 double solenoid, 5/2-way, monostable
Max. standard nominal flow rate	700 l/min at 18 mm, 1350 l/min at 26 mm, 1860 l/min at 42 mm, 2900 l/min at 52 mm	700 l/min at 18 mm, 1350 l/min at 26 mm, 1860 l/min at 42 mm, 2900 l/min at 52 mm, 4000 l/min at 65 mm	170 l/min at 10 mm
Max. no. of valve positions	32	32	16
Max. no. of pressure zones		16	8
Electrical actuation	Ethernet, Fieldbus, Integrated controller	AP interface, Ethernet, Fieldbus, Multi-pin plug, IO-Link®, Integrated controller	CPI installation system, Individual connection, Fieldbus, Multi-pin plug
Valve terminal design	Modular, valve sizes can be mixed	Modular, valve sizes can be mixed	Fixed grid
Description	• Valve terminal VTSA optimised for flow rate and communication • Extended diagnostic functions via CBUS and LED display • Previous external cabling is now unnecessary, while the installation space remains the same • Up to 96 valve addresses and up to four voltage zones, three of which can be safely shut off • For applications with increased safety requirements such as manual work stations • Control via CPX pneumatic interface with serial communication • Five valve sizes can be combined on one valve terminal	• Flow rate-optimised valve terminal VTSA • Linking with increased flow rates • Functions like standard valve manifolds VTSA	• Small and compact • High flow rate even with a compact design • Suitable for vacuum • Multi-pin or fieldbus control
online: →	vtsa-f	vtsa	cpv-sc

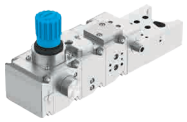
Application-specific valve terminals

	Valve terminals MPA-C	**Valve terminals VTOC**	**Valve terminals MH1**
Valve size	14 mm, 26.8 mm	10 mm	10 mm
Valve function	2/2-way, closed, monostable, 2x3/2-way, monostable, closed, 2x3/2-way, open, monostable, 2x3/2-way, open/closed, monostable, 3/2-way, closed, monostable, 3/2 open, single solenoid, 5/2 double solenoid, 5/2-way, monostable, 5/3-way, pressurised, 5/3 exhausted, 5/3 closed	2x3/2-way, monostable, closed	2/2-way, closed, monostable, 3/2-way, closed, monostable, 3/2 open, single solenoid
Nominal size DN			0.9 mm
Max. standard nominal flow rate	780 l/min at 14 mm	10 l/min at 10 mm	10 l/min at 10 mm
Operating pressure [MPa]	-0.09 ... 0.8 MPa	0 ... 0.8 MPa	
Operating pressure	-0.9 ... 8 bar	0 ... 8 bar	-0.9 ... 8 bar
Operating pressure [psi]	-13.05 ... 116 psi	0 ... 116 psi	
Electrical actuation	I-Port, IO-Link®, Multi-pin plug	I-Port, IO-Link®, Multi-pin plug	Individual connection, Multi-pin plug
Nominal operating voltage DC	24 V	24 V	5 V, 12 V, 24 V
Max. no. of valve positions	32	24	24
Valve terminal design	Modular and expandable	Fixed grid	Fixed grid
Description	• Valve terminal in clean design • Easy-to-clean design • High corrosion resistance • Degree of protection IP69K • FDA-compliant materials • Redundant sealing system	• Compact pilot valves • Compact assembly • Greater safety thanks to interlock function • Multi-pin or fieldbus control • IO-Link® capable	• Miniaturised poppet valves • Multi-pin or electrical individual connection
online: →	mpa-c	vtoc	mh1

Application-specific valve terminals

	Dispense heads VTOE	 **Dispense heads VTOI**
Grid dimension	9 mm	9 mm
Valve function	2/2-way, closed, monostable	2/2-way, closed, monostable
Nominal size	0.8 mm	0.8 mm
Nominal width of dosing needle	0.32 ... 1 mm	0.3 mm
Length of dosing needle	30 mm	30 mm
Operating pressure [MPa]	0 ... 0.05 MPa	-0.02 ... 0.1 MPa
Operating pressure	0 ... 0.5 bar	-0.2 ... 1 bar
Operating pressure [psi]	0 ... 7.25 psi	-2.9 ... 14.5 psi
Electrical connection	2-wire, 9-pin, Cable, Plugs, Sub-D, Open end	2-wire, 2x single wires, Open end
Nominal operating voltage DC	24 V	24 V
Description	• Basic function: dosing • Ready-to-install dosing solution saves time and costs • Compact 9 mm grid dimension • Suitable for sensitive and aggressive liquids • Ideally suited to non-contact dispensing of liquid media • Maximum dosing precision down to the microlitre range • Small internal volume makes it easy to rinse • 1- or 8-channel dispense head • Typical coefficient variation (CV): < 1% at 10 to 1000 µl	• One valve controller for distributing to 8 dispensing channels • Grid dimension 9 mm – ideal for microwell plates • Simple design with side-by-side mounting for increased throughput • Only a few components are needed to form a complete system • Suitable for aggressive liquids
online: →	vtoe	vtoi

Application-specific valve terminals

	 **Valve terminals VTOP**
Size	100 mm
Variants	Manifold block for safety functions, HFT0 prepared for exhaust, VDI/VDE 3845, Manifold block for safety functions, HFT1 prepared for exhaust, VDI/VDE 3845, End plate, double-acting, active direction can be switched, Filter regulator, pressure range 0.5 ... 12 bar, grade of filtration 40 µm, Filter regulator, pressure range 0.5 ... 12 bar, grade of filtration 5 µm, Module for reaching a specific end position in case of a pressure failure, Volume booster, double-acting, Volume booster, single-acting
Operating pressure [MPa]	0 MPa, 0.9 MPa
Operating pressure	0 bar, 9 bar
Operating pressure [psi]	0 psi, 130.5 psi
Pneumatic connection	Sub-base design, airing
Description	• Innovative, modular, compact complete solution for control applications • Modules such as fail-safe, volume booster and filter regulator can be combined with one another as required, are easy to install, and can be extended and retrofitted without any problems • Patented integrated air duct to supply all modules as well as actuator and positioner, without leak-prone, external piping • Standardised mounting interface for direct attachment of a positioner according to VDI/VDE 3847-2 • Optimised for positioner CMSH for controlling single- and double-acting quarter turn and linear actuators • Suitable for quarter turn actuators DFPD-C with mechanical interface to VDI/VDE 3847-2 and for linear actuators DFPI-NB3 based on ISO 15552 • Sustainable operation thanks to leakage reduction at sealing points
online: →	vtop

Software tools

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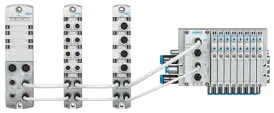
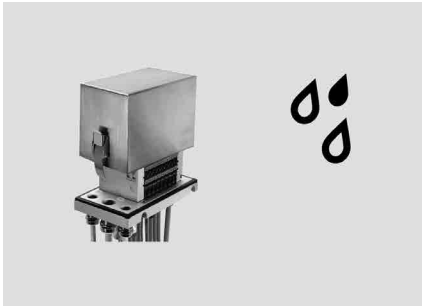
Electrical peripherals

	Terminal CPX	NEW **Automation system CPX-AP-A**	 **Automation systems CPX-AP-I**	**Automation systems CPX-E**
Protocol	Interbus, DeviceNet, CANopen, CC-Link, PROFIBUS DP, PROFINET, EtherCAT, EtherNet/IP, Modbus®TCP, SercosIII, Powerlink, IO-Link®, I-Port, HART	AP	IO-Link, PROFIBUS DP, PROFINET, EtherCAT, EtherNet/IP, Modbus®TCP	PROFIBUS DP, PROFINET, EtherCAT, EtherNet/IP, Modbus®TCP, IO-Link®
Electrical actuation	Fieldbus, Integrated controller	Ethernet		Fieldbus, Integrated controller
Max. address capacity, inputs	64 Byte	1024 ... 4096 Byte		64 Byte
Maximum address volume for outputs	64 Byte	1024 ... 4096 Byte		64 Byte
Parameterisation	Diagnostic behaviour, Fail-safe response, Forcing of channels, Signal setup			
Degree of protection	IP65, IP67	IP65, IP67		IP20
Nominal operating voltage DC	24 V			
Operating voltage range DC	18 ... 30 V			
Description	• Automation platform • Open to all common fieldbus protocols and Ethernet • Integrated diagnostic and maintenance functions • Can be used as stand-alone remote I/O or with valve terminals MPA-S, MPA-L, VTSA/VTSA-F • Choice of polymer or metal interlinking block with individual linking • Analogue inputs and outputs, 2-way/4-way, with optional HART protocol	• Modular and lightweight IO system in IP65/IP67 • Highly flexible remote IO system with maximum performance • Real-time capability, transmission rate of 200 Mbit full duplex • Up to 15 modules in a CPX-AP-A automation system • Complete IO-Link® master V1.1 with data storage mechanism including device parameterisation tool • Easily integrated into standard host systems • Commissioning using normal tools from the PLC manufacturers or with the Festo Automation Suite • Integrated web server • Can be adapted to valve terminals from Festo	• Powerful remote I/O system that flexibly links 80 modules at a data rate of 200 Mbaud in real-time • Seamless connectivity along with advanced diagnostics option increase the machine availability and productivity • Simple integration into the controller of your choice: PROFINET, PROFIBUS, EtherCAT®, EtherNet/IP, ModbusTCP • Real-time capability and deterministic system behaviour enable cycle times of up to 250 µs • Cable lengths of up to 50 m between every module enable vast system dimensions • The IO-Link master and parameterisation software enable simple integration of any IO-Link® devices • Ethernet performance up to the valve terminal and digital as well as analogue input/output modules	• Modern control system with high performance • Fieldbus master interfaces, EtherCAT® master, fieldbus slave interfaces, PROFINET, EtherNet/IP, PROFIBUS, EtherCAT® digital input modules (16DI), digital output modules (8DO/0.5A) • Analogue input modules (current, voltage), analogue output modules (current, voltage) • Modern programming with CoDeSys V3 to IEC 61131-3 • Integration of SoftMotion functions (SoftMotion) • Compact I/O assembly • Easy mounting of the control system
online: →	cpx	cpx-apa	cpx-api	cpx-e

Electrical peripherals

	Terminal CPX-P	**Electrical interfaces CPX-CTEL**	**Fieldbus modules CTEU**	**AS-Interface® module ASI**
Protocol	DeviceNet, CANopen, PROFIBUS DP, PROFINET, EtherCAT, EtherNet/IP, Modbus®TCP, IO-Link®, I-Port, HART	I-Port, IO-Link®	AS-Interface, CANopen, CC-LINK, CPI-B, DeviceNet, EtherCAT, EtherNet/IP, PROFINET, Modbus® TCP, PROFIBUS DP, VARAN, I-Port	AS-Interface®
Electrical actuation	Fieldbus, Integrated controller			
Max. address capacity, inputs	64 Byte	32 Byte	2 ... 64 Byte	
Maximum address volume for outputs	64 Byte	32 Byte	2 ... 64 Byte	
Parameterisation	Diagnostic behaviour, Fail-safe response, Forcing of channels, Signal setup	Diagnostic behaviour, Fail-safe per channel, Forcing per channel, Idle mode per channel, Module parameters, Tool-change mode	Activate diagnostics, Diagnostic behaviour, Fail-safe and idle response, Fail-safe response, IO-Link mode, Watchdog disable, Watchdog enable	
Degree of protection	IP20, IP65	IP65, IP67	IP65, IP67	IP65/IP67 (when fully plugged-in or fitted with protective cap)
Nominal operating voltage DC	24 V	24 V	24 ... 30 V	Sensors 24 V
Operating voltage range DC		18 ... 30 V	18 ... 31.6 V	
Description	• Use of matching remote I/O and valve terminals in a control cabinet • Combination with modules of the electrical terminal CPX, which can then be used for hybrid applications • Unique modular structure • Comprehensive integrated diagnostic and service functions • Analogue inputs and outputs with HART protocol	• CPX-CTEL master module with 4 I-Port connections • Decentralised pneumatic components and sensors for fast processes • Standardised M12 connections	• For valve terminals VTUG, MPA-L, VTOC • Can be expanded into the installation system CTEL • Fieldbus-typical LEDs, interfaces and switching elements • Isolated power supply for electronics and valves	• Accessories for the AS-Interface installation system • Compact I/O modules (IP65, IP67)
online: →	cpx-p	cpx-ctel	cteu	as-interface

Customised components – for your specific requirements



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Common product modifications:
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- Modified actuating elements
- Modified connecting thread

Modified valve sub-bases

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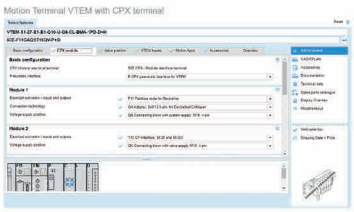
Software tools

Configurator



Design a product with numerous features reliably and quickly with the help of the configurator.
Select all the required product features step-by-step. The use of logic checks ensures that only correct configurations are available for selection.

You will find the configurator
- at www.festo.com/catalogue/vtem
- Click on the product
- Click on the blue “Configure product” button

Motion Terminal

	Motion Terminal VTEM
Valve terminal design	Fixed grid
Grid dimension	28 mm
Max. no. of valve positions	8
Valve function	Can be allocated using the Motion App
Standard nominal flow rate, exhaust 6->5 bar	480 l/min
Pneumatic connection 1	G3/8
Operating pressure [MPa]	0.3 ... 0.8 MPa
Operating pressure	3 ... 8 bar
Operating pressure [psi]	43.5 ... 116 psi
Note on operating pressure	0 - 8 bar with external pilot air, Vacuum operation at connection 3 only
Pilot pressure [MPa]	0.3 ... 0.8 MPa
Pilot pressure	3 ... 8 bar
Pilot pressure [psi]	43.5 ... 116 psi
Motion Apps	Leakage diagnostics, Flow control, ECO drive, Positioning, Proportional pressure regulation, Proportional directional control valve, Soft Stop, Presetting of travel time, Directional control valve functions, Selectable pressure head, Supply and exhaust air flow control, Model-based proportional pressure regulation
Actuation type	Electric
Nominal operating voltage DC	24 V
Temperature of medium	5 ... 45°C
Description	• Many functions for movement, pressure and flow in one component – thanks to apps • Maximum repeat accuracy thanks to digital parameter sets • Easy to trace – ideal for the Industry 4.0 • Easy to duplicate the parameters • Increased energy efficiency • Reduced complexity and time to market • Increasing profitability and know-how protection • Predictive maintenance • Minimal installation effort • Sustainable operation with pressure-reduced return stroke and leakage detection
online: →	**vtem**

Motion Apps

	 Motion Apps **GAMM**
Description	• Open and closed-loop control programs for valves VEVM • A new dimension in flexibility thanks to Motion Apps – a single valve with a wide range of different functions • Accelerated engineering processes • Short response times without the need to adapt the hardware • Reduced system complexity • Shorter time to market for your application
online: ➔	gamm

Accessories for the Motion Terminal >

Piezo valves

	 Valves **VEVM**
Valve function	Can be allocated using the Motion App
Standard nominal flow rate	
Operating pressure [MPa]	0.3 ... 0.8 MPa
Operating pressure	3 ... 8 bar
Pneumatic connection 1	G3/8
Nominal size	4.2 mm
Nominal operating voltage DC	24 V
Description	• Functionality can be assigned via Motion app • For Motion Terminal VTEM • Consisting of 4 wired piezo pilot-controlled piston seat valves • Extremely long service life • Very low power consumption • Low leakage with the function of a proportional-pressure regulator
online: ➔	vevm

Accessories for the Motion Terminal >

Position sensors

	 Position transmitters SDAP-MHS
Design type	For T-slot
Sensing range	0 ... 160000 µm
Analogue output	4 - 20 mA
Electrical connection, connection type	Cable with plug
Electrical connection, connection technology	M8x1, A-coded, to EN 61076-2-104
Electrical connection, occupied pins/wires	4
Description	• Only for use with Festo Motion Terminal VTEM • Analogue sensor for VTEM input module CTMM • Measuring principle: magnetic Hall • Insertable in the slot from above, screw-clamped • LED status indicator • Cable length 0.3 m • Suitable for T-slot
online: ➔	sdap

Accessories for the Motion Terminal >

Input modules

	 Input modules CTMM
Electrical connection, input, function	Analogue input, Digital input
Electrical connection, input, connection type	8x socket
Electrical connection, input, connection technology	M8x1, A-coded to EN 61076-2-104
Electrical connection input, number of pins/ wires	3, 4
Number of inputs	8
Nominal operating voltage DC	24 V
Signal range	4 - 20 mA
Diagnostics via LED	Errors per module, Status per channel
Degree of protection	IP65, IP67
Description	• For connecting analogue and digital sensors to the Motion Terminal • Digital module with PNP logic or analogue module for 4 ... 20 mA • Input signals can be transmitted to a higher-order controller by the Motion Apps
online: ➔	ctmm

FESTO

Software tools

Festo Design Tool 3D

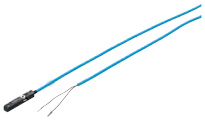
The Festo Design Tool 3D is a 3D product configurator for generating specific CAD product combinations from Festo.
The configurator makes your search for the right accessory easier, more reliable and faster.

You can then order the module that has been created as a single order item, either completely pre-assembled or as individual parts in a single box. This considerably reduces your bill of materials, and downstream processes such as product ordering, order picking and assembly are significantly simplified.

This tool can be found at
➔ **www.festo.com/x/festo-design-tool**

Proximity switches >

Proximity switches for T-slot

	Proximity sensors SMT-8M-A ★	**Proximity sensors SDBT-MSX** ★	**Proximity sensors SDBT-BSW**	 **Proximity sensors SDBT-MS-EX6**
Electrical connection, connection type	Cable, Cable with plug	Cable, Cable with plug	Cable, Cable with plug	Cable
Electrical connection, connection technology	M12x1, A-coded to EN 61076-2-101, M8x1, A-coded, to EN 61076-2-104, Open end	M8x1, A-coded, to EN 61076-2-104, Open end	M12x1, A-coded to EN 61076-2-101, Open end	Open end
Operating voltage range DC	5 ... 30 V	10 ... 30 V	10 ... 30 V	7.5 ... 18 V
Switching element function	N/C contact, N/C or N/O contact, switchable, N/O contact	N/C or N/O contact, switchable	N/O contact	NAMUR
Switching output	NPN, PNP, PNP/NPN, switchable, Non-contacting, 2-wire	PNP/NPN, switchable	NPN, PNP, Non-contacting, 2-wire	NAMUR
Description	• Measuring principle: magneto-resistive • For universal use • Individually configurable or pre-assembled • Inserted in the slot from above, flush with the cylinder profile • LED switching status indication • LED operating reserve indication • Cable length 0.1 ... 30 m	• Measuring principle: magnetic Hall • Auto teach-in: automatic teach-in of the switching point at system start-up • Programmable: PNP/NPN, NO/NC and switching window range between 2 ... 15 mm • Insertable in the slot from above, screw-clamped • LED status indicator • Cable length 0.3 ... 5 m	• Measuring principle: magneto-resistive • Welding field immune • Resistant to welding spatter • For contactless piston-rod position sensing on Festo pneumatic cylinders, in particular the hinge cylinder DW/DWA/DWB/DWC for AMI • Insertable in the slot from above, screw-clamped • LED switching status indication • Cable length 0.3 ... 5 m	• Measuring principle: magneto-resistive • To EU Explosion Protection Directive (ATEX) • Insertable in the slot from above, screw-clamped • LED switching status indication • Cable length 2.5 ... 20 m
online: ➔	smt-8m	sdbt	sdbt	sdbt

Proximity switches >

Proximity switches for T-slot

	Proximity sensors SMT-8-SL	**Proximity sensors SMT-8G**	**Proximity sensors CRSMT-8M**	**Proximity switch SME-8**
Electrical connection, connection type	Plugs	Cable, Cable with plug	Cable, Cable with plug	Cable
Electrical connection, connection technology	M8x1, A-coded, to EN 61076-2-104	M8x1, A-coded, to EN 61076-2-104, Open end	M12x1, A-coded to EN 61076-2-101, M8x1, A-coded, to EN 61076-2-104, Open end	Open end
Operating voltage range DC	10 ... 30 V	10 ... 30 V	5 ... 30 V	0 ... 230 V
Switching element function	N/O contact	N/O contact	N/O contact	N/O contact
Switching output	PNP	NPN, PNP	PNP	Contacting, bipolar
Description	• Measuring principle: magneto-resistive • SMT-8-SL: sturdy thanks to long guides and plug directly on the sensor • Insertable in the slot lengthwise or from above • LED switching status indication • Cable length 0.3, 2.5, 5 m	• Measuring principle: magneto-resistive • SMT-8G: design ideal for gripper sensing • Insertable in the slot lengthwise or from above • LED switching status indication • Cable length 0.3, 2.5, 5 m	• Measuring principle: magneto-resistive • Corrosion-resistant design • Food-safe (see www.festo.com/certificates/CRSMT_8M), resistant to acids and cooling lubricants • Inserted in the slot from above, flush with the cylinder profile • LED switching status indication • Cable length 0.3, 5 m, 10 m	• Measuring principle: magnetic reed • Insertable in the slot lengthwise • LED switching status indication • Cable length 0.3, 2.5, 5, 7.5, 0.2 ... 10 m
online: ➔	smt-8	smt-8G	crsmt-8m	sme-8

Proximity switches >

Proximity switches for T-slot

	Proximity sensors SMTO-8E	**Proximity sensors SMPO-8E**	**Proximity sensors SMTSO-8E**
Electrical connection, connection type	Plugs		Plugs
Electrical connection, connection technology	M12x1, A-coded to EN 61076-2-101, M8x1, A-coded, to EN 61076-2-104		M12x1, A-coded to EN 61076-2-101
Operating voltage range DC	10 ... 30 V		10 ... 30 V
Switching element function	N/O contact		N/O contact
Switching output	NPN, PNP		NPN, PNP
Description	• Measuring principle: magneto-resistive • Sturdy sensor in block design • Plug integrated in housing • LED switching status indication • Inserted in the slot from above	• Measuring principle: magnetic • Pneumatic proximity sensor • Function: 3/2-way valve, normally closed • Pneumatic connection via female thread M5 • Visual switching status indication	• Measuring principle: magneto-inductive • Welding field resistant design • Sturdy sensor in block design • Inserted in the slot from above • Plug integrated in housing • LED switching status indication
online: ➔	smto	smpo	smtso

Proximity switches >

Round slot proximity switch

	Proximity switch SMT-10M ★	**Proximity switch SMT-10G**
Electrical connection, connection type	Cable, Cable with plug	Cable, Cable with plug
Electrical connection, connection technology	M12x1, A-coded to EN 61076-2-101, M8x1, A-coded, to EN 61076-2-104, Open end	M8x1, A-coded, to EN 61076-2-104, Open end
Electrical connection, number of pins/wires	2, 3	3
Operating voltage range DC	5 ... 30 V	10 ... 30 V
Switching element function	N/O contact	N/O contact
Switching output	NPN, PNP, Non-contacting, 2-wire	NPN, PNP
Description	• Measuring principle: magneto-resistive • For universal use • Individually configurable or pre-assembled • Inserted in the slot from above, flush with the cylinder profile • LED switching status indication • Cable length 0.3, 2.5 m	• Measuring principle: magneto-resistive • SMT-10G: design ideal for gripper sensing • Insertable in the slot lengthwise or from above • LED switching status indication • Cable length 0.3, 2.5 m
online: →	smt-10M	smt-10

Proximity switches >

Proximity switch in round shape

	NEW **Proximity sensors CRSMEO-4**
Electrical connection, connection type	Cable
Electrical connection, connection technology	Open end
Electrical connection, number of pins/wires	3
Operating voltage range DC	12 ... 30 V
Switching element function	N/O contact
Switching output	Contacting, bipolar
Description	• Measuring principle: magnetic reed • Corrosion-resistant design • LED switching status indication • Cable length 2.5 m
online: →	crsmeo-4

Proximity switches >

Proximity switches with block design

	 Proximity sensors SMT-C1
Electrical connection, connection type	Cable, Cable with plug
Electrical connection, connection technology	M12x1, A-coded to EN 61076-2-101, M8x1, A-coded, to EN 61076-2-104, Open end
Electrical connection, number of pins/wires	3
Operating voltage range DC	10 ... 30 V
Switching element function	N/O contact
Switching output	PNP
Description	• Measuring principle: magneto-inductive • Easy-to-clean design • Food grade see www.festo.com/certificates/SMT_C1 • For clean design, standards-based cylinder DSBF with mounting rail for sensors • LED switching status indication
online: ➔	smt-c1

Proximity switches >

Cylinder signal generators

	 Cylinder signal generators PPL
Standard nominal flow rate	48 l/min
Operating pressure [MPa]	0.1 ... 0.8 MPa
Operating pressure	1 ... 8 bar
Pneumatic connection	Barbed connector for 3 mm I.D. plastic tubing
Type of mounting	Hollow bolt G1/8, G1/4
Description	• For contactless pneumatic signal generation at the end of cylinder strokes • Function: 3/2-way valve, normally open • Can be screwed directly into the supply port of the cylinder using a hollow bolt
online: ➔	ppl

Inductive sensors

	Proximity switch SIEN	**Proximity switch SIED**	**Proximity switch SIEF**
Size	4 mm, 6.5 mm, M12, M12x1, M18, M18x1, M30, M30x1.5, M5x0.5, M8x1	M12, M18, M30	40x40x65 mm, M12, M18, M30, M8
Switching output	NPN, PNP	Non-contacting, 2-wire	NPN, PNP
Switching element function	N/C contact, N/O contact	N/C contact, N/O contact	Antivalent, N/O contact
Electrical connection	3-wire, 3-pin, Cable, Plugs, M8x1, M12x1	2-wire, 2-pin, Cable, Plugs, M12x1	3-wire, 3-pin, 4-pin, Fixcon, Cable, Plugs, M8x1, M12x1
Operating voltage range DC	10 ... 30 V	10 ... 320 V	10 ... 65 V
Description	• With standard switching distance • For DC voltage • Round design • Metric thread • Flush or non-flush mounting • LED switching status indication • Design with metal or polyamide housing	• With standard switching distance • For DC and AC voltage • Metric thread • Flush or non-flush mounting • LED switching status indication • Design with metal or polyamide housing	• Reduction factor 1 for all metals • Welding field immune • Design with housing resistant to welding spatter • Flush, partially flush or non-flush mounting • LED switching status indication
online: →	sien	sied	sief

Inductive sensors

	Proximity switch SIEH	**Proximity switch SIES-Q**	**Proximity switch SIES-8M**
Size	3 mm, M12, M18	8x8x59 mm, 15x20x30 mm, 40x40x120 mm, 5x5x25 mm, 8x8x40 mm	Slot 8
Switching output	NPN, PNP	NPN, PNP	NPN, PNP
Switching element function	N/C contact, N/O contact	Antivalent, N/C contact, N/O contact	N/C contact, N/O contact
Electrical connection	3-wire, 3-pin, Cable, Cable with plug, Plugs, M8x1, M12x1	3-wire, 3-pin, Cable, Screw terminal, Plugs, M8x1	
Operating voltage range DC	10 ... 30 V	10 ... 30 V	10 ... 30 V
Description	• With increased sensing distance • Flush mounting • Metric thread • LED switching status indication • Design with stainless steel housing	• Block design • Flush mounting • LED switching status indication	• Ideally suited for position sensing for electric axes and grippers with T-slot • Flush mounting • Switching status indication with 2 LEDs for better visibility regardless of the direction from which it is approached • Single inductive sensor for 8 slot with patented LED status indicator
online: →	sieh	sies	sies

Position sensors

	Position transmitter SDAC-MHS	**Position transmitters SDAT-MHS**	**Position transmitters SDAS-MHS**	**Position transmitter SMAT-8M**
Design type	For C-slot	For T-slot	For T-slot	For T-slot
Sensing range	25000 ... 35000 µm	0 ... 160000 µm	≤52000 µm	52000 µm
Analogue output	0 - 10 V	0 - 10 V, 4 - 20 mA		0 - 10 V
Electrical connection, connection type	Cable, Cable with plug	Cable with plug	Cable, Cable with plug	Cable with plug
Electrical connection, connection technology	M8x1, A-coded, to EN 61076-2-104, Open end	M8x1, A-coded, to EN 61076-2-104	M8x1, A-coded, to EN 61076-2-104, Open end	M8x1, A-coded, to EN 61076-2-104
Electrical connection, occupied pins/wires	3, 4	4	4	4
Description	• Measuring principle: magnetic Hall • Sensing range up to 35 mm • IO-Link®, 2 programmable switching outputs • Analogue output 0 ... 10 V • Very compact design makes the unit especially well suited to work with grippers, compact cylinders and any application in a tight space • LED status indicator • Cable length 0.3, 2.5 m • Suitable for round slot	• Measuring principle: magnetic Hall • Analogue output 0 ... 10 V or 4 ... 20 mA • Programmable IO-Link®/ switching output • Insertable in the slot from above, screw-clamped • LED status indicator • Cable length 0.3 m • Suitable for T-slot	• Measuring principle: magnetic Hall • IO-Link®, 2 programmable switching outputs • Inserted in the slot from above • Very compact design makes the unit especially well suited to work with grippers, compact cylinders and any application in a tight space • LED status indicator • Cable length 0.3, 2.5 m • Suitable for T-slot	• Measuring principle: magnetic Hall • Analogue output 0 ... 10 V • Very compact design makes the unit especially well suited to work with grippers, compact cylinders and any application in a tight space • Insertable in the slot from above, screw-clamped • LED status indicator • Cable length 0.3 m • Suitable for T-slot
online: →	sdac	sdat	sdas	smat-8m

Position sensors

	Position sensors SRBS ★	**Position sensors SMH-S1**	**Position transmitters SDAP-MHS**
Design type	Round	For grippers	For T-slot
Sensing range	>270 deg		0 ... 160000 µm
Analogue output	50 mA		4 - 20 mA
Electrical connection, connection type	Cable with plug	Cable with plug	Cable with plug
Electrical connection, connection technology	M8x1, A-coded, to EN 61076-2-104	M8x1, A-coded, to EN 61076-2-104	M8x1, A-coded, to EN 61076-2-104
Electrical connection, occupied pins/wires	4	4	4
Description	• Used to detect rotation of the shaft on rotary drives DRVS and DSM • Simple and reliable operation using just one pushbutton directly on the device • Switching output 2x PNP or 2x NPN, switchable • Sensor can be quickly mounted without having to manually search for switching points	• Measuring principle: magnetic Hall • 3 gripper positions can be detected using an evaluation unit • Freely selectable switching points	• Only for use with Festo Motion Terminal VTEM • Analogue sensor for VTEM input module CTMM • Measuring principle: magnetic Hall • Insertable in the slot from above, screw-clamped • LED status indicator • Cable length 0.3 m • Suitable for T-slot
online: →	srbs	smh-s1	sdap

Displacement encoders

	Displacement encoders MME-MTS-TLF	**Displacement encoders MLO-POT-TLF**	**Displacement encoders MLO-POT-LWG**
Stroke	225 ... 2000 mm	225 ... 2000 mm	100 ... 750 mm
Measuring principle of displacement encoder	Digital	Analogue	Analogue
Output signal	CAN protocol type SPC-AIF	Analogue	Analogue
Displacement resolution	<0.01 mm	0.01 mm	0.01 mm
Electrical connection	6-pin, Plugs, To DIN 45322, Round design	4-pin, Type A, Plugs, To DIN 43650, Square design	4-pin, Plugs, Square design, 16 mm
Description	• Measuring principle: magnetostrictive • Contactless with absolute measurement • High travel speed • System product for servo-pneumatic positioning technology and Soft Stop • Degree of protection IP65	• Conductive plastic potentiometer • Absolute measurement with high resolution • High travel speed and long service life • Plug-in connections	• Connecting rod potentiometer • Absolute measurement with high resolution • Long service life • Degree of protection IP65 • Plug-in connections
online: →	mme	mlo	mlo

Pressure and vacuum sensors

	Pressure sensors SDE5 ★	**Pressure sensors SPAN** ★	**Pressure sensors SPAE**	**Pressure sensors SPAU**
Pressure measuring range [MPa]		-0.1 ... 1.6 MPa	-0.1 ... 1 MPa	
Pressure measuring range	-1 ... 10 bar	-1 ... 16 bar	-1 ... 10 bar	-1 ... 16 bar
Pressure measuring range [psi]		–14.5 ... 232 psi	–14.5 ... 145 psi	
Switching element function	N/C contact, N/O contact, Switchable	N/C or N/O contact, switchable	N/C contact, N/O contact, Switchable	N/C or N/O contact, switchable
Switching output	NPN, PNP	2 x PNP or 2 x NPN, switchable, PNP/NPN, switchable	PNP/NPN, switchable	2 x PNP or 2 x NPN, switchable, 2xPNP
Pneumatic connection	QS-1/4, QS-4, QS-5/32, QS-6	Male thread 1/8 NPT, Female thread G1/8, M5, For tubing O.D. 4 mm, Male thread G1/8, R1/8	Flange, Cartridge 10 mm, Push-in sleeve QS-4, QS-6, QS-3, QS-4	Flange, 1/8 NPT, G1/8, M5, M7, QS-4, QS-5/32, QS-6, R1/4, R1/8
Electrical connection	3-wire, 3-pin, Cable, Plugs, To EN 60947-5-2, Round design, M8x1	Plug 4-pin, square design	3-wire, Cable, Open end	
Electrical connection 1, connection type		Plugs		Plugs
Display type		Illuminated LCD	LED indicator, 2-digit	Illuminated LCD, LED
Description	• Programmable and configurable pressure switch for simple pressure sensing tasks • Threshold/window comparator • Switching point adjustment via teach-in function • Integrated microprocessor • Switching status indicated by an LED visible from all sides • Certification: c UL us listed (OL), C-Tick	• For monitoring compressed air and non-corrosive gases • For network monitoring, regulator monitoring, leak testing, object detection • Relative measurement method based on a piezoresistive measuring cell • Serial communication integrated using IO-Link® 1.1 • Compact design 30x30 mm • High-contrast display with blue backlight	• Electronic pressure sensor with piezoresistive pressure measuring cell, integrated signal processing, numeric pressure indicator in percent, operating key and a switching output, PNP/NPN switchable • Display of minimum and maximum measured value • All parameters entered can be transferred to other SPAEs (replicating function) • Communication interface IO-Link®	• For monitoring compressed air and non-corrosive gases • With or without display • Transfer of the pressure value as switching signal, analogue signal or via IO-Link® to the connected control system • Maximum versatility thanks to a wide range of pneumatic adaptations and switchable electrical outputs
online: →	sde5	span	spae	spau

Pressure and vacuum sensors

	Pressure sensors SPAW	**Pressure sensors SDE3**	**Pressure switches SPBA**	**Pressure switches, vacuum switches PEV, VPEV**
Pressure measuring range [MPa]	-0.1 ... 10 MPa			
Pressure measuring range	-1 ... 100 bar	-1 ... 10 bar		-1 ... 10 bar
Pressure measuring range [psi]	–14.5 ... 1450 psi			
Switching element function	Switchable	Switchable	Antivalent, Changeover switch	Changeover switch
Switching output	2xNPN, 2xPNP	2xNPN, 2xPNP	2xPNP, Contacting	
Pneumatic connection	Female thread G1/4, Male thread G1/2	QS-4, QS-5/32	G1/8	G1/4, G1/8, M5
Electrical connection			4-pin, Plugs, To EN 60947-5-2, Round design, M12x1	4-pin, Type A, Screw terminal, Plugs, To DIN 43650, To EN 60947-5-2, Round design, Square design, M8x1, M12x1
Electrical connection 1, connection type	Plugs	Cable, Cable with plug, Plugs		
Display type	4-place alphanumeric, LED indicator	Illuminated LCD		
Description	• Extremely sturdy • For liquid and gaseous media • Quick and easy adjustment of the switching outputs using three pushbuttons • Optimal legibility: display housing rotatable 320°, display at an angle of 45°	• 5 pressure measuring ranges • Measurement of relative or differential pressure or 2 independent supply ports • Switching output 2x PNP or 2x NPN • Numerical and graphical pressure indication • Mounting: via H-rail, via wall/ surface bracket, front panel mounting, with through-holes • Certification: C-Tick, ATEX, c UL us Listed (OL)	• Pressure sensor with permanently set switching point • For solenoid valve VSVA • Mounting: screw-in	• Mechanical pressure and vacuum switch • Adjustable switching point • Mounting: screw-in, via through-holes or on an H-rail • Visual scale for pressure adjustment • Certification: CCC, c UL us – Recognized (OL), RCM
online: →	spaw	sde3	spba	pev

