

**FESTO**

**Product overview 2021**



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Product overview 2021

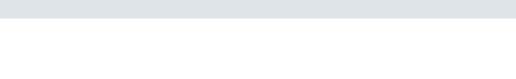
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FESTO



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

→ WE ARE THE ENGINEERS  
OF PRODUCTIVITY.

## Dear Customers,

You have in front of you the new Product Overview. It is designed to give you an outline of the products that are important for your day-to-day tasks, with just the details you need. It also includes many new products for pneumatic and electric automation that have been developed in response to market requirements.

Good examples of the continuous expansion of our portfolio are the compact cylinder ADN-S as well as the completely redesigned round cylinder DSNU-S from our Core Range. This cylinder is smaller, lighter and slimmer than its predecessor, but still offers exactly the same performance.

In our Core Range we have brought together the most important components that solve the majority of your automation tasks. These can also be delivered quickly around the world and are attractively priced. Quality, costs and fast delivery are the cornerstones of our product philosophy across the board, not just of the Core Range. We have therefore redesigned many of our products, optimised production in all our plants worldwide and switched to a local-for-local strategy. The benefit for you is much shorter delivery times.

Our Simplified Motion Series has grown too, with new additions such as the electric cylinder units EPCS and EPCE. When we launched the Simplified Motion Series, we wanted to offer a cost-effective electric alternative for simple tasks like movement between two mechanical end stops that would lie somewhere between pneumatics and much more expensive standard electric solutions. We are confident that we have achieved this. These drives and the entire Simplified Motion Series make all of this possible by combining the simplicity of pneumatics with the advantages of electric automation. At the same time, their digital I/O modules and IO-Link® support most communication protocols.

One thing you may notice about many of our new products is the fact that we are also increasingly looking at the sustainability and energy efficiency of our product portfolio. This can be seen in new materials and weight savings as well as in improved running characteristics and our Energy Saving Services. This is a path we will continue to follow. Please get in touch if you have any questions about this or would like some advice.

Or if there's anything else we can help you with - we're always there for you. In person, by telephone or fax, online via e-mail or in the Online Shop, simply pick your preferred method – we're your Engineers of Productivity.

I hope you find lots to inspire you in our new Product Overview!

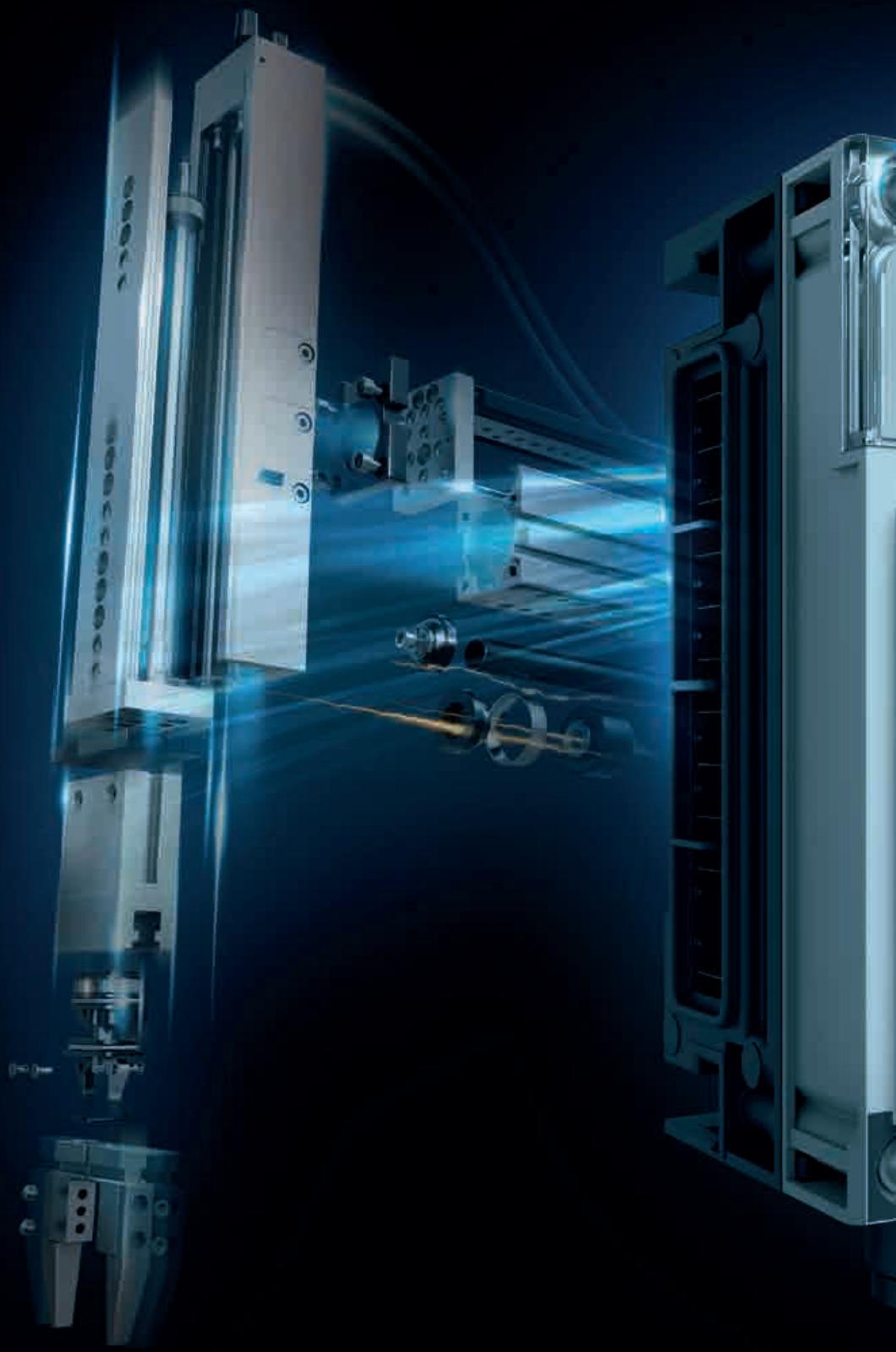
Best regards.



Dr. Ansgar Kriwet  
Member of the Management Board Sales of Festo SE & Co.KG

Partner for maximum productivity

Editorial



# Smart. Flexible. Digital.

For your sustainable solution.

For your sustainable 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.

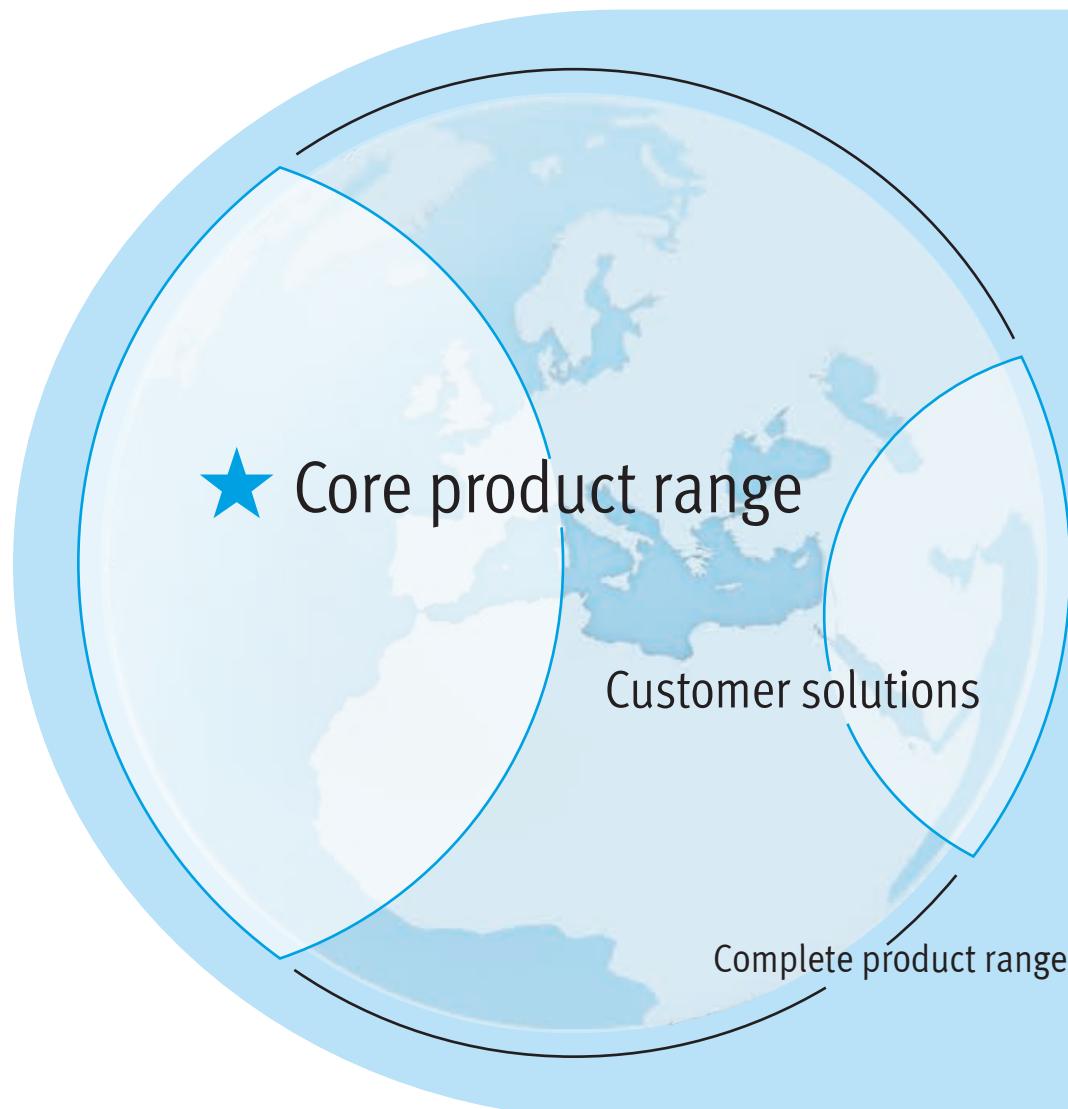
What does the automation of tomorrow look like? What are the trends? And what will make my production highly flexible, while also offering standardisation? You can find the answers right now with our Festo Motion Terminal VTEM, the first app-controlled pneumatic component. Future Concepts and our bionic 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](http://www.festo.com)

## Digitalisation

### Digitalisation – megatrend for productivity

The virtual and real worlds are growing ever closer together – and are leading to Industry 4.0. Increased digitalisation is one of the basic prerequisites for this process. Festo is driving this process forward in the field of automation – and we invite our customers to undertake this journey together with us.



## The future: digital products and services with added value

Digital products can do more and more and are masters at integrating additional functions. Smart components automatically optimise themselves, adapt to external influences and identify themselves. The digital twin is accessed via the Product Key. These are the prerequisites for highly flexible and extremely fast and adaptive production.

This also includes a tailored offer in the form of intelligent, digitally networked products and services along the value creation chain.

Digital configurators help you to engineer your solutions. With FluidDraw or EPLAN Schematic Solution, you get consistent, error-free documentation. Condition monitoring of components or solutions takes place via dashboards that visualise all the relevant parameters – on the go and in real time.

This allows maximum system availability and optimum maintenance planning to be combined. Smartenance, the digital maintenance manager from Festo, now also features a plant logbook and data interface. It is a low-cost way of getting started with digitalisation and offers significant savings potential – including for products other than those from Festo.

## Starting out in the digital world? CPX/MPA as an example

The advantages of digitalisation are clearly demonstrated by a valve terminal MPA ordered and configured in the Online Shop and the CPX automation platform with decentralised intelligence.

It is documented electromechanically and pneumatically in no time at all with Schematic Solution and FluidDraw from the App World, so that a digital twin is immediately available.

In addition, the Product Key as a data matrix code on the product ensures that important information is easy to retrieve during commissioning and maintenance.

A configurable OPC-UA interface connects the CPX/MPA to the IoT gateway that transfers the data to the Festo Cloud. Dashboards visualise this data, for example for condition monitoring. Smartenance is used for maintenance planning, including for the entire plant or production line. This combination of classic hardware and software-supported elements boosts the productivity and flexibility of the automation solution. We are happy to share this expertise with our customers.

You can find out more about digitalisation under the Festo Motion Terminal in Chapter 09 from page 125.

## Easy selection

The systematically faster route to the right solution



### It couldn't be easier:

1. Select the product group you require from the Table of contents  
→ page 1  
For example: Electric drives → page 51
2. Find the products you want on the product pages using the technical features and descriptions.
3. The blue arrow directs you to the search term with which you can find all product information and process your order on the Internet. Simply add the search term or type to the Internet address.  
Example with search term:  
→ [www.festo.com/catalogue/spindle\\_axis](http://www.festo.com/catalogue/spindle_axis)  
Example with type:  
→ [www.festo.com/catalogue/egg-bs](http://www.festo.com/catalogue/egg-bs)

Are you already in the electronic product catalogue?

Enter the search term in the search field next to the magnifying glass:



## ★ Quick order placement for selected basic designs

### We make it easy for you!

We have compiled a globally standardised core product range that not only offers you faster and easier selection, but also fast delivery.

It has been selected by Festo experts based on actual customer requirements and covers the main applications of automation technology, while offering the best possible value for money.

### Products with the star: easy selection and fast delivery

You can recognise these outstanding products at a glance: they are marked in the catalogues with a ★ star.

### High level of availability

In stock and generally ready for immediate dispatch: these products are available in no time at all.

### More variety or individually configured? No problem!

If your requirements go beyond the main applications of automation technology or if you need individually configurable products such as valve terminals, you can choose from the full spectrum of Festo's automation portfolio with all of its technological diversity. You can find these products in our electronic catalogue online on our website and in the Online Shop.



You can benefit from these advantages whenever you need core pneumatic and electrical functions. Wherever you see this symbol in our printed or electronic catalogue, it identifies a selected product which is perfect for the main applications of automation technology. The stars will help you to find what you are looking for more quickly and place orders more easily. These star products are generally in stock and ready for immediate delivery.

### At a glance:

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

## Round-the-clock benefits



**24h  
online**

### Fast and convenient

Get a quick and easy overview of prices and delivery times in the basket at any time, including shipment tracking and order documentation.

Use our Online Shop.

#### Request quotes

- + Quickly create quotes for your purchasing department
- + View the quote by e-mail and in your user account shortly afterwards.



#### Order documents and reordering

- + Easy and secure: download the order confirmation, delivery note and invoice
- + Reordering of previous orders made easy



#### Express delivery<sup>1)</sup>

- + Fast and guaranteed delivery on the next business day
- + Regardless of the business hours of our order service



#### Order tracking

- + Planning reliability: all delivery dates in the basket at a glance
- + Track orders and view the status display, even for orders outside of the Online Shop
- + Track shipments



#### No minimum quantity surcharge for online orders

- + Reduces your costs
- + Gives you greater flexibility when ordering



#### Create warehouse labels with the Label Designer

- + Organisation and transparency in your warehouse
- + Easy identification of the stock location
- + Uniform labelling

#### Share and import bills of materials and baskets

- + Supports teamwork
- + Exchange data quickly with colleagues, customers, suppliers
- + Enter data only once: greater efficiency, fewer errors

#### Download complete documentation

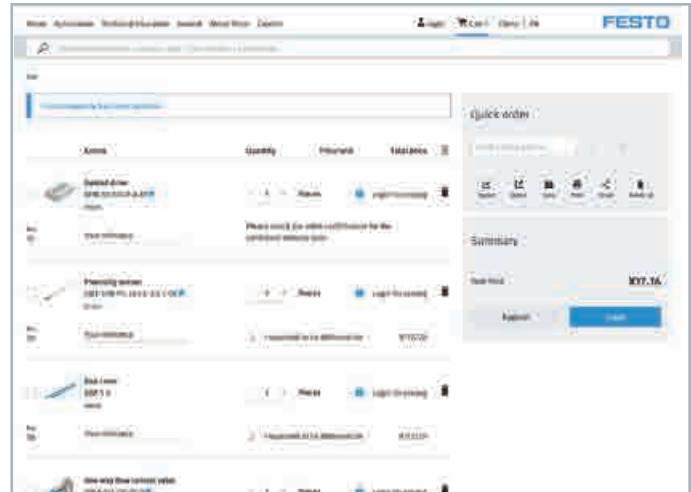
- + Download all documents for the selected products with just a few clicks

1) Orders placed before 8:30 p.m. with express delivery selected will be with you by noon the following working day, provided the items are in stock.

## You can find the Online Shop at ...

→ [www.festo.com](http://www.festo.com)

› click on the link for "Basket"



#### If you already have an account ...

... then you can log in directly at → [www.festo.com/login](http://www.festo.com/login) or by clicking on "Login".

#### If you have not yet registered ...

... you can access the registration form via → [www.festo.com](http://www.festo.com) and click on "Register".

Further information on the Festo Online Shop can be found here:

→ [www.festo.com/ols](http://www.festo.com/ols)

## Festo Didactic

Festo Didactic is the world's leading supplier to technical educational institutions and provider of consulting and training services to industry. The product and service portfolio offers customers an integrated approach, covering all technological areas of factory and process automation.

We integrate technical training content with knowledge and training courses from other specialist areas like process optimisation, management and communication.

As an integral part of the Festo Group, Festo Didactic has its roots in the world of automation and industry is just part of its DNA. We work in close cooperation with Festo Automation and are familiar with the challenges faced by our customers. This enables us to offer tailored and practical training courses for industry. As well as covering our core competency in automation technology, these also include innovation topics like Industry 4.0. This content is delivered by experienced trainers and is tailored to each individual group of participants.



## Selection of current training courses

### Industry 4.0 Assessment –

#### We prepare your company for digitalisation and Industry 4.0

Like many other companies, you are probably asking yourself the following questions: how well prepared are your production and processes for the digital transformation? Where do you stand at the moment as an organisation? And how well do you prepare your employees for the digital future? Our Industry 4.0 Assessment is the ideal solution for assessing how prepared your company is for Industry 4.0 and providing a starting point for your digitalisation strategy. Together we define which Industry 4.0 technologies will add value to your company and help you to achieve your goals in the long term. Our detailed analysis offers you a reliable basis for initiating further processes and projects on the path of digital transformation.

### Introduction to Industry 4.0 – Fundamentals and opportunities

Industry 4.0 is a hot topic, and one that is often understood in different ways. People working in management positions in particular are increasingly being confronted with Industry 4.0, and need to be aware of the effects. It offers companies numerous ways of enhancing productivity, quality and processes. Before it can be implemented, however, managers need a thorough understanding of all the elements and technologies, and how they are intertwined. This knowledge can then be used to develop new business models and specific strategies for implementing Industry 4.0 in the participants' own companies.

### Active participation 4.0 – Interactive introduction to Industry 4.0

"Industry 4.0" is a hot topic in industry at the moment. Despite the transformation that this brings, many employees do not know what the changes will involve or why they are necessary. Changes are hard for them to understand and also cause anxiety, resulting in a lack of motivation.

The "Active participation 4.0" training course is a 1-day interactive awareness building training course for employees from industrial companies working in both production-related and non-production-related areas. Its purpose is to raise awareness of the topic of digitalisation and the changes associated with the technological transformation. The training course addresses the current challenges and motivates participants to embrace them.

### Lean management and Industry 4.0 – Two solutions that complement each other

Lean management and Industry 4.0 are two concepts that pursue similar goals. With an increasing number of customised products and ever declining batch sizes, the lean concept is reaching its limits. Industry 4.0 supports the existing lean methods with new technologies. However, digitalisation produces new types of waste (particularly when it comes to data), therefore new forms of value stream analysis are becoming more important. By adapting the typical value stream analysis, these new types of waste can be identified and avoided.

### Industry 4.0: Enabling the production of tomorrow

The goal of Industry 4.0 is the smart factory.

The trend in industrial production is towards the individualisation of products and batch sizes of one. Conventional processes are increasingly merging with modern information and communication technologies. The real and virtual worlds are continuing to converge, and the Internet of Things is becoming a reality.

However, the transformation and the new technical opportunities are not only affecting companies, but in particular their employees. The challenge of being able to apply the principles of self-organisation in open and unpredictable, complex and dynamic situations also calls for new knowledge on the part of your employees. New competencies – both technical, organisational or social – that were less relevant up to now are becoming increasingly important and help your employees to be productive in a new, more complex working environment.

These include the ability to reflect, analytical thinking, complex communication and coming up with new ideas.

All our services are focused on developing these necessary competencies. We always combine the transfer of knowledge with the development of skills and the practical transfer to the participants' working environment, whether in public courses, company-specific training courses or during process-oriented consultation.

The aim is to ensure that your employees not only understand the technologies around Industry 4.0, but can also apply and develop them in a targeted way in your company to help increase efficiency and performance.

You will find a small selection of our training courses on this page.

### CP Factory Training – Production planning and control in the smart factory

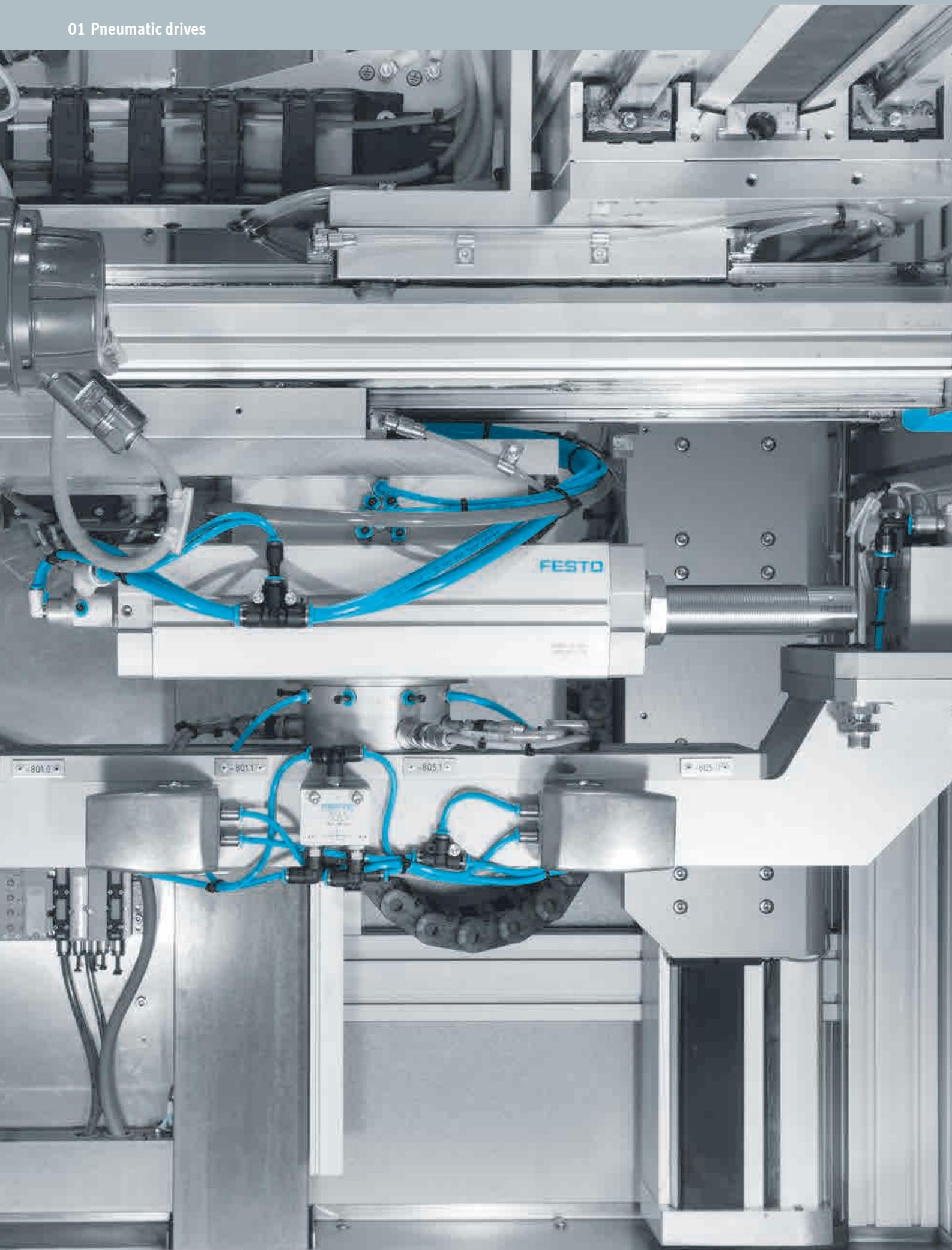
Production planning and control (PPC) has always been one of the core tasks of a manufacturing company and is gaining in significance with smart factories and Industry 4.0 (e.g. greater product diversity, customised solutions and the demand for batch sizes of one). The purpose of production planning and control is to design the production processes so that smooth and economical operation is guaranteed. Inadequate or poor PPC frequently results in delivery, cost and quality problems. Designing an efficient PPC system is therefore essential for every manufacturing company.

### Smart Maintenance – Predictive and usage-based maintenance

Cyber-physical systems enable new approaches in maintenance and yet also place higher demands on maintenance. Because all the promises of Industry 4.0, such as one-piece flow or make-to-order, can only be fulfilled with extremely high machine and system availability and reliability. Those responsible for maintenance are therefore required to use maintenance strategies that show anomalies and wear in good time before malfunctions and failures occur, and that turn maintenance into a predictable process.

Detailed information as well as course dates, locations and costs: → [www.festo-didactic.com](http://www.festo-didactic.com)

## 01 Pneumatic drives



## Product overview

### Software tools

<b>Pneumatic simulation</b>		Perfect simulations replace expensive real-life tests. The tool is an expert system that supports you in the selection and configuration of the entire pneumatic control chain. If one parameter is changed, the program automatically adapts all the others.
<b>Festo Design Tool 3D</b>		This tool can be found at → <a href="http://www.festo.com/x/pneumatic-simulation">www.festo.com/x/pneumatic-simulation</a>

### Piston rod cylinder >

#### Round cylinders

<b>Standards-based cylinder DSNU</b>			
<b>Mode of operation</b>	Double-acting	Double-acting	Double-acting
<b>Piston diameter</b>	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
<b>Theoretical force at 6 bar, advancing</b>	23 ... 295 N	482.5 ... 1870.3 N	30.2 ... 294.5 N
<b>Stroke</b>	1 ... 500 mm	1 ... 500 mm	1 ... 200 mm
<b>Cushioning</b>	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
<b>NEW</b>			<ul style="list-style-type: none"> <li>New for 7/2020: additional versions</li> </ul>
<b>Description</b>	<ul style="list-style-type: none"> <li>ISO 6432</li> <li>Wide range of variants for customised applications</li> <li>Good running performance and long service life</li> <li>Self-adjusting pneumatic end-position cushioning which adapts optimally to changes in load and speed</li> <li>Piston rod with female or male thread</li> <li>For position sensing</li> </ul>	<ul style="list-style-type: none"> <li>Wide range of variants for customised applications</li> <li>Good running performance and long service life</li> <li>Self-adjusting pneumatic end-position cushioning which adapts optimally to changes in load and speed</li> <li>Piston rod with female or male thread</li> <li>For position sensing</li> </ul>	<ul style="list-style-type: none"> <li>Short variant of ISO cylinder DSNU</li> <li>Quick and easy installation, even in tight spaces</li> <li>Light weight</li> <li>Self-adjusting pneumatic end-position cushioning which adapts optimally to changes in load and speed</li> <li>Piston rod with male thread</li> <li>For position sensing</li> </ul>
<b>online:</b> →	<a href="#">dsnu</a>	<a href="#">dsnu</a>	<a href="#">dsnu</a>

[Piston rod cylinder >](#)

## Round cylinders

	<b>Standards-based cylinder ESNU</b>		<b>Round cylinders ESNU</b>		<b>Round cylinders EG-PK</b>
<b>Mode of operation</b>	Single-acting, Pushing	Single-acting, Pushing	Single-acting, Pushing	Single-acting, Pushing	Single-acting, Pushing
<b>Piston diameter</b>	8 mm, 10 mm, 12 mm, 16 mm, 20 mm, 25 mm	32 mm, 40 mm, 50 mm, 63 mm		2.5 mm, 4 mm, 6 mm	
<b>Theoretical force at 6 bar, advancing</b>	19 ... 271 N	406 ... 1765 N		1.9 ... 11.8 N	
<b>Stroke</b>	1 ... 50 mm	1 ... 50 mm		5 ... 25 mm	
<b>Cushioning</b>	Elastic cushioning rings/plates at both ends	Elastic cushioning rings/plates at both ends		On one side, Not adjustable, No cushioning	
<b>Description</b>	<ul style="list-style-type: none"> <li>ISO 6432</li> <li>Wide range of variants for customised applications</li> <li>Good running performance and long service life</li> <li>Piston rod with female or male thread</li> <li>For position sensing</li> </ul>	<ul style="list-style-type: none"> <li>Wide range of variants for customised applications</li> <li>Good running performance and long service life</li> <li>Piston rod with female or male thread</li> <li>For position sensing</li> </ul>		<ul style="list-style-type: none"> <li>Micro cylinder</li> <li>Barbed fitting for plastic tubing with standard I.D.</li> <li>Without position sensing</li> </ul>	
<b>online:</b> ➔	<a href="#">esnu</a>	<a href="#">esnu</a>		<a href="#">eg-pk</a>	

[Piston rod cylinder >](#)

## Tie rod and profile barrel cylinders

	<b>Standards-based cylinders DSBC, pre-configured DSBC</b> ★		<b>Standards-based cylinders DSBG</b>		<b>Standards-based cylinders DSBG</b>		<b>Standards-based cylinders, Clean Design DSBF</b>
<b>Mode of operation</b>	Double-acting	Double-acting	Double-acting	Double-acting	Double-acting	Double-acting	Double-acting
<b>Piston diameter</b>	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	160 mm, 200 mm, 250 mm, 320 mm	160 mm, 200 mm, 250 mm, 320 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	32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm, 125 mm
<b>Theoretical force at 6 bar, advancing</b>	415 ... 7363 N	415 ... 7363 N	12064 ... 48255 N	12064 ... 48255 N	415 ... 7363 N	415 ... 7363 N	415 ... 7363 N
<b>Stroke</b>	1 ... 2800 mm	1 ... 2800 mm	1 ... 2700 mm	1 ... 2700 mm	1 ... 2800 mm	1 ... 2800 mm	1 ... 2800 mm
<b>Cushioning</b>	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, Pneumatic cushioning, adjustable at both ends	Elastic cushioning rings/plates 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	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
<b>Description</b>	<ul style="list-style-type: none"> <li>ISO 15552 (ISO 6431, VDMA 24562)</li> <li>Self-adjusting pneumatic end-position cushioning which adapts optimally to changes in load and speed</li> <li>Standard profile with two sensor slots</li> <li>Wide range of variants for customised applications</li> <li>Comprehensive range of mounting accessories for just about every type of installation</li> <li>For position sensing</li> </ul>	<ul style="list-style-type: none"> <li>ISO 15552 (ISO 6431, VDMA 24562)</li> <li>Sturdy tie rod design</li> <li>Self-adjusting pneumatic end-position cushioning which adapts optimally to changes in load and speed</li> <li>Comprehensive range of mounting accessories for just about every type of installation</li> <li>For position sensing</li> <li>Variants to EU Explosion Protection Directive (ATEX)</li> </ul>	<ul style="list-style-type: none"> <li>ISO 15552 (ISO 6431, VDMA 24562)</li> <li>Sturdy tie rod design</li> <li>Pneumatic end-position cushioning adjustable at both ends</li> <li>Optionally without pneumatic end-position cushioning, adjustable at both ends, and position sensing, resulting in a price advantage</li> <li>Optionally with spacer bolt attachment</li> <li>For position sensing</li> <li>Variants to EU Explosion Protection Directive (ATEX)</li> </ul>	<ul style="list-style-type: none"> <li>ISO 15552 (ISO 6431, VDMA 24562)</li> <li>Increased corrosion protection</li> <li>Easy-to-clean design</li> <li>FDA-approved lubrication and sealing on the basic version</li> <li>Long service life thanks to optional dry-running seal</li> <li>Self-adjusting pneumatic end-position cushioning which adapts optimally to changes in load and speed</li> <li>For position sensing</li> </ul>	<ul style="list-style-type: none"> <li>ISO 15552</li> <li>Increased corrosion protection</li> <li>Easy-to-clean design</li> <li>FDA-approved lubrication and sealing on the basic version</li> <li>Long service life thanks to optional dry-running seal</li> <li>Self-adjusting pneumatic end-position cushioning which adapts optimally to changes in load and speed</li> <li>For position sensing</li> </ul>		
<b>online:</b> ➔	<a href="#">dsbc</a>	<a href="#">dsbg</a>	<a href="#">dsbg</a>	<a href="#">dsbg</a>			<a href="#">dsbf</a>

## Product overview

### Piston rod cylinder >

#### Compact, short-stroke and flat cylinders

					NEW
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 6 bar, 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	
NEW			• New for 11/2020: additional versions	• New for 11/2020: additional versions	
Description	<ul style="list-style-type: none"> <li>• ISO 21287</li> <li>• Up to 50% less installation space than comparable standards-based cylinders to ISO 15552</li> <li>• Piston rod with female or male thread</li> <li>• Wide range of variants for customised applications</li> <li>• For position sensing</li> </ul>	<ul style="list-style-type: none"> <li>• ISO 21287</li> <li>• Up to 50% less installation space than comparable standards-based cylinders to ISO 15552</li> <li>• Piston rod with female or male thread</li> <li>• Wide range of variants for customised applications</li> <li>• For position sensing</li> </ul>	<ul style="list-style-type: none"> <li>• Minimal installation space</li> <li>• Very lightweight</li> <li>• Ideal for small movements</li> <li>• Piston rod with female or male thread</li> <li>• For position sensing</li> </ul>	<ul style="list-style-type: none"> <li>• Minimal installation space</li> <li>• Very lightweight</li> <li>• Ideal for small movements</li> <li>• High forces in a compact size</li> <li>• Piston rod with female or male thread</li> <li>• For position sensing</li> </ul>	
online: ➔	adn	aen	adn-s	aen-s	

**Piston rod cylinder >****Compact, short-stroke and flat cylinders**

				
	<b>Short-stroke cylinders ADVC, AEVC</b>	<b>Compact cylinders, multimount DPDM</b>	<b>Compact cylinders ADN-EL</b>	<b>Compact cylinders, Clean Design CDC</b>
<b>Mode of operation</b>	Double-acting, Single-acting, Pushing	Double-acting, Single-acting, Pushing, Pulling	Double-acting	Double-acting
<b>Piston diameter</b>	4 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	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
<b>Theoretical force at 6 bar, advancing</b>	4.9 ... 4712 N	9 ... 483 N	188 ... 4712 N	141 ... 3016 N
<b>Stroke</b>	2.5 ... 25 mm	5 ... 50 mm	10 ... 500 mm	1 ... 500 mm
<b>Cushioning</b>	Elastic cushioning rings/plates at both ends	Elastic cushioning rings/plates at both ends	Elastic cushioning rings/plates at both ends	Elastic cushioning rings/plates at both ends
<b>Description</b>	<ul style="list-style-type: none"> <li>• Very short overall length</li> <li>• High forces in a compact size</li> <li>• Piston rod with female or male thread</li> <li>• Optimised fitting space and height</li> <li>• Mounting hole pattern to VDMA 24562 as of Ø 32 mm</li> <li>• For position sensing with proximity sensor for T-slot and for C-slot</li> </ul>	<ul style="list-style-type: none"> <li>• Mounting using through-hole and female thread</li> <li>• Compact design</li> <li>• Piston rod variants</li> <li>• For position sensing</li> </ul>	<ul style="list-style-type: none"> <li>• ISO 21287</li> <li>• With end-position locking at both ends, front or rear</li> <li>• Piston rod with female or male thread</li> <li>• For position sensing</li> </ul>	<ul style="list-style-type: none"> <li>• ISO 21287</li> <li>• Up to 50% less installation space than comparable standards-based cylinders to ISO 15552</li> <li>• Easy-to-clean design</li> <li>• Increased corrosion protection</li> <li>• Wide range of variants for customised applications</li> <li>• Piston rod with female or male thread</li> <li>• For position sensing</li> </ul>
<b>online: ➔</b>	<a href="#">advc</a>	<a href="#">dpdm</a>	<a href="#">adn-el</a>	<a href="#">cdc</a>

**Piston rod cylinder >****Compact, short-stroke and flat cylinders**

			
	<b>Flat cylinders DZF</b>	<b>Flat cylinders DZH</b>	<b>Flat cylinders EZH</b>
<b>Mode of operation</b>	Double-acting	Double-acting	Single-acting, Pushing
<b>Piston diameter</b>	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
<b>Theoretical force at 6 bar, advancing</b>	51 ... 1870 N	104 ... 1870 N	3.8 ... 205 N
<b>Stroke</b>	1 ... 320 mm	1 ... 1000 mm	10 ... 50 mm
<b>Cushioning</b>	Elastic cushioning rings/plates at both ends	Pneumatic cushioning, adjustable at both ends	No cushioning
<b>Description</b>	<ul style="list-style-type: none"> <li>• Extremely flat design</li> <li>• Protected against rotation thanks to special piston shape</li> <li>• Ideal for manifold assembly</li> <li>• Wide variety of mounting and attachment options</li> <li>• Piston rod with female or male thread</li> <li>• For position sensing</li> </ul>	<ul style="list-style-type: none"> <li>• Flat design</li> <li>• Protected against rotation thanks to special piston shape</li> <li>• Ideal for manifold assembly</li> <li>• Wide variety of mounting and attachment options</li> <li>• Piston rod with male thread</li> <li>• For position sensing</li> </ul>	<ul style="list-style-type: none"> <li>• Extremely flat design</li> <li>• Protected against rotation thanks to special piston shape</li> <li>• Wide variety of mounting and attachment options</li> <li>• For position sensing</li> </ul>
<b>online: ➔</b>	<a href="#">dzf</a>	<a href="#">dzh</a>	<a href="#">eZH</a>

## Product overview

### Piston rod cylinder >

#### Multimount and cartridge cylinders

		
<b>Compact cylinders, multimount DPDM</b>		
<b>Mode of operation</b>	Double-acting, Single-acting, Pushing, Pulling	Single-acting, Pushing
<b>Piston diameter</b>	6 mm, 10 mm, 16 mm, 20 mm, 25 mm, 32 mm	6 mm, 10 mm, 16 mm
<b>Theoretical force at 6 bar, advancing</b>	9 ... 483 N	13.9 ... 109 N
<b>Stroke</b>	5 ... 50 mm	5 ... 15 mm
<b>Cushioning</b>	Elastic cushioning rings/plates at both ends	No cushioning
<b>Description</b>	<ul style="list-style-type: none"> <li>• Mounting using through-hole and female thread</li> <li>• Compact design</li> <li>• Piston rod variants</li> <li>• For position sensing</li> </ul>	<ul style="list-style-type: none"> <li>• Minimal installation space</li> <li>• Installation with or without mounting components</li> <li>• Piston rod with male thread</li> </ul>
<b>online: ➔</b>	<a href="#">dpdm</a>	<a href="#">egz</a>

### Piston rod cylinder >

#### Cylinders with clamping unit

			
<b>Standards-based cylinders with clamping unit DSBC-C</b>			
<b>Mode of operation</b>	Double-acting	Double-acting	Double-acting
<b>Piston diameter</b>	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
<b>Theoretical force at 6 bar, advancing</b>	415 ... 7363 N	23 ... 295 N	483 ... 1870 N
<b>Stroke</b>	1 ... 2800 mm	1 ... 500 mm	1 ... 500 mm
<b>Cushioning</b>	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
<b>Description</b>	<ul style="list-style-type: none"> <li>• The piston rod can be held in any position</li> <li>• Piston rod can be held in position for long periods even with alternating loads, fluctuating operating pressure or leaks in the system</li> <li>• Mounting hole pattern to ISO 15552</li> <li>• Piston rod with female or male thread</li> <li>• For position sensing</li> </ul>	<ul style="list-style-type: none"> <li>• Based on ISO 6432</li> <li>• The piston rod can be held in any position</li> <li>• The piston rod can also be held for long periods with alternating loads, fluctuating operation pressure or loss of pressure</li> <li>• For position sensing</li> </ul>	<ul style="list-style-type: none"> <li>• The piston rod can be held in any position</li> <li>• The piston rod can also be held for long periods with alternating loads, fluctuating operation pressure or loss of pressure</li> <li>• For position sensing</li> </ul>
<b>online: ➔</b>	<a href="#">dsbc-c</a>	<a href="#">dsnu-kp</a>	<a href="#">dsnu-kp</a>

**Piston rod cylinder >****Cylinders with clamping unit**

			
	<b>Compact cylinders with clamping unit ADN-KP</b>	<b>Cylinders with holding brake DFLC</b>	<b>Cylinders with holding brake DFLG</b>
<b>Mode of operation</b>	Double-acting	Double-acting	Double-acting
<b>Piston diameter</b>	20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm	40 mm, 63 mm, 100 mm	160 mm
<b>Theoretical force at 6 bar, advancing</b>	188 ... 4712 N	754 ... 4712 N	12064 N
<b>Stroke</b>	10 ... 500 mm	10 ... 2000 mm	10 ... 2000 mm
<b>Cushioning</b>	Elastic cushioning rings/plates at both ends	Pneumatic cushioning, adjustable at both ends	Pneumatic cushioning, adjustable at both ends
<b>NEW</b>		<ul style="list-style-type: none"> <li>• New product, 4/2020</li> </ul>	<ul style="list-style-type: none"> <li>• New product, 4/2020</li> </ul>
<b>Description</b>	<ul style="list-style-type: none"> <li>• The piston rod can be held in any position</li> <li>• The piston rod can also be held for long periods with alternating loads, fluctuating operation pressure or loss of pressure</li> <li>• Mounting hole pattern to ISO 21287</li> <li>• Piston rod with female or male thread</li> <li>• For position sensing</li> </ul>	<ul style="list-style-type: none"> <li>• Combination of holding brake and standards-based cylinder based on ISO 15552</li> <li>• Holding function: retains the piston rod by clamping with frictional locking</li> <li>• Emergency braking function: stops the movement of the piston rod by clamping with frictional locking</li> <li>• Safety device tested and certified in accordance with Machinery Directive 2006/42/EC and applicable standards. For more information, see <a href="http://www.festo.com/sp">www.festo.com/sp</a> &gt; "Certificates" tab</li> <li>• Optional: high level of corrosion protection, variants in accordance with EU Explosion Protection Directive (ATEX)</li> <li>• For position sensing</li> </ul>	<ul style="list-style-type: none"> <li>• Combination of holding brake and standards-based cylinder based on ISO 15552</li> <li>• Holding function: retains the piston rod by clamping with frictional locking</li> <li>• Emergency braking function: stops the movement of the piston rod by clamping with frictional locking</li> <li>• Safety device tested and certified in accordance with Machinery Directive 2006/42/EC and applicable standards. For more information, see <a href="http://www.festo.com/sp">www.festo.com/sp</a> &gt; "Certificates" tab</li> <li>• Optional: high level of corrosion protection, variants in accordance with EU Explosion Protection Directive (ATEX)</li> <li>• For position sensing</li> </ul>
<b>online:</b> ➔	<a href="#">adn-kp</a>	<a href="#">dflc</a>	<a href="#">dflg</a>

## Product overview

### Piston rod cylinder >

#### Stainless steel cylinders

				
	<b>Standards-based cylinder CRDSNU, CRDSNU-B</b>	<b>Round cylinders CRDSNU, CRDSNU-B</b>	<b>Standards-based cylinders CRDNG, CRDNGS</b>	<b>Round cylinders CRHD</b>
<b>Mode of operation</b>	Double-acting	Double-acting	Double-acting	Double-acting
<b>Piston diameter</b>	12 mm, 16 mm, 20 mm, 25 mm	32 mm, 40 mm, 50 mm, 63 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
<b>Theoretical force at 6 bar, advancing</b>	68 ... 295 N	483 ... 1870 N	483 ... 7363 N	483 ... 4712 N
<b>Stroke</b>	1 ... 500 mm	1 ... 500 mm	10 ... 2000 mm	10 ... 500 mm
<b>Cushioning</b>	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
<b>Description</b>	<ul style="list-style-type: none"> <li>• ISO 6432</li> <li>• Corrosion resistant against aggressive ambient conditions</li> <li>• Easy-to-clean design</li> <li>• Long service life thanks to optional dry-running seal</li> <li>• Wide range of variants for customised applications</li> <li>• Self-adjusting pneumatic end-position cushioning which adapts optimally to changes in load and speed</li> <li>• For position sensing</li> </ul>	<ul style="list-style-type: none"> <li>• Corrosion resistant against aggressive ambient conditions</li> <li>• Easy-to-clean design</li> <li>• Long service life thanks to optional dry-running seal</li> <li>• Wide range of variants for customised applications</li> <li>• Self-adjusting pneumatic end-position cushioning which adapts optimally to changes in load and speed</li> <li>• For position sensing</li> </ul>	<ul style="list-style-type: none"> <li>• ISO 15552 (ISO 6431, VDMA 24562)</li> <li>• Corrosion resistant against aggressive ambient conditions</li> <li>• Easy-to-clean design</li> <li>• Variants: through piston rod, heat-resistant design</li> <li>• Threaded mounting, mounting via accessories</li> <li>• For position sensing</li> </ul>	<ul style="list-style-type: none"> <li>• Corrosion resistant against aggressive ambient conditions</li> <li>• Easy-to-clean design, optimised for very exacting demands</li> <li>• Flexible design thanks to different end caps</li> <li>• Piston rod with male thread</li> <li>• For position sensing</li> </ul>
<b>online: ➔</b>	<a href="#">crdnsu</a>	<a href="#">crdsnu</a>	<a href="#">crdng</a>	<a href="#">crhd</a>