Pressure and vacuum sensors

	Pressure transmitters SPTE	**Pressure transmitters SPTW**	**PE converters PEN, PE, VPE**
Pressure measuring range [MPa]	-0.1 ... 1 MPa	-0.1 ... 10 MPa	
Pressure measuring range	-1 ... 10 bar	-1 ... 100 bar	
Pressure measuring range [psi]	–14.5 ... 145 psi	–14.5 ... 1450 psi	
Switching element function			N/O contact, Changeover switch
Switching output			PNP, Contacting
Pneumatic connection	Flange, Cartridge 10 mm, Push-in sleeve QS-4, QS-6, QS-3, QS-4	G1/4	G1/8, M5, PK-4
Electrical connection	3-wire, Cable, Open end		3 connector leads, 3-wire, 4-wire, Cable, Open end
Electrical connection 1, connection type		Plugs	Cable
Display type			
Description	• Piezoresistive pressure sensor • Measured variable: relative pressure • Cable length 2.5 m • Compact: 8-bracket wall mount for manifold mounting	• Sensor versions: piezoresistive pressure sensor or metal thin-film pressure sensor • Measured variable: relative pressure • Operating medium: liquid media and gaseous media • Seal-free: pressure measuring cell and interfaces in stainless steel • Degree of protection IP67	• Pneumatic/electric differential pressure switch • Pneumatic/electric pressure transducer • Design for vacuum • Mounting via through-hole, on mounting frame 1n, on mounting frame 2n • Splash-proof design • Certification: CCC, RCM
online: →	spte	sptw	pen

Flow sensors

	Flow transmitters SFTE	**Flow sensors SFAH**	**Flow sensors SFAW**
Flow measuring range	0 ... 10 l/min	0.002 ... 200 l/min	1.8 ... 100 l/min
Operating medium	Nitrogen, Compressed air ISO 8573-1:2010 [6:4:4]	Argon, Nitrogen, Compressed air ISO 8573-1:2010 [6:4:4]	Liquid media, Water, Neutral fluids
Operating pressure	-0.9 ... 10 bar	-0.9 ... 10 bar	0 ... 12 bar
Pneumatic connection	Female thread M5, For push-in connector O.D. 3 mm, 4 mm	Female thread G1/4, G1/8, For tubing O.D. 4 mm, 6 mm, 8 mm	
Switching output		2 x PNP or 2 x NPN, switchable	2 x PNP or 2 x NPN, switchable
Electrical connection, connection type	Cable, Cable with plug	Plugs	Plugs
Electrical connection, connection technology	M8x1, A-coded, to EN 61076-2-104, Open end	Connection pattern L1J, M8x1, A-coded, to EN 61076-2-104	M12x1, A-coded to EN 61076-2-101
Electrical connection			
Description	• Compact design • Universal flow detection • Simple installation • Reliable pick & place application for extremely small workpieces	• Process air, compressed air, forming gas consumption and pneumatic object monitoring, handling ultra-small parts, leak test • Compact design 20x58 mm • Clear 2-line display • Mounting: H-rail mounting, wall or surface mounting, front panel mounting • Serial communication integrated using IO-Link® 1.1	• Cooling circuit monitoring, leakage or line break monitoring, process water monitoring, fill level monitoring • Input connection: clamped terminal connection DN15, DN20, barbed hose fitting 13 mm, female thread G1/2, G3/4, G1, user-specific connection • With optional integrated temperature sensor • Connection to higher-level systems via 2 switching outputs, an analogue output and/or an IO-Link® interface • Certification: RCM, c UL us Listed (OL) • Rotatable display, 90° anticlockwise and 180° clockwise
online: →	**sfte**	**sfah**	**sfaw**

Flow sensors

	Flow sensors SFAB	**Flow sensors SFAM**
Flow measuring range	0.1 ... 1000 l/min	10 ... 15000 l/min
Operating medium	Argon, Carbon dioxide, Nitrogen, Compressed air ISO 8573-1:2010 [7:4:4], ISO 8573-1:2010 [6:4:4]	Nitrogen, Compressed air ISO 8573-1:2010 [7:4:4]
Operating pressure	0 ... 10 bar	16 bar
Pneumatic connection	For tubing O.D. 1/4 “, 10 mm, 12 mm, 3/8 “, 5/16 “, 6 mm, 8 mm	Manifold module, 1/2 NPT, 1 NPT, 1 1/2 NPT, G1, G1 1/2, G1/2
Switching output	2 x PNP or 2 x NPN, switchable	2 x PNP or 2 x NPN, switchable
Electrical connection, connection type	Plugs	Plugs
Electrical connection, connection technology	M12x1, A-coded to EN 61076-2-101	M12x1, A-coded to EN 61076-2-101
Electrical connection		5-pin, Straight plug, M12x1
Description	• Flow sensor with integrated digital display • With unidirectional flow input • Mounting: H-rail, wall or surface mounting • Certification: C-Tick • Sustainable operation with system consumption monitoring	• Stand-alone device or combined with MS series service unit components • Supplies absolute flow information and accumulated air consumption measurements • Covers large measuring range with great precision thanks to high dynamic response • Large, illuminated LCD display
online: →	sfab	sfam

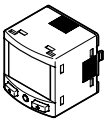
Opto-electrical sensors

	Retro-reflective sensors, diffuse sensors, light barriers SOOD	**Retro-reflective sensors, diffuse sensors, distance sensor, light barriers SOOE**	**Sensors SOEG-RT, SOEG-RS**	**Through-beam sensors SOEG-E, SOEG-S**
Method of measurement	Retro-reflective sensor, Through-beam sensor, Transmitter, Receiver, Diffuse sensor with background clipping	Retro-reflective sensor, Distance sensor, Through-beam sensor, Transmitter, Receiver, Diffuse sensor with background clipping, Laser contrast sensor, Retro-reflective sensor for transparent objects, Diffuse sensor	Retro-reflective sensor, Diffuse sensor, Diffuse sensor with background suppression	Through-beam sensor, Receiver, Transmitter
Working range	0 ... 10000 mm	0 ... 20000 mm	0 ... 2000 mm	20000 mm
Size			M12, M12x1, M18, M18x1	M18x1
Setting options		IO-Link®, Potentiometer, Teach-in	Potentiometer	
Type of light	Laser, Red, LED	Laser, Red, LED	Red, Red polarised	Red
Switching output	Push-pull	Push-pull	NPN, PNP	NPN, PNP
Description	• Simple operation • Fast commissioning • Reliable and stable detection • Attractive price/performance ratio	• Simple operation • Fast commissioning • Reliable and stable detection • Attractive price/performance ratio	• Round design • Electrical connection via open cable end or plug connector	• Round design • Electrical connection via open cable end or plug connector
online: →	sood	sooe	soeg	soeg

Opto-electrical sensors

	Colour sensors SOEC	**Fibre-optic units SOE4**	**Fork light barriers SOOF**	**Fibre-optic cables SOEZ, SOOC**
Method of measurement	Colour sensor	Fibre-optic unit	Fork light barrier	Through-beam sensor, Fork light barrier, Light guide, Diffuse sensor
Working range	12 ... 32 mm			5 ... 400 mm
Size	50x50x17 mm		Clevis 120x60 mm, 30x35 mm, 50x55 mm, 80x55 mm	M4, M6
Setting options	Teach-in, Teach-in via electrical connection	Teach-in, Teach-in via electrical connection	IO-Link®, Potentiometer, Teach-in	
Type of light	White	Red	Red	
Switching output	PNP	NPN, PNP	Push-pull, NPN, PNP	
Description	• Diffuse sensor • Block design • Electrical connection via M12x1 plug, 8-pin • Display via 7 LEDs	• Use for precise and space-saving position sensing in the electronics and light assembly industry • Switching frequencies of up to 8000 Hz • Operational with fibre-optic cable SOOC as accessory • Variants: LED or LED display, timer function • Mounting: H-rail mounting or via through-holes • With protection against mutual interference	• Through-beam sensor with minimal installation effort • Design: polymer or metal • Sturdy housing: high shock and vibration resistance • Degree of protection IP67 • Electrical connection via M8x1 plug connector, 3-pin • LED indicators	• Cable connection, push-in connector
online: →	soec	soe4	soof	soez

Signal converters

	 **Signal converters SCDN**	**Signal converters SVE4**
Signal range	0 - 10 V, 0 - 20 mA	0 - 10 V +/-0.3 V, 0 - 20 mA +/-0.6 mA
Switching output	2 x PNP or 2 x NPN, switchable	2xNPN, 2xPNP
Switching function	Freely programmable	Freely programmable
Electrical connection, connection type	Plugs	Socket
Electrical connection, connection technology	Connection pattern L1J	M8x1, A-coded, to EN 61076-2-104
Electrical connection, number of pins/wires	4	4
Electrical connection 2, connection type	2x socket	Plugs
Electrical connection 2, connection technology	Connection pattern EC	M8x1, A-coded to EN 61076-2-104
Electrical connection 2, number of pins/wires	4	4
Description	• Converts analogue signals into IO-Link® signals • Switching function freely programmable with teach-in • Mounting: wall or surface mounting, front panel mounting, manifold mounting using mounting brackets • Large, illuminated LCD display	• Converts analogue signals into switching points • Switching function freely programmable with teach-in • Threshold value, hysteresis or window comparator • Mounting: H-rail mounting or via adapter plate • LED switching status indication • Certification: c UL us listed (OL), C-Tick
online: →	scdn	sve4

Electromechanical switches

	Micro switches S-3
Description	• Electric limit switch • N/C contact, N/O contact, changeover switch • Actuator attachments: roller lever type AR, one-way roller lever type AL, whisker actuator type AF
online: →	s-3

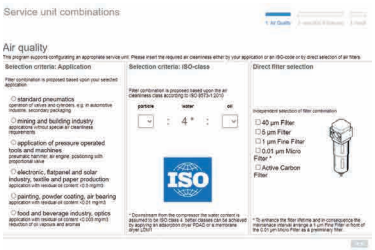
Air gap sensors

	Air gap sensors SOPA	**Micro reflex sensors, reflex sensors RML, RFL**	**Back pressure end stops SD-2, SD-3, SD-3-N**	**Air barriers SFL, SML**
Sensing range	20 ... 200 µm	Distance between nozzles 4.8 ... 5.1 mm, 4.5 ... 15.5 mm	Distance between nozzles 0 ... 0.5 mm	Distance between nozzles 5 ... 50 mm, up to 100 mm
Operating pressure	4 ... 7 bar			
Display type	Illuminated LCD, multi-colour	Signal pressure ≥0.5 mbar	Pneumatic signal 0 ... 8 bar	Pneumatic signal
Operating medium	Compressed air ISO 8573-1:2010 [7:4:4]	Filtered, unlubricated compressed air	Filtered, lubricated or filtered, unlubricated compressed air	Filtered, unlubricated compressed air
Description	• Convenient solution for high-precision contact and distance monitoring • Setting option: IO-Link®, teach-in or numerical setting using three buttons • Integrated air jet function • Multi-coloured LCD display • Mounting: H-rail mounting, wall mounting, through-hole • Certification: C-Tick	• Back pressure actuated valve • For contactless sensing of indicating instruments, checking pressing and stamping tools, edge control, magazine control, for measuring and counting • Can be used even in very dirty environments, in complete darkness, with translucent or magnetic objects	• Can be used for stroke-dependent signal generation as a limit switch and fixed stop • Ideal for end-position sensing and position control with high accuracy requirements and small actuating forces • SD-3-N for sensing fluid levels and heavily foaming liquids • For use in places that are difficult to access	• Sender nozzle, receiver nozzle, gap sensor • Back pressure actuated valve • Functional reliability even in very dirty environments • Reliable even at high ambient temperatures • Insensitive to mechanical influences and sound waves • Reliable even in complete darkness and when sensing translucent objects
online: →	sopa	rfl	sd	sfl

Product overview

FESTO
FESTO
Out A
5.57
bar
Edit

Software tools

Air consumption		Calculate your system's air consumption quickly and conveniently. Simply enter all the drives and tubing, set the cycle times and working pressure and the air consumption per minute and per day will be calculated for you. It includes a feature for exporting the input table together with the result directly to Excel. This tool can be found at ➔ **www.festo.com/x/air-consumption**
Configurator		Design a product with numerous features reliably and quickly with the help of the configurator. Select all the required product features step-by-step. The use of logic checks ensures that only correct configurations are available for selection. A dynamic graphic generated on the basis of the configuration provides a visual aid for selecting the correct product features. This tool can be found at ➔ **www.festo.com/x/service-unit-sizing**

Service units for compressed air >

Series MS-B

NEW

Service units
MS4-EM1FR, MS6-EM1FR

★

Size	4, 6
Pressure indication	Prepared for G1/8, With pressure gauge
Operating pressure [MPa]	0.1 ... 1 MPa
Operating pressure	1 ... 10 bar
Standard nominal flow rate	1500 ... 5300 l/min
Type of mounting	Either:, In-line installation, Via mounting bracket, With accessories
Description	• Combination of on/off valve and filter regulator • With manual or fully automatic condensate drain • For filtered and unlubricated compressed air supply • Supply pressure can be switched on or off • Output pressure is continuously adjustable within the pressure regulation range • Grid dimensions 40, 62 mm (size 4, 6)
online: ➔	ms4-em1fr

Service units for compressed air >

MS series

	Service unit combinations MSB4, MSB6, MSB9 ★	**Energy efficiency modules MSE6-E2M**	**Energy efficiency modules MSE6-D2M**	**Energy efficiency modules MSE6-C2M**
Pneumatic connection 1	1/2 NPT, 3/4 NPT, 1 NPT, 1 1/4 NPT, 1 1/2 NPT, G1, G1 1/2, G1 1/4, G1/2, G1/4, G1/8, G3/4	G1/2	G1/2	G1/2
Standard nominal flow rate	750 ... 18000 l/min	4500 l/min	4500 l/min	7000 l/min
Flow measuring range		50 ... 5000 l/min	50 ... 5000 l/min	50 ... 5000 l/min
Pressure regulation range	0.5 ... 16 bar			
Operating pressure [MPa]	0 ... 2 MPa	0.35 ... 1 MPa	0.35 ... 1.3 MPa	0.5 ... 1.1 MPa
Operating pressure	0 ... 20 bar	3.5 ... 10 bar	3.5 ... 13 bar	5 ... 11 bar
Grade of filtration	0.01 ... 40 µm			
Fieldbus interface		2x socket, M12x1, 4-pin, D-coded, 2x RJ45 push-pull socket, AIDA, Sub-D socket, 9-pin		2x socket, M12x1, 4-pin, D-coded, 2x RJ45 push-pull socket, AIDA
Description	• Combination of filter regulator, filter, lubricator, on/off valve, soft-start valve • Grid dimension 40, 62, 90 mm (size 4, 6, 9)	• Intelligent service unit component for optimising the use of compressed air as an energy medium in industrial automation technology • Combination of stop valve, flow sensor, pressure sensor and fieldbus node • Identification of production downtime and leakages • User-controlled shut-off and pressurisation • Equipped with measurement, control and diagnostic functions • Fieldbus connection (PROFIBUS DP, PROFINET IO, EtherNet/IP or EtherCAT®) via integrated fieldbus nodes enables connection to a higher-level controller • Grid dimension 62 mm (size 6) • Sustainable operation with active air shut-off and pressure reduction	• Intelligent service unit component for optimising the use of compressed air as an energy medium in industrial automation technology • Combination of flow sensor and stop valve with pressure sensor • Identification of production downtime and leakages • User-controlled shut-off and pressurisation • Equipped with measurement, control and diagnostic functions • Fieldbus connection (PROFINET IO) via the fieldbus node of the energy efficiency module MSE6-C2M-...-M actuated via the CPX extension or CPX terminal • Grid dimension 62 mm (size 6) • Sustainable operation with active air shut-off and pressure reduction	• Intelligent service unit component for optimising the use of compressed air as an energy medium in industrial automation technology • Combination of fieldbus node, flow sensor, proportional pressure regulator and stop valve with pressure sensor • Identification of production downtime and leakages • User-controlled shut-off and pressure regulation • Configurable rise limit for setpoint pressure • Equipped with measurement, control and diagnostic functions • Fieldbus connection (PROFINET IO) via integrated bus nodes enables connection to a higher-level controller • Two digital inputs and outputs • Grid dimension 62 mm (size 6) • Sustainable operation with active air shut-off and pressure reduction
online: →	msb4	mse6	mse6	mse6

Filter regulators/lubricators >

MS series

	 Service unit combinations MSB4-FRC, MSB6-FRC ★
Pneumatic connection 1	G1/2, G1/4, G1/8, G3/8
Standard nominal flow rate	850 ... 4800 l/min
Pressure regulation range	0.3 ... 12 bar
Operating pressure	0.8 ... 20 bar
Grade of filtration	5 µm, 40 µm
Description	• Filter, regulator and lubricator functions in a single unit • High flow rate and highly efficient in removing contaminants • Good control characteristics with minimal pressure hysteresis • Grid dimension 40, 62 mm (size 4, 6)
online: ➔	**msb4-frc**

Filter regulators >

Series MS-B

	 Filter regulators MS2-LFR-B, MS4-LFR-B, MS6-LFR-B ★
Pneumatic connection 1	G1/2, G1/4, M5, QS-6
Standard nominal flow rate	140 ... 5300 l/min
Pressure regulation range [MPa]	0.03 ... 0.7 MPa
Pressure regulation range	0.3 ... 7 bar
Grade of filtration	5 µm, 40 µm
Operating pressure [MPa]	0.1 ... 1 MPa
Operating pressure	1 ... 10 bar
Description	• Competitively priced basic component focused on the most important technical functions • Lightweight and sturdy thanks to modern polymer materials • Compatible with the MS series for the ideal combination of low-cost basic functionality and high-end functional requirements • Stabile control response • With or without pressure gauge • Rotary knob with latch • With integrated secondary exhausting and primary exhausting with return flow function • MS2: Directly operated diaphragm regulator • MS4, MS6: directly actuated piston regulator • Grid dimension 25, 40, 62 mm (sizes 2, 4, 6)
online: ➔	**ms2-lfr**

Filter regulators >

MS series

	 Filter regulators **MS4-LFR, MS6-LFR, MS9-LFR, MS12-LFR** ★
Pneumatic connection 1	Internal, G1/2, G1/4, G1/8, G3/8
Standard nominal flow rate	850 ... 24000 l/min
Pressure regulation range	0.3 ... 16 bar
Operating pressure	0.8 ... 20 bar
Grade of filtration	5 µm, 40 µm
Description	• MS4-LFR, MS6-LFR: directly actuated diaphragm regulator, MS9-LFR: piloted or directly actuated filter-diaphragm regulator, MS12-LFR: piloted diaphragm regulator without internal air consumption • Good control characteristics with minimal pressure hysteresis and primary pressure compensation • Good particle and condensate separation • With or without secondary exhausting • High flow rate • Lockable rotary knob • Return flow option for exhausting from output 2 to input 1 already integrated • Variants to EU Explosion Protection Directive (ATEX) • With or without pressure gauge • Grid dimension 40, 62, 90, 124 mm (size 4, 6, 9, 12)
online: →	ms4-lfr

Filter regulators >

D series, metal

	 Filter regulators **LFR-EX4**
Pneumatic connection 1	1/4 NPT, 1/2 NPT, G1/2, G1/4
Standard nominal flow rate	1150 ... 3400 l/min
Pressure regulation range	0.5 ... 16 bar
Operating pressure [MPa]	0.1 ... 2 MPa
Operating pressure	1 ... 20 bar
Grade of filtration	5 µm, 40 µm
Description	• Sturdy thanks to full metal design • High corrosion resistance (corrosion resistance class CRC 3 to Festo standard 940 070) and chemical resistance • Ambient temperature -40 ... +80 °C • Resistant to UV radiation and corrosive environments • With or without pressure gauge • Reliable manual drain • Energy efficient: excellent leakage values • Attractive price • To EU Explosion Protection Directive (ATEX) • Size: Midi
online: →	lfr

Filter regulators >

Individual devices

	Filter regulator PCRI	**Filter regulators PCRP** ★
Pneumatic connection 1		1/4 NPT, 1/2 NPT, G1/2, G1/4, NPT1/2-14, NPT1/4-18
Standard nominal flow rate	1400 l/min	1600 ... 4115 l/min
Pressure regulation range	0.5 ... 8 bar	0.5 ... 12 bar
Grade of filtration	5 µm, 40 µm	5 µm, 40 µm
Operating pressure [MPa]	0.1 ... 0.9 MPa	0.1 ... 2 MPa
Operating pressure	1 ... 9 bar	1 ... 20 bar
Description	• Pneumatic extension module for valve terminal VTOP • Smooths pressure fluctuations and regulates the compressed air to the set output pressure • Removes dirt particles from the compressed air that passes through it	• Robust housing for the specific requirements of the process automation industry • Suitable for use outdoors and at temperatures down to –60 °C • Resistant to UV radiation and corrosive environments • Two pressure gauge connections for different installation options • With manual condensate drain, rotating • Size 44, 64 • Sustainable operation thanks to reduced pressure level
online: ➔	pcri	pcrp

Compressed air filters >

Series MS-B

	NEW **Filter MS2-LF-B**
Pneumatic connection 1	M5, QS-6
Standard nominal flow rate	225 ... 250 l/min
Operating pressure	1 ... 10 bar
Grade of filtration	5 µm
Description	• Very compact and extremely lightweight series for use close to the process directly in the machine • Lightweight and sturdy thanks to modern polymer materials • Compatible with the MS series for the ideal combination of low-cost basic functionality and high-end functional requirements • With manual condensate drain, rotating • Variants recommended for production systems for manufacturing lithium-ion batteries
online: ➔	ms2-lf-b

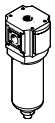
Compressed air filters >

MS series

	Filters MS4-LF, MS6-LF, MS9-LF, MS12-LF	Fine filters MS4-LFM-B, MS6-LFM-B, MS9-LFM-B, MS12-LFM-B	Micro filters MS4-LFM-A, MS6-LFM-A, MS9-LFM-A, MS12-LFM-A	Activated carbon filters MS4-LFX, MS6-LFX, MS9-LFX, MS12-LFX
Pneumatic connection 1	Internal, G1/2, G1/4, G1/8, G3/8	Manifold module, 1/2 NPT, 3/4 NPT, 1 NPT, 1 1/4 NPT, 1 1/2 NPT, G1, G1 1/2, G1 1/4, G1/2, G1/4, G1/8, G3/4, G3/8	Manifold module, 1/2 NPT, 3/4 NPT, 1 NPT, 1 1/4 NPT, 1 1/2 NPT, G1, G1 1/2, G1 1/4, G1/2, G1/4, G1/8, G3/4, G3/8	Manifold module, 1/2 NPT, 3/4 NPT, 1 NPT, 1 1/4 NPT, 1 1/2 NPT, G1, G1 1/2, G1 1/4, G1/2, G1/4, G1/8, G3/4, G3/8
Standard nominal flow rate	1000 ... 16000 l/min			
Operating pressure	0 ... 20 bar	0 ... 20 bar	0 ... 20 bar	0 ... 20 bar
Grade of filtration	5 µm, 40 µm	0.01 µm, 1 µm	0.01 µm, 1 µm	0.01 µm, 1 µm
Description	• Good particle and condensate separation • High flow rate performance with minimal pressure drop • Available with manual, semi-automatic, fully automatic or fully automatic, electrically actuated condensate drain • Grid dimension 40, 62, 90, 124 mm (size 4, 6, 9, 12)	• High-efficiency filter for exceptionally clean compressed air • Removing oil aerosols from compressed air • Optionally with differential pressure indicator for indication of contamination • Available with electronic filter contamination indicator • Grid dimension 40, 62, 90, 124 mm (size 4, 6, 9, 12)	• High-efficiency filter for exceptionally clean compressed air • Removing oil aerosols from compressed air • Optionally with differential pressure indicator for indication of contamination • Available with electronic filter contamination indicator • Grid dimension 40, 62, 90, 124 mm (size 4, 6, 9, 12)	• Removal of gaseous oil particles from compressed air using activated carbon • Air quality class at the output [1.4.1] to ISO 8573-1 • Eliminates odours and vapours • Residual oil content = 0.003 mg/m³ • Grid dimension 40, 62, 90, 124 mm (size 4, 6, 9, 12)
online: →	ms4-lf	ms4-lfm-b	ms4-lfm-a	ms4-lfx

Compressed air filters >

Individual devices

	Filter silencers LFU	 Micro filters PFML
Size	G1/4, G3/8	186, 90
Grade of filtration	1 µm	0.01 µm
Operating pressure [MPa]	0 ... 1.6 MPa	0 ... 5 MPa
Operating pressure	0 ... 16 bar	0 ... 50 bar
Operating pressure [psi]	0 ... 232 psi	0 ... 725 psi
Flow rate with respect to atmosphere	4000 ... 12500 l/min	
Noise reduction	Reduction by 40 dB	
Description	• Removes up to 99.99% of oil and other contaminants from the exhaust air • Manual rotary condensate drain • Exhaust noise reduced regardless of frequency	• For high-pressure applications • Food grade www.festo.com/certificates/PFML
online: →	lfu	pfml

Pressure regulators >

Series MS-B

	 Pressure regulators **MS2-LR-B, MS4-LR-B, MS6-LR-B** ★
Pneumatic connection 1	G1/2, G1/4, M5, QS-6
Standard nominal flow rate	170 ... 6000 l/min
Pressure regulation range	0.3 ... 7 bar
Operating pressure [MPa]	0.1 ... 1 MPa
Operating pressure	1 ... 10 bar
Description	• Competitively priced basic component focused on the most important technical functions • Lightweight and sturdy thanks to modern polymer materials • Compatible with the MS series for the ideal combination of low-cost basic functionality and high-end functional requirements • Stabile control response • With or without pressure gauge • Rotary knob with latch • With integrated secondary exhausting and primary exhausting with return flow function • MS2: Directly operated diaphragm regulator • MS4, MS6: directly actuated piston regulator • Grid dimension 25, 40, 62 mm (sizes 2, 4, 6) • Sustainable operation thanks to reduced pressure level
online: ➔	ms-lr-b

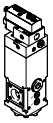
Pressure regulators >

MS series

	Pressure regulators MS4-LR, MS6-LR, MS9-LR ★	**Pressure regulators MS12-LR**	**Pressure regulators MS4-LRB, MS6-LRB**	**Precision pressure regulators MS6-LRP, MS6-LRPB**
Pneumatic connection 1	G1/2, G1/4, G1/8, G3/8	Sub-base	G1/2, G1/4	G1/2, G1/4, G3/8
Standard nominal flow rate	1000 ... 30000 l/min	12000 ... 22000 l/min	300 ... 7300 l/min	800 ... 5000 l/min
Pressure regulation range	0.3 ... 16 bar	0.15 ... 16 bar	0.3 ... 16 bar	0.05 ... 12 bar
Operating pressure [MPa]	0.08 ... 1.4 MPa	0.08 ... 2.1 MPa		0.1 ... 1.4 MPa
Operating pressure	0.8 ... 20 bar	0.8 ... 21 bar	0.8 ... 20 bar	1 ... 14 bar
Description	• High flow rate performance with minimal pressure drop • Good control characteristics with minimal pressure hysteresis and primary pressure compensation • With or without secondary exhausting • Lockable rotary knob • Optional pressure sensor and rotary knob pressure gauge • Grid dimension 25, 40, 62, 90 mm (size 2, 4, 6, 9)	• High flow rate performance with minimal pressure drop • Good control characteristics with minimal pressure hysteresis and primary pressure compensation • With secondary exhausting • Lockable rotary knob • With or without pressure gauge • MS12-LR-...-PO: pneumatically actuated (pressure range determined by pilot regulator) • MS12-LR-...-PE6: electrically actuated (pilot control by proportional pressure regulator) • Grid dimension 124 mm (size 12) • Sustainable operation thanks to reduced pressure level	• To build a regulator manifold with through air supply for pressure ranges that can be adjusted independently of one another • Good control characteristics with minimal pressure hysteresis and primary pressure compensation • Lockable rotary knob • With or without secondary exhausting • Integrated return flow option for exhausting from output 2 to input 1 • Optional pressure sensor and rotary knob pressure gauge • Variants to EU Explosion Protection Directive (ATEX) • Grid dimension 40, 62 mm (size 4, 6)	• As individual device and for manifold assembly • Manifold assembly with through air supply • Good control characteristics with minimal pressure hysteresis and primary pressure compensation • High secondary exhausting • Lockable rotary knob • Optional pressure sensor and rotary knob pressure gauge • Grid dimension 62 mm (size 6)
online: →	ms4-lr	ms12-lr	ms4-lrb	ms6-lrp

Pressure regulators >

Individual devices

	Precision pressure regulators LRP, LRPS	 **Electrical pressure regulators PREL**
Pneumatic connection 1	For sub-base Ø 7 mm, G1/4, G1/8	G1
Standard nominal flow rate	240 ... 2300 l/min	
Pressure regulation range	0.05 ... 10 bar	0.4 ... 40 bar
Operating pressure [MPa]	0.1 ... 1.2 MPa	0 ... 5 MPa
Operating pressure	1 ... 12 bar	0 ... 50 bar
Description	• Lockable design • Good control characteristics with minimal pressure hysteresis and primary pressure compensation • High secondary exhausting • Variants to EU Explosion Protection Directive (ATEX)	• For high-pressure applications • Food grade see www.festo.com/certificates/PREL • Size 90 mm, 186 mm
online: ➔	**lrp**	**prel**

Compressed air lubricators >

MS series

	Lubricators MS4-LOE, MS6-LOE, MS9-LOE, MS12-LOE
Pneumatic connection 1	Internal, G1/2, G1/4, G1/8, G3/8
Standard nominal flow rate	1100 ... 27000 l/min
Operating pressure	1 ... 16 bar
Minimum flow rate for lubricator function	40 ... 400 l/min
Description	• Proportional lubricator with precision oil metering • Quick and easy top-up even under pressure • Oil capacity 30 ... 1500 cm³ • Grid dimension 40, 62, 90, 124 mm (size 4, 6, 9, 12)
online: ➔	**ms4-loe**

On/off and soft-start valves >

Series MS-B

	Soft-start valves MS4-EDE-B, MS6-EDE-B ★	**On/off valves MS4-EE-B, MS6-EE-B** ★
Design	Poppet valve, electrically actuated	Poppet valve, electrically actuated
Pneumatic connection 1	G1/2, G1/4	G1/2, G1/4
Operating pressure [MPa]	0.3 ... 0.7 MPa	0.3 ... 0.7 MPa
Operating pressure	3 ... 7 bar	3 ... 7 bar
Standard nominal flow rate	2000 ... 5000 l/min	2000 ... 5000 l/min
Exhaust air function	Without flow control option	
Electrical connection	Type C, To EN 175301-803	Type C, To EN 175301-803
Description	• Very compact and extremely lightweight series for use close to the process directly in the machine • Electrically operated 3/2-way valve for slowly pressurising and exhausting pneumatic systems • The switching pressure can be precisely controlled with a solenoid valve • Adjustable switching time delay • Built-in connections into which the tubing can be directly inserted • Detenting and non-detenting manual override • Supply voltage 24 V DC • With solenoid coil, without plug socket • Variants recommended for production systems for manufacturing lithium-ion batteries • Grid dimension 40, 62 mm (size 4, 6)	• Very compact and extremely lightweight series for use close to the process directly in the machine • Electrically operated 3/2-way valve for pressurising and exhausting pneumatic systems • Ducted exhaust air possible via threaded connection with silencer • Detenting and non-detenting manual override • Supply voltage 24 V DC • With solenoid coil, without plug socket • Variants recommended for production systems for manufacturing lithium-ion batteries • Grid dimension 40, 62 mm (size 4, 6)
online: →	ms-ede-b	ms-ee-b

On/off and soft-start valves >

MS series

	Soft-start/quick exhaust valves MS6-SV-E, MS6-SV-D	**Soft-start/quick exhaust valves MS6-SV-C, MS9-SV-C**	**On/off valves MS4-EM1, MS6-EM1, MS9-EM, MS12-EM** ★
Pneumatic connection 1	G1/2	G1/2	Manifold module, G1/2, G1/4, G1/8, G3/8
Standard nominal flow rate	4300 ... 5700 l/min	4300 ... 16550 l/min	1200 ... 32000 l/min
Operating pressure	3 ... 10 bar	3 ... 16 bar	0 ... 20 bar
Actuation type	Electric	Electric	Manual
Safety integrity level (SIL)	Exhaust/SIL 3, Prevention of unexpected start-up (pressurisation)/SIL 3		
Performance level (PL)	Exhaust/category 3, performance level d, Exhausting/up to category 4, performance level e, Prevention of unexpected start-up (pressurisation)/category 3, performance level d, Prevention of unexpected start-up (pressurisation)/up to category 4, performance level e	Exhausting/category 1, performance level c, Exhausting/up to category 1, performance level c, Prevention of unexpected start-up (pressurisation)/category 1, performance level c	
Description	• With safety functions • For reducing pressure quickly and reliably and for building up pressure gradually • Adjustable pressure build-up time • Available with silencer • Supply voltage 24 V DC • Grid dimension 62 mm (size 6)	• With safety functions • For reducing pressure quickly and reliably and for building up pressure gradually • Adjustable pressure build-up time • Adjustable switch-through pressure • Supply voltage 24 V DC • Grid dimension 62, 90 mm (size 6, 9)	• Manual 3/2-way valve for pressurising and exhausting pneumatic systems • A silencer can be attached or the exhaust air ducted at port 3 • Switching position is immediately recognisable • Optionally with pressure gauge and pressure sensor • Variants to EU Explosion Protection Directive (ATEX) • Grid dimension 40, 62, 90, 124 mm (size 4, 6, 9, 12)
online: →	ms6-sv-e	ms6-sv-c	ms4-em1

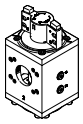
On/off and soft-start valves >

MS series

	On/off valves MS4-EE, MS6-EE, MS9-EE, MS12-EE ★	Soft-start valves MS4-DL, MS6-DL, MS12-DL ★	Soft-start valves MS4-DE, MS6-DE, MS12-DE
Pneumatic connection 1	Manifold module, G1/2, G1/4, G1/8, G3/8	Manifold module, G1/2, G1/4, G1/8, G3/8	Manifold module, G1/2, G1/4, G3/8
Standard nominal flow rate	1000 ... 32000 l/min	1000 ... 42000 l/min	1000 ... 42000 l/min
Operating pressure	3 ... 18 bar	2 ... 20 bar	3 ... 18 bar
Actuation type	Electric	Pneumatic	Electric
Safety integrity level (SIL)			
Performance level (PL)			
Description	• Electric 3/2-way valve for pressurising and exhausting pneumatic installations • A silencer can be attached or the exhaust air ducted at port 3 • Supply voltage 24 V DC, 110, 230 V AC • Optionally with pressure gauge and pressure sensor • With solenoid coil, without plug socket • Variants to EU Explosion Protection Directive (ATEX) • Grid dimension 40, 62, 90, 124 mm (size 4, 6, 9, 12)	• 2/2-way valve for slowly pressurising pneumatic systems (for use with on/off valves EM(1) and EE) • For building up pressure gradually • Adjustable pressure build-up time • Variants to EU Explosion Protection Directive (ATEX) • Grid dimension 40, 62, 124 mm (size 4, 6, 12)	• 2/2-way valve for slowly pressurising pneumatic installations with electrically switchable pressure switchover point • Supply voltage 24 V DC, 110, 230 V AC • Switchable pressure switching point • For advancing the drives slowly and reliably into the initial position • For avoiding sudden and unexpected movements • Adjustable pressure build-up time • Variants to EU Explosion Protection Directive (ATEX) • Grid dimension 40, 62, 124 mm (size 4, 6, 12)
online: →	ms4-ee	ms4-dl	ms4-de

On/off and soft-start valves >

Individual devices

	Shut-off valves HE-LO	 On/off valves PVEL
Pneumatic connection 1	G1, G1/2, G3/4, G3/8	
Standard nominal flow rate	5200 ... 10000 l/min	
Nominal size DN		54
Operating pressure [MPa]		0 ... 5 MPa
Operating pressure	1 ... 10 bar	0 ... 50 bar
Actuation type	Manual	Manual, Pneumatic
Description	• For shutting off the compressed air supply whilst simultaneously exhausting systems powered by compressed air • Can be locked in the closed position • Screwed into piping, through-holes for wall mounting • To OSHA 29 CFR 147	• Food grade see www.festo.com/certificates/PVEL • For high-pressure applications
online: →	he-lo	pvel

Air dryers >

MS series

	 Membrane air dryers **MS4-LDM1, MS6-LDM1**
Pneumatic connection 1	G1/2, G1/4
Standard nominal flow rate	50 ... 400 l/min
Operating pressure	3 ... 12.5 bar
Pressure dew point reduction	Please refer to documentation in the Internet
Description	• Final dryer with excellent operational reliability • Suitable for use as an individual device or for integration into existing service unit combinations • Flow rate-dependent dew point reduction • Wear-free function requiring no external energy • Grid dimension 40, 62 mm (size 4, 6)
online: ➔	**ms4-ldm1**

Air dryers >

Air dryers: individual devices

	 Adsorption dryers **PDAD**
Pneumatic connection 1	G1/2, G3/8
Inlet pressure 1	4 ... 16 bar
Pressure dew point	-40°C
Description	• Ideal for decentralised compressed air drying • Integrated filtering of oil and particulates • Defined pressure dew point • Low purge air consumption
online: ➔	**pdad**

Compressed air distributors >

MS series

	Branching modules MS4-FRM, MS6-FRM, MS9-FRM, MS12-FRM ★	**Distributor blocks MS4-FRM-FRZ, MS6-FRM-FRZ** ★
Pneumatic connection 1	G1/4, G1/2, G1, G2, Manifold module, 1/2 NPT, 3/4 NPT, 1 NPT, 1 1/4 NPT, 1 1/2 NPT, G1, G1 1/2, G1 1/4, G1/2, G1/4, G1/8, G3/4, G3/8	G1/4, G1/2
Standard nominal flow rate in main flow direction 1->2	1200 ... 50000 l/min	4050 ... 14600 l/min
Operating pressure	0 ... 20 bar	0 ... 20 bar
Description	• Optionally with integrated non-return function and pressure switch • Outlet at top and bottom • Can be used as an intermediate distributor for varying air qualities • Optionally with pressure sensor • Grid dimension 40, 62, 90, 124 mm (size 4, 6, 9, 12)	• Slim compressed air distributor • Outlet at top and bottom • Can be used as an intermediate distributor for varying air qualities • Can be used as an adapter between two pressure regulators size 4 with pressure gauge with large rotary knob • Grid dimension 40, 62 mm (size 4, 6)
online: →	ms*-frm	ms*-frm-frz

Compressed air distributors >

Individual devices

	Branching modules PMBL
Pneumatic connection 3	G1
Pneumatic connection 4	G1
Operating pressure [MPa]	0 ... 5 MPa
Operating pressure	0 ... 50 bar
Description	• For high-pressure applications • Food grade see www.festo.com/certificates/PMBL • Size 90 mm, 186 mm
online: →	pmbl

Generators

	 Pressure vacuum generators **PGVA**
Output pressure 1 [MPa]	-0.062 MPa, -0.045 MPa
Output pressure 2 [Mpa]	0.045 MPa, 0.08 MPa
Pneumatic connection 1	QS-4
Display	LED
Configuration support	CODESYS V3, Integrated web server, Phyton scripts
Electrical power consumption	11 W, 19 W
Nominal operating voltage DC	24 V
Electrical actuation	COM port, Ethernet, Integrated controller
Description	• Power supply 24 V DC
online: ➔	pgva

Condensate drain >

MS series

	 Water separators **MS6-LWS, MS9-LWS, MS12-LWS**
Pneumatic connection 1	G1/2, G1/4, G3/8
Operating pressure	0.8 ... 16 bar
Description	• No replacement of filter cartridges necessary • Constantly high condensate separation (99%) up to the maximum flow rate • Available with fully automatic or fully automatic, electrically actuated condensate drain
online: ➔	ms6-lws

Condensate drain >

Individual devices

	Condensate drains, electrical **PWEA**	**Condensate drains, automatic** **WA**
Pneumatic connection	G1/2	M9
Operating pressure	0.8 ... 16 bar	1.5 ... 16 bar
Description	• Fully automatic condensate drain with independent electric controller • Interface available for communicating with master control device • Reliable thanks to contactless capacitive sensor • Can be used with service units or simply in piping systems • Ready status and switching status indicated via LEDs and electrical interface	• For attaching to service units and compressed air networks/ systems • Automatic emptying after the max. fill level has been reached • Automatic emptying after the operating pressure p < 0.5 bar is switched off • Manual actuation during operation is possible
online: ➔	pwea	wa

Pressure amplifiers

Pressure boosters

	Pressure boosters **DPA**
Pneumatic connection 1	G1/2, G1/4, G3/8, QS-10, QS-12, QS-16
Outlet pressure 2	4 ... 16 bar
Inlet pressure 1	2 ... 10 bar
Description	• Pneumatic pressure increase up to double the input pressure • Available as pressure booster/air pressure reservoir combinations • Any mounting position • Short filling times • Long service life • Compact design • Available with sensing option
online: ➔	dpa

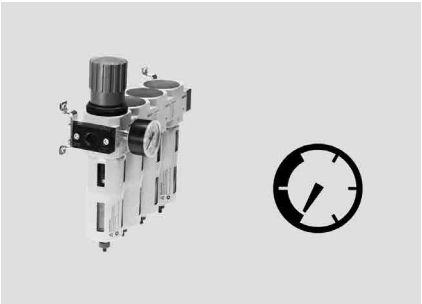
Pressure gauges

	Pressure gauges PAGN	**Pressure gauges MA**	**Flanged pressure gauges FMA**	**Flanged precision pressure gauges, precision pressure gauges FMAP, MAP**
Type of mounting	Front panel mounting, In-line installation	In-line installation	Front panel mounting	Front panel mounting, In-line installation
Indicating range [MPa]	0 ... 1.6 MPa	0 ... 1.6 MPa		
Display range	0 ... 16 bar	0 ... 25 bar	0 ... 16 bar	0 ... 16 bar
Display range [psi]	0 ... 232 psi	0 ... 362.5 psi	0 ... 232 psi	0 ... 232 psi
Pneumatic connection	G1/8 with sealing ring, Cartridge 10 mm, G1/4, R1/8	G1/4, G1/8, M5, QS-4, QS-6, QS-8, R1/4, R1/8	G1/4	G1/4, R1/8
Operating pressure [MPa]	0 ... 1.6 MPa	0 ... 2.5 MPa	0 ... 1.6 MPa	0 ... 1.6 MPa
Operating pressure	0 ... 16 bar	0 ... 25 bar	0 ... 16 bar	0 ... 16 bar
Operating pressure [psi]	0 ... 232 psi	0 ... 362.5 psi	0 ... 232 psi	0 ... 232 psi
Measurement accuracy class	1, 1.6, 2.5, 4, 5	1.6, 2.5, 4, 5	1.6, 2.5	1, 1.6
Description	• Designs based on EN 837-1 • Display units bar, psi, MPa	• Designs based on DIN EN 837-1, available with red-green range • Pneumatic connection via R, G or metric thread, push-in connector • Display units bar, psi, MPa	• Designs based on EN 837-1 • Pneumatic connection via G thread • Display units bar, psi	• Designs based on EN 837-1 • Pneumatic connection via R or G thread • Display units bar, psi
online: →	pagn	ma	fma	fmap

Pressure gauges

	Pressure gauge kits DPA	**Vacuum gauges VAM, FVAM**	**Pressure gauges PAGL**
Type of mounting	Via male thread	Front panel mounting, Screw-in	In-line installation
Indicating range [MPa]			0 ... 6 MPa
Display range		-1 ... 9 bar	0 ... 60 bar
Display range [psi]		0 ... 130 psi	0 ... 870 psi
Pneumatic connection	G1/4, G1/8, R1/8	G1/4, G1/8, R1/4, R1/8	G1/4
Operating pressure [MPa]			0 ... 6 MPa
Operating pressure	10 ... 16 bar	-1 ... 9 bar	0 ... 60 bar
Operating pressure [psi]			0 ... 870 psi
Measurement accuracy class	2.5, 4	2.5	1.6
Description	• For pressure booster DPA • For monitoring the supply and output pressure • Pneumatic connection via R or G thread	• Designs based on DIN EN 837-1, available with red-green range • Pneumatic connection via R or G thread • Double or single scale • Display units bar, in Hg, psi	• For high-pressure applications • Display units bar, psi, MPa
online: →	dpa	vam	pagl

Customised components – for your specific requirements



Components for compressed air preparation with customised designs

Can't find the compressed air preparation components you need in our catalogue?

We can offer you customised components that are tailored to your specific requirements.

Common product modifications:
- Modified pressure range
- Rotary knob: in a special colour, with protection against rotation
- Fitting: integrated throttling port, special thread
- Tubing with special printing
- Pressure gauge with red-green range

Many additional variants are possible.

Ask your Festo sales engineer, who will be happy to help you:

➔ **www.festo.com/contact**

Product overview

46.1A2.2
46.1A2.3
46.1A2.4
46.2A2.7
Esc
Enter
Teach

Software tools

Configurator for connecting cable NEBU		Design a product with numerous features reliably and quickly with the help of the configurator. Select all the required product features step-by-step. The use of logic checks ensures that only correct configurations are available for selection. A dynamic graphic generated on the basis of the configuration provides a visual aid for selecting the correct product features. You will find the configurator • at www.festo.com/catalogue/nebu • Click on the product • Click on the blue “Configure product” button

Connecting cables >

Connecting cables, universal

	 Connecting cables NEBA	 **Connecting cables NEBU** ★	 **Connecting cables NEBB**
Electrical connection, connection type	Socket, Cable, Plugs	Socket, Cable, Plugs	Socket, Cable
Electrical connection, cable outlet	Straight, Straight, angled, Angled	Straight, Angled, Angled, can be aligned in increments of 15°	Straight, Angled
Electrical connection, design	Round	Round	Round
Electrical connection, connection technology	M12x1, A-coded to EN 61076-2-101, M8x1, A-coded to EN 61076-2-104, M8x1, A-coded, to EN 61076-2-104, Open end, Diameter 8 mm, A-coded according to EN 61076-2-104	G7/8 coded to NFPA/T3.5.29 R1-2007, M8x1, A-coded to EN 61076-2-104, M12x1, A-coded to EN 61076-2-101, Open end, M8x1, A-coded, to EN 61076-2-104	M12x1, A-coded to EN 61076-2-101, Open end, M8x1, A-coded, to EN 61076-2-104
Electrical connection, number of pins/wires	3, 4, 5	3, 4, 5, 8	3, 4, 5
Cable length	0.3 ... 30 m	0.1 ... 30 m	2.5 ... 10 m
Description	• Powerful universal connecting cables • Suitable for harsh environments and applications in constant motion or vibration • Meets the safety requirements of IEC 61010-1 and IEC 61010-2-202 for electrical equipment for measurement, control, and laboratory devices • High IP65, IP68, IP69k degree of protection • Resistant to abrasion and low adhesion • Suitable for use with energy chains and robots • Flame-retardant and self-extinguishing • Recommended for production systems for manufacturing lithium-ion batteries	• For thread M8x1 A-coded according to EN 61076-2-104 • For thread M12x1 A-coded according to EN 61076-2-101 • Pre-assembled at one or both ends • Designs for static, standard, energy chain and robot applications • Cable length 0.1 ... 30 m • With PVC or PUR cable • Ambient temperature -25 ... +80 °C	• For thread M8x1 A-coded according to EN 61076-2-104 • For thread M12x1 A-coded according to EN 61076-2-101 • Pre-assembled at one end • With PVC cable • Ambient temperature -25 ... +70 °C
online: ➔	neba	nebu	nebb

Connecting cables >

Connecting cables, universal

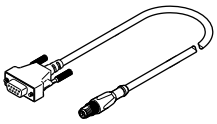
	Connecting cables/plug sockets with cable SIM	Connecting cables KM12
Electrical connection, connection type	Socket, Cable	Socket, Plugs
Electrical connection, cable outlet	Straight, Angled	Straight
Electrical connection, design	Round	Round
Electrical connection, connection technology	M12x1, A-coded to EN 61076-2-101, Open end, M8 snap-locking A-coded to EN 61076-2-104	M12x1, A-coded to EN 61076-2-101
Electrical connection, number of pins/wires	3, 4, 8	8
Cable length	2 ... 25 m	2 m
Description	• For thread M8 grid locking A-coded according to EN 61076-2-104 • For thread M12x1 A-coded according to EN 61076-2-101 • Pre-assembled at one end • With PVC or PUR cable • Ambient temperature -25 ... +80 °C	• For thread M12x1 A-coded according to EN 61076-2-101 • With PUR cable • Ambient temperature -25 ... +80 °C
online: →	sim	km12

Connecting cables >

Connecting cables for control systems

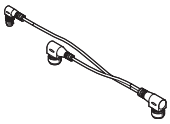
	Connecting cables NEBC ★	**Connecting cables NEBP**	**Connecting cables NEBL** ★
Electrical connection	25-pin, 5-pin, Straight plug, Straight plug connector/open at one end, Sub-D/-, Sub-D/Sub-D, Square design/angled, M12x1		
Electrical connection, connection type	Socket, Hybrid plug, Cable, Plugs, Plug and socket strip	Socket, Plugs	Socket, Cable, Plugs
Electrical connection, cable outlet	Straight, Angled	Angled	Straight, Angled
Electrical connection, design	Angular, Round	Round	Round
Electrical connection, connection technology	Plug pattern P1, M12x1, A-coded to EN 61076-2-101, M12x1, Festo-specific coding, Plug pattern type A to EN 175301-803, M8x1, D-coded according to EN 61076-2-114, M9x0.5, RJ45 to IEC 60603-7-3, M12x1, D-coded to EN 61076-2-101, USB 2.0 type A, Open end, M8x1, A-coded, to EN 61076-2-104, RJ45, RJ45 and socket strip 12 pins, 2 rows, Sub-D, USB 2.0 type B	M9x0.5, M16x0.75	M8x1, A-coded to EN 61076-2-104, M12x1, T-coded according to EN 61076-2-111, Open end, M8x1, A-coded, to EN 61076-2-104
Electrical connection, number of pins/wires	3, 4, 5, 8, 9, 17, 20, 25, 26	5, 6	4
Cable length	0.2 ... 50 m	2 m	0.3 ... 15 m
Description	• Variants in easy-to-clean design • Standard variants, variants with shielding or as a hybrid cable • Variants suitable for energy chains • Variants with Ethernet, CANopen, I-Port or RS232	• Connection between displacement encoder MME and measuring module CPX-CMIX	• For power supply • Suitable for use with energy chains
online: →	**nebc**	**nebp**	**nebl**

Connecting cables for motors

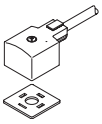
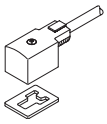
	Motor, encoder, resolver cables **NEBM** ★	 **Fieldbus adapters** **FBA**
Electrical connection, connection type	Socket, Hybrid socket, Cable, Plugs, Plugs and cables	Socket, Plugs
Electrical connection, cable outlet	Straight, Angled	Straight
Electrical connection, design	Angular, Round	Angular, Round
Electrical connection, connection technology	Connection pattern F1, Connection pattern H6, coded for motor, Connection pattern H7, coded for motor brake, Connection pattern RE, ITT M3, M12x1, A-coded to EN 61076-2-101, RJ45, RJ45 and open end, Sub-D, Sub-D and open end, M12x1, T-coded according to EN 61076-2-111, Open end, M16x0.75, M23x1, M40x1	M12x1, A-coded to EN 61076-2-101, Sub-D
Electrical connection, number of pins/wires	2, 4, 6, 8, 9, 12, 14, 15, 21, 28, 31	5, 9
Cable length	0.2 ... 100 m	0.1 m
Description	• For servo motors and stepper motors • For motor controllers • Can be used in a wide temperature range • Suitable for use with energy chains	• 9-pin Sub-D plug to 5-pin round plug/M12 socket • For CANopen and DeviceNet
online: →	nebm	fba

Connecting cables >

Connecting cables for valves

	Connecting cables/plug sockets with cable NEBV ★	**Plug sockets with cable KMEB-1, KMEB-2, KMEB-3** ★	**Plug sockets with cable KMF** ★	 **Connecting cables NEDV**
Electrical connection	4-pin/2-wire, 4-pin/3-pin, 44-pin, Socket, Angled socket/cable, Angled socket/straight plug connector, M8x1/M8x1, Sub-D, M8x1	4-pin, 5-pin, Angled socket, Type C, To DIN EN 175301-803	Socket	2x angled socket, M12, 3-pin, 1x angled plug, M8, 4-pin
Electrical connection, connection type	2x single wires, Socket, Socket, narrow, Cable with socket, Cable, Plugs, Twin wire	Socket		
Electrical connection, cable outlet	Straight, Angled	Angled		
Electrical connection, design	Angular, Round	Angular		
Electrical connection, connection technology	Connection pattern ZB, self-tapping screw, Connection pattern ZC, self-tapping screw, Plug pattern ZC, metric screw, Connection pattern H, Connection pattern HP, M12x1, A-coded to EN 61076-2-101, Connection pattern Q7, Connection pattern S, Connection pattern type A based on EN 175301-803, Plug pattern type B to industry standard, 11 mm, Plug pattern type C to EN 175301-803, M8x1, A-coded to EN 61076-2-104, Open end, Sub-D	Open end		
Electrical connection, number of pins/wires	2, 3, 4, 5, 8, 10, 25, 26, 27, 36, 37, 44	2, 3		
Cable length	0.1 ... 30 m	0.5 ... 10 m	2.5 ... 10 m	0.2 m
Description	• For solenoid coils form A, form B or form C • For solenoid coils with thread M8x1 or M12x1 A-coded • For solenoid coils ZC or various special connection patterns • Pre-assembled at one or both ends • Cable length 0.1 ... 30 m • With PUR cable • Ambient temperature -25 ... +80 °C	• For solenoid coils with plug pattern type C according to EN 175301-803 • For EB solenoid coils • With PVC or PUR cable • Ambient temperature -20 ... +80 °C	• For solenoid coils with plug pattern type B as per industrial standard, 11 mm • For F solenoid coils • With PVC cable • Ambient temperature -20 ... +80 °C	• For proportional valves VPWP • For connecting to sub-base VABP-S3 • Pre-assembled • With PUR cable • Ambient temperature -25 ... +80 °C
online: →	**nebv**	**kmeb-1**	**kmf**	**nedv**

Connecting cables for valves

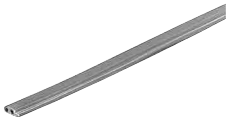
	Connecting cables/plug sockets with cable KMYZ-2, KMYZ-4	**Plug sockets with cable KME**	 **Connecting cables KMC**	 **Plug sockets with cable KMV**
Electrical connection	2-pin/2-wire, 2-pin/3-pin, Angled socket/cable, Angled socket/straight plug connector, Angled socket, Cable, Square design/M8x1, Square design/ open end, Square design MSZB, Square design MSZC	Angled socket, square design, 3-pin, type C (industrial type), open end, 2-wire	Socket, Type A	Socket, Type B
Electrical connection, connection type				
Electrical connection, cable outlet				
Electrical connection, design				
Electrical connection, connection technology				
Electrical connection, number of pins/wires				
Cable length	0.5 ... 10 m	2.5 ... 10 m	2.5 ... 10 m	2.5 ... 10 m
Description	• For solenoid coils with plug pattern ZB • For solenoid coils with plug pattern ZC • With PVC or PUR cable • Ambient temperature -10 ... +50 °C	• For solenoid coils with plug pattern type C as per industrial standard, 9.4 mm • For E solenoid coils • With PVC cable • Ambient temperature -20 ... +80 °C	• For solenoid coils with plug pattern type A according to EN 175301-803 • For D solenoid coils • For N1 solenoid coils • With PVC cable • Ambient temperature -20 ... +80 °C	• For solenoid coils with plug pattern type B according to EN 175301-803 • For V solenoid coils • With PVC cable • Ambient temperature -20 ... +80 °C
online: →	kmyz-2	kme	kmc	kmv

Connecting cables >

Connecting cables for valves

	Electrical plug-in bases MHAP-PI	**Plug sockets with cable KMPPE**	**Connecting/plug sockets with cable KMPYE-AIF, KMPYE-5**	**Connecting cables MHJ9-KMH**
Electrical connection	2-pin, Socket			2-pin/2-pin/4-wire, Straight socket/straight socket/cable
Electrical connection, connection type		Socket, Cable	Socket, Cable, Plugs	
Electrical connection, cable outlet		Angled	Straight	
Electrical connection, design		Round	Round	
Electrical connection, connection technology		Open end, M16x0.75 to EN 61076-2-106	M9x0.5, M12x1, A-coded to EN 61076-2-101, Open end	
Electrical connection, number of pins/wires		8	4, 7	
Cable length	0.5 ... 1 m	2.5 ... 5 m	0.3 ... 5 m	0.5 ... 2.5 m
Description	• Electrical plug-in base with plug pattern H • For sub-base valves and semi in-line valves MHA1-...-PI and MHP1-...-PI • Pre-assembled • Ambient temperature -20 ... +80 °C	• For solenoid coils with thread M16x0.75 • For proportional pressure regulators MPPES • With PVC cable • Ambient temperature -30 ... +80 °C	• For solenoid coils with thread M12x1 A-coded according to EN 61076-2-101 • For connecting proportional directional control valves MPYE with end-position controller SPC11 • Cable length 0.3 ... 5 m • With PVC or PUR cable • Ambient temperature -25 ... +80 °C	• With control electronics for solenoid valves MHJ9 • With plug sockets KMH • With PVC cable • Ambient temperature -5 ... +50 °C
online: →	**mhap**	**kmppe**	**kmpye**	**mhj9-kmh**

Connecting cables for valve terminals

	Connecting cables NEBV-S1, NEBV-C	 Flat cables KASI	Addressing cables KASI-ADR	Connecting cables KMP3, KMP4, KMP6
Electrical connection	44-pin, Socket, Sub-D			
Electrical connection, connection type	Socket, Cable		Socket	Socket, Cable
Electrical connection, cable outlet	Straight, Angled		Straight, Angled	Angled
Electrical connection, design	Angular		Angular, Round	Angular
Electrical connection, connection technology	Open end, Sub-D	Open end	AS-Interface, M12x1, A-coded to EN 61076-2-101	Open end, Sub-D
Electrical connection, number of pins/wires	10, 25, 26, 27, 36, 37, 44		2, 4	9, 10, 18, 25
Cable length	2.5 ... 10 m	100 m		1 ... 99 m
Description	• For multi-pin plug connection Sub-D • Connecting cable between valve terminal and controller • Variants in easy-to-clean design • With PVC or PUR cable • Pre-assembled at one end • Ambient temperature -5 ... +50 °C	• For AS-Interface • Reverse polarity protected • Contact using insulation displacement technology • No need to strip cable and wire insulation • Two different colours: yellow (preferred for the AS-Interface® network) and black (for auxiliary power supply)	• For AS-Interface • For any slaves such as individual valve interface, valve terminal with AS-Interface® connection • Reverse polarity protected	• For multi-pin plug connection Sub-D • Connecting cable between valve terminal and controller • Pre-assembled • With PVC or PUR cable • Ambient temperature -40 ... +70 °C
online: →	nebv	kasi	kasi-adr	kmp

Connecting cables >

Connecting cables for valve terminals

	Connecting cables KV-M12	**Connecting cables KMPV-SUB**	**Connecting cables KVI**	**Connecting cables VMPA-KMS1, VMPA-KMS2, VMPAL-KM, VMPAL-KMSK**
Electrical connection				Cable with plug
Electrical connection, connection type	Socket, Plugs	Socket, Cable	Socket, Plugs	Socket, Cable
Electrical connection, cable outlet	Straight	Straight	Straight, Angled	Angled
Electrical connection, design	Round	Angular	Round	Angular
Electrical connection, connection technology	M12x1, A-coded to EN 61076-2-101	Open end, Sub-D	M9x0.5	Open end, Sub-D
Electrical connection, number of pins/wires	5	15	5	10, 25
Cable length	1.5 ... 3.5 m	5 ... 10 m	0.25 ... 8 m	2.5 ... 10 m
Description	• Plug socket with cable for diagnostic interface (to CPX terminal) • Pre-assembled at both ends • With PUR cable • Ambient temperature -25 ... +70 °C	• For multi-pin plug connection Sub-D • Pre-assembled at one end • With PUR cable • Ambient temperature -20 ... +80 °C	• For fieldbus connection with thread M9x0.5 • Connecting cable between valve terminal and controller • Connecting cable between valve terminal and input/output modules • Connecting cable between controller and input/output modules • Pre-assembled at both ends • Suitable for use with energy chains • With PUR cable • Ambient temperature -20 ... +80 °C	• For multi-pin plug connection Sub-D • Connecting cable between valve terminal MPA and controller • Variants suitable for energy chains • Pre-assembled at one end • With PVC or PUR cable • Ambient temperature -40 ... +80 °C
online: →	**kv-m12**	**kmpv**	**kvi**	**vmpa-kms**

Connecting cables >

Connecting cables for sensors

	Connecting cables NEBB	**Connecting cables NEBS** ★	**Connecting cables NEBU** ★
Electrical connection, connection type	Socket, Cable	Socket, Cable, Plugs	Socket, Cable, Plugs
Electrical connection, cable outlet	Straight, Angled	Straight	Straight, Angled, Angled, can be aligned in increments of 15°
Electrical connection, design	Round	Angular, Round	Round
Electrical connection, connection technology	M12x1, A-coded to EN 61076-2-101, Open end, M8x1, A-coded, to EN 61076-2-104	Connection pattern L1J, M12x1, A-coded to EN 61076-2-101, Open end	G7/8 coded to NFPA/T3.5.29 R1-2007, M8x1, A-coded to EN 61076-2-104, M12x1, A-coded to EN 61076-2-101, Open end, M8x1, A-coded, to EN 61076-2-104
Electrical connection, number of pins/wires	3, 4, 5	4, 5, 12	3, 4, 5, 8
Cable length	2.5 ... 10 m	0.3 ... 15 m	0.1 ... 30 m
Description	• For thread M8x1 A-coded according to EN 61076-2-104 • For thread M12x1 A-coded according to EN 61076-2-101 • Pre-assembled at one end • With PVC cable • Ambient temperature -25 ... +70 °C	• For connection with rectangular design L1, grid dimension 5.8 mm • For thread M12x1 A-coded according to EN 61076-2-101 • For thread M16x0.75 • Connecting cable for pressure sensor SPAN • Degree of protection IP40, IP65, IP67, IP69K, when mounted • With PVC or PUR cable • Ambient temperature -40 ... +70 °C	• For thread M8x1 A-coded according to EN 61076-2-104 • For thread M12x1 A-coded according to EN 61076-2-101 • Pre-assembled at one or both ends • Designs for static, standard, energy chain and robot applications • Cable length 0.1 ... 30 m • With PVC or PUR cable • Ambient temperature -25 ... +80 °C
online: →	nebb	nebs	nebu

Connecting cables >

Connecting cables for sensors

	Connecting cables/plug sockets with cable SIM	**Connecting cables KM12**
Electrical connection, connection type	Socket, Cable	Socket, Plugs
Electrical connection, cable outlet	Straight, Angled	Straight
Electrical connection, design	Round	Round
Electrical connection, connection technology	M12x1, A-coded to EN 61076-2-101, Open end, M8 snap-locking A-coded to EN 61076-2-104	M12x1, A-coded to EN 61076-2-101
Electrical connection, number of pins/wires	3, 4, 8	8
Cable length	2 ... 25 m	2 m
Description	• For thread M8 grid locking A-coded according to EN 61076-2-104 • For thread M12x1 A-coded according to EN 61076-2-101 • Pre-assembled at one end • With PVC or PUR cable • Ambient temperature -25 ... +80 °C	• For thread M12x1 A-coded according to EN 61076-2-101 • With PUR cable • Ambient temperature -25 ... +80 °C
online: →	sim	km12

Plugs >

Universal plug connectors

	T-distributors NEDY	Cable sockets NEFU	Plugs, power supply sockets NECU, NECU-HX
Electrical connection		Angled socket, RJ45, 4-pin, Straight socket, M12x1, 4-pin, D-coded	Socket, sub-D, 9-pin, Straight socket, 7/8", 4-pin, IDC terminal, Straight socket, 7/8", 5-pin, Screw terminal, Screw terminal, can be screened, Straight socket, M12x1, 5-pin, B-coded, screenable, Straight plug connector, M12x1, 4-pin, D-coded, screenable, Straight plug connector, M12x1, 5-pin, B-coded, screenable, Sub-D plug, 9-pin, 3-pin, 4-pin, 7-pin, 8-pin, A-coded, Spring-loaded terminal, Straight plug/insulation displacement connector, Straight plug, Square design, M8x1, M12x1
Electrical connection, connection type	2x socket, 2x cable, Cable, Plugs		2x cable, Socket, Cable, Plugs
Electrical connection, design	Angular, Round		Angular, Round
Electrical connection, connection technology	Connection pattern ZB, self-tapping screw, Connection pattern ZC, self-tapping screw, Plug pattern ZC, metric screw, Connection pattern H, Plug pattern type A to EN 175301-803, Plug pattern type B to EN 175301-803, Plug pattern type B to industry standard, 11 mm, Plug pattern type C to EN 175301-803, Plug pattern type C to industry standard, 9.4 mm, M8x1, A-coded to EN 61076-2-104, M12x1, A-coded to EN 61076-2-101, M8x1, A-coded, to EN 61076-2-104, Open end		Connection pattern FC, Spring-loaded terminal, Connection pattern PP, coding on pins 2 and 5, M12x1, A-coded to EN 61076-2-101, Insulation displacement connector, Screw terminal, M8x1, A-coded, to EN 61076-2-104
Electrical connection, number of pins/wires	2, 3, 4, 5		4, 5, 40
Degree of protection	IP65, IP67, IP68, IP69K	IP20, IP65, IP67	IP20, IP40, IP65, IP67
Connection cross section			0.08 ... 2.5 mm²
Description	• Collecting signals between field devices (sensors) and double-assigned controller inputs • Distributing signals between double-assigned controller outputs and field devices (actuators, e.g. valves)	• Cable socket for branching the AS-Interface network at any required point • Reconnecting AS-Interface flat cable to 5-pin M12 socket • Reverse polarity protected	• Power supply socket for fieldbus connection • NECU-HX: reconnectable M8 and M12 round plug connector with Harax® quick connection technology for low-voltage applications • Plug and socket for power supply • Can be assembled with any cable lengths
online: →	nedy	nefu	necu

Plugs >

Universal plug connectors

	Push-in T-connectors NEDU	**Multi-pin plug distributors NEDU**	**Multi-pin plug distributors MPV-E/A**
Electrical connection	Straight socket, M12, 5-pin, A-coded, Straight socket, M12x1, 5-pin, A-coded, Straight plug connector, M12x1, 2-pin, A-coded, 4-pin/4-pin/4-pin, A-coded/A-coded/A-coded, Socket/socket/plug connector, M12x1/M12x1/M12x1	Straight socket, M8, 3-pin, Straight plug connector, M12x1, 8-pin	
Electrical connection, connection type			
Electrical connection, design			
Electrical connection, connection technology			
Electrical connection, number of pins/wires			
Degree of protection	IP65, IP67	IP68	IP65, In assembled state, To IEC 60529
Connection cross section			
Description	• For fieldbus interface • Branch line for connecting and disconnecting fieldbus components	• Particularly compact • LED switching status indication	• Mounting: H-rail mounting or via through-holes • LED switching status indication
online: →	**nedu**	**nedu**	**mpv**

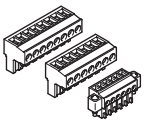
Plugs >

Universal plug connectors

	Plug connectors SEA	**Cable distributors ASI-KVT**	**Cable sockets ASI-SD**
Electrical connection	3-pin, 4-pin, 5-pin, Type A, Straight plug/ soldered connection, Straight plug connector/screw terminal, M8x1, M12x1, M12x1 Round plug connector		2-pin, 4-pin, Straight socket, Screw terminal
Electrical connection, connection type	Plugs		
Electrical connection, design	Round		
Electrical connection, connection technology	M12x1, A-coded to EN 61076-2-101, Screw terminal, M8x1, A-coded, to EN 61076-2-104	Insulation displacement technology	
Electrical connection, number of pins/wires	3, 4, 8		
Degree of protection	IP65, IP67	IP65	IP65, IP67
Connection cross section	0.14 ... 0.75 mm²	1.5 mm²	0.75 ... 1.5 mm²
Description	• Sensor plug for inputs/outputs • Can be assembled with any cable lengths	• Flat cable distributor for branching or for reconnecting AS-Interface flat cables • Reverse polarity protected	• For AS-Interface • Flat-cable socket for connecting AS-Interface stations to the AS-Interface bus system • M12 connection • Reverse polarity protected • Detachable connection
online: →	sea	asi-kvt	asi-sd

Plugs >

Plug connectors for control systems

	 Assortments of plugs NEKM ★	Plug connectors NECC	Plug connectors PS1-SAC, PS1-ZC
Electrical connection		9-pin/9-pin, Sub-D/screw terminal	10-pin/30-pin, Socket/terminal strip
Electrical connection, connection type		Socket	
Electrical connection, design		Angular	
Electrical connection, connection technology	Screw connector	Spring-loaded terminal, Connection pattern L8	
Electrical connection, number of pins/wires	2 ... 9	5	
Degree of protection		IP20, IP40	
Connection cross section			0.08 ... 0.75 mm²
Description	• For motor controllers CMMS-ST, CMMP-AS • For servo drive CMMT-AS	• Encoder plug for motor controller CMMS-ST • For controllers CECC • 2-pin, 4-pin, 6-pin, 8-pin, 11-pin, 18-pin	• For power supply • Cable connection using clamping technology • Individually or as a set
online: →	nekm	necc	ps1

Plugs >

Plug connectors for control systems

	Plug, adapter, manifold block NEFC	Plug socket NEFF
Electrical connection	5-pin, Plugs, M12x1	
Electrical connection, connection type	Socket, Plugs	
Electrical connection, design	Round	
Electrical connection, connection technology	M12x1, A-coded to EN 61076-2-101	
Electrical connection, number of pins/wires	5, 8	
Degree of protection	IP20, IP65, IP67	IP40
Connection cross section		
Description	• Adapter, 5-pin M12, for mini USB socket with controller software for CPX terminal • Adapter for rotary drive unit ERMS which forms a connection between the motor and IO-Link master • Plug and manifold block for motor controller CMMO-ST to form a connection from the I/O interface to the controller	• For operation of an interlock-capable valve terminal interface in pure I-Port mode
online: →	nefc	neff

Plugs >

Plugs for motors

	 Adapter **NEFM**
Electrical connection 1, connection type	Socket, Plugs
Electrical connection, design	Angular
Electrical connection, connection technology	Connection pattern RE, RJ45, Sub-D
Electrical connection, number of pins/wires	6, 8, 9
Degree of protection	IP20
Description	• Pre-assembled • For the encoder connection of the servo motor EMMB to the servo drive CMMT-AS • With PVC cable • Ambient temperature -40 ... +80 °C
online: →	**nefm**

Plugs >

Plug connectors for valves

	Plug sockets MSSD ★	**Electrical plug-in base, adapter NEFV**	**Soldering bases PCBC**	**Multi-pin plug sockets NECA**
Electrical connection	3-pin, 4-pin, Socket, Angled socket, Type A, Type B, Type C, To DIN EN 175301-803, To DIN EN 61984, Square design, Square design MSC, Square design MSEB, Square design MSF, Square design MSN1, Square design MSN2, Square design MSV		2-pin	
Electrical connection, connection type	Socket	Socket, 4x plug connectors		
Electrical connection, design	Angular	Angular, Round		
Electrical connection, connection technology	Plug pattern type A to EN 175301-803, Plug pattern type B to industry standard, 11 mm, Screw terminal	M12x1, A-coded to EN 61076-2-101, ZIF		
Electrical connection, number of pins/wires	3	5, 8, 12		
Connection cross section	0.25 ... 1.5 mm²			0.34 ... 1 mm²
Degree of protection	IP50, IP65, IP67, To IEC 60529	IP40, IP65, IP67	IP40	IP65, To IEC 60529
Description	• For valves with F, D, N1, V, E, EB, N2, Y, Z, ZB, ZC, MD-2 and MH-2 solenoid coils • For connecting individual valves • Available with LED display	• Adapter for connecting the piezo valves to the electronics module VAVE-P12	• For mounting miniature valves MHA1 and MHP1 on a PCB with plug connection underneath (-PI)	• For soft-start/quick exhaust valves MS6-SV, MS series • Electrical connection via 9-pin Sub-D, 9-pin screw terminal
online: →	**mssd**	**nefv**	**pcbc**	**neca**