Rodless cylinders &gt;

## Mechanically coupled cylinders

			
<b>Linear drives DLGF</b>			
<b>Piston diameter</b>	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
<b>Theoretical force at 6 bar, advancing</b>	188 ... 754 N	153 ... 3016 N	30 ... 1870 N
<b>Stroke</b>	50 ... 1000 mm	1 ... 8500 mm	1 ... 8500 mm
<b>Cushioning</b>	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
<b>Position sensing</b>	Via proximity switch	Via proximity switch	Via proximity switch
<b>Description</b>	<ul style="list-style-type: none"> <li>Extremely flat design</li> <li>Choice of two types of cushioning: self-adjusting pneumatic end-position cushioning or external hydraulic shock absorbers</li> <li>Supply port on the left or right or at both ends or alternatively from below</li> <li>Loads and devices can be directly mounted on the slide</li> <li>Basic design DLGF-G without external guide for simple drive functions in small installation spaces</li> <li>Recirculating ball bearing guide DLGF-KF with a standard recirculating ball bearing guide for high torques and heavy loads</li> </ul>	<ul style="list-style-type: none"> <li>Compact design: 30% smaller than basic design DGC-G</li> <li>Basic drive without guide, for simple drive functions</li> <li>Low moving dead weight</li> <li>Symmetrical design</li> </ul>	<ul style="list-style-type: none"> <li>Basic design, plain or ball bearing guide, guide axis without actuator</li> <li>All settings accessible from one side</li> <li>Available with variable end stops and intermediate position module</li> <li>Optional: NSF-H1 lubricant for the food zone (see <a href="http://www.festo.com/sp/dgc">www.festo.com/sp/dgc</a> -&gt; "Certificates" tab)</li> <li>Optional: clamping unit for holding loads</li> </ul>
online: →	<a href="#">dlgf</a>	<a href="#">dgc-k</a>	<a href="#">dgc</a>

Rodless cylinders &gt;

## Mechanically coupled cylinders

		
<b>Linear drives with heavy-duty guide DGC-HD</b>		
<b>Piston diameter</b>	18 mm, 25 mm, 40 mm	8 mm, 12 mm, 18 mm
<b>Theoretical force at 6 bar, advancing</b>	153 ... 754 N	30 ... 153 N
<b>Stroke</b>	1 ... 5000 mm	100 ... 900 mm
<b>Cushioning</b>	Shock absorber, hard characteristic curve, Shock absorber, soft characteristic curve	Elastic cushioning rings/plates at both ends, Shock absorber, hard characteristic curve
<b>Position sensing</b>	Via proximity switch	Via proximity switch
<b>Description</b>	<ul style="list-style-type: none"> <li>For maximum loads and torques thanks to duo guide rail</li> <li>Very good operating performance under torque load</li> <li>Long service life</li> <li>Ideal as a basic axis for linear gantries and cantilever axes</li> <li>Wide range of adaptation options on the drives</li> </ul>	<ul style="list-style-type: none"> <li>Extremely flat design</li> <li>Highest precision thanks to integrated recirculating ball bearing guide</li> <li>Adjustable end stops</li> <li>Wide range of supply ports</li> <li>Available with intermediate position module</li> </ul>
online: →	<a href="#">dgc-hd</a>	<a href="#">slg</a>

## Product overview

Rodless cylinders >

### Magnetically coupled cylinders

		
<b>Linear drives DGO</b>		
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 6 bar, 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	<ul style="list-style-type: none"> <li>Magnetic power transmission</li> <li>Pressure-tight and zero leakage</li> <li>Dirt-proof and dust-proof</li> </ul>	<ul style="list-style-type: none"> <li>Magnetic power transmission</li> <li>Recirculating ball bearing guide: combination of slide unit and rodless linear drive</li> <li>Individual choice of end-position cushioning and sensing</li> </ul>
online: ➔	dgo	slm

## Software tools

<b>Mass moment of inertia</b>		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 ➔ <a href="http://www.festo.com/x/mass-moment-of-inertia">www.festo.com/x/mass-moment-of-inertia</a>		

Semi-rotary drives >

### Semi-rotary drives with rotary vane

			
<b>Semi-rotary drives DRVS</b>			
Size	12, 16, 25, 32, 40, 6, 8	10, 6, 8	12, 16, 25, 32, 40, 63
Theoretical torque at 6 bar	0.15 ... 20 Nm	0.15 ... 1.7 Nm	1.25 ... 80 Nm
Permissible mass moment of inertia	6.5 ... 350 kgcm <sup>2</sup>	6.5 ... 26 kgcm <sup>2</sup>	50 ... 5000 kgcm <sup>2</sup>
Position sensing	Via proximity switch	Via proximity switch, Without	Via proximity switch
Swivel angle	0 ... 270 deg	0 ... 240 deg	0 ... 270 deg
Description	<ul style="list-style-type: none"> <li>Double-acting semi-rotary drive with rotary vane</li> <li>Lighter than other semi-rotary drives</li> <li>Fixed swivel angle, adjustable swivel angle possible with the help of accessories</li> <li>Housing protected against splash water and dust</li> </ul>	<ul style="list-style-type: none"> <li>Double-acting semi-rotary drive with rotary vane or with tandem rotary vane</li> <li>Fixed or infinitely adjustable swivel angle</li> <li>With spigot shaft or hollow flange shaft</li> <li>With elastic cushioning rings/plates at both ends</li> </ul>	<ul style="list-style-type: none"> <li>Double-acting semi-rotary drive with rotary vane, with tandem rotary vane or with heavy-duty bearing</li> <li>Swivel angle is infinitely adjustable over the entire swivel range</li> <li>With elastic cushioning rings/plates at both ends, adjustable or with shock absorbers at both ends, self-adjusting</li> </ul>
online: ➔	drv	dsm	dsm

**Semi-rotary drives >****Semi-rotary drives with rack and pinion**

	<b>Semi-rotary drives</b> DRRD	
<b>Size</b>	10, 12, 16, 20, 25, 32, 35, 40, 50, 63, 8	
<b>Theoretical torque at 6 bar</b>	0.2 ... 112 Nm	
<b>Permissible mass moment of inertia</b>	15 ... 420000 kgcm <sup>2</sup>	
<b>Position sensing</b>	Via proximity switch	
<b>Swivel angle</b>	180 deg	
<b>Description</b>	<ul style="list-style-type: none"> <li>• Twin-piston drive, power transmission via rack and pinion principle</li> <li>• Very high accuracy in the end positions</li> <li>• Very high load bearing capacity</li> <li>• Very good axial run-out at the flanged shaft</li> <li>• Greater stability even with smaller sizes</li> </ul>	
<b>online:</b> ➔	<a href="#">drd</a>	

**Semi-rotary drives >****Swivel/linear drive units**

	<b>Swivel/linear units</b> DSL-B	
<b>Piston diameter</b>	16 mm, 20 mm, 25 mm, 32 mm, 40 mm	
<b>Theoretical torque at 6 bar</b>	1.25 ... 20 Nm	
<b>Permissible mass moment of inertia</b>	0.35 ... 40 kgcm <sup>2</sup>	
<b>Position sensing</b>	Via proximity switch	
<b>Swivel angle</b>	0 ... 272 deg	
<b>Description</b>	<ul style="list-style-type: none"> <li>• Rotary and linear motion can be controlled individually or simultaneously</li> <li>• High repetition accuracy</li> <li>• With plain or recirculating ball bearing guide</li> <li>• Through piston rod</li> </ul>	
<b>online:</b> ➔	<a href="#">dsl</a>	

## Product overview

**Tandem, high-force and multi-position cylinders >**

### Tandem and high-force cylinders

 <b>High-force cylinders</b> <b>ADNH</b>	 <b>Tandem cylinders</b> <b>DNCT</b>
<b>Piston diameter</b>	25 mm, 40 mm, 63 mm, 100 mm
<b>Theoretical force at 6 bar, advancing</b>	1036 ... 18281 N
<b>Stroke</b>	1 ... 150 mm
<b>Description</b>	<ul style="list-style-type: none"> <li>• Max. 4 cylinders can be combined</li> <li>• Increased thrust force</li> <li>• Only 2 connections are required to pressurise all cylinders</li> <li>• Piston rod with female or male thread</li> <li>• For position sensing</li> <li>• Mounting hole pattern to ISO 21287</li> </ul>
<b>online:</b> ➔	<a href="#">adnh</a>
	<a href="#">dnct</a>

**Tandem, high-force and multi-position cylinders >**

### Multi-position cylinders

 <b>Multi-position cylinders</b> <b>ADNM</b>
<b>Piston diameter</b>
25 mm, 40 mm, 63 mm, 100 mm
<b>Theoretical force at 6 bar, advancing</b>
295 ... 4712 N
<b>Max. total of all individual strokes</b>
1000 mm, 2000 mm
<b>Description</b>
<ul style="list-style-type: none"> <li>• Mounting hole pattern to ISO 21287</li> <li>• Piston rod with female or male thread</li> <li>• 2 ... 5 cylinders can be combined</li> <li>• Max. 5 positions can be approached</li> <li>• For position sensing</li> </ul>
<b>online:</b> ➔
<a href="#">adnm</a>

Drives with guides &gt;

## Drives with slides

			
<b>Mini slides DGST</b>		<b>Mini slides DGSL</b>	<b>Mini slides DGSC</b>
<b>Piston diameter</b>	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	6 mm
<b>Theoretical force at 6 bar, advancing</b>	34 ... 589 N	17 ... 483 N	17 N
<b>Stroke</b>	10 ... 200 mm	10 ... 200 mm	10 mm
<b>Cushioning</b>	Elastomer cushioning, double-sided, stroke not adjustable, 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	Elastic cushioning rings/plates at both ends
<b>Position sensing</b>	Via proximity switch	Via proximity switch	Without
<b>Description</b>	<ul style="list-style-type: none"> <li>Powerful twin-piston drive</li> <li>Shortest mini slide on the market</li> <li>Precise recirculating ball bearing guide</li> <li>Versatile mounting options</li> <li>Version with mirrored supply port configuration and sensor slots for compact assembly available to order using the configurator</li> </ul>	<ul style="list-style-type: none"> <li>High load capacity and positioning accuracy</li> <li>Maximum movement precision thanks to ground-in ball bearing cage guide</li> <li>Maximum flexibility thanks to 8 sizes</li> <li>Reliable in the event of a pressure drop thanks to clamping cartridge or end-position locking</li> <li>Wide variety of mounting and attachment options</li> <li>Compact design</li> </ul>	<ul style="list-style-type: none"> <li>Smallest guided slide unit on the market</li> <li>Precision ball bearing cage guide for a reliable and high-quality process</li> <li>Long service life thanks to housing made from high-alloy steel</li> <li>Low break-away pressure and uniform movement thanks to minimal friction of guide and seal</li> </ul>
<b>online: ➔</b>	<a href="#">dgst</a>	<a href="#">dgsl</a>	<a href="#">dgsc</a>

Drives with guides &gt;

## Drives with slides

		
<b>Mini slides SLF</b>		<b>Mini slides SLS</b>
<b>Piston diameter</b>	6 mm, 10 mm, 16 mm	6 mm, 10 mm, 16 mm
<b>Theoretical force at 6 bar, advancing</b>	17 ... 121 N	17 ... 121 N
<b>Stroke</b>	10 ... 80 mm	5 ... 30 mm
<b>Cushioning</b>	Elastic cushioning rings/plates at both ends	Elastic cushioning rings/plates at both ends
<b>Position sensing</b>	Via proximity switch	Via proximity switch
<b>Description</b>	<ul style="list-style-type: none"> <li>Flat design</li> <li>Ball bearing cage guide</li> <li>Versatile mounting options</li> <li>Easy adjustment of end positions</li> </ul>	<ul style="list-style-type: none"> <li>Slim design</li> <li>Ball bearing cage guide</li> <li>Versatile mounting options</li> </ul>
<b>online: ➔</b>	<a href="#">slf</a>	<a href="#">sls</a>

## Product overview

[Drives with guides >](#)

### Drives with guide rods

				
<b>Piston diameter</b>	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	12 mm, 16 mm, 20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm
<b>Theoretical force at 6 bar, advancing</b>	17 ... 4712 N	188 ... 1870 N	189 ... 1870 N	68 ... 4712 N
<b>Stroke</b>	5 ... 400 mm	20 ... 400 mm	10 ... 400 mm	1 ... 400 mm
<b>Cushioning</b>	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	Elastic cushioning rings/plates at both ends, Self-adjusting pneumatic end-position cushioning
<b>Position sensing</b>	Via proximity switch	Via proximity switch	Via proximity switch	Via proximity switch
<b>Description</b>	<ul style="list-style-type: none"> <li>• Drive and guide unit in a single housing</li> <li>• High resistance to torques and lateral forces</li> <li>• Plain or recirculating ball bearing guide</li> <li>• Wide variety of mounting and attachment options</li> <li>• Wide range of variants for customised applications</li> </ul>	<ul style="list-style-type: none"> <li>• High resistance to torques and lateral forces</li> <li>• Plain or recirculating ball bearing guide</li> <li>• Wide variety of mounting and attachment options</li> <li>• Wide range of variants for customised applications</li> <li>• Drive and guide unit in a single housing</li> </ul>	<ul style="list-style-type: none"> <li>• Easy-to-clean design</li> <li>• Increased corrosion protection</li> <li>• FDA-approved lubrication and sealing on the basic version</li> <li>• Hygienic mounting of the sensors possible</li> <li>• Compact design with high guide precision and load capacity</li> <li>• Long service life thanks to optional dry-running seal</li> <li>• Self-adjusting pneumatic end-position cushioning which adapts optimally to changes in load and speed</li> </ul>	<ul style="list-style-type: none"> <li>• ISO 21287</li> <li>• Piston rod secured against rotation by a guide rod and yoke plate</li> <li>• Plain bearing</li> <li>• Optionally with through piston rod</li> <li>• Higher load capacity thanks to guide rod and yoke plate</li> <li>• For position sensing</li> </ul>
<b>online:</b> ➔	<a href="#">dfm</a>	<a href="#">dfm</a>	<a href="#">dgrf</a>	<a href="#">adngf</a>

Drives with guides &gt;

## Drives with guide rods

					NEW
<b>Piston diameter</b>	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	6 mm, 10 mm, 16 mm, 20 mm, 25 mm, 32 mm	
<b>Theoretical force at 6 bar, advancing</b>	7.5 ... 47 N	60 ... 966 N	60 ... 724 N	34 ... 966 N	
<b>Stroke</b>	5 ... 30 mm	10 ... 100 mm	10 ... 100 mm	10 ... 200 mm	
<b>Cushioning</b>	Elastic cushioning rings/plates at both ends	Elastic cushioning rings/plates at both ends	Elastic cushioning rings/plates at both ends	Elastic cushioning rings/plates at both ends	
<b>Position sensing</b>	Via proximity switch, Without	Via proximity switch	Via proximity switch	Via proximity switch	
<b>NEW</b>					• New product, 11/2020
<b>Description</b>	<ul style="list-style-type: none"> <li>Smallest guided drive</li> <li>Precise and resilient</li> <li>Minimal space requirement</li> <li>Drive and guide unit in a single housing</li> <li>Plain or recirculating ball bearing guide</li> </ul>	<ul style="list-style-type: none"> <li>Twin pistons provide twice the force in half the space</li> <li>Plain or recirculating ball bearing guide</li> <li>Precision stroke adjustment in the end position</li> </ul>	<ul style="list-style-type: none"> <li>With yoke plate on rear of cylinder for higher lateral forces and precision</li> <li>Twin pistons provide twice the force in half the space</li> <li>Plain or recirculating ball bearing guide</li> <li>Precision stroke adjustment in the end position</li> </ul>	<ul style="list-style-type: none"> <li>Minimal space requirement</li> <li>Minimal mounting time</li> <li>High resistance to torques and lateral forces</li> <li>High rigidity thanks to its guide rods with large diameter and two plain-bearing bushes</li> <li>Wide range of mounting options</li> <li>Drive and guide unit in a single housing</li> <li>Plain bearing</li> </ul>	
<b>online: ➔</b>	<a href="#">dfc</a>	<a href="#">dpz</a>	<a href="#">dpzj</a>	<a href="#">dg tz</a>	

Stopper cylinders and feed separators &gt;

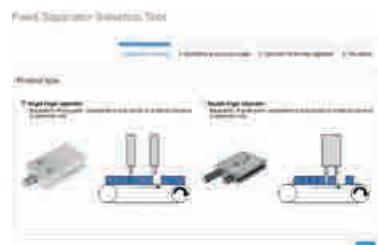
## Stopper cylinders

			
<b>Piston diameter</b>	16 mm, 20 mm, 32 mm, 40 mm, 50 mm	32 mm, 50 mm, 63 mm, 80 mm	80 mm
<b>Permissible impact force on the advanced piston rod</b>	710 ... 6280 N	1000 ... 6000 N	13300 ... 14600 N
<b>Stroke</b>	5 ... 30 mm	20 ... 40 mm	30 ... 40 mm
<b>Position sensing</b>	Via proximity switch	Via proximity switch	Via proximity switch
<b>Toggle lever position sensing</b>		Via inductive sensors	
<b>Description</b>	<ul style="list-style-type: none"> <li>Trunnion version with/without protection against rotation, with/without female thread</li> <li>Roller version with protection against rotation</li> <li>Compact design</li> <li>Sensor slots on 3 sides</li> <li>Long service life thanks to very good cushioning characteristics and sturdy piston rod guide</li> <li>Safe stopping of workpiece carriers, pallets and packages weighing up to 90 kg</li> </ul>	<ul style="list-style-type: none"> <li>Toggle lever design</li> <li>Integrated, adjustable shock absorber for smooth and adapted stopping</li> <li>Up to 800 kg impact load</li> <li>For position sensing on the piston</li> <li>Adjustable active direction thanks to rotatable toggle lever set-up (90°, 180°, 270°)</li> <li>Lever locking mechanism</li> <li>Toggle lever deactivator</li> <li>Roller version made of polyamide or steel</li> </ul>	<ul style="list-style-type: none"> <li>Roller version</li> <li>Absorption of high lateral forces</li> <li>Direct mounting of solenoid valves on flange plate</li> </ul>
<b>online: ➔</b>	<a href="#">dfsp</a>	<a href="#">dfst</a>	<a href="#">staf</a>

## Product overview

### 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 – enter the general parameters and you will receive at least one suggestion for the product best suited to your application.

This tool can be found at

→ on our website at [www.festo.com/catalogue](http://www.festo.com/catalogue) by clicking on the blue icon “Engineering”.

#### Stopper cylinders and feed separators >

### Feed separators



**Feed separators  
HPVS**



**Feed separators  
HPV**

<b>Mode of operation</b>	Double-acting	Double-acting
<b>Piston diameter</b>	10 mm, 14 mm, 22 mm	10 mm, 14 mm, 22 mm
<b>Stroke</b>	10 ... 60 mm	10 ... 60 mm
<b>Theoretical force at 6 bar, advancing</b>	45 ... 225 N	45 ... 225 N
<b>Description</b>	<ul style="list-style-type: none"> <li>• Version with one plunger</li> <li>• With non-rotating piston rod</li> <li>• Proximity sensor SME/SMT-8 can be integrated in the housing</li> </ul>	<ul style="list-style-type: none"> <li>• Version with two plungers</li> <li>• With twin piston, non-rotating piston rod and locking mechanism</li> <li>• Cost-effective: replaces at least two drives in the feed process</li> <li>• Proximity sensor SME/SMT-8 can be integrated in the housing</li> </ul>
<b>online:</b> →	<a href="#">hpvs</a>	<a href="#">hpv</a>

#### Clamping cylinders >

### Clamping modules



**Clamping modules  
EV**

<b>Clamping area</b>	10x30, 15x40, 15x63, 20x75, 20x120, 20x180, Ø16 mm, Ø20 mm, Ø25 mm, Ø32 mm, Ø40 mm, Ø50 mm, Ø63 mm, Ø12 mm
<b>Stroke</b>	3 ... 5 mm
<b>Description</b>	<ul style="list-style-type: none"> <li>• Compact rodless cylinder with diaphragm</li> <li>• Single-acting, with reset function</li> <li>• Flat design</li> <li>• Hermetically sealed</li> <li>• Pressure plates and foot mounting as accessories</li> </ul>
<b>online:</b> →	<a href="#">ev</a>

## Clamping cylinders &gt;

## 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 6 bar	51 ... 1682 N
Clamping stroke	10 ... 50 mm
Swivel angle	90° +/- 2°, 90° +/- 3°, 90° +/- 4°
Description	<ul style="list-style-type: none"> <li>• Swivelling and clamping in one step</li> <li>• Adjustable swivel direction</li> <li>• Available with clamping fingers as accessories</li> <li>• Available with dust and welding spatter protection</li> <li>• Double-acting</li> <li>• For position sensing</li> </ul>
online: →	<a href="#">clr</a>

## Clamping cylinders &gt;

## Hinge cylinders

Hinge cylinders  
DWA, DWB, DWC

Piston diameter	50 mm, 63 mm, 80 mm
Stroke	10 ... 200 mm
Theoretical force at 6 bar, advancing	1178 ... 3016 N
Position sensing	Via proximity switch, Without
Cushioning	Pneumatic cushioning, adjustable at both ends
Description	<ul style="list-style-type: none"> <li>• For clamping components during the welding process</li> <li>• Double-acting</li> <li>• Easy to mount thanks to swivel bearing on the bearing cap</li> <li>• Integrated flow control</li> <li>• Integrated end-position cushioning</li> <li>• Rod wiper seal to protect against welding spatter</li> <li>• Asian automotive standard for car body production</li> </ul>
online: →	<a href="#">dw</a>

## Product overview

**Bellows and diaphragm drives >**

### Bellows actuators



**Bellows cylinder  
EB**

<b>Size</b>	145, 165, 215, 250, 325, 385, 80
<b>Stroke</b>	20 ... 230 mm
<b>Description</b>	<ul style="list-style-type: none"> <li>• Use as a spring element or for reducing oscillations</li> <li>• Single- or double-bellows cylinder</li> <li>• High forces with a short stroke</li> <li>• Uniform movement: no stick-slip effect</li> <li>• Use in dusty environments or in water</li> <li>• Maintenance-free</li> </ul>
<b>online:</b> →	<a href="#">eb</a>

**Bellows and diaphragm drives >**

### Fluidic muscles



**Fluidic muscles  
DMSP**

<b>Size</b>	10, 20, 40, 5
<b>Theoretical force at 6 bar</b>	140 ... 6000 N
<b>Nominal length</b>	30 ... 9000 mm
<b>Max. contraction</b>	20% of nominal length, 25% of the nominal length
<b>Description</b>	<ul style="list-style-type: none"> <li>• With press-fitted connection</li> <li>• Up to 30% less weight: a superb force/weight ratio</li> <li>• Single-acting, pulling</li> <li>• 3 integrated adapter variants</li> <li>• 10 times the initial force of a comparable pneumatic cylinder</li> <li>• Uniform movement: no stick-slip effect</li> <li>• Hermetically sealed design offers protection against dust, dirt and moisture</li> </ul>
<b>online:</b> →	<a href="#">dmsp</a>

## 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 – enter the general parameters and 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](http://www.festo.com/x/rotary-indexing-table-selection)

### Rotary indexing tables >

## Rotary indexing tables



**Rotary indexing tables  
DHTG**

<b>Size</b>	140, 220, 65, 90
<b>Theoretical torque at 6 bar</b>	2.1 ... 58.9 Nm
<b>Indexing stations</b>	2 ... 24
<b>Description</b>	<ul style="list-style-type: none"><li>• For swivelling or separating tasks</li><li>• Sturdy mechanical system</li><li>• Easy planning and commissioning</li><li>• Rotary table diameters: 65, 90, 140, 220 mm</li><li>• Free control of rotational direction</li></ul>
<b>online:</b> →	<a href="#">dhtg</a>

## Product overview

Valve actuators for process automation >

### Quarter turn actuators and quarter turn actuator units for process automation

		<b>NEW</b>			
	<b>Quarter turn actuator units KDFP-DFPD</b>		<b>Quarter turn actuators DFPD</b> 	<b>Quarter turn actuators DFPD-C</b>	<b>Quarter turn actuators DAPS</b>
<b>Design</b>	Rack and pinion	Rack and pinion	Rack and pinion	Rack and pinion	Scotch yoke system
<b>Mode of operation</b>	Double-acting, Single-acting	Double-acting, Single-acting	Single-acting	Double-acting, Single-acting	
<b>Size of valve actuator</b>	10 ... 2300	10, 20, 40, 80, 120, 160, 240, 300, 480, 700, 900, 1200, 2300	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	
<b>Flange hole pattern</b>	F03, F04, F05, F07, F10, F12, F14, F16	F03, F04, F05, F07, F10, F12, F14, F16, F0507, F0710, F1012, F1216	F05, F07, F10, F12, F14, F16	F03, F04, F05, F07, F10, F12, F14, F16, F25	
<b>Swivel angle</b>	90 deg	90 - 180 deg	90 deg	90 - 92 deg	
<b>Operating pressure</b>	2 ... 8 bar	2 ... 8 bar	2 ... 8 bar	1 ... 8.4 bar	
<b>Ambient temperature</b>	-50 ... 150°C	-50 ... 150°C	-20 ... 80°C	-50 ... 150°C	
<b>NEW</b>	• New product, 7/2020				
<b>Description</b>	<ul style="list-style-type: none"> <li>• Quarter turn actuator unit comprising quarter turn actuator DFPD and accessories</li> <li>• Select, size and order quickly, easily and reliably with the configurator</li> <li>• Optionally with pilot valve</li> <li>• Optionally with positioner</li> <li>• Optional with position indicator</li> <li>• Optionally with end position feedback</li> <li>• Optionally with the required mounting adapters or reducing sleeves for mounting on the valve body</li> </ul>	<ul style="list-style-type: none"> <li>• Uniform torque characteristic across the entire rotation angle of 90° with the double-acting version</li> <li>• Process valve connection to ISO 5211</li> <li>• Mounting hole pattern to VDI/VDE 3845</li> <li>• Sturdy, non-slip and easy-to-clean aluminium housing</li> <li>• Long service life, low wear</li> <li>• Version with swivel angle 120°, 135°, 180° for the sizes 40, 120, 240, 480, double-acting</li> </ul>	<ul style="list-style-type: none"> <li>• Suitable for process automation in the chemical and petrochemical industries</li> <li>• Extended NAMUR interface to VDI/VDE 3847</li> <li>• Anti-blow-out screws for end-position adjustment</li> <li>• Hard anodised cover to prevent surface damage</li> <li>• Non-ferrous metal-free spring sets</li> <li>• Version with compressed air ducts in the housing for direct attachment of positioner and pilot valve on the actuator, without extra barbed tubing connectors</li> </ul>	<ul style="list-style-type: none"> <li>• High breakaway torques</li> <li>• Flange hole pattern to ISO 5211</li> <li>• Mounting hole pattern to VDI/VDE 3845</li> <li>• Optionally with handwheel as a manual emergency override</li> <li>• Corrosion-resistant version made from stainless steel</li> <li>• To EU Explosion Protection Directive (ATEX)</li> </ul>	
<b>online: ➔</b>	<a href="#">kdfp</a>	<a href="#">dfpd</a>	<a href="#">dfpd</a>	<a href="#">daps</a>	

Valve actuators for process automation &gt;

## Linear actuators for process automation

		<b>NEW</b>			
<b>Design</b>	Piston, Piston rod, Tie rod, Cylinder barrel			Piston, Piston rod, Tie rod, Cylinder barrel	Piston, Piston rod, Tie rod, Cylinder barrel
<b>Mode of operation</b>	Double-acting			Double-acting	Double-acting
<b>Size of valve actuator</b>	80, 100, 125, 160, 200	46, 75		100, 125, 160, 200, 250, 320	100, 125, 160, 200, 250, 320
<b>Stroke</b>	10 ... 1600 mm	17 ... 20 mm		40 ... 990 mm	40 ... 990 mm
<b>Flange hole pattern</b>	F07, F10				
<b>Operating pressure</b>	0.6 ... 8 bar	5 ... 10 bar		3 ... 8 bar	3 ... 8 bar
<b>Ambient temperature</b>	-20 ... 80°C	0 ... 60°C		-20 ... 80°C	-20 ... 80°C
<b>NEW</b>	• New product, 7/2020				
<b>Description</b>	<ul style="list-style-type: none"> <li>• Robust and corrosion-resistant tie-rod design</li> <li>• Ideal for use in harsh ambient conditions</li> <li>• Numerous configuration options</li> <li>• Variants with fastening interface in accordance with ISO 5210 or ISO 15552 with extended tie rods</li> </ul>	<ul style="list-style-type: none"> <li>• Stainless steel design</li> <li>• Available as a valve actuator with angle seat valve VZXA and as a valve block solution</li> <li>• Linear actuating motion</li> <li>• High actuating forces</li> <li>• To EU Explosion Protection Directive (ATEX)</li> </ul>	<ul style="list-style-type: none"> <li>• Mounting interfaces for process valves to DIN EN ISO 5210</li> <li>• Integrated air supply</li> <li>• Optionally with integrated displacement encoder or fully integrated positioner</li> <li>• IP65, IP67, IP69K, NEMA4</li> <li>• To EU Explosion Protection Directive (ATEX)</li> </ul>	<ul style="list-style-type: none"> <li>• Mounting interfaces to ISO 15552</li> <li>• Robust and corrosion-resistant tie-rod design</li> <li>• Optionally with integrated displacement encoder or fully integrated positioner</li> <li>• IP65, IP67, IP69K, NEMA4</li> <li>• To EU Explosion Protection Directive (ATEX)</li> </ul>	
online: ➔	<a href="#">dfpc</a>	<a href="#">dfpk</a>		<a href="#">dfpi</a>	<a href="#">dfpi</a>

## Product overview

### Software tools

<b>Shock absorber</b>		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 → <a href="http://www.festo.com/x/shock-absorber-selection-tool">www.festo.com/x/shock-absorber-selection-tool</a>

### Shock absorbers

<b>Shock absorbers DYSS</b>				
<b>Size</b>	2, 20, 25, 3, 32, 4, 5	12, 16, 20, 25, 32, 8	10, 12, 16, 20, 25, 32, 4, 5, 7, 8	10, 12, 16, 20, 5, 7, 8
<b>Stroke</b>	4 ... 12 mm	8 ... 60 mm	4 ... 60 mm	8 ... 34 mm
<b>Max. energy absorption per stroke</b>	0.1 ... 10 J	4 ... 384 J	0.6 ... 380 J	1.3 ... 70 J
<b>Cushioning</b>	Self-adjusting	Adjustable	Self-adjusting	Self-adjusting, Soft characteristic curve
<b>Description</b>	<ul style="list-style-type: none"> <li>Hydraulic shock absorber with path-controlled flow control function</li> <li>Rapidly increasing cushioning force curve</li> <li>Short cushioning stroke</li> <li>Suitable for low-vibration operation</li> </ul>	<ul style="list-style-type: none"> <li>Hydraulic shock absorber with spring return</li> <li>Adjustable cushioning hardness</li> </ul>	<ul style="list-style-type: none"> <li>Hydraulic shock absorber with path-controlled flow control function</li> <li>Rapidly increasing cushioning force curve</li> <li>Short cushioning stroke</li> <li>Suitable for rotary drives</li> </ul>	<ul style="list-style-type: none"> <li>Hydraulic shock absorber with path-controlled flow control function</li> <li>Gently increasing cushioning force curve</li> <li>Long cushioning stroke</li> <li>Suitable for low-vibration operation</li> <li>Short cycle times possible</li> </ul>
<b>online:</b> →	<a href="#">dyss</a>	<a href="#">dysr</a>	<a href="#">ysr-c</a>	<a href="#">ysrw</a>

### Shock absorbers

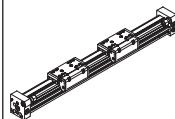
<b>Shock absorbers YSRW-DGC</b>			
<b>Size</b>	12, 18, 25, 32, 40, 50, 63, 8	5, 7, 8	M10, M12, M14, M16, M22, M4, M5, M6, M8
<b>Stroke</b>		8 ... 14 mm	0.9 ... 7 mm
<b>Max. energy absorption per stroke</b>		1 ... 3 J	0.005 ... 1.2 J
<b>Cushioning</b>	Self-adjusting, Soft characteristic curve	Self-adjusting, 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
<b>Description</b>	<ul style="list-style-type: none"> <li>For linear drives DGC</li> <li>Gently increasing cushioning force curve</li> </ul>	<ul style="list-style-type: none"> <li>Cushioning with self-adjusting, progressive hydraulic shock absorber</li> <li>Gently increasing cushioning force curve</li> <li>Adjustable cushioning stroke</li> <li>End-position sensing with proximity sensor SME/SMT-8</li> <li>Precision end-position adjustment</li> </ul>	<ul style="list-style-type: none"> <li>Mechanical shock absorber with flexible rubber buffer</li> <li>Flexible rubber buffer allows a defined metal end position</li> <li>Adjustable cushioning hardness</li> <li>Ideal for cushioning low energy</li> <li>With precise metal end position</li> </ul>
<b>online:</b> →	<a href="#">ysrw-dgc</a>	<a href="#">ysrwj</a>	<a href="#">dyef</a>

## Shock absorbers

			
<b>Shock absorbers DYSC</b>	<b>Shock absorbers DYSW</b>	<b>Hydraulic cushioning cylinders DYHR</b>	
<b>Size</b>	12, 16, 20, 25, 4, 5, 7, 8	10, 12, 4, 5, 7, 8	16, 20, 25, 32
<b>Stroke</b>	4 ... 25 mm	6 ... 20 mm	20 ... 60 mm
<b>Max. energy absorption per stroke</b>	0.6 ... 100 J	0.8 ... 12 J	32 ... 384 J
<b>Cushioning</b>	Self-adjusting	Self-adjusting, Soft characteristic curve	Adjustable
<b>Description</b>	<ul style="list-style-type: none"> <li>Hydraulic shock absorber with path-controlled flow control function</li> <li>Rapidly increasing cushioning force curve</li> <li>Short cushioning stroke</li> <li>Suitable for rotary drives</li> <li>With metal fixed stop</li> </ul>	<ul style="list-style-type: none"> <li>Hydraulic shock absorber with path-controlled flow control function</li> <li>Gently increasing cushioning force curve</li> <li>Long cushioning stroke</li> <li>Suitable for low-vibration operation</li> <li>Short cycle times possible</li> <li>With metal fixed stop</li> </ul>	<ul style="list-style-type: none"> <li>Hydraulic cushioning cylinder for constant, slow braking speeds across the entire stroke</li> <li>Braking speed can be precisely adjusted</li> <li>A built-in compression spring returns the piston rod to the initial position</li> <li>Suitable for slow feed speeds in the range up to 0.1 m/s</li> </ul>
<b>online:</b> ➔	<a href="#">dysc</a>	<a href="#">dysw</a>	<a href="#">dyhr</a>

## Cylinder mounting parts and accessories for pneumatic drives >

### Accessories for pneumatic drives

				
<b>Mounting components</b> ★	<b>Piston-rod attachments</b> ★	<b>Guide axes DGC-FA</b>	<b>Guide units FEN, FENG</b>	
<b>Size</b>	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, 65, 8, 8/10, 8/12, 80, 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
<b>Stroke</b>			1 ... 8500 mm	1 ... 500 mm
<b>Round material to be clamped</b>				
<b>Static holding force</b>				
<b>Description</b>	<ul style="list-style-type: none"> <li>Mounting kits</li> <li>Direct mountings</li> <li>Foot mountings</li> <li>Flange mountings</li> <li>Swivel mountings</li> <li>Clevis feet, trunnion supports</li> <li>Multi-position kits</li> <li>Slot nuts</li> <li>Centring pins/sleeves</li> </ul>	<ul style="list-style-type: none"> <li>Rod clevises</li> <li>Rod eyes</li> <li>Coupling pieces</li> <li>Self-aligning rod couplers</li> <li>Adapter</li> </ul>	<ul style="list-style-type: none"> <li>Without drive</li> <li>With recirculating ball bearing guide</li> <li>With guide and freely movable slide unit</li> <li>High torsional resistance</li> <li>Reduced vibrations with dynamic loads</li> <li>For supporting forces and torques in multi-axis applications</li> </ul>	<ul style="list-style-type: none"> <li>For protecting standards-based cylinders against rotation at high torque loads</li> <li>Plain or recirculating ball bearing guide</li> <li>High guide precision for workpiece handling</li> </ul>
<b>online:</b> ➔	<a href="#">n_015001</a>	<a href="#">n_03150</a>	<a href="#">dgc-fa</a>	<a href="#">fen</a>

## Product overview

Cylinder mounting parts and accessories for pneumatic drives >

### Accessories for pneumatic drives

				
<b>Clamping cartridges KP</b>		<b>Clamping units KPE</b>	<b>Clamping units, clamping components DADL</b>	<b>Holding brakes DACS</b>
<b>Size</b>			16, 20, 25, 32, 35, 40, 50, 63	
<b>Stroke</b>				
<b>Round material to be clamped</b>	4 ... 32 mm	4 ... 32 mm		16 ... 40 mm
<b>Static holding force</b>	80 ... 7500 N	80 ... 7500 N		1350 ... 17000 N
<b>Description</b>	<ul style="list-style-type: none"> <li>For in-house assembly of clamping units</li> <li>Not certified for use in safety-related control systems</li> </ul>	<ul style="list-style-type: none"> <li>Ready-to-install combination of clamping cartridge KP and housing</li> </ul>	<ul style="list-style-type: none"> <li>Clamping unit DADL-EL for semi-rotary drive DRRD, for mechanical locking in the end positions to prevent unwanted movement when unpressurised</li> <li>Clamping component DADL-EC: for semi-rotary drive DRRD, for securing an intermediate position in combination with the clamping unit DADL-EL</li> <li>Without drive</li> </ul>	<ul style="list-style-type: none"> <li>Holding function: retains the piston rod by clamping with frictional locking</li> <li>Emergency braking function: stops the movement of the piston rod by clamping with frictional locking</li> <li>Safety device tested and certified in accordance with Machinery Directive 2006/42/EC and applicable standards. For more information, see <a href="http://www.festo.com/sp">www.festo.com/sp</a> &gt; "Certificates" tab</li> <li>Compact design</li> <li>Optional: high level of corrosion protection</li> <li>For position sensing</li> </ul>
<b>online:</b> ➔	<a href="#">kp</a>	<a href="#">kpe</a>	<a href="#">dadl</a>	<a href="#">dacs</a>

## 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.

This tool can be found at

- [www.festo.com/x/gripper-parallel](http://www.festo.com/x/gripper-parallel)
- [www.festo.com/x/gripper-3-point](http://www.festo.com/x/gripper-3-point)
- [www.festo.com/x/gripper-angle](http://www.festo.com/x/gripper-angle)
- [www.festo.com/x/gripper-radial](http://www.festo.com/x/gripper-radial)

Grippers > Mechanical grippers >

## Parallel grippers

	 <b>Parallel gripper DHPL</b>	 <b>Parallel grippers DHPS</b>	 <b>Parallel grippers HGPD</b>	 <b>Parallel grippers HGPT</b>
<b>Size</b>	10, 16, 20, 25, 32, 40	10, 16, 20, 25, 35, 6	16, 20, 25, 35, 40, 50, 63, 80	16, 20, 25, 35, 40, 50, 63, 80
<b>Stroke per gripper jaw</b>	10 ... 100 mm	2 ... 12.5 mm	3 ... 20 mm	1.5 ... 25 mm
<b>Total gripping force at 6 bar, closing</b>		25 ... 910 N	94 ... 3716 N	106 ... 6300 N
<b>Gripping force backup</b>		During opening, During closing	During opening, During closing	During opening, During closing
<b>Gripper repetition accuracy</b>	0.03 mm	0.02 mm	0.03 mm, 0.04 mm, 0.05 mm	0.03 mm, 0.04 mm, 0.05 mm
<b>Position sensing</b>	Via proximity switch	Via Hall sensor, Via proximity switch	Via proximity switch	Via proximity switch
<b>NEW</b>	<ul style="list-style-type: none"> <li>• New product, 4/2021</li> </ul>			
<b>Description</b>	<ul style="list-style-type: none"> <li>• Double-acting piston drive</li> <li>• High torque resistance due to guided gripper jaw</li> <li>• Compact and sturdy design</li> <li>• Ideal for gripping larger parts</li> <li>• Suitable for external and internal gripping</li> <li>• Mounting: direct fastening via thread, with through-hole</li> <li>• For position sensing with proximity sensor for T-slot and for C-slot</li> </ul>	<ul style="list-style-type: none"> <li>• Sturdy and precise T-slot guidance of the gripper jaws</li> <li>• High gripping force and compact size</li> <li>• Max. repetition accuracy</li> <li>• Wide range of adaptation options on the drives</li> </ul>	<ul style="list-style-type: none"> <li>• Ideal for very harsh environments</li> <li>• Precise gripping even at high torque load</li> <li>• Max. gripping force at optimum installation space/force ratio</li> <li>• 8 sizes with total stroke of up to 40</li> </ul>	<ul style="list-style-type: none"> <li>• Sturdy and powerful</li> <li>• With T-slot guide</li> <li>• Suitable for external and internal gripping</li> <li>• Gripper jaw guide protected by sealing air against dust</li> <li>• High-force variant available</li> </ul>
<b>online:</b> →	<b>dhpl</b>	<b>dhsps</b>	<b>hgpd</b>	<b>hgpt</b>

## Product overview

Grippers > Mechanical grippers >

### Parallel grippers

			
<b>Parallel grippers HGPL-B</b>			
<b>Size</b>	14, 25, 40, 63	10, 12, 16, 20, 25, 32	16, 25
<b>Stroke per gripper jaw</b>	20 ... 150 mm	2 ... 12.5 mm	5 ... 7.5 mm
<b>Total gripping force at 6 bar, closing</b>	158 ... 2742 N	80 ... 830 N	160 ... 340 N
<b>Gripping force backup</b>		During opening, During closing	
<b>Gripper repetition accuracy</b>	0.03 mm	0.02 mm	0.04 mm
<b>Position sensing</b>	Via proximity switch	Via Hall sensor, Via inductive sensors	Via proximity switch
<b>Description</b>	<ul style="list-style-type: none"> <li>Space-saving, high forces and torques</li> <li>Controlled, precise and centred gripping</li> <li>Long stroke: long guide length for the gripper jaws</li> <li>Suitable for external and internal gripping</li> <li>Opening stroke can be adjusted to optimise time</li> </ul>	<ul style="list-style-type: none"> <li>High-precision gripper jaw guide</li> <li>Suitable for external and internal gripping</li> <li>Very flexible thanks to versatile attachment, mounting and application options</li> </ul>	<ul style="list-style-type: none"> <li>Double-acting piston drive</li> <li>High gripping force and compact size</li> <li>Self-centring</li> <li>Suitable for external and internal gripping</li> <li>With protective dust cap for use in dusty environments (degree of protection IP54)</li> <li>Max. repetition accuracy</li> <li>Internal fixed flow control</li> <li>Versatile thanks to externally adaptable gripper fingers</li> <li>Wide range of adaptation options on the drives</li> </ul>
online: →	<a href="#">hgpl</a>	<a href="#">hgpp</a>	<a href="#">hgp</a>

Grippers > Mechanical grippers >

### Parallel grippers

			NEW
<b>Parallel grippers HGPM</b>			
<b>Size</b>	12, 8	10, 16, 20, 25, 32, 40, 6	
<b>Stroke per gripper jaw</b>	2 ... 3 mm	2 ... 15 mm	
<b>Total gripping force at 6 bar, closing</b>	16 ... 35 N	7.8 ... 717.2 N	
<b>Gripping force backup</b>			
<b>Gripper repetition accuracy</b>	0.05 mm	0.02 mm	
<b>Position sensing</b>	Without	Via proximity switch	
<b>NEW</b>		<ul style="list-style-type: none"> <li>New product, 11/2020</li> </ul>	
<b>Description</b>	<ul style="list-style-type: none"> <li>Micro gripper: compact, handy design</li> <li>Versatile thanks to externally adaptable gripper fingers</li> <li>Mounting options with clamping flange, with flange mounting, with Z-stroke compensation</li> </ul>	<ul style="list-style-type: none"> <li>Resilient and precise ball guide</li> <li>High gripping force and compact size</li> <li>Max. repetition accuracy</li> <li>Wide variety of mounting and attachment options</li> <li>Compressed air regulation</li> <li>Can be used as a double-acting or single-acting gripper</li> <li>Suitable for external and internal gripping</li> </ul>	
online: →	<a href="#">hgpm</a>	<a href="#">dhpc</a>	

Grippers &gt; Mechanical grippers &gt;

## Three-point grippers

			
	<b>Three-point grippers DHDS</b>	<b>Three-point grippers HGDD</b>	<b>Three-point grippers HGDT</b>
<b>Size</b>	16, 32, 50	35, 40, 50, 63, 80	25, 35, 40, 50, 63
<b>Stroke per gripper jaw</b>	2.5 ... 6 mm	4 ... 12 mm	1.5 ... 10 mm
<b>Total gripping force at 6 bar, closing</b>	87 ... 750 N	336 ... 2745 N	207 ... 2592 N
<b>Gripping force backup</b>	During closing	During opening, During closing	During opening, During closing
<b>Gripper repetition accuracy</b>	0.04 mm	0.03 mm, 0.05 mm	0.03 mm
<b>Position sensing</b>	Via Hall sensor, Via proximity switch	Via proximity switch	Via proximity switch
<b>Description</b>	<ul style="list-style-type: none"> <li>Sturdy and precise T-slot guidance of the gripper jaws</li> <li>High gripping force and compact size</li> <li>Max. repetition accuracy</li> <li>Wide range of adaptation options on the drives</li> </ul>	<ul style="list-style-type: none"> <li>Precise gripping with centric movements despite high torque loads</li> <li>Ideal for very harsh environments</li> <li>5 sizes with stroke/jaw of up to 12 mm</li> <li>Precise with a repetition accuracy of <math>\leq 0.03</math> mm, <math>\leq 0.05</math> mm</li> </ul>	<ul style="list-style-type: none"> <li>Synchronous movement of the gripper jaws</li> <li>With T-slot guide</li> <li>Suitable for external and internal gripping</li> <li>Gripper jaw guide protected by sealing air against dust</li> <li>High-force variant available</li> </ul>
online: ➔	<a href="#">dhds</a>	<a href="#">hgdd</a>	<a href="#">hgdt</a>

Grippers &gt; Mechanical grippers &gt;

## Angle grippers

		
	<b>Angle grippers DHWS</b>	<b>Angle grippers HGWM</b>
<b>Size</b>	10, 16, 25, 32, 40	12, 8
<b>Total gripping torque at 6 bar, closing</b>	30 ... 1362 Ncm	22 ... 64 Ncm
<b>Max. opening angle</b>	40 deg	14 ... 18.5 deg
<b>Gripping force backup</b>	During closing	
<b>Gripper repetition accuracy</b>	0.04 mm	0.02 mm
<b>Position sensing</b>	Via Hall sensor, Via proximity switch	Without
<b>Description</b>	<ul style="list-style-type: none"> <li>Improved gripper jaw guide</li> <li>Slotted guide</li> <li>Internal fixed flow control, does away with the need for external flow control in 90% of applications</li> <li>Max. repetition accuracy</li> <li>Wide range of adaptation options on the drives</li> </ul>	<ul style="list-style-type: none"> <li>Micro gripper: compact, handy design</li> <li>Mounting options with clamping flange, with flange mounting, with Z-stroke compensation</li> <li>Versatile thanks to externally adaptable gripper fingers</li> </ul>
online: ➔	<a href="#">dhws</a>	<a href="#">hgwm</a>

## Product overview

Grippers > Mechanical grippers >

### Radial grippers

		
	<b>Radial grippers DHRS</b>	<b>Radial grippers HGRT</b>
<b>Size</b>	10, 16, 25, 32, 40	16, 20, 25, 32, 40, 50
<b>Total gripping torque at 6 bar, closing</b>	15 ... 660 Ncm	158 ... 7754 Ncm
<b>Max. opening angle</b>	180 deg	180 deg
<b>Gripping force backup</b>	During closing	
<b>Gripper repetition accuracy</b>	0.1 mm	0.02 mm
<b>Position sensing</b>	Via Hall sensor, Via proximity switch	Via proximity switch, Via inductive sensors
<b>Description</b>	<ul style="list-style-type: none"> <li>Lateral gripper jaw support for high torque loads</li> <li>Self-centring</li> <li>Gripper jaw centring options</li> <li>Max. repetition accuracy</li> </ul>	<ul style="list-style-type: none"> <li>Secure gripping thanks to precise, polished plain-bearing guide</li> <li>Gripping force backup via compression spring holds the gripped workpiece securely in the event of pressure failure</li> <li>Compression spring also boosts the gripping force for applications involving heavier loads</li> <li>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</li> </ul>
<b>online:</b> →	<b>dhrs</b>	<b>hgtr</b>

Grippers > Mechanical grippers >

### Swivel/gripper units

		
	<b>Swivel/gripper units HGDS</b>	
<b>Size</b>	12, 16, 20	
<b>Total gripping force at 6 bar, closing</b>	74 ... 168 N	
<b>Stroke per gripper jaw</b>	2.5 ... 7 mm	
<b>Swivel angle</b>	210 deg	
<b>Position sensing, gripper</b>	Via proximity switch	
<b>Description</b>	<ul style="list-style-type: none"> <li>Combination of parallel gripper and swivel module</li> <li>Swivel angle infinitely adjustable</li> <li>Precise end stop with elastic cushioning or integrated shock absorber</li> </ul>	
<b>online:</b> →	<b>hgds</b>	

**Grippers >****Bellows grippers****Adaptive shape gripper**  
**DHEF****Bellows grippers**  
**DHEB**

<b>Size</b>	20	10, 12, 14, 18, 22, 27, 33, 41, 51, 63, 8
<b>Stroke</b>	66 mm	
<b>Bellows stroke</b>		3.5 ... 25 mm
<b>Max. operating frequency of gripper</b>	1 Hz	≤4 Hz
<b>Min. diameter to be gripped</b>	12 mm	8 ... 66 mm
<b>Max. diameter to be gripped</b>	38 mm	11 ... 85 mm
<b>Position sensing</b>	Via proximity switch	Via proximity switch, Without
<b>Description</b>	<ul style="list-style-type: none"> <li>• Gripping of parts with undefined positions and shapes</li> <li>• Form-fitting gripping of products with different geometries</li> <li>• Form-fitting gripping with suction cup effect</li> <li>• Gentle gripping of delicate products of varying sizes</li> <li>• RA1 version with robot connection, enables fast integration in lightweight robot environments</li> </ul>	<ul style="list-style-type: none"> <li>• 11 sizes for gripping diameter from 8 to 85 mm</li> <li>• Direction of movement: bellows upwards or downwards</li> <li>• Different bellows materials: EPDM or silicone</li> <li>• Air connection on the side or from above</li> <li>• Optimised process sequence with increased quality: prevents the workpieces from being scratched</li> <li>• Additional reliability: optional sensing via proximity or position sensor</li> <li>• For gentle internal gripping of delicate workpieces</li> </ul>
<b>online:</b> →	<a href="#">dhef</a>	<a href="#">dheb</a>

**Grippers >****Accessories for grippers****Adaptive gripper fingers**  
**DHAS-GF**

<b>Size</b>	120, 60, 80
<b>Description</b>	<ul style="list-style-type: none"> <li>• Self-adapting to different workpiece shapes</li> <li>• Adaptive gripper fingers for gentle and flexible gripping using the Fin Ray Effect® modelled on a fish's tail fin</li> <li>• For workpiece diameters from 6 to 120 mm</li> </ul>
<b>online:</b> →	<a href="#">dhas</a>

## Product overview

### 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:

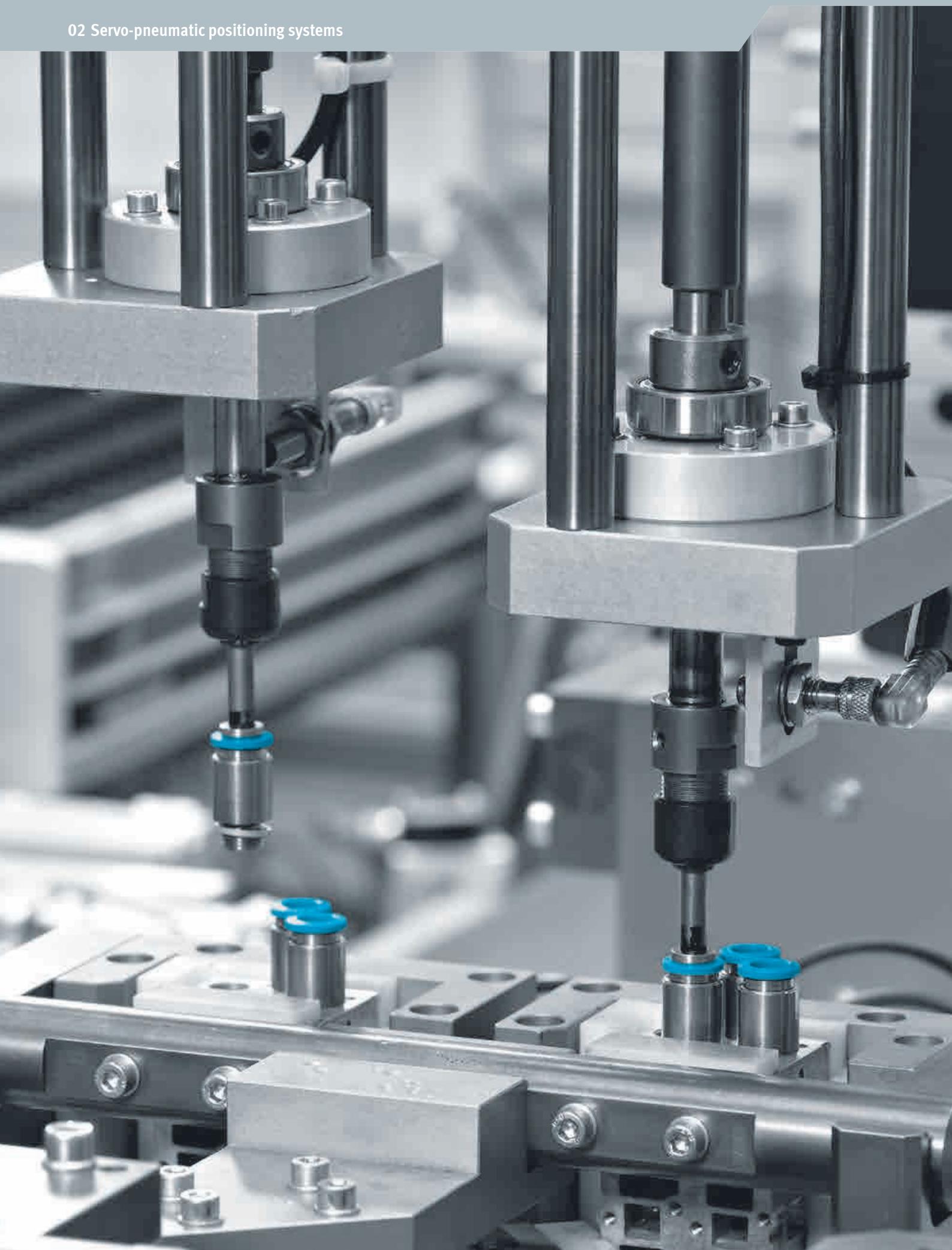
[www.festo.com/contact](http://www.festo.com/contact)

### Telescopic cylinder

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



## 02 Servo-pneumatic positioning systems



## Product overview

### Software tools

<b>Soft Stop</b>		Soft Stop virtually makes the impossible possible. Travel times for pneumatic drives are reduced by as much as 30% and vibration is also greatly reduced. The selection program makes all the necessary calculations.
		This tool can be found <ul style="list-style-type: none"> <li>• on our website at <a href="http://www.festo.com/catalogue">www.festo.com/catalogue</a> by clicking on the blue icon "Engineering".</li> </ul>

### Drives with displacement encoder >

#### Linear actuators with displacement encoder

			
<b>Linear actuators with displacement encoder DFPI</b>			
<b>Piston diameter</b>	100 mm, 125 mm, 160 mm, 200 mm, 250 mm, 320 mm	100 mm, 125 mm, 160 mm, 200 mm, 250 mm, 320 mm	25 mm, 32 mm, 40 mm, 63 mm
<b>Theoretical force at 6 bar, advancing</b>	4712 ... 48255 N	4712 ... 48255 N	295 ... 1870 N
<b>Max. load, horizontal</b>			2 ... 180 kg
<b>Max. load, vertical</b>			2 ... 60 kg
<b>Stroke</b>	40 ... 990 mm	40 ... 990 mm	100 ... 2000 mm
<b>Description</b>	<ul style="list-style-type: none"> <li>• Mounting interfaces for process valves to DIN EN ISO 5210</li> <li>• Integrated air supply</li> <li>• Optionally with integrated displacement encoder or fully integrated positioner</li> <li>• IP65, IP67, IP69K, NEMA4</li> <li>• To EU Explosion Protection Directive (ATEX)</li> </ul>	<ul style="list-style-type: none"> <li>• Mounting interfaces to ISO 15552</li> <li>• Robust and corrosion-resistant tie-rod design</li> <li>• Optionally with integrated displacement encoder or fully integrated positioner</li> <li>• IP65, IP67, IP69K, NEMA4</li> <li>• To EU Explosion Protection Directive (ATEX)</li> </ul>	<ul style="list-style-type: none"> <li>• Based on linear drive DGC-K</li> <li>• Without guide</li> <li>• With displacement encoder for contactless measurement</li> <li>• Suitable for positioning with axis controller CPX-CMAX</li> <li>• Suitable for end-position control with end-position controller CPX-CMPX or SPC11</li> <li>• Measures absolute values</li> <li>• Can be used as a measuring cylinder</li> <li>• Degree of protection IP67</li> <li>• For attachment to customer's own guide</li> <li>• Supply ports on end face</li> </ul>
<b>online:</b> ➔	<a href="#">dfpi</a>	<a href="#">dfpi</a>	<a href="#">ddli</a>

Drives with displacement encoder &gt;

## Linear actuators with displacement encoder

			
	<b>Standards-based cylinders with displacement encoder DDPC</b>	<b>Standards-based cylinders with displacement encoder DNCI</b>	<b>Linear drives with displacement encoder DGCI</b>
<b>Piston diameter</b>	80 mm, 100 mm	32 mm, 40 mm, 50 mm, 63 mm	18 mm, 25 mm, 32 mm, 40 mm, 63 mm
<b>Theoretical force at 6 bar, advancing</b>	3016 ... 4712 N	415 ... 1870 N	153 ... 1870 N
<b>Max. load, horizontal</b>	300 ... 450 kg	45 ... 180 kg	1 ... 180 kg
<b>Max. load, vertical</b>	100 ... 150 kg	15 ... 60 kg	1 ... 60 kg
<b>Stroke</b>	10 ... 2000 mm	10 ... 2000 mm	100 ... 2000 mm
<b>Description</b>	<ul style="list-style-type: none"> <li>Standards-based cylinder to ISO 15552</li> <li>With displacement encoder for contactless measurement</li> <li>Suitable for positioning with axis controller CPX-CMAX</li> <li>Suitable for end-position control with end-position controller CPX-CMPX or SPC11</li> <li>Can be used as a measuring cylinder</li> <li>Piston rod variants</li> <li>Fixed cushioning</li> <li>With optional recirculating ball bearing guide, clamping unit</li> </ul>	<ul style="list-style-type: none"> <li>Standards-based cylinder to ISO 15552</li> <li>With integrated displacement encoder for relative analogue, contactless measurement</li> <li>Suitable for servo-pneumatic applications with axis controller CPX-CMAX, end-position controller CPX-CMPX or SPC11 and measuring module CPX-CMIX</li> <li>Piston rod with male thread</li> <li>Piston rod variants</li> <li>With optional recirculating ball bearing guide, clamping unit</li> </ul>	<ul style="list-style-type: none"> <li>With guide</li> <li>With displacement encoder for absolute, contactless measurement</li> <li>Suitable for servo-pneumatic applications with axis controller CPX-CMAX, end-position controller CPX-CMPX or SPC11 and measuring module CPX-CMIX</li> <li>Choice of supply ports on end face or front</li> </ul>
online: ➔	<a href="#">ddpc</a>	<a href="#">dnci</a>	<a href="#">dgci</a>

Drives with displacement encoder &gt;

## Swivel modules with displacement encoder

	
	<b>Semi-rotary drives with angular displacement encoder DSMI-B</b>
<b>Piston diameter</b>	25 mm, 40 mm, 63 mm
<b>Theoretical torque at 6 bar</b>	5 ... 40 Nm
<b>Max. mass moment of inertia, horizontal</b>	0.03 ... 0.6 kgm <sup>2</sup>
<b>Max. mass moment of inertia, vertical</b>	0.03 ... 0.6 kgm <sup>2</sup>
<b>Swivel angle</b>	0 ... 272 deg
<b>Description</b>	<ul style="list-style-type: none"> <li>With rotary vane</li> <li>Integrated rotary potentiometer</li> <li>Suitable for servo-pneumatic applications with axis controller CPX-CMAX, end-position controller CPX-CMPX or SPC11 and measuring module CPX-CMIX</li> <li>Compact design</li> </ul>
online: ➔	<a href="#">dsni</a>

## Product overview

### Axis controllers

			
<b>Axis controllers CPX-CMAX</b>		<b>End-position controllers CPX-CMPX</b>	<b>End-position controllers SPC11</b>
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	<ul style="list-style-type: none"> <li>Axis controller as CPX module, supports pneumatic drives with piston rod, rodless drives and semi-rotary drives</li> <li>Force and position control</li> <li>Use with all fieldbuses/Ethernet and controllers CEC available on CPX</li> <li>Easy commissioning thanks to auto identification function</li> <li>Rapid commissioning and comprehensive diagnostics with FCT configuration software (Festo Configuration Tool)</li> </ul>	<ul style="list-style-type: none"> <li>Electronic end-position control for pneumatic drives</li> <li>Soft Stop for smooth braking and quick acceleration</li> <li>Use with all fieldbuses/Ethernet available on CPX</li> <li>Easy commissioning with Festo plug plug &amp; work</li> <li>Approx. 30% shorter travel times and 30% less air consumption than with comparable standard pneumatics</li> <li>End positions with 2 additional, freely positionable intermediate positions</li> </ul>	<ul style="list-style-type: none"> <li>Quickly and smoothly into the end position with 2 additional intermediate positions</li> <li>Electronic end-position cushioning</li> <li>Quick and easy commissioning: configure, teach, done</li> <li>Supports pneumatic drives with piston rod, rodless drives and semi-rotary drives</li> </ul>
online: ➔	<a href="#">cpx-cmax</a>	<a href="#">cpx-cmpx</a>	<a href="#">spc11</a>

### Displacement encoders

			
<b>Displacement encoders MLO-POT-TLF</b>		<b>Displacement encoders MLO-POT-LWG</b>	<b>Displacement encoders MME-MTS-TLF</b>
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	<ul style="list-style-type: none"> <li>Conductive plastic potentiometer</li> <li>Absolute measurement with high resolution</li> <li>High travel speed and long service life</li> <li>Plug-in connections</li> </ul>	<ul style="list-style-type: none"> <li>Connecting rod potentiometer</li> <li>Absolute measurement with high resolution</li> <li>Long service life</li> <li>Degree of protection IP65</li> <li>Plug-in connections</li> </ul>	<ul style="list-style-type: none"> <li>Measuring principle: magnetostrictive</li> <li>Contactless with absolute measurement</li> <li>High travel speed</li> <li>System product for servo-pneumatic positioning technology and Soft Stop</li> <li>Degree of protection IP65</li> </ul>
online: ➔	<a href="#">mlo</a>	<a href="#">mlo</a>	<a href="#">mme</a>

## Proportional directional control valves

## Proportional valves

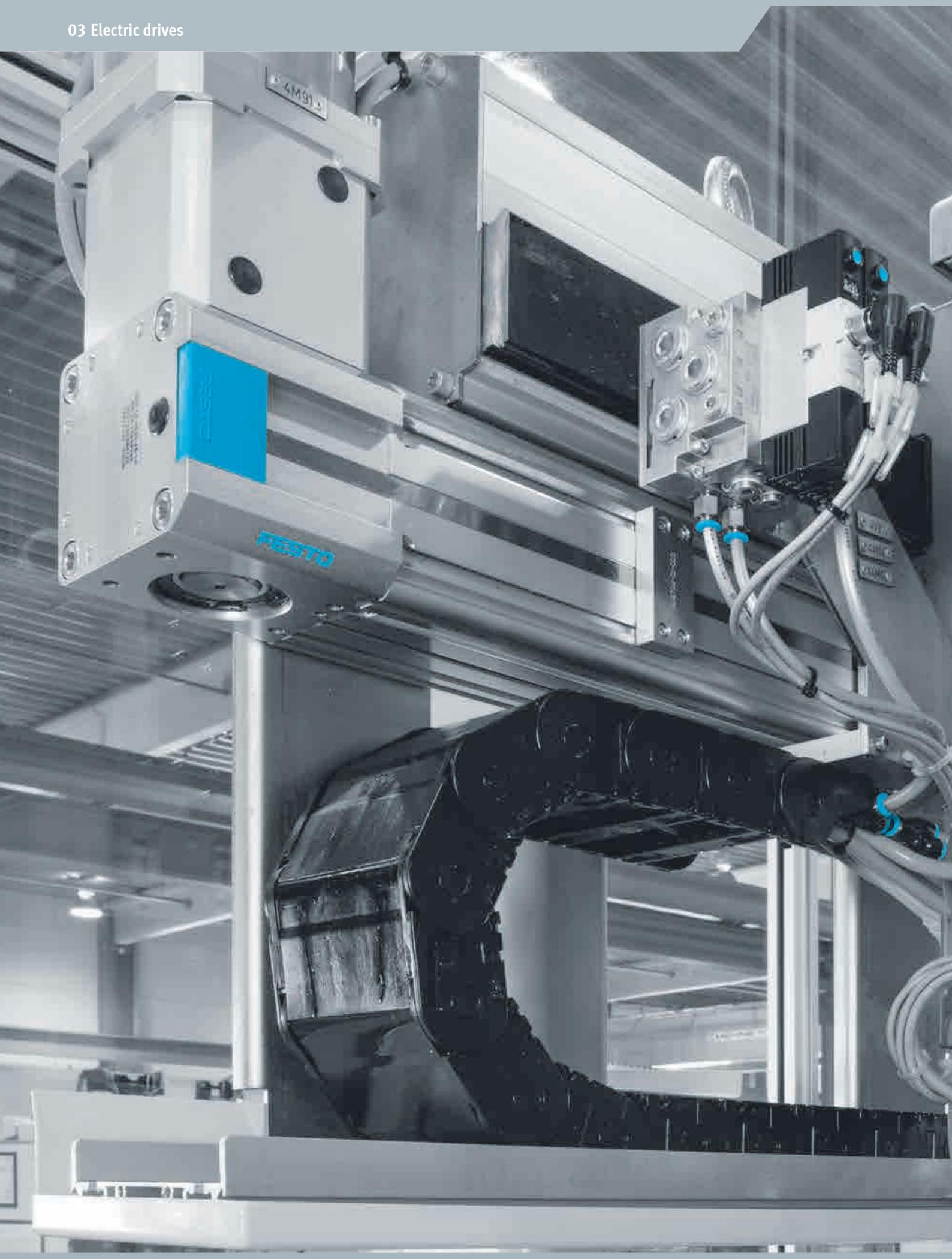
			
	<b>Proportional directional control valves VPWP</b>	<b>Proportional directional control valves MPYE</b>	<b>Proportional directional control valves VPWS</b>
<b>Valve function</b>	5/3-way proportional directional control valve, closed	5/3 closed	2/2 proportional directional control valve, closed
<b>Pneumatic connection 1</b>	G1/4, G1/8, G3/8	G1/4, G1/8, G3/8, M5	Cartridge 15 mm, Cartridge 7.5 mm
<b>Operating pressure for positioning/Soft Stop</b>	4 ... 8 bar		
<b>Operating pressure</b>	0 ... 10 bar	0 ... 10 bar	0 ... 8 bar
<b>Standard nominal flow rate</b>	350 ... 2000 l/min	100 ... 2000 l/min	
<b>Description</b>	<ul style="list-style-type: none"> <li>Controlled piston spool valve</li> <li>Digitally actuated</li> <li>Integrated pressure sensors for monitoring function and force control</li> <li>With auto identification</li> <li>Diagnostic function</li> <li>Integrated digital output, e.g. for a clamping/brake unit</li> <li>Suitable for servo-pneumatic applications with axis controller CPX-CMAX and end-position controller CPX-CMPX</li> </ul>	<ul style="list-style-type: none"> <li>Controlled piston spool valve</li> <li>Analogue actuation</li> <li>Setpoint input as analogue voltage signal (0 ... 10 V)</li> <li>Suitable for servo-pneumatic applications with end-position controller SPC11</li> </ul>	<ul style="list-style-type: none"> <li>Directly actuated poppet valve</li> <li>Operating medium: air, oxygen, inert gases</li> <li>Extremely small and lightweight</li> <li>Compact and cost-effective</li> <li>Mounting: on sub-base</li> </ul>
online: ➔	<a href="#">vpwp</a>	<a href="#">mpye</a>	<a href="#">vpws</a>

## Sensor interfaces

		
	<b>Sensor interfaces CASM</b>	<b>Measured-value transducers DADE</b>
<b>Diagnostic function</b>	Display via LED	Display via LED
<b>Electrical connection, displacement encoder</b>	Socket, 8-pin, 5-pin, M12	Socket, 8-pin, M12
<b>Electrical connection, control interface</b>	Plugs, 5-pin, M9	
<b>Control interface</b>	Digital, CAN bus with Festo protocol, Without terminating resistor	
<b>Description</b>	<ul style="list-style-type: none"> <li>For controlling pneumatic positioning drives with the latest servo-pneumatic systems such as CPX-CMAX, CPX-CMPX and CPX-CMIX</li> <li>Short cables for analogue signals, secure digitised bus transmission</li> <li>Convenient plug and work concept with auto identification and comprehensive diagnostics</li> <li>High degree of protection IP67</li> </ul>	<ul style="list-style-type: none"> <li>For standards-based cylinders DNCI and DDPC</li> <li>Converts sensor signals into voltage or current signals</li> <li>Mounting via through-holes</li> </ul>
online: ➔	<a href="#">casm</a>	<a href="#">dade</a>

## Product overview

## 03 Electric drives



## Product overview

### Software tools

<b>PositioningDrives:</b> for selecting and sizing electro-mechanical linear drives, motors, and gear units		Which electromechanical linear drive, which motor and which gear unit best meets your needs? Enter the data for your application, such as position values, effective loads and mounting position, and the software will suggest several solutions.
<b>Simplified Motion Series – Solution Finder</b>		This tool can be found at <b>→ <a href="http://www.festo.com/x/simplified-motion-series">www.festo.com/x/simplified-motion-series</a></b> <p>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.</p>

### Electric axes

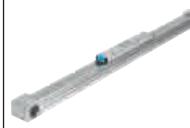
 <b>Toothed belt axes</b> <b>EGC-TB-KF</b>	 <b>Spindle axes</b> <b>EGC-BS-KF</b>	 <b>Toothed belt axes</b> <b>EGC-HD-TB</b>	 <b>Spindle axes</b> <b>EGC-HD-BS</b>	
<b>Size</b>	120, 185, 50, 70, 80	120, 185, 70, 80	125, 160, 220	
<b>Max. feed force Fx</b>	50 ... 2500 N	400 ... 3000 N	450 ... 1800 N	
<b>Repetition accuracy</b>	+/-0.08 mm, +/-0.1 mm	+/-0.02 mm	+/-0.02 mm	
<b>Working stroke</b>	50 ... 8500 mm	50 ... 3000 mm	50 ... 5000 mm	
<b>Description</b>	<ul style="list-style-type: none"> <li>Axis for high speeds and acceleration</li> <li>Recirculating ball bearing guide for high loads and torques</li> <li>Optionally with clamping unit, at one or both ends</li> <li>Profile with optimised rigidity</li> <li>22 types in stock with short delivery times and modular products for custom variants</li> </ul>	<ul style="list-style-type: none"> <li>Axis for high repeat accuracy</li> <li>Recirculating ball bearing guide for high loads and torques</li> <li>Optionally with clamping unit, at one or both ends</li> <li>Profile with optimised rigidity</li> <li>Various spindle pitches</li> <li>The optional spindle support enables maximum travel speed</li> <li>Axial or parallel motor mounting</li> </ul>	<ul style="list-style-type: none"> <li>With heavy-duty guide</li> <li>Axis for high speeds and acceleration</li> <li>For high loads and torques, high feed forces</li> <li>Precise and resilient DUO guide rail</li> <li>Motor can be mounted on 4 sides</li> <li>For maximum lateral load up to 900 Nm</li> </ul>	<ul style="list-style-type: none"> <li>With heavy-duty guide</li> <li>Axis for high repeat accuracy</li> <li>With integrated ball screw</li> <li>For maximum loads and torques</li> <li>Precise and resilient DUO guide rail</li> <li>For maximum lateral load up to 900 Nm</li> <li>Ideal as a basic axis for linear gantries and cantilever axes</li> <li>The optional spindle support enables maximum travel speed</li> </ul>
<b>online:</b> →	<a href="#">egc</a>	<a href="#">egc</a>	<a href="#">egc</a>	

## Electric axes

				
Toothed belt axes ELGC-TB-KF	★	Spindle axes ELGC-BS-KF	★	Spindle axes ELGT-BS
<b>Size</b>	45, 60, 80	32, 45, 60, 80	120, 160, 90	120, 150, 70, 80
<b>Max. feed force Fx</b>	75 ... 250 N	40 ... 350 N	805 ... 1575 N	650 ... 6400 N
<b>Repetition accuracy</b>	+/-0.1 mm	+/-0.01 mm, +/-0.015 mm	+/-0.02 mm	+/-0.02 mm
<b>Working stroke</b>	200 ... 2000 mm	100 ... 1000 mm	50 ... 1400 mm	50 ... 3000 mm
<b>NEW</b>			• New product, 11/2020	
<b>Description</b>	<ul style="list-style-type: none"> <li>Precision guide rail with high load capacity</li> <li>Internal guide and toothed belt</li> <li>Flexible motor mounting</li> <li>The toothed belt axes, spindle axes ELGC and mini slides EGSC form a scalable modular system for compact automation</li> </ul>	<ul style="list-style-type: none"> <li>Internal guide and ball screw drive</li> <li>Space-saving position sensing</li> <li>Flexible motor mounting</li> <li>The toothed belt axes, spindle axes ELGC and mini slides EGSC form a scalable modular system for compact automation</li> </ul>	<ul style="list-style-type: none"> <li>Great resilience and rigidity due to double-acting guide</li> <li>Compact design</li> <li>With ball screw drive</li> <li>Optimal ratio between installation space and working space due to the optimised axis design</li> <li>Simple integration of motors with mounting kits</li> <li>Optimised for use in the electronics and automotive industry</li> </ul>	<ul style="list-style-type: none"> <li>Internal, precision recirculating ball bearing guide with high load capacity for high torque loads</li> <li>Guide and ball screw protected by cover strip</li> <li>For the highest requirements in terms of feed force and accuracy</li> <li>Speeds up to 2 m/s with high acceleration up to 15 m/s<sup>2</sup></li> <li>Space-saving position sensing</li> <li>Flexible motor mounting</li> <li>34 preconfigured types and modular product system for custom variants</li> </ul>
online: ➔	<a href="#">elgc-tb</a>	<a href="#">elgc-bs</a>	<a href="#">elgt</a>	<a href="#">elga</a>

## Product overview

### Electric axes

				
<b>Toothed belt axes ELGA-TB-G</b>				
<b>Size</b>	120, 70, 80	120, 150, 70, 80	120, 70, 80	45, 60
<b>Max. feed force Fx</b>	350 ... 1300 N	260 ... 2000 N	260 ... 1000 N	65 ... 75 N
<b>Repetition accuracy</b>	+/-0.08 mm	+/-0.08 mm	+/-0.08 mm	+/-0.1 mm
<b>Working stroke</b>	50 ... 8500 mm	50 ... 8500 mm	50 ... 7400 mm	50 ... 2000 mm
<b>Description</b>	<ul style="list-style-type: none"> <li>• Integrated plain-bearing guide</li> <li>• For small and medium loads</li> <li>• Low guide backlash</li> <li>• Drive component for external guides</li> <li>• Speeds up to 5 m/s with high acceleration up to 50 m/s<sup>2</sup></li> <li>• Flexible motor mounting</li> <li>• Motor can be mounted on 4 sides</li> </ul>	<ul style="list-style-type: none"> <li>• Recirculating ball bearing guide for high loads and torques</li> <li>• High feed forces</li> <li>• Precision guide rail with high load capacity</li> <li>• Speeds up to 5 m/s with high acceleration up to 50 m/s<sup>2</sup></li> <li>• Optional: food-safe (for further information, see <a href="http://www.festo.com/sp/elga-tb-kf">www.festo.com/sp/elga-tb-kf</a> "Certificates" tab)</li> <li>• Flexible motor mounting</li> <li>• Guide and toothed belt protected by cover band</li> <li>• 22 types in stock with short delivery times and modular products for custom variants</li> </ul>	<ul style="list-style-type: none"> <li>• Integrated roller bearing guide</li> <li>• High speeds up to 10 m/s with high acceleration up to 50 m/s<sup>2</sup></li> <li>• Guide backlash = 0 mm</li> <li>• Very good operating performance under torque load</li> <li>• Sturdy alternative for the recirculating ball bearing guide</li> <li>• As an actuator for external guides, especially for high speeds</li> <li>• Motor can be mounted on 4 sides</li> </ul>	<ul style="list-style-type: none"> <li>• Complete solution consisting of integrated drive, motor and servo drive</li> <li>• Resilient toothed belt with long service life</li> <li>• Ideal for precise XY movements, e.g. in assembly plants or when handling small parts as well as for test and inspection systems</li> <li>• Protected against external influences by internal guide</li> <li>• Clean look design: easy to clean and less prone to soiling</li> <li>• Integrated end position sensing</li> <li>• Two control options integrated as standard: digital I/O and IO-Link</li> <li>• 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</li> <li>• Product of the Simplified Motion Series: doesn't need any external servo drive or any control cabinet for the installation</li> </ul>
<b>online:</b> ➔	<a href="#">elga</a>	<a href="#">elga</a>	<a href="#">elga</a>	<a href="#">elgs-tb</a>

## Electric axes

			
<b>Spindle axis units ELGS-BS-KF</b>		<b>Toothed belt axis units ELGE-TB</b>	<b>Toothed belt axes ELGG</b>
<b>Size</b>	32, 45, 60	35	35, 45, 55
<b>Max. feed force Fx</b>	40 ... 200 N	50 N	50 ... 350 N
<b>Repetition accuracy</b>	+/-0.01 mm, +/-0.015 mm	+/-0.1 mm	+/-0.1 mm
<b>Working stroke</b>	100 ... 800 mm	50 ... 800 mm	50 ... 1200 mm
<b>Description</b>	<ul style="list-style-type: none"> <li>Complete solution consisting of integrated drive, motor and servo drive</li> <li>Powerful ball screw drive</li> <li>Ideal for precise XY movements, e.g. in assembly plants or when handling small parts as well as for test and inspection systems</li> <li>Protected against external influences by internal guide</li> <li>Clean look design: easy to clean and less prone to soiling</li> <li>Integrated end position sensing</li> <li>Two control options integrated as standard: digital I/O and IO-Link</li> <li>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</li> <li>Product of the Simplified Motion Series: doesn't need any external servo drive or any control cabinet for the installation</li> </ul>	<ul style="list-style-type: none"> <li>Complete solution consisting of integrated drive, motor and servo drive</li> <li>Cost-optimised design for easy motion and positioning tasks between two mechanical end positions</li> <li>Running performance of 5000 km</li> <li>Freely selectable motor mounting position on four sides</li> <li>Integrated end position sensing</li> <li>Two control options integrated as standard: digital I/O and IO-Link</li> <li>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</li> <li>Product of the Simplified Motion Series: doesn't need any external servo drive or any control cabinet for the installation</li> </ul>	<ul style="list-style-type: none"> <li>Toothed belt axis with two opposing slides</li> <li>With low-cost plain bearing and precise ball bearing guide</li> <li>Optional central support improves the rigidity</li> <li>Motor can be mounted on 4 sides</li> </ul>
online: →	<a href="#">elgs-bs</a>	<a href="#">elge-tb</a>	<a href="#">elgg</a>

## Electric axes

		
	<b>Toothed belt axes ELGR-TB</b>	<b>Cantilever axes ELCC-TB-KF</b>
<b>Size</b>	35, 45, 55	110, 60, 70, 90
<b>Max. feed force Fx</b>	50 ... 350 N	300 ... 2500 N
<b>Repetition accuracy</b>	+/-0.1 mm	+/-0.05 mm
<b>Working stroke</b>	50 ... 1500 mm	50 ... 2000 mm
<b>Description</b>	<ul style="list-style-type: none"> <li>Optimum price/performance ratio</li> <li>Ready-to-install unit for quick and easy design</li> <li>With plain or recirculating ball bearing guide</li> <li>Motor can be mounted on 4 sides</li> <li>Also available as an OMS product (Optimised Motion Series)</li> </ul>	<ul style="list-style-type: none"> <li>Stationary drive head</li> <li>Toothed belt drive with recirculating ball bearing guide</li> <li>High rigidity thanks to innovative design principle</li> <li>Very small moving mass</li> <li>Able to move high loads of up to 100 kg vertically</li> </ul>
online: →	<a href="#">elgr</a>	<a href="#">elcc</a>

## Product overview

## Electric cylinders and slides

		<b>NEW</b>		<b>NEW</b>		<b>★</b>		<b>★</b>
<b>Electric cylinder units EPCS-BS</b>			<b>Electric cylinder units EPCE-TB</b>		<b>Electric cylinder EPCC-BS</b>		<b>Electric cylinders ESBF</b>	
<b>Size</b>	32, 45, 60		45, 60		25, 32, 45, 60		100, 32, 40, 50, 63, 80	
<b>Max. feed force Fx</b>	150 ... 900 N		85 ... 150 N		75 ... 1000 N		600 ... 17000 N	
<b>Repetition accuracy</b>	+/-0.02 mm		+/-0.05 mm		+/-0.02 mm		+/-0.01 mm, +/-0.015 mm, +/-0.05 mm	
<b>Stroke</b>	25 ... 500 mm		10 ... 80 mm		25 ... 500 mm		30 ... 1500 mm	
<b>NEW</b>	• New product, 7/2020		• New product, 11/2020					
<b>Description</b>	<ul style="list-style-type: none"> <li>• Complete solution consisting of integrated drive, motor and servo drive</li> <li>• Extremely cost-effective, yet powerful and very flexible</li> <li>• Ideal for individual linear movements in every installation position and especially for vertical Z movements</li> <li>• Precise positioning thanks to smoothly running ball screw drive</li> <li>• Compact dimensions</li> <li>• Safe movement through flexible position sensing</li> <li>• Integrated end position sensing</li> <li>• Two control options integrated as standard: digital I/O and IO-Link</li> <li>• 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</li> <li>• Product of the Simplified Motion Series: doesn't need any external servo drive or any control cabinet for the installation</li> </ul>		<ul style="list-style-type: none"> <li>• Complete solution consisting of integrated compact cylinder, motor and controller</li> <li>• Cost-optimised design for easy motion and positioning tasks between two mechanical end positions</li> <li>• Minimal zero stroke and extremely compact design make this product the perfect choice for applications where space is at a premium</li> <li>• Innovative interpretation of toothed belt technology for maximum dynamic response and minimal positioning times</li> <li>• Ideal for fast movement in sorting, distribution and testing applications</li> <li>• Up to four piston rods can be selected at the same time in four different mounting positions and different combinations</li> <li>• Integrated end position sensing</li> <li>• Two control options integrated as standard: digital I/O and IO-Link</li> <li>• 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</li> <li>• Product of the Simplified Motion Series: doesn't need any external servo drive or any control cabinet for the installation</li> </ul>		<ul style="list-style-type: none"> <li>• Low-cost: optimum price/performance ratio</li> <li>• Flexible: wide range of mounting options for the motor</li> <li>• Dynamic due to low internal friction</li> <li>• Short positioning times</li> <li>• Weight-optimised design – ideal for handling systems</li> <li>• Unique “one-size-down” assembly system for optimal use of space</li> </ul>		<ul style="list-style-type: none"> <li>• Available with ball screw drive (size 32 ... 100) or lead screw (size 32 ... 50)</li> <li>• Optional: high corrosion protection, degree of protection IP65, food-safe (see www.festo.com/sp/esbf -&gt; “Certificates” tab), piston rod extension</li> <li>• Ball screw: with three spindle pitches for selecting the optimal force-speed ratio</li> <li>• Axial or parallel motor mounting</li> <li>• 68 types in stock with short delivery times and modular products for custom variants</li> </ul>	
<b>online:</b> ➔	<a href="#">epcs</a>		<a href="#">epce</a>		<a href="#">epcc</a>		<a href="#">esbf</a>	

## Electric cylinders and slides

			
<b>Electric cylinders EPCO</b>		<b>Mini slides EGSC-BS-KF</b>	<b>Mini slide units EGSS-BS</b>
<b>Size</b>	16, 25, 40	25, 32, 45, 60	32, 45, 60
<b>Max. feed force Fx</b>	50 ... 650 N	20 ... 250 N	60 ... 250 N
<b>Repetition accuracy</b>	+/-0.02 mm	+/-0.015 mm	+/-0.015 mm
<b>Stroke</b>	50 ... 400 mm	25 ... 200 mm	25 ... 200 mm
<b>Description</b>	<ul style="list-style-type: none"> <li>Linear drive with permanently attached motor</li> <li>With ball screw drive</li> <li>Optional: encoder, holding brake and female thread on the piston rod</li> <li>Two different spindle pitches for high force or high speed</li> <li>Suitable for simple applications in factory automation that in the past were mostly carried out using pneumatic solutions</li> <li>Cost-optimised: 28 types and modular products in stock for custom variants</li> <li>Optional: precise and backlash-free guide</li> <li>Available as an OMS product (Optimised Motion Series)</li> </ul>	<ul style="list-style-type: none"> <li>Precise guide and ball screw drive</li> <li>Compact dimensions</li> <li>Flexible motor mounting</li> <li>The toothed belt axes, spindle axes ELGC and mini slides EGSC form a scalable modular system for compact automation</li> </ul>	<ul style="list-style-type: none"> <li>Complete solution consisting of integrated drive, motor and servo drive</li> <li>For precise vertical Z movements or individual guided linear movements</li> <li>Very high-quality ball screw drive with low internal friction</li> <li>Rigid, high load-bearing and precise linear guide for absorbing lateral forces and increased anti-twist protection</li> <li>Integrated end position sensing</li> <li>Two control options integrated as standard: digital I/O and IO-Link</li> <li>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</li> <li>Product of the Simplified Motion Series: doesn't need any external servo drive or any control cabinet for the installation</li> </ul>
<b>online:</b> ➔	<a href="#">epco</a>	<a href="#">egsc-bs</a>	<a href="#">egss</a>

## Electric cylinders and slides

		
	<b>Mini slides EGSL-BS</b>	<b>Electric slides EGSK</b>
<b>Size</b>	35, 45, 55, 75	15, 20, 26, 33, 46
<b>Max. feed force Fx</b>	75 ... 450 N	19 ... 392 N
<b>Repetition accuracy</b>	+/-0.015 mm	+/-0.003 - +/-0.004 mm, +/-0.003 - +/-0.01 mm, +/-0.01 mm
<b>Stroke</b>	50 ... 300 mm	25 ... 840 mm
<b>Description</b>	<ul style="list-style-type: none"> <li>Very high rated slide load, ideal for vertical applications such as press-fitting or joining</li> <li>Reliable: the completely closed spindle stops dirt or stray small parts getting into the guide area</li> <li>Axial or parallel motor mounting</li> </ul>	<ul style="list-style-type: none"> <li>Electromechanical linear axis with ball screw drive</li> <li>Recirculating ball bearing guide and ball screw without caged ball bearings</li> <li>Standardised mounting interfaces</li> <li>Compact design</li> <li>High rigidity</li> <li>22 types in stock with short delivery times and modular products for custom variants</li> </ul>
<b>online:</b> ➔	<a href="#">egsl</a>	<a href="#">egsk</a>

## Product overview

## Electric semi-rotary drives

				
	<b>Rotary drive units ERMS</b>	<b>Rotary drives ERMO</b>	<b>Rotary modules ERMB</b>	<b>Front units ERMH</b>
<b>Size</b>	25, 32	12, 16, 25, 32	20, 25, 32	11, 8
<b>Max. driving torque</b>	2.7 ... 5.6 Nm	0.15 ... 5 Nm	0.7 ... 8.5 Nm	0.75 ... 4.5 Nm
<b>Max. input speed</b>			900 ... 1350 rpm	
<b>Max. rotational speed</b>	100 ... 150 rpm	100 ... 200 rpm		
<b>Rotation angle</b>	Infinite, 90°, 180°	Infinite	Infinite	Infinite
<b>Description</b>	<ul style="list-style-type: none"> <li>Complete solution consisting of integrated drive, motor and servo drive</li> <li>Cost-effective solution package for simple swivel tasks, but also for applications with high loads</li> <li>Sealed hollow shaft for the integrated through-feed of cables and tubing</li> <li>Standardised mounting interface for direct connection to the electric mini slides EGSL, EGSC and EGSS</li> <li>Integrated end position sensing</li> <li>Two control options integrated as standard: digital I/O and IO-Link</li> <li>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</li> <li>Product of the Simplified Motion Series: doesn't need any external servo drive or any control cabinet for the installation</li> </ul>	<ul style="list-style-type: none"> <li>Electric rotary drive with stepper motor and integrated gear unit</li> <li>ServoLite – closed-loop operation with encoder</li> <li>Heavy-duty bearing for high forces and torques</li> <li>Backlash-free, pre-stressed rotating plate with very good axial eccentricity and concentricity properties</li> <li>Quick and accurate installation</li> <li>For simple rotary indexing table applications and as a rotary axis in multi-axis applications</li> <li>Available as an OMS product (Optimised Motion Series)</li> </ul>	<ul style="list-style-type: none"> <li>Electromechanical rotary module with toothed belt</li> <li>Compact design</li> <li>Mounting interfaces on all sides</li> <li>Stable output shaft bearings</li> <li>Unlimited and flexible rotation angle</li> </ul>	<ul style="list-style-type: none"> <li>For linear gantry system EXCT and parallel kinematic system EXPT</li> <li>Electromechanical rotary module with servo motor and gear unit</li> <li>Gear ratio 30:1</li> <li>With or without air throughfeed</li> <li>With optional pneumatic rotary through-feed (for vacuum and gauge pressure)</li> <li>Max. output speed: 200 rpm</li> </ul>
<b>online:</b> ➔	<a href="#">erm</a>	<a href="#">ermo</a>	<a href="#">ermb</a>	<a href="#">ermh</a>