Plugs >

Plug connectors for valves

	Time delay inserts MFZ	Illuminating seals MC-LD, ME-LD, MEB-LD, MF-LD, MV-LD	Indicating inserts MCL, MFL, MFLZ
Electrical connection		Type A, Type B, Type C, To DIN EN 175301-803, Square design MSC, Square design MSE, Square design MSEB, Square design MSF, Square design MSV	Type A, Type B, Plugs, To DIN EN 175301-803, To industry standard (11 mm)
Electrical connection, connection type	for connector socket or device plug		
Electrical connection, design	Design F		
Electrical connection, connection technology			
Electrical connection, number of pins/wires			
Connection cross section			
Degree of protection	IP64	IP65	IP65, To IEC 60529
Description	• Electronic timer with adjustable delay time of between 0 ... 10 s • For mounting between the solenoid coil and connector socket or device plug	• The seal lights up yellow when the power is switched on • For mounting between the solenoid coil and connector socket or device plug • For F, D, N1, V, E and EB solenoid coils	• Variant with integrated protective circuit • For mounting between the solenoid coil and connector socket or device plug • With yellow LED display
online: →	mfz	mc-ld	mcl

Plugs >

Plug connectors for valve terminals

	NEW Cable plug connectors NECL	Plug sockets FBSD-GD, FBSD-WD	Plug sockets NTSD-GD, NTSD-WD	T adapter FB-TA
Electrical connection		4-pin, 5-pin, 5-pin/5-pin, Straight socket/screw terminal, Angled socket/screw terminal, Type A, M12x1	4-pin, 5-pin, Straight socket, Angled socket, Screw terminal, Straight plug connector/screw terminal	5-pin, M12x1/M12x1, Plug connectors/sockets
Fieldbus interface				
Degree of protection	IP65, IP67	IP20, IP67	IP67	IP67
Connection cross section		0.2 ... 2.5 mm²	0.75 ... 2.5 mm²	
Description	• Power supply socket, power supply plug • Straight or angled design • For thread M12x1, L-coded to EN 61076-2-111 • For cable diameter 8 ... 13 mm	• For fieldbus interface • Straight or angled design	• Straight or angled design • For power supply	• Branch line for connecting and disconnecting fieldbus components • For fieldbus connection with thread M12x1 A-coded according to EN 61076-2-101 • Cable length 150 mm
online: →	necl	fbs	ntsd	fb-ta

Plugs >

Plug connectors for valve terminals

	Bus connections FBA-1, FBA-2	**Plug connectors FBS-SUB, FBS-SCRJ, FBS-M12**	**Plug connectors FBS-RJ45**	**Bus connections FBSD-KL**
Electrical connection	9-pin/5-pin, Straight socket/ straight plug connector, Straight socket/plug connector and socket, Sub-D/-, Sub-D/M12x1	5-pin, Type A, Straight plug connector/screw terminal, M12x1	RJ45 connection	5-pin/5-pin, Angled socket/ screw terminal
Fieldbus interface	Socket and plug, M12x1, 5-pin, B-coded	1x 5 spring-loaded terminals, 1x 9 spring-loaded terminals, 2x 2 spring-loaded terminals, 2x 4 spring-loaded terminals, 2x 5 spring-loaded terminals		
Degree of protection	IP40, IP65, To IEC 60529	IP65, IP67, In assembled state, To IEC 60529	IP65, IP67, To IEC 60529	IP20
Connection cross section		0.75 mm²		0.2 ... 2.5 mm²
Description	• 9-pin Sub-D plug on M12 or screw terminal for CANopen and DeviceNet® • 9-pin Sub-D socket on M12 for PROFIBUS and CC-LINK®	• Variants for different fieldbus systems • Position of DIL switches can be read externally • Easy assembly	• Ethernet plug with 8-pin RJ45 connection • High transmission quality • Detachable connection	• 5-pin angled socket, 5-pin screw terminal
online: →	fba	fbs-sub	fbs-rj	fbsd-kl

Plugs >

Plug connectors for valve terminals

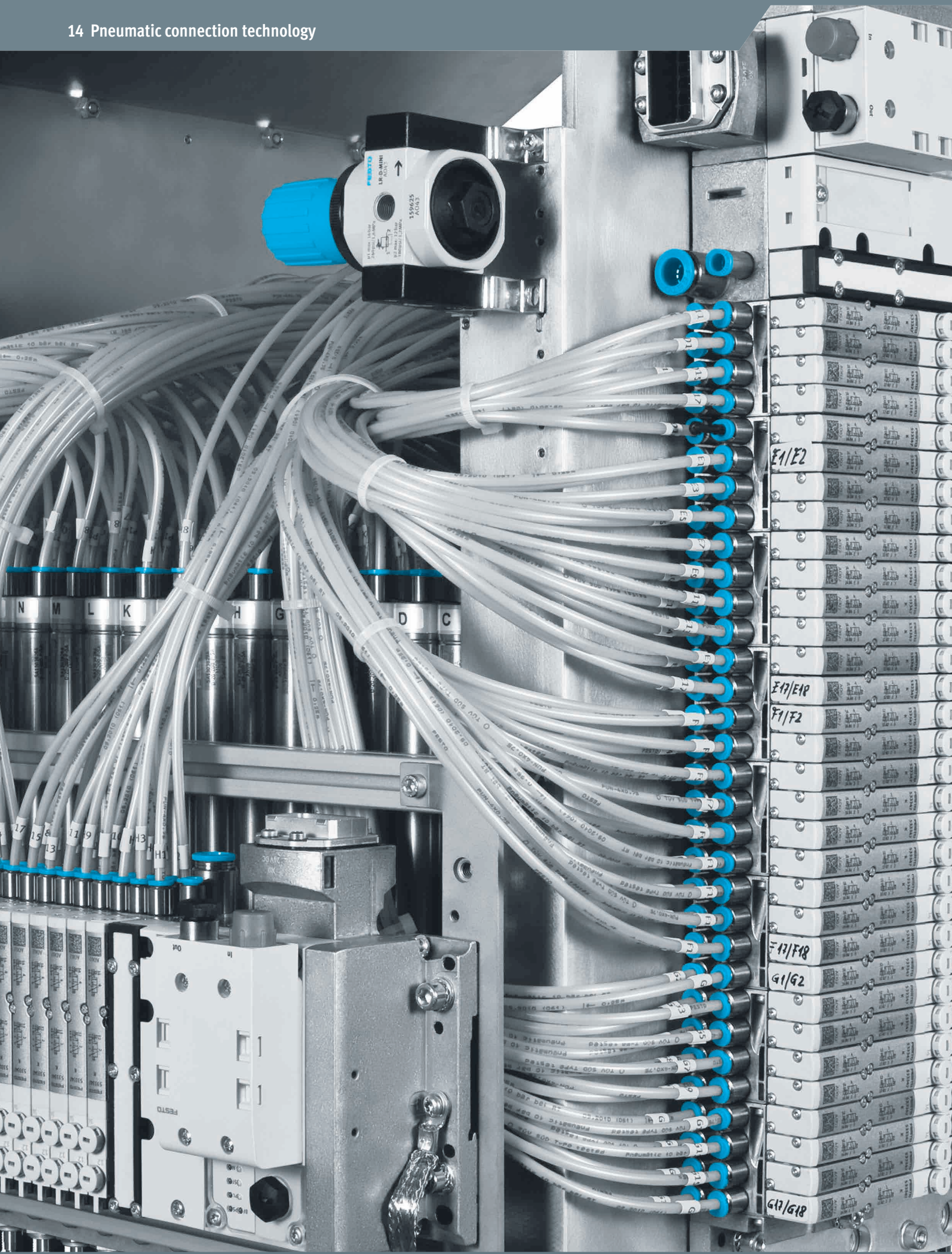
	Sensor sockets, angled plug sockets SIE-GD, SIE-WD	**Cover caps ISK**	**Plug connectors FBS-SUB-9-WS**	**Plug sockets, plug connectors SD-SUB**
Electrical connection	4-pin, Straight socket/screw terminal, Angled socket/screw terminal, M12x1		Plug, Straight, Type A, M12x1, screw terminal	25-pin, Plugs, Sub-D
Fieldbus interface				
Degree of protection	IP67	IP65	IP40	IP65
Connection cross section	0.25 ... 0.75 mm²			
Description	• For customised fabrication of cables • Pin adapter for fieldbus interface • With screw terminals • Straight or angled design	• For sealing unused ports/ openings • Thread M8, M12	• Plug connector for CAN bus and PROFIBUS bus connection • Cable connection 2x horizontal or 2x vertical • PCB terminal block with screw connector	• Plug socket for multi-pin plug connection • Plug for inputs/outputs • Can be assembled with any cable lengths
online: →	sie-gd	isk	fbs-sub-9-ws	sd-sub

Plugs >

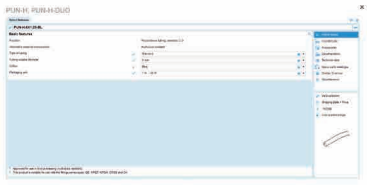
Plug connectors for sensors

	Angled plug sockets PEV-...-WD	**Plug sockets SD-4-WD**
Electrical connection	4-pin, Angled socket	Plug, Sub-D, 4-pin
Degree of protection	IP65	IP65, To IEC 60529
Description	• For pressure switch PEV • 15 ... 30, 180 V DC, 230 V AC • Available with LED display • Angled design	• For swivel module DSMI • Angled design
online: →	pev*wd	sd-4-wd

Product overview

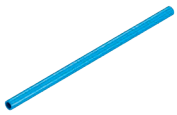

FESTO
LR-D-MINI
1509625
A043
E1/E2
E17/E18
F1/F2
F17/F18
G1/G2
G17/G18
N M L K H G D C
H3
H1
In
Out
FESTO

Software tools

Calculating the media resistance		Which Festo tubing is resistant to benzene? Can elastomers withstand contact with glycol? Which type of stainless steel can be used in acetic acid? You can find the answer to these and many other questions about media resistance right here. You can search for chemical reactions from A to Z. You can filter the media either by name or chemical formula and/or select the material in question. This tool can be found at www.festo.com/x/media-resistance
Configurator for tubing		Design a product with numerous features reliably and quickly with the help of the configurator. Select all the required product features step-by-step. The use of logic checks ensures that only correct configurations are available for selection. You will find the configurator for your desired product • at www.festo.com/catalogue/tubing • Select your desired product • Click on the blue “Configure product” button
Festo Design Tool 3D		The Festo Design Tool 3D is a 3D product configurator for generating specific CAD product combinations from Festo. The configurator makes your search for the right accessory easier, more reliable and faster. You can then order the module that has been created as a single order item, either completely pre-assembled or as individual parts in a single box. This considerably reduces your bill of materials, and downstream processes such as product ordering, order picking and assembly are significantly simplified. This tool can be found at ➔ **www.festo.com/x/festo-design-tool**

Pneumatic tubing >

Standard O.D. pneumatic tubing

	Plastic tubing PUN-H, PUN-H-DUO ★	NEW Plastic tubing PUN-H-SF	 Plastic tubing PUN-H-F	Plastic tubing PUN, PUN-DUO
Outside diameter	2 ... 16 mm	4 ... 25 mm	4 ... 16 mm	3 ... 16 mm
Inside diameter	1.2 ... 11 mm	2.3 ... 15.3 mm	2.6 ... 11 mm	2.1 ... 11 mm
Temperature-dependent operating pressure [MPa]	-0.095 ... 1 MPa	-0.095 ... 1.3 MPa	-0.095 ... 1 MPa	-0.095 ... 1 MPa
Temperature-dependent operating pressure	-0.95 ... 10 bar	-0.95 ... 13 bar	-0.95 ... 10 bar	-0.95 ... 10 bar
Temperature-dependent operating pressure [psi]	-13.775 ... 145 psi	-13.775 ... 188.5 psi	-13.775 ... 145 psi	-13.775 ... 145 psi
Ambient temperature	-35 ... 60°C	-35 ... 80°C	-35 ... 60°C	-35 ... 60°C
Description	• Polyurethane • High resistance to microbes and hydrolysis • Suitable for use with energy chains • Clean room-compatible combination with fitting NPKA • Also available as DUO plastic tubing • Operating media compressed air, vacuum, water. Water as per the manufacturer's declaration, see www.festo.com/certificates/PUN_H	• Polyurethane • Very resistant to kinking and extremely sturdy thanks to increased wall thickness • Maximum flexibility despite increased wall thickness • High resistance to microbes and hydrolysis • Suitable for use with energy chains • Operating medium: compressed air, vacuum, water	• Polyurethane • High resistance to microbes and hydrolysis • For food safety certificates, see www.festo.com/certificates/PUN_H_F • Clean room-compatible combination with fitting NPKA • Operating medium: compressed air, vacuum, water	• Polyurethane • High resistance to stress cracks • Suitable for use with energy chains • Also available as DUO plastic tubing • Operating medium: compressed air, vacuum
online: →	pun-h	pun-h-sf	pun-h-f	pun

Pneumatic tubing >

Standard O.D. pneumatic tubing

	Plastic tubing PTFEN	**Plastic tubing PUN-CM**	**Plastic tubing PUN-V0**	**Plastic tubing PEN**
Outside diameter	4 ... 16 mm	4 ... 12 mm	4 ... 16 mm	4 ... 16 mm
Inside diameter	2.9 ... 11 mm	2.5 ... 8 mm	2 ... 11.8 mm	2.7 ... 10.8 mm
Temperature-dependent operating pressure [MPa]	-0.095 ... 1.5 MPa	-0.095 ... 1 MPa	-0.095 ... 3 MPa	-0.095 ... 1 MPa
Temperature-dependent operating pressure	-0.95 ... 15 bar	-0.95 ... 10 bar	-0.95 ... 30 bar	-0.95 ... 10 bar
Temperature-dependent operating pressure [psi]	-13.775 ... 217.5 psi	-13.775 ... 145 psi	-13.775 ... 435 psi	-13.775 ... 145 psi
Ambient temperature	-20 ... 150°C	-35 ... 60°C	-35 ... 60°C	-30 ... 60°C
Description	• Polytetrafluoroethylene • Food grade see www.festo.com/certificates/PTFEN • High resistance to chemicals • High temperature resistance • Operating medium: compressed air, vacuum	• Polyurethane • Plastic tubing, antistatic, electrically conductive • Suitable for use with energy chains • Operating medium: compressed air, vacuum	• Polyurethane • Flame retardant to UL 94 V0 ... V2 • For use in the immediate vicinity of welding applications • High resistance to microbes and hydrolysis • Suitable for use with energy chains • Operating medium: compressed air, vacuum, water	• Polyethylene • High resistance to chemicals and very high resistance to hydrolysis • Resistant to most cleaning agents and lubricants • Suitable for use with energy chains • Operating media compressed air, vacuum, water. Water as per the manufacturer's declaration, see www.festo.com/certificates/PEN_S
online: →	ptfen	pun-cm	pun-v0	pen

Standard O.D. pneumatic tubing

	Plastic tubing PAN	**Customised tubing PAN, PEN, PLN, PUN**	**Plastic tubing PAN-MF**	**Heavy-duty tubing PAN-R**
Outside diameter	4 ... 16 mm	3 ... 16 mm	4 ... 16 mm	4 ... 28 mm
Inside diameter	2.9 ... 12 mm	2 ... 12 mm	2.5 ... 12 mm	2.5 ... 23 mm
Temperature-dependent operating pressure [MPa]	-0.095 ... 1.9 MPa		-0.095 ... 3.1 MPa	-0.095 ... 3.5 MPa
Temperature-dependent operating pressure	-0.95 ... 19 bar	-0.95 ... 35 bar	-0.95 ... 31 bar	-0.95 ... 35 bar
Temperature-dependent operating pressure [psi]	-13.775 ... 275.5 psi		-13.775 ... 449.5 psi	-13.775 ... 507.5 psi
Ambient temperature	-30 ... 80°C	-60 ... 100°C	-60 ... 100°C	-30 ... 80°C
Description	• Polyamide • High thermal and mechanical load capacities • Highly resistant to microbes • Operating medium: compressed air, vacuum	• Individual lengths: delivered in units of 25, 50, 100, 200 ... 500 m • Minimum quantity: 3000 m • Individual design: labelled with your company name and/or your part number • Easy to recognise and handle: individual colour selection • Choose from 9 basic colours; further colours available on request • Select, size and order quickly, easily and reliably with the configurator	• Polyamide • High thermal and mechanical load capacities • Meets the requirements to DIN 73378 “Polyamide tubing for use in motor vehicles” • Operating media: compressed air, mineral oil	• Polyamide • For applications with high pressure ranges • Highly resistant to microbes • Operating medium: compressed air, vacuum
online: →	pan	pan	pan-mf	pan-r

Pneumatic tubing >

Standard O.D. pneumatic tubing

	Plastic tubing PAN-V0	**Plastic tubing PLN**	**Plastic tubing PFAN**
Outside diameter	6 ... 14 mm	4 ... 16 mm	3 ... 12 mm
Inside diameter	2.5 ... 9 mm	2.9 ... 12 mm	2.3 ... 8.4 mm
Temperature-dependent operating pressure [MPa]	-0.095 ... 1.2 MPa	-0.095 ... 1.4 MPa	-0.095 ... 1.6 MPa
Temperature-dependent operating pressure	-0.95 ... 12 bar	-0.95 ... 14 bar	-0.95 ... 16 bar
Temperature-dependent operating pressure [psi]	-13.775 ... 174 psi	-13.775 ... 203 psi	-13.775 ... 232 psi
Ambient temperature	-30 ... 90°C	-30 ... 80°C	-20 ... 150°C
Description	• Polyvinyl chloride, polyamide • Flame retardant according to UL 94 V0 • High resistance to microbes and UV radiation • Double-sheath tubing • Operating medium: compressed air, vacuum, water, mineral oil • Resistant to welding spatter	• Polyethylene • High resistance to chemicals, microbes and hydrolysis • Food grade see www.festo.com/certificates/PLN • Resistant to most cleaning agents and lubricants • Operating media compressed air, vacuum, water. Water as per the manufacturer's declaration, see www.festo.com/certificates/PLN	• Perfluoroalkoxy alkane • Pneumatic tubing with resistance to high temperatures and chemicals • Food grade see www.festo.com/certificates/PFAN • High resistance to chemicals, microbes, UV radiation, hydrolysis and stress cracks • Operating media compressed air, vacuum, water. Water as per the manufacturer's declaration, see www.festo.com/certificates/PFAN
online: →	pan-v0	pln	pfan

Pneumatic tubing >

Standard I.D. tubing

	Plastic tubing PU
Outside diameter	11.6 ... 17.6 mm
Inside diameter	9 ... 13 mm
Operating pressure for entire temperature range	-0.95 ... 10 bar
Ambient temperature	-35 ... 60°C
Description	• Polyurethane with fabric • High resistance to abrasion and kinks • Operating media: compressed air, vacuum (PU-13)
online: →	pu

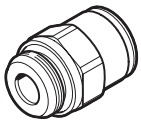
Pneumatic tubing >

Spiral tubing

	Spiral plastic tubing PUN-S, PUN-S-DUO	Spiral plastic tubing PUN-SG	Spiral plastic tubing PPS
Outside diameter	4 ... 12 mm	9.5 ... 11.7 mm	6.3 ... 7.8 mm
Inside diameter	2.6 ... 8 mm	6.4 ... 7.9 mm	4.7 ... 6.2 mm
Working length	0.5 ... 6 m	2.4 ... 6 m	7.5 ... 15 m
Temperature-dependent operating pressure	-0.95 ... 10 bar	-0.95 ... 15 bar	-0.95 ... 21.2 bar
Ambient temperature	-35 ... 60°C	-40 ... 60°C	-30 ... 80°C
Description	• Polyurethane • Also available as DUO plastic tubing • Operating medium: compressed air, vacuum • High resistance to UV radiation and stress cracks	• Polyurethane, nickel-plated brass, polyacetal • Pre-assembled with captive rotatable fittings • High resistance to microbes and hydrolysis • Operating medium: compressed air, vacuum	• Polyamide, brass, galvanised steel • Pre-assembled with 2 rotatable connectors and captive sealing rings OL • Highly resistant to microbes • Operating medium: compressed air, vacuum
online: →	pun-s	pun-sg	pps

Pneumatic fittings >

Pneumatics push-in fittings

	Push-in fittings/connectors, mini series QSM ★	**Push-in fittings/connectors, standard series QS** ★	**Push-in fittings/connectors NPQH**	 **Push-in fittings/connectors NPQE-F1A**
Pneumatic connection 1	Male thread M8x1.25, Push-in sleeve Ø 2 mm, Push-in sleeve Ø 3 mm, Push-in sleeve Ø 4 mm, Push-in sleeve Ø 6 mm, Female thread M3, M5, For tubing O.D. 2 mm, 3 mm, 4 mm, 6 mm, Male thread G1/8, M3, M5, M6, M6x0.75, M7, M8x0.75, R1/8	Push-in sleeve Ø 4 mm, Push-in sleeve Ø 6 mm, Push-in sleeve Ø 8 mm, Push-in sleeve Ø 10 mm, Push-in sleeve Ø 12 mm, Push-in sleeve Ø 16 mm, Female thread G1/2, G1/4, G1/8, G3/8, For tubing O.D. 10 mm, 12 mm, 16 mm, 4 mm, 6 mm, 8 mm, Male thread G1/2, G1/4, G1/8, G3/4, G3/8, M5, R1/2, R1/4, R1/8, R3/8	Push-in sleeve Ø 4 mm, Push-in sleeve Ø 6 mm, Push-in sleeve Ø 8 mm, Push-in sleeve Ø 10 mm, Push-in sleeve Ø 12 mm, Push-in sleeve Ø 14 mm, Female thread G1/4, G1/8, For tubing O.D. 10 mm, 12 mm, 14 mm, 4 mm, 6 mm, 8 mm, Male thread G1/2, G1/4, G1/8, G3/8, M5, M7	For tubing O.D. 10 mm, 12 mm, 4 mm, 6 mm, 8 mm, Male thread G1/4, G1/8, M3, M5, M7, R1/4, R1/8
Pneumatic connection 2	For tubing O.D. 2 mm, 3 mm, 4 mm, 6 mm	Push-in sleeve Ø 4 mm, Push-in sleeve Ø 6 mm, Push-in sleeve Ø 8 mm, Push-in sleeve Ø 10 mm, Push-in sleeve Ø 12 mm, Push-in sleeve Ø 16 mm, Female thread G1/2, G1/4, G1/8, G3/8, For tubing O.D. 10 mm, 12 mm, 16 mm, 22 mm, 4 mm, 6 mm, 8 mm	Push-in sleeve Ø 4 mm, Push-in sleeve Ø 6 mm, Push-in sleeve Ø 8 mm, Push-in sleeve Ø 10 mm, Push-in sleeve Ø 12 mm, Push-in sleeve Ø 14 mm, For tubing O.D. 10 mm, 12 mm, 14 mm, 4 mm, 6 mm, 8 mm	For tubing O.D. 10 mm, 12 mm, 4 mm, 6 mm, 8 mm
Design type	Blanking plug, L-shape, L-shape, long, T-shape, additional push-in connector, lengthwise, Bulkhead, T-shape, X-shape, Y-shape, Straight design, Straight design, round releasing ring	45° angle, 45° angle, long, Blanking plug, L-shape, L-shape, 2-way, parallel, L-shape, long, L-shape, additional connection, female thread, lengthwise, T-shape, additional push-in connector, lengthwise, Bulkhead, T-shape, X-shape, Y-shape, Straight design	Blanking plug, L-shape, L-shape, long, Bulkhead, T-shape, Plug screw, Y-shape, Straight design	L-shape, T-shape, Y-shape, Straight design
Temperature-dependent operating pressure	-0.95 ... 14 bar	-0.95 ... 14 bar		
Operating pressure for entire temperature range	-0.95 ... 6 bar	-0.95 ... 14 bar	-0.95 ... 20 bar	-0.95 ... 8 bar
Ambient temperature	-10 ... 80°C	-20 ... 80°C	0 ... 150°C	-5 ... 60°C
Description	• Mini series • Compact for maximum component density in confined installation spaces • PBT and nickel-plated brass • Operating medium: compressed air, vacuum • Straight shape, L-shape, T-shape, X-shape, Y-shape, push-in bulkhead connector	• Standard series • Wide range of variants: wide selection for maximum flexibility in standard applications • PBT and nickel-plated brass • Operating media compressed air, vacuum, water. Water as per the manufacturer's declaration, see www.festo.com/certificates/QS • Straight shape, L-shape, T-shape, at 45° angle, X-shape, Y-shape, push-in bulkhead connector	• Solid-metal brass, chemically nickel-plated • High corrosion and chemical resistance • Highly resistant to temperatures and pressure • Food grade see www.festo.com/certificates/NPQH • Operating media compressed air, vacuum, water. Water as per the manufacturer's declaration, see www.festo.com/certificates/NPQH • Straight shape, L-shape, T-shape, Y-shape, push-in bulkhead connector	• Economical push-in fittings for pneumatic applications • Recommended for production systems for manufacturing lithium-ion batteries • Tapered thread in accordance with JIS B0203 and compatible with pressure-tight media to DIN EN 10226 • Operating medium: compressed air, vacuum • Straight shape, T-shape, L-shape, Y-shape
online: →	qsm	qs	npqh	npqe

Pneumatic fittings >

Pneumatics push-in fittings

	Push-in fittings/connectors NPQR	**Push-in fittings/connectors, metal, standard series NPQM**	**Push-in fittings/connectors, resistant to media NPQP**	**Cartridges, polymer, black QSPK**
Pneumatic connection 1	For tubing O.D. 10 mm, 12 mm, 14 mm, 16 mm, 4 mm, 6 mm, 8 mm, Male thread G1/2, G1/4, G1/8, G3/8, M5, M7	Push-in sleeve Ø 4 mm, Push-in sleeve Ø 6 mm, Push-in sleeve Ø 8 mm, Push-in sleeve Ø 10 mm, Push-in sleeve Ø 12 mm, Push-in sleeve Ø 14 mm, Female thread G1/4, G1/8, For tubing O.D. 10 mm, 12 mm, 14 mm, 4 mm, 6 mm, 8 mm, Male thread G1/2, G1/4, G1/8, G3/8, M5, M7, Push-in sleeve QS-10, QS-12, QS-8	Push-in sleeve Ø 4 mm, Push-in sleeve Ø 6 mm, Push-in sleeve Ø 8 mm, Push-in sleeve Ø 10 mm, Push-in sleeve Ø 12 mm, For tubing O.D. 10 mm, 12 mm, 4 mm, 6 mm, 8 mm, Male thread R1/2, R1/4, R1/8, R3/8	Cartridge 10 mm, 18 mm
Pneumatic connection 2	For tubing O.D. 10 mm, 12 mm, 14 mm, 16 mm, 4 mm, 6 mm, 8 mm	For tubing O.D. 10 mm, 12 mm, 14 mm, 3 mm, 4 mm, 6 mm, 8 mm, Push-in sleeve QS-10, QS-12, QS-14, QS-4, QS-6, QS-8	For tubing O.D. 10 mm, 12 mm, 4 mm, 6 mm, 8 mm	For tubing O.D. 10 mm, 3 mm, 4 mm, 6 mm, 8 mm
Design type	L-shape, Bulkhead, T-shape, Plug screw, Y-shape, Straight design	L-shape, L-shape, 2-way, F-outlet, Bulkhead, T-shape, Y-shape, Straight design	Blanking plug, L-shape, T-shape, additional push-in connector, lengthwise, Bulkhead, T-shape, Y-shape, Straight design	L-shape, L-shape, long, Straight design
Temperature-dependent operating pressure			-0.95 ... 10 bar	
Operating pressure for entire temperature range	-0.95 ... 16 bar	-0.95 ... 16 bar		-0.95 ... 10 bar
Ambient temperature	-20 ... 150°C	-20 ... 70°C	-20 ... 60°C	-5 ... 60°C
Description	• Very easy to clean thanks to chamfered O-ring and fewer edges where dirt can accumulate • Optimal price/performance ratio, perfect for applications from a single source • Maximum corrosion resistance (corrosion resistance class CRC 4 to Festo standard 940 070) and chemical resistance • High temperature resistance • Stainless steel • Operating media: compressed air, vacuum, (water) • Straight shape, L-shape, T-shape, Y-shape, push-in bulkhead connector	• Solid-metal brass, nickel-plated • Attractively priced metal push-in fitting • Sturdy • Operating medium: compressed air, vacuum • Straight shape, L-shape, T-shape, Y-shape, push-in bulkhead connector	• Polypropylene • Low-cost alternative to stainless steel: resistant to most cleaning agents in combination with tubing PLN • For use with extreme media influences • Food grade see www.festo.com/certificates/NPQP • Operating medium: compressed air, vacuum • Straight shape, L-shape, T-shape, Y-shape, push-in bulkhead connector	• Compact installation space • Threadless mounting • Straight shape, L-shape
online: →	npqr	npqm	npqp	qsp

Pneumatic fittings >

Pneumatics push-in fittings

	Cartridges QSPK, NPT	**Cartridges, polymer, grey QSPKG**	**Cartridges QSPKG, NPT**	**Push-in fittings, resistant to welding spatter QS-V0**
Pneumatic connection 1	Cartridge 18 mm	Cartridge 10 mm, 14 mm, 18 mm, 20 mm	Cartridge 10 mm, 14 mm, 18 mm, 20 mm	For tubing O.D. 10 mm, 12 mm, 4 mm, 6 mm, 8 mm, Male thread G1/2, G1/4, G1/8, G3/8, R1/2, R1/4, R1/8, R3/8
Pneumatic connection 2	For tubing O.D. 3/8 in “	For tubing O.D. 10 mm, 12 mm, 3 mm, 4 mm, 6 mm, 8 mm	For tubing O.D. 1/2 in “, 1/4 in “, 1/8 in “, 3/8 in “, 5/16 in “, 5/32 in “	For tubing O.D. 10 mm, 12 mm, 4 mm, 6 mm, 8 mm
Design type	L-shape	L-shape, L-shape, long, Straight design	L-shape, L-shape, long, Straight design	L-shape, T-shape, Straight design
Temperature-dependent operating pressure				
Operating pressure for entire temperature range	-0.95 ... 10 bar	-0.95 ... 10 bar	-0.95 ... 10 bar	-0.95 ... 10 bar
Ambient temperature	-5 ... 60°C	-5 ... 60°C	-5 ... 60°C	0 ... 60°C
Description	• Compact installation space • Threadless mounting • Straight shape, L-shape	• Compact installation space • Threadless mounting • Straight shape, L-shape	• Compact installation space • Threadless mounting • Straight shape, L-shape	• PBT, reinforced • Resistant to welding spatter • For use in all areas where there is a risk of fire • Reliable even for applications in close proximity to welding spatter • Operating medium: compressed air, vacuum, water • Straight design, L-shaped, T-shaped
online: →	qsp	qsp	qsp	qs-v0

Pneumatic fittings >

Pneumatics push-in fittings

	Self-sealing push-in fittings/ connectors QSK	**Push-in fittings, rotatable QSR**	**Push-in fittings CQA**	**Cartridges QSP**
Pneumatic connection 1	For tubing O.D. 10 mm, 12 mm, 4 mm, 6 mm, 8 mm, Male thread G1/2, G1/4, G1/8, G3/8, M5, R1/2, R1/4, R1/8, R3/8	Male thread G1/2, G1/4, G1/8, G3/8, M5, R1/2, R1/4, R1/8, R3/8	For pipe and tubing O.D. 22 mm, Push-in sleeve CQ-28	Cartridge 10 mm, 14 mm, 17 mm
Pneumatic connection 2	For tubing O.D. 10 mm, 12 mm, 4 mm, 6 mm, 8 mm	For tubing O.D. 10 mm, 12 mm, 4 mm, 6 mm, 8 mm	For pipe and tubing O.D. 22 mm, Push-in sleeve CQ-28	Male thread G1/8, For tubing O.D. 4 mm, 6 mm
Design type	L-shape, Bulkhead, Straight design	L-shape, Straight design		Straight design
Temperature-dependent operating pressure	-0.95 ... 14 bar	-0.95 ... 14 bar	-0.95 ... 15 bar	
Operating pressure for entire temperature range	-0.95 ... 6 bar	-0.95 ... 6 bar	-0.95 ... 7 bar	-0.95 ... 10 bar
Ambient temperature	-10 ... 80°C	0 ... 60°C	-25 ... 70°C	-10 ... 60°C
Description	• Standard series • Self-sealing push-in fitting blocks the air flow after the tubing is disconnected • PBT and nickel-plated brass • Operating medium: compressed air, vacuum • Straight shape, L-shape, push-in bulkhead connector	• Push-in fitting, rotatable with swivel connection, rotatable by 360° with max. 500 rpm • Compact installation space • Straight shape, L-shape	• Assembling and disassembling without tools • For pipes PQ-PA, PQ-AL and tubing PAN and PUN • Sturdy, air-tight connection • Straight design, T-shape	• Plug-in cartridges • PBT and nickel-plated brass • Operating medium: compressed air, vacuum • Straight shape
online: →	qsk	qsr	cq	qsp

Pneumatic fittings >

Barbed fittings

	Quick connectors NPCK	**Barbed fittings CN, CRCN, FCN, L-PK, LCN, LCNH, N, RTU, SCN, T-PK, TCN, Y-PK**	**Barbed hose fittings C-P, N-P, N-MS**	**Quick connectors ACK, CK, CV, FCK, GCK, LCK, QCK, SCK, TCK**
Nominal size	2 ... 6.2 mm	1.3 ... 5.3 mm	4 ... 16.5 mm	2 ... 12 mm
Pneumatic connection 1	Male thread G1/4, G1/8, G3/8, M5	For tubing O.D. 3 mm, 4 mm, 6 mm, 8 mm, Male thread G1/4, G1/8, G3/8, M3, M5	Male thread R1, Male thread 3/4 NPT, Male thread 1 NPT, Female thread G1/2, G1/4, G1/8, G3/8, Male thread G1/2, G1/4, G1/8, G3/4, G3/8	Female thread G1/2, G1/4, G1/8, G3/8, M5, For barbed connector I.D. 3 mm Via union nut, 4 mm Via union nut, 6 mm Via union nut, 9 mm Via union nut, For tubing O.D. 4 mm, 6 mm, 8 mm, Male thread G1/2, G1/4, G1/8, G3/8, M5, R1/4, R1/8, R3/8
Pneumatic connection 2	For tubing O.D. 10 mm, 4 mm, 6 mm, 8 mm	For tubing O.D. 3 mm, 4 mm, 6 mm, 8 mm	For tubing I.D. 6 mm, For tubing I.D. 19 mm, For tubing I.D. 13 mm, 9 mm, For tubing O.D. 8 mm	For barbed connector I.D. 13 mm Via union nut, 3 mm Via union nut, 4 mm Via union nut, 6 mm Via union nut, 9 mm Via union nut, For tubing O.D. 4 mm, 6 mm, 8 mm
Design type	Straight design	Straight design	Straight design	L-shape, Bulkhead, T-shape, Straight design
Operating pressure for entire temperature range	-0.95 ... 12 bar	-0.95 ... 10 bar	-0.95 ... 16 bar	-0.95 ... 10 bar
Ambient temperature	-20 ... 120°C	-10 ... 60°C	-10 ... 60°C	-10 ... 80°C
Description	• Stainless steel design • Food grade see www.festo.com/certificates/NPCK • Fulfils all clean design requirements • Operating media compressed air, vacuum, water. Water as per the manufacturer's declaration, see www.festo.com/certificates/NPCK • Straight shape	• Operating medium: compressed air, vacuum • Brass, POM, aluminium or stainless steel • Straight shape, T-shape, L-shape, Y-shape	• Barbed hose fitting with or without sealing ring • Tubing clip to DIN 3017 • Operating medium: compressed air, vacuum • Brass or aluminium, steel	• Bulkhead quick connector • Sealing cap for plastic tube fittings and barbed fittings • Multiple distributor • Union nut for CK tube fitting • Operating media: compressed air, vacuum, (water) • Aluminium, steel, POM or zinc • Straight design, L-shaped, T-shaped
online: →	npck	n_070302	n_cnp	ck