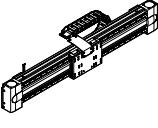
## Electric stopper cylinders

	
	<b>Stopper cylinders, electric EFS</b>
<b>Design</b>	Electric stopper cylinder
<b>Size</b>	100, 20, 50
<b>Position sensing</b>	With Hall sensor
<b>Cushioning length</b>	11.5 ... 18.2 mm
<b>Description</b>	<ul style="list-style-type: none"> <li>Fast and simple set-up of transfer systems without compressed air</li> <li>For stopping conveyed goods weighing between 0.25 kg and 100 kg</li> <li>Status and error messages for visual error diagnostics</li> <li>Controlled via digital I/O of a higher-order controller, e.g. terminal CPX, makes commissioning easier</li> <li>Mounting interface for ease of mounting on transfer systems</li> <li>Adjustable cushioning power</li> </ul>
<b>online:</b> ➔	<a href="#">efsd</a>

## Electric handling modules

			
<b>Rotary gripper modules EHMD</b>		<b>Rotary/lifting modules EHMB</b>	<b>Handling modules EHMX</b>
<b>Size</b>	40	20, 25, 32	
<b>Stroke per gripper jaw</b>	5 mm, 15 mm		
<b>Working stroke</b>		0 ... 200 mm	200 ... 4500 mm
<b>Max. output torque</b>	0.3 Nm		
<b>Max. driving torque</b>		0.7 ... 6.7 Nm	
<b>Max. input speed</b>		900 ... 1350 rpm	
<b>Max. acceleration</b>			50 m/s <sup>2</sup>
<b>Max. speed</b>			3 m/s, 5 m/s
<b>Rotation angle</b>	Infinite	Infinite	
<b>Repetition accuracy</b>			+/-0.08 mm, +/-0.1 mm
<b>Description</b>	<ul style="list-style-type: none"> <li>Ideal for small objects in laboratory automation</li> <li>Infinite electrical rotation and electrical or pneumatic gripping</li> </ul>	<ul style="list-style-type: none"> <li>Complete module with combined and configurable rotary/lifting movement</li> <li>Dynamic, flexible, economical thanks to the modular drive concept for the linear movement</li> <li>Hollow axis with large internal diameter makes laying power supply lines easy, convenient and safe</li> </ul>	<ul style="list-style-type: none"> <li>For creating 3D gantries for the YXCR series</li> <li>For X-axis movements in 3-dimensional gantries</li> </ul>
online: →	<a href="#">ehmd</a>	<a href="#">ehmb</a>	<a href="#">ehmx</a>

## Electric handling modules

		
	<b>Handling modules EHMY</b>	<b>Handling modules EHMZ</b>
<b>Size</b>		
<b>Stroke per gripper jaw</b>		
<b>Working stroke</b>	50 ... 4500 mm	50 ... 1000 mm
<b>Max. output torque</b>		
<b>Max. driving torque</b>		
<b>Max. input speed</b>		
<b>Max. acceleration</b>	40 ... 50 m/s <sup>2</sup>	15 ... 25 m/s <sup>2</sup>
<b>Max. speed</b>	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, 3 m/s
<b>Rotation angle</b>		
<b>Repetition accuracy</b>	+/-0.08 mm, +/-0.1 mm	+/-0.015 mm, +/-0.02 mm, +/-0.05 mm
<b>Description</b>	<ul style="list-style-type: none"> <li>For creating 3D gantries for the YXCR series</li> <li>For Y-axis movements in 3-dimensional gantries</li> </ul>	<ul style="list-style-type: none"> <li>For creating 2-dimensional and 3-dimensional gantries for the YXCL and YXCR series</li> <li>For Z-axis movements in 2-dimensional and 3-dimensional gantries</li> </ul>
online: →	<a href="#">ehmy</a>	<a href="#">ehmz</a>

## Product overview

[Accessories for electric drives >](#)

### Linear guides

			
<b>Guide axes ELFC</b>	<b>Guide units EAGF</b>	<b>Guide axes ELFA-KF</b>	
<b>Size</b>	32, 45, 60, 80	100, 16, 25, 32, 40, 50, 63, 80	
<b>Stroke</b>	100 ... 2000 mm	1 ... 550 mm	
<b>Guide</b>	Recirculating ball bearing guide	Recirculating ball bearing guide	
<b>Description</b>	<ul style="list-style-type: none"> <li>Driveless linear guide unit with guide and freely movable slide unit</li> <li>High torsional resistance</li> <li>Reduced vibrations with dynamic loads</li> </ul>	<ul style="list-style-type: none"> <li>For electric cylinders EPCO and ESBF</li> <li>For absorbing high process forces and torques</li> <li>High guide precision</li> </ul>	<ul style="list-style-type: none"> <li>For spindle/toothed belt axes ELGA-BS/ELGA-TB (drive axes)</li> <li>Driveless linear guide unit with guide and freely movable slide unit</li> <li>For supporting forces and torques in multi-axis applications</li> <li>High torsional resistance</li> <li>Reduced vibrations with dynamic loads</li> </ul>
online: ➔	<a href="#">elfc</a>	<a href="#">eagf</a>	<a href="#">elfa</a>

[Accessories for electric drives >](#)

### Linear guides

			
<b>Guide axes ELFA-RF</b>	<b>Guide axes ELFR</b>	<b>Guide axes EGC-FA</b>	
<b>Size</b>	70, 80	35, 45, 55	
<b>Stroke</b>	50 ... 7000 mm	50 ... 1500 mm	
<b>Guide</b>	Roller bearing guide	Plain-bearing guide, Recirculating ball bearing guide	
<b>Description</b>	<ul style="list-style-type: none"> <li>For toothed belt axis ELGA-TB (drive axes)</li> <li>Driveless linear guide unit with guide and freely movable slide unit</li> <li>For supporting forces and torques in multi-axis applications</li> <li>High torsional resistance</li> <li>Reduced vibrations with dynamic loads</li> </ul>	<ul style="list-style-type: none"> <li>For toothed belt axes ELGR (drive axes)</li> <li>For spindle/toothed belt axes ELGA (drive axes)</li> <li>For supporting forces and torques in multi-axis applications</li> <li>High torsional resistance</li> </ul>	<ul style="list-style-type: none"> <li>For spindle/toothed belt axes ELGA (drive axes)</li> <li>For supporting forces and torques in multi-axis applications</li> <li>High torsional resistance</li> </ul>
online: ➔	<a href="#">elfa</a>	<a href="#">elfr</a>	<a href="#">egc</a>

## Electric grippers



**Parallel grippers, electric EHPS**

**NEW**

<b>Size</b>	16, 20, 25
<b>Total gripping force at 6 bar, closing</b>	see documentation on our website
<b>Stroke per gripper jaw</b>	10 ... 16 mm
<b>Gripper repetition accuracy</b>	0.01 mm, 0.03 mm
<b>Position sensing</b>	Via proximity switch, With Hall sensor, With integrated displacement encoder, Via IO-Link interface
<b>NEW</b>	<ul style="list-style-type: none"> <li>New for 7/2020: additional versions</li> </ul>
<b>Description</b>	<ul style="list-style-type: none"> <li>Electric version of the pneumatically actuated parallel gripper DHPS</li> <li>Ideal for use as a front-end actuator thanks to its low dead weight</li> <li>Controller-free actuation using digital signals</li> <li>Gripping force (4 settings) adjustable via ratchet switch or via IO-Link® interface</li> <li>RA1 version with robot connection, enables fast integration in lightweight robot environments</li> </ul>
<b>online:</b> →	<a href="#">ehps</a>

## 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:

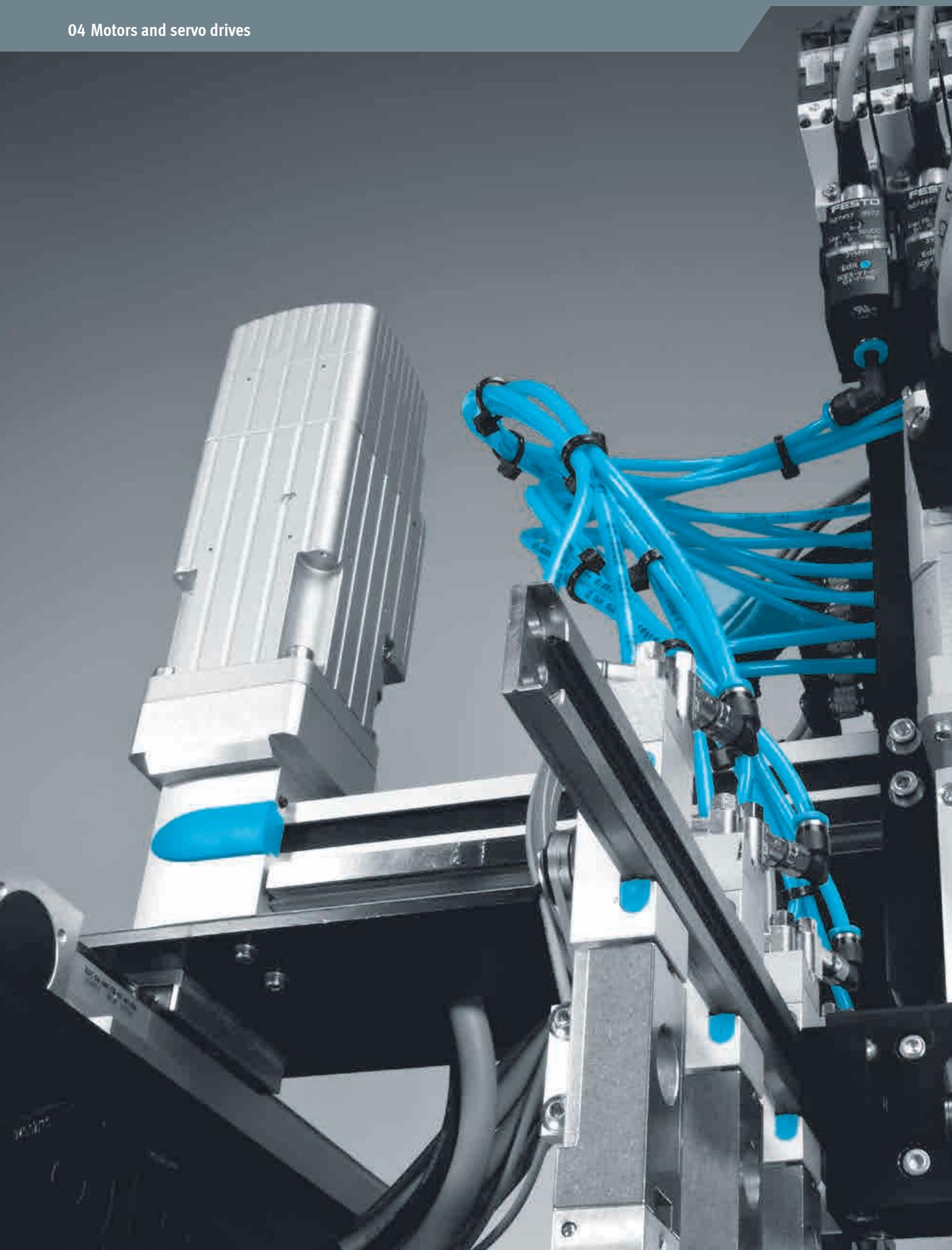
- Special strokes
- Design for special environmental conditions
- Design optimised for the installation space
- Design with opposing carriages
- Design with absolute encoder

Many additional variants are possible.

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

[www.festo.com/contact](http://www.festo.com/contact)

## Product overview



## Product overview

### Software tools

<b>Festo Configuration Tool (FCT)</b> 	<p>FCT is a configuration and parameterisation software program that supports all Festo devices, in particular motor controllers.</p> <p>It 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.</p> <p>The parameterisation software can be found on the website under Support &gt; Support Portal &gt; enter search term.</p>
<b>PositioningDrives: for selecting and sizing electro-mechanical linear drives, motors, and gear units</b> 	<p>Which electromechanical linear drive, which motor and which gear unit best meets your needs?</p> <p>Enter the data for your application, such as position values, effective loads and mounting position, and the software will suggest several solutions.</p> <p>This tool can be found</p> <ul style="list-style-type: none"> <li>• in the electronic catalogue by clicking on the blue button "Engineering".</li> </ul>

### Servo motors

		 ★		
<b>Nominal torque</b>	0.32 ... 2.39 Nm	0.6 ... 7.2 Nm	0.12 ... 6.4 Nm	7.7 ... 22.63 Nm
<b>Nominal rotary speed</b>	3000 rpm	2700 ... 3000 rpm	3000 ... 9000 rpm	2000 ... 3900 rpm
<b>Nominal motor power</b>	100 ... 750 W	190 ... 2030 W	110 ... 2000 W	2600 ... 6880 W
<b>Peak torque</b>	0.96 ... 7.17 Nm	1.6 ... 30.5 Nm	0.7 ... 30 Nm	25.6 ... 120 Nm
<b>Max. rotational speed</b>	5000 ... 6000 rpm	3770 ... 12500 rpm	3910 ... 10000 rpm	2460 ... 5300 rpm
<b>Description</b>	<ul style="list-style-type: none"> <li>• Very cost-effective</li> <li>• Brushless, permanently excited synchronous servo motor</li> <li>• Digital absolute displacement encoder, single turn; multi-turn optional</li> <li>• Reliable, dynamic, precise</li> <li>• Optimised connection technology</li> <li>• Different winding variants</li> <li>• Optionally with holding brake</li> </ul>	<ul style="list-style-type: none"> <li>• For demanding tasks</li> <li>• Brushless, permanently excited synchronous servo motor</li> <li>• Digital absolute displacement encoder, single turn or multi-turn</li> <li>• Extremely low resting torque – supports high synchronisation even at low rotational speeds</li> <li>• Simple connection technology (OCP: one cable plug) – one connecting cable for supply and encoder</li> <li>• Optionally with holding brake</li> </ul>	<ul style="list-style-type: none"> <li>• Brushless, permanently excited synchronous servo motor</li> <li>• Digital absolute displacement encoder, single turn or multi-turn</li> <li>• Reliable, dynamic, precise</li> <li>• Optimised connection technology</li> <li>• Over 40 types in stock</li> <li>• Optionally with holding brake</li> <li>• Optional multi-turn encoder with SIL2</li> </ul>	<ul style="list-style-type: none"> <li>• Brushless, permanently excited synchronous servo motor</li> <li>• Digital absolute displacement encoder, single turn or multi-turn</li> <li>• 66 stock types</li> <li>• 490 built-to-order variants</li> <li>• Optionally with holding brake, IP65, resolver</li> <li>• Different winding variants</li> </ul>
<b>online:</b> ➔	<a href="#">emmb</a>	<a href="#">emmt</a>	<a href="#">emme</a>	<a href="#">emms</a>

## Stepper motors



**Stepper motors**  
**EMMS-ST**



<b>Nominal motor current</b>	1.4 ... 9.5 A
<b>Max. rotational speed</b>	430 ... 6000 rpm
<b>Motor holding torque</b>	0.09 ... 9.3 Nm
<b>Description</b>	<ul style="list-style-type: none"> <li>Small increments and high driving torques thanks to 2-phase hybrid technology</li> <li>Optimised connection technology</li> <li>28 types in stock</li> <li>With incremental encoder for closed-loop operation</li> <li>Optionally with holding brake</li> </ul>
<b>online:</b> →	<a href="#">emms</a>

## Motors with integrated servo drives



**Integrated drives**  
**EMCA**

<b>Nominal torque</b>	0.37 ... 0.45 Nm
<b>Nominal rotary speed</b>	3100 ... 3150 rpm
<b>Nominal motor power</b>	120 ... 150 W
<b>Max. rotational speed</b>	3300 ... 3500 rpm
<b>Peak torque</b>	0.85 ... 0.91 Nm
<b>Description</b>	<ul style="list-style-type: none"> <li>64 freely programmable position sets</li> <li>Convenient web diagnostics</li> <li>Digital absolute displacement encoder, single-turn and multi-turn, with buffering</li> <li>Degree of protection IP54 as standard, optionally IP65</li> <li>Activation via CANopen, EtherNet/IP, I/O interface, PROFINET and EtherCAT®</li> </ul>
<b>online:</b> →	<a href="#">emca</a>

## Product overview

### Software tools

<b>Commissioning software</b> <b>Festo Automation Suite</b>		Quickly and reliably to a ready-to-use drive system – the Festo Automation Suite combines the parameterisation, programming and maintenance of Festo components in one program and enables the entire drive package, from the mechanical system to the controller, to be commissioned. Perfect for making industrial automation simple, efficient and seamless.
		<p><b>Servo drive plug-in CMMT-AS</b></p> <ul style="list-style-type: none"> <li>An operational drive system in just 5 steps – parameterisation is almost fully automatic with the commissioning wizard</li> <li>Advanced editing with the expert view: full access to all device parameters</li> <li>Conveniently install the plug-in using the software</li> </ul> <p>This tool can be found</p> <ul style="list-style-type: none"> <li>on our website at <a href="http://www.festo.com/AutomationSuite">www.festo.com/AutomationSuite</a></li> </ul>

### Electric servo drives >

#### Servo drive

	<b>Servo drives</b> <b>CMMT-AS</b>			<b>Motor controllers</b> <b>CMMMP-AS-M0, CMMMP-AS-M3</b>
<b>Nominal current</b>			2 ... 13 A	
<b>Nominal operating voltage AC</b>	230 ... 400 V		230 ... 400 V	
<b>Nominal operating voltage phases</b>	Single-phase, 3-phase		Single-phase, 3-phase	
<b>Rated output controller</b>	350 ... 6000 VA		500 ... 9000 VA	
<b>Fieldbus coupling</b>	EtherCAT, EtherNet/IP, PROFINET		CANopen, DeviceNet, EtherCAT, EtherNet/IP, Modbus/TCP, PROFINET, PROFIBUS DP	
<b>Description</b>	<ul style="list-style-type: none"> <li>Universal applications</li> <li>The latest generation of servo drive systems with optimised prices and sizes</li> <li>One of the most compact servo drives on the market</li> <li>Configuration of standard safety functions without software</li> <li>Auto-tuning supports easy commissioning and automatically optimises the control behaviour of rotary and linear motions</li> <li>Precise force, speed and position control</li> <li>Optimally with servo motor EMMT-AS</li> </ul>		<ul style="list-style-type: none"> <li>Many interfaces and functions for decentralised motion functions (flying saw, flying measurement, modulo function, etc.)</li> <li>Optional: integrated cam disk controllers and highly dynamic movements</li> <li>Standardised interfaces allow seamless integration in mechatronic multi-axis modular systems</li> <li>Reliable and easy commissioning and parameterisation with the Festo Configuration Tool (FCT)</li> <li>Optionally with 3 slots, safety module or extension module</li> <li>255 positioning records</li> </ul>	
<b>online:</b> ➔	<a href="#">cmmt-as</a>		<a href="#">cmmmp</a>	

Electric servo drives &gt;

## Stepper motor controllers

			
	Servo drives CMMT-ST	Motor controllers CMMO-ST	Motor controllers CMMS-ST
Nominal current load supply	8 A	6 A	8 A
Nominal voltage, load supply DC	24 V, 48 V	24 V	48 V
Fieldbus coupling	EtherCAT®, EtherNet/IP, PROFINET IRT, PROFINET RT	Ethernet	CANopen, PROFIBUS DP
Description	<ul style="list-style-type: none"> <li>Very efficient for tasks with low power requirements</li> <li>Ideal for positioning tasks and point-to-point and interpolating motion solutions</li> <li>50% more compact than the smallest servo drive CMMT-AS</li> <li>Optimised for use with stepper motors like the tried-and-tested EMMS-ST</li> </ul>	<ul style="list-style-type: none"> <li>Motor controllers from the Optimised Motion Series (for electric cylinders EPCO, toothed belt axes ELGR, rotary drives ERMO)</li> <li>With convenient commissioning via FCT (Festo Configuration Tool) for stepper motor EMMS-ST</li> <li>Simple and quick parameterisation via web browser and parameter cloud</li> <li>Reliable and easy commissioning and parameterisation with the Festo Configuration Tool (FCT)</li> <li>Simple control via digital I/O, IO-Link®, I-Port, Modbus® TCP</li> <li>Safety function "Safe Torque Off" (STO) PLe</li> <li>Sinusoidal current injection for especially silent motor operation</li> <li>Compact design</li> </ul>	<ul style="list-style-type: none"> <li>For controlling stepper motors EMMS-ST and Optimised Motion Series (for electric cylinders EPCO, toothed belt axes ELGR, rotary drives ERMO)</li> <li>Easy and convenient commissioning and firmware updates via SD card slot</li> <li>Reliable and easy commissioning and parameterisation with the Festo Configuration Tool (FCT)</li> <li>Integrated process interface: digital I/O, CAN, RS485</li> <li>Safety function Safe Torque Off (STO) PLd</li> <li>Optional: PROFIBUS and DeviceNet®</li> </ul>
online: →	cmmt-st	cmmo	cmms

Electric servo drives &gt;

## Motion controllers

		
	Controllers CMXH-ST2	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	IP20	IP65, IP67
Configuration support	FCT (Festo Configuration Tool)	CODESYS V3
Fieldbus coupling	1x CANopen Slave	
Description	<ul style="list-style-type: none"> <li>For controlling two servo motors</li> <li>For actuating planar surface gantries EXCM-30 and EXCM-40</li> <li>Supports the Safe Torque Off (STO) safety function</li> <li>Easy and convenient actuation using integrated transformation and linear interpolation</li> <li>Easy control via digital I/O interface, CAN interface, or EtherNet TCP/IP</li> <li>H-rail mounting possible</li> <li>Parameterisation with the Festo Configuration Tool (FCT)</li> </ul>	<ul style="list-style-type: none"> <li>Easy control of valve terminal configurations</li> <li>Programming with CoDeSys to IEC 61131-3</li> <li>Connection to all fieldbuses as a remote controller and for pre-processing</li> <li>Control of electric drives via CANopen</li> <li>SoftMotion functions for coordinated multi-axis movements</li> </ul>
online: →	cmxh	cpx-cec-m1

## Product overview

[Electric servo drives >](#)

### Positioners for process automation

 <b>Positioners CMSX</b>	<span style="color: blue;">★</span>
<b>Standard nominal flow rate</b>	50 ... 130 l/min
<b>Ambient temperature</b>	-5 ... 60°C
<b>Reference value</b>	0...10 V/0...20 mA/4...20 mA
<b>Operating voltage range DC</b>	21.6 ... 26.4 V
<b>Operating pressure</b>	3 ... 8 bar
<b>Safety information</b>	Safety function: Opening or closing in the event of system failure, Hold position in the event of a system failure
<b>Degree of protection</b>	IP65
<b>Type of mounting</b>	With accessories
<b>Information on housing materials</b>	PC-reinforced
<b>Description</b>	<ul style="list-style-type: none"> <li>• Digital electropneumatic positioner for single-acting or double-acting pneumatic quarter turn actuators and double-acting pneumatic linear actuators</li> <li>• No air consumption in the adjusted state</li> </ul>
<b>online:</b> →	<a href="#">cmsx</a>

## Gear units

 <b>Gear unit EMGA-A</b>	 <b>Gear units EMGA-P-EAS</b> <span style="color: blue;">★</span>	 <b>Gear units EMGA-P-SAS</b> <span style="color: blue;">★</span>
<b>Gear ratio</b>	12:1, 20:1, 3:1, 5:1, 8:1	12:1, 20:1, 3:1, 5:1, 8:1
<b>Continuous output torque</b>	4.5 ... 120 Nm	6 ... 120 Nm
<b>Max. drive speed</b>	7000 ... 18000 rpm	7000 ... 18000 rpm
<b>Torsional rigidity</b>	0.7 ... 5.1 Nm/arcmin	0.85 ... 10.4 Nm/arcmin
<b>Torsional backlash</b>	0.22 ... 0.41 deg	0.12 ... 0.31 deg
<b>Mass moment of inertia, gear unit</b>	0.032 ... 1.409 kgcm <sup>2</sup>	0.015 ... 0.77 kgcm <sup>2</sup>
<b>Max. efficiency</b>	92%, 93%, 94%, 95%	96%, 97%, 98%
<b>Description</b>	<ul style="list-style-type: none"> <li>• Bevel gear for servo motors EMME-AS, EMMT-AS, EMMS-AS</li> <li>• Life-time lubrication</li> <li>• Degree of protection IP54</li> </ul>	<ul style="list-style-type: none"> <li>• Planetary gear unit, straight, for servo motors EMME-AS, EMMS-AS, EMMT-AS</li> <li>• Eco AC synchronous interface</li> <li>• Life-time lubrication</li> <li>• Degree of protection IP54</li> </ul> <ul style="list-style-type: none"> <li>• Planetary gear unit, straight, for servo motors EMME-AS, EMMS-AS</li> <li>• AC synchronous interface</li> <li>• Life-time lubrication</li> <li>• Degree of protection IP54</li> </ul>
<b>online:</b> →	<a href="#">emga</a>	<a href="#">emga</a>

## Gear units

			
<b>Gear ratio</b>	12:1, 3:1, 5:1, 8:1	1:1	10:1, 12:1, 16:1, 20:1, 25:1, 35:1, 3:1, 40:1, 4:1, 5:1, 7:1
<b>Continuous output torque</b>	6 ... 120 Nm	2 Nm	5 ... 44 Nm
<b>Max. drive speed</b>	7000 ... 18000 rpm	4500 rpm	6000 rpm
<b>Torsional rigidity</b>	0.8 ... 10.4 Nm/arcmin	0.105 Nm/arcmin	0.65 ... 2.4 Nm/arcmin
<b>Torsional backlash</b>	0.12 ... 0.31 deg	0.67 deg	0.5 ... 0.67 deg
<b>Mass moment of inertia, gear unit</b>	0.015 ... 0.77 kgcm <sup>2</sup>	0.09 kgcm <sup>2</sup>	0.04 ... 0.4 kgcm <sup>2</sup>
<b>Max. efficiency</b>	96%, 97%, 98%	90%	92%, 94%
<b>Description</b>	<ul style="list-style-type: none"> <li>• Planetary gear unit, straight, for stepper motors EMMS-ST</li> <li>• Life-time lubrication</li> <li>• Degree of protection IP54</li> </ul>	<ul style="list-style-type: none"> <li>• Angle gear for integrated drive EMCA</li> <li>• Life-time lubrication</li> <li>• Degree of protection IP54</li> </ul>	<ul style="list-style-type: none"> <li>• Planetary gear units, straight, one-stage or two-stage, for integrated drives EMCA</li> <li>• Life-time lubrication</li> <li>• Degree of protection IP54</li> </ul>
online: →	<a href="#">emga</a>	<a href="#">emgc</a>	<a href="#">emgc</a>

## Accessories for motors and servo drives &gt;

## Accessories for servo drives

		
<b>Safety function</b>	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)
<b>Safety integrity level (SIL)</b>	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
<b>Characteristics of logic inputs</b>	Galvanically isolated	4 safe, 2-channel inputs Equivalent/antivalent switching Test pulses configurable Function configurable, 6 safe, 1-channel inputs Test pulses configurable
<b>No. of digital logic inputs</b>	2	10
<b>Digital output design</b>	Potential-free signal contact	Potential-free signal contact, 3 safe, 2-channel semiconductor outputs
<b>Description</b>	<ul style="list-style-type: none"> <li>• For motor controller CMMP-AS-M3</li> <li>• Plug-in module</li> </ul>	<ul style="list-style-type: none"> <li>• For motor controller CMMP-AS-M3</li> <li>• Plug-in module</li> </ul>
online: →	<a href="#">camc</a>	<a href="#">camc</a>

## Product overview

Accessories for motors and servo drives >

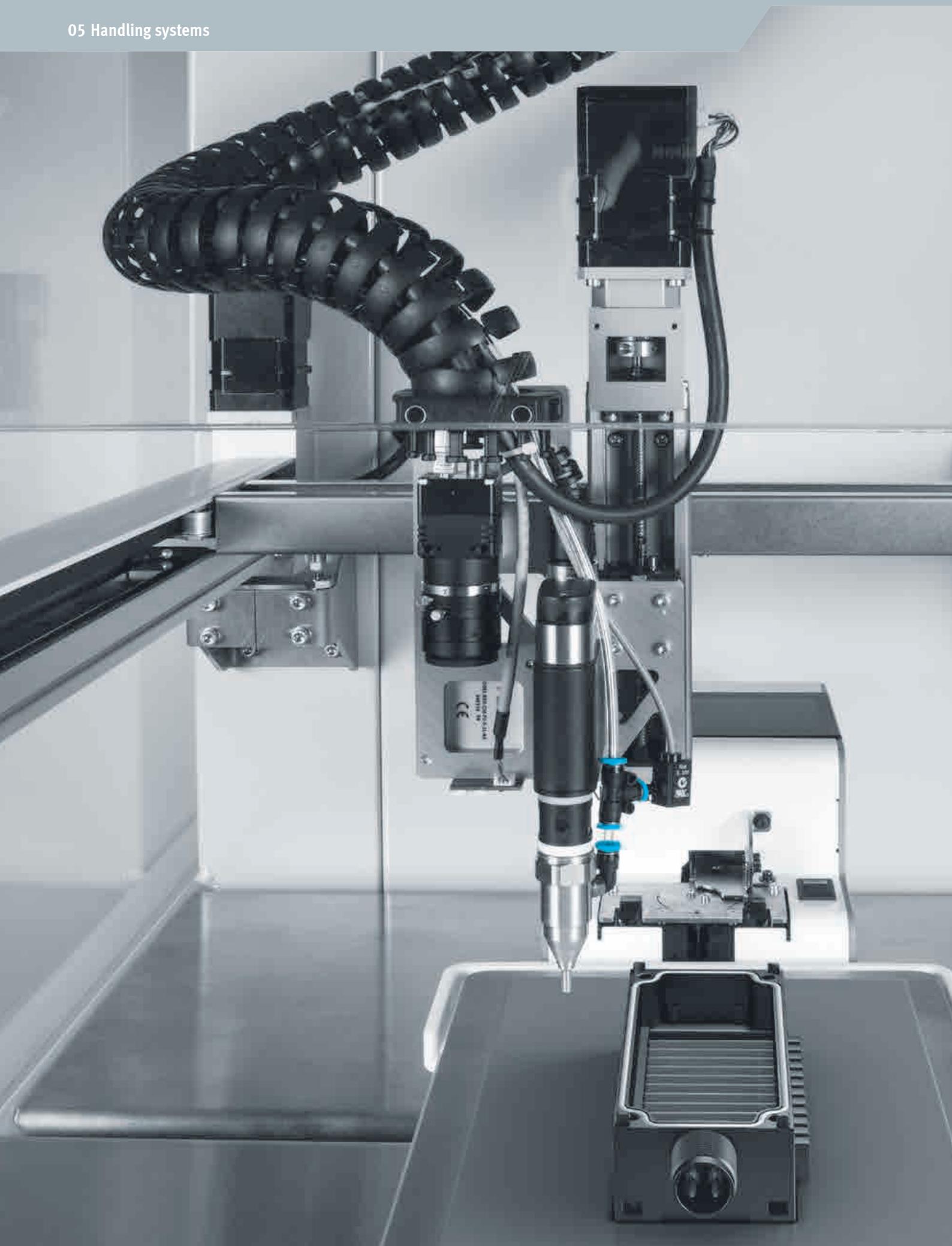
### Power supply units



**Power supply units  
CACN**

<b>Nominal output voltage DC</b>	24 ... 48 V
<b>Nominal output current</b>	5 ... 20 A
<b>Input voltage range AC</b>	100 ... 500 V
<b>Power failure buffering</b>	24 ... 110 ms
<b>Description</b>	<ul style="list-style-type: none"><li>• H-rail mounting</li><li>• Mounting position: free convection</li></ul>
<b>online:</b> ➔	<a href="#">cacn</a>

## 05 Handling systems



## Product overview

### Software tools

<b>Configurator</b>		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.  The configurator is part of the electronic catalogue and is not available as a separate software program.
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### Pneumatic handling systems

	<b>Handling modules HSP</b>		<b>Handling modules, pneumatic HSW-AP, HSW-AS</b>
<b>Size</b>	12, 16, 25	10, 12, 16	
<b>Y-stroke</b>	52 ... 170 mm		
<b>Z-stroke</b>	20 ... 70 mm	80 ... 100 mm	
<b>Repetition accuracy</b>	+/-0.01 mm, +/-0.02 mm		
<b>Min. cycle time</b>	0.6 ... 1 s	0.6 ... 1 s	
<b>Theoretical force at 6 bar</b>	40 ... 65 N	30 ... 55 N	
<b>Description</b>	<ul style="list-style-type: none"> <li>• Function module for automatically repositioning, feeding and removing small parts in extremely confined spaces</li> <li>• Guided vertical and horizontal motion sequence</li> <li>• High precision and rigidity</li> <li>• Compact design</li> <li>• Extremely short cycle times</li> <li>• Cost-optimised</li> <li>• Stroke adjustment along Y- and Z-axes</li> </ul>	<ul style="list-style-type: none"> <li>• Function module for automatically repositioning, feeding and removing small parts in extremely confined spaces</li> <li>• Guided swivel and linear motion</li> <li>• High precision and rigidity</li> <li>• HSW-AP: pneumatic, with swivel module DSM; HSW-AS: without drive, with drive shaft</li> <li>• Fast and compact</li> <li>• Low cost and ideal for universal use</li> </ul>	
<b>online:</b> 	<a href="#">hsp</a>		<a href="#">hsw</a>

## Software tools

<b>Engineering Tool: Handling Guide Online (HGO)</b>		Planning and designing complex handling systems, e.g. for pick-and-place applications, generally takes a lot of time. With the innovative Handling Guide Online (HGO), you can design an individually calculated system in just a few steps. Very simply, on the basis of your application data like the load weight, travel distance and cycle time.
		<p><b>Advantages:</b></p> <ul style="list-style-type: none"> <li>• 1D- ... 3D kinematics</li> <li>• Tailor-made system solution within just a few minutes</li> <li>• CAD model available immediately</li> <li>• Fully automatic selection of all relevant components</li> <li>• Fully automated processing including ordering function</li> <li>• Fully assembled or unassembled systems</li> </ul> <p>This tool is integrated into the Festo online catalogue or can be called directly under <a href="http://www.festo.com/handling-guide">www.festo.com/handling-guide</a></p>

Cartesian robots >

## Single-axis robots

	<b>Single-axis systems YXCS</b>
<b>Description</b>	<ul style="list-style-type: none"> <li>• Ready-to-install single-axis solution including energy chain for cables or tubing as well as suitable motor and servo drive package</li> <li>• For any single-axis movement</li> <li>• For horizontal mounting position</li> <li>• Based on the axis series EGC-TB (toothed belt axis) and EGC-HD-TB (toothed belt axis with heavy-duty guide)</li> <li>• High mechanical rigidity and sturdy design</li> <li>• Ideal for long gantry strokes and heavy loads</li> </ul>
online: →	<a href="#">yxcs</a>

Cartesian robots >

## Linear gantries

	<b>Linear gantry, highly dynamic YXML</b>		<b>Two-dimensional linear gantries YXCL</b>		<b>Linear gantries EXCT</b>
<b>Description</b>	<ul style="list-style-type: none"> <li>• Parallel kinematic drive concept for maximum dynamic response</li> <li>• Ready-to-install complete system including energy chain for cables or tubing as well as suitable motor and servo drive package</li> <li>• For two-dimensional movements in vertical working areas</li> <li>• Flexible working area due to scalable strokes in the Y and Z directions</li> <li>• Choice of vertical axis – pneumatic or electric</li> <li>• Y-axis based on the toothed belt axis EGC-TB and toothed belt axis with heavy-duty guide EGC-HD-TB.</li> <li>• Z-axis based on mini slide DGSL (pneumatic), EGSL (electromechanical) and spindle axis EGC-BS (electromechanical)</li> <li>• High mechanical rigidity and sturdy design</li> <li>• Ideal for long gantry strokes and heavy loads</li> </ul>	<ul style="list-style-type: none"> <li>• Ready-to-install complete system including energy chain for cables or tubing as well as suitable motor and servo drive package</li> <li>• For two-dimensional movements in vertical working areas</li> <li>• Flexible working area due to scalable strokes in the Y and Z directions</li> <li>• Choice of vertical axis – pneumatic or electric</li> <li>• Y-axis based on the toothed belt axis EGC-TB and toothed belt axis with heavy-duty guide EGC-HD-TB.</li> <li>• Z-axis based on mini slide DGSL (pneumatic), EGSL (electromechanical) and spindle axis EGC-BS (electromechanical)</li> <li>• High mechanical rigidity and sturdy design</li> <li>• Ideal for long gantry strokes and heavy loads</li> </ul>	<ul style="list-style-type: none"> <li>• Short cycle times thanks to high dynamic response</li> <li>• Perfectly matched drive and controller package for quick commissioning</li> <li>• Especially economical due to the low moving dead weight</li> </ul>		
online: →	<a href="#">yxml</a>		<a href="#">yxcl</a>		<a href="#">exct</a>

## Product overview

[Cartesian robots >](#)

### Planar surface gantries

	 <p><b>Planar surface gantry, compact YXMF</b></p>	 <p><b>Planar surface gantry, highly dynamic YXMF</b></p>	 <p><b>Two-dimensional planar surface gantries YXCF</b></p>
<b>Description</b>	<ul style="list-style-type: none"> <li>Parallel kinematic drive concept with minimal space requirements</li> <li>Ready-to-install complete system including energy chain, suitable motors and dual servo drive</li> <li>For two-dimensional movements in horizontal working areas</li> <li>Flexible working area due to scalable strokes in the X and Y directions</li> <li>Based on the planar surface gantry EXCM</li> <li>For extremely small working areas</li> <li>For desktop applications in small parts assembly, electronics manufacturing and laboratory processes</li> </ul>	<ul style="list-style-type: none"> <li>Parallel kinematic drive concept for maximum dynamic response</li> <li>Ready-to-install complete system, including energy chain and suitable motor and servo drive package</li> <li>For two-dimensional movements in horizontal working areas</li> <li>Flexible working area due to scalable strokes in the X and Y directions</li> <li>Based on the planar surface gantry EXCH</li> <li>Maximum dynamic response and efficient operation up to max. 100 picks/min.</li> <li>For rapid processes with high cycle rates like pick &amp; place, feeding parts, stacking, packaging tasks</li> <li>Cost-saving alternative to two Scara robots due to large working area and high dynamic response</li> </ul>	<ul style="list-style-type: none"> <li>Ready-to-install complete system including energy chain for cables or tubing as well as suitable motor and servo drive package</li> <li>For two-dimensional movements in horizontal working areas</li> <li>Flexible working area due to scalable strokes in the X and Y directions</li> <li>X-axis based on toothed belt axis EGC-TB</li> <li>Y-axis based on the toothed belt axis EGC-HD-TB.</li> <li>Especially suitable for very long strokes</li> </ul>
online: ➔	<a href="#">yxmf</a>	<a href="#">yxmf</a>	<a href="#">yxcf</a>

[Cartesian robots >](#)

### Planar surface gantries

	 <p><b>Two-dimensional planar surface gantries EXCM</b></p>	 <p><b>Two-dimensional planar surface gantries EXCH</b></p>
<b>Description</b>	<ul style="list-style-type: none"> <li>Excellent functionality in small installation spaces</li> <li>Low moving dead weight</li> <li>Actuation via two stepper motors with an integrated optical encoder and a two-axis controller</li> <li>With recirculating ball bearing guide</li> </ul>	<ul style="list-style-type: none"> <li>Optimal dynamic response when compared with other Cartesian gantry systems</li> <li>Drive concept with low moving dead weight</li> <li>Flat system design</li> <li>High acceleration in both axial directions</li> <li>Large working space</li> </ul>
online: ➔	<a href="#">excm</a>	<a href="#">exch</a>

## Cartesian robots &gt;

## Three-dimensional gantries

			
<b>Description</b>	<ul style="list-style-type: none"> <li>Parallel kinematic drive concept with minimal space requirements</li> <li>Ready-to-install complete system including energy chain, suitable motors and dual servo drive</li> <li>For three-dimensional movements in horizontal working areas</li> <li>Flexible working area due to scalable strokes in the X and Y directions</li> <li>Based on the planar surface gantry EXCM</li> <li>Choice of vertical axis – pneumatic or electric</li> <li>For extremely small working areas</li> <li>For desktop applications in small parts assembly, electronics manufacturing and laboratory processes</li> </ul>	<ul style="list-style-type: none"> <li>Parallel kinematic drive concept for maximum dynamic response</li> <li>Ready-to-install complete system, including energy chain and suitable motor and servo drive package</li> <li>For three-dimensional movements in horizontal working areas</li> <li>Flexible working area due to scalable strokes in the X and Z directions</li> <li>Based on the planar surface gantry EXCH</li> <li>Maximum dynamic response and efficient operation up to max. 100 picks/min.</li> <li>Choice of vertical axis – pneumatic or electric</li> <li>For rapid processes and high cycle rates e.g. assembling, packaging and sorting</li> </ul>	<ul style="list-style-type: none"> <li>Ready-to-install complete system including energy chain for cables or tubing as well as suitable motor and servo drive package</li> <li>For three-dimensional movements in vertical working areas</li> <li>Flexible working area due to scalable strokes in the X, Y and Z directions</li> <li>Choice of vertical axis – pneumatic or electric</li> <li>X-axis based on toothed belt axis EGC-TB</li> <li>Y-axis based on the toothed belt axis EGC-TB and toothed belt axis with heavy-duty guide EGC-HD-TB.</li> <li>Z-axis based on mini slide DGSL (pneumatic), EGSL (electromechanical) and spindle axis EGC-BS (electromechanical)</li> <li>High mechanical rigidity and sturdy design</li> <li>For universal use</li> <li>Especially suitable for long strokes in all directions</li> </ul>
online: →	<a href="#">yxmr</a>	<a href="#">yxmr</a>	<a href="#">yxcr</a>

## Parallel kinematic systems

	
<b>Parallel kinematic systems, tripod EXPT</b>	
<b>Maximum rated load</b>	5 kg
<b>Working space nominal diameter</b>	950 ... 1200 mm
<b>Working space nominal height</b>	100 mm
<b>Max. picking rate</b>	150 picks/min in 12" cycle
<b>Description</b>	<ul style="list-style-type: none"> <li>Low moving mass – ideal for demanding requirements on dynamic response in three dimensions</li> <li>High path accuracy with a range of path profiles, even for very dynamic operation</li> <li>Optional rotary unit as 4th axis, on request with pneumatic rotary through-feed for vacuum or gauge pressure</li> </ul>
online: →	<a href="#">expt</a>

## Product overview

### Control cabinets



<b>Control systems CMCA</b>	
<b>Electrical connection</b>	Spring-loaded terminal
<b>Mains voltage AC</b>	230/400 V
<b>Nominal operating voltage phases</b>	3-phase
<b>Mains frequency</b>	50 ... 60 Hz
<b>Safety function</b>	Safe Stop 1 (SS1)
<b>Description</b>	<ul style="list-style-type: none"> <li>Control system for handling systems from Festo</li> <li>Available on a mounting plate with or without control cabinet housing</li> <li>Includes the multi-axis controller and motor controller CMMP required for actuation</li> <li>The control solution CMCA is pre-programmed and already tested together with the relevant parallel kinematic system</li> <li>The version with the control cabinet housing also features control elements and fans in the door</li> <li>Also included, among others: terminals for control cabinet lighting, plug socket for PC in the control cabinet, terminals for camera, terminals for 2 limit switches per axis</li> </ul>
<b>online:</b> ➔	<a href="#">cmca</a>

### Customised components – for your specific requirements

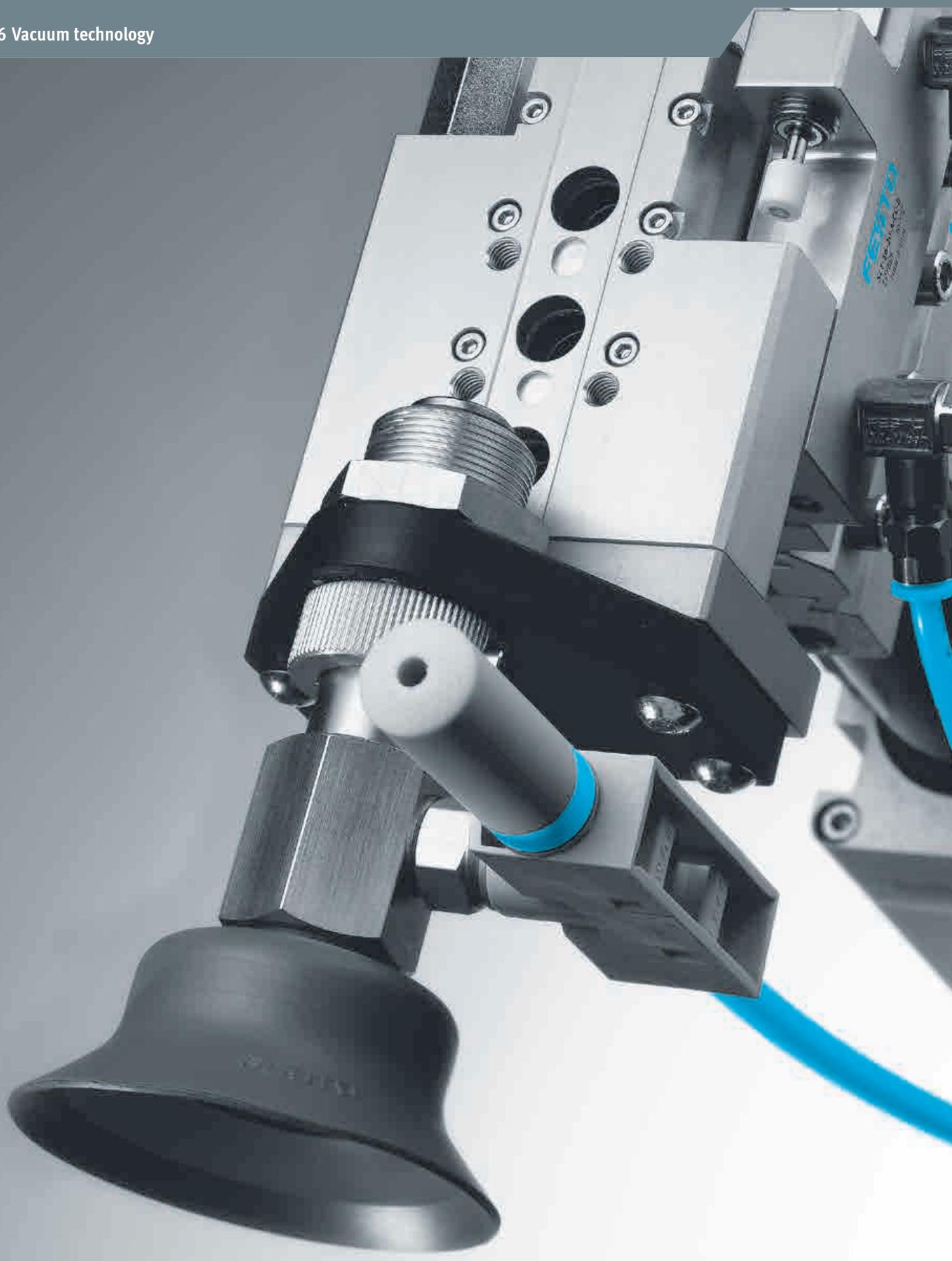


#### Compact handling system for desktop applications

- 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](http://www.festo.com/contact)



## Product overview

### Software tools

<b>Vacuum selection</b>		Which suction cup for which surface and which movement? Don't experiment – calculate! This software tool even enables a distinction to be made between linear and rotary movements.  This tool can be found <ul style="list-style-type: none"><li>• on our website at <a href="http://www.festo.com/catalogue">www.festo.com/catalogue</a> by clicking on the blue icon "Engineering".</li></ul>
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### Vacuum generators

		<b>NEW</b>			
<b>Nominal width of Laval nozzle</b>	0.45 ... 0.95 mm	0.45 ... 0.95 mm	0.45 ... 3 mm	0.45 ... 3 mm	
<b>Ejector characteristics</b>	High suction rate, High vacuum, Standard	High suction rate, High vacuum, Standard	High suction rate, High vacuum, Standard	High suction rate, High vacuum, Standard, Inline, High negative pressure, High suction volume	
<b>Integrated function</b>	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	Ejector pulse valve, pneumatic, Open silencer, Vacuum switch	
<b>Max. vacuum</b>	89 ... 92%	89 ... 92%	93%	86 ... 93%	
<b>Max. suction rate with respect to atmosphere</b>	4 ... 45 l/min	4 ... 21 l/min	6 ... 348 l/min	6.1 ... 339 l/min	
<b>NEW</b>	• New product, 7/2020				
<b>Description</b>	• 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	• 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 • Adjustable ejector pulse	• 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	
<b>online:</b> ➔	<a href="#">ovtl</a>	<a href="#">ovel</a>	<a href="#">ovem</a>	<a href="#">vn</a>	

## Vacuum generators

			
	<b>Vacuum generators, electropneumatic VN</b>	<b>Vacuum generators for valve terminals CPV CPV10-M1H, CPV14-M1H, CPV18-M1H</b>	<b>Vacuum generator cartridges VN</b>
<b>Nominal width of Laval nozzle</b>	0.45 ... 3 mm	0.7 ... 1.4 mm	0.45 ... 2 mm
<b>Ejector characteristics</b>	Standard, High negative pressure, High suction volume	High vacuum	Standard, High negative pressure, High suction volume
<b>Integrated function</b>	Ejector pulse valve, pneumatic, Electric on-off valve, Open silencer		
<b>Max. vacuum</b>	92 ... 93%	85%	92 ... 93%
<b>Max. suction rate with respect to atmosphere</b>	7.2 ... 186 l/min		7.2 ... 184.4 l/min
<b>Description</b>	<ul style="list-style-type: none"> <li>Can be used directly in the work space</li> <li>Low cost</li> <li>Maintenance-free operation and reduced noise level through an integrated, open silencer</li> <li>With solenoid valve vacuum on/off</li> </ul>	<ul style="list-style-type: none"> <li>Combinations of switching valves with vacuum generators are possible on a valve terminal</li> <li>With solenoid valve vacuum on/off</li> <li>Available with ejector pulse</li> </ul>	<ul style="list-style-type: none"> <li>For fitting into customised housing for decentralised vacuum generation</li> </ul>
<b>online: ➔</b>	<a href="#">vn</a>	<a href="#">cpv10-m1h</a>	<a href="#">vn</a>

## Vacuum gripping technology

			
<b>Suction cup size</b>	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
<b>Gripper diameter</b>		60 ... 140 mm	
<b>Suction cup diameter</b>	20 ... 125 mm		2 ... 200 mm
<b>Holding force at nominal operating pressure</b>	15 ... 630 N	6 ... 10 N	
<b>Design</b>			Vacuum port on top, Vacuum port on side, With height compensator, With long height compensator
<b>Information on suction cup materials</b>	HNBR, NBR		BR, FPM, NBR, PUR, VMQ (silicone), Vulkollan
<b>Spacer material</b>		NBR, POM	
<b>Description</b>	<ul style="list-style-type: none"> <li>Extremely energy efficient, very high transverse forces, minimal suction times</li> <li>Optimum suction ergonomics for maximum process reliability</li> <li>Ideal for workpieces with complex contours</li> <li>Accessories available for a wide range of applications</li> </ul>	<ul style="list-style-type: none"> <li>Ideally suited to transporting thin, extremely delicate and brittle workpieces</li> <li>Minimised workpiece contact, gentle workpiece handling</li> <li>Low energy costs thanks to minimised air consumption</li> <li>The ideal solution for low-contact gripping and for gripping pliable, porous and brittle workpieces</li> </ul>	<ul style="list-style-type: none"> <li>Modular system of suction cup holders and suction cups with over 5000 variants</li> <li>Optionally with angle compensator, height compensator, filter</li> <li>15 suction cup diameters</li> <li>6 suction cup shapes</li> <li>Suction cup volume: 0.002 ... 245 cm<sup>3</sup></li> <li>Min. workpiece radius: 10 ... 680 mm</li> <li>Vacuum connection: push-in connector or barbed fitting for plastic tubing, threaded connection</li> </ul>
<b>online: ➔</b>	<a href="#">ogvm</a>	<a href="#">oggb</a>	<a href="#">esg</a>

## Product overview

### Vacuum gripping technology

			
<b>Suction cup size</b>	4x20 mm, 6x10 mm, 6x20 mm, 8x20 mm, 8x30 mm, 4x10 mm, 10x30 mm, 15x45 mm, 20x60 mm, 25x75 mm, 30x90 mm		
<b>Gripper diameter</b>			
<b>Suction cup diameter</b>	2 ... 200 mm	20 ... 200 mm	2 ... 125 mm
<b>Holding force at nominal operating pressure</b>	0.1 ... 1610 N	8.2 ... 1610 N	0.14 ... 700 N
<b>Design</b>	Round, bell-shaped	Bellows, Round, bell-shaped	
<b>Information on suction cup materials</b>	BR, FPM, NBR, PUR, VMQ (silicone), Vulkollan	BR, FPM, NBR, PUR, VMQ (silicone), Vulkollan	NBR, PUR, TPE-U(PU), VMQ (silicone)
<b>Spacer material</b>			
<b>Description</b>	<ul style="list-style-type: none"> <li>Suction cup consisting of the suction cup itself, plus the support plate with mounting</li> <li>Suction cup volume: 0.002 ... 245 cm<sup>3</sup></li> <li>Min. workpiece radius: 10 ... 680 mm</li> <li>Mounting for suction cup holder: female thread, male thread, push-in connector</li> <li>Suction cup with mounting thread</li> </ul>	<ul style="list-style-type: none"> <li>Wearing part for suction cup</li> <li>Easily interchangeable</li> <li>Suction cup volume: 0.318 ... 245 cm<sup>3</sup></li> <li>Min. workpiece radius: 10 ... 680 mm</li> </ul>	<ul style="list-style-type: none"> <li>Sturdy and reliable</li> <li>Suction cups with fixed connecting thread</li> <li>11 suction cup diameters</li> <li>Round suction cup, bellows</li> <li>Vacuum connection on top, on side</li> <li>Screw-in thread</li> </ul>
<b>online:</b> ➔	<a href="#">ess</a>	<a href="#">esv</a>	<a href="#">vas</a>

#### Accessories for vacuum >

### Assembly and connecting components

	
<b>Suction cup holders ESH</b>	
<b>Design</b>	Vacuum port on top, Vacuum port on side, With height compensator
<b>Description</b>	<ul style="list-style-type: none"> <li>With or without height compensator</li> <li>6 holder sizes</li> <li>8 holder types</li> <li>3 tubing connection options</li> </ul>
<b>online:</b> ➔	<a href="#">esh</a>

## Accessories for vacuum &gt;

## Vacuum-specific accessories

				
Length compensator VAL				Vacuum filters ESF, VAF, OAFF
Vacuum connection	G1/4, G1/8, M5			G1/2, G1/4, G3/8, M4, M6
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		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	<ul style="list-style-type: none"> <li>Vacuum port M5, G1/8, G1/4</li> </ul>	<ul style="list-style-type: none"> <li>Vacuum port M4x0.7, M6x1, M10x1.5</li> </ul>	<ul style="list-style-type: none"> <li>Designs based on DIN EN 837-1, available with red-green range</li> <li>Pneumatic connection via R or G thread</li> <li>Double or single scale</li> <li>Display units bar, in Hg, psi</li> </ul>	<ul style="list-style-type: none"> <li>Vacuum filter ESF: for suction gripper ESG</li> <li>Vacuum filter VAF: with transparent housing or bowl to allow users to assess contamination level</li> <li>Vacuum filter OAFF: for vacuum generators OVEL</li> </ul>
online: →	val	eswa	vam	vaf

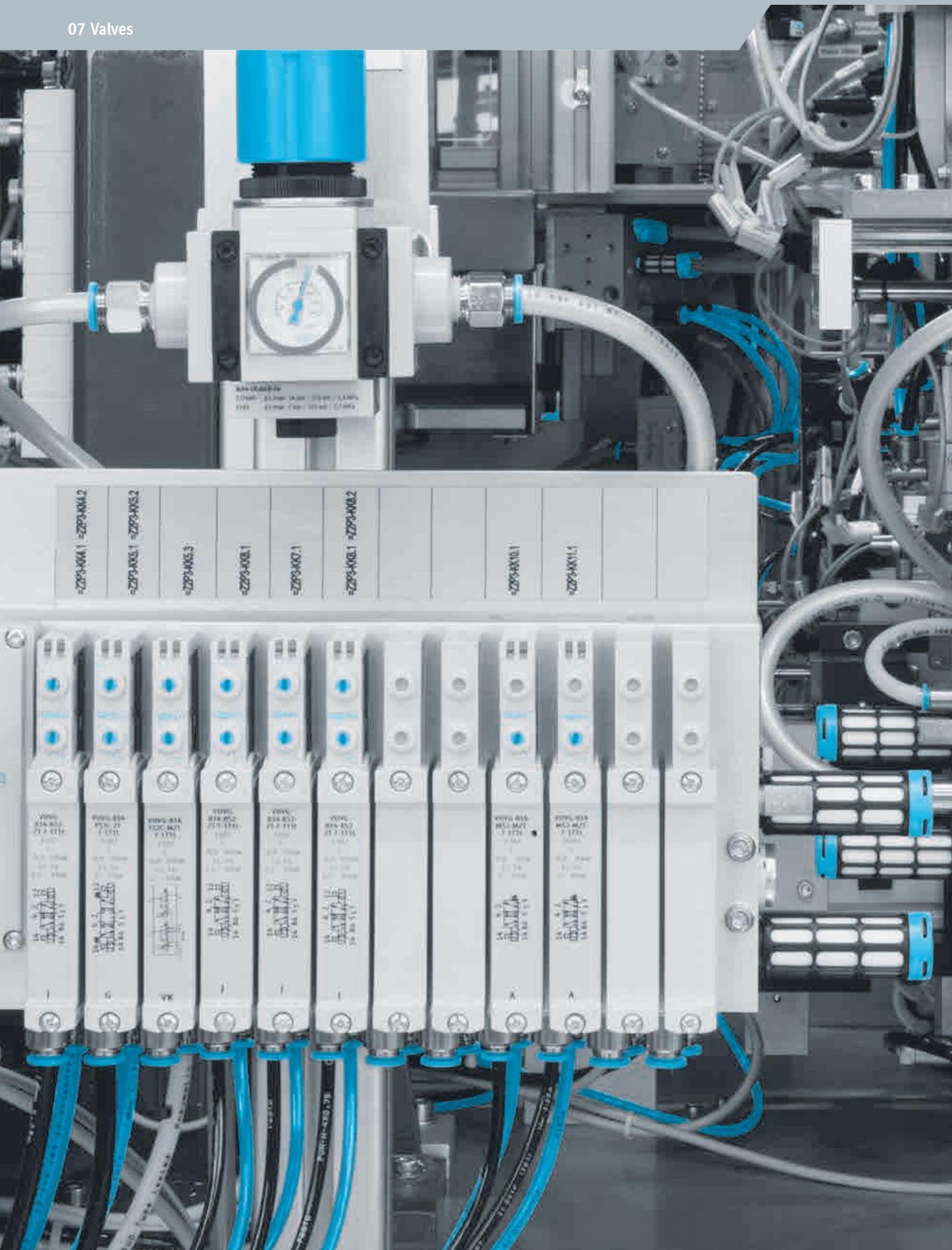
## Accessories for vacuum &gt;

## Vacuum-specific accessories

			
Vacuum connection			
Pneumatic connection	G1/4, G1/8, G3/8, M10, M4, M5, M6	G1/4, G1/8, M7	G1/4, G3/8
Type of mounting	Screw-in		Snapping in, Screw-in
Grade of filtration			
Description	<ul style="list-style-type: none"> <li>For maintaining the vacuum when using multiple suction cups and one fails</li> <li>Gripping of randomly placed products</li> <li>Saves compressed air and energy</li> </ul>	<ul style="list-style-type: none"> <li>Special open minimal resistance silencer</li> <li>For vacuum generators</li> <li>Facilitates trouble-free operation of the vacuum generator</li> <li>Operating medium compressed air</li> </ul>	<ul style="list-style-type: none"> <li>Special open minimal resistance silencer</li> <li>For vacuum generators</li> <li>Facilitates trouble-free operation of the vacuum generator</li> <li>Silencer extension for extending the silencer for further noise reduction</li> <li>Operating medium compressed air</li> </ul>
online: →	isv	uo	uom

## Product overview

## 07 Valves



## Product overview

[Electrically and pneumatically actuated directional control valves >](#)

### Standards-based directional control valves

				
<b>Solenoid valves VSNC</b>		<b>Standards-based valves with central plug VSVA-R5, VSVA-R2</b>	<b>Standards-based valves with individual plug VSVA-C1, VSVA-P1</b>	<b>Standards-based valves, plug-in VSVA-T1</b>
<b>Actuation type</b>	Electric	Electric	Electric	Electric
<b>Pneumatic connection 1</b>	1/4 NPT, G1/4, G1/8, QS-1/4, QS-10, QS-3/8, QS-5/16, QS-6, QS-8	Sub-base Size 1 ISO 5599-1, Size 2 ISO 5599-1	Sub-base Size 18 mm ISO 15407-1, Size 26 mm ISO 15407-1	Sub-base Size 1 ISO 5599-2, Size 2 ISO 5599-2, Size 18 mm ISO 15407-2, Size 26 mm ISO 15407-2
<b>Operating pressure</b>	1.5 ... 10 bar	-0.9 ... 16 bar	-0.9 ... 16 bar	-0.9 ... 10 bar
<b>Standard nominal flow rate</b>	500 ... 1350 l/min	400 ... 2800 l/min	400 ... 1400 l/min	150 ... 2900 l/min
<b>Valve function</b>	5/2 double solenoid, 5/2-way or 3/2-way, convertible, 5/3-way, pressurised, 5/3 exhausted, 5/3 closed, 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	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
<b>Electrical connection</b>	3-pin, Type A, Type B, Type C, Cable connector M20x1.5, Plugs, To EN 175301-803, To industry standard (11 mm)	3-pin, 4-pin, Central plug, Round design, M8x1, M12x1	Type C, With protective earth conductor, To DIN EN 175301-803, To EN 175301-803, Without protective earth conductor	2-pin, 4-pin, Plug-in, Plugs, To ISO 15407-2, To ISO 5599-2
<b>Description</b>	<ul style="list-style-type: none"> <li>Namur connection pattern to VDI/VDE 3845</li> <li>Rotatable seal for 3/2- or 5/2-way valve</li> <li>Wide choice of EX solenoid systems</li> <li>Sturdy and powerful</li> <li>Extended temperature range</li> <li>Excellent value for money</li> <li>All solenoid coils can be used on an armature tube</li> <li>The VSNC-...FN variant achieves greater energy efficiency with reduced power consumption</li> </ul>	<ul style="list-style-type: none"> <li>Conforms to ISO 5599-1</li> <li>Electrical connection with central plug</li> <li>Robust metal housing</li> <li>Manifold assembly with mixed sizes possible</li> </ul>	<ul style="list-style-type: none"> <li>Corresponds to ISO 15407-1 and to ISO 15218 for pilot valve with interface</li> <li>Electrical connection via plug type C</li> <li>Robust metal housing</li> <li>Manifold assembly with mixed sizes possible</li> </ul>	<ul style="list-style-type: none"> <li>For valve terminal VTSA/VTSA-F</li> <li>Robust metal housing</li> </ul>
<b>online:</b> 	<a href="#">vsnc</a>	<a href="#">vsva</a>	<a href="#">vsva</a>	<a href="#">vsva</a>

## Electrically and pneumatically actuated directional control valves &gt;

## Standards-based directional control valves

		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		Pneumatic valves to ISO 5599-1 VL, J, JD
<b>Actuation type</b>	Pneumatic	Electric		Pneumatic		
<b>Pneumatic connection 1</b>	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		Sub-base Size 1 ISO 5599-1, Size 2 ISO 5599-1, Size 3 ISO 5599-1, Size 4 ISO 5599-1		
<b>Operating pressure</b>	-0.9 ... 16 bar	-0.9 ... 16 bar		-0.9 ... 16 bar		
<b>Standard nominal flow rate</b>	400 ... 1100 l/min	1200 ... 6000 l/min		1200 ... 6000 l/min		
<b>Valve function</b>	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		5/2 double solenoid, 5/2-way, bistable, dominant, 5/2-way, monostable, 5/3-way, pressurised, 5/3 exhausted, 5/3 closed		
<b>Electrical connection</b>		Central plug, To DIN EN 175301-803, Round design, Via F coil, to be ordered separately, Via N1 coil, to be ordered separately, M12x1				
<b>Description</b>	<ul style="list-style-type: none"> <li>• Conforms to ISO 15407-1</li> <li>• Pneumatic control</li> <li>• Manifold assembly with mixed sizes possible</li> </ul>	<ul style="list-style-type: none"> <li>• Conforms to ISO 5599-1</li> <li>• Robust metal housing</li> <li>• Manifold assembly with mixture of ISO sizes 1, 2 and 3 possible</li> <li>• Extensive range of electrical connection options</li> <li>• Wide range of vertical stacking modules: pressure regulator, flow control valve, vertical pressure shut-off plate, etc.</li> <li>• Also available as a valve terminal</li> </ul>		<ul style="list-style-type: none"> <li>• Conforms to ISO 5599-1</li> <li>• Pneumatic control</li> </ul>		
<b>online:</b> →	<a href="#">vspa</a>	<a href="#">iso 5599-1</a>				<a href="#">iso 5599-1</a>

## Electrically and pneumatically actuated directional control valves &gt;

## Standards-based directional control valves

		Standards-based valves to ISO 15218 (CNOMO) MDH, MGXDH, MGXIAH, VSCS		Standards-based valves, NAMUR (VDI/VDE 3845) NVF3
<b>Actuation type</b>	Electric	Electric		
<b>Pneumatic connection 1</b>	Sub-base	G1/4		
<b>Operating pressure</b>	-0.9 ... 16 bar	2 ... 10 bar		
<b>Standard nominal flow rate</b>	13.5 ... 50 l/min	900 l/min		
<b>Valve function</b>	3/2-way, closed, monostable	5/2- or 3/2-way monostable		
<b>Electrical connection</b>	Type A, Type C, To DIN EN 175301-803, To IEC 61076-2-101, M12x1			
<b>Description</b>	<ul style="list-style-type: none"> <li>• CNOMO connection pattern, to ISO 15218</li> <li>• With or without manual override</li> </ul>	<ul style="list-style-type: none"> <li>• Namur connection pattern to VDI/VDE 3845</li> <li>• Electrically actuated, piloted</li> <li>• Reset via mechanical return</li> <li>• Variants to EU Explosion Protection Directive (ATEX)</li> </ul>		
<b>online:</b> →	<a href="#">iso 15218</a>	<a href="#">namur</a>		

## Product overview

[Electrically and pneumatically actuated directional control valves >](#)

### Universal directional control valves

				
<b>Actuation type</b>	Electric	Electric	Pneumatic	Electric
<b>Pneumatic connection 1</b>	G1/4, G1/8, M3, M5, M7		G1/4, G1/8, M3, M5, M7	1/8 NPT, G1/4, G1/8, G3/8
<b>Pneumatic working port</b>	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	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
<b>Operating pressure</b>	-0.9 ... 10 bar	-0.9 ... 10 bar	-0.9 ... 10 bar	-0.9 ... 10 bar
<b>Standard nominal flow rate</b>	80 ... 1380 l/min	130 ... 1200 l/min	80 ... 1380 l/min	500 ... 2400 l/min
<b>Valve function</b>	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, 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
<b>Description</b>	<ul style="list-style-type: none"> <li>• Compact universal valve</li> <li>• Connection technology via E-box</li> <li>• High flow rate relative to its size</li> <li>• In-line valves can be used as individual valves or manifold valves</li> </ul>	<ul style="list-style-type: none"> <li>• Sub-base valve</li> <li>• For valve terminal VTUG with multi-pin, fieldbus interface</li> <li>• Variants to EU Explosion Protection Directive (ATEX)</li> </ul>	<ul style="list-style-type: none"> <li>• Compact universal valve</li> <li>• Pneumatically actuated</li> <li>• High flow rate relative to its size</li> <li>• In-line valves can be used as individual valves or manifold valves</li> <li>• Can be combined on manifold rail with electric individual valves</li> </ul>	<ul style="list-style-type: none"> <li>• Universal valve, sturdy and durable</li> <li>• Low cost with no performance limitations</li> <li>• Can be used as individual valves or manifold valves VTUS</li> </ul>
<b>online:</b> ➔	<a href="#">vuvg</a>	<a href="#">vuvg</a>	<a href="#">vuwg</a>	<a href="#">vuvsv</a>

## Electrically and pneumatically actuated directional control valves &gt;

## Universal directional control valves

				
<b>Actuation type</b>	Pneumatic	Electric	Electric	Electric, Pneumatic
<b>Pneumatic connection 1</b>	G1/4, G1/8, G3/8	G1/8, M7	G1/4, G1/8, G3/8, M5, M7, QS-10, QS-12, QS-4, QS-6, QS-8	G1/4, G1/8, G3/8
<b>Pneumatic working port</b>	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	G1/8, M7	G1/4, G1/8, G3/8, M5, M7, QS-10, QS-12, QS-4, QS-6, QS-8	G1/4, G1/8, G3/8
<b>Operating pressure</b>	-0.9 ... 10 bar	-0.9 ... 10 bar	-0.9 ... 10 bar	-0.9 ... 10 bar
<b>Standard nominal flow rate</b>	500 ... 2400 l/min	140 ... 870 l/min	1250 ... 3200 l/min	750 ... 2600 l/min
<b>Valve function</b>	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	2x2/2-way, monostable, closed, 2x3/2-way, monostable, closed, 2x3/2-way, open, monostable, 2x3/2-way, open/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, 5/2 double solenoid, 5/2-way, monostable, 5/3-way, pressurised, 5/3 exhausted, 5/3 closed	5/2 double solenoid, 5/2-way, monostable, 5/3-way, pressurised, 5/3 exhausted, 5/3 closed
<b>Description</b>	<ul style="list-style-type: none"> <li>Universal valve, sturdy and durable</li> <li>Pneumatically actuated</li> <li>Can be used as individual valves or manifold valves VTUS</li> </ul>	<ul style="list-style-type: none"> <li>For valve terminal MPA</li> <li>As individual valve mounted on sub-base</li> <li>Comprehensive range of valves</li> </ul>	<ul style="list-style-type: none"> <li>Universal individual valve</li> <li>High flow rate relative to its size</li> </ul>	<ul style="list-style-type: none"> <li>Sturdy and reliable</li> <li>Wide range of voltages thanks to individual coils</li> <li>Principle with armature tube</li> </ul>
<b>online: ➔</b>	<a href="#">vuws</a>	<a href="#">vmpa1</a>	<a href="#">cpe</a>	<a href="#">tiger 2000</a>

## Electrically and pneumatically actuated directional control valves &gt;

## Universal directional control valves

			
<b>Actuation type</b>	Electric, Pneumatic	Electric, Pneumatic	Electric
<b>Pneumatic connection 1</b>	G1/2, G1/4, G1/8, G3/4	Sub-base, G1/2, G1/4	G1/4, G1/8, M5
<b>Pneumatic working port</b>	G1/2, G1/4, G1/8, G3/4	Sub-base, G1/2, G1/4	G1/8, M5
<b>Operating pressure</b>	-0.95 ... 10 bar	1 ... 16 bar	-0.95 ... 8 bar
<b>Standard nominal flow rate</b>	500 ... 7500 l/min	1400 l/min	46 ... 300 l/min
<b>Valve function</b>	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	5/2 double solenoid, 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
<b>Description</b>	<ul style="list-style-type: none"> <li>Sturdy and reliable</li> <li>Poppet valve</li> <li>All-metal version</li> <li>Principle with armature tube</li> </ul>	<ul style="list-style-type: none"> <li>Sturdy</li> <li>Direct mounting on sub-base</li> <li>With or without manual override</li> </ul>	<ul style="list-style-type: none"> <li>Manifold mounting or individual valve</li> <li>Valves for special applications</li> <li>With or without manual override</li> </ul>
<b>online: ➔</b>	<a href="#">tiger classic</a>	<a href="#">cm</a>	<a href="#">bmch</a>

## Product overview

**Electrically and pneumatically actuated directional control valves >**

### Application-specific directional control valves

				
<b>Design</b>	Piston gate valve	Directly actuated poppet valve	Piston gate valve, Piloted piston poppet valve	Piston gate valve
<b>Valve function</b>	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, monos- table	3/2-way, closed, monostable, 3/2 open, single solenoid, 5/2-way, monostable
<b>Operating pressure</b>	3 ... 10 bar	0 ... 12 bar	0 ... 10 bar	-0.9 ... 8 bar
<b>Ambient temperature</b>	-5 ... 50°C	-50 ... 60°C	-25 ... 60°C	-5 ... 50°C
<b>Pneumatic connection 1</b>	G1/4	1/4 NPT, NAMUR port pattern, G1/4, M5	1/2 NPT, 1/4 NPT, NAMUR port pattern, G1/2, G1/4, M5	Sub-base, M5, M7
<b>Standard nominal flow rate</b>	950 ... 1050 l/min	52 ... 1900 l/min	766 ... 2686 l/min	180 ... 200 l/min
<b>Description</b>	<ul style="list-style-type: none"> <li>• Redundantly designed valve block, can be used for safe reversing of a hazardous movement</li> <li>• 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</li> <li>• Equipped with valves VSVA</li> <li>• Switching position sensing by sensors</li> <li>• Safety device tested and certified in accordance with Machinery Directive 2006/42/EC and applicable standards. For more information, see <a href="http://www.festo.com/sp">www.festo.com/sp</a> &gt; "Certificates" tab</li> <li>• Suitable for use as a press safety valve to EN 692</li> </ul>	<ul style="list-style-type: none"> <li>• Suitable for process automation in the chemical and petrochemical industries</li> <li>• Suitable for outdoor use under harsh ambient conditions</li> <li>• Especially suitable for quarter turn actuators thanks to NAMUR flange pattern</li> <li>• Variants with TÜV approval up to SIL3 to IEC 61508</li> <li>• Variants to EU Explosion Protection Directive (ATEX)</li> </ul>	<ul style="list-style-type: none"> <li>• Suitable for process automation in the chemical and petrochemical industries</li> <li>• Suitable for outdoor use under harsh ambient conditions</li> <li>• Especially suitable for quarter turn actuators thanks to NAMUR flange pattern</li> <li>• Valve can switch between internal and external pilot air</li> <li>• Variants with TÜV approval up to SIL3 to IEC 61508</li> <li>• Variants to EU Explosion Protection Directive (ATEX)</li> </ul>	<ul style="list-style-type: none"> <li>• Very compact valve for solutions with high component density</li> <li>• Suitable for applications in the electronics and light assembly industry</li> <li>• In-line, semi in-line and sub-base valve</li> <li>• Manifold rail for 2 ... 10 valves</li> </ul>
<b>online:</b> ➔	<a href="#">vofa</a>	<a href="#">vofd</a>	<a href="#">vofc</a>	<a href="#">vofg</a>

## Electrically and pneumatically actuated directional control valves &gt;

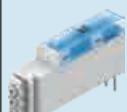
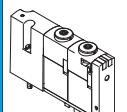
## Application-specific directional control valves

				
<b>Solenoid valves MHA1, MHP1</b>	<b>Solenoid valves MHE2, MHP2, MHA2, MHE3, MHP3, MHA3, MHE4, MHP4, MHA4</b>	<b>Solenoid valves CDVI5.0</b>	<b>Fast-switching valves MHJ9, MHJ10</b>	
<b>Design</b>	Poppet valve with spring return	Pressure-relieved poppet valve	Piston gate valve	Poppet valve without spring return
<b>Valve function</b>	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
<b>Operating pressure</b>	-0.9 ... 8 bar	-9 ... 8 bar	-0.9 ... 10 bar	0.5 ... 8 bar
<b>Ambient temperature</b>	-5 ... 50°C	-5 ... 60°C	-5 ... 50°C	-5 ... 60°C
<b>Pneumatic connection 1</b>	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
<b>Standard nominal flow rate</b>	10 ... 30 l/min	90 ... 400 l/min	300 ... 650 l/min	50 ... 160 l/min
<b>Description</b>	<ul style="list-style-type: none"> <li>• Directly actuated poppet valve</li> <li>• Miniature valve: grid dimension 10 mm</li> <li>• Switching times down to 4 ms</li> <li>• Sub-base valve</li> <li>• Manifold block for 2 ... 10 valves</li> <li>• Use as a pilot valve</li> <li>• UL certification; same connections and cables as for the VUVG</li> </ul>	<ul style="list-style-type: none"> <li>• Directly actuated poppet valve</li> <li>• Fast-switching valve: switching times down to 2 ms</li> <li>• Direct mounting, individual sub-base, manifold assembly</li> <li>• Manifold block for 2 ... 10 valves</li> </ul>	<ul style="list-style-type: none"> <li>• Clean design sub-base valve</li> <li>• Easy-to-clean design</li> <li>• Individual valve for clean design</li> <li>• Can be used in the food zone (based on standard EN 1672-2)</li> </ul>	<ul style="list-style-type: none"> <li>• Directly actuated poppet valve</li> <li>• Identical basic valves for direct mounting or manifold installation</li> <li>• Individual valve with integrated plug connection</li> <li>• Switching frequencies up to 1000 Hz</li> <li>• Very good reproducibility</li> <li>• MHJ9: Valve manifold assembly with individual outputs or with air nozzle output</li> <li>• MHJ9: Electrical connection via connecting cable MHJ9-KMH with integrated control electronics</li> <li>• MHJ10: Valve manifold assembly with individual outputs</li> <li>• MHJ10: Electrical connection via moulded-in cable, control electronics included in the valve</li> </ul>
<b>online:</b> ➔	<b>mh1</b>	<b>mh2</b>	<b>cdvi5.0</b>	<b>mhj9</b>

## Product overview

**Electrically and pneumatically actuated directional control valves >**

### Application-specific directional control valves

		<b>NEW</b>		<b>Solenoid valves VOVK</b>		<b>NEW</b>		<b>Solenoid and pneumatic valves, M5 Compact System J, JD, JMFH, MFH, MUFH, VD, VL, VL/O, VLL</b>
<b>Design</b>	Connection direction downwards, Connection orientation forwards, Poppet valve with spring return	Poppet valve with spring return		Directly actuated poppet valve			Piston gate valve, Poppet seat	
<b>Valve function</b>	3/2-way, closed, monostable	2x3/2-way, monostable, closed		3/2-way, closed, monostable			3/2 double solenoid, 3/2 open, single solenoid, 5/2 double solenoid, 5/2-way, bistable, dominant, 5/2-way, monostable	
<b>Operating pressure</b>	-1 ... 7 bar	0 ... 8 bar		-0.9 ... 8 bar			-0.9 ... 8 bar	
<b>Ambient temperature</b>	5 ... 50°C	-5 ... 50°C		-10 ... 50°C			-10 ... 60°C	
<b>Pneumatic connection 1</b>	Sub-base, For tubing I.D. 1.5 mm, For tubing I.D. 2 mm	Sub-base		G1/8			PK-3	
<b>Standard nominal flow rate</b>	5.5 l/min	10 l/min		50 l/min			100 ... 105 l/min	
<b>NEW</b>	• New product, 11/2020			• New product, 11/2020				
<b>Description</b>	<ul style="list-style-type: none"> <li>• Very narrow: 5.9 mm grid dimension</li> <li>• Extremely small and lightweight</li> <li>• Very low power consumption</li> <li>• Variable connection concepts: flanged connection underneath or at the front, barbed fitting connection at the front</li> <li>• Ideal for control of small air flows</li> </ul>	<ul style="list-style-type: none"> <li>• For valve terminal VT0C</li> <li>• Optimal use of the installation space yet maximum performance</li> <li>• Detenting or non-detenting manual override</li> </ul>		<ul style="list-style-type: none"> <li>• For angle seat valves VZXF and VZXA</li> <li>• For use wherever valve terminals are not economically or technically viable</li> <li>• Manual override, detenting</li> </ul>			<ul style="list-style-type: none"> <li>• Control elements with all functions for pneumatic sequence controls</li> <li>• For control cabinet installation</li> <li>• Fast replacement of components</li> </ul>	
<b>online: ➔</b>	<b>vovk</b>	<b>vovc</b>		<b>vofx</b>			<b>m5-compact</b>	

**Manually actuated directional control valves >**

### Swivel lever valves

		<b>Hand lever valves VHEF-H</b>		<b>Hand lever valves VHER</b> ★		<b>Hand lever valves H-3, H-5</b>
<b>Valve function</b>	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			3/2 double solenoid, 5/2 double solenoid
<b>Type of control</b>	Direct		Direct			Direct
<b>Standard nominal flow rate</b>	530 ... 1200 l/min		170 ... 3800 l/min			550 ... 600 l/min
<b>Pneumatic working port</b>	G1/4, G1/8		G1/2, G1/4, G1/8, M5			G1/4
<b>Operating pressure</b>	-0.95 ... 10 bar		0 ... 10 bar			-0.95 ... 10 bar
<b>Description</b>	<ul style="list-style-type: none"> <li>• With hand lever at the side</li> <li>• Durable thanks to tried-and-tested piston slide and disc seat valve technology</li> <li>• Robust metal housing</li> <li>• Attractive price</li> <li>• Ergonomic and safe operation</li> <li>• Minimal actuating forces</li> <li>• Modern design</li> <li>• Reverse operation possible</li> </ul>		<ul style="list-style-type: none"> <li>• Lever in metal or polymer design</li> <li>• Front panel mounting, through holes or mounting holes</li> </ul>			<ul style="list-style-type: none"> <li>• Die-cast aluminium design</li> </ul>
<b>online: ➔</b>	<b>vgef</b>		<b>vher</b>			<b>n_v14</b>

## Manually actuated directional control valves &gt;

## Pushbutton valves

			
	<b>Pushbutton valves VHEF-P</b>	<b>Pushbutton valves K/O-3</b>	<b>Pushbutton valves K-3</b>
<b>Valve function</b>	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
<b>Type of control</b>	Direct, Pilot actuated	Direct	Direct
<b>Standard nominal flow rate</b>	750 ... 1200 l/min	80 l/min	80 l/min
<b>Pneumatic working port</b>	G1/4, G1/8	PK-3	M5
<b>Operating pressure</b>	-0.95 ... 10 bar	0 ... 8 bar	-0.95 ... 8 bar
<b>Description</b>	<ul style="list-style-type: none"> <li>• With button switch</li> <li>• Durable thanks to tried-and-tested piston slide and disc seat valve technology</li> <li>• Robust metal housing</li> <li>• Attractive price</li> <li>• Ergonomic and safe operation</li> <li>• Minimal actuating forces</li> <li>• Modern design</li> <li>• Reverse operation possible</li> </ul>	<ul style="list-style-type: none"> <li>• With button switch</li> <li>• Polymer design</li> <li>• Ducted exhaust air</li> </ul>	<ul style="list-style-type: none"> <li>• With button switch</li> <li>• Suitable for vacuum operation</li> <li>• Sturdy die-cast zinc design</li> </ul>
<b>online: →</b>	<a href="#">vhef</a>	<a href="#">k</a>	<a href="#">k-3</a>

## Manually actuated directional control valves &gt;

## Pushbutton valves

		
	<b>Pushbutton valves T-5/3</b>	<b>Pushbutton valves F-3</b>
<b>Valve function</b>	5/3 closed	3/2-way, closed, monostable
<b>Type of control</b>	Pilot actuated	Direct
<b>Standard nominal flow rate</b>	680 l/min	80 l/min
<b>Pneumatic working port</b>	G1/4	M5
<b>Operating pressure</b>	2 ... 10 bar	-0.9 ... 8 bar
<b>Description</b>	<ul style="list-style-type: none"> <li>• With pushbutton</li> <li>• For positioning, for stopping in the event of an emergency stop and for holding double-acting cylinders in any position</li> <li>• Aluminium design</li> </ul>	<ul style="list-style-type: none"> <li>• With pedal</li> <li>• Suitable for vacuum operation</li> <li>• Sturdy die-cast zinc design</li> </ul>
<b>online: →</b>	<a href="#">n_msv</a>	<a href="#">f-3-m5</a>

## Product overview

[Manually actuated directional control valves >](#)

### Finger lever valves

				
	<b>Finger lever valves VHEF-L</b>	<b>Finger lever valves TH/O-3</b>	<b>Finger lever valves TH-3, THO-3, TH-5</b>	<b>Finger lever valves H-4/3</b>
<b>Valve function</b>	3/2-way, monostable, open/closed, 5/2-way, monostable	3/2-way, monostable, open/closed	3/2-way, closed, monostable, 3/2 open, single solenoid, 5/2-way, monostable	4/3 exhausted
<b>Type of control</b>	Direct	Direct	Direct	Pilot actuated
<b>Standard nominal flow rate</b>	750 ... 1200 l/min	80 l/min	80 ... 600 l/min	125 l/min
<b>Pneumatic working port</b>	G1/4, G1/8	PK-3	G1/4, M5	M5
<b>Operating pressure</b>	-0.95 ... 10 bar	0 ... 8 bar	-0.95 ... 10 bar	0 ... 8 bar
<b>Description</b>	<ul style="list-style-type: none"> <li>• With finger lever</li> <li>• Durable thanks to tried-and-tested piston slide and disc seat valve technology</li> <li>• Robust metal housing</li> <li>• Attractive price</li> <li>• Ergonomic and safe operation</li> <li>• Minimal actuating forces</li> <li>• Modern design</li> <li>• Reverse operation possible</li> </ul>	<ul style="list-style-type: none"> <li>• With finger lever</li> <li>• Polymer design</li> <li>• Ducted exhaust air</li> </ul>	<ul style="list-style-type: none"> <li>• With finger lever</li> <li>• Die-cast zinc or die-cast aluminium design</li> </ul>	<ul style="list-style-type: none"> <li>• With detenting finger lever</li> <li>• Front panel mounting or mounting on sub-base</li> <li>• Aluminium design</li> </ul>
<b>online:</b> →	<a href="#">vhf</a>	<a href="#">th</a>	<a href="#">th-3-m5</a>	<a href="#">h-4</a>

[Manually actuated directional control valves >](#)

### Toggle lever valves

			
	<b>Toggle lever valves VHEF-V</b>	<b>Toggle lever valves KH/O-3</b>	<b>Toggle lever valves H-5/3</b>
<b>Valve function</b>	3/2 double solenoid, 3/2-way, monostable, open/closed, 5/2 double solenoid, 5/2-way, monostable	3/2-way, monostable, open/closed	5/3 closed
<b>Type of control</b>	Direct	Direct	Pilot actuated
<b>Standard nominal flow rate</b>	750 ... 1200 l/min	80 l/min	680 ... 2700 l/min
<b>Pneumatic working port</b>	G1/4, G1/8	PK-3	G1/2, G1/4
<b>Operating pressure</b>	-0.95 ... 10 bar	0 ... 8 bar	2 ... 10 bar
<b>Description</b>	<ul style="list-style-type: none"> <li>• With toggle lever</li> <li>• Durable thanks to tried-and-tested piston slide and disc seat valve technology</li> <li>• Robust metal housing</li> <li>• Attractive price</li> <li>• Ergonomic and safe operation</li> <li>• Minimal actuating forces</li> <li>• Modern design</li> <li>• Reverse operation possible</li> </ul>	<ul style="list-style-type: none"> <li>• With toggle lever</li> <li>• Polymer design</li> <li>• Ducted exhaust air</li> </ul>	<ul style="list-style-type: none"> <li>• With toggle lever</li> <li>• For positioning, for stopping in the event of an emergency stop and for holding double-acting cylinders in any position</li> <li>• Aluminium design</li> </ul>
<b>online:</b> →	<a href="#">vhf</a>	<a href="#">kh</a>	<a href="#">n_msv</a>

[Manually actuated directional control valves >](#)

## Foot valves

	<b>Foot valves</b> <b>F-3, FO-3, F-5</b>		<b>Foot valves with detent</b> <b>FP-3, FPB-3, FP-5, FPB-5</b>
<b>Valve function</b>	3/2-way, closed, monostable, 3/2 open, single solenoid, 5/2-way, monostable	3/2 double solenoid, 5/2 double solenoid	
<b>Type of control</b>	Direct	Direct	
<b>Standard nominal flow rate</b>	550 ... 600 l/min	550 ... 600 l/min	
<b>Pneumatic working port</b>	G1/4	G1/4	
<b>Operating pressure</b>	-0.95 ... 10 bar	-0.95 ... 10 bar	
<b>Description</b>	<ul style="list-style-type: none"> <li>• With foot pedal</li> <li>• Sturdy die-cast zinc design</li> </ul>	<ul style="list-style-type: none"> <li>• With foot pedal with detent</li> <li>• Sturdy die-cast zinc design</li> </ul>	
<b>online: →</b>	<a href="#">fo-3</a>		<a href="#">fpb-3</a>

[Manually actuated directional control valves >](#)

## Selector switches

	<b>Selector valves</b> <b>VHEF-E</b>		<b>Selector switches</b> <b>HW-6-38</b>
<b>Valve function</b>	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	
<b>Type of control</b>	Direct	Direct	
<b>Standard nominal flow rate</b>	530 ... 1200 l/min	180 l/min	
<b>Pneumatic working port</b>	G1/4, G1/8	M5	
<b>Operating pressure</b>	-0.95 ... 10 bar	0 ... 8 bar	
<b>Description</b>	<ul style="list-style-type: none"> <li>• With selector switch on the side or on top</li> <li>• Durable thanks to tried-and-tested piston slide and disc seat valve technology</li> <li>• Robust metal housing</li> <li>• Attractive price</li> <li>• Ergonomic and safe operation</li> <li>• Minimal actuating forces</li> <li>• Modern design</li> <li>• Reverse operation possible</li> </ul>	<ul style="list-style-type: none"> <li>• With rotary knob and arrow</li> <li>• Front panel mounting or mounting on sub-base</li> <li>• With six switching positions</li> </ul>	
<b>online: →</b>	<a href="#">vhef</a>		<a href="#">hw-6</a>

## Product overview

[Manually actuated directional control valves >](#)

### Front panel valves

			
<b>Front panel valves SV/0-3</b>		<b>Front panel valves SVS-3, SVS-4, SVOS-3</b>	
<b>Valve function</b>		3/2-way, closed, monostable, 3/2 open, single solenoid, 4/2-way, single solenoid	
<b>Type of control</b>		Direct, Pilot actuated	
<b>Standard nominal flow rate</b>		70 l/min	
<b>Pneumatic working port</b>		G1/8	
<b>Operating pressure</b>		M5	
<b>Description</b>		<ul style="list-style-type: none"> <li>For actuator attachments such as toggle and selector switches</li> <li>Reliable coupling system for quick mounting and dismounting</li> <li>Polymer design</li> </ul>	
<b>online:</b> ➔		<b>sv</b>	
<b>Front panel valves SV-3, SV-5</b>		<b>SVOS</b>	
<b>SV-3</b>		<b>SVOS</b>	

[Mechanically actuated directional control valves >](#)