Pneumatic fittings >

Threaded fittings

	Blanking plugs ★ **B**	**Threaded fittings** **NPFC**	**Adapters** **NPFV**	**Ring pieces, hollow bolts** **LK, TK, VT**
Pneumatic connection 1	Male thread G1, G1/2, G1/4, G1/8, G3/4, G3/8, M3, M5, M7	G1, G1/2, G1/4, G1/8, G3/4, G3/8, M3, M5, M7, R1, R1/2, R1/4, R1/8, R3/4, R3/8	1/4 NPT, G1/4	Male thread G1/4, G1/8, G3/8, M5, G1/4, G1/8, G3/8
Pneumatic connection 2		G1, G1/2, G1/4, G1/8, G3/4, G3/8, M3, M5, R1, R1/2, R1/4, R1/8, R3/4, R3/8	1/4 NPT, G1/4	Female thread G1/4, G1/8, G3/8, For barbed connector I.D. 3 mm Via union nut, 4 mm Via union nut, 6 mm Via union nut
Operating pressure		-0.95 ... 50 bar	2 ... 8 bar	
Operating pressure for entire temperature range				0 ... 10 bar
Ambient temperature		-20 ... 150°C		
Description	• Aluminium, stainless steel • With sealing ring • Variants recommended for production systems for manufacturing lithium-ion batteries	• Brass, nickel-plated • Sleeve • Extension • Double nipple • Reducing nipple • Operating medium: compressed air, vacuum • Straight shape, L-shape, T-shape, X-shape, Y-shape	• Adapter with filter • From male thread G1/4 to female thread G1/4 or NPT1/4 and male thread NPT1/4 to female thread NPT1/4 • Adapter material: high-alloy stainless steel • Operating medium compressed air	• Multiple distributor consisting of hollow bolt VT and ring piece LK or TK • With two to six outlets and one common air feed • Operating medium: compressed air, vacuum • Galvanised steel
online: →	b-1	npfc	npfv	lk

Pneumatic fittings >

Threaded fittings

	Reducers, sleeve, double nipple **FR**	**Reducers, sleeve, double nipple** **G**	**Reducers, sleeve, double nipple** **LJK, TJK**
Pneumatic connection 1	Male thread G1/4, G1/8, G3/8, M5	G1/4, G1/8, G3/8, M5	Male thread G1/2, G1/4, G1/8, G3/8, M3
Pneumatic connection 2	Female thread G1/4, G1/8, G3/8, M5	G1/4, G1/8, G3/8, M5	Female thread G1/2, G1/4, G1/8, G3/8, M3
Operating pressure			
Operating pressure for entire temperature range			
Ambient temperature			
Description	• With sealing ring • Aluminium	• Elbow piece • With sealing ring • Aluminium	• T-fitting, swivelling, with female thread • Elbow fitting with female thread • With sealing ring
online: →	fr	g	jk

Pneumatic fittings >

Threaded fittings

	Reducers, sleeve, double nipple E, ESK	**Reducers, sleeve, double nipple QM**	**Reducers, sleeve, double nipple D**
Pneumatic connection 1	R1/2, R1/4, R1/8, R3/8	Female thread M5, G1, G1/2, G1/4, G1/8, G3/4, G3/8	M5
Pneumatic connection 2	R1/2, R1/4, R1/8, R3/8	Female thread M5, G1, G1/2, G1/4, G1/8, G3/4, G3/8	M7
Operating pressure			
Operating pressure for entire temperature range			
Ambient temperature			
Description	• For connecting pneumatic components with different threaded connections	• For connecting pneumatic components with different threaded connections	• Reducing nipple • For reducing threaded connections • With sealing ring • Brass
online: →	esk	qm	d

Pneumatic fittings >

Click fitting

	Click fittings NPKA
Pneumatic connection 1	For tubing O.D. 6 mm, Male thread G1/8
Pneumatic connection 2	For tubing O.D. 6 mm
Operating pressure [MPa]	-0.095 ... 1 MPa
Operating pressure	-0.95 ... 10 bar
Nominal size	4 mm
Ambient temperature	-10 ... 60°C
Description	• POM, polyamide 66 • Quick and easy one-handed tube installation • Completely made of polymer • Food grade see www.festo.com/certificates/NPKA • Operating media compressed air, vacuum, water. Water as per the manufacturer's declaration, see www.festo.com/certificates/NPKA • No copper, fluor or silicone • Cleanroom compatible • Easy-to-clean design with few corners and edges • Straight design, L-shaped, T-shaped
online: →	npka

Pipes

	Plastic pipes PQ-PA	**Pipes PQ-AL**	**Plastic-coated metal tubes PM**
Outside diameter	12 ... 28 mm	12 ... 28 mm	6 ... 8 mm
Information on tubing materials	PA	Wrought aluminium alloy	Wrought aluminium alloy, PE
Temperature-dependent operating pressure	-0.95 ... 15 bar	-0.95 ... 15 bar	-0.95 ... 30 bar
Ambient temperature	-25 ... 75°C	-30 ... 75°C	-29 ... 65°C
Description	• Rigid pipe made from high-quality polyamide • Smooth inside wall ensures optimum flow conditions • Operating media: compressed air, vacuum, liquid media	• Rigid aluminium pipe • Smooth inside wall ensures optimum flow conditions • Operating media: compressed air, vacuum, liquid media	• Polyethylene, aluminium • Can be bent straight and reshaped several times without a pipe-bending device and without being damaged • Resistant to deformation • Operating medium: compressed air, vacuum
online: →	pq-pa	pq-al	pm

Push-in fittings for piping PQ

	Push-in fittings CQ, CQC, CQH, CQL, CQT
Pneumatic connection 1	For pipe and tubing O.D. 12 mm, 15 mm, 18 mm, 22 mm, 28 mm, Male thread G1, G1/2, G3/4, G3/8, Push-in sleeve CQ-12, CQ-15, CQ-18, CQ-22, CQ-28
Pneumatic connection 2	For pipe and tubing O.D. 12 mm, 15 mm, 18 mm, 22 mm, 28 mm, Push-in sleeve CQ-12, CQ-15, CQ-18, CQ-22, CQ-28, QS-12, QS-16
Nominal size	8 ... 24.9 mm
Temperature-dependent operating pressure	-0.95 ... 15 bar
Ambient temperature	-25 ... 70°C
Description	• For pipes PQ-PA, PQ-AL and tubing PAN and PUN • Operating media: compressed air, vacuum, liquid media • POM • Straight design, L-shaped, T-shaped
online: →	cq

Couplings

	Quick coupling sockets, quick coupling plugs NPHS-D6, NPHS-S6	**Quick coupling sockets, quick coupling plugs KD1, KD2, KD3, KD4, KS1, KS2, KS3, KS4**	**Multiple connectors KSV, KDV, KDVF**	**Multi-tube connectors KM**
Pneumatic connection			For tubing O.D. 3 mm, 4 mm, 6 mm, 8 mm, PK-2, PK-3, PK-4, PK-6	For tubing O.D. 3 mm, 4 mm, 6 mm
Pneumatic connection 1	For plug-in nipple I.D. 9 mm, Female thread G1/2, G1/4, G3/8, Male thread G1/2, G1/4, G1/8, G3/8	N-6, N-9, Female thread G1/2, G1/4, G1/8, G3/8, M5, Male thread G1/2, G1/4, G1/8, G3/8, M3, M5, CK-3, CK-4, CK-6, CK-9, CN-2		
Standard nominal flow rate	875 ... 2083 l/min	44 ... 1350 l/min		
Operating pressure	-0.95 ... 20 bar	-0.95 ... 12 bar	-0.95 ... 16 bar	-0.95 ... 8 bar
Ambient temperature	-20 ... 80°C	-10 ... 60°C	-10 ... 60°C	-10 ... 60°C
Description	• Safety coupling • Shut-off at one end • Exhaust the air on the connector side without releasing the coupling • Combination of coupling and hand slide valve • Can be used as an on/off valve • Nickel-plated brass or galvanised hardened steel	• Quick connection coupling for standard applications without safety function • Shut-off at one or both ends • With male or female thread or with barbed fitting or quick connector • Nickel-plated brass, PP • Operating medium: compressed air, vacuum	• POM, aluminium, brass • Multi-plug, multi-socket • Terminal plug and terminal socket • Operating medium: compressed air, vacuum	• Polymer, brass • For max. 22 lines • Used as control cabinet outlets • Operating medium: compressed air, vacuum
online: →	nphs	kd1	ksv	km

Distributors

	Push-in fittings QSLV, QSQ, QST3	**Push-in fittings QSYTF**	**Distributors FR**
Pneumatic connection 1	For tubing O.D. 10 mm, 6 mm, 8 mm, Male thread G1/2, G1/4, G1/8, G3/8, R1/2, R1/4, R1/8, R3/8	Male thread G1/2, G1/4, G1/8, G3/8, R1/2, R1/4, R1/8, R3/8	Female thread G1/2, G1/4, G1/8, G3/8, G3/4
Pneumatic connection 2	For tubing O.D. 10 mm, 12 mm, 4 mm, 6 mm, 8 mm	Female thread G1/2, G1/4, G1/8, G3/8, For tubing O.D. 10 mm, 12 mm, 6 mm, 8 mm	Female thread G1/2, G1/4, G1/8, G3/8, M3, M5, For tubing O.D. 4 mm, 6 mm
No. of supply lines	1	1	1
No. of outlets	2, 3, 4, 6	3	3, 8, 9, 12
Max. rotational speed			
Description	• PBT and nickel-plated brass • Rotatable 360° • Reducing design • Operating media: compressed air, vacuum, (water) • Straight design, L-shaped, T-shaped	• PBT and nickel-plated brass • Rotatable 360° • Operating media: compressed air, vacuum, (water) • Y-shape	• Aluminium • 4, 8, 9 or 12 connections • Operating medium: compressed air, vacuum
online: →	qslv	qsytf	fr

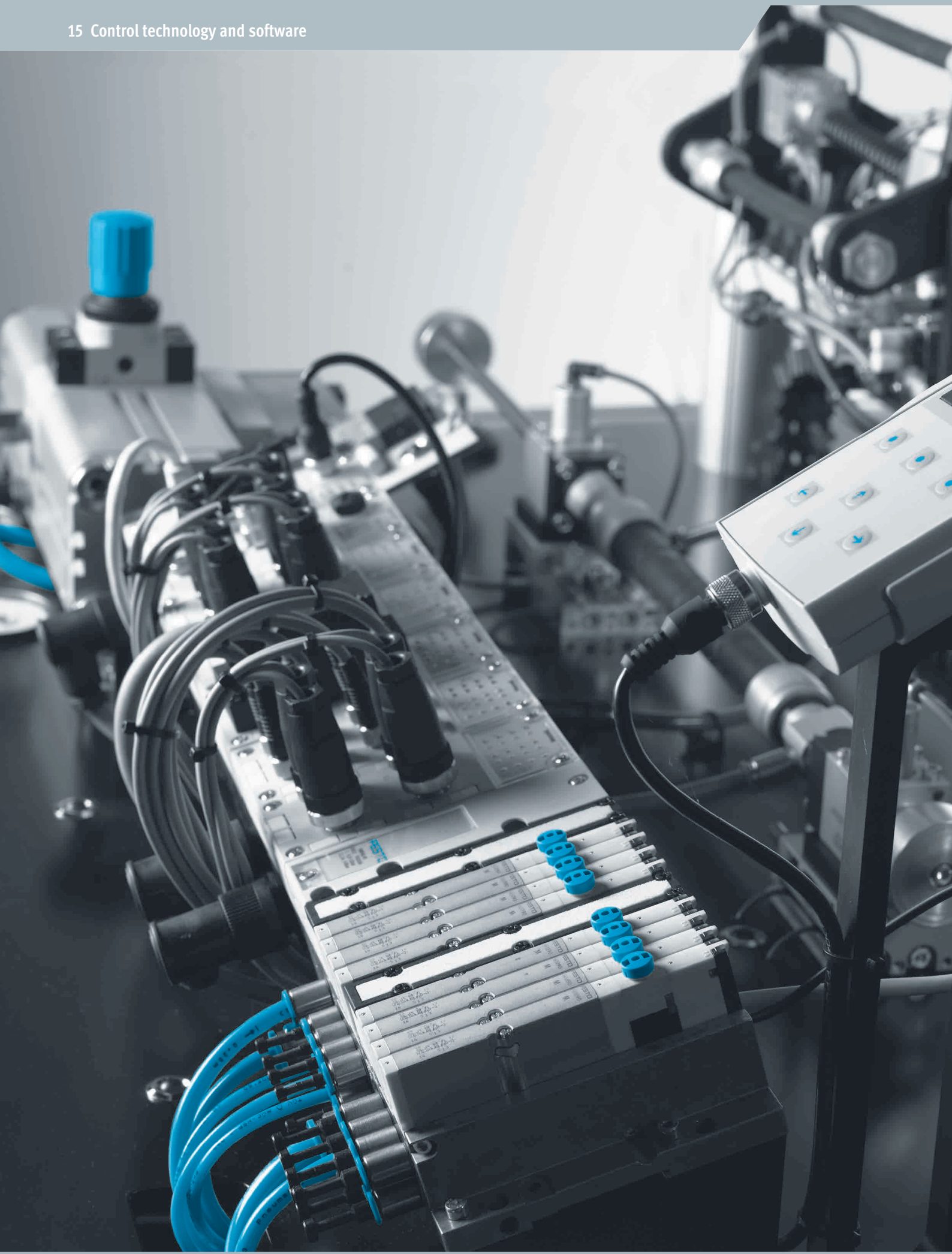
Distributors

	Distributors CQD	**Rotary distributors GF**
Pneumatic connection 1	Female thread G1/2	Male thread G1/4, G3/8, G1/2, G1/4, G1/8
Pneumatic connection 2	Female thread G1/2	Female thread G1/4, G3/8, G1/2, G1/4, G1/8, M5
No. of supply lines	1	
No. of outlets	4	
Max. rotational speed		300 ... 3000 rpm
Description	• POM • Operating medium: compressed air, vacuum	• 2 or 4 axial and radial outlets • Single or multiple rotary distributor • Operating medium: compressed air, vacuum • Brass, hardened steel
online: →	cq	gf

Protective conduit systems

	Protective conduits MK, MKG, MKR, MKV	**Fittings HMZAS, HMZV, MKA, MKGV, MKM, MKRL, MKRS, MKRT, MKRV, MKVM, MKVV, MKY**
Inside diameter	7.5 ... 48 mm	
Outside diameter	10 ... 56 mm	
Threaded connection		Pg9, Pg11, Pg13,5, Pg16, Pg21, Pg29, Pg36, Pg48
Design	Strip-wound metal conduit, internally and externally corrugated all-plastic conduit, separable	
Ambient temperature	-20 ... 100°C	-40 ... 200°C
Description	• For protecting pneumatic tubing and electrical cables • Galvanised steel, PA, PP, PVC spring steel • Metal or polymer design • High alternating bending strength	• Installation kit • Junction box • Reducing connector • Protective conduit fitting • Lock nut • Protective conduit connector • Y-distributor • Polymer, polyamide, nickel-plated brass
online: →	mkg	mka

Product overview



Pneumatic and electropneumatic controllers

	Steppers **TAA, TAB**	**Memory modules** **SBA-2N**	**Pulse generators** **VLG**
Pneumatic connection	Barbed connector for plastic tubing NW3, on mounting frame		
Type of mounting			Through-hole in housing
Nominal size	2 mm	3 mm	3.5 mm, 7 mm
Standard nominal flow rate	60 l/min	70 l/min	120 l/min, 600 l/min
Description	• For ensuring a logical program sequence • Poppet valve with integrated AND as well as OR element	• For input logic operations • For simplifying the design and installation of pneumatic controllers	• For generating infinitely adjustable signals in controllers • For high-speed cylinder movements of diaphragm cylinders, single- and double-acting cylinders
online: →	taa	sba	vlg

Software tools

Festo Automation Suite commissioning software

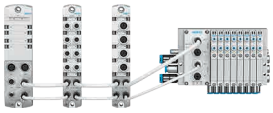
Quickly and reliably to a ready-to-use drive system – the Festo Automation Suite combines the parameterisation, programming and maintenance of complete drive systems, from the mechanical to the control system, in just one software program.
Perfect for making industrial automation simple, efficient and seamless.

Plug-in automation system CPX-E

- Controller programming in CODESYS as a system expansion for SoftMotion – up to robotic applications
- Just 2 mouse clicks instead of 100: greatly simplified integration of the servo drive CMMT-AS into the control program with CPX-E-CEC
- Conveniently install the plug-in using the software

This tool can be found on our website at
➔ **www.festo.com/AutomationSuite**

Electrical peripherals

	NEW **Automation system CPX-AP-A**	 **Automation systems CPX-AP-I**	 **Automation systems CPX-E**	 **Input modules for installation system CTEL CTSL**
Address capacity, inputs	1024 ... 4096 Byte		64 Byte	
Max. no. of inputs				16
Address capacity, outputs	1024 ... 4096 Byte		64 Byte	
Max. no. of outputs				
No. of module positions				
Electrical actuation	Ethernet		Fieldbus, Integrated controller	
Protocol	AP	PROFIBUS DP, PROFINET, EtherCAT, EtherNet/IP, Modbus®TCP	PROFIBUS DP, PROFINET, EtherCAT, EtherNet/IP, Modbus®TCP, IO-Link®	I-Port, IO-Link®
Description	• Modular and lightweight IO system in IP65/IP67 • Highly flexible remote IO system with maximum performance • Real-time capability, transmission rate of 200 Mbit full duplex • Up to 15 modules in a CPX-AP-A automation system • Complete IO-Link® master V1.1 with data storage mechanism including device parameterisation tool • Easily integrated into standard host systems • Commissioning using normal tools from the PLC manufacturers or with the Festo Automation Suite • Integrated web server • Can be adapted to valve terminals from Festo	• Powerful remote I/O system that flexibly links 80 modules at a data rate of 200 Mbaud in real-time • Seamless connectivity along with advanced diagnostics option increase the machine availability and productivity • Simple integration into the controller of your choice: PROFINET, PROFIBUS, EtherCAT®, EtherNet/IP, ModbusTCP • Real-time capability and deterministic system behaviour enable cycle times of up to 250 µs • Cable lengths of up to 50 m between every module enable vast system dimensions • The IO-Link master and parameterisation software enable simple integration of any IO-Link® devices • Ethernet performance up to the valve terminal and digital as well as analogue input/output modules	• Modern control system with high performance • Fieldbus master interfaces, EtherCAT® master, fieldbus slave interfaces, PROFINET, EtherNet/IP, PROFIBUS, EtherCAT® digital input modules (16DI), digital output modules (8DO/0.5A) • Analogue input modules (current, voltage), analogue output modules (current, voltage) • Modern programming with CoDeSys V3 to IEC 61131-3 • Integration of SoftMotion functions (SoftMotion) • Compact I/O assembly • Easy mounting of the control system	• For installation system CTEL • For recording sensor input signals • Display of the input statuses for each input signal via an assigned LED • Diagnostic LED for short circuit/overload in sensor supply
online: ➔	cpx-apa	cpx-api	cpx-e	ctsl

Electrical peripherals

	Fieldbus modules CTEU	**Terminal CPX-P**	**Terminal CPX**
Address capacity, inputs	2 ... 64 Byte	64 Byte	64 Byte
Max. no. of inputs			
Address capacity, outputs	2 ... 64 Byte	64 Byte	64 Byte
Max. no. of outputs			Max. 9 electric input/output modules
No. of module positions			
Electrical actuation		Fieldbus, Integrated controller	Fieldbus, Integrated controller
Protocol	AS-Interface, CANopen, CC-LINK, CPI-B, DeviceNet, EtherCAT, EtherNet/IP, PROFINET, Modbus® TCP, PROFIBUS DP, VARAN, I-Port	DeviceNet, CANopen, PROFIBUS DP, PROFINET, EtherCAT, EtherNet/IP, Modbus®TCP, IO-Link®, I-Port, HART	Interbus, DeviceNet, CANopen, CC-Link, PROFIBUS DP, PROFINET, EtherCAT, EtherNet/IP, Modbus®TCP, SercosIII, Powerlink, IO-Link®, I-Port, HART
Description	• For valve terminals VTUG, MPA-L, VTOC • Can be expanded into the installation system CTEL • Fieldbus-typical LEDs, interfaces and switching elements • Isolated power supply for electronics and valves	• Use of matching remote I/O and valve terminals in a control cabinet • Combination with modules of the electrical terminal CPX, which can then be used for hybrid applications • Unique modular structure • Comprehensive integrated diagnostic and service functions • Analogue inputs and outputs with HART protocol	• Automation platform • Open to all common fieldbus protocols and Ethernet • Integrated diagnostic and maintenance functions • Can be used as stand-alone remote I/O or with valve terminals MPA-S, MPA-L, VTSA/VTSA-F • Choice of polymer or metal interlinking block with individual linking • Analogue inputs and outputs, 2-way/4-way, with optional HART protocol
online: →	cteu	cpx-p	cpx

Electrical peripherals

	Measuring modules CPX-CMIX	**Electrical interfaces CPX-CTEL**	**AS-Interface® module ASI**
Address capacity, inputs		32 Byte	
Max. no. of inputs			
Address capacity, outputs		32 Byte	
Max. no. of outputs			
No. of module positions		Max. 4 modules with I-Port interface	
Electrical actuation	Via fieldbus		AS-Interface®
Protocol		I-Port, IO-Link®	
Description	• Pneumatics and electrics – movement and measurement on one platform • Innovative measurement technology for piston rod drives, rodless drives, rotary drives • Control via fieldbus • Remote maintenance, remote diagnostics, web server, SMS and e-mail alerts are all possible via TCP/IP • Modules can be quickly exchanged and expanded without altering the wiring	• CPX-CTEL master module with 4 I-Port connections • Decentralised pneumatic components and sensors for fast processes • Standardised M12 connections	• Accessories for the AS-Interface installation system • Compact I/O modules (IP65, IP67)
online: →	cpx-cmix	cpx-ctel	as-interface

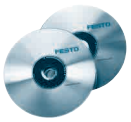
Motion controllers

	 Motor controllers **CPX-CEC-M1**
CPU data	800 MHz processor, 256 MB MB RAM, 32 MB MB Flash
Processing time	Approx. 200 µs/1 k instruction
Degree of protection	IP65, IP67
Configuration support	CODESYS V3
Fieldbus interface, type	CAN bus
Fieldbus interface, connection technology	Plugs, Sub-D, 9-pin
Additional functions	Diagnostic functions, SoftMotion functions for electric drives
Description	• Easy control of valve terminal configurations • Programming with CoDeSys to IEC 61131-3 • Connection to all fieldbuses as a remote controller and for pre-processing • Control of electric drives via CANopen • SoftMotion functions for coordinated multi-axis movements
online: →	**cpx-cec-m1**

Operator units

	Operator units CDSA	IO-Link Master USB CDSU-1	Operator units CDSB ★	Operator units CDPX
Conforms to standard		EN 61131-9		
Electrical connection for IO-Link®, connection type		Socket		
Electrical connection for IO-Link®, connection technology		M12x1, A-coded to EN 61076-2-101		
Electrical connection for IO-Link®, number of pins/wires		5		
Ethernet interface	RJ45			RJ45 10/100 MBd
Protocol		IO-Link®		
Display	LCD display, With backlighting		TFT colour	With backlighting
Display size	7 in “		1.77”	10.1”, 15.6”, 21.5”, 5”, 7 in “, 4.3 in “
Recipe memory				
Display resolution	WSVGA, 600x1024 pixels		128x160 pixels	1024x600 pixels, 1025x600 pixels, 1280x800 pixels, 1366x768 pixels, 1920x1080 pixels, 800x480 pixels, 480x272 Pixels
Description	• For mobile commissioning and optimisation • Integrated reporting system and user administration in combination with the robotics library from Festo • Terminal box for installation in a control cabinet and various cable lengths available • Interfaces for Ethernet, RS-422-A/RS-232-C, USB host/USB client • With colour touchscreen	• Allows Festo IO-Link® products to be commissioned quickly and intuitively • Compact, cost-effective, powerful • Universal connections • Galvanic isolation • Connecting cables for almost all IO-Link® devices from Festo • For IO-Link® devices with protocol version 1.1 or 1.0 • Supports data storage	• Plug-in display and control unit for the servo drive CMMT and automation system CPX-E • Colour touchscreen • Diagnostic function • Compact size • Mini USB interface • Update function for basic unit	• Cost-optimised for simple visualisation tasks, e.g. of process data • Powerful processors combined with wide-screen technology • Ideally matched to CODESYS controls from Festo or ModbusTCP networks • Integrated EtherNet interfaces • With touchscreen • Variants according to EU explosion protection directive (ATEX) and in IP67 suitable for the requirements in process automation
online: →	**cdsa**	**cdsu**	**cdsb**	**cdpx**

Software

	NEW **Licence** **GSPL**	 **Motion Apps** **GAMM**	 **Software packages** **GSAY**	 **Software (FluidDraw® P6/365)** **GSWF**
Description	• For simple and intuitive development of control logics and user interfaces • For implementing your automation solutions without in-depth programming knowledge • Extensive set of predefined function blocks and associated visualisation • Compatible with controller CPX-E-CEC, control block CPX-CEC	• Open and closed-loop control programs for valves VEVM • A new dimension in flexibility thanks to Motion Apps – a single valve with a wide range of different functions • Accelerated engineering processes • Short response times without the need to adapt the hardware • Reduced system complexity • Shorter time to market for your application	• Modular operating software for the servo press kit YJKP	• Generate pneumatic and electrical circuit diagrams quickly and easily • Documentation of complete systems • Extensive standard symbol library • Insert products directly via the integrated product catalogue from Festo • Automatically generated evaluations of item data and circuit information • Automatic equipment labelling with customisation options • Create your own symbols, libraries, product databases or drawing frames
online: →	gspl	gamm	gsay	gswf

Software

	 Eplan projects (Schematic Solution) **GDDE**	 **Smartenance** **GASM**	 **Licence** **GSAR**
Description	• Get complete EPLAN projects of complex products in minutes • Simple integration into existing EPLAN projects • Significant time saving • More certainty on completeness	• The digital maintenance and incident manager with plant logbook • Mobile application with adapted interface for tablets and smartphones • Manufacturer-independent • Greater acceptance thanks to user-friendly user interface • Cloud-based and accessible everywhere • Enormous time savings thanks to complete transparency • No training necessary • Constantly growing knowledge base	• Software licence for controlling a handling system from Festo • For point-to-point interpolation or Cartesian interpolation
online: →	gdde	gasm	gsar

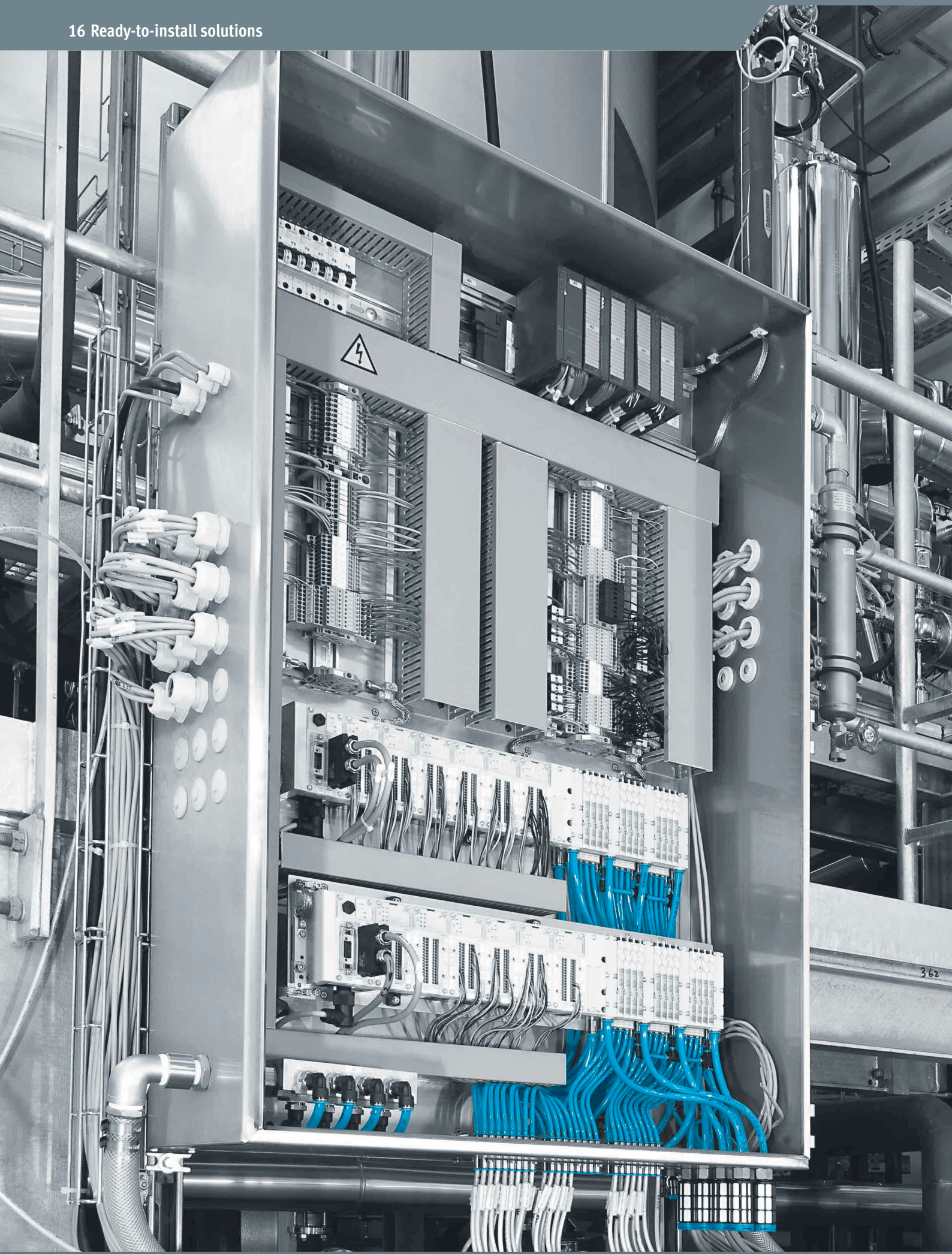
Documentation

	Descriptions
Description	• Manuals, operating instructions
online: ➔	p.be

Training systems

Learning systems

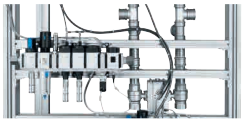
	 EduTrainer Universal **D:ET-SPS**
Description	• PLC EduTrainer® support system for use in teaching and training • Equipped with PLCs from different manufacturers • Two series: universal and compact • Equipped with 19 simulation modules • Individually configurable or pre-assembled
online: ➔	edutrainer



Control cabinets

	Factory automation	**Process automation**	**Control cabinets for handling systems**
Technical data	• Simple to complex control cabinet designs • Application-specific combination of components • Fully tested, with test certificate • Ready-to-install • Complete documentation • Design conforms to: – EN 60204-1 – ATEX zone 1 and 21 (pneumatic only), ATEX zone 2 and 22 (electric and electropneumatic) – UL-508 A • Implementation of safety functions • Different bus technologies	• Simple to complex control cabinet designs • Application-specific combination of components • Different operating voltages • Fully tested, with test certificate • Ready-to-install • Complete documentation • Design conforms to: – EN 60204-1 – ATEX zone 1 and 21 (pneumatic only), ATEX zone 2 and 22 (electric and electropneumatic) – UL-508 A • Implementation of safety functions • Wide range of bus technologies • Compliance with special cleanliness and hygiene requirements • Special materials • Protected against the ingress of liquids and foreign matter • Heating or cooling elements • Intrinsically safe valve terminal technology • Hot swap inspection window	• Simple to complex control cabinet designs • Control of motion sequences with up to 6 axes • Application-specific combination of components • Use of the latest innovations and technologies • Fully tested, with test certificate • Ready-to-install • Complete documentation • Design conforms to: – EN 60204-1 – ATEX zone 1 and 21 (pneumatic only), ATEX zone 2 and 22 (electric and electropneumatic) – UL-508 A • Implementation of safety functions • Wide range of bus technologies • Function modules for motion applications • Host modules for easy connection to the customer's control environment
Description	• Made-to-measure control cabinets • Pneumatic, electric, combined • Individually configured • Adapted to requirements in industrial automation • Design and sizing included	• Made-to-measure control cabinets • Pneumatic, electric, combined • Individually configured • Adapted to requirements in process automation • Design and sizing included	• Made-to-measure control cabinets for handling systems • Software package for third-party devices included • Individually configurable • Adapted to requirements for handling solutions ➔ chapter 6 „Handling systems and industrial robots“ on page 87
Contact us for more information: ➔	**www.festo.com/contact**	**www.festo.com/contact**	**www.festo.com/contact**

Mounting and installation plates

	Mounting plates	 **Hall installation plates (HIP) for body assembly**	**Robot installation plates (RIP) for body assembly**
Technical data	• Customised support plate shape • Support plate available in different materials • Application-specific combination of components • Fully assembled, connected and wired • Defined interfaces • Ready-to-install • Fully tested, with test certificate • Complete documentation • Design conforms to: – EN 60204-1 – ATEX zone 1 and 21 (pneumatic only), ATEX zone 2 and 22 (electric and electropneumatic) – UL-508 A • Implementation of safety functions	• Media supply for compressed air and cooling water for welding cells • Made to measure: profile as support element, design perfectly adapted to the installation space, for installation within safety barriers • Labelling: customised labelling for safe operation • Fast installation: thanks to assembly according to the customer‘s specification • Medium water: fittings for liquid media	• Media supply for compressed air and cooling water for welding robots • Protection against ambient conditions through the use of special materials, such as hoses and fittings resistant to welding spatter • Protection against environmental influences to prevent damage to the installation • Made to measure: profile as support element, design perfectly adapted to the installation space • Cooling water suction cylinder for drawing in cooling water when changing welding caps • Water flow sensor: measures flow rate, volume and cooling water temperature – to monitor the welding process • Easy to maintain thanks to removable fittings
Description	• Machine-specific pre-assembly of pneumatic and electric components on support plate • Tubing and wiring included • Defined interfaces for simple installation directly in the system	• Controls and monitors the compressed air and cooling water supply for whole welding cells	• Controls and monitors the compressed air and cooling water supply for individual welding guns
Contact us for more information: ➔	www.festo.com/contact	www.festo.com/contact	www.festo.com/contact

Software tools

Festo Design Tool 3D

The Festo Design Tool 3D is a 3D product configurator for generating specific CAD product combinations from Festo. The configurator makes your search for the right accessory easier, more reliable and faster.

You can then order the module that has been created as a single order item, either completely pre-assembled or as individual parts in a single box. This considerably reduces your bill of materials, and downstream processes such as product ordering, order picking and assembly are significantly simplified.