### Stem actuated valves

					
<b>Stem actuated valves VMEF-S</b>		<b>Stem actuated valves V/0-3</b>		<b>Stem actuated micro valves S-3, SO-3</b>	
<b>Valve function</b>		3/2-way, closed, monostable, 5/2-way, monostable		3/2-way, closed, monostable, 3/2 open, single solenoid	
<b>Type of control</b>		Direct, Pilot actuated		Direct	
<b>Standard nominal flow rate</b>		750 ... 1200 l/min		80 ... 140 l/min	
<b>Pneumatic working port</b>		G1/4, G1/8		G1/8, M5, PK-3	
<b>Operating pressure</b>		-0.95 ... 10 bar		-0.95 ... 8 bar	
<b>Description</b>		<ul style="list-style-type: none"> <li>Durable thanks to tried-and-tested piston slide and disc seat valve technology</li> <li>Robust metal housing</li> <li>Outstanding pneumatic performance</li> <li>Attractive price</li> <li>Ergonomic and safe operation</li> <li>Minimal actuating forces</li> <li>Modern design</li> <li>Reverse operation possible</li> </ul>		<ul style="list-style-type: none"> <li>Through-holes in housing</li> <li>Polymer, aluminium or die-cast zinc design</li> <li>Dimensions to DIN 41635, type A</li> <li>Polymer design</li> <li>Various actuator attachments</li> <li>Aluminium design</li> <li>Minimal actuating force with pilot control</li> </ul>	
<b>online:</b> ➔		<b>vmef</b>		<b>v/o</b>	
<b>so</b>		<b>vs</b>		<b>vos</b>	

**Mechanically actuated directional control valves >****Stem actuated valves**

			
<b>Stem actuated valves V-3, V-5, VO-3</b>		<b>Limit switches with push-in connector SDK, SVK</b>	<b>Limit stop signal generators with push-in connector SDV</b>
<b>Valve function</b>	3/2-way, closed, monostable, 3/2 open, single solenoid, 5/2-way, monostable	3/2-way, closed, monostable	3/2-way, closed, monostable
<b>Type of control</b>	Direct	Direct	Direct
<b>Standard nominal flow rate</b>	550 ... 600 l/min	16 ... 50 l/min	8 ... 16 l/min
<b>Pneumatic working port</b>	G1/4	PK-3	PK-3
<b>Operating pressure</b>	-0.95 ... 10 bar	-0.9 ... 8 bar	0 ... 8 bar
<b>Description</b>	<ul style="list-style-type: none"> <li>Die-cast aluminium design</li> </ul>	<ul style="list-style-type: none"> <li>For end-position sensing and position control</li> <li>High accuracy</li> <li>Stainless steel design</li> </ul>	<ul style="list-style-type: none"> <li>For end-position sensing and position control</li> <li>High precision and low actuating forces</li> <li>Sturdy design</li> </ul>
<b>online: ➔</b>	<b>vo-3</b>	<b>sdk</b>	<b>sdv</b>

**Mechanically actuated directional control valves >****Roller lever valves**

				
<b>Roller lever valves VMEF-R</b>	<b>★</b>	<b>Roller lever valves R/O-3-PK-3</b>	<b>Roller lever valves RS-3, RS-4, ROS-3</b>	<b>Roller lever valves R-3, R-5, RO-3</b>
<b>Valve function</b>	3/2-way, single solenoid, 5/2-way, monostable	3/2-way, monostable, open/closed	3/2-way, closed, monostable, 3/2 open, single solenoid, 4/2-way, single solenoid	3/2-way, closed, monostable, 3/2 open, single solenoid, 5/2-way, monostable
<b>Type of control</b>	Direct	Direct	Pilot actuated	Direct
<b>Standard nominal flow rate</b>	750 ... 1200 l/min	80 l/min	128 ... 169 l/min	80 ... 600 l/min
<b>Pneumatic working port</b>	G1/4, G1/8	PK-3	G1/8	G1/4, M5
<b>Operating pressure</b>	-0.95 ... 10 bar	0 ... 8 bar	3.5 ... 8 bar	-0.95 ... 10 bar
<b>Description</b>	<ul style="list-style-type: none"> <li>Durable thanks to tried-and-tested piston slide and disc seat valve technology</li> <li>Robust metal housing</li> <li>Outstanding pneumatic performance</li> <li>Attractive price</li> <li>Ergonomic and safe operation</li> <li>Minimal actuating forces</li> <li>Modern design</li> <li>Reverse operation possible</li> </ul>	<ul style="list-style-type: none"> <li>With roller lever</li> <li>Polymer design</li> <li>Ducted exhaust air</li> </ul>	<ul style="list-style-type: none"> <li>With roller lever</li> <li>Aluminium design</li> <li>Minimal actuating force with pilot control</li> </ul>	<ul style="list-style-type: none"> <li>With roller lever</li> <li>Die-cast aluminium design</li> </ul>
<b>online: ➔</b>	<b>vmef</b>	<b>r/o</b>	<b>ros-3</b>	<b>ro-3</b>

## Product overview

[Mechanically actuated directional control valves >](#)

### Roller lever valves

				
<b>Roller lever valves VMEF-K</b>	<b>Toggle lever valves L/O-3</b>	<b>Roller lever valves LS-3, LS-4, LOS-3</b>	<b>Roller lever valves L-3, L-5, LO-3</b>	
<b>Valve function</b>	3/2-way, single solenoid, 5/2-way, monostable	3/2-way, monostable, open/closed	3/2-way, closed, monostable, 3/2 open, single solenoid, 4/2-way, single solenoid	3/2-way, closed, monostable, 3/2 open, single solenoid, 5/2-way, monostable
<b>Type of control</b>	Direct	Direct	Pilot actuated	Direct
<b>Standard nominal flow rate</b>	750 ... 1200 l/min	80 l/min	128 ... 175 l/min	80 ... 600 l/min
<b>Pneumatic working port</b>	G1/4, G1/8	PK-3	G1/8	G1/4, M5
<b>Operating pressure</b>	-0.95 ... 10 bar	0 ... 8 bar	3.5 ... 8 bar	-0.95 ... 10 bar
<b>Description</b>	<ul style="list-style-type: none"> <li>Durable thanks to tried-and-tested piston slide and disc seat valve technology</li> <li>Robust metal housing</li> <li>Outstanding pneumatic performance</li> <li>Attractive price</li> <li>Ergonomic and safe operation</li> <li>Minimal actuating forces</li> <li>Modern design</li> <li>Reverse operation possible</li> </ul>	<ul style="list-style-type: none"> <li>With roller lever with idle return</li> <li>Polymer design</li> <li>Ducted exhaust air</li> </ul>	<ul style="list-style-type: none"> <li>With toggle lever</li> <li>Aluminium design</li> <li>Minimal actuating force with pilot control</li> </ul>	<ul style="list-style-type: none"> <li>With roller lever</li> <li>Die-cast aluminium design</li> </ul>
<b>online:</b> →	<a href="#">vmef</a>	<a href="#">l/o</a>	<a href="#">los-3</a>	<a href="#">lo-3</a>

[Mechanically actuated directional control valves >](#)

### Swivel lever valves

				
<b>Swivel lever valves RW/O-3</b>	<b>Pneumatic limit valves RWN/O-3</b>	<b>Swivel lever valves RW-3</b>		
<b>Valve function</b>	3/2-way, monostable, open/closed	3/2-way, monostable, open/closed	3/2-way, closed, monostable	
<b>Type of control</b>	Direct		Direct	
<b>Standard nominal flow rate</b>	80 ... 140 l/min	120 l/min	80 l/min	
<b>Pneumatic working port</b>	G1/8, PK-3	G1/8	M5	
<b>Operating pressure</b>	-0.95 ... 8 bar	-0.95 ... 8 bar	-0.95 ... 8 bar	
<b>Description</b>	<ul style="list-style-type: none"> <li>Basic valve for actuator attachments such as short or long swivel lever, swivel lever rod</li> <li>Aluminium design</li> </ul>	<ul style="list-style-type: none"> <li>Directly actuated in one direction</li> <li>Aluminium design</li> </ul>	<ul style="list-style-type: none"> <li>With swivel lever</li> <li>Sturdy die-cast zinc design</li> <li>Various actuator attachments</li> </ul>	
<b>online:</b> →	<a href="#">rw</a>	<a href="#">rwn</a>	<a href="#">rw-3</a>	

**Mechanically actuated directional control valves >****Whisker valves**

	<b>Whisker valves</b> <b>FVS-3, FVS0-3</b>
<b>Valve function</b>	3/2-way, closed, monostable, 3/2 open, single solenoid
<b>Type of control</b>	Pilot actuated
<b>Standard nominal flow rate</b>	146 ... 175 l/min
<b>Pneumatic working port</b>	G1/8
<b>Operating pressure</b>	3.5 ... 8 bar
<b>Description</b>	<ul style="list-style-type: none"> <li>• With whisker</li> <li>• For sensing dissimilar workpieces or workpieces not precisely positioned</li> <li>• Aluminium design</li> <li>• Minimal actuating force with pilot control</li> </ul>
online: ➔	<a href="#">fvs-3</a>

**Shut-off valves >****Non-return valves and quick exhaust valves**

	<b>Check valves, piloted</b> <b>HGL</b> 		<b>Manual override tools</b> <b>HAB</b>		<b>Check valves, piloted</b> <b>VBNF</b>
<b>Pneumatic connection 1</b>	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	
<b>Standard nominal flow rate</b>					
<b>Standard flow rate exhaust 6-&gt;0 bar</b>		165 l/min			
<b>Standard nominal flow rate pressurisation 6-&gt;5 bar</b>					
<b>Standard nominal flow rate 1</b> → 2 from 6 to 5 bar	130 ... 1600 l/min			260 ... 620 l/min	
<b>Operating pressure</b>	0.5 ... 10 bar	0 ... 10 bar		0.2 ... 10 bar	
<b>Operating pressure for entire temperature range</b>				0.2 ... 10 bar	
<b>Description</b>	<ul style="list-style-type: none"> <li>• Valve function: piloted non-return function</li> <li>• Pneumatically piloted</li> <li>• Screw-in with male thread</li> <li>• Pilot air connection: M5, G1/8, G1/4, G3/8, QS-4</li> <li>• Manually actuated exhaust possible with separate accessory</li> </ul>	<ul style="list-style-type: none"> <li>• Valve function: exhaust component</li> <li>• For check valve HGL</li> <li>• For manual exhausting air trapped in a cylinder</li> </ul>	<ul style="list-style-type: none"> <li>• Minimal height</li> <li>• High flow rate</li> <li>• Can be rotated horizontally through 360° in assembled state</li> <li>• Manually actuated exhaust possible</li> </ul>		
online: ➔	<a href="#">hgl</a>	<a href="#">hab</a>		<a href="#">vbnf</a>	

## Product overview

### Shut-off valves >

#### Non-return valves and quick exhaust valves

			
	<b>Quick exhaust valves VBQF</b>	<b>Non-return valves H, HA, HB</b>	<b>Quick exhaust valves SE, SEU</b>
Pneumatic connection 1	G1/4, G1/8, 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	G1/2, G1/4, G1/8, G3/4, G3/8
Standard nominal flow rate		115 ... 2230 l/min	
Standard flow rate exhaust 6->0 bar	850 ... 2500 l/min		550 ... 7500 l/min
Standard nominal flow rate pressurisation 6->5 bar	350 ... 960 l/min		300 ... 4560 l/min
Standard nominal flow rate 1 -> 2 from 6 to 5 bar		1000 ... 5900 l/min	
Operating pressure	0.2 ... 10 bar	-1 ... 12 bar	0.2 ... 10 bar
Operating pressure for entire temperature range			
Description	<ul style="list-style-type: none"> <li>Minimal height</li> <li>High flow rate</li> <li>Reduced noise emission</li> <li>Available with silencer</li> <li>Available with ducted or unducted exhaust air</li> <li>For higher cycle times</li> </ul>	<ul style="list-style-type: none"> <li>Valve function: non-return function</li> <li>Screw-in or in-line installation</li> <li>With connecting thread at both ends, push-in connector at both ends, thread/push-in connector</li> </ul>	<ul style="list-style-type: none"> <li>Valve function: quick exhaust</li> <li>Shut-off valve, piloted</li> <li>Screw-in</li> <li>With or without silencer</li> </ul>
online: ➔	<a href="#">vbqf</a>	<a href="#">h-qs</a>	<a href="#">se</a>

### Shut-off valves >

#### Shut-off valves and ball valves

				
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	-0.95 ... 12 bar	-0.95 ... 10 bar	-1 ... 10 bar	
Description	<ul style="list-style-type: none"> <li>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</li> <li>Non-overlapping, so no pressure losses when switching</li> <li>Minimal installation effort</li> </ul>	<ul style="list-style-type: none"> <li>Shut-off valve, manually operated</li> <li>Connection: thread at both ends, push-in connector at both ends, thread/push-in connector</li> <li>Different mounting options</li> </ul>	<ul style="list-style-type: none"> <li>Shut-off valve, manually operated</li> <li>In-line installation, can be screwed in, bulkhead fitting</li> <li>Variants: thread at both ends, push-in connector at both ends, thread/push-in connector</li> </ul>	<ul style="list-style-type: none"> <li>Shut-off valve, manually operated</li> <li>In-line installation</li> <li>Female thread at both ends</li> <li>With hand lever</li> <li>Pipe thread to ISO 2281</li> </ul>
online: ➔	<a href="#">vboh</a>	<a href="#">he</a>	<a href="#">qh</a>	<a href="#">qh</a>

## Shut-off valves &gt;

## Logic valves

				
<b>Valve function</b>	OR function			AND function
<b>Pneumatic connection 1</b>	G1/2, G1/4, G1/8, PK-3, PK-4	M5	M5	G1/8, PK-3, PK-4
<b>Standard nominal flow rate</b>	100 ... 5000 l/min	80 l/min	80 l/min	100 ... 550 l/min
<b>Operating pressure</b>	0.001 ... 10 bar	0.001 ... 6 bar	0.001 ... 6 bar	0.001 ... 10 bar
<b>Description</b>	<ul style="list-style-type: none"> <li>Pneumatic control system</li> <li>Mounting via through-holes</li> </ul>	<ul style="list-style-type: none"> <li>For pneumatic sensors</li> </ul>	<ul style="list-style-type: none"> <li>For pneumatic sensors</li> </ul>	<ul style="list-style-type: none"> <li>Dual-pressure valve</li> <li>Connects two input signals in the AND function</li> <li>Mounting via through-holes</li> </ul>
online: →	os	vk	vlo	zk

## Pressure regulators

		
<b>Differential pressure regulators LRL, LRLL</b>		<b>Pressure regulator VRPA</b>
<b>Pressure regulation range</b>	2 ... 6 bar	1 ... 8 bar
<b>Standard nominal flow rate</b>		80 ... 130 l/min
<b>Nominal flow rate, closed</b>	30 ... 730 l/min	
<b>Nominal flow rate, open</b>	30 ... 760 l/min	
<b>Pneumatic connection 1</b>	G1/2, G1/4, G1/8, G3/8, M5	M5, QS-4, QS-6, QS-8, R1/4, R1/8
<b>Pneumatic connection 2</b>	QS-10, QS-12, QS-4, QS-6, QS-8	QS-4, QS-6, QS-8
<b>Description</b>	<ul style="list-style-type: none"> <li>Piston regulator with through pressure supply</li> <li>Constant pressure differential between the input and output</li> <li>Connections: thread/push-in connector on top or on side</li> <li>Without secondary exhaust</li> <li>Without pressure gauge</li> </ul>	<ul style="list-style-type: none"> <li>Regulates the operating pressure independently of the fluctuating inlet pressure</li> <li>With secondary exhaust and with return flow function</li> <li>Piston regulator with through pressure supply</li> <li>Greater energy efficiency thanks to movement-specific pressure adjustment</li> <li>Directly actuated</li> <li>Available with pressure gauge</li> <li>Connections: push-in connector at both ends, thread/push-in connector</li> </ul>
online: →	lrl	vropa

## Product overview

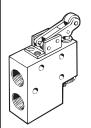
[Flow control valves >](#)

### One-way flow control valves

		<b>NEW</b>			
<b>Valve function</b>	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	Exhaust air one-way flow control function
<b>Pneumatic connection 1</b>	QS-4, QS-6, QS-8	Male thread G1/4, 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	
<b>Standard nominal flow rate in flow control direction</b>	160 ... 180 l/min	0 ... 4320 l/min	180 ... 530 l/min	240 ... 590 l/min	
<b>Adjusting element</b>	Rotary knob with detent	Internal hexagon, Knurled screw, Slotted head screw	External hex	Internal hexagon	
<b>NEW</b>	• New product, 4/2021				
<b>Description</b>	<ul style="list-style-type: none"> <li>Low-cost solution for standard applications</li> <li>Simple and reliable adjustment of pneumatic cylinder speed</li> <li>Extremely easy assembly</li> <li>Fast commissioning</li> <li>Compact dimensions</li> </ul>	<ul style="list-style-type: none"> <li>Functional combination of one-way flow control valve and piloted check valve</li> <li>Flow control valve, flow control at one end</li> <li>Polymer, metal or stainless steel design</li> <li>Standard, mini, in-line variants with different flow rates</li> <li>Connections: thread at both ends, push-in connector at both ends, thread/push-in connector</li> </ul>	<ul style="list-style-type: none"> <li>Easy-to-clean design</li> <li>Increased corrosion protection</li> <li>Can be rotated horizontally through 360° in assembled state</li> </ul>	<ul style="list-style-type: none"> <li>Functional combination of one-way flow control valve and piloted check valve</li> <li>High flow rate</li> <li>Can be rotated horizontally through 360° in assembled state</li> <li>Compact and can be operated from the side</li> </ul>	
online: ➔	<a href="#">vfoe</a>	<a href="#">grla</a>	<a href="#">vfoh</a>	<a href="#">vfov</a>	

[Flow control valves >](#)

### One-way flow control valves

			
	<b>One-way flow control valves VFOC</b>	<b>One-way flow control valves GR, GRA</b>	<b>One-way flow control valves GG, GGO, GRR</b>
<b>Valve function</b>	Supply air one-way flow control function	One-way flow control function	One-way flow control function
<b>Pneumatic connection 1</b>	QS-4, QS-6	G1/2, G1/4, G1/8, G3/4, G3/8, M3, M5, QS-3, QS-4, QS-6, QS-8	G1/2, G1/4
<b>Standard nominal flow rate in flow control direction</b>	0 ... 270 l/min	29.5 ... 3300 l/min	870 ... 1300 l/min
<b>Adjusting element</b>	Slotted head screw	Knurled screw	Roller lever
<b>Description</b>	<ul style="list-style-type: none"> <li>Shut-off valve, flow control at one end</li> <li>Metal version</li> <li>Precision adjustment for low and medium speeds</li> <li>Push-in connector/push-in sleeve</li> </ul>	<ul style="list-style-type: none"> <li>Non-return and flow control valve</li> <li>In-line installation</li> </ul>	<ul style="list-style-type: none"> <li>Non-return and flow control valve</li> <li>With roller lever</li> </ul>
online: ➔	<a href="#">vfoc</a>	<a href="#">gra</a>	<a href="#">gg</a>

## Flow control valves &gt;

## One-way flow control valves

		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	
Pneumatic connection 1	G1/8, PK-3, PK-4		PK-3	
Standard nominal flow rate in flow control direction	3.8 ... 75.8 l/min		45 l/min	
Adjusting element	Rotary knob with scale		Knurled screw	
Description	<ul style="list-style-type: none"> <li>Non-return and flow control valve</li> <li>Mounting on sub-base or for front panel mounting</li> </ul>		<ul style="list-style-type: none"> <li>Complete system offering control components with all the functions required for pneumatic sequence control</li> <li>For control cabinet installation</li> <li>Fast replacement of components</li> </ul>	
online: ➔	<a href="#">grp</a>		<a href="#">m5-compact</a>	

## Flow control valves &gt;

## 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	Flow control function		
Pneumatic connection 1	M5, M7, R1/4, R1/8	M3, M5	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 6->0 bar	0 ... 420 l/min					
Adjusting element	Knurled screw	Slotted head screw		Knurled screw		
Description	<ul style="list-style-type: none"> <li>With polymer silencer</li> </ul>	<ul style="list-style-type: none"> <li>Flow control valve, flow control at both ends</li> <li>Standard or mini flow control valve</li> <li>Precision adjustment for low and medium speeds</li> <li>Connections: thread at both ends, thread/push-in connector</li> <li>Connections: L-outlet</li> <li>Metal version</li> </ul>	<ul style="list-style-type: none"> <li>Flow control valve, flow control at both ends</li> <li>In-line flow control valve</li> <li>Connections: push-in connector at both ends</li> <li>Connections: in-line, Y-shape</li> <li>Polymer design</li> </ul>			
online: ➔	<a href="#">vffk</a>	<a href="#">grlo</a>		<a href="#">gro</a>		

## Product overview

[Flow control valves >](#)

### Flow control valves



Precision flow control valves  
GRPO



Exhaust air flow control valves, flow control/silencers  
GRE, GRU

<b>Valve function</b>	Flow control function	Sound pressure control function
<b>Pneumatic connection 1</b>	G1/8, PK-3, PK-4	G1/2, G1/4, G1/8, G3/4, G3/8
<b>Standard flow rate in flow control direction 6 → 0 bar</b>	5.2 ... 129 l/min	
<b>Standard nominal flow rate in flow control direction</b>	3.8 ... 75.8 l/min	520 ... 3600 l/min
<b>Standard flow rate 6→0 bar</b>		0 ... 8000 l/min
<b>Adjusting element</b>	Rotary knob with scale	Slotted head screw
<b>Description</b>	<ul style="list-style-type: none"> <li>• Connections: threaded connection at both ends, push-in connector at both ends</li> <li>• Metal version</li> </ul>	<ul style="list-style-type: none"> <li>• Exhaust air flow control valve GRE: sintered metal</li> <li>• Flow control/silencer GRU: polymer</li> </ul>
<b>online:</b> ➔	<a href="#">grpo</a>	<a href="#">gre</a>

[Flow control valves >](#)

### Time delay valves



Time delay valves, M5 Compact System  
VLK, VZ, VZO

<b>Pneumatic connection</b>	PK-3
<b>Standard nominal flow rate</b>	60 ... 90 l/min
<b>Adjustable delay time</b>	0.25 ... 5 s
<b>Operating pressure</b>	2.5 ... 8 bar
<b>Type of mounting</b>	Either:, Front panel mounting, On mounting frame
<b>Description</b>	<ul style="list-style-type: none"> <li>• Complete system offering control components with all the functions required for pneumatic sequence control</li> <li>• For control cabinet installation</li> <li>• Fast replacement of components</li> </ul>
<b>online:</b> ➔	<a href="#">m5-compact</a>

## Proportional valves &gt;

## Flow control valves

				
<b>Proportional directional control valves MPYE</b>	<b>Proportional directional control valves VPWP</b>	<b>Proportional flow control valves VPCF</b>	<b>Piezo valves VEMP</b>	
<b>Valve function</b>	5/3 closed	5/3-way proportional directional control valve, closed	3-way proportional flow control valve	2/2-way, closed, monostable, 3/3-way, closed, monostable
<b>Pneumatic connection 1</b>	G1/4, G1/8, G3/8, M5	G1/4, G1/8, G3/8	G3/8	Flange
<b>Flow rate control range</b>			20 ... 1500 l/min	
<b>Operating pressure</b>	0 ... 10 bar	0 ... 10 bar	1 ... 10 bar	0 ... 1.7 bar
<b>Standard nominal flow rate</b>	100 ... 2000 l/min	350 ... 2000 l/min	20 ... 1500 l/min	18 ... 28 l/min
<b>Description</b>	<ul style="list-style-type: none"> <li>Controlled piston spool valve</li> <li>Analogue actuation</li> <li>Setpoint input as analogue voltage signal (0 ... 10 V)</li> <li>Suitable for servo-pneumatic applications with end-position controller SPC11</li> </ul>	<ul style="list-style-type: none"> <li>Controlled piston spool valve</li> <li>Digitally actuated</li> <li>Integrated pressure sensors for monitoring function and force control</li> <li>With auto identification</li> <li>Diagnostic function</li> <li>Integrated digital output, e.g. for a clamping/brake unit</li> <li>Suitable for servo-pneumatic applications with axis controller CPX-CMAX and end-position controller CPX-CMPX</li> </ul>	<ul style="list-style-type: none"> <li>Linear characteristic curve for easy programming</li> <li>To EU Explosion Protection Directive (ATEX)</li> <li>Highly dynamic</li> <li>Piston spool with integrated sensor</li> <li>Electrical connection via M12x1 plug, 8-pin</li> </ul>	<ul style="list-style-type: none"> <li>Very low power consumption</li> <li>Highly precise</li> <li>Integrated piezo technology</li> <li>Mounting: on sub-base, on manifold rail</li> </ul>
<b>online:</b> →	<a href="#">mpye</a>	<a href="#">vpwp</a>	<a href="#">vpcf</a>	<a href="#">vemp</a>

## Proportional valves &gt;

## Flow control valves

					<b>NEW</b>
<b>Proportional flow control valves VEMD</b>	<b>Valve units VPCB</b>	<b>Proportional directional control valves VPWS</b>	<b>Piezo valves VEAЕ</b>		
<b>Valve function</b>	2-way proportional flow control valve	3-way proportional pressure regulator	2/2 proportional directional control valve, closed	2/2-way, closed, monostable	
<b>Pneumatic connection 1</b>	Female thread M5	G3/8	Cartridge 15 mm, Cartridge 7.5 mm	Flange	
<b>Flow rate control range</b>	0 ... 20 l/min				
<b>Operating pressure</b>	0 ... 2.5 bar	4 ... 8 bar	0 ... 8 bar	0 ... 6 bar	
<b>Standard nominal flow rate</b>	0 ... 20 l/min	725 l/min		50 ... 81 l/min	
<b>NEW</b>					<ul style="list-style-type: none"> <li>New product, 7/2020</li> </ul>
<b>Description</b>	<ul style="list-style-type: none"> <li>Compact module with integrated control electronics</li> <li>Dynamic regulation with short response time</li> <li>Minimal power consumption thanks to piezo technology</li> <li>Silent: ideal for mobile applications and those close to patients</li> <li>Direct mounting via thread</li> <li>Ideal for life sciences applications</li> </ul>	<ul style="list-style-type: none"> <li>Valve unit for controlling a pneumatic cylinder in balancer applications</li> <li>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</li> <li>Diagnostic display for fast error detection</li> <li>Version for applications with safety Performance Level d</li> </ul>	<ul style="list-style-type: none"> <li>Directly actuated poppet valve</li> <li>Operating medium: air, oxygen, inert gases</li> <li>Extremely small and lightweight</li> <li>Compact and cost-effective</li> <li>Mounting: on sub-base</li> </ul>	<ul style="list-style-type: none"> <li>Silent operation</li> <li>Very low power consumption</li> <li>Integrated piezo technology</li> <li>Extremely long service life</li> <li>For use with gases, including oxygen</li> <li>Small and lightweight</li> <li>Mounting via through-holes</li> </ul>	
<b>online:</b> →	<a href="#">vemd</a>	<a href="#">vpcb</a>	<a href="#">vpws</a>	<a href="#">veae</a>	

## Product overview

### Proportional valves >

#### Pressure regulators

				
	Proportional pressure regulators MPPE	Proportional pressure regulators MPPES	Proportional pressure regulators VPPE	Proportional pressure regulators VPPM
<b>Valve function</b>	3-way proportional-pressure regulator, closed	3-way proportional-pressure regulator, closed	3-way proportional pressure regulator, 3-way proportional-pressure regulator, closed	3-way proportional pressure regulator
<b>Pneumatic connection 1</b>	G1/2, G1/4, G1/8	G1/2, G1/4, G1/8	G1/8	Sub-base, G1/2, G1/4, G1/8
<b>Pressure regulation range</b>	0 ... 10 bar	0 ... 10 bar	0.02 ... 10 bar	0.02 ... 10 bar
<b>Operating pressure</b>	0 ... 12 bar	≤12 bar	8 bar	
<b>Standard nominal flow rate</b>			310 ... 1250 l/min	380 ... 7000 l/min
<b>Description</b>	<ul style="list-style-type: none"> <li>Piloted pressure regulator</li> <li>Setpoint value input as analogue voltage or current signal</li> <li>Choice of pressure regulation ranges</li> <li>Available with setpoint module</li> <li>Electrical connection via plug, round design to DIN 45326, M16 x 0.75, 8-pin</li> </ul>	<ul style="list-style-type: none"> <li>Directly actuated (G1/8), pilot actuated (G1/4, G1/2)</li> <li>Setpoint value input as analogue voltage or current signal</li> <li>Choice of pressure regulation ranges</li> <li>Available with setpoint module</li> <li>Electrical connection via plug, round design to DIN 45326, M16 x 0.75, 8-pin</li> <li>With proportional solenoid</li> </ul>	<ul style="list-style-type: none"> <li>Piloted pressure regulator</li> <li>Setpoint input as analogue voltage signal (0 ... 10 V)</li> <li>Electrical connection via M12x1 plug, 4 or 5-pin</li> <li>Available with setpoint module</li> <li>Variant with display with three retrievable presets and digital controller electronics</li> <li>For simple control tasks</li> </ul>	<ul style="list-style-type: none"> <li>Piloted pressure regulator</li> <li>Multi-sensor control (cascade control)</li> <li>Three default presets for fast commissioning</li> <li>Integration in valve terminal MPA</li> <li>User interface with LED displays, LCD display, adjustment/selection buttons</li> <li>Integrated pressure sensor</li> <li>Electrical connection via plug connector, round design, 8-pin, M12 or terminal linking</li> </ul>
<b>online:</b> ➔	<a href="#">mppe</a>	<a href="#">mppes</a>	<a href="#">vppe</a>	<a href="#">vppm</a>

### Proportional valves >

#### Pressure regulators

			
	Proportional-pressure regulator, NPT VPPM	Proportional pressure regulators VPPE	Proportional directional control valves VPPL
<b>Valve function</b>	3-way proportional pressure regulator	3-way proportional pressure regulator	3-way proportional-pressure regulator, closed
<b>Pneumatic connection 1</b>	1/8 NPT, 1/4 NPT, 1/2 NPT	Sub-base, G1/2, G1/4, G1/8	Flange, G1/4
<b>Pressure regulation range</b>	0.02 ... 10 bar	0.1 ... 10 bar	0.2 ... 40 bar
<b>Operating pressure</b>			≤50 bar
<b>Standard nominal flow rate</b>	380 ... 7000 l/min	1400 ... 7000 l/min	300 l/min
<b>Description</b>	<ul style="list-style-type: none"> <li>Piloted pressure regulator</li> <li>Multi-sensor control (cascade control)</li> <li>Three default presets for fast commissioning</li> <li>Integration in valve terminal MPA</li> <li>User interface with LED displays, LCD display, adjustment/selection buttons</li> <li>Integrated pressure sensor</li> <li>Electrical connection via plug connector, round design, 8-pin, M12 or terminal linking</li> </ul>	<ul style="list-style-type: none"> <li>Pressure regulator with additional sensor input</li> <li>Programmable, freely adjustable PID controller</li> <li>Multi-sensor control (cascade control)</li> <li>Control characteristic adjustable via software FCT (Festo Configuration Tool)</li> <li>Integrated pressure sensor with separate output</li> <li>Pressure is maintained if the controller fails</li> </ul>	<ul style="list-style-type: none"> <li>For high-pressure applications</li> <li>Directly actuated piston regulator</li> <li>Available in three variants: flanged valve, flanged valve with external pilot air supply, in-line valve</li> </ul>
<b>online:</b> ➔	<a href="#">vppm</a>	<a href="#">vppx</a>	<a href="#">vppl</a>

## Proportional valves &gt;

## Pressure regulators

				NEW
<b>Valve function</b>	3-way proportional pressure regulator	3-way proportional pressure regulator	3-way proportional pressure regulator	
<b>Pneumatic connection 1</b>	Flange, QS-4	Flange, QS-4	G1/8	
<b>Pressure regulation range</b>	-1 ... 6 bar	0.01 ... 10 bar	-1 ... 12 bar	
<b>Operating pressure</b>			0 ... 13 bar	
<b>Standard nominal flow rate</b>	≥4.5 l/min	≥7 l/min	150 ... 1630 l/min	
<b>NEW</b>			• New product, 7/2020	
<b>Description</b>	<ul style="list-style-type: none"> <li>Silent operation</li> <li>Very low power consumption</li> <li>Highly precise</li> <li>Integrated piezo technology</li> <li>Short switching times</li> <li>Mounting: using through-holes, H-rail mounting</li> </ul>	<ul style="list-style-type: none"> <li>Silent operation</li> <li>Very low power consumption</li> <li>Highly precise</li> <li>Integrated piezo technology</li> <li>Durable</li> <li>Mounting: via through-holes, H-rail mounting, on mounting plate or sub-base</li> </ul>	<ul style="list-style-type: none"> <li>Select between three predefined and one customer-specific controller preset</li> <li>With or without display</li> <li>Low-noise, flexible and highly dynamic</li> <li>Precise and stable changeover, rapid switching of setpoint by high-performance moving coil actuator</li> <li>Control via analogue current or voltage signal, digital pattern for adjustable setpoint values or pulse-width modulation signal</li> </ul>	
online: →	<a href="#">veab</a>	<a href="#">veaa</a>	<a href="#">vppi</a>	

## Solenoid-actuated process and media valves

				
<b>Design</b>	Directly actuated poppet valve	Diaphragm valve, Force pilot operated	Diaphragm valve, servo-controlled	Angled design, Straight design with flange, Diaphragm valve
<b>Actuation type</b>	Electric	Electric	Electric	Electric
<b>Nominal size</b>	1 ... 6 mm	13.5 ... 50 mm	13 ... 50 mm	20 ... 76 mm
<b>Flow rate Kv</b>	0.06 ... 0.4 m³/h	1.8 ... 28 m³/h	1.6 ... 39 m³/h	15 ... 210 m³/h
<b>Temperature of medium</b>	-10 ... 80°C	-10 ... 80°C	-10 ... 60°C	
<b>Medium pressure</b>	0 ... 90 bar	0 ... 10 bar		0.35 ... 8 bar
<b>Process valve connection</b>	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, NPT1, NPT1 1/2, NPT1 1/4, NPT1/2, NPT1/4, NPT2, NPT3/4, NPT3/8	G1, G1 1/2, G1 1/4, G1/2, G1/4, G2, G3/4, G3/8	
<b>Description</b>	<ul style="list-style-type: none"> <li>Extensive pressure range</li> <li>Directly actuated poppet valve</li> <li>No differential pressure required</li> <li>Can also be used in vacuum technology</li> </ul>	<ul style="list-style-type: none"> <li>High flow rates</li> <li>Large nominal diameters with relatively small solenoids</li> <li>No differential pressure required</li> <li>Can also be used in vacuum technology</li> </ul>	<ul style="list-style-type: none"> <li>Brass or stainless steel casting design</li> <li>Electrical connection via solenoid armature tube</li> <li>Comprehensive range of coils</li> <li>Coil can be ordered separately</li> </ul>	<ul style="list-style-type: none"> <li>High flow rates</li> <li>For mechanically cleaning filters and dust filter systems</li> <li>Fast opening and closing times</li> <li>Sturdy pilot system</li> </ul>
online: →	<a href="#">vzwd</a>	<a href="#">vzwf</a>	<a href="#">vzwm</a>	<a href="#">vzwe</a>

## Product overview

## Solenoid-actuated process and media valves

					NEW	NEW
<b>Solenoid valves VZWP</b>	<b>Solenoid valves MN1H</b>	<b>Media separated solenoid valves VYKA</b>	<b>Media separated solenoid valves VYKB</b>			
<b>Design</b>	Piloted piston poppet valve	Diaphragm valve	Rocker valve with diaphragm seal	Electrical connection at top, Electrical connection at the side, Rocker valve with diaphragm seal		
<b>Actuation type</b>	Electric	Electric	Electric	Electric		
<b>Nominal size</b>	13 ... 25 mm	13 ... 40 mm	1.2 mm	1.6 ... 2 mm		
<b>Flow rate Kv</b>	1.5 ... 11.5 m³/h		0.013 ... 0.021 m³/h	0.034 ... 0.056 m³/h		
<b>Temperature of medium</b>	-10 ... 80°C	-10 ... 60°C	0 ... 50°C	0 ... 50°C		
<b>Medium pressure</b>	0.5 ... 40 bar	0.5 ... 10 bar			-0.75 ... 3 bar	
<b>Process valve connection</b>	1 NPT, 1/2 NPT, 1/4 NPT, 3/4 NPT, 3/8 NPT, G1, G1/2, G1/4, G3/4, G3/8	G1, G1 1/2, G1/2, G1/4, G3/4, G3/8				
<b>NEW</b>			• New product, 7/2020	New product, 5/2021		
<b>Description</b>	<ul style="list-style-type: none"> <li>• For all applications with a differential pressure of min. 0.5 bar</li> <li>• For high pressures and high flow rates with relatively small solenoids</li> <li>• For controlling gaseous and liquid media in open circuits</li> </ul>	<ul style="list-style-type: none"> <li>• Piloted diaphragm valve</li> <li>• Brass design</li> <li>• Can only be used for gaseous media</li> <li>• Adjustable closing cushioning, in-line mounting or through-hole</li> <li>• Operating voltage 24 V DC, 110/230 V AC (50 ... 60 Hz)</li> </ul>	<ul style="list-style-type: none"> <li>• Compact width of 7 mm</li> <li>• Maximum performance and precision in the smallest of spaces</li> <li>• High flow rate with small size</li> <li>• Very easy to clean thanks to media separation</li> <li>• Low media consumption thanks to small internal volume</li> <li>• FDA-listed materials</li> <li>• High-quality materials, therefore also suitable for aggressive media</li> <li>• High repetition accuracy, switching frequency and precision, therefore also suitable for extremely small volumes and dosing tasks</li> <li>• Very flexible in use thanks to 3/2-way and 2/2-way variants as well as 12 ... 26 V DC control</li> <li>• Developed according to ISO 13485</li> </ul>	<ul style="list-style-type: none"> <li>• Compact width of 10 mm or 12 mm</li> <li>• Very easy to clean thanks to media separation</li> <li>• FDA-listed materials</li> <li>• High-quality materials, therefore also suitable for aggressive media</li> <li>• Very flexible in use thanks to 3/2-way or 2/2-way variants as well as 12 or 24 V DC actuation</li> <li>• For dosing, aspirating and for continuous flow applications</li> <li>• Developed according to ISO 13485</li> </ul>		
<b>online:</b> 	<a href="#">vzwp</a>	<a href="#">mn1h-2</a>	<a href="#">vyka</a>	<a href="#">vykb</a>		

## Pneumatically and mechanically actuated process and media valves

				
<b>Angle seat valves VZXF</b>				
<b>Design</b>	Poppet valve with piston drive	Poppet valve with piston drive, Poppet valve with diaphragm actuator	Pinch valve, pneumatically actuated	2-way ball valve
<b>Valve function</b>	2/2-way, closed, monostable	2/2	2/2-way, closed, monostable, 2/2 open, single solenoid	2/2
<b>Actuation type</b>	Pneumatic	Pneumatic	Pneumatic	Mechanical
<b>Nominal size</b>	12 ... 45 mm			
<b>Nominal size DN</b>	12, 13, 16, 18, 23, 24, 29, 31, 35, 43, 45	13, 20, 25, 32, 40, 50, 65	6, 15, 25	15, 20, 25, 32, 40, 50, 65, 80, 100
<b>Process valve connection</b>			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, G1, G1/2, G1/4	Clamp to ASME-BPE, Clamp to DIN 32676 series B, Weld-on end to ASME-BPE, Weld-on end to ISO 1127
<b>Flow rate Kv</b>	3.3 ... 43 m³/h	4.6 ... 77.9 m³/h	0.7 ... 18 m³/h	3.5 ... 436.3 m³/h
<b>Standard nominal flow rate</b>				
<b>Temperature of medium</b>	-40 ... 200°C	-30 ... 200°C	-5 ... 150°C	-20 ... 200°C
<b>Medium pressure</b>	-0.9 ... 40 bar	-0.9 ... 30 bar	0 ... 6 bar	
<b>Nominal pressure process valve PN</b>	16, 40	25, 40	10	16
<b>Description</b>	<ul style="list-style-type: none"> <li>• Sturdy design</li> <li>• Stainless steel and gunmetal process valves with stainless steel, brass or aluminium actuators</li> <li>• Safety position "closing"</li> <li>• Different actuator sizes and housing materials</li> <li>• Selection of different seat and shaft seals</li> <li>• For liquids, gases and other easily contaminated media</li> <li>• Easy-to-clean design</li> </ul>	<ul style="list-style-type: none"> <li>• Highly flexible, extremely high flow rates</li> <li>• Long service life</li> <li>• Stainless steel or Ecobrass process valves with stainless steel or polymer drives</li> <li>• Modular design</li> <li>• Hygienic design, insensitive to dirt</li> <li>• Quick and easy maintenance</li> <li>• Simple and sturdy: an ideal choice for virtually all media with a viscosity of 600 mm²/s</li> <li>• High chemical and thermal resistance</li> <li>• Variants to EU Explosion Protection Directive (ATEX)</li> </ul>	<ul style="list-style-type: none"> <li>• Modular design</li> <li>• Quick and easy replacement of the diaphragm</li> <li>• For critical, abrasive and viscous media</li> <li>• Easy-to-clean design</li> <li>• Flow direction is freely selectable</li> <li>• Versions with end-position sensing</li> </ul>	<ul style="list-style-type: none"> <li>• Electropolished surfaces SF4</li> <li>• PTFE seal with little dead space</li> <li>• The high-performance ball valve for the pharmaceutical and cosmetics industry</li> <li>• FDA-compliant seal to FDA 21 CFR 177.1550</li> </ul>
<b>online:</b> ➔	vzxf	vzxa	vzqa	vzbd

## Product overview

### Pneumatically and mechanically actuated process and media valves

				
<b>Ball valves VZBE</b>				
<b>Design</b>	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
<b>Valve function</b>	2/2, 3/2	2/2	2/2, 3/2	
<b>Actuation type</b>	Mechanical	Mechanical	Mechanical	Pneumatic
<b>Nominal size</b>				
<b>Nominal size DN</b>	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
<b>Process valve connection</b>	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
<b>Flow rate Kv</b>	5 ... 435.2 m³/h	8.5 ... 2078.3 m³/h	5.9 ... 243 m³/h	5.9 ... 243 m³/h
<b>Standard nominal flow rate</b>				
<b>Temperature of medium</b>	-20 ... 200°C	-20 ... 200°C	-20 ... 130°C	-20 ... 130°C
<b>Medium pressure</b>				
<b>Nominal pressure process valve PN</b>	63	20	25, 40, 50	25, 40
<b>Description</b>	<ul style="list-style-type: none"> <li>• 2-way manual, with lockable hand lever</li> <li>• 2- and 3-way with ISO 5211 head flange, with optional lockable hand lever</li> <li>• Stainless steel design</li> <li>• Pipe thread according to ASME B1.20.1 or welded end according to ASME B16.11</li> <li>• Optionally with pre-assembled hand lever</li> </ul>	<ul style="list-style-type: none"> <li>• Flanged connections to ANSI B 16.5. class 150</li> <li>• Static discharge ensured</li> <li>• API 607 Fire Safe certification</li> <li>• Stainless steel design</li> <li>• Easy to service</li> <li>• Optionally with pre-assembled hand lever</li> </ul>	<ul style="list-style-type: none"> <li>• Brass design</li> <li>• Pipe thread to EN 10226-1</li> </ul>	<ul style="list-style-type: none"> <li>• Ball valve actuator unit with double-acting or single-acting quarter turn actuator DFPD</li> <li>• Brass ball valve</li> <li>• 2-way ball valve actuator unit with pipe thread to EN 10226-1</li> <li>• 3-way ball valve actuator unit with drilled L-hole and pipe thread to EN 10226-1</li> <li>• 3-way ball valve actuator unit with drilled T-hole and pipe thread to EN 10226-1</li> <li>• Flow is fully opened or closed in both directions</li> </ul>
<b>online:</b> 	<a href="#">vzbe</a>	<a href="#">vzbf</a>	<a href="#">vzbm</a>	<a href="#">vzbm</a>

## Pneumatically and mechanically actuated process and media valves

				
<b>Design</b>	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
<b>Valve function</b>		2/2		2/2, 3/2
<b>Actuation type</b>	Mechanical	Mechanical	Pneumatic	Mechanical
<b>Nominal size</b>				
<b>Nominal size DN</b>	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
<b>Process valve connection</b>	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
<b>Flow rate Kv</b>	5.9 ... 535 m³/h	19.4 ... 1414 m³/h	19.4 ... 1414 m³/h	7 ... 1414 m³/h
<b>Standard nominal flow rate</b>				
<b>Temperature of medium</b>	-20 ... 150°C	-10 ... 200°C	-10 ... 200°C	-10 ... 200°C
<b>Medium pressure</b>				
<b>Nominal pressure process valve PN</b>	25, 40	16, 40	16, 40	63
<b>Description</b>	<ul style="list-style-type: none"> <li>• Automatable 2-way ball valve</li> <li>• Brass design</li> <li>• Blow-out proof shaft</li> <li>• Manual operation possible using hand lever</li> <li>• Connecting thread to EN 10226-1</li> <li>• Mounting flange to ISO 5211</li> </ul>	<ul style="list-style-type: none"> <li>• Automatable 2-way compact flanged ball valve</li> <li>• Stainless steel design</li> <li>• Short installation length</li> <li>• Blow-out proof shaft</li> <li>• Manual operation possible using hand lever</li> <li>• Flange to DIN 1092-1</li> <li>• Mounting flange to ISO 5211</li> <li>• Use in zone 1, 21, 2, 22</li> </ul>	<ul style="list-style-type: none"> <li>• Ball valve actuator unit with double- or single-acting quarter turn actuator DAPS</li> <li>• Stainless steel ball valve in compact design</li> <li>• NAMUR connection pattern for solenoid valves/limit switch attachments to VDI/VDE 3845</li> <li>• Flow is fully opened or closed in both directions</li> <li>• Use in zone 1, 21, 2, 22</li> </ul>	<ul style="list-style-type: none"> <li>• Automatable 2-way or 3-way ball valve</li> <li>• Stainless steel design</li> <li>• Blow-out proof shaft</li> <li>• Manual operation possible using hand lever</li> <li>• Connecting thread to EN 10226-1</li> <li>• Mounting flange to ISO 5211</li> <li>• Use in zone 1, 21, 2, 22</li> </ul>
<b>online: ➔</b>	<b>vapb</b>	<b>vzbc</b>	<b>vzbc</b>	<b>vzba</b>