This tool can be found at
➔ **www.festo.com/x/festo-design-tool**

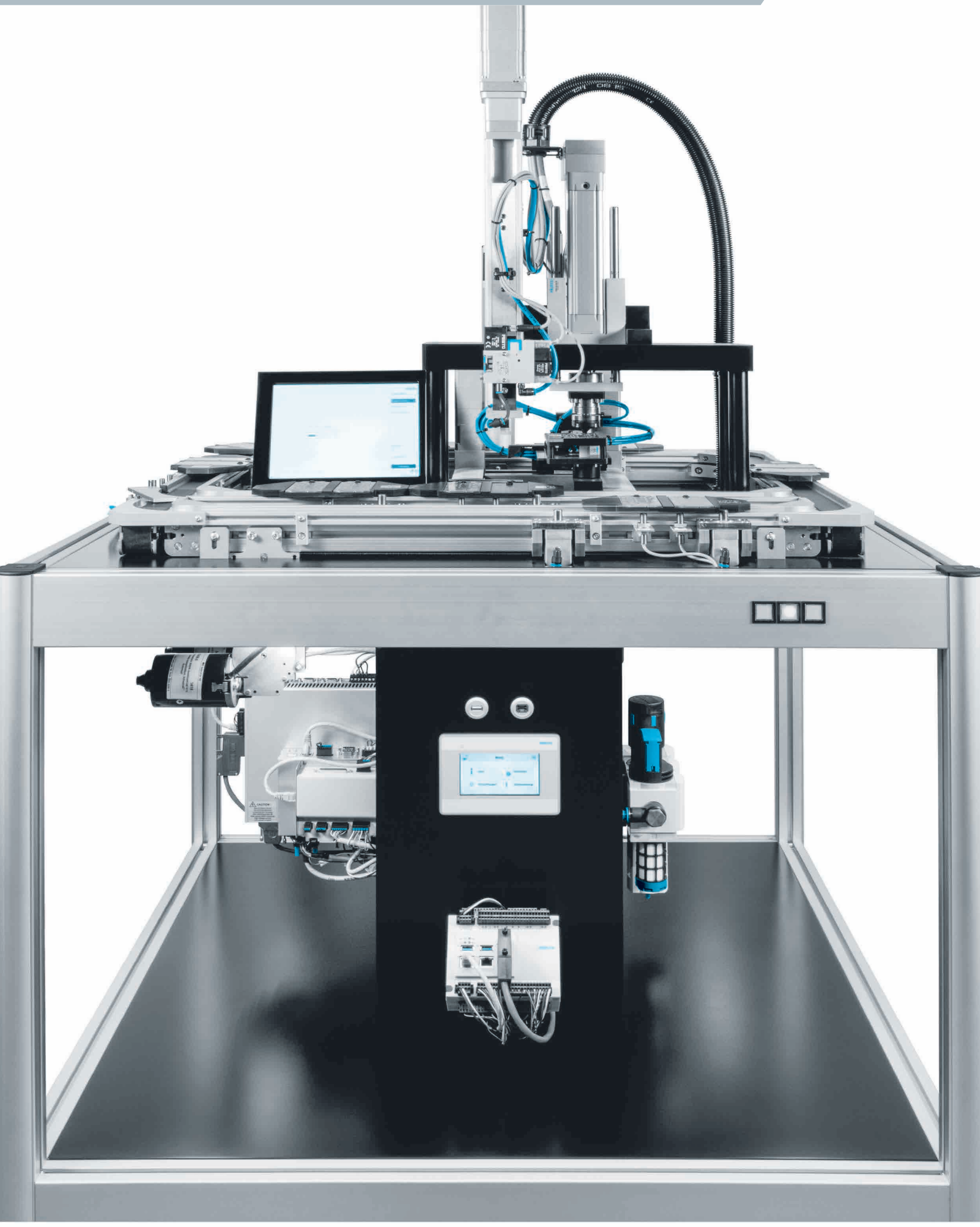
Modules

	Modules	**Cartridge solutions**	**Sheet-metal constructions and special housings**
Technical data	• Combination of various pneumatic and/or electric components to create a single unit • Application-specific combination of components • Accessories mounted on sub-assembly • Use of the latest innovations and technologies • Ready-to-install • Fully tested, with test certificate • Complete documentation • Design conforms to: – EN 60204-1 – ATEX zone 1 and 21 (pneumatic only), ATEX zone 2 and 22 (electric and electropneumatic) – UL-508 A • Implementation of safety functions	• Space-saving thanks to extremely compact design • Pneumatic functions integrated in a single compact housing • Housing in different materials • No tubing required • Minimal cabling required • Significant design freedom • Flexible integration options on and within the machine • Sturdy design • Fully tested • Ready-to-install • Complete documentation	• Sheet-metal structures – Customised shape and size – Reduced weight and number of assembly parts • Special housing – Customised shape – Customised dimensions – Various materials – Compact, space-saving format – Protection against environmental influences and unauthorised access • In combination – Alternative to conventional control cabinets – Variable integration options on and within the machine – Short tubing and cable lengths – Attractive design
Description	• Pneumatic and electric components pre-assembled to create a function unit • Can be combined from around 30,000 catalogue components • Connections included • For integration in machines	• Integration of various pneumatic functions in one component • No need for single housings • Ideal for applications that require a highly compact design	• Reduced weight thanks to optimal use of materials with sheet-metal structures • Protection against environmental influences and unauthorised access in the special housing • Ideally combined as a control cabinet directly in the system
Contact us for more information: ➔	www.festo.com/contact	www.festo.com/contact	www.festo.com/contact

Modules

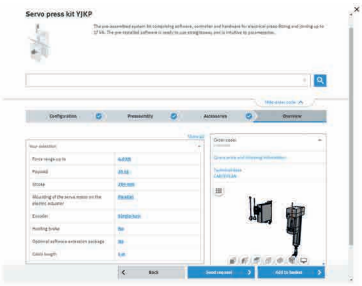
	Function blocks	**Profile solutions**
Technical data	• No tubing required thanks to drilled ducts • Housing available in different materials • Customised design of the pneumatic interfaces for the system • Ideal for a small number of components and variable connection options • Extremely economical, even for small quantities	• Profiles in customised cross sections and lengths • Integrated ducts for straight-line routing of the compressed air • Common air supply for multiple valves or valve terminals via a single duct • Combination of exhaust air and supply air without tubing, even over long distances • Supply of compressed air at different locations • No tubing required • Significantly reduced cabling • Modular structure easy to achieve • Optional: profile as mechanical mounting element for other components or as a supporting part of the machine frame
Description	• Compressed air supply for pneumatic components via drilled ducts • Ideal for a small number of pneumatic components and variable connection options • Compact and easy to service	• Extruded profiles in combination with valves as a valve terminal • For the distribution of compressed air in the machine concept • Customised profile cross sections available
Contact us for more information: ➔	**www.festo.com/contact**	**www.festo.com/contact**

Product overview



Software tools

Configurator



Design a product with numerous features reliably and quickly with the help of the configurator.

Select all the required product features step-by-step. The use of logic checks ensures that only correct configurations are available for selection.

A dynamic graphic generated on the basis of the configuration provides a visual aid for selecting the correct product features.

You will find the configurator
- at www.festo.com/catalogue/yjkp
- Click on the product
- Click on the blue “Configure product” button

Joining technology

Function-specific systems

	Servo press kits YJKP	**Commissioning service GFCA-Y2**
Working stroke	100 ... 400 mm	
Pressing force	0 ... 17 kN	
Feed speed	0 ... 250 mm/s	
Accuracy in ± % FS	0.25 %FS	
Protocol	EtherNet/IP, OPC UA, PROFINET IO, TCP/IP, Modbus® TCP	
Description	• Modular system kit comprising application software GSAY, electric cylinder, servo motor, motor controller, force sensor and controller together with the required accessories • Less expensive than conventional press-fitting systems • Pre-installed application software GSAY offers precisely the required application-specific functions • Commissioning made easy: parameterisation instead of programming • For top quality: real-time monitoring of the press-fitting operation and clear visualisation of the force/displacement curves • Fit for Industry 4.0 thanks to the OPC UA interface at the controller	• Commissioning services for the servo press kit YJKP • Available remotely or on site • Support with commissioning • Support with electrical installation • Checking the electrical connections and the travel path • Configuration and parameterisation • Testing the system, data backup and documentation • Introduction to WebVisu software
online: →	**yjkp**	**gfca**

Handling solutions

	Balancer kits YHBP	**Control systems CMCB**
Stroke range	100 ... 1990 mm	
Cylinder diameter	50 ... 200 mm	
Max. travel speed	1 m/s	
Load	25 ... 999 kg	
Operating pressure [MPa]	0.4 ... 0.8 MPa	
Operating pressure	4 ... 8 bar	
Nominal operating voltage DC	24 V	24 V
Design		Mounting plate, Control cabinet, Built-in safety relay unit
Electrical connection		Spring-loaded terminal, Push-in
Nominal operating voltage AC		230 V
Max. current consumption		1100 mA
Performance level (PL)		Category B, Performance Level b, Category 3, Performance Level d
Description	• Very low operating forces of just 10 N • For applications involving the movement of heavy loads in defined, repetitive sequences • Extremely fast, automatic weight detection for a wide range of variants in production processes • With safety functions • The individual components are delivered mounted in the control cabinet, on a mounting plate or unassembled	• Ready-to-install control system • Available on a mounting plate with or without control cabinet housing • Variants with safety functions • Adapted for balancer kit YHBP • With connecting cables for balancer kit YHBP connected
online: →	yhbp	cmcb

Product overview

Air reservoir

Air reservoirs

	Air pressure reservoirs VZS	**Air pressure reservoirs CRVZS**
Volume	20 l l	0.1 l l, 0.4 l l, 0.75 l l, 10 l l, 2 l l, 20 l l, 5 l l
Information on air reservoir materials	Powder-coated steel	High-alloy stainless steel
Conforms to standard	EN 286-1	AD 2000
Condensate drain connection	G3/8	G3/8
Description	• Compensation of pressure fluctuations and as accumulators in the event of sudden air consumption • Providing large quantities of compressed air for supplying fast pulsing drives • With connection for condensate drain • Conforms to the requirements of Directive 2014/29/EC and EN 286-1 • Operating medium: compressed air, vacuum	• Corrosion-resistant • Compensation of pressure fluctuations and as accumulators in the event of sudden air consumption • Providing large quantities of compressed air for supplying fast pulsing drives • With connection for condensate drain in some cases • Food-safe, see www.festo.com/catalogue/crvzs > “Support / Downloads” tab > “Certificates” • Designs to EU Pressure Equipment Directive EN 286-1 • Operating medium: compressed air, vacuum
online: →	vzs	crvzs

Pneumatic silencers

	Silencers AMTE ★	**Silencers U** ★	**Silencers UC** ★	**Silencers AMTC**
Information on silencer insert materials	Bronze	PE, Bronze	PE	PE
Pneumatic connection	10-32 UNF-2A, 1/8 NPT, 1/4 NPT, 3/8 NPT, 1/2 NPT, G1, G1/2, G1/4, G1/8, G3/4, G3/8, M3, M5	3/4 NPT, G1, G1/2, G1/4, G1/8, G3/4, G3/8, PK-3, PK-4	G1/4, G1/8, G3/8, M5, M7, QS-10, QS-3, QS-4, QS-6, QS-8	Cartridge 10 mm
Noise level	55 ... 95 dB(A)	70 ... 90 dB(A)	58 ... 68 dB(A)	58 dB(A)
Description	• Long or short design • Metal version • Operating medium compressed air • High temperature resistance up to 80°C • Slim width • Many different variants • Universal applications	• Compact design, polymer or die-cast • Barbed fitting or threaded connection • Operating medium compressed air	• For noise reduction and prevention of contamination at exhaust ports of pneumatic components • Polymer version • Operating medium compressed air • For solenoid valves CPE • Threaded connection or push-in sleeve for push-in fitting QS	• Attached via pin (spring clip, included in the delivery of the valve) • Polymer version • Operating medium compressed air
online: →	amte	u	uc	amtc

Pneumatic silencers

	Silencers **UO**	**Silencers** **UOS-1, UOS-1-LF**	**Silencers** **UOM, UOMS**
Information on silencer insert materials	PE	PE	PU foam
Pneumatic connection	G1/4, G1/8, M5, M7	G1	G1/4, G3/8
Noise level		75 dB(A)	
Description	• Special open minimal resistance silencer • For vacuum generators • Facilitates trouble-free operation of the vacuum generator • Operating medium compressed air	• Silencer for MS6-SV, MS series • Operating medium compressed air	• Special open minimal resistance silencer • For vacuum generators • Facilitates trouble-free operation of the vacuum generator • Silencer extension for extending the silencer for further noise reduction • Operating medium compressed air
online: →	uo	uos	uom

Compressed air pistols

	Air guns **LSP**	**Air nozzles** **LPZ**
Exhaust air function	Metered blowing	
Pneumatic connection	Female thread G1/4	Male thread M12x1.25
Information on housing materials	Wrought aluminium alloy, PA6 reinforced	Aluminium, Brass, Die-cast zinc, Chrome-plated, Nickel-plated
Description	• Precise, infinitely variable, lever-operated flow metering • Interchangeable nozzles • Operating medium compressed air	• With protective air shield or silencer • Targeted, strong air jet or powerful, focused air jet • Low noise level • Operating medium compressed air
online: →	lsp	lpz

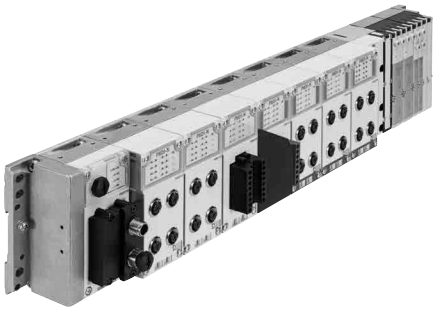
Pressure indicators

	Visual indicators **OH**	**Pneumatic terminals, end clamps, distributors** **LT, LTE, LTV**
Operating pressure [MPa]	-0.1 ... 0.8 MPa	
Operating pressure	-1 ... 8 bar	0.1 ... 8 bar
Pneumatic connection	Barbed connector PK-3, G1/8	Barbed connector PK-3, PK-4
Pneumatic connection 2		For tubing O.D. 4 mm, 6 mm
Type of mounting	Installation into control panel in Ø22.5	
Description	• Visual indicator • Indicator colours red, blue, yellow or green • Aluminium or polymer • Operating medium compressed air	• Pneumatic terminal for checking incoming and outgoing signals at the controller input and output • Up to 15 distributor pieces with common air supply, for easy connection • Brass, polymer • Operating medium compressed air
online: →	oh	lt

Inscription systems

	Inscription labels **ASLR, BZ, HWF, IBS, KM, KMC, MH, SBS**	**Inscription label holders** **ASCF, CPV10-VI-ST, CPV14-VI-ST, CPV18-VI-ST, CPVSC1-ST, CPX-ST, VMPA1-ST, VMPA14-ST, VMPAL-ST**
Type of mounting	Can be pressed in manually	Plug-on, snap-in, clip-on
Width	29 mm	21 mm, 12 mm
Height	5 mm, 5.2 mm, 6 mm, 9 mm, 27 mm	7 mm, 2 mm
Description	• For labelling items • Can be inserted in holders or carriers on suitably equipped components	• Holder for inscription labels • For components without pre-assembled carriers
online: →	aslr	ascf

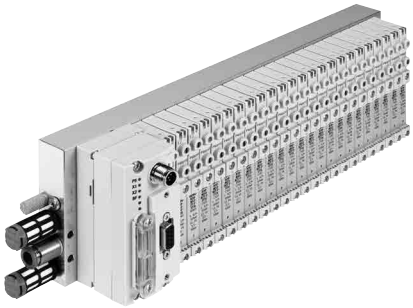
Control technology and remote I/O



- Electronic controllers and remote I/Os including electrical peripherals for standard and potentially explosive atmospheres.

➔ **www.festo.com/pa/control**

Valve terminals



- Valve modules with electrical multi-pin, individual or fieldbus connection or integrated controller, with or without electrical inputs and outputs

➔ **www.festo.com/pa/valveterminals**

Pilot valves

	Solenoid valves VSNC ★	**Solenoid valves VSNC-G1/8**	**Solenoid valves VOFC**	**Solenoid valves VOFD**
Valve function	5/2 double solenoid, 5/2-way or 3/2-way, convertible, 5/3-way, pressurised, 5/3 exhausted, 5/3 closed	3/2-way, closed, monostable, 5/2-way, monostable, Connections swapped	3/2-way, closed, monostable, 5/2 double solenoid, 5/2-way, monostable	3/2-way, closed, monostable, semi-automatic, 3/2-way, closed, monostable
Operating pressure [MPa]	0.15 ... 1 MPa	0.25 ... 0.8 MPa	0 ... 1 MPa	0 ... 1.2 MPa
Operating pressure	1.5 ... 10 bar	2.5 ... 8 bar	0 ... 10 bar	0 ... 12 bar
Ambient temperature	-20 ... 60°C	-20 ... 50°C	-25 ... 60°C	-50 ... 60°C
Pneumatic connection 1	1/4 NPT, G1/4, QS-1/4, QS-10, QS-3/8, QS-5/16, QS-6, QS-8	G1/8	1/4 NPT, 1/2 NPT, NAMUR port pattern, G1/2, G1/4	1/4 NPT, NAMUR port pattern, G1/4, 1/2 NPT, G1/2
Standard nominal flow rate	800 ... 1350 l/min	400 l/min	595 ... 2794 l/min	52 ... 1900 l/min
Explosion prevention and protection	Class I, Div. 1 (US), Class I, Div. 2 (US), Class II, Div. 1 (US), Class II, Div. 2 (US), Class III, Div. 1 (US), Class III, Div. 2 (US), The information in the certificate must be observed., Zone 0 (IEC-EX), Zone 0 (KR), Zone 1 (ATEX), Zone 1 (IEC-EX), Zone 1 (KR), Zone 2 (ATEX), Zone 2 (KR), Zone 20 (IEC-EX), Zone 21 (ATEX), Zone 21 (IECEx), Zone 21 (KR), Zone 22 (ATEX), Zone 22 (KR)		Zone 1 (ATEX), Zone 1 (IEC-EX), Zone 1 (KR), Zone 2 (ATEX), Zone 21 (ATEX), Zone 21 (IECEx), Zone 21 (KR), Zone 22 (ATEX)	II 2G, II 2D, for zone, 2, 21, 22, Ex d IIC T6, T5, T4 Gb, Ex eb mb IIC T6, T5 Gb
Safety integrity level (SIL)			Up to SIL 2 High Demand mode, To SIL 2 Low Demand mode, Up to SIL 3 High Demand mode, To SIL 3 Low Demand mode	Up to SIL 3 High Demand mode, To SIL 3 Low Demand mode
Description	• Namur connection pattern to VDI/VDE 3845 • Rotatable seal for 3/2- or 5/2-way valve • Wide choice of EX solenoid systems • Sturdy and powerful • Extended temperature range • Excellent value for money • All solenoid coils can be used on an armature tube • The VSNC-...FN variant achieves greater energy efficiency with reduced power consumption	• Namur connection pattern to VDI/VDE 3845 • Compact, cost-effective, powerful • Especially suitable for rotary actuators DAPS and DFPD with connection pattern according to VDI/VDE 3845 • Extended temperature range • Electrical connection with plug pattern type form C, according to EN 175301-803 • Solenoid coil 24 V integrated • Excellent value for money	• Suitable for process automation in the chemical and petrochemical industries • Suitable for outdoor use under harsh ambient conditions • Especially suitable for quarter turn actuators thanks to NAMUR flange pattern • Valve can switch between internal and external pilot air • Variants with safety functions • Variants to EU Explosion Protection Directive (ATEX)	• Suitable for process automation in the chemical and petrochemical industries • Suitable for outdoor use under harsh ambient conditions • Especially suitable for quarter turn actuators thanks to NAMUR flange pattern • Variants with safety functions • Variants to EU Explosion Protection Directive (ATEX)
online: →	vsnc	vsnc	vofc	vofd

Limit switch attachments

	End switch attachments SRBC ★	**End switch attachments SRBG**	**End switch attachments SRBE**
Information on housing materials	Die-cast aluminium	PBT	Painted die cast aluminium
Operating voltage range AC	0 ... 250 V		0 ... 250 V
Operating voltage range DC	0 ... 175 V	6 ... 60 V	0 ... 60 V
Measuring principle	Inductive, Magnetic reed, Mechanical/ electrical	Inductive	Inductive, Magnetic reed, Mechanical/ electrical, Via proximity switch
Switching element function	N/C contact, N/O contact, Toggle switch, single-pole	N/C contact, N/C or N/O contact, switchable, N/O contact	N/C contact, N/O contact, Toggle switch, single-pole, Toggle switch, double-pole
Safety integrity level (SIL)	SIL 2	SIL 2	SIL 2
Description	• Pre-assembled mounting adapter for ease of installation • The trip cams can be easily set without additional tools • Sturdy, corrosion-resistant design, ideal for use in harsh ambient conditions • Clearly visible 3D position indicator allows the current position of the quarter turn actuator to be quickly detected • With safety functions • Variants to EU Explosion Protection Directive (ATEX)	• Compact housing with M12 plug connection • Direct mounting on quarter turn actuators to VDI/VDE 3845 • For quarter turn actuators for process automation with position indicators • AS-Interface version with extended addressing options • LED status indicator for switching status, supply voltage and solenoid valve output • With safety functions • Variants to EU Explosion Protection Directive (ATEX)	• The trip cams can be easily set without additional tools • Sturdy, corrosion-resistant design, ideal for use in harsh ambient conditions • Clearly visible 3D position indicator allows the current position of the quarter turn actuator to be quickly detected • With safety functions • To EU Explosion Protection Directive (ATEX)
online: →	srbc	srbg	srbe

Limit switch attachments

	Limit switch attachments SRAP	**Limit switch attachments DAPZ**	**Limit switch box SRBI**
Information on housing materials	Wrought aluminium alloy		PBT
Operating voltage range AC		4 ... 250 V	
Operating voltage range DC	15 ... 30 V	4 ... 250 V	10 ... 30 V
Measuring principle	Magnetic Hall	Inductive, Mechanical/electrical	Inductive
Switching element function		N/O contact, Changeover switch	N/O contact
Safety integrity level (SIL)			
Description	• Based on standard VDI/VDE 3845 (NAMUR) • Analogue • For monitoring the position of quarter turn actuators • Sensors based on 2D Hall technology • Variants to EU Explosion Protection Directive (ATEX)	• Round design • Drive interface to standard VDI/VDE 3845 (NAMUR) • With display • Integrated solenoid valve control	• Compact housing with M12 plug connection • Direct mounting on quarter turn actuators to VDI/VDE 3845 • For quarter turn actuators for process automation with position indicators • LED status indicator for switching status and supply voltage
online: →	srap	dapz	srbi

Accessories for limit switch attachments

	 Position indicators SASF
Setting range of swivel angle	0 ... 360 deg
Ambient temperature	-40 - 80°C
Type of mounting	To VDI/VDE 3845
Description	• For limit switch attachments SRBG, SRBI, SRBC • Variants for mounting on drive shafts of standard drives according to VDI/VDE 3845 • Variants with adjustable swivel angle • Variants for clockwise and anticlockwise rotating actuators with 90° and 180° rotation • Variants with position indicator in yellow/red, I-, T-, L-design or with 180° arrow
online: →	sasf

Positioners

	 Positioner CMSH	 **Positioners CMSX** ★
Mode of operation	Double-acting, Single-acting	Double-acting, Single-acting
Standard nominal flow rate		50 ... 130 l/min
Ambient temperature	-40 ... 80°C	-5 ... 60°C
Reference value		0...10 V/0...20 mA/4...20 mA
Operating voltage range DC		21.6 ... 26.4 V
Operating pressure [MPa]	0.14 ... 0.8 MPa	0.3 ... 0.8 MPa
Operating pressure	1.4 ... 8 bar	3 ... 8 bar
Operating pressure [psi]	20.3 ... 116 psi	43.5 ... 116 psi
Design features	Safety position - pneumatic outlets closed, Safety pneumatic output 4 pressurised, Safety pneumatic output 2 exhausted	Safety position – pneumatic outlet 4 exhausted, Safety position – pneumatic outlet 2 pressurised, Safety position - pneumatic outlets closed
Degree of protection	IP66, IP67	IP65
Type of mounting	With accessories, To VDI/VDE 3845, To VDI/VDE 3847-2	With accessories
Information on housing materials	Aluminium, powder-coated	PC-reinforced
Description	• Intelligent, digital electropneumatic positioner with HART communication • Fast and precise position control of single- and double-acting pneumatic rotary and linear drives • With integrated or external path/angular detection • Commissioning, operation, maintenance and diagnostics on the local display via the user-friendly software menu or via remote access with EDD-based (Electronic Device Description) or FDT-based (Field Device Tool) transmission • 2-conductor technology • Perfect interaction with the pneumatic extension modules VTOP • Variants with safety functions • Sustainable operation thanks to efficient control	• Digital, electropneumatic positioner • Simple and efficient position control of single- and double-acting pneumatic rotary and linear drives • With integrated or external path/angular detection • Simple commissioning through automatic initialisation function • Intuitive menu navigation • 4-conductor technology • Variants with safety functions
online: →	cmsh	cmsx

Drives & actuators >

Linear actuators

	Linear actuators DFPC	**Piston drives DFPK**	**Linear drives with displacement encoder DFPI**
Design	Piston, Piston rod, Tie rod, Cylinder barrel		Piston, Piston rod, Tie rod, Cylinder barrel
Mode of operation	Double-acting		Double-acting
Size of valve actuator	80, 100, 125, 160, 200, 250, 320	46, 75	100, 125, 160, 200, 250, 320
Stroke	10 ... 1600 mm	17 ... 20 mm	40 ... 990 mm
Operating pressure [MPa]	0.06 ... 0.8 MPa	0.5 ... 1 MPa	0.3 ... 0.8 MPa
Operating pressure	0.6 ... 8 bar	5 ... 10 bar	3 ... 8 bar
Operating pressure [psi]	8.7 ... 116 psi	72.5 ... 145 psi	43.5 ... 116 psi
Ambient temperature	-20 ... 80°C	0 ... 60°C	-20 ... 80°C
Description	• Robust and corrosion-resistant tie-rod design • Ideal for use in harsh ambient conditions • Numerous configuration options • Variants with fastening interface in accordance with ISO 5210 or ISO 15552 with extended tie rods	• Stainless steel design • Available as a valve actuator with angle seat valve VZXA and as a valve block solution • Linear actuating motion • High actuating forces • To EU Explosion Protection Directive (ATEX)	• Mounting interfaces to ISO 15552 on bearing and end caps • Sturdy tie rod design • Integrated air supply • Optionally with integrated displacement encoder or fully integrated positioner • IP65, IP67, IP69K, NEMA4 • To EU Explosion Protection Directive (ATEX)
online: ➔	dfpc	dfpk	dfpi

Software tools

Configurator for quarter turn actuator units KDFP

Choose just an actuator unit without process valve for automating existing process valves. Simply enter the required parameters on the input screen and the configurator will suggest suitable solutions.

You can find the configurator at
➔ **www.festo.com/process**

Drives & actuators >

Quarter turn actuators for process valves

	Quarter turn actuator units KDFP-DFPD	**Quarter turn actuators DFPD** ★	**Quarter turn actuators with heavy-duty guide DFPD-HD**
Design	Rack and pinion	Rack and pinion	Scotch yoke system
Mode of operation	Double-acting, Single-acting	Double-acting, Single-acting	Double-acting, Single-acting
Size of valve actuator	120, 80, 10, 20, 300, 240, 40, 900, 160, 2300, 700, 1200, 480	10, 20, 40, 80, 120, 160, 240, 300, 480, 700, 900, 1200, 2300	9000, 18000, 32000
Flange hole pattern	F12, F10, F07, F14, F16, F05, F04, F03	F03, F04, F05, F07, F10, F12, F14, F16, F0507, F0710, F1012, F1216	F25, F30, F35
Swivel angle	90 deg	90 deg, 120 deg, 135 deg, 180 deg	90 deg
Operating pressure [MPa]	0.2 ... 0.8 MPa	0.2 ... 0.8 MPa	0.1 ... 0.85 MPa
Operating pressure	2 ... 8 bar	2 ... 8 bar	1 ... 8.5 bar
Operating pressure [psi]	29 ... 116 psi	29 ... 116 psi	14.5 ... 123.25 psi
Ambient temperature	-50 ... 150°C	-50 ... 150°C	-20 ... 80°C
Safety function		The safety function consists of the actuator switching to the specified safety switching position. This switching movement is achieved by pressurising the corresponding pressure chamber with compressed air. The value of the torque generated depends on the differential pressure between the two pressure chambers separated by the piston., The safety function consists of the actuator switching to the specified safety switching position when the compressed air is switched off and the spring chamber is exhausted. This switching movement is achieved through the spring force of the spring assembly.	
Safety integrity level (SIL)		To SIL 2 Low Demand mode, Up to SIL 3 in a redundant architecture, Up to SIL 1 high demand mode	
Description	• Quarter turn actuator unit comprising quarter turn actuator DFPD and accessories • Select, size and order quickly, easily and reliably with the configurator • Optionally with pilot valve • Optionally with positioner • Optional with position indicator • Optionally with end position feedback • Optionally with the required mounting adapters or reducing sleeves for mounting on the valve body	• Uniform torque characteristic across the entire rotation angle of 90° with the double-acting version • Process valve connection to ISO 5211 • Mounting hole pattern to VDI/VDE 3845 • Sturdy, non-slip and easy-to-clean aluminium housing • Long service life, low wear • Version with swivel angle 120°, 135°, 180° for the sizes 40, 120, 240, 480, double-acting • Variants with safety functions • To EU Explosion Protection Directive (ATEX)	• Ideal for applications with high torques up to max. 32,000 Nm • Extremely modular for a variety of uses: configurable spring forces, a choice between right or left direction of rotation and mechanical or hydraulic manual override • With safety functions • Namur connection pattern to VDI/VDE 3845 • Variants to EU Explosion Protection Directive (ATEX)
online: ➔	kdfp	dfpd	dfpd

Drives & actuators >

Quarter turn actuators for process valves

	Quarter turn actuators DFPD-C	**Quarter turn actuators DAPS**
Design	Rack and pinion	Scotch yoke system
Mode of operation	Single-acting	Double-acting, Single-acting
Size of valve actuator	20, 40, 80, 120, 160, 240, 300, 480, 700, 900, 1200, 2300	0008, 0015, 0030, 0053, 0060, 0090, 0106, 0120, 0180, 0240, 0360, 0480, 0720, 0960, 1440, 1920, 2880, 3840, 4000, 5760, 8000
Flange hole pattern	F05, F07, F10, F12, F14, F16	F03, F04, F05, F07, F10, F12, F14, F16, F25
Swivel angle	90 deg	90 deg, 92 deg
Operating pressure [MPa]	0.2 ... 0.8 MPa	0.1 ... 0.84 MPa
Operating pressure	2 ... 8 bar	1 ... 8.4 bar
Operating pressure [psi]	29 ... 116 psi	
Ambient temperature	-20 ... 80°C	-50 ... 150°C
Safety function	The safety function consists of the actuator switching to the specified safety switching position when the compressed air is switched off and the spring chamber is exhausted. This switching movement is achieved through the spring force of the spring assembly.	
Safety integrity level (SIL)	To SIL 2 Low Demand mode, Up to SIL 3 in a redundant architecture, Up to SIL 1 high demand mode	Up to SIL 2 High Demand mode, To SIL 2 Low Demand mode
Description	• Suitable for process automation in the chemical and petrochemical industries • Extended NAMUR interface to VDI/VDE 3847 • Anti-blow-out screws for end-position adjustment • Hard anodised cover to prevent surface damage • Non-ferrous metal-free spring sets • Version with compressed air ducts in the housing for direct attachment of positioner and pilot valve on the actuator, without extra barbed tubing connectors	• High breakaway torques • Flange hole pattern to ISO 5211 • Mounting hole pattern to VDI/VDE 3845 • Optionally with handwheel as a manual emergency override • Corrosion-resistant version made from stainless steel • To EU Explosion Protection Directive (ATEX) • With safety functions
online: →	**dfpd**	**daps**

Software tools

Process Valve Automation Tool (PVA-Tool) engineering software		User-friendly software for sizing and selecting the appropriate quarter turn actuators for automating butterfly and ball valves The torque curve of the selected actuator will be displayed for visual confirmation. The specifications for the application can be changed at any time and the results will be automatically adjusted in line with the new requirements. You can find the engineering software at ➔ **www.festo.com/x/engineering**

Process valves >

Ball valves

	Ball valves VZBD	**Ball valves VZBE**	**Ball valves VZBF**	**Ball valves VZBM**
Design	2-way ball valve	2-way ball valve, 2-way ball valve with hand lever, 3-way ball valve, L-hole, T-hole	2-way ball valve	2-way ball valve, 3-way ball valve, L-hole, T-hole
Actuation type	Mechanical	Mechanical	Mechanical	Mechanical
Nominal size DN	15, 20, 25, 32, 40, 50, 65, 80, 100	8, 10, 15, 20, 25, 32, 40, 50, 65, 80, 100	15, 20, 25, 32, 40, 50, 65, 80, 100, 150, 200	8, 10, 15, 20, 25, 32, 40, 50
Process valve connection	Clamp to ASME-BPE, Clamp to DIN 32676 series B, Weld-on end to ASME-BPE, Weld-on end to ISO 1127	1 NPT, 1 1/2 NPT, 1 1/4 NPT, 1/2 NPT, 1/4 NPT, 2 NPT, 2 1/2 NPT, 3 NPT, 3/4 NPT, 3/8 NPT, 4 NPT, Weld-on end according to ASME B16.11	Flange to ANSI B16.5 class 150	Rp1, Rp1 1/2, Rp1 1/4, Rp1/2, Rp1/4, Rp2, Rp3/4, Rp3/8
Flow rate Kv	13 ... 1641 m3/h	5.1 ... 1637 m3/h	8.5 ... 7816 m3/h	5.9 ... 243 m3/h
Temperature of medium	-20 ... 200°C	-20 ... 200°C	-20 ... 200°C	-20 ... 130°C
Nominal pressure process valve PN	16	63	20	25, 40, 50
Description	• Electropolished surfaces SFV4 • PTFE seal with little dead space • The high-performance ball valve for the pharmaceutical and cosmetics industry • FDA-compliant seal to FDA 21 CFR 177.1550	• 2-way manual, with lockable hand lever • 2- and 3-way with ISO 5211 head flange, with optional lockable hand lever • Stainless steel design • Pipe thread according to ASME B1.20.1 or welded end according to ASME B16.11 • Optionally with pre-assembled hand lever	• Flanged connections to ANSI B 16.5. class 150 • Static discharge ensured • API 607 Fire Safe certification • Stainless steel design • Easy to service • Optionally with pre-assembled hand lever	• Brass design • Pipe thread to EN 10226-1
online: ➔	vzbd	vzbe	vzbf	vzbm

Process valves >

Ball valves

	Ball valves VAPB	**Ball valves VZBC**	**Ball valves VZBA**
Design	2-way ball valve	2-way ball valve	2-way ball valve, 3-way ball valve, L-hole, T-hole
Actuation type	Mechanical	Mechanical	Mechanical
Nominal size DN	15, 20, 25, 32, 40, 50, 63	15, 20, 25, 32, 40, 50, 65, 80, 100	8, 10, 15, 20, 25, 32, 40, 50, 65, 80, 100
Process valve connection	Rp1, Rp1 1/2, Rp1 1/4, Rp1/2, Rp1/4, Rp2, Rp2 1/2, Rp3/4, Rp3/8	Ring housing with threaded flange	Weld-on ends/weld-on ends, Rp1, Rp1 1/2, Rp1 1/4, Rp1/2, Rp1/4, Rp2, Rp2 1/2, Rp3, Rp3/4, Rp3/8, Rp4
Flow rate Kv	5.9 ... 535 m3/h	19.4 ... 1414 m3/h	7 ... 1414 m3/h
Temperature of medium	-20 ... 150°C	-10 ... 200°C	-10 ... 200°C
Nominal pressure process valve PN	25, 40	16, 40	63
Description	• Automatable 2-way ball valve • Brass design • Blow-out proof shaft • Manual operation possible using hand lever • Connecting thread to EN 10226-1 • Mounting flange to ISO 5211	• Automatable 2-way compact flanged ball valve • Stainless steel design • Short installation length • Blow-out proof shaft • Manual operation possible using hand lever • Flange to DIN 1092-1 • Mounting flange to ISO 5211 • Use in zone 1, 21, 2, 22	• Automatable 2-way or 3-way ball valve • Stainless steel design • Blow-out proof shaft • Manual operation possible using hand lever • Connecting thread to EN 10226-1 • Mounting flange to ISO 5211 • Use in zone 1, 21, 2, 22
online: →	**vapb**	**vzbc**	**vzba**

Process valves >

Angle seat valves

	Angle seat valves VZXA ★	**Angle seat valves VZXF**
Design	Poppet valve with piston drive, Poppet valve with diaphragm actuator	Poppet valve with piston drive
Drive size	46 mm, 75 mm, 90 mm	50 mm, 80 mm
Valve function	2/2	2/2-way, closed, monostable
Control function	Closed via reduced spring force, N/C, Double-acting, Opened via spring force, N/O, Closed via spring force, N/C	Closed via spring force, NC
Actuation type	Pneumatic	Pneumatic
Nominal size DN	13, 20, 25, 32, 40, 50, 65	12, 13, 16, 18, 23, 24, 29, 31, 35, 43, 45
Flow rate Kv	4.6 ... 77.9 m3/h	3.3 ... 43 m3/h
Medium pressure [MPa]	0 ... 3 MPa	-0.09 ... 4 MPa
Medium pressure	0 ... 30 bar	-0.9 ... 40 bar
Temperature of medium	-30 ... 200°C	-40 ... 200°C
Nominal pressure process valve PN	25, 40	16, 40
Description	• Highly flexible, extremely high flow rates • Long service life • Stainless steel or Ecobrass process valves with stainless steel or polymer actuators • Modular design • Hygienic design, insensitive to dirt • Quick and easy maintenance • Simple and sturdy: an ideal choice for virtually all media with a viscosity of 600 mm2/s • High chemical and thermal resistance • Sustainable in production thanks to the use of alternative materials	• Sturdy design • Stainless steel and gunmetal process valves with stainless steel, brass or aluminium actuators • Different actuator sizes and housing materials • Selection of different seat and shaft seals • For liquids, gases and other easily contaminated media • Easy-to-clean design
online: ➔	vzxa	vzxf

Process valves >

Pinch valves

	Pinch valves VZQA
Design	Pinch valve, pneumatically actuated
Actuation type	Pneumatic
Valve function	2/2-way, closed, monostable, 2/2 open, single solenoid
Nominal size DN	6, 15, 25, 50
Process valve connection	Clamp to ASME-BPE, type A, Clamp to ASME-BPE, type B, Clamp to DIN 32676 series A, 1 NPT, 1/2 NPT, 1/4 NPT, 2 NPT, G1, G1/2, G1/4, G2
Flow rate Kv	0.7 ... 72 m3/h
Medium pressure [MPa]	0 ... 0.6 MPa
Medium pressure	0 ... 6 bar
Medium pressure [psi]	0 ... 87 psi
Temperature of medium	-5 ... 150°C
Nominal pressure process valve PN	10
Description	• Modular design • Quick and easy replacement of the diaphragm • For critical, abrasive and viscous media • Easy-to-clean design • Flow direction is freely selectable • Versions with end-position sensing
online: →	vzqa

Process valves >

Solenoid-actuated media valves

	Solenoid valves VZWD ★	**Solenoid valves VZWF** ★	**Solenoid valves VZWM** ★
Design	Directly actuated poppet valve	Diaphragm valve, Force pilot operated	Diaphragm valve, servo-controlled
Actuation type	Electric	Electric	Electric
Nominal size	1 ... 6 mm	13.5 ... 50 mm	13 ... 50 mm
Process valve connection	1/4 NPT, 1/8 NPT, G1/4, G1/8, NPT1/4	1 NPT, 1 1/2 NPT, 1 1/4 NPT, 1/2 NPT, 1/4 NPT, 2 NPT, 3/4 NPT, 3/8 NPT, G1, G1 1/2, G1 1/4, G1/2, G1/4, G2, G3/4, G3/8	G1, G1 1/2, G1 1/4, G1/2, G1/4, G2, G3/4, G3/8
Flow rate Kv	0.06 ... 0.4 m3/h	1.8 ... 28 m3/h	1.6 ... 39 m3/h
Medium pressure [MPa]	0 ... 9 MPa	0 ... 1 MPa	
Medium pressure	0 ... 90 bar	0 ... 10 bar	
Medium pressure [psi]	0 ... 1305 psi	0 ... 145 psi	
Temperature of medium	-10 ... 80°C	-10 ... 80°C	-10 ... 60°C
Description	• Extensive pressure range • Directly actuated poppet valve • No differential pressure required • Can also be used in vacuum technology	• High flow rates • Large nominal diameters with relatively small solenoids • No differential pressure required • Can also be used in vacuum technology	• Brass or stainless steel casting design • Electrical connection via solenoid armature tube • Comprehensive range of coils • Coil can be ordered separately
online: →	vzwd	vzwf	vzwm

Process valves >

Solenoid-actuated media valves

	Solenoid valves VZWP	**Media separated solenoid valves VYKA**	**Media separated solenoid valves VYKB**
Design	Piloted piston poppet valve	Rocker valve with diaphragm seal	Electrical connection at top, Electrical connection at the side, Rocker valve with diaphragm seal
Actuation type	Electric	Electric	Electric
Nominal size	13 ... 25 mm	1.2 mm	1.6 ... 2 mm
Process valve connection	1 NPT, 1/2 NPT, 1/4 NPT, 3/4 NPT, 3/8 NPT, G1, G1/2, G1/4, G3/4, G3/8		
Flow rate Kv	1.5 ... 11.5 m3/h	0.013 ... 0.021 m3/h	0.034 ... 0.056 m3/h
Medium pressure [MPa]	0.05 ... 4 MPa	-0.05 ... 0.2 MPa	-0.075 ... 0.3 MPa
Medium pressure	0.5 ... 40 bar	-0.5 ... 2 bar	-0.75 ... 3 bar
Medium pressure [psi]	7.25 ... 580 psi	-7.25 ... 29 psi	-10.875 ... 43.5 psi
Temperature of medium	-10 ... 80°C		0 ... 50°C
Description	• For all applications with a differential pressure of min. 0.5 bar • For high pressures and high flow rates with relatively small solenoids • For controlling gaseous and liquid media in open circuits	• Compact width of 7 mm • Maximum performance and precision in the smallest of spaces • High flow rate with small size • Very easy to clean thanks to media separation • Low media consumption thanks to small internal volume • FDA-listed materials • High-quality materials, therefore also suitable for aggressive media • High repetition accuracy, switching frequency and precision, therefore also suitable for extremely small volumes and dosing tasks • Very flexible in use thanks to 3/2-way and 2/2-way variants as well as 12 ... 26 V DC control • Optionally with slide-on E-box VAVE-K1 with holding current reduction as accessory • Developed according to ISO 13485 • Sustainable operation thanks to efficient control and active air shut-off	• Compact width of 10 mm or 12 mm • Very easy to clean thanks to media separation • High-quality materials, therefore also suitable for aggressive media • Very flexible in use thanks to 3/2-way or 2/2-way variants as well as 12 or 24 V DC actuation • For dosing, aspirating and for continuous flow applications • Developed according to ISO 13485 • Sustainable operation thanks to efficient control and active air shut-off
online: →	vzwp	vyka	vykb

Software tools

Configurator for ball valve units KVZB		Size and order your custom ball valve units quickly, easily and reliably via the configurator – without waiting times. You will receive configuration-specific datasheets and the relevant CAD data or CAD models. You can find the configurator at ➔ **www.festo.com/process**

Process valve units >

Ball valve units

	 Ball valve units KVZB
Description	• Manually actuated with hand lever • Automatically actuated with quarter turn actuator • Controlled operation with quarter turn actuator and valve positioner • Variants to EU Explosion Protection Directive (ATEX)
online: ➔	kvzb

Process valve units >

Ball valve actuator units

	Ball valve actuator units VZBM	**Ball valve actuator units VZBC**	**Ball valve actuator units VZBA**	**Ball valve actuator units VZPR**
Design	2-way ball valve, 3-way ball valve, Semi-rotary drive	2-way ball valve, Semi-rotary drive	2-way ball valve, 3-way ball valve, L-hole, Semi-rotary drive, T-hole	2-way ball valve, Semi-rotary drive
Actuation type	Pneumatic	Pneumatic	Pneumatic	Electric, Pneumatic
Nominal size DN	8, 10, 15, 20, 25, 32, 40, 50	15, 20, 25, 32, 40, 50, 65, 80, 100	8, 10, 15, 20, 25, 32, 40, 50, 65, 80, 100	15, 20, 25, 32, 40, 50, 63
Process valve connection	Rp1, Rp1 1/2, Rp1 1/4, Rp1/2, Rp1/4, Rp2, Rp3/4, Rp3/8	Ring housing with threaded flange	Weld-on ends/weld-on ends, Rp1, Rp1 1/2, Rp1 1/4, Rp1/2, Rp1/4, Rp2, Rp2 1/2, Rp3, Rp3/4, Rp3/8, Rp4	Rp1, Rp1 1/2, Rp1 1/4, Rp1/2, Rp1/4, Rp2, Rp2 1/2, Rp3/4, Rp3/8
Flow rate Kv	5.9 ... 243 m3/h	19.4 ... 1414 m3/h	7 ... 1414 m3/h	
Temperature of medium	-20 ... 130°C	-10 ... 200°C	-10 ... 200°C	-20 ... 150°C
Nominal pressure process valve PN	25, 40	16, 40	63	25, 40
Description	• Ball valve actuator unit with double-acting or single-acting quarter turn actuator DFPD • Brass ball valve • 2-way ball valve actuator unit with pipe thread to EN 10226-1 • 3-way ball valve actuator unit with drilled L-hole and pipe thread to EN 10226-1 • 3-way ball valve actuator unit with drilled T-hole and pipe thread to EN 10226-1 • Flow is fully opened or closed in both directions	• Ball valve actuator unit with double- or single-acting quarter turn actuator DAPS • Stainless steel ball valve in compact design • NAMUR connection pattern for solenoid valves/limit switch attachments to VDI/VDE 3845 • Flow is fully opened or closed in both directions • Use in zone 1, 21, 2, 22	• Ball valve actuator unit with double- or single-acting quarter turn actuator DAPS • Stainless steel ball valve • NAMUR connection pattern for solenoid valves/limit switch attachments to VDI/VDE 3845 • Flow is fully opened or closed in both directions • Use in zone 1, 21, 2, 22	• Ball valve actuator unit with double-acting quarter turn actuator DAPS • Brass ball valve • NAMUR connection pattern for solenoid valves/limit switch attachments to VDI/VDE 3845 • Flow is fully opened or closed in both directions
online: →	vzbm	vzbc	vzba	vzpr

Software tools

Configurator for butterfly valve units KVZA		Size and order your custom butterfly valve units quickly, easily and reliably via the configurator – without waiting times. You will receive configuration-specific datasheets and the relevant CAD data or CAD models. You can find the configurator at ➔ **www.festo.com/process**

Process valve units >

Butterfly valve units

	 Butterfly valve units KVZA
Description	• For versatile use in various industry sectors • Manually actuated with hand lever • Automatically actuated with quarter turn actuator • Controlled operation with quarter turn actuator and valve positioner • Butterfly valve type: wafer or lug • Nominal width DN25 ... DN200 • Connection standard DIN EN 1092-1 or ANSI CLASS 150
online: ➔	kvza

Process valves >

Pneumatically actuated media valves

	Pneumatic valves VLX	**Media separated pneumatic valves VZDB**
Design	Diaphragm valve	Rocker valve with diaphragm seal
Valve function	2/2-way, closed, monostable	2/2-way, closed, monostable, 3/2-way, monostable, open/closed
Actuation type	Pneumatic	Pneumatic
Nominal size	13 ... 25 mm	1.6 mm
Process valve connection	G1, G1/2, G1/4, G3/4, G3/8	Male thread/male thread
Flow rate Kv		0.034 m³/h
Standard nominal flow rate	2400 ... 14000 l/min	
Temperature of medium	-10 ... 80°C	0 ... 50°C
Medium pressure	1 ... 10 bar	
Operating pressure		-0.75 ... 1 bar
Description	• Poppet valve • Indirectly actuated • Brass design • In-line mounting	• Compact width of 10 mm • Very easy to clean thanks to media separation • High-quality materials, therefore also suitable for aggressive media • For dosing, aspirating and for continuous flow applications • Developed according to ISO 13485
online: →	vlx	vzdb

Compressed air preparation

- Service unit combinations and individual units for compressed air preparation in two series: series MS and D (in metal or polymer)

➔ **www.festo.com/pa/airprep**

Pneumatic connection technology

- Pipes
- Tubings
- Plug connectors
- Couplings
- Distributors
- Protective conduit systems
- Accessories

➔ **www.festo.com/pa/fittings**

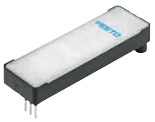
Individual valves >

Media separated valves

	Media separated solenoid valves VYKA	**Media separated solenoid valves VYKB**	**Media separated pneumatic valves VZDB**
Size	7	10, 12	10
Valve function	2/2-way, closed, monostable, 2/2 open, single solenoid, 3/2-way, monostable, open/closed	2/2-way, closed, monostable, 3/2-way, monostable, open/closed	2/2-way, closed, monostable, 3/2-way, monostable, open/closed
Operating voltage range DC	12 ... 26 V	12 ... 24 V	
Note on operating voltage range DC	With electrical sub-base VAVE-K1-..., ±10%		
Coil characteristics	12 - 26 V DC: low-current phase 0.06 W, high-current phase 2.2 W	12 V DC: low-current phase 1 W, high-current phase 3.7 W, 12 V DC: low-current phase 1 W, high-current phase 5.2 W, 24 V DC: low-current phase 1 W, high-current phase 5.2 W, 24 V DC: low-current phase 1 W, high-current phase 3.7 W	
Fluid connection	Flange	Flange	Flange
Nominal size	1.2 mm	1.6 mm, 2 mm	1.6 mm
Flow rate Kv	0.013 m³/h, 0.018 m³/h, 0.021 m³/h	0.034 m³/h, 0.056 m³/h	0.034 m³/h
Medium	Liquid media, Gaseous media	Liquid media, Gaseous media	
Medium pressure [MPa]	-0.05 MPa, 0 MPa, 0.2 MPa	-0.075 MPa, 0.1 MPa, 0.3 MPa	
Materials in contact with the media	FFPM, PEEK, EPDM, FPM	EPDM, FFPM, FPM, PEEK	
Ambient temperature	0 ... 50°C	0 ... 50°C	0 ... 50°C
Description	• Compact width of 7 mm • Maximum performance and precision in the smallest of spaces • High flow rate with small size • Very easy to clean thanks to media separation • Low media consumption thanks to small internal volume • FDA-listed materials • High-quality materials, therefore also suitable for aggressive media • High repetition accuracy, switching frequency and precision, therefore also suitable for extremely small volumes and dosing tasks • Very flexible in use thanks to 3/2-way and 2/2-way variants as well as 12 ... 26 V DC control • Optionally with slide-on E-box VAVE-K1 with holding current reduction as accessory • Developed according to ISO 13485 • Sustainable operation thanks to efficient control and active air shut-off	• Compact width of 10 mm or 12 mm • Very easy to clean thanks to media separation • High-quality materials, therefore also suitable for aggressive media • Very flexible in use thanks to 3/2-way or 2/2-way variants as well as 12 or 24 V DC actuation • For dosing, aspirating and for continuous flow applications • Developed according to ISO 13485 • Sustainable operation thanks to efficient control and active air shut-off	• Compact width of 10 mm • Very easy to clean thanks to media separation • High-quality materials, therefore also suitable for aggressive media • For dosing, aspirating and for continuous flow applications • Developed according to ISO 13485
online: →	vyka	vykb	vzdb

Individual valves >

Proportional valves, piezo valves

	 **Piezo valves VEMP**	**Piezo valves VEAE**	**Proportional directional control valves VPWS**
Design			Directly actuated poppet valve
Valve function	2/2-way, closed, monostable, 3/3-way, closed, monostable	2/2-way, closed, monostable	2/2 proportional directional control valve, closed
Pneumatic connection 1	Flange	Flange	Cartridge 7.5 mm, Cartridge 15 mm
Actuation type	Electric	Electric	Electric
Operating pressure	0 bar, 0.7 bar, 1.1 bar, 1.7 bar	0 bar, 3 bar, 6 bar	0 bar, 3 bar, 7 bar, 8 bar, 10 bar
Standard nominal flow rate	18 l/min, 19 l/min, 27 l/min, 28 l/min	50 l/min, 53 l/min, 60 l/min, 61 l/min, 64 l/min, 81 l/min	
Standard flow rate pmax -> 0 MPa (0 bar, 0 psi)			46 l/min, 56 l/min, 68 l/min, 82 l/min, 88 l/min, 98 l/min, 200 l/min, 220 l/min, 270 l/min, 350 l/min
Nominal size	1.3 mm, 1.6 mm	1.2 mm, 1.5 mm, 1.7 mm	1 mm, 1.5 mm, 2.2 mm, 6 mm
Medium	Inert gases, Air, Oxygen (oxygen applications to IEC 60601-1 only on request), Nitrogen	Compressed air as per ISO 8573-1:2010 [5:3:1], Inert gases, Oxygen (oxygen applications to IEC 60601-1 only on request)	Inert gases, Air, Oxygen
Ambient temperature	-20°C, 0°C, 50°C, 70°C	-10°C, 60°C	5°C, 50°C
Description	• Very low power consumption • No self-heating • Low leakage • Highly precise • Operating medium: air, oxygen, inert gases, nitrogen • Integrated piezo technology • Long service life • Light weight • Mounting: on sub-base, on manifold rail	• Silent operation • Very low power consumption • No self-heating • Integrated piezo technology • Extremely long service life • Operating medium: air, oxygen, inert gases • Small and lightweight • High throughflow • Mounting via through-holes	• Directly actuated poppet valve • Operating medium: air, oxygen, inert gases • Extremely small and lightweight • Compact and cost-effective • Mounting: on sub-base
online: →	vemp	veae	vpws

Individual valves >

Switching valves

	Solenoid valves VOVK	**Solenoid valves MHA1, MHP1**	**Solenoid valves MHE2, MHP2, MHA2, MHE3, MHP3, MHA3, MHE4, MHP4, MHA4**	**Fast-switching valves MHJ9, MHJ10**
Design	Connection direction downwards, Connection orientation forwards, Poppet valve with spring return	Poppet valve with spring return	Pressure-relieved poppet valve	Poppet valve without spring return
Width	5.9 mm	10 mm, 20 mm	10 mm, 14 mm, 18 mm	9 mm, 10 mm
Valve function	3/2-way, closed, monostable	2/2-way, closed, monostable, 2x2/2-way, monostable, closed, 3/2-way, closed, monostable, 3/2 open, single solenoid	3/2-way, closed, monostable, 3/2 open, single solenoid, 5/2-way, monostable	2/2-way, closed, monostable
Actuation type	Electric	Electric	Electric	Electric
Standard nominal flow rate	5.5 l/min	10 l/min, 14 l/min, 30 l/min	90 l/min, 100 l/min, 200 l/min, 400 l/min	50 l/min, 100 l/min, 160 l/min
Nominal size	0.36 mm	0.65 mm, 0.7 mm, 0.9 mm, 1.5 mm	2 mm, 3 mm, 4 mm	
Operating pressure	-1 bar, 7 bar	-0.9 bar, 0 bar, 1.5 bar, 2 bar, 6 bar, 8 bar	-0.9 bar, 8 bar	0.5 bar, 4 bar, 6 bar, 8 bar
Operating pressure [MPa]	-0.1 MPa, 0.7 MPa	-0.09 MPa, 0 MPa, 0.15 MPa, 0.2 MPa, 0.6 MPa, 0.8 MPa	-0.09 MPa, 0.8 MPa	0.05 MPa, 0.4 MPa, 0.6 MPa, 0.8 MPa
Operating medium	Compressed air to ISO 8573-1:2010 [6:4:1]	Compressed air ISO 8573-1:2010 [7:4:4]	Compressed air ISO 8573-1:2010 [7:4:4]	Compressed air ISO 8573-1:2010 [7:4:4]
Nominal operating voltage DC	12 V, 24 V			
Ambient temperature	5°C, 50°C	-5°C, 40°C, 50°C	-5°C, 40°C, 60°C	-5°C, 60°C
Description	• Very narrow: 5.9 mm grid dimension • Extremely small and lightweight • Very low power consumption • Variable connection concepts: flanged connection underneath or at the front, barbed fitting connection at the front • Ideal for control of small air flows	• Directly actuated poppet valve • Miniature valve: grid dimension 10 mm • Switching times down to 4 ms • Sub-base valve • Manifold block for 2 ... 10 valves • Use as a pilot valve • UL certification; same connections and cables as for the VUVG	• Directly actuated poppet valve • Fast-switching valve: switching times down to 2 ms • Direct mounting, individual sub-base, manifold assembly • Manifold block for 2 ... 10 valves	• Directly actuated poppet valve • Identical basic valves for direct mounting or manifold installation • Individual valve with integrated plug connection • Switching frequencies up to 1000 Hz • Very good reproducibility • MHJ9: Valve manifold assembly with individual outputs or with air nozzle output • MHJ9: Electrical connection via connecting cable MHJ9-KMH with integrated control electronics • MHJ10: Valve manifold assembly with individual outputs • MHJ10: Electrical connection via moulded-in cable, control electronics included in the valve
online: →	vovk	mh1	mh2	mhj9

Individual valves >

Accessories for individual valves

Silencers
U

Information on silencer insert materials	PE, Bronze
Pneumatic connection	3/4 NPT, G1, G1/2, G1/4, G1/8, G3/4, G3/8, PK-3, PK-4
Noise level	70 ... 90 dB(A)
Ambient temperature	-10 ... 70°C
Description	• Compact design, polymer or die-cast • Barbed fitting or threaded connection • Operating medium compressed air
online: →	u

Individual valves >

Accessories for individual valves

Fitting
NLFA

Design	Tubing mount via clamped connection, Tubing mount via barbed connector
Design type	Straight design
Fluid connection	UNF1/4-28
Fluid connection 2	For tubing O.D. 3 mm, For tubing I.D. 1.2 mm, For tubing I.D. 2.1 mm, For tubing O.D. 1.6 mm (1/16”), For tubing O.D. 3.2 mm (1/8”)
Operating pressure for entire temperature range	-0.75 bar, 4 bar, 6 bar
Operating pressure [MPa] for entire temperature range	-0.075 MPa, 0.4 MPa, 0.6 MPa
Operating pressure [psi] for entire temperature range	-10.875 psi, 58 psi, 87 psi
Medium	Liquid media, Gaseous media
Ambient temperature	0 ... 50°C
Description	• For mounting in laboratory devices • Very easy to flush thanks to connection without dead space • For liquid and gaseous media • Also for aggressive liquid media • Materials in contact with the media: PP • For securing tubing and dosing needles • Straight design
online: →	nlfa

Individual valves >

Accessories for piezo valves

	Electronics modules VAVE-P12	**Electronics modules VAVE-P17**
Operating voltage range DC	12 ... 24 V	12 ... 24 V
Adjustable output voltage	0 ... 310 V	0 ... 310 V
Voltage of external setpoint input	0 ... 10 V	0 ... 10 V
Max. output current	5 mA	5 mA
Ambient temperature	-10 ... 60°C	-10 ... 60°C
Description	• 2-channel open-loop piezo driver • For electrical actuation of the piezo valve VEMP • For electrical actuation of the piezo valves VEMR and VEAE via an adapter of the type NEFV-V13/NEFV-V14 • With protective circuit	• 2-channel open-loop piezo driver • For electrical actuation of the piezo valve VEMC • With protective circuit
online: ➔	vave	vave

Regulators >

Flow control valves

	Proportional flow control valves VEMD
Valve function	2-way proportional flow control valve
Operating pressure	0 bar, 2.5 bar
Flow rate control range	0 l/min, 20 l/min
Nominal size	1.4 mm
Nominal operating voltage DC	12 V, 24 V
Reference value	0.2 - 10 V
Medium	Compressed air to ISO 8573-1:2010 [5:4:1], Inert gases, Oxygen (oxygen applications to IEC 60601-1 only on request), Nitrogen
Ambient temperature	0 ... 50°C
Description	• Compact module with integrated control electronics • Dynamic regulation with short response time • Mass flow controller (MFC) • Operating medium: air, oxygen, inert gases, nitrogen • Minimal power consumption thanks to piezo technology • Silent: ideal for mobile applications and those close to patients • Direct mounting via thread • Ideal for life sciences applications • Sustainable operation thanks to efficient control
online: ➔	vemd

Regulators >

Pressure regulators

	Proportional-pressure regulators VEAA	**Proportional-pressure regulators VEAB**	**Proportional pressure regulators VPPE** ★
Valve function	3-way proportional pressure regulator	3-way proportional pressure regulator	3-way proportional pressure regulator, 3-way proportional-pressure regulator, closed
Standard nominal flow rate	7 l/min, 10 l/min, 13 l/min	4.5 l/min, 5 l/min, 13 l/min, 13.5 l/min, 16 l/min, 17 l/min, 20 l/min, 21 l/min	310 l/min, 800 l/min, 850 l/min, 1250 l/min
Operating pressure			8 bar
Inlet pressure 1	0 bar, 11 bar	0 bar, 1 bar, 2 bar, 3 bar, 4 bar, 5.5 bar, 6.5 bar	3 bar, 4 bar, 6 bar, 8 bar, 11 bar
Pressure regulation range			0.02 bar, 0.06 bar, 0.1 bar, 0.15 bar, 2 bar, 6 bar, 10 bar
Operating medium	Inert gases, Compressed air ISO 8573-1:2010 [7:4:4]	Inert gases, Compressed air ISO 8573-1:2010 [7:4:4]	Inert gases, Compressed air ISO 8573-1:2010 [7:4:4]
Nominal operating voltage DC	24 V	24 V	
Reference value	4 - 20 mA, 0 - 5 V, 0 - 10 V	4 - 20 mA, 0 - 5 V, 0 - 10 V	
Ambient temperature	0 ... 50°C	0 ... 50°C	0 ... 60°C
Description	• Silent operation • Very low power consumption • Highly precise • Integrated piezo technology • Durable • Mounting: via through-holes, H-rail mounting, on mounting plate or sub-base	• Silent operation • Very low power consumption • Highly precise • Integrated piezo technology • Short switching times • Mounting: using through-holes, H-rail mounting	• Piloted pressure regulator • Setpoint input as analogue voltage signal (0 ... 10 V) • Electrical connection via M12x1 plug, 4 or 5-pin • Available with setpoint module • Variant with display with three retrievable presets and digital controller electronics • For simple control tasks • Variants recommended for production systems for manufacturing lithium-ion batteries
online: →	veaa	veab	vppe

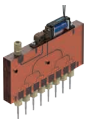
Regulators >

Pressure regulators

	Proportional pressure regulators VPPX	**Proportional-pressure regulators VPPI**
Valve function	3-way proportional pressure regulator	3-way proportional pressure regulator
Standard nominal flow rate	1400 l/min, 1650 l/min, 2750 l/min, 7000 l/min	150 l/min, 375 l/min, 900 l/min, 1400 l/min, 1630 l/min
Operating pressure		0 bar, 1 bar, 2 bar, 4 bar, 6 bar, 8 bar, 10 bar, 12 bar, 13 bar
Inlet pressure 1	0 bar, 11 bar	0 bar, 6 bar, 13 bar
Pressure regulation range	0.1 bar, 10 bar	-1 bar, 0 bar, 1 bar, 2 bar, 6 bar, 10 bar, 12 bar
Operating medium	Inert gases, Compressed air ISO 8573-1:2010 [7:4:4]	Inert gases, Compressed air ISO 8573-1:2010 [7:4:4]
Nominal operating voltage DC		24 V
Reference value		
Ambient temperature	0 ... 60°C	0 ... 50°C
Description	• Pressure regulator with additional sensor input • Programmable, freely adjustable PID controller • Multi-sensor control (cascade control) • Control characteristic adjustable via software FCT (Festo Configuration Tool) • Integrated pressure sensor with separate output • Pressure is maintained if the controller fails	• Select between three predefined and one customer-specific controller preset • With or without display • Low-noise, flexible and highly dynamic • Precise and stable changeover, rapid switching of setpoint by high-performance moving coil actuator • Control via analogue current or voltage signal, digital pattern for adjustable setpoint values or pulse-width modulation signal
online: →	**vppx**	**vppi**

Dispense and pipette heads >

Dispense heads

	Dispense heads VTOE	 **Dispense heads VTOI**
Valve function	2/2-way, closed, monostable	2/2-way, closed, monostable
Operating pressure	0 bar, 0.5 bar	-0.2 bar, 0 bar, 0.65 bar, 1 bar
Internal volume	113 µl valve with fluid connections	10 µl fluid space valve, 178 µl distributor block with valve, needle and fittings
Fluid connection	8x UNF1/4-28, UNF1/4-28	Female thread 1/4-28 UNF-2B
Medium	Liquid media	Liquid media, Gaseous media
Materials in contact with the media	ETFE, FFPM, FPM, PC, PEEK, PPS, High-alloy stainless steel	ETFE, FPM, PEI, PPS, High-alloy stainless steel
Nominal width of dosing needle	0.32 mm, 0.6 mm, 1 mm	0.3 mm
Ambient temperature	5 ... 40°C	5 ... 40°C
Description	• Basic function: dosing • Ready-to-install dosing solution saves time and costs • Compact 9 mm grid dimension • Suitable for sensitive and aggressive liquids • Ideally suited to non-contact dispensing of liquid media • Maximum dosing precision down to the microlitre range • Small internal volume makes it easy to rinse • 1- or 8-channel dispense head • Typical coefficient variation (CV): < 1% at 10 to 1000 µl	• One valve controller for distributing to 8 dispensing channels • Grid dimension 9 mm – ideal for microwell plates • Simple design with side-by-side mounting for increased throughput • Only a few components are needed to form a complete system • Suitable for aggressive liquids
online: ➔	**vtoe**	**vtoi**

Dispense and pipette heads >

Accessories for dispense heads

	 Valve control modules VAEM
Dimensions (W x L x H)	92 mm x 100 mm x 28 mm
Parameterisation	Parameter setting per output
Max. no. of outputs	8
Inrush current, per output	20 ... 1000 mA
Holding current, per output	20 ... 400 mA
Inrush current, total	4 A
Holding current, total	1.8 A
Trigger level	Level 14 V ... 24 V
Time resolution	0.2 ms
Communication interface, protocol	ASCII via RS232
Ethernet interface, protocol	Modbus® TCP
Description	• Electronic actuation with integrated, adjustable holding current reduction for controlling up to 8 solenoid valves • Parameterisation, diagnostics and control via graphical user interface (GUI), Ethernet and RS232 interface as well as external 24 V trigger input • Graphical user interface (GUI) for the extremely easy operation and clear visualisation • Very fast valve control with a temporal resolution of 0.2 ms • Easy setting of a calibration factor between the individual channels (opening times per valve)
online: →	vaem

Dispense and pipette heads >

Accessories for dispense heads

	 Dosing elements VAVN	 **Disposable tips DHAP**
Operating pressure [MPa]	0 ... 0.4 MPa	
Flow rate Kv	0.003 ... 0.039 m³/h	
Medium	Liquid media, Gaseous media	
Materials in contact with the media	High-alloy stainless steel	
Ambient temperature	5 ... 60°C	5 ... 40°C
Description	• For dosing applications with the highest precision • Length of dosing needle 30 mm or 60 mm • Outside diameter 1.6 mm • Nominal width 0.3 mm, 0.6 mm or 1.2 mm • High corrosion resistance (corrosion resistance class CRC 3 to Festo standard 940 070) and chemical resistance • Design with chamfer and/or with taper • Pack of 10	• Volume: 20, 300, 1000 µl • Disposable tip material: polypropylene (clear, not coloured) • Filter material: polyethylene (white) • Optional: sterile packaging • Delivered stacked or in racks • Packaging unit: 960 pieces
online: →	vavn	dhap

Compressed air preparation

- Service unit combinations and individual units for compressed air preparation in two series: series MS and D (in metal or polymer)

➔ **www.festo.com/pa/airprep**

Air preparation >

Filter regulators, series MS-B

	 Filter regulators **MS2-LFR-B, MS4-LFR-B, MS6-LFR-B** ★
Pneumatic connection 1	G1/2, G1/4, M5, QS-6
Standard nominal flow rate	140 ... 5300 l/min
Pressure regulation range	0.3 ... 7 bar
Operating pressure	1 ... 10 bar
Grade of filtration	5 µm, 40 µm
Ambient temperature	-5 ... 50°C
Description	• Competitively priced basic component focused on the most important technical functions • Lightweight and sturdy thanks to modern polymer materials • Compatible with the MS series for the ideal combination of low-cost basic functionality and high-end functional requirements • Stabile control response • With or without pressure gauge • Rotary knob with latch • With integrated secondary exhausting and primary exhausting with return flow function • MS2: Directly operated diaphragm regulator • MS4, MS6: directly actuated piston regulator • Grid dimension 25, 40, 62 mm (sizes 2, 4, 6)
online: ➔	**ms2-lfr**

Air preparation >

Pressure regulators, series MS-B

	 Pressure regulators **MS2-LR-B, MS4-LR-B, MS6-LR-B** ★
Pneumatic connection 1	G1/2, G1/4, M5, QS-6
Standard nominal flow rate	170 ... 6000 l/min
Pressure regulation range	0.3 ... 7 bar
Operating pressure	1 ... 10 bar
Ambient temperature	-5 ... 50°C
Description	• Competitively priced basic component focused on the most important technical functions • Lightweight and sturdy thanks to modern polymer materials • Compatible with the MS series for the ideal combination of low-cost basic functionality and high-end functional requirements • Stabile control response • With or without pressure gauge • Rotary knob with latch • With integrated secondary exhausting and primary exhausting with return flow function • MS2: Directly operated diaphragm regulator • MS4, MS6: directly actuated piston regulator • Grid dimension 25, 40, 62 mm (sizes 2, 4, 6) • Sustainable operation thanks to reduced pressure level
online: →	ms-lr-b

Air preparation >

Pressure regulators, individual devices

	 Precision pressure regulators **LRP, LRPS**
Pneumatic connection 1	For sub-base Ø 7 mm, G1/4, G1/8
Standard nominal flow rate	240 ... 2300 l/min
Pressure regulation range	0.05 ... 10 bar
Operating pressure	1 ... 12 bar
Ambient temperature	-10 ... 60°C
Description	• Lockable design • Good control characteristics with minimal pressure hysteresis and primary pressure compensation • High secondary exhausting • Variants to EU Explosion Protection Directive (ATEX)
online: →	lrp

Air preparation >

On/off and soft-start valves, MS-B Basic series

	On/off valves MS4-EE-B, MS6-EE-B ★	**Soft-start valves MS4-EDE-B, MS6-EDE-B** ★
Pneumatic connection 1	G1/2, G1/4	G1/2, G1/4
Standard nominal flow rate	2000 ... 5000 l/min	2000 ... 5000 l/min
Operating pressure	3 ... 7 bar	3 ... 7 bar
Actuation type		Electric
Ambient temperature	-5 ... 50°C	-5 ... 50°C
Description	• Very compact and extremely lightweight series for use close to the process directly in the machine • Electrically operated 3/2-way valve for pressurising and exhausting pneumatic systems • Ducted exhaust air possible via threaded connection with silencer • Detenting and non-detenting manual override • Supply voltage 24 V DC • With solenoid coil, without plug socket • Variants recommended for production systems for manufacturing lithium-ion batteries • Grid dimension 40, 62 mm (size 4, 6)	• Very compact and extremely lightweight series for use close to the process directly in the machine • Electrically operated 3/2-way valve for slowly pressurising and exhausting pneumatic systems • The switching pressure can be precisely controlled with a solenoid valve • Adjustable switching time delay • Built-in connections into which the tubing can be directly inserted • Detenting and non-detenting manual override • Supply voltage 24 V DC • With solenoid coil, without plug socket • Variants recommended for production systems for manufacturing lithium-ion batteries • Grid dimension 40, 62 mm (size 4, 6)
online: →	ms-ee-b	ms-ede-b

Sensors >

Pressure and vacuum sensors

	Pressure transmitters SPTW	**Pressure transmitters SPTE**	**Pressure sensors SPAN** ★
Pressure measuring range start value	-1 bar, 0 bar	-1 bar, 0 bar	-1 bar, 0 bar
Pressure measuring range start value [MPa]	-0.1 MPa, 0 MPa	-0.1 MPa, 0 MPa	-0.1 MPa, 0 MPa
Pressure measuring range end value	1 bar, 2 bar, 6 bar, 10 bar, 16 bar, 25 bar, 50 bar, 100 bar	-1 bar, 1 bar, 10 bar	-1 bar, 1 bar, 10 bar, 16 bar
Pressure measuring range end value [MPa]	0.1 MPa, 0.2 MPa, 0.6 MPa, 1 MPa, 1.6 MPa, 2.5 MPa, 5 MPa, 10 MPa	-0.1 MPa, 0.1 MPa, 1 MPa	-0.1 MPa, 0.1 MPa, 1 MPa, 1.6 MPa
Switching element function			N/C or N/O contact, switchable
Switching output			2 x PNP or 2 x NPN, switchable, PNP/NPN, switchable
Pneumatic connection	G1/4	Flange, Cartridge 10 mm, Push-in sleeve QS-4, QS-6, QS-3, QS-4	Male thread 1/8 NPT, Female thread G1/8, M5, For tubing O.D. 4 mm, Male thread G1/8, R1/8
Electrical connection		3-wire, Cable, Open end	
Display type			Illuminated LCD
Ambient temperature	0 ... 80°C	0 ... 50°C	0 ... 50°C
Description	• Sensor versions: piezoresistive pressure sensor or metal thin-film pressure sensor • Measured variable: relative pressure • Operating medium: liquid media and gaseous media • Seal-free: pressure measuring cell and interfaces in stainless steel • Degree of protection IP67	• Piezoresistive pressure sensor • Measured variable: relative pressure • Cable length 2.5 m • Compact: 8-bracket wall mount for manifold mounting	• For monitoring compressed air and non-corrosive gases • For network monitoring, regulator monitoring, leak testing, object detection • Relative measurement method based on a piezoresistive measuring cell • Serial communication integrated using IO-Link® 1.1 • Compact design 30x30 mm • High-contrast display with blue backlight
online: →	sptw	spte	span