## Product overview

## Pneumatically and mechanically actuated process and media valves

					NEW
<b>Design</b>	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	
<b>Valve function</b>			2/2-way, closed, monostable	2/2-way, closed, monostable, 3/2-way, monostable, open/closed	
<b>Actuation type</b>	Pneumatic	Electric, Pneumatic	Pneumatic	Pneumatic	
<b>Nominal size</b>			13 ... 25 mm	1.6 mm	
<b>Nominal size DN</b>	8, 10, 15, 20, 25, 32, 40, 50, 65, 80, 100	15, 20, 25, 32, 40, 50, 63			
<b>Process valve connection</b>	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	
<b>Flow rate Kv</b>	7 ... 1414 m³/h			0.034 m³/h	
<b>Standard nominal flow rate</b>			2400 ... 14000 l/min		
<b>Temperature of medium</b>	-10 ... 200°C	-20 ... 150°C	-10 ... 80°C	0 ... 50°C	
<b>Medium pressure</b>			1 ... 10 bar		
<b>Nominal pressure process valve PN</b>	63	25, 40			
<b>NEW</b>					• New product, 5/2021
<b>Description</b>	<ul style="list-style-type: none"> <li>• Ball valve actuator unit with double- or single-acting quarter turn actuator DAPS</li> <li>• Stainless steel ball valve</li> <li>• NAMUR connection pattern for solenoid valves/limit switch attachments to VDI/VDE 3845</li> <li>• Flow is fully opened or closed in both directions</li> <li>• Use in zone 1, 21, 2, 22</li> </ul>	<ul style="list-style-type: none"> <li>• Ball valve actuator unit with double-acting quarter turn actuator DAPS</li> <li>• Brass ball valve</li> <li>• NAMUR connection pattern for solenoid valves/limit switch attachments to VDI/VDE 3845</li> <li>• Flow is fully opened or closed in both directions</li> </ul>	<ul style="list-style-type: none"> <li>• Poppet valve</li> <li>• Indirectly actuated</li> <li>• Brass design</li> <li>• In-line mounting</li> </ul>	<ul style="list-style-type: none"> <li>• Compact width of 10 mm</li> <li>• Very easy to clean thanks to media separation</li> <li>• FDA-listed materials</li> <li>• High-quality materials, therefore also suitable for aggressive media</li> <li>• For dosing, aspirating and for continuous flow applications</li> <li>• Developed according to ISO 13485</li> </ul>	
<b>online:</b> ➔	<a href="#">vzba</a>	<a href="#">vzpr</a>	<a href="#">vlx</a>	<a href="#">vzdb</a>	

## Piezo valves

			
<b>Proportional flow control valves VEMD</b>		<b>Piezo valves VEMP</b>	<b>Valves VEVM</b>
<b>Valve function</b>	2-way proportional flow control valve	2/2-way, closed, monostable, 3/3-way, closed, monostable	Can be allocated using the Motion App
<b>Standard nominal flow rate</b>		18 ... 28 l/min	
<b>Operating pressure</b>	0 ... 2.5 bar	0 ... 1.7 bar	3 ... 8 bar
<b>Pneumatic connection 1</b>	Female thread M5	Flange	G3/8
<b>Nominal size</b>	1.4 mm	1.3 ... 1.6 mm	4.2 mm
<b>Nominal operating voltage DC</b>	12 ... 24 V	250 ... 310 V	24 V
<b>Control range</b>	0 ... 20 l/min		
<b>Description</b>	<ul style="list-style-type: none"> <li>Compact module with integrated control electronics</li> <li>Dynamic regulation with short response time</li> <li>Minimal power consumption thanks to piezo technology</li> <li>Silent: ideal for mobile applications and those close to patients</li> <li>Direct mounting via thread</li> <li>Ideal for life sciences applications</li> </ul>	<ul style="list-style-type: none"> <li>Very low power consumption</li> <li>Highly precise</li> <li>Integrated piezo technology</li> <li>Mounting: on sub-base, on manifold rail</li> </ul>	<ul style="list-style-type: none"> <li>Functionality can be assigned via Motion app</li> <li>For Motion Terminal VTEM</li> <li>Consisting of 4 wired piezo pilot-controlled piston seat valves</li> <li>Extremely long service life</li> <li>Very low power consumption</li> <li>Low leakage with the function of a proportional-pressure regulator</li> </ul>
online: →	<a href="#">vemd</a>	<a href="#">vemp</a>	<a href="#">vevm</a>

## Piezo valves

			
	<b>Proportional-pressure regulators VEA</b>	<b>Proportional-pressure regulators VEAB</b>	<b>Piezo valves VEA</b>
<b>Valve function</b>	3-way proportional pressure regulator	3-way proportional pressure regulator	2/2-way, closed, monostable
<b>Standard nominal flow rate</b>	≥7 l/min	≥4.5 l/min	50 ... 81 l/min
<b>Operating pressure</b>			0 ... 6 bar
<b>Pneumatic connection 1</b>	Flange, QS-4	Flange, QS-4	Flange
<b>Nominal size</b>			1.2 ... 1.7 mm
<b>Nominal operating voltage DC</b>	24 V	24 V	300 V
<b>Control range</b>	0.01 ... 10 bar	-1 ... 6 bar	
<b>NEW</b>			• New product, 7/2020
<b>Description</b>	<ul style="list-style-type: none"> <li>Silent operation</li> <li>Very low power consumption</li> <li>Highly precise</li> <li>Integrated piezo technology</li> <li>Durable</li> <li>Mounting: via through-holes, H-rail mounting, on mounting plate or sub-base</li> </ul>	<ul style="list-style-type: none"> <li>Silent operation</li> <li>Very low power consumption</li> <li>Highly precise</li> <li>Integrated piezo technology</li> <li>Short switching times</li> <li>Mounting: using through-holes, H-rail mounting</li> </ul>	<ul style="list-style-type: none"> <li>Silent operation</li> <li>Very low power consumption</li> <li>Integrated piezo technology</li> <li>Extremely long service life</li> <li>For use with gases, including oxygen</li> <li>Small and lightweight</li> <li>Mounting via through-holes</li> </ul>
online: →	<a href="#">veaa</a>	<a href="#">veab</a>	<a href="#">veae</a>

NEW

## Product overview

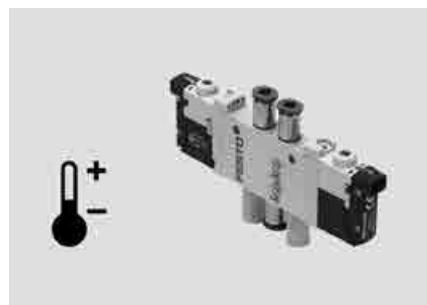
### Pneumatic control systems

			
<b>Quickstepper FSS</b>	<b>Control blocks for two-hand start ZSB</b>	<b>Pneumatic counters, M5 Compact System PZA, PZV</b>	
<b>Design</b>	Sequencer, additive		Mechanical sequence counter with pneumatic drive
<b>Actuation type</b>		Pneumatic	
<b>Pneumatic connection</b>			M5
<b>Pneumatic connection 2</b>		G1/8	
<b>Type of mounting</b>		Either:, With through-hole, Via female thread	Front panel mounting, With through-hole
<b>Operating pressure</b>	2.5 ... 6 bar	4 ... 8 bar	2 ... 8 bar
<b>Performance level (PL)</b>		Two-hand operation/category 1, Performance Level c	
<b>Description</b>	<ul style="list-style-type: none"> <li>• Pneumatic/mechanical sequencer with 12 steps and linked to start</li> <li>• Ready-to-install sequence controller</li> <li>• Feedback-controlled motion sequences</li> <li>• Quick to replace, tubing can be left in place</li> </ul>	<ul style="list-style-type: none"> <li>• Used wherever manual actuation poses a risk of accident to operating personnel</li> <li>• Safety device tested and certified in accordance with Machinery Directive 2006/42/EC and applicable standards. For more information, see <a href="http://www.festo.com/sp">www.festo.com/sp</a> &gt; "Certificates" tab</li> </ul>	<ul style="list-style-type: none"> <li>• Complete system offering control components with all the functions required for pneumatic sequence control</li> <li>• For control cabinet installation</li> <li>• Fast replacement of components</li> <li>• Available with protective cap</li> </ul>
<b>online:</b> ➔	<a href="#">fss</a>	<a href="#">zsb</a>	<a href="#">pza</a>

### Pneumatic control systems

		
<b>Timers, M5 Compact System PZVT</b>	<b>Electrical counters CCES</b>	
<b>Design</b>	Mechanical sequence counter with pneumatic drive	Electric adding counter with battery
<b>Actuation type</b>		
<b>Pneumatic connection</b>	Female thread M5	
<b>Pneumatic connection 2</b>		
<b>Type of mounting</b>	Front panel mounting	Front panel mounting
<b>Operating pressure</b>	2 ... 6 bar	
<b>Performance level (PL)</b>		
<b>Description</b>	<ul style="list-style-type: none"> <li>• Complete system offering control components with all the functions required for pneumatic sequence control</li> <li>• For control cabinet installation</li> <li>• Fast replacement of components</li> <li>• Mechanical sequence counter with pneumatic drive</li> <li>• Adjustable delay time</li> <li>• Available with protective cap</li> </ul>	<ul style="list-style-type: none"> <li>• 8-digit LCD display</li> <li>• Independent power supply</li> <li>• Connection via terminal strip</li> <li>• Reset button</li> </ul>
<b>online:</b> ➔	<a href="#">pzvt</a>	<a href="#">cces</a>

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- Modified valve sub-bases

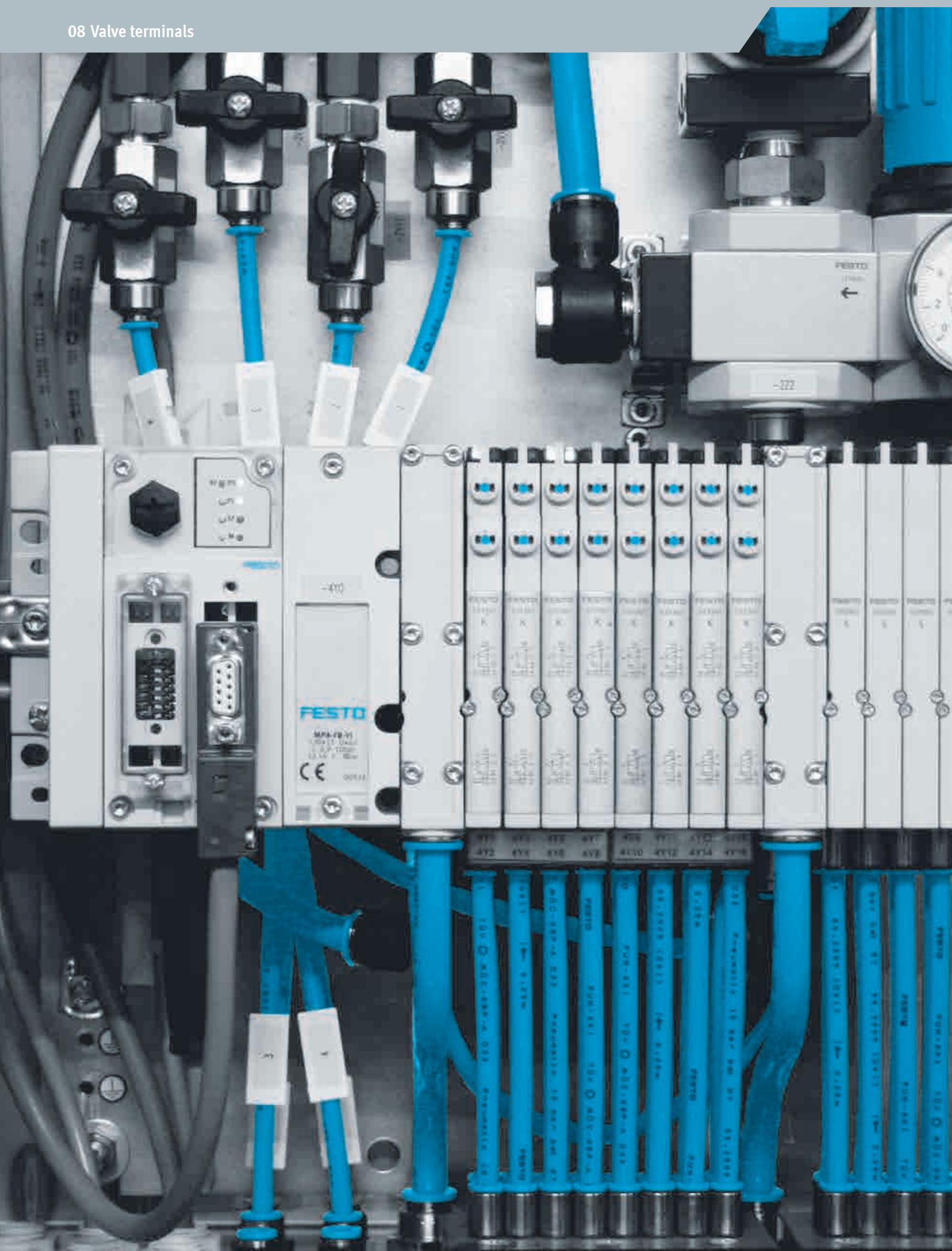
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## Product overview

## 08 Valve terminals



## Product overview

### Software tools

<b>Product Finder for valve terminals</b>		<p>Find the right valve terminal quickly with the help of the Product Finder.</p> <p>Start the Product Finder by clicking on the blue button "Product Finder" under "Products". Select the technical features on the left-hand side step-by-step; the selection of suitable products on the right-hand side is automatically updated to reflect the chosen technical features.</p> <p>The use of logic checks ensures that only correct configurations are available for selection.</p> <p>This tool can be found</p> <ul style="list-style-type: none"> <li>on our website under <a href="http://www.festo.com/catalogue">www.festo.com/catalogue</a> by clicking on the blue icon "Product Finder".</li> </ul>
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### Standards-based valve terminals

<b>Valve terminals VTSA</b>			
<b>Width</b>	18 mm, 26 mm, 42 mm, 52 mm, 65 mm	18 mm, 26 mm, 42 mm, 52 mm, 65 mm	18 mm, 26 mm, 18 mm, 26 mm
<b>Valve function</b>	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	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, 5/2-way, monostable, 5/3-way, pressurised, 5/3 exhausted, 5/3 closed
<b>Max. standard nominal flow rate</b>	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, 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
<b>Max. no. of valve positions</b>	32	32	16
<b>Electrical actuation</b>	Ethernet, Fieldbus, Multi-pin plug, Integrated controller	Ethernet, Fieldbus, Multi-pin plug, Integrated controller	Individual connection
<b>Valve terminal design</b>	Modular, valve sizes can be mixed	Modular, valve sizes can be mixed	Modular, valve sizes can be mixed
<b>Description</b>	<ul style="list-style-type: none"> <li>Conforms to ISO 15407-2/ISO 5599-2</li> <li>Multi-pin plug connection or fieldbus connection via the CPX system</li> <li>Five valve sizes can be combined on one valve terminal</li> <li>Integratable safety functions</li> </ul>	<ul style="list-style-type: none"> <li>Conforms to ISO 15407-2/ISO 5599-2</li> <li>Multi-pin plug connection or fieldbus connection via the CPX system</li> <li>Five valve sizes can be combined on one valve terminal</li> <li>Integratable safety functions</li> </ul>	<ul style="list-style-type: none"> <li>Conforms to ISO 15407-1</li> <li>Wide range of individual electrical connections</li> <li>Two valve sizes can be combined</li> <li>Standardised electrical connection: square plug type C or individual connection with M8/M12 central plug</li> </ul>
<b>online:</b> ➔	<a href="#">vtsa</a>	<a href="#">vtsa</a>	<a href="#">vtia</a>

## Universal valve terminals

				
<b>Width</b>	10 mm, 14 mm, 18 mm	10 mm, 14 mm, 18 mm	10 mm, 14 mm, 18 mm	21 mm, 26.5 mm, 31 mm
<b>Valve function</b>	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, 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
<b>Max. standard nominal flow rate</b>	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	
<b>Max. no. of valve positions</b>	16	24	24	16
<b>Electrical actuation</b>	Individual connection	Individual connection, Fieldbus, Multi-pin plug, IO-Link®, I-Port, AP interface	Fieldbus, Multi-pin plug, IO-Link®, I-Port	Individual connection
<b>Valve terminal design</b>	Fixed grid	Fixed grid	Fixed grid	Fixed grid
<b>Description</b>	<ul style="list-style-type: none"> <li>• Compact with small VUVG valves</li> <li>• Connection technology easy to change via the E-box</li> <li>• Wide range of valve functions</li> <li>• Also with semi in-line valves</li> </ul>	<ul style="list-style-type: none"> <li>• Low-cost fixed grid</li> <li>• Extremely easy assembly</li> <li>• Exchangeable electrical control</li> <li>• IO-Link® capable</li> <li>• Valves VUVG with individual electrical connection can be integrated</li> <li>• Also available with pneumatic multiple connector plate</li> <li>• Part of the VG series</li> <li>• Energy-efficient thanks to reverse operation and targeted pressure reduction</li> <li>• Optimised and space-saving variant available for installation in control cabinets</li> <li>• Variants with hot-swap connections: valves can be replaced during operation</li> </ul>	<ul style="list-style-type: none"> <li>• To EU Explosion Protection Directive (ATEX)</li> <li>• Stainless-steel-coated terminal strips for extreme corrosion resistance, suitable for control cabinets and environments up to IP69k</li> </ul>	<ul style="list-style-type: none"> <li>• Sturdy valves VUVS with long service life</li> <li>• Individual electrical connection</li> <li>• Pilot air supply in the manifold rail</li> <li>• Comprehensive range of accessories</li> </ul>
<b>online:</b> 	<a href="#">vtug</a>	<a href="#">vtug</a>	<a href="#">vtug</a>	<a href="#">vtus</a>

## Product overview

## Universal valve terminals

				
<b>Valve terminals MPA-L</b>			<b>Valve terminals VTSA-F</b>	<b>Valve terminals VTSA-F-CB</b>
<b>Width</b>	10 mm, 14 mm, 20 mm	10 mm, 14 mm, 20 mm	18 mm, 26 mm, 42 mm, 52 mm, 65 mm	18 mm, 26 mm, 42 mm, 52 mm
<b>Valve function</b>	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	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
<b>Max. standard nominal flow rate</b>	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	700 l/min at 18 mm, 1350 l/min at 26 mm
<b>Max. no. of valve positions</b>	32	24, 32, 64, 8	32	
<b>Electrical actuation</b>	Fieldbus, Multi-pin plug, IO-Link®, I-Port	AS-Interface, Fieldbus, Multi-pin plug	Ethernet, Fieldbus, Multi-pin plug, Integrated controller	Fieldbus
<b>Valve terminal design</b>	Valve sizes can be mixed	Modular, valve sizes can be mixed	Modular, valve sizes can be mixed	Modular, valve sizes can be mixed
<b>Description</b>	<ul style="list-style-type: none"> <li>• Maximum modularity</li> <li>• Single granularity</li> <li>• Polymer sub-bases</li> <li>• 3 valve sizes</li> <li>• Tamper-proof fixed flow restrictor</li> <li>• Fieldbus interface via CPX</li> <li>• IO-Link® capable</li> </ul>	<ul style="list-style-type: none"> <li>• Valve terminals for universal applications</li> <li>• High-performance valves in a sturdy metal housing</li> <li>• Metal linking</li> <li>• Two valve sizes can be combined</li> <li>• Excellent communication thanks to serial linking</li> <li>• Fieldbus interface via CPX</li> <li>• Max. 128 valves</li> </ul>	<ul style="list-style-type: none"> <li>• Flow rate-optimised valve terminal VTSA</li> <li>• Linking with increased flow rates</li> <li>• Functions like standard valve manifolds VTSA</li> </ul>	<ul style="list-style-type: none"> <li>• Previous external cabling is now unnecessary, while the installation space remains the same</li> <li>• Up to 96 valve addresses and up to four voltage zones, three of which can be safely shut off</li> <li>• For applications with increased safety requirements such as manual work stations</li> <li>• Five valve sizes can be combined on one valve terminal</li> </ul>
<b>online:</b> ➔	<a href="#">mpa-l</a>	<a href="#">mpa-s</a>	<a href="#">vtsa</a>	<a href="#">vtsa-f</a>

## Universal valve terminals

			
<b>Width</b>	18 mm, 26 mm, 42 mm, 52 mm, 65 mm	10 mm, 14 mm, 18 mm, 18 mm	10 mm
<b>Valve function</b>	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	2x2/2-way, monostable, closed, 2x2/2-way, open/closed, monostable, 2x3/2-way, monostable, closed, 2x3/2-way, open, monostable, 2x3/2-way, open/closed, monostable, 5/2 double solenoid, 5/2-way, monostable, Vacuum generator, Vacuum generator + 2/2-way, closed, monostable	2x2/2-way, monostable, closed, 2x2/2-way, open/closed, monostable, 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 closed
<b>Max. standard nominal flow rate</b>	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	400 l/min at 10 mm, 800 l/min at 14 mm, 1600 l/min at 18 mm	400 l/min at 10 mm
<b>Max. no. of valve positions</b>	32	8	8
<b>Electrical actuation</b>	Ethernet, Fieldbus, Multi-pin plug, Integrated controller	AS-Interface, CPI installation system, Individual connection, Fieldbus, Multi-pin plug	Individual connection
<b>Valve terminal design</b>	Modular, valve sizes can be mixed	Fixed grid	Fixed grid
<b>Description</b>	<ul style="list-style-type: none"> <li>Flow rate-optimised valve terminal VTSA</li> <li>Linking with increased flow rates</li> <li>Functions like standard valve manifolds VTSA</li> </ul>	<ul style="list-style-type: none"> <li>Maximum performance in the smallest of spaces</li> <li>Three sizes</li> <li>Wide range of connection and mounting options</li> <li>Multi-pin or fieldbus control</li> <li>IO-Link® capable</li> </ul>	<ul style="list-style-type: none"> <li>Intrinsically safe valve manifold assembly to ATEX category 2 (zone 1)</li> <li>Optimised for control cabinet assembly</li> <li>Optimal for pilot control of process valves</li> </ul>
<b>online:</b> →	<a href="#">vtsa</a>	<a href="#">cpv</a>	<a href="#">cpv10-ex</a>

## Universal valve terminals

		
<b>Width</b>	10 mm	12 mm, 24 mm, 12 mm, 24 mm
<b>Valve function</b>	2/2-way, closed, monostable, 3/2-way, closed, monostable, 3/2 open, single solenoid, 5/2 double solenoid, 5/2-way, monostable	3/2-way, closed, monostable, 3/2 open, single solenoid, 5/2 double solenoid, 5/2-way, monostable
<b>Max. standard nominal flow rate</b>	170 l/min at 10 mm	400 l/min at 12 mm
<b>Max. no. of valve positions</b>	16	35
<b>Electrical actuation</b>	CPI installation system, Individual connection, Fieldbus, Multi-pin plug	Fieldbus, Multi-pin plug
<b>Valve terminal design</b>	Fixed grid	Fixed grid
<b>Description</b>	<ul style="list-style-type: none"> <li>Small and compact</li> <li>High flow rate even with a compact design</li> <li>Suitable for vacuum</li> <li>Multi-pin or fieldbus control</li> </ul>	<ul style="list-style-type: none"> <li>Compact dimensions</li> <li>Poppet valves in polymer technology</li> <li>Multi-pin or fieldbus control</li> <li>IO-Link® capable</li> </ul>
<b>online:</b> →	<a href="#">cpv-sc</a>	<a href="#">vtub-12</a>

## Product overview

### Application-specific valve terminals

			
<b>Width</b>	9 mm	9 mm	14 mm, 26.8 mm
<b>Valve function</b>	2/2-way, closed, monostable	2/2-way, closed, monostable	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
<b>Nominal size DN</b>	0.8 mm	0.8 mm	
<b>Nominal width of dosing needle</b>	0.32 ... 1 mm	0.3 mm	
<b>Max. standard nominal flow rate</b>			780 l/min at 14 mm
<b>Operating pressure</b>	0 ... 0.5 bar	-0.2 ... 1 bar	-0.9 ... 8 bar
<b>Electrical connection</b>	2-wire, 9-pin, Cable, Plugs, Sub-D, Open end	2-wire, 2-pin, 2x single wires, Connection pattern L9, Cable with plug, Open end	
<b>Electrical actuation</b>			Multi-pin plug, IO-Link®, I-Port
<b>Nominal operating voltage DC</b>	24 V	24 V	24 V
<b>Max. no. of valve positions</b>			32
<b>Valve terminal design</b>			Modular and expandable
<b>Description</b>	<ul style="list-style-type: none"> <li>• Ready-to-install dosing solution saves time and costs</li> <li>• Compact 9 mm grid dimension</li> <li>• Suitable for sensitive and aggressive liquids</li> <li>• Ideally suited to non-contact dispensing and jetting of liquid media</li> <li>• Maximum dosing precision down to the microlitre range</li> <li>• Small internal volume makes it easy to rinse</li> <li>• 1- or 8-channel dispense head</li> </ul>	<ul style="list-style-type: none"> <li>• Compact 9 mm grid dimension</li> <li>• High-quality materials, therefore also suitable for aggressive media</li> <li>• Highly precise</li> <li>• 8-channel dispense head</li> <li>• Ideal for microwell plates</li> <li>• Simple design with side-by-side mounting for increased throughput</li> </ul>	<ul style="list-style-type: none"> <li>• Valve terminal in clean design</li> <li>• Easy-to-clean design</li> <li>• High corrosion resistance</li> <li>• Degree of protection IP69K</li> <li>• FDA-compliant materials</li> <li>• Redundant sealing system</li> </ul>
<b>online:</b> ➔	<a href="#">vtoe</a>	<a href="#">vtoi</a>	<a href="#">mpa-c</a>

## Application-specific valve terminals

		
<b>Valve terminals VTOC</b>		<b>Valve terminals MH1</b>
<b>Width</b>		10 mm
<b>Valve function</b>		2x3/2-way, monostable, closed
<b>Nominal size DN</b>		0.9 mm
<b>Nominal width of dosing needle</b>		
<b>Max. standard nominal flow rate</b>		10 l/min at 10 mm
<b>Operating pressure</b>		0 ... 8 bar
<b>Electrical connection</b>		
<b>Electrical actuation</b>		Multi-pin plug, IO-Link®, I-Port
<b>Nominal operating voltage DC</b>		5 V, 12 V, 24 V
<b>Max. no. of valve positions</b>		24
<b>Valve terminal design</b>		Fixed grid
<b>Description</b>		<ul style="list-style-type: none"><li>• Compact pilot valves</li><li>• Compact assembly</li><li>• Greater safety thanks to interlock function</li><li>• Multi-pin or fieldbus control</li><li>• IO-Link® capable</li></ul> <ul style="list-style-type: none"><li>• Miniaturised poppet valves</li><li>• Multi-pin or electrical individual connection</li></ul>
<b>online:</b> →	<b>vtoc</b>	<b>mh1</b>

## Product overview

### Software tools

<b>Festo Automation Suite commissioning software</b>	 <p>A quick and reliable way to a ready-to-use drive system – the Festo Automation Suite combines the parameterisation, programming and servicing of Festo components in one program and enables commissioning of the entire drive package, from the mechanical system to the controller. Perfect for designing industrial automation simply, efficiently and consistently.</p>
	<p><b>Plug-in automation system CPX-E</b></p> <ul style="list-style-type: none"> <li>• Controller programming in CODESYS as a system expansion for SoftMotion – up to robotic applications</li> <li>• Just 2 mouse clicks instead of 100: greatly simplified integration of the servo controller CMMT-AS into the control program with CPX-E-CEC</li> <li>• Conveniently install the plug-in using the software</li> </ul> <p>This tool can be found</p> <ul style="list-style-type: none"> <li>• on our website at <a href="http://www.festo.com/AutomationSuite">www.festo.com/AutomationSuite</a></li> </ul>

### Electrical peripherals

	 <b>Automation systems CPX-AP-I</b>	 <b>Terminal CPX</b>	 <b>Fieldbus modules CTEU</b>	 <b>CPI installation systems CTEC</b>
<b>Protocol</b>	IO-Link®		AS-Interface, CANopen, CC-Link, CPI-B, DeviceNet, EtherCAT, EtherNet/IP, PROFINET, Modbus® TCP, PROFIBUS DP	
<b>Electrical actuation</b>		Fieldbus, Integrated controller		Fieldbus, Integrated controller
<b>Max. address capacity, inputs</b>	244 ... 2048 Byte	64 Byte	2 ... 64 Byte	
<b>Maximum address volume for outputs</b>	244 ... 2048 Byte	64 Byte	2 ... 64 Byte	
<b>Parameterisation</b>		Diagnostic behaviour, Fail-safe response, Forcing of channels, Signal setup	Activate diagnostics, Diagnostic behaviour, Fail-safe and idle response, Fail-safe response, IO-Link mode, Watchdog disable, Watchdog enable	
<b>Degree of protection</b>	IP65, IP67	IP65, IP67	IP65, IP67	IP65, IP67
<b>Nominal operating voltage DC</b>		24 V	24 ... 30 V	24 V
<b>Operating voltage range DC</b>		18 ... 30 V	18 ... 31.6 V	
<b>Description</b>	<ul style="list-style-type: none"> <li>• Simple integration into the controller of your choice: PROFINET, PROFIBUS, EtherCAT®, EtherNet/IP, ModbusTCP</li> <li>• Powerful remote I/O system that flexibly links 80 modules at a data rate of 200 Mbaud in real-time</li> <li>• Cable lengths of up to 50 m between every module enable vast system dimensions</li> <li>• Real-time capability and deterministic system behaviour enable cycle times of up to 250 µs</li> <li>• The IO-Link master and parameterisation software enable simple integration of any IO-Link® devices</li> <li>• Ethernet performance up to the valve terminal and digital as well as analogue input/output modules</li> <li>• Seamless connectivity along with advanced diagnostics option increase the machine availability and productivity</li> </ul>	<ul style="list-style-type: none"> <li>• Automation platform</li> <li>• Open to all common fieldbus protocols and Ethernet</li> <li>• Integrated diagnostic and maintenance functions</li> <li>• Can be used as stand-alone remote I/O or with valve terminals MPA-S, MPA-L, VTSA/VTSA-F</li> <li>• Choice of polymer or metal interlinking block with individual linking</li> <li>• Analogue inputs and outputs, 2-way/4-way, with optional HART protocol</li> </ul>	<ul style="list-style-type: none"> <li>• For valve terminals VTUB-12, VTUG, MPA-L, CPV, VTOC</li> <li>• Can be expanded into the installation system CTEL</li> <li>• Fieldbus-typical LEDs, interfaces and switching elements</li> <li>• Isolated power supply for electronics and valves</li> </ul>	<ul style="list-style-type: none"> <li>• CPX master module for four CPI strings</li> <li>• Combination of centralised and decentralised installation possible</li> <li>• Decentralised pneumatic components and sensors for fast processes</li> <li>• Can be connected to valve terminal CPV, MPA-S, CPV-SC</li> </ul>
<b>online:</b> ➔	<a href="http://cpx-ap">cpx-ap</a>	<a href="http://cpx">cpx</a>	<a href="http://cteu">cteu</a>	<a href="http://ctec">ctec</a>

## Electrical peripherals

				
<b>Protocol</b>				I-Port, IO-Link®
<b>Electrical actuation</b>	Fieldbus, Integrated controller	Fieldbus, Integrated controller		
<b>Max. address capacity, inputs</b>	64 Byte	64 Byte		32 Byte
<b>Maximum address volume for outputs</b>	64 Byte	64 Byte		32 Byte
<b>Parameterisation</b>		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
<b>Degree of protection</b>	IP20	IP20, IP65	IP65/IP67 (when fully plugged-in or fitted with protective cover)	IP65, IP67
<b>Nominal operating voltage DC</b>		24 V	Sensors 24 V	24 V
<b>Operating voltage range DC</b>				18 ... 30 V
<b>Description</b>	<ul style="list-style-type: none"> <li>Modern control system with high performance</li> <li>Fieldbus master interfaces, EtherCAT® master, fieldbus slave interfaces, PROFINET, EtherNet/IP, PROFIBUS, EtherCAT® digital input modules (16DI), digital output modules (8DO/0.5A)</li> <li>Analogue input modules (current, voltage), analogue output modules (current, voltage)</li> <li>Modern programming with CoDeSys V3 to IEC 61131-3</li> <li>Integration of SoftMotion functions (SoftMotion)</li> <li>Compact I/O assembly</li> <li>Easy mounting of the control system</li> </ul>	<ul style="list-style-type: none"> <li>Use of matching remote I/O and valve terminals in a control cabinet</li> <li>Combination with modules of the electrical terminal CPX, which can then be used for hybrid applications</li> <li>Unique modular structure</li> <li>Comprehensive integrated diagnostic and service functions</li> <li>Analogue inputs and outputs with HART protocol</li> </ul>	<ul style="list-style-type: none"> <li>Accessories for the AS-Interface installation system</li> <li>Compact I/O modules (IP65, IP67)</li> </ul>	<ul style="list-style-type: none"> <li>CPX-CTEL master module with 4 I-Port connections</li> <li>Decentralised pneumatic components and sensors for fast processes</li> <li>Standardised M12 connections</li> </ul>
<b>online:</b> ➔	<a href="#">cpx-e</a>	<a href="#">cpx-p</a>	<a href="#">as-interface</a>	<a href="#">cpx-ctel</a>

## Customised components – for your specific requirements



### Valve terminals with customised designs

Can't find the valve terminal 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](http://www.festo.com/contact)

## Product overview

## 09 Motion Terminal



## Product overview

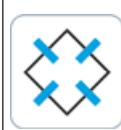
### Motion Terminal



**Motion Terminal  
VTEM**

<b>Valve terminal design</b>	Fixed grid
<b>Grid dimension</b>	28 mm
<b>Max. no. of valve positions</b>	8
<b>Standard nominal flow rate, exhaust 6-&gt;5 bar</b>	480 l/min
<b>Pneumatic connection 1</b>	G3/8
<b>Operating pressure</b>	3 ... 8 bar
<b>Pilot pressure</b>	3 ... 8 bar
<b>Actuation type</b>	Electric
<b>Nominal operating voltage DC</b>	24 V
<b>Temperature of medium</b>	5 ... 50°C
<b>Description</b>	<ul style="list-style-type: none"> <li>• Many functions in one component – thanks to apps</li> <li>• Combines the benefits of electric and pneumatic components</li> <li>• Maximum standardisation</li> <li>• Reduced complexity and time to market</li> <li>• Increasing profitability and know-how protection</li> <li>• Minimal installation effort</li> <li>• Increased energy efficiency</li> </ul>
<b>online:</b> ➔	<a href="#">vtem</a>

### Motion Apps



**Motion Apps  
GAMM**

<b>Description</b>	<ul style="list-style-type: none"> <li>• Open and closed-loop control programs for valves VEVM</li> <li>• A new dimension in flexibility thanks to Motion Apps – a single valve with a wide range of different functions</li> <li>• Accelerated engineering processes</li> <li>• Short response times without the need to adapt the hardware</li> <li>• Reduced system complexity</li> <li>• Shorter time to market for your application</li> </ul>
<b>online:</b> ➔	<a href="#">gamm</a>

## 10 Sensors



## Product overview

### Software tools

<b>Configurator</b> 	<p>Design a product with numerous features reliably and quickly with the help of the configurator.</p> <p>Select all the required product features step-by-step. The use of logic checks ensures that only correct configurations are available for selection.</p> <p>A dynamic graphic generated on the basis of the configuration provides a visual aid for selecting the correct product features.</p> <p>The configurator is part of the electronic catalogue and is not available as a separate software program.</p>
<b>Festo Design Tool 3D</b> 	<p>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.</p> <p>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.</p> <p>This tool can be found      ➔ <a href="http://www.festo.com/x/festo-design-tool">www.festo.com/x/festo-design-tool</a></p>

#### Proximity switches >

### Proximity switches for T-slot

	Proximity sensors SMT-8M-A	Proximity sensors SME-8, SME-8M	Proximity sensors SDBT	Proximity sensors SMT-8-SL, SMT-8G
<b>Electrical connection</b>	2-wire, 3-wire, 3-pin, Cable, Cable with plug, Plugs, M8x1			
<b>Electrical connection, connection type</b>	Cable, Cable with plug	Cable, Cable with plug	Cable, Cable with plug	Cable, Cable with plug, Plugs
<b>Electrical connection, connection technology</b>	M12x1, A-coded to EN 61076-2-101, 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	M12x1, A-coded to EN 61076-2-101, Open end	M8x1, A-coded, to EN 61076-2-104, Open end
<b>Electrical connection, number of pins/wires</b>	2, 3, 4	2, 3	2, 3	3
<b>Operating voltage range DC</b>	5 ... 30 V	0 ... 230 V	7.5 ... 30 V	10 ... 30 V
<b>Switching element function</b>	N/C contact, N/C or N/O contact, switchable, N/O contact	N/C contact, N/O contact	NAMUR, N/O contact	N/O contact
<b>Switching output</b>	NPN, PNP, PNP/NPN, switchable, Non-contacting, 2-wire	Contacting, bipolar, Without LED function	NAMUR, NPN, PNP, Non-contacting, 2-wire	NPN, PNP
<b>Description</b>	<ul style="list-style-type: none"> <li>Measuring principle: magneto-resistive</li> <li>Short design</li> <li>Variants to EU Explosion Protection Directive (ATEX)</li> <li>Inserted in the slot from above, flush with the cylinder profile</li> <li>LED switching status indication</li> <li>LED operating reserve indication</li> <li>Cable length 0.1 ... 30 m</li> </ul>	<ul style="list-style-type: none"> <li>Measuring principle: magnetic Reed</li> <li>SME-8-...-S6: heat-resistant design</li> <li>Variants suitable for use with energy chains and robots</li> <li>Screw-clamped or clamped in the slot, insertable in the slot from above or lengthwise</li> <li>LED switching status indication</li> <li>Cable length 0.3 ... 5 m</li> </ul>	<ul style="list-style-type: none"> <li>Measuring principle: magneto-resistive</li> <li>Oil-resistant, welding field immune, resistant to welding spatter</li> <li>Insertable in the slot from above, screw-clamped</li> <li>LED switching status indication</li> <li>Cable length 0.3 ... 5 m</li> <li>SDBT-EX6: to EU Explosion Protection Directive (ATEX)</li> </ul>	<ul style="list-style-type: none"> <li>Measuring principle: magneto-resistive</li> <li>SMT-8G: design ideal for gripper sensing</li> <li>SMT-8-SL: sturdy thanks to long guides and plug directly on the sensor</li> <li>Variants suitable for use with energy chains and robots</li> <li>Insertable in the slot lengthwise or from above</li> <li>LED switching status indication</li> <li>Cable length 0.3, 2.5, 5, 7.5, 0.2 ... 10 m</li> </ul>
<b>online:</b> ➔	smt-8m	sme-8	sdbt	smt-8

## Proximity switches &gt;

## Proximity switches for T-slot

			
	<b>Proximity sensors CRSMT-8M</b>	<b>Proximity sensors SMEO-8E</b>	<b>Proximity sensors SMT0-8E</b>
<b>Electrical connection</b>		2-wire, 3-pin, Cable, Plugs, M8x1	
<b>Electrical connection, connection type</b>	Cable, Cable with plug	Plugs	Plugs
<b>Electrical connection, connection technology</b>	M8x1, A-coded, to EN 61076-2-104, Open end	M12x1, A-coded to EN 61076-2-101	M12x1, A-coded to EN 61076-2-101, M8x1, A-coded, to EN 61076-2-104
<b>Electrical connection, number of pins/wires</b>	3	3	3
<b>Operating voltage range DC</b>	5 ... 30 V	0 ... 250 V	10 ... 30 V
<b>Switching element function</b>	N/O contact	N/O contact	N/O contact
<b>Switching output</b>	PNP	Contacting, Contacting, bipolar, Without LED function	NPN, PNP
<b>Description</b>	<ul style="list-style-type: none"> <li>Measuring principle: magneto-resistive</li> <li>Corrosion-resistant design</li> <li>Food-safe (see <a href="http://www.festo.com/sp/crsmt-8">www.festo.com/sp/crsmt-8</a> -&gt; "Certificates" tab), resistant to acids and cooling lubricants</li> <li>Insertable in the slot lengthwise, flush with the cylinder profile</li> <li>LED switching status indication</li> <li>Cable length 0.3, 5 m, 10 m</li> </ul>	<ul style="list-style-type: none"> <li>Measuring principle: magnetic reed</li> <li>Sturdy sensor in block design</li> <li>Plug integrated in housing</li> <li>LED switching status indication</li> <li>Cable length 2.5 m</li> </ul>	<ul style="list-style-type: none"> <li>Measuring principle: magneto-resistive</li> <li>Sturdy sensor in block design</li> <li>Plug integrated in housing</li> <li>LED switching status indication</li> </ul>
<b>online:</b> →	<a href="#">crsmt-8m</a>	<a href="#">smeo</a>	<a href="#">smto</a>

## Proximity switches &gt;

## Proximity switches for T-slot

		
	<b>Proximity sensors SMT0-8E</b>	<b>Proximity sensors SMPO-8E</b>
<b>Electrical connection</b>	3-pin, Plugs, M12x1	
<b>Electrical connection, connection type</b>	Plugs	
<b>Electrical connection, connection technology</b>	M12x1, A-coded to EN 61076-2-101	
<b>Electrical connection, number of pins/wires</b>	3	
<b>Operating voltage range DC</b>	10 ... 30 V	
<b>Switching element function</b>	N/O contact	
<b>Switching output</b>	NPN, PNP	
<b>Description</b>	<ul style="list-style-type: none"> <li>Measuring principle: magneto-inductive</li> <li>Welding field resistant design</li> <li>Sturdy sensor in block design</li> <li>Plug integrated in housing</li> <li>LED switching status indication</li> </ul>	<ul style="list-style-type: none"> <li>Measuring principle: magnetic</li> <li>Pneumatic proximity sensor</li> <li>Function: 3/2-way valve, normally closed</li> <li>Pneumatic connection via female thread M5</li> <li>Visual switching status indication</li> </ul>
<b>online:</b> →	<a href="#">smt0</a>	<a href="#">smpo</a>

## Product overview

### Proximity switches >

#### Proximity switches for round slot

				NEW
<b>Proximity sensors SME-10, SME-10M</b>		<b>Proximity sensors SMT-10M, SMT-10G</b>		
<b>Electrical connection</b>	3-wire, 3-pin, Cable, Cable with plug, M8x1			
<b>Electrical connection, connection type</b>	Cable, Cable with plug	Cable, Cable with plug	Cable, Cable with plug	
<b>Electrical connection, connection technology</b>	M12x1, A-coded to EN 61076-2-101, 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	M12x1, A-coded to EN 61076-2-101, M8x1, A-coded, to EN 61076-2-104, Open end	
<b>Electrical connection, number of pins/wires</b>	2, 3	2, 3		
<b>Operating voltage range DC</b>	5 ... 30 V	5 ... 30 V	5 ... 30 V	
<b>Switching element function</b>	N/O contact	N/O contact	N/O contact	
<b>Switching output</b>	Contacting, bipolar	NPN, PNP, Non-contacting, 2-wire	NPN, PNP, Non-contacting, 2-wire	
				New product, 05/2021
<b>Description</b>	<ul style="list-style-type: none"> <li>Measuring principle: magnetic reed</li> <li>Clamped in C-slot, insertable in the slot from above or lengthwise</li> <li>LED switching status indication</li> <li>Cable length 0.3, 2.5 m</li> </ul>	<ul style="list-style-type: none"> <li>Measuring principle: magneto-resistive</li> <li>Clamped in C-slot, insertable in the slot from above or lengthwise</li> <li>LED switching status indication</li> <li>Cable length 0.3, 2.5 m</li> </ul>	<ul style="list-style-type: none"> <li>Measuring principle: magneto-resistive</li> <li>Insertable in the slot from above, screw-clamped</li> <li>LED switching status indication</li> <li>Cable length 0.3, 2 m</li> </ul>	
<b>online: ➔</b>	<a href="#">sme-10</a>	<a href="#">smt-10</a>	<a href="#">sdhc</a>	