Flow sensors

	Flow sensors SFAH	**Flow transmitters SFTE**
Flow measuring range end value	0.1 l/min, 0.5 l/min, 1 l/min, 5 l/min, 10 l/min, 50 l/min, 100 l/min, 200 l/min	
Operating medium	Argon, Nitrogen, Compressed air ISO 8573-1:2010 [6:4:4]	Nitrogen, Compressed air ISO 8573-1:2010 [6:4:4]
Operating pressure	-0.9 bar, 10 bar	-0.9 bar, 10 bar
Pneumatic connection	Female thread G1/4, G1/8, For tubing O.D. 4 mm, 6 mm, 8 mm	Female thread M5, For push-in connector O.D. 3 mm, 4 mm
Switching output	2 x PNP or 2 x NPN, switchable	
Electrical connection, connection type	Plugs	Cable, Cable with plug
Electrical connection, connection technology	Connection pattern L1J, M8x1, A-coded, to EN 61076-2-104	M8x1, A-coded, to EN 61076-2-104, Open end
Ambient temperature	0 ... 50°C	0 ... 50°C
Description	• Process air, compressed air, forming gas consumption and pneumatic object monitoring, handling ultra-small parts, leak test • Compact design 20x58 mm • Clear 2-line display • Mounting: H-rail mounting, wall or surface mounting, front panel mounting • Serial communication integrated using IO-Link® 1.1	• Compact design • Universal flow detection • Simple installation • Reliable pick & place application for extremely small workpieces
online: →	sfah	sfte

Sensors >

Opto-electrical sensors

	Colour sensors SOEC	**Retro-reflective sensors, diffuse sensors, distance sensor, light barriers SOOE**	**Fork light barriers SOOF**	**Fibre-optic cables SOEZ, SOOC**
Method of measurement	Colour sensor	Distance sensor	Fork light barrier	Through-beam sensor, Fork light barrier, Light guide, Diffuse sensor
Working range	12 ... 32 mm	0 ... 20000 mm		5 ... 400 mm
Size	50x50x17 mm		Clevis 120x60 mm, 30x35 mm, 50x55 mm, 80x55 mm	M4, M6
Setting options	Teach-in, Teach-in via electrical connection	IO-Link®, Potentiometer, Teach-in	IO-Link®, Potentiometer, Teach-in	
Type of light	White	Laser, Red, LED	Red	
Switching output	PNP	Push-pull	Push-pull, NPN, PNP	
Ambient temperature	-10 ... 55°C	-40 ... 60°C	-25 ... 60°C	-55 ... 160°C
Description	• Diffuse sensor • Block design • Electrical connection via M12x1 plug, 8-pin • Display via 7 LEDs	• Simple operation • Fast commissioning • Reliable and stable detection • Attractive price/performance ratio	• Through-beam sensor with minimal installation effort • Design: polymer or metal • Sturdy housing: high shock and vibration resistance • Degree of protection IP67 • Electrical connection via M8x1 plug connector, 3-pin • LED indicators	• Cable connection, push-in connector
online: →	soec	sooe	soof	soez

Opto-electrical sensors

	Retro-reflective sensors, diffuse sensors, light barriers SOOD	**Sensors SOEG-RT, SOEG-RS**	**Through-beam sensors SOEG-E, SOEG-S**	**Fibre-optic units SOE4**
Method of measurement		Retro-reflective sensor, Diffuse sensor, Diffuse sensor with background suppression	Through-beam sensor, Receiver, Transmitter	Fibre-optic unit
Working range	0 ... 10000 mm	0 ... 2000 mm	20000 mm	
Size		M12, M12x1, M18, M18x1	M18x1	
Setting options		Potentiometer		Teach-in, Teach-in via electrical connection
Type of light	Laser, Red, LED	Red, Red polarised	Red	Red
Switching output	Push-pull	NPN, PNP	NPN, PNP	NPN, PNP
Ambient temperature	-25 ... 60°C	-25 ... 55°C	-25 ... 55°C	-20 ... 60°C
Description	• Simple operation • Fast commissioning • Reliable and stable detection • Attractive price/performance ratio	• Round design • Electrical connection via open cable end or plug connector	• Round design • Electrical connection via open cable end or plug connector	• Use for precise and space-saving position sensing in the electronics and light assembly industry • Switching frequencies of up to 8000 Hz • Operational with fibre-optic cable SOOC as accessory • Variants: LED or LED display, timer function • Mounting: H-rail mounting or via through-holes • With protection against mutual interference
online: →	sood	soeg	soeg	soe4

Connection technology >

Standard O.D. pneumatic tubing

	Plastic tubing PFAN	**Plastic tubing PTFEN**	**Plastic tubing PLN**
Outside diameter	3 ... 12 mm	4 ... 16 mm	4 ... 16 mm
Inside diameter	2.3 ... 8.4 mm	2.9 ... 11 mm	2.9 ... 12 mm
Temperature-dependent operating pressure	-0.95 ... 16 bar	-0.95 ... 15 bar	-0.95 ... 14 bar
Ambient temperature	-20 ... 150°C	-20 ... 150°C	-30 ... 80°C
Description	• Perfluoroalkoxy alkane • Pneumatic tubing with resistance to high temperatures and chemicals • Food grade see www.festo.com/certificates/PFAN • High resistance to chemicals, microbes, UV radiation, hydrolysis and stress cracks • Operating media compressed air, vacuum, water. Water as per the manufacturer's declaration, see www.festo.com/certificates/PFAN	• Polytetrafluoroethylene • Food grade see www.festo.com/certificates/PTFEN • High resistance to chemicals • High temperature resistance • Operating medium: compressed air, vacuum	• Polyethylene • High resistance to chemicals, microbes and hydrolysis • Food grade see www.festo.com/certificates/PLN • Resistant to most cleaning agents and lubricants • Operating media compressed air, vacuum, water. Water as per the manufacturer's declaration, see www.festo.com/certificates/PLN
online: →	pfan	ptfen	pln

Connection technology >

Standard O.D. pneumatic tubing

	Plastic tubing PUN-H, PUN-H-DUO ★	**Customised tubing PAN, PEN, PLN, PUN**
Outside diameter	2 ... 16 mm	3 ... 16 mm
Inside diameter	1.2 ... 11 mm	2 ... 12 mm
Temperature-dependent operating pressure	-0.95 ... 10 bar	-0.95 ... 35 bar
Ambient temperature	-35 ... 60°C	-60 ... 100°C
Description	• Polyurethane • High resistance to microbes and hydrolysis • Suitable for use with energy chains • Clean room-compatible combination with fitting NPKA • Also available as DUO plastic tubing • Operating media compressed air, vacuum, water. Water as per the manufacturer's declaration, see www.festo.com/certificates/PUN_H	• Individual lengths: delivered in units of 25, 50, 100, 200 ... 500 m • Minimum quantity: 3000 m • Individual design: labelled with your company name and/or your part number • Easy to recognise and handle: individual colour selection • Choose from 9 basic colours; further colours available on request • Select, size and order quickly, easily and reliably with the configurator
online: →	pun-h	pan

Connection technology >

Pneumatic fittings

	Fitting NLFA
Design	Tubing mount via clamped connection, Tubing mount via barbed connector
Design type	Straight design
Fluid connection	UNF1/4-28
Fluid connection 2	For tubing O.D. 3 mm, For tubing I.D. 1.2 mm, For tubing I.D. 2.1 mm, For tubing O.D. 1.6 mm (1/16”), For tubing O.D. 3.2 mm (1/8”)
Pneumatic connection 1	
Pneumatic connection 2	
Operating pressure for entire temperature range	-0.75 bar, 4 bar, 6 bar
Operating pressure	
Operating pressure [MPa] for entire temperature range	-0.075 MPa, 0.4 MPa, 0.6 MPa
Operating pressure [psi] for entire temperature range	-10.875 psi, 58 psi, 87 psi
Medium	Liquid media, Gaseous media
Materials in contact with the media	PP
Ambient temperature	0 ... 50°C
Description	• For mounting in laboratory devices • Very easy to flush thanks to connection without dead space • For liquid and gaseous media • Also for aggressive liquid media • Materials in contact with the media: PP • For securing tubing and dosing needles • Straight design
online: →	**nlfa**

Connection technology >

Pneumatic fittings

	Push-in fittings/connectors, resistant to media NPQP	**Push-in fittings/connectors, standard series QS** ★
Design	Push-pull principle	Push-pull principle
Design type	Blanking plug, L-shape, T-shape, additional push-in connector, lengthwise, Bulkhead, T-shape, Y-shape, Straight design	45° angle, 45° angle, long, Blanking plug, L-shape, L-shape, 2-way, parallel, L-shape, long, L-shape, additional connection, female thread, lengthwise, T-shape, additional push-in connector, lengthwise, Bulkhead, T-shape, X-shape, Y-shape, Straight design
Fluid connection		
Fluid connection 2		
Pneumatic connection 1	Push-in sleeve Ø 4 mm, Push-in sleeve Ø 6 mm, Push-in sleeve Ø 8 mm, Push-in sleeve Ø 10 mm, Push-in sleeve Ø 12 mm, For tubing O.D. 10 mm, 12 mm, 4 mm, 6 mm, 8 mm, Male thread R1/2, R1/4, R1/8, R3/8	Push-in sleeve Ø 4 mm, Push-in sleeve Ø 6 mm, Push-in sleeve Ø 8 mm, Push-in sleeve Ø 10 mm, Push-in sleeve Ø 12 mm, Push-in sleeve Ø 16 mm, Female thread G1/2, G1/4, G1/8, G3/8, For tubing O.D. 10 mm, 12 mm, 16 mm, 4 mm, 6 mm, 8 mm, Male thread G1/2, G1/4, G1/8, G3/4, G3/8, M5, R1/2, R1/4, R1/8, R3/8
Pneumatic connection 2	For tubing O.D. 10 mm, 12 mm, 4 mm, 6 mm, 8 mm	Push-in sleeve Ø 4 mm, Push-in sleeve Ø 6 mm, Push-in sleeve Ø 8 mm, Push-in sleeve Ø 10 mm, Push-in sleeve Ø 12 mm, Push-in sleeve Ø 16 mm, Female thread G1/2, G1/4, G1/8, G3/8, For tubing O.D. 10 mm, 12 mm, 16 mm, 22 mm, 4 mm, 6 mm, 8 mm
Operating pressure for entire temperature range		-0.95 bar, 6 bar, 14 bar
Operating pressure		
Operating pressure [MPa] for entire temperature range		-0.095 MPa, 0.6 MPa, 1.4 MPa
Operating pressure [psi] for entire temperature range		-13.775 psi, 87 psi, 203 psi
Medium		
Materials in contact with the media		
Ambient temperature	-20 ... 60°C	-20 ... 80°C
Description	• Polypropylene • Low-cost alternative to stainless steel: resistant to most cleaning agents in combination with tubing PLN • For use with extreme media influences • Food grade see www.festo.com/certificates/NPQP • Operating medium: compressed air, vacuum • Straight shape, L-shape, T-shape, Y-shape, push-in bulkhead connector	• Standard series • Wide range of variants: wide selection for maximum flexibility in standard applications • PBT and nickel-plated brass • Operating media compressed air, vacuum, water. Water as per the manufacturer's declaration, see www.festo.com/certificates/QS • Straight shape, L-shape, T-shape, at 45° angle, X-shape, Y-shape, push-in bulkhead connector
online: →	npqp	qs

Pneumatic fittings

	Push-in fittings/connectors NPQR	**Threaded fittings NPFC**
Design	Push-pull principle	
Design type	L-shape, Bulkhead, T-shape, Plug screw, Y-shape, Straight design	
Fluid connection		
Fluid connection 2		
Pneumatic connection 1	For tubing O.D. 10 mm, 12 mm, 14 mm, 16 mm, 4 mm, 6 mm, 8 mm, Male thread G1/2, G1/4, G1/8, G3/8, M5, M7	G1, G1/2, G1/4, G1/8, G3/4, G3/8, M3, M5, M7, R1, R1/2, R1/4, R1/8, R3/4, R3/8
Pneumatic connection 2	For tubing O.D. 10 mm, 12 mm, 14 mm, 16 mm, 4 mm, 6 mm, 8 mm	G1, G1/2, G1/4, G1/8, G3/4, G3/8, M3, M5, R1, R1/2, R1/4, R1/8, R3/4, R3/8
Operating pressure for entire temperature range	-0.95 bar, 12 bar, 16 bar	
Operating pressure		-0.95 bar, 10 bar, 50 bar
Operating pressure [MPa] for entire temperature range	-0.095 MPa, 1.2 MPa, 1.6 MPa	
Operating pressure [psi] for entire temperature range	-13.775 psi, 174 psi, 232 psi	
Medium		
Materials in contact with the media		
Ambient temperature	-20 ... 150°C	-20 ... 150°C
Description	• Very easy to clean thanks to chamfered O-ring and fewer edges where dirt can accumulate • Optimal price/performance ratio, perfect for applications from a single source • Maximum corrosion resistance (corrosion resistance class CRC 4 to Festo standard 940 070) and chemical resistance • High temperature resistance • Stainless steel • Operating media: compressed air, vacuum, (water) • Straight shape, L-shape, T-shape, Y-shape, push-in bulkhead connector	• Brass, nickel-plated • Sleeve • Extension • Double nipple • Reducing nipple • Operating medium: compressed air, vacuum • Straight shape, L-shape, T-shape, X-shape, Y-shape
online: →	npqr	npfc

Drives & actuators >

Piston rod cylinders

	Round cylinders **EG-PK**	**Cartridge cylinders** **EGZ**
Mode of operation	Single-acting, Pushing	Single-acting, Pushing
Piston diameter	2.5 mm, 4 mm, 6 mm	6 mm, 10 mm, 16 mm
Theoretical force at 0.6 MPa (6 bar, 87 psi), advancing	1.9 ... 11.8 N	13.9 ... 109 N
Stroke	5 ... 25 mm	5 ... 15 mm
Cushioning	On one side, Not adjustable, No cushioning	No cushioning
Description	• Micro cylinder • Barbed fitting for plastic tubing with standard I.D. • Without position sensing	• Minimal installation space • Installation with or without mounting components • Piston rod with male thread
online: →	eg-pk	egz

Drives & actuators >

Electric actuators

	Toothed belt axes **EGC-TB-KF** ★	**Spindle axes** **EGC-BS-KF** ★	**Toothed belt axes** **ELGC-TB-KF**	**Spindle axes** **ELGC-BS-KF**
Design	Electromechanical linear axis, With toothed belt	Electromechanical linear axis, With ball screw	Electromechanical linear axis, With toothed belt	Electromechanical linear axis, With ball screw
Size	120, 185, 50, 70, 80	120, 185, 70, 80	45, 60, 80	32, 45, 60, 80
Working stroke	50 ... 8500 mm	50 ... 3000 mm	200 ... 2000 mm	100 ... 1000 mm
Max. acceleration	50 m/s²	15 m/s²	15 m/s²	15 m/s²
Max. speed	3 ... 5 m/s	0.5 ... 2 m/s	1.2 ... 1.5 m/s	0.6 ... 1 m/s
Max. feed force Fx	50 ... 2500 N	400 ... 3000 N	75 ... 250 N	40 ... 350 N
Max. force Fy	50 ... 2500 N	400 ... 3000 N	75 ... 250 N	40 ... 350 N
Max. force Fz	650 ... 15200 N	1850 ... 15200 N	600 ... 2700 N	300 ... 2700 N
Motor type	Stepper motor, Servo motor	Stepper motor, Servo motor	Stepper motor, Servo motor	Stepper motor, Servo motor
Ambient temperature	-10 ... 60°C	-10 ... 60°C	0 ... 50°C	0 ... 50°C
Description	• Axis for high speeds and acceleration • Recirculating ball bearing guide for high loads and torques • Optionally with clamping unit, at one or both ends • Profile with optimised rigidity • 22 types in stock with short delivery times and modular products for custom variants	• Axis for high repeat accuracy • Recirculating ball bearing guide for high loads and torques • Optionally with clamping unit, at one or both ends • Profile with optimised rigidity • Various spindle pitches • The optional spindle support enables maximum travel speed • Axial or parallel motor mounting	• Precision guide rail with high load capacity • Internal guide and toothed belt • Flexible motor mounting • The toothed belt axes, spindle axes ELGC and mini slides EGSC form a scalable modular system for compact automation • Variants recommended for production systems for manufacturing lithium-ion batteries	• Internal guide and ball screw drive • Space-saving position sensing • Flexible motor mounting • The toothed belt axes, spindle axes ELGC and mini slides EGSC form a scalable modular system for compact automation • Variants recommended for production systems for manufacturing lithium-ion batteries
online: →	egc	egc	elgc-tb	elgc-bs

Drives & actuators >

Electric actuators

	Electric slides **EGSK**	**Mini slides** **EGSL-BS**	**Mini slides** **EGSC-BS-KF**
Design	Electromechanical linear axis, With ball screw drive	Electric mini slide, Guidance, With ball screw drive	Electric mini slide, With ball screw drive
Size	15, 20, 26, 33, 46	35, 45, 55, 75	25, 32, 45, 60
Working stroke	25 ... 840 mm	50 ... 300 mm	25 ... 200 mm
Max. acceleration	10 m/s², 20 m/s²	25 m/s²	5 m/s², 15 m/s²
Max. speed	0.16 ... 1.48 m/s	0.3 ... 1.3 m/s	0.133 ... 0.6 m/s
Max. feed force Fx	19 ... 392 N	75 ... 450 N	20 ... 250 N
Max. force Fy	19 ... 392 N	75 ... 450 N	20 ... 250 N
Max. force Fz	764 ... 4919 N	291 ... 1539 N	669 ... 4937 N
Motor type		Stepper motor, Servo motor	Stepper motor, Servo motor
Ambient temperature	0 ... 40°C	0 ... 60°C	0 ... 50°C
Description	• Electromechanical linear axis with ball screw drive • Recirculating ball bearing guide and ball screw without caged ball bearings • Standardised mounting interfaces • Compact design • High rigidity • 22 types in stock with short delivery times and modular products for custom variants	• Very high rated slide load, ideal for vertical applications such as press-fitting or joining • Reliable: the completely closed spindle stops dirt or stray small parts getting into the guide area • Axial or parallel motor mounting	• Precise guide and ball screw drive • Compact dimensions • Flexible motor mounting • The toothed belt axes, spindle axes ELGC and mini slides EGSC form a scalable modular system for compact automation • Variants recommended for production systems for manufacturing lithium-ion batteries
online: ➔	egsk	egsl	egsc-bs

Drives & actuators >

Handling systems

	Two-dimensional planar surface gantries **EXCM**	**Rotary gripper modules** **EHMD**
Design	Planar surface gantry	Electric rotary drive, Electric gripper, Pneumatic gripper
Size	30, 40	40
Stroke per gripper jaw		5 mm, 15 mm
Max. output torque		0.3 Nm
Gripping force per gripper jaw		3 ... 35 N
Rotation angle		Infinite
Motor type	Stepper motor	Stepper motor
Nominal voltage DC		24 V
Ambient temperature	10 ... 50°C	0 ... 40°C
Description	• Excellent functionality in small installation spaces • Low moving dead weight • Actuation via two stepper motors with an integrated optical encoder and a two-axis controller • With recirculating ball bearing guide • Sustainable operation due to weight-optimised axes	• Ideal for small objects in laboratory automation • Infinite electrical rotation and electrical or pneumatic gripping • Gripping and turning to open and close covers on vials • Optional: mounting with Z-compensation compensates for the thread pitch of covers on vials during opening and closing
online: ➔	excm	ehmd

Drives & actuators >

Motors and servo drives > Stepper motors

	 Stepper motors **EMMS-ST** ★
Nominal motor current	1.4 ... 9.5 A
Max. rotational speed	430 ... 6000 rpm
Motor holding torque	0.09 ... 9.3 Nm
Ambient temperature	-10 ... 50°C
Description	• Small increments and high driving torques thanks to 2-phase hybrid technology • Optimised connection technology • Four sizes with flange sizes 28, 42, 57 and 87 • 28 types in stock • With incremental encoder for closed-loop operation • Degree of protection IP40 (motor shaft), IP54 (sizes 42, 27, 87: motor housing and plug connection), IP65 (size 28: motor housing and plug connection) • Optionally with holding brake
online: →	emms

Drives & actuators >

Motors and servo drives > Stepper motor controllers

	 Servo drives **CMMT-ST** ★
Nominal current load supply	8 A
Nominal voltage, load supply DC	24 V, 48 V
Fieldbus coupling	Modbus/TCP, PROFINET, EtherNet/IP, EtherCAT
Performance level (PL)	STO/Cat. 3, PLe (stepper motor/EC motor with diagnostics), STO/Cat. 3, PLd (EC motor without diagnostics)
Ambient temperature	0 ... 50°C
Description	• Very efficient for tasks with low power requirements • Ideal for positioning tasks and point-to-point and interpolating motion solutions • 50% more compact than the smallest servo drive CMMT-AS • 150 W at 24 V DC, 300 W at 48 V DC • With safety functions • Optimised for use with stepper motors like the tried-and-tested EMMS-ST
online: →	cmmt-st

Grippers, rotary drives >

Electric grippers

	 Parallel grippers, electric **EHPS**
Design	Worm gear unit, T-shape, Rack and pinion, Electric gripper
Size	16, 20, 25
Stroke per gripper jaw	10 ... 16 mm
Max. force on gripper jaw Fz, static	200 ... 450 N
Gripper repetition accuracy	0.01 mm, 0.03 mm
Motor type	DC servo motor
Electrical connection	5-pin, Cable with plug, M12x1
Nominal operating voltage DC	24 V
Protocol	IO-Link®
Ambient temperature	5 ... 60°C
Description	• Electric version of the pneumatically actuated parallel gripper DHPS • Ideal for use as a front-end actuator thanks to its low dead weight • Controller-free actuation using digital signals • Gripping force (4 settings) adjustable via ratchet switch or via IO-Link® interface • RA1 version with robot connection, enables fast integration in lightweight robot environments
online: →	ehps

Grippers, rotary drives >

Accessories for grippers

	 Gripper jaw **DHAS-GG**	 **Gripper jaw mountings** **EHAA-G1**
Size		
Type of mounting		
Ambient temperature	0 ... 40°C	0 ... 40°C
Description	• Process-reliable gripping, e.g. for microtiter plates in the life sciences sector • Easy assembly	• Gripper fingers for horizontal or vertical mounting on the gripper jaws • Stainless steel design
online: →	dhas	ehaa-g1

Grippers, rotary drives >

Electric semi-rotary drives

	 Rotary drives **ERMO**
Size	12, 16, 25, 32
Max. driving torque	0.15 ... 5 Nm
Max. rotational speed	100 ... 200 rpm
Rotation angle	Infinite
Description	• Electric rotary drive with stepper motor and integrated gear unit • ServoLite – closed-loop operation with encoder • Heavy-duty bearing for high forces and torques • Backlash-free, pre-stressed rotating plate with very good axial eccentricity and concentricity properties • Quick and accurate installation • For simple rotary indexing table applications and as a rotary axis in multi-axis applications
online: →	ermo

Grippers, rotary drives >

Handling systems

	 Rotary gripper modules **EHMD**
Design	Electric rotary drive, Electric gripper, Pneumatic gripper
Size	40
Stroke per gripper jaw	5 mm, 15 mm
Max. output torque	0.3 Nm
Gripping force per gripper jaw	3 ... 35 N
Rotation angle	Infinite
Motor type	Stepper motor
Nominal voltage DC	24 V
Ambient temperature	0 ... 40°C
Description	• Ideal for small objects in laboratory automation • Infinite electrical rotation and electrical or pneumatic gripping • Gripping and turning to open and close covers on vials • Optional: mounting with Z-compensation compensates for the thread pitch of covers on vials during opening and closing
online: →	ehmd

Services >

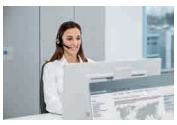
Energy Saving Services

	 Compressed Air Energy Efficiency Audit GFAA
Scope of services	Measurement and analysis of compressed air preparation at the point of generation: sizing/drying capacity/measurement of compressed air quality (water and residual oil content), Analysis of pneumatic applications: visual inspection of the production plant with leakage location and detailed energy efficiency analysis of the pneumatic applications on at least two selected machine cells (depending on complexity)
Description	• TÜV-certified energy efficiency analysis of the entire compressed air system according to DIN EN ISO 11011 • Available in three packages, depending on the number of existing compressors • Analysis of the current situation with weighted recommendations for improving energy efficiency • Documentation of CO2 values, costs and savings potentials • Savings of up to 60% of the compressed air costs of pneumatic systems • Improved productivity and Overall Equipment Effectiveness (OEE) • Sustainable operation by checking the energy efficiency of the compressed air system
online: →	gfaa

Product overview

FESTO

Technical support

	 Technical support
Description	• Support in the event of equipment downtime or malfunction • Identifying the cause of the error • Deriving technical solutions • Error elimination • Remote support/on-site support
online: ➔	www.festo.com/support

Commissioning services

	Installation service	On-site commissioning service for axis systems	Remote commissioning service for axis systems
Description	• Mechanical installation • Pneumatic installation • Electric installation • Available for products and system solutions from Festo	• Inspecting the cabling, electrical and pneumatic connections as well as travel distances and energy chains • Configuring and parameterising, incl. optimising the controller parameters and homing • Activating components in test mode • Data backup and documentation • Instruction manual for operators • Available for 1, 2 and 3-axis systems with and without safety module • Service is performed on site	• Checking electrical connections and of the travel paths • Configuration and parameterisation • System test • Data backup and documentation • Introduction to the Festo Automation Suite software • Available for 1, 2 and 3-axis systems with and without safety module • Service is provided via remote communication
online: ➔	www.festo.com/service	www.festo.com/catalogue/gfch	www.festo.com/catalogue/gfch

Commissioning services

	Commissioning service servo press kit GFCA-Y2-A5, GFCA-Y2-A5-R	PLC integration service servo press kit GFCA-Y2-A2, GFCA-Y2-A2-R
Description	• Support with commissioning • Support with the electrical installation • Checking the electrical connections and the travel path • Configuration and parameterisation • Testing the system, data backup and documentation • Introduction to WebVisu software • Remote service/on-site service	• On-site support for the integration of function blocks into the higher-level control system (based on an empty project) • Testing the communication between the YJKP servo press kit and the higher-order controller • Functional test of the relevant function blocks for controlling the servo press kit YJKP based on a sample project • Introduction to the structure of the function blocks and their functionality • Remote service/on-site service
online: ➔	www.festo.com/catalogue/gfca	www.festo.com/catalogue/gfca

Maintenance and repair services

	Maintenance service	**Repair service**
Description	• Checking for signs of damage and wear • Checking mechanical, pneumatic, and electrical connections and connectors • Checking the air preparation • Carrying out component-specific inspections • Lubricating/re-lubricating guides • Tightening connectors • Replacing air filters • Replacing silencers • Carrying out component-specific preventive maintenance tasks • Troubleshooting • Solution finding/error elimination • Eliminating leakages • Replacing or servicing components	• In-house repair components from Festo • Analysis of economic efficiency • Inspection • Cleaning • Replacement of worn-out parts • Function test
online: →	www.festo.com/service	www.festo.com/service

Energy Saving Services

	Pre-audit energy efficiency air system	**Compressed air energy efficiency audit**	**Analysing compressed air generation**
Description	• Inspecting/analysing the compressor station: consumption, flow rate, pressure, capacity utilisation • Analysing the air preparation: design and type of dryer • Analysing the design of the compressed air network: pressure measurement at two points and calculating the pressure drop • Random check of air consumption: leakage detection and energy efficiency analysis of the system • Air quality measurement: water and oil content • Estimating the air savings potential • Recommendations for increasing the energy efficiency of the air system • Executing and documenting the results in compliance with DIN ISO 11011 • Implementing and documenting the results in the “Festo Energy Saving Services Portal” in accordance with DIN ISO 11011	• TÜV-certified energy efficiency analysis of the entire compressed air system according to DIN EN ISO 11011 • Available in three packages, depending on the number of existing compressors • Analysis of the current situation with weighted recommendations for improving energy efficiency • Documentation of CO2 values, costs and savings potentials • Savings of up to 60% of the compressed air costs of pneumatic systems • Improved productivity and Overall Equipment Effectiveness (OEE) • Implementing and documenting the results in the “Festo Energy Saving Services Portal” in accordance with DIN ISO 11011	• Measuring the installed compressors • Current consumption • Delivery rate • Pressure band • Analysing the compressor output • Analysing the usage ratio (workload) • Calculating the leakages • Calculating the annual electricity and compressed air costs as well as potential savings by eliminating leakages • Implementing and documenting the results in the “Festo Energy Saving Services Portal” in accordance with DIN ISO 11011
online: →	www.festo.com/energysaving	www.festo.com/catalogue/gfaa	www.festo.com/energysaving

Energy Saving-Services

	Air quality analysis	Compressed air consumption analysis	Leakage detection and documentation
Description	• Inspecting the decentralised air preparation • Measuring the residual oil content (up to ISO 8573-1:2010 class 2) • Measuring the pressure dew point (up to ISO 8573-1:2010 class 2) • Analysing the measurement results • Suggested improvements • Implementing and documenting the results in the “Festo Energy Saving Services Portal” in accordance with DIN ISO 11011	• Installing and removing measuring devices with standard parts (fittings, tubing, etc.) • Measuring the static compressed air consumption of machines at standstill and in operation • Calculating losses due to leakages • Determining the consumption per machine cycle • Determining the average consumption per minute • Determining the max./min. pressure • Determining the average pressure level • Determining the max./min. air flow • Analysing the measurement results • Implementing and documenting the results in the “Festo Energy Saving Services Portal” in accordance with DIN ISO 11011	• Localising leakages with ultrasonic detectors in the entire compressed air system during operation • Classifying the leakages according to size and cost • Gathering relevant information for eliminating the leakage: photo documentation, recommended measures, required spare parts, estimated repair time, prioritising measures, assessing whether maintenance can be carried out during machine operation, indicating optimisation options • Results available online on the Festo Energy Saving Assessment Portal • Implementing and documenting the results in the “Festo Energy Saving Services Portal” in accordance with DIN ISO 11011
online: ➔	www.festo.com/energysaving	www.festo.com/energysaving	www.festo.com/energysaving

Energy Saving-Services

	Leakage elimination	Machine analysis for energy efficiency
Description	• Comprehensive elimination of leakages • Repairing or replacing the affected components based on the report of the leakage detection • Final verification using leakage test • Implementing and documenting the results in the “Festo Energy Saving Services Portal” in accordance with DIN ISO 11011	• Measuring compressed air consumption of machines/systems • Carrying out a leakage detection • Identifying the energy saving potential by assessing the energy efficiency of the system design • Proposing solutions for improving energy consumption including the calculation of possible annual savings potential • Calculating the amortisation time • Implementing and documenting the results in the “Festo Energy Saving Services Portal” in accordance with DIN ISO 11011
online: ➔	www.festo.com/energysaving	www.festo.com/energysaving

System optimisation

System optimisation

Description	• Developing customer-specific solutions for the modernisation and optimisation of equipment and/or applications • Calculating, selecting and sizing products incl. CAD drawings and circuit diagrams • Simulating and testing in order to optimise the existing system/application • Implementing optimisation measures • Documentation
online: →	www.festo.com/service

Service contract

Service contract

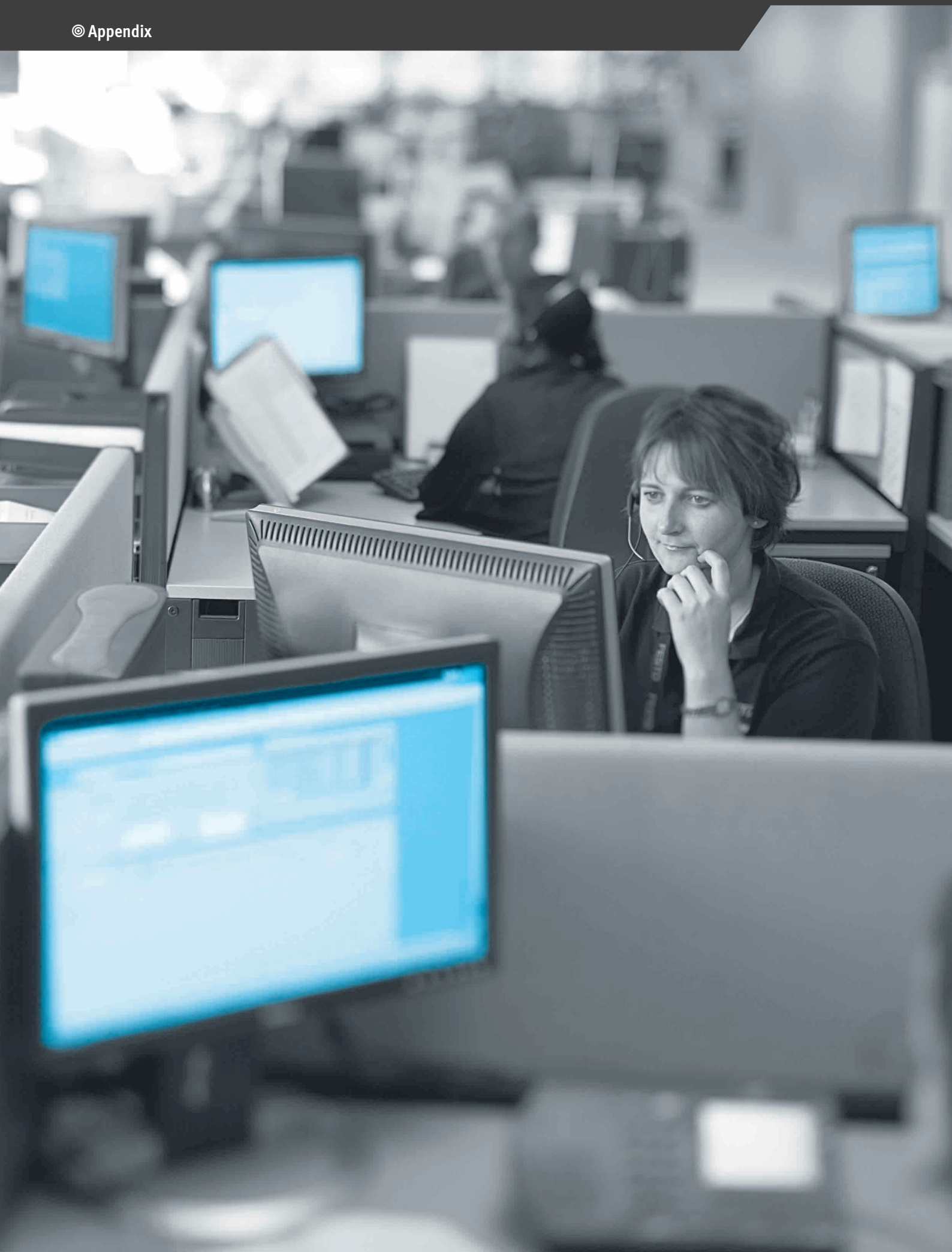
Description	• Customer-specific service contract with a range of service options • Regular inspections according to recommendations by Festo • Regular preventive maintenance • Software updates • Replacing worn or defective components • Guaranteed availability • Guaranteed reaction times for on-site support in the event of machine downtime or malfunctions
online: →	www.festo.com/service

Training programs and courses

Energy Saving Services workshop

Description	• Basic principles of “energy efficiency in pneumatic systems” • Carrying out leakage detection using ultrasonic detection equipment • Documenting leakages • Theory and practical exercises
online: →	www.festo.com/service

Product overview



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What must be taken into account when using Festo products?

The limit values specified in the technical data and any specific safety instructions must be adhered to by the user in order to ensure correct functioning.

The pneumatic components must be supplied with correctly prepared compressed air free of aggressive media.
Take the ambient conditions at the place of use into consideration. Corrosive, abrasive and dusty environments (e.g. water, ozone, grinding dust) will reduce the service life of the product.
Check the resistance of the materials of Festo products to the media used and surrounding media.

When Festo products are used in safety-oriented applications, all national and international laws and regulations, for example the EC Machinery Directive, together with the relevant references to standards, trade association rules and the applicable international regulations must be observed and complied with.

Unauthorised conversions or modifications to products and systems from Festo constitute a safety risk and are thus not permitted.
Festo does not accept any liability for the resulting damages.

You should contact Festo if one of the following applies to your application:
- The ambient conditions and conditions of use or the operating medium differ from the specified technical data.
- The product is to perform a safety function.
- A risk or safety analysis is required.
- You are unsure about the product's suitability for use in the planned application.
- You are unsure about the product's suitability for use in safety-oriented applications.

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