### Proximity switches >

#### Proximity switches with block design

				
<b>Proximity sensors SME-1</b>		<b>Proximity sensors SMT-C1</b>		<b>Proximity sensors SMEO-1</b>
<b>Electrical connection</b>	2-wire, 3-wire, 3-pin, Cable, Plugs, M8x1	3-wire, 3-pin, Cable, Cable with plug, Rotatable thread, M8x1, M12x1	2-wire, 3-wire, 3-pin, Cable, Plugs, M8x1	
<b>Operating voltage range DC</b>	0 ... 200 V	10 ... 30 V	0 ... 200 V	
<b>Switching element function</b>	N/O contact	N/O contact	N/O contact	
<b>Switching output</b>	Contacting, bipolar	PNP	Contacting, bipolar	
<b>Description</b>	<ul style="list-style-type: none"> <li>Measuring principle: magneto-inductive</li> <li>For mounting kit</li> <li>With or without LED switching status indication</li> </ul>	<ul style="list-style-type: none"> <li>Measuring principle: magneto-inductive</li> <li>For clean design, standards-based cylinder DSBF with mounting rail for sensors</li> <li>LED switching status indication</li> </ul>	<ul style="list-style-type: none"> <li>Measuring principle: magnetic reed</li> <li>SMEO-1-S6: heat-resistant design</li> <li>With or without LED switching status indication</li> <li>Cable length 2.5, 5 m</li> </ul>	
<b>online: ➔</b>	<a href="#">sme-1</a>	<a href="#">smt-c1</a>	<a href="#">smeo-1</a>	

## Proximity switches &gt;

## Proximity switches with block design

			
	<b>Proximity sensors SMT0-1</b>	<b>Proximity sensors SMTSO-1</b>	<b>Proximity sensors SMPO-1</b>
<b>Electrical connection</b>	3-wire, 3-pin, Cable, Plugs, M8x1	3-pin, Plugs, M12x1	
<b>Operating voltage range DC</b>	10 ... 30 V	10 ... 30 V	
<b>Switching element function</b>	N/O contact	N/O contact	
<b>Switching output</b>	NPN, PNP	PNP	
<b>Description</b>	<ul style="list-style-type: none"> <li>Measuring principle: magneto-resistive</li> <li>LED switching status indication</li> <li>Cable length 2.5 m</li> </ul>	<ul style="list-style-type: none"> <li>Measuring principle: magneto-resistive</li> <li>Welding field resistant design</li> <li>LED switching status indication</li> </ul>	<ul style="list-style-type: none"> <li>Measuring principle: magnetic</li> <li>Pneumatic proximity sensor</li> <li>Function: 3/2-way valve, normally closed</li> <li>Pneumatic connection via barbed fitting for tubing I.D. 3 mm</li> <li>Visual switching status indication</li> </ul>
<b>online: →</b>	<a href="#">smto-1</a>	<a href="#">smtso-1</a>	<a href="#">smpo</a>

## Proximity switches &gt;

## Cylinder signal generators

	
	<b>Cylinder signal generators PPL</b>
<b>Standard nominal flow rate</b>	48 l/min
<b>Operating pressure</b>	1 ... 8 bar
<b>Pneumatic connection</b>	Barbed fitting for 3 mm plastic tubing
<b>Type of mounting</b>	Hollow bolt G1/8, G1/4
<b>Description</b>	<ul style="list-style-type: none"> <li>For contactless pneumatic signal generation at the end of cylinder strokes</li> <li>Function: 3/2-way valve, normally closed</li> <li>Can be screwed directly into the supply port of the cylinder using a hollow bolt</li> </ul>
<b>online: →</b>	<a href="#">ppl</a>

## Product overview

## Inductive sensors

			
<b>Proximity switch SIEH</b>			
<b>Size</b>	4 mm, 6.5 mm, M12, M12x1, M18, M18x1, M30, M30x1.5, M5x0.5, M8x1	M12, M18, M30	40x40x65 mm, M12, M18, M30, M8
<b>Switching output</b>	NPN, PNP	Non-contacting, 2-wire	NPN, PNP
<b>Switching element function</b>	N/C contact, N/O contact	N/C contact, N/O contact	Antivalent, N/O contact
<b>Electrical connection</b>	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
<b>Operating voltage range DC</b>	10 ... 30 V	10 ... 320 V	10 ... 65 V
<b>Description</b>	<ul style="list-style-type: none"> <li>With standard switching distance</li> <li>For DC voltage</li> <li>Round design</li> <li>Metric thread</li> <li>Flush or non-flush mounting</li> <li>LED switching status indication</li> <li>Design with metal or polyamide housing</li> </ul>	<ul style="list-style-type: none"> <li>With standard switching distance</li> <li>For DC and AC voltage</li> <li>Metric thread</li> <li>Flush or non-flush mounting</li> <li>LED switching status indication</li> <li>Design with metal or polyamide housing</li> </ul>	<ul style="list-style-type: none"> <li>Reduction factor 1 for all metals</li> <li>Welding field immune</li> <li>Design with housing resistant to welding spatter</li> <li>Flush, partially flush or non-flush mounting</li> <li>LED switching status indication</li> </ul>
<b>online:</b> ➔	sien	sied	sief

## Inductive sensors

			
<b>Proximity switch SIEH</b>			
<b>Size</b>	3 mm, M12, M18	8x8x59 mm, 12x26x40 mm, 15x20x30 mm, 40x40x120 mm, 5x5x25 mm, 8x8x40 mm	Slot 8
<b>Switching output</b>	NPN, PNP	NPN, PNP	NPN, PNP
<b>Switching element function</b>	N/C contact, N/O contact	Antivalent, N/C contact, N/O contact	N/C contact, N/O contact
<b>Electrical connection</b>	3-wire, 3-pin, Cable, Cable with plug, Plugs, M8x1, M12x1	3-wire, 3-pin, Cable, Screw terminal, Plugs, M8x1	3-wire, 3-pin, Cable, Cable with plug, Rotatable thread, M8x1
<b>Operating voltage range DC</b>	10 ... 30 V	10 ... 30 V	10 ... 30 V
<b>Description</b>	<ul style="list-style-type: none"> <li>With increased sensing distance</li> <li>Flush mounting</li> <li>Metric thread</li> <li>LED switching status indication</li> <li>Design with stainless steel housing</li> </ul>	<ul style="list-style-type: none"> <li>Block design</li> <li>Flush mounting</li> <li>LED switching status indication</li> </ul>	<ul style="list-style-type: none"> <li>Ideally suited for position sensing for electric axes and grippers with T-slot</li> <li>Flush mounting</li> <li>Switching status indication with 2 LEDs for better visibility regardless of the direction from which it is approached</li> <li>Single inductive sensor for 8 slot with patented LED status indicator</li> </ul>
<b>online:</b> ➔	sieh	sies	sies

## Position sensors

				
<b>Design type</b>	For T-slot	For T-slot	Round	For T-slot
<b>Sensing range</b>	0 ... 160000 µm	≤ 52000 µm	> 270 deg	0 ... 160000 µm
<b>Analogue output</b>	4 - 20 mA	50 mA	50 mA	100 mA, 4 - 20 mA
<b>Electrical connection, connection type</b>	Cable with plug	Cable, Cable with plug	Cable with plug	Cable with plug
<b>Electrical connection, connection technology</b>	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	M8x1, A-coded, to EN 61076-2-104
<b>Electrical connection, occupied pins/wires</b>	4	4	4	4
<b>Electrical connection</b>				
<b>Description</b>	<ul style="list-style-type: none"> <li>Only for use with Festo Motion Terminal VTEM</li> <li>Measuring principle: magnetic Hall</li> <li>Insertable in the slot from above, screw-clamped</li> <li>Suitable for use with energy chains and robots</li> <li>LED status indicator</li> <li>Cable length 0.3 m</li> </ul>	<ul style="list-style-type: none"> <li>Very compact design makes the unit especially well suited to work with grippers, compact cylinders and any application in a tight space</li> <li>Measuring principle: magnetic Hall</li> <li>Suitable for T-slot</li> <li>LED status indicator</li> <li>Suitable for use with energy chains and robots</li> <li>Cable length 0.3, 2.5 m</li> </ul>	<ul style="list-style-type: none"> <li>Used to detect rotation of the shaft on rotary drives DRVS and DSM</li> <li>Sensor can be quickly mounted without having to manually search for switching points</li> <li>Simple and reliable operation using just one pushbutton directly on the device</li> </ul>	<ul style="list-style-type: none"> <li>Measuring principle: magnetic Hall</li> <li>Insertable in the slot from above, screw-clamped</li> <li>Suitable for use with energy chains and robots</li> <li>LED status indicator</li> <li>Cable length 0.3 m</li> <li>Programmable IO-Link®/ switching output</li> </ul>
<b>online:</b> ➔	<a href="#">sdap</a>	<a href="#">sdas</a>	<a href="#">srbs</a>	<a href="#">sdat</a>

## Position sensors

			
<b>Design type</b>	For T-slot	For T-slot	For grippers
<b>Sensing range</b>	48 ... 52 mm	52000 µm	
<b>Analogue output</b>	0 - 10 VV, 4 - 20 mA	0 ... 10 V	
<b>Electrical connection, connection type</b>	Cable with plug, Plugs	Cable with plug, Plugs	
<b>Electrical connection, connection technology</b>	M8x1, A-coded, to EN 61076-2-104	M8x1, A-coded, to EN 61076-2-104	
<b>Electrical connection, occupied pins/wires</b>	4	4	
<b>Electrical connection</b>			4-pin, Cable with plug, M8x1
<b>Description</b>	<ul style="list-style-type: none"> <li>Measuring principle: magnetic Hall</li> <li>Current and voltage signal at the analogue output</li> <li>Insertable in the slot lengthwise</li> <li>Suitable for use with energy chains and robots</li> <li>LED status indicator</li> <li>Cable length 2.5, 5 m</li> </ul>	<ul style="list-style-type: none"> <li>Measuring principle: magnetic Hall</li> <li>Displacement-proportional analogue output signal</li> <li>Insertable in the slot, central clamping</li> <li>Suitable for use with energy chains and robots</li> <li>LED status indicator</li> <li>Cable length 0.3 m</li> </ul>	<ul style="list-style-type: none"> <li>Measuring principle: magnetic Hall</li> <li>3 gripper positions can be detected using an evaluation unit</li> <li>Freely selectable switching points</li> </ul>
<b>online:</b> ➔	<a href="#">smat-8e</a>	<a href="#">smat-8m</a>	<a href="#">smh-s1</a>

## Product overview

### Displacement encoders

			
<b>Stroke</b>	225 ... 2000 mm	225 ... 2000 mm	100 ... 750 mm
<b>Measuring principle of displacement encoder</b>	Digital	Analogue	Analogue
<b>Output signal</b>	CAN protocol type SPC-AIF	Analogue	Analogue
<b>Displacement resolution</b>	<0.01 mm	0.01 mm	0.01 mm
<b>Electrical connection</b>	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
<b>Description</b>	<ul style="list-style-type: none"> <li>Measuring principle: magnetostrictive</li> <li>Contactless with absolute measurement</li> <li>High travel speed</li> <li>System product for servo-pneumatic positioning technology and Soft Stop</li> <li>Degree of protection IP65</li> </ul>	<ul style="list-style-type: none"> <li>Conductive plastic potentiometer</li> <li>Absolute measurement with high resolution</li> <li>High travel speed and long service life</li> <li>Plug-in connections</li> </ul>	<ul style="list-style-type: none"> <li>Connecting rod potentiometer</li> <li>Absolute measurement with high resolution</li> <li>Long service life</li> <li>Degree of protection IP65</li> <li>Plug-in connections</li> </ul>
<b>online:</b> ➔	mme	mlo	mlo

### Pressure and vacuum sensors

				
<b>Pressure measuring range</b>	-1 ... 10 bar	-1 ... 16 bar	-1 ... 10 bar	-1 ... 16 bar
<b>Switching element function</b>	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
<b>Switching output</b>	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
<b>Pneumatic connection</b>	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
<b>Electrical connection</b>	3-wire, 3-pin, Cable, Plugs, To EN 60947-5-2, Round design, M8x1	Plug, 4-pin, square design	3-wire, Cable, Open end	
<b>Display type</b>		Illuminated LCD	LED indicator, 2-digit	Illuminated LCD, LED
<b>Description</b>	<ul style="list-style-type: none"> <li>Programmable and configurable pressure switch for simple pressure sensing tasks</li> <li>Threshold/window comparator</li> <li>Switching point adjustment via teach-in function</li> <li>Integrated microprocessor</li> <li>Switching status indicated by an LED visible from all sides</li> <li>Certification: c UL us listed (OL), C-Tick</li> </ul>	<ul style="list-style-type: none"> <li>For monitoring compressed air and non-corrosive gases</li> <li>For network monitoring, regulator monitoring, leak testing, object detection</li> <li>Relative measurement method based on a piezoresistive measuring cell</li> <li>Serial communication integrated using IO-Link® 1.1</li> <li>Compact design 30x30 mm</li> <li>High-contrast display with blue backlight</li> </ul>	<ul style="list-style-type: none"> <li>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</li> <li>Display of minimum and maximum measured value</li> <li>All parameters entered can be transferred to other SPAEs (replicating function)</li> <li>Communication interface IO-Link®</li> </ul>	<ul style="list-style-type: none"> <li>For monitoring compressed air and non-corrosive gases</li> <li>With or without display</li> <li>Transfer of the pressure value as switching signal, analogue signal or via IO-Link® to the connected control system</li> <li>Maximum versatility thanks to a wide range of pneumatic adaptations and switchable electrical outputs</li> </ul>
<b>online:</b> ➔	sde5	span	spae	spau

## Pressure and vacuum sensors

				
	<b>Pressure sensors SPAW</b>	<b>Pressure switches SPBA</b>	<b>Pressure transmitters SPTE</b>	<b>Pressure transmitters SPTW</b>
<b>Pressure measuring range</b>	-1 ... 100 bar		-1 ... 10 bar	-1 ... 100 bar
<b>Switching element function</b>	Switchable	Antivalent, Changeover switch		
<b>Switching output</b>	2xNPN, 2xPNP	2xPNP, Contacting		
<b>Pneumatic connection</b>	Female thread G1/4, Male thread G1/2	G1/8	Flange, Cartridge 10 mm, Push-in sleeve QS-4, QS-6, QS-3, QS-4	G1/4
<b>Electrical connection</b>	4-pin, 5-pin, Plugs, To EN 60947-5-2, Round design, M12x1	4-pin, Plugs, To EN 60947-5-2, Round design, M12x1	3-wire, Cable, Open end	4-pin, Plugs, To EN 60947-5-2, Round design, M12x1
<b>Display type</b>	4-place alphanumeric, LED indicator			
<b>Description</b>	<ul style="list-style-type: none"> <li>Extremely sturdy</li> <li>For liquid and gaseous media</li> <li>Quick and easy adjustment of the switching outputs using three pushbuttons</li> <li>Optimal legibility: display housing rotatable 320°, display at an angle of 45°</li> </ul>	<ul style="list-style-type: none"> <li>Pressure sensor with permanently set switching point</li> <li>For solenoid valve VSVA</li> <li>Mounting: screw-in</li> </ul>	<ul style="list-style-type: none"> <li>Piezoresistive pressure sensor</li> <li>Measured variable: relative pressure</li> <li>Cable length 2.5 m</li> <li>Compact: 8-bracket wall mount for manifold mounting</li> </ul>	<ul style="list-style-type: none"> <li>Sensor versions: piezoresistive pressure sensor or metal thin-film pressure sensor</li> <li>Measured variable: relative pressure</li> <li>Operating medium: liquid media and gaseous media</li> <li>Seal-free: pressure measuring cell and interfaces in stainless steel</li> <li>Degree of protection IP67</li> </ul>
online: ➔	<a href="#">spaw</a>	<a href="#">spba</a>	<a href="#">spte</a>	<a href="#">sptw</a>

## Pressure and vacuum sensors

			
	<b>Pressure switches, vacuum switches PEV, VPEV</b>	<b>PE converters PEN, PE, VPE</b>	<b>Pressure sensors SDE3</b>
<b>Pressure measuring range</b>	-1 ... 1.6 bar	-1 ... 0 bar	-1 ... 10 bar
<b>Switching element function</b>	Changeover switch	N/O contact, Changeover switch	Switchable
<b>Switching output</b>		PNP, Contacting	2xNPN, 2xPNP
<b>Pneumatic connection</b>	G1/4, G1/8	G1/8, M5, PK-4	QS-4, QS-5/32
<b>Electrical connection</b>	4-pin, Type A, Plugs, To DIN 43650, To EN 60947-5-2, Round design, Square design, M12x1	3 connector leads, 3-wire, 4-wire, Cable, Open end	4-pin, 5-pin, Cable, Cable with plug, Plugs, To EN 60947-5-2, Round design, M8x1, M12x1
<b>Display type</b>			Illuminated LCD
<b>Description</b>	<ul style="list-style-type: none"> <li>Mechanical pressure and vacuum switch</li> <li>Adjustable switching point</li> <li>Mounting: screw-in, via through-holes or on an H-rail</li> <li>Visual scale for pressure adjustment</li> <li>Certification: CCC, c UL us – Recognized (OL), RCM</li> </ul>	<ul style="list-style-type: none"> <li>Pneumatic/electric differential pressure switch</li> <li>Pneumatic/electric pressure transducer</li> <li>Design for vacuum</li> <li>Mounting via through-hole, on mounting frame 1n, on mounting frame 2n</li> <li>Splash-proof design</li> <li>Certification: CCC, RCM</li> </ul>	<ul style="list-style-type: none"> <li>5 pressure measuring ranges</li> <li>Measurement of relative or differential pressure or 2 independent supply ports</li> <li>Switching output 2x PNP or 2x NPN</li> <li>Numerical and graphical pressure indication</li> <li>Mounting: via H-rail, via wall/surface bracket, front panel mounting, with through-holes</li> <li>Certification: C-Tick, ATEX, c UL us Listed (OL)</li> </ul>
online: ➔	<a href="#">pev</a>	<a href="#">pen</a>	<a href="#">sde3</a>

## Product overview

### Flow sensors

			
<b>Flow transmitters SFTE</b>		<b>Flow sensors SFAH</b>	<b>Flow sensors SFAW</b>
<b>Flow measuring range end value</b>		0.1 ... 200 l/min	32 ... 100 l/min
<b>Operating medium</b>	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
<b>Operating pressure</b>	-0.9 ... 10 bar	-0.9 ... 10 bar	0 ... 12 bar
<b>Pneumatic connection</b>	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	
<b>Switching output</b>		2 x PNP or 2 x NPN, switchable	2 x PNP or 2 x NPN, switchable
<b>Electrical connection, connection type</b>	Cable, Cable with plug	Plugs	
<b>Electrical connection, connection technology</b>	M8x1, A-coded, to EN 61076-2-104, Open end	Connection pattern L1J, M8x1, A-coded, to EN 61076-2-104	
<b>Electrical connection</b>			5-pin, A-coded, Straight plug, M12x1
<b>Description</b>	<ul style="list-style-type: none"> <li>Compact design</li> <li>Universal flow detection</li> <li>Simple installation</li> <li>Reliable pick &amp; place application for extremely small workpieces</li> </ul>	<ul style="list-style-type: none"> <li>Process air, compressed air, forming gas consumption and pneumatic object monitoring, handling ultra-small parts, leak test</li> <li>Compact design 20x58 mm</li> <li>Clear 2-line display</li> <li>Mounting: H-rail mounting, wall or surface mounting, front panel mounting</li> <li>Serial communication integrated using IO-Link® 1.1</li> </ul>	<ul style="list-style-type: none"> <li>Cooling circuit monitoring, leakage or line break monitoring, process water monitoring, fill level monitoring</li> <li>Input connection: clamped terminal connection DN15, DN20, barbed hose fitting 13 mm, female thread G1/2, G3/4, G1, user-specific connection</li> <li>With optional integrated temperature sensor</li> <li>Connection to higher-level systems via 2 switching outputs, an analogue output and/or an IO-Link® interface</li> <li>Certification: RCM, c UL us Listed (OL)</li> <li>Rotatable display, 90° anticlockwise and 180° clockwise</li> </ul>
online: ➔	<a href="#">sfte</a>	<a href="#">sfah</a>	<a href="#">sfaw</a>

### Flow sensors

		
	<b>Flow sensors SFAB</b>	<b>Flow sensors SFAM</b>
<b>Flow measuring range end value</b>	10 ... 1000 l/min	1000 ... 15000 l/min
<b>Operating medium</b>	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]
<b>Operating pressure</b>	0 ... 10 bar	0 ... 16 bar
<b>Pneumatic connection</b>	QS-1/4, QS-10, QS-12, QS-3/8, QS-5/16, QS-6, QS-8	Manifold module, 1/2 NPT, 1 NPT, 1 1/2 NPT, G1, G1 1/2, G1/2
<b>Switching output</b>	2 x PNP or 2 x NPN, switchable	2x PNP or 2x NPN adjustable
<b>Electrical connection, connection type</b>		
<b>Electrical connection, connection technology</b>		
<b>Electrical connection</b>	5-pin, Straight plug, M12x1	5-pin, Straight plug, M12x1
<b>Description</b>	<ul style="list-style-type: none"> <li>Flow sensor with integrated digital display</li> <li>With unidirectional flow input</li> <li>Mounting: H-rail, wall or surface mounting</li> <li>Certification: C-Tick</li> </ul>	<ul style="list-style-type: none"> <li>Stand-alone device or combined with MS series service unit components</li> <li>Supplies absolute flow information and accumulated air consumption measurements</li> <li>Covers large measuring range with great precision thanks to high dynamic response</li> <li>Large, illuminated LCD display</li> </ul>
online: ➔	<a href="#">sfab</a>	<a href="#">sfam</a>

## Opto-electrical sensors

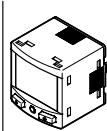
				
<b>Method of measurement</b>	Retro-reflective sensor, Through-beam sensor, Transmitter, Receiver, Diffuse sensor with background clipping	Distance sensor, Retro-reflective sensor, Through-beam sensor, Transmitter, Receiver, Diffuse sensor with background clipping, Laser contrast sensor, Retro-reflective sensor for transparent objects, Diffuse sensor	Retro-reflective sensor, Diffuse sensor, Diffuse sensor with background suppression	Through-beam sensor, Receiver, Transmitter
<b>Working range</b>	0 ... 10000 mm	0 ... 20000 mm	0 ... 2000 mm	20000 mm
<b>Size</b>			M12, M12x1, M18, M18x1	M18x1
<b>Setting options</b>		IO-Link®, Potentiometer, Teach-in	Potentiometer	
<b>Type of light</b>	Laser, Red, LED	Laser, Red, LED	Red, Red polarised	Red
<b>Switching output</b>	Push-pull	Push-pull	NPN, PNP	NPN, PNP
<b>Description</b>	<ul style="list-style-type: none"> <li>Simple operation</li> <li>Fast commissioning</li> <li>Reliable and stable detection</li> <li>Attractive price/performance ratio</li> </ul>	<ul style="list-style-type: none"> <li>Simple operation</li> <li>Fast commissioning</li> <li>Reliable and stable detection</li> <li>Attractive price/performance ratio</li> </ul>	<ul style="list-style-type: none"> <li>Round design</li> <li>Electrical connection via open cable end or plug connector</li> </ul>	<ul style="list-style-type: none"> <li>Round design</li> <li>Electrical connection via open cable end or plug connector</li> </ul>
<b>online:</b> →	<a href="#">sood</a>	<a href="#">sooe</a>	<a href="#">soeg</a>	<a href="#">soeg</a>

## Opto-electrical sensors

				
<b>Method of measurement</b>	Colour sensor	Fibre-optic unit	Fork light barrier	Through-beam sensor, Fixed focus, Fork light barrier, Light guide, Diffuse sensor
<b>Working range</b>	12 ... 32 mm			2 ... 650 mm
<b>Size</b>	50x50x17 mm		Clevis 120x60 mm, 30x35 mm, 50x55 mm, 80x55 mm	M4, M6
<b>Setting options</b>	Teach-in, Teach-in via electrical connection	Teach-in, Teach-in via electrical connection	IO-Link®, Potentiometer, Teach-in	
<b>Type of light</b>	White	Red	Red	
<b>Switching output</b>	PNP	NPN, PNP	Push-pull, NPN, PNP	
<b>Description</b>	<ul style="list-style-type: none"> <li>Diffuse sensor</li> <li>Block design</li> <li>Electrical connection via M12x1 plug, 8-pin</li> <li>Display via 7 LEDs</li> </ul>	<ul style="list-style-type: none"> <li>Use for precise and space-saving position sensing in the electronics and light assembly industry</li> <li>Switching frequencies of up to 8000 Hz</li> <li>Operational with fibre-optic cable SOOC as accessory</li> <li>Variants: LED or LED display, timer function</li> <li>Mounting: H-rail mounting or via through-holes</li> <li>With protection against mutual interference</li> </ul>	<ul style="list-style-type: none"> <li>Through-beam sensor with minimal installation effort</li> <li>Design: polymer or metal</li> <li>Sturdy housing: high shock and vibration resistance</li> <li>Degree of protection IP67</li> <li>Electrical connection via M8x1 plug connector, 3-pin</li> <li>LED indicators</li> </ul>	<ul style="list-style-type: none"> <li>Cable connection, push-in connector</li> </ul>
<b>online:</b> →	<a href="#">soec</a>	<a href="#">soe4</a>	<a href="#">soof</a>	<a href="#">soez</a>

## Product overview

## Signal converters

Signal converters  
SCDNSignal converters  
SVE4

<b>Signal range</b>	0 - 10 V, 0 - 20 mA	Adapted for position sensors SMH-S1-HG, 0 - 10 V +/-0.3 V, 0 - 20 mA +/-0.6 mA
<b>Switching output</b>	2 x PNP or 2 x NPN, switchable	2xNPN, 2xPNP
<b>Switching function</b>	Freely programmable	Freely programmable
<b>Electrical connection input</b>		Socket, 4-pin, To EN 60947-5-2, M8x1
<b>Electrical connection, connection type</b>	Plugs	
<b>Electrical connection, connection technology</b>	Connection pattern L1J	
<b>Electrical connection, number of pins/wires</b>	4	
<b>Electrical connection output</b>		Plugs, 4-pin, To EN 60947-5-2, M8x1
<b>Electrical connection 2, connection type</b>	2x socket	
<b>Electrical connection 2, connection technology</b>	Connection pattern EC	
<b>Electrical connection 2, number of pins/wires</b>	4	
<b>Description</b>	<ul style="list-style-type: none"> <li>• Converts analogue signals into IO-Link® signals</li> <li>• Switching function freely programmable with teach-in</li> <li>• Mounting: wall or surface mounting, front panel mounting, manifold mounting using mounting brackets</li> <li>• Large, illuminated LCD display</li> </ul>	<ul style="list-style-type: none"> <li>• Converts analogue signals into switching points</li> <li>• Switching function freely programmable with teach-in</li> <li>• Threshold value, hysteresis or window comparator</li> <li>• Mounting: H-rail mounting or via adapter plate</li> <li>• LED switching status indication</li> <li>• Certification: c UL us listed (OL), C-Tick</li> </ul>
<b>online:</b> ➔	<a href="#">scdn</a>	<a href="#">sve4</a>

## Electromechanical switches

Micro switches  
S-3

<b>Description</b>	<ul style="list-style-type: none"> <li>• Electric limit switch</li> <li>• N/C contact, N/O contact, changeover switch</li> <li>• Actuator attachments: roller lever type AR, one-way roller lever type AL, whisker actuator type AF</li> </ul>
<b>online:</b> ➔	<a href="#">s-3</a>

## Air gap sensors

				
<b>Sensing range</b>	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
<b>Operating pressure</b>	4 ... 7 bar			
<b>Display type</b>	Illuminated LCD, multi-colour	Signal pressure ≥ 0.5 mbar	Pressure signal 0 ... 8 bar	Pressure signal
<b>Operating medium</b>	Compressed air ISO 8573-1:2010 [7:4:4]	filtered, unlubricated compressed air	filtered, lubricated or filtered, unlubricated compressed air	filtered, unlubricated compressed air
<b>Description</b>	<ul style="list-style-type: none"> <li>Convenient solution for high-precision contact and distance monitoring</li> <li>Setting option: IO-Link®, teach-in or numerical setting using three buttons</li> <li>Integrated air jet function</li> <li>Multi-coloured LCD display</li> <li>Mounting: H-rail mounting, wall mounting, through-hole</li> <li>Certification: C-Tick</li> </ul>	<ul style="list-style-type: none"> <li>Back pressure actuated valve</li> <li>For contactless sensing of indicating instruments, checking pressing and stamping tools, edge control, magazine control, for measuring and counting</li> <li>Can be used even in very dirty environments, in complete darkness, with translucent or magnetic objects</li> </ul>	<ul style="list-style-type: none"> <li>Can be used for stroke-dependent signal generation as a limit switch and fixed stop</li> <li>Ideal for end-position sensing and position control with high accuracy requirements and small actuating forces</li> <li>SD-3-N for sensing fluid levels and heavily foaming liquids</li> <li>For use in places that are difficult to access</li> </ul>	<ul style="list-style-type: none"> <li>Sender nozzle, receiver nozzle, gap sensor</li> <li>Back pressure actuated valve</li> <li>Functional reliability even in very dirty environments</li> <li>Reliable even at high ambient temperatures</li> <li>Insensitive to mechanical influences and sound waves</li> <li>Reliable even in complete darkness and when sensing translucent objects</li> </ul>
online: ➔	sopa	rfl	sd	sfl

## Limit switch attachments

### End switch attachments

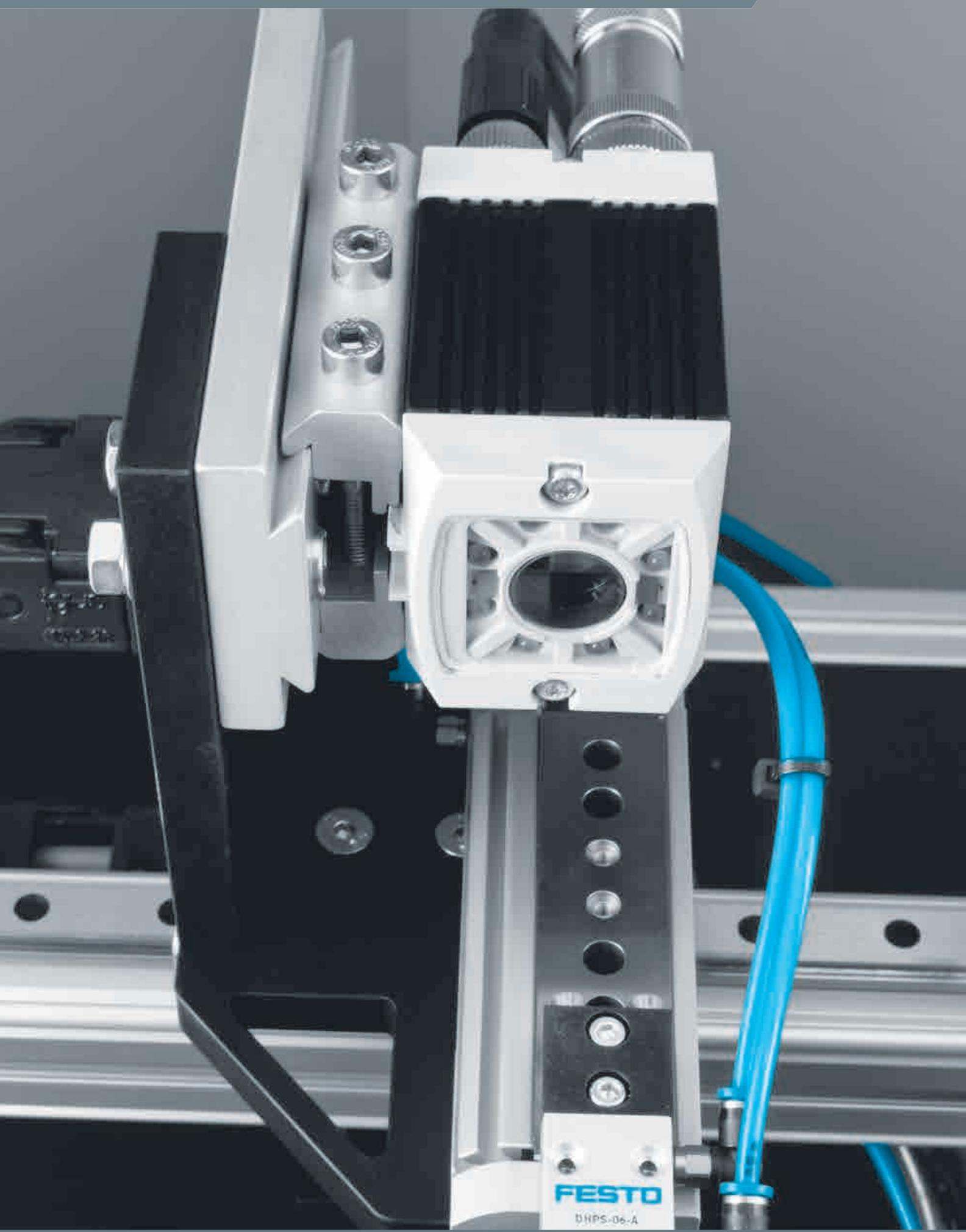
			
<b>Measured variable</b>			
<b>Operating voltage range AC</b>	0 ... 250 V		0 ... 250 V
<b>Operating voltage range DC</b>	0 ... 175 V	6 ... 60 V	0 ... 60 V
<b>Electrical connection</b>	10-pin, Screw terminal		10-pin, 14-pin, Screw terminal
<b>Type of mounting</b>	Via mounting bracket, On flange ISO 5211		Via mounting bracket, On flange ISO 5211
<b>Description</b>	<ul style="list-style-type: none"> <li>Pre-assembled mounting adapter for ease of installation</li> <li>The trip cams can be easily set without additional tools</li> <li>Sturdy, corrosion-resistant design, ideal for use in harsh ambient conditions</li> <li>Clearly visible 3D position indicator allows the current position of the quarter turn actuator to be quickly detected</li> </ul>	<ul style="list-style-type: none"> <li>Compact housing with M12 plug connection</li> <li>Direct mounting on quarter turn actuators to VDI/VDE 3845</li> <li>For quarter turn actuators for process automation with position indicators</li> <li>AS-Interface version with extended addressing options</li> <li>Intrinsically safe version to ATEX and SIL 2 to IEC 61508</li> <li>LED status indicator for switching status, supply voltage and solenoid valve output</li> </ul>	<ul style="list-style-type: none"> <li>The trip cams can be easily set without additional tools</li> <li>Sturdy, corrosion-resistant design, ideal for use in harsh ambient conditions</li> <li>Clearly visible 3D position indicator allows the current position of the quarter turn actuator to be quickly detected</li> </ul>
online: ➔	srbc	srbg	srbe

## Product overview

### Limit switch attachments

#### End switch attachments

		
<b>Limit switch attachments</b>		
<b>SRAP</b>		<b>DAPZ</b>
<b>Measured variable</b>	Rotation angle	
<b>Operating voltage range AC</b>		4 ... 250 V
<b>Operating voltage range DC</b>	15 ... 30 V	4 ... 250 V
<b>Electrical connection</b>	9-pin, Screw terminal, Plug-in	Screw terminal
<b>Type of mounting</b>		
<b>Description</b>	<ul style="list-style-type: none"> <li>Based on standard VDI/VDE 3845 (NAMUR)</li> <li>Analogue</li> <li>For monitoring the position of quarter turn actuators</li> <li>Sensors based on 2D Hall technology</li> </ul>	
<b>online:</b> →	<a href="#">srap</a>	<a href="#">dapz</a>



## Product overview

### Controllers

 <b>Controllers</b> <b>SBRD-Q</b>	
<b>Nominal operating voltage DC</b>	24 V
<b>Input/output interface, function</b>	10x digital input, 2x digital inputs with integrated pull-up resistor, 8x digital output, Ground, Power supply
<b>Camera interface, connection technology</b>	USB 3.0 type A
<b>Ethernet interface, protocol</b>	TCP/IP
<b>Ethernet interface, transmission rate</b>	10 Mbit/s, 100 Mbit/s, 1000 Mbps
<b>Storage capacity</b>	32000000000 Byte
<b>Description</b>	<ul style="list-style-type: none"> <li>Space-saving controller with dual-core processor and PROFINET communication</li> <li>Two camera interfaces for multi-camera tasks</li> <li>Up to 256 test programs</li> <li>Individual image recording and inspection or ongoing image recording and inspection</li> <li>Detection of the position and the rotary orientation of parts, pick &amp; place, quality inspection, measurement, reading barcodes, data matrix codes and optical characters (OCR)</li> <li>Powerful image processing software for fast and reliable results</li> </ul>
<b>online:</b> ➔	<a href="#">sbrd</a>

### Camera heads

 <b>Camera heads</b> <b>SBPB</b>	
<b>Sensor resolution</b>	1600 x 1200 pixels (UXGA), 2456 x 2054 pixels (5MPix), 1280 x 1024 Pixels (SXGA)
<b>Lens attachment</b>	C mount
<b>Sensor type</b>	Colour, Monochrome
<b>Frame rate (full image)</b>	36, 60
<b>Exposure time</b>	9 ... 10000000 µs
<b>Description</b>	<ul style="list-style-type: none"> <li>High-quality, sturdy housing</li> </ul>
<b>online:</b> ➔	<a href="#">sbpb</a>

## Vision sensors

				
<b>Sensor resolution</b>	1280 x 1024 Pixels (SXGA), 736 x 480 Pixels WideVGA	1280 x 1024 Pixels (SXGA), 736 x 480 Pixels WideVGA	736 x 480 Pixels WideVGA	1280 x 1024 Pixels (SXGA), 736 x 480 Pixels WideVGA
<b>Working distance</b>	6 mm - infinite, 30 mm - infinite	6 mm - infinite, 30 mm - infinite	6 mm - infinite, 30 mm - infinite	
<b>Field of view</b>	Depends on the lens chosen, Min. 16 mm x 13 mm, Min. 5 x 4 mm, Min. 8 x 6 mm	Depends on the lens chosen, Min. 16 mm x 13 mm, Min. 5 x 4 mm, Min. 8 x 6 mm	Depends on the lens chosen, Min. 5 x 4 mm, Min. 8 x 6 mm	Depends on the lens chosen
<b>Frame rate (full image)</b>	40 fps, 50 fps	40 fps, 50 fps	40 fps	50 fps
<b>Max. no. of inspection programs</b>	8,255	8,255	8,255	255
<b>Description</b>	<ul style="list-style-type: none"> <li>Reading 1D barcodes, 2D matrix codes and directly marked codes</li> <li>Equipped with position tracking and additional inspection algorithms</li> <li>High resolution of 1.3 megapixels</li> <li>Vision sensor with integrated lighting/lens or with CS mount</li> </ul>	<ul style="list-style-type: none"> <li>Easy quality inspection</li> <li>360° position tracking</li> <li>Quick and powerful recognition algorithms</li> <li>BLOB function for position sensing, quality inspection or counting multiple parts in the image</li> <li>Calliper function for measuring products (distance, edge position)</li> <li>Vision sensor with integrated lighting/lens or with CS mount</li> </ul>	<ul style="list-style-type: none"> <li>With detectors for contrast, position tracking based on contour, colour field, grey threshold, brightness, contour matching, pattern matching, edge detection, BLOB, colour value and list</li> <li>Vision sensor with integrated lighting/lens or with CS mount</li> </ul>	<ul style="list-style-type: none"> <li>Field of view can be individually determined using a suitable lens</li> <li>OCR function (optical character recognition)</li> <li>BLOB function for position sensing, quality inspection or counting multiple parts in the image</li> <li>Calliper function for measuring products (distance, edge position)</li> <li>Calibration function</li> <li>Vision sensor with CS mount</li> </ul>
<b>online:</b> →	<a href="#">sbsc-b</a>	<a href="#">sbsc-q</a>	<a href="#">sbsc-f</a>	<a href="#">sbsc-u</a>

## Accessories for vision systems

			
<b>Type of mounting</b>	Clamped in dovetail slot, Via mounting bracket, With accessories	Clamped, With through-hole, Via thread, Via dovetail slot	Via thread
<b>Description</b>	<ul style="list-style-type: none"> <li>External lighting for vision sensor SBSI</li> </ul>	<ul style="list-style-type: none"> <li>Assembly and mounting attachments for vision sensor SBSI</li> </ul>	<ul style="list-style-type: none"> <li>To protect the sensor against external influences</li> </ul>
<b>online:</b> →	<a href="#">sbal</a>	<a href="#">sbam</a>	<a href="#">sbap</a>

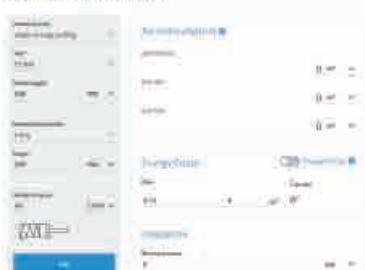
## Product overview

## 12 Compressed air preparation



## Product overview

### Software tools

<b>Air consumption</b>		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.
<b>Configurator</b>		<p>Design a product with numerous features reliably and quickly with the help of the configurator.</p> <p>Select all the required product features step-by-step. The use of logic checks ensures that only correct configurations are available for selection.</p> <p>A dynamic graphic generated on the basis of the configuration provides visual assistance in selecting the correct product features.</p> <p>This tool can be found at  <b>→ <a href="http://www.festo.com/x/air-consumption">www.festo.com/x/air-consumption</a></b></p> <p>This tool can be found at  <b>→ <a href="http://www.festo.com/x/service-unit-sizing">www.festo.com/x/service-unit-sizing</a></b></p>

## Service units &gt;

## MS series

				
	<b>Service unit combinations MSB4, MSB6, MSB9</b>	<b>Energy efficiency modules MSE6-E2M</b>	<b>Energy efficiency modules MSE6-D2M</b>	<b>Energy efficiency modules MSE6-C2M</b>
<b>Pneumatic connection 1</b>	1 1/2 NPT, 1 1/4 NPT, 1 NPT, 1/2 NPT, 3/4 NPT, G1, G1 1/2, G1 1/4, G1/2, G1/4, G1/8, G3/4	G1/2	G1/2	G1/2
<b>Standard nominal flow rate</b>	750 ... 18000 l/min			
<b>Flow measuring range end value</b>		5000 l/min	5000 l/min	5000 l/min
<b>Pressure regulation range</b>	0.5 ... 16 bar			
<b>Operating pressure</b>	0 ... 20 bar	3.5 ... 10 bar	3.5 ... 13 bar	5 ... 11 bar
<b>Grade of filtration</b>	0.01 ... 40 µm			
<b>Fieldbus interface</b>		2x socket, M12x1, 4-pin, D-coded, 2x RJ45 push-pull socket, AIDA, 2x SCRJ push-pull socket, AIDA, Sub-D socket, 9-pin		2x RJ45 push-pull socket, AIDA
<b>Description</b>	<ul style="list-style-type: none"> <li>• Combination of filter regulator, filter, lubricator, on/off valve, soft-start valve</li> <li>• Grid dimensions 40, 62, 90 mm (size 4, 6, 9)</li> </ul>	<ul style="list-style-type: none"> <li>• Grid dimension 62 mm</li> <li>• Intelligent service unit component for optimising the use of compressed air as an energy medium in industrial automation technology</li> <li>• Combination of stop valve, flow sensor, pressure sensor and fieldbus node</li> <li>• Identification of production downtime and leakages</li> <li>• User-controlled shut-off and pressurisation</li> <li>• Equipped with measurement, control and diagnostic functions</li> <li>• Fieldbus connection (PROFIBUS DP, PROFINET IO, EtherNet/IP or EtherCAT®) via integrated fieldbus nodes enables connection to a higher-level controller</li> </ul>	<ul style="list-style-type: none"> <li>• Grid dimension 62 mm</li> <li>• Intelligent service unit component for optimising the use of compressed air as an energy medium in industrial automation technology</li> <li>• Combination of flow sensor and stop valve with pressure sensor</li> <li>• Identification of production downtime and leakages</li> <li>• User-controlled shut-off and pressurisation</li> <li>• Equipped with measurement, control and diagnostic functions</li> <li>• Fieldbus connection (PROFINET IO) via the fieldbus node of the energy efficiency module MSE6-C2M-...-M actuated via the CPX extension or CPX terminal</li> </ul>	<ul style="list-style-type: none"> <li>• Grid dimension 62 mm</li> <li>• Intelligent service unit component for optimising the use of compressed air as an energy medium in industrial automation technology</li> <li>• Combination of fieldbus node, flow sensor, proportional pressure regulator and stop valve with pressure sensor</li> <li>• Identification of production downtime and leakages</li> <li>• User-controlled shut-off and pressure regulation</li> <li>• Configurable rise limit for setpoint pressure</li> <li>• Equipped with measurement, control and diagnostic functions</li> <li>• Fieldbus connection (PROFINET IO) via integrated bus nodes enables connection to a higher-level controller</li> <li>• System extension by extending CPX row 1 interface for connecting an energy efficiency module MSE6-D2M or connecting digital and analogue CPX IO modules</li> <li>• Two digital inputs and outputs</li> </ul>
<b>online:</b> →	<b>msb4</b>	<b>mse6</b>	<b>mse6</b>	<b>mse6</b>

## Product overview

[Service units >](#)

### D series, polymer



Service unit combinations with lubricator  
FRC-K



Service unit combinations without lubricator  
LFR-DB

Pneumatic connection 1	G1/4	G1/4
Standard nominal flow rate	400 ... 700 l/min	1900 l/min
Pressure regulation range	0.5 ... 7 bar	0.5 ... 7 bar
Operating pressure	1.5 ... 10 bar	1.5 ... 10 bar
Grade of filtration	40 µm	40 µm
Description	<ul style="list-style-type: none"> <li>Combination of on/off valve, filter regulator, distributor module and lubricator</li> <li>Size mini</li> </ul>	<ul style="list-style-type: none"> <li>Combination of on/off valve, filter regulator and distributor module</li> <li>Size mini</li> </ul>
online: ➔	frc	lfr

[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	<ul style="list-style-type: none"> <li>Filter, regulator and lubricator functions in a single unit</li> <li>High flow rate and highly efficient in removing contaminants</li> <li>Good control characteristics with minimal pressure hysteresis</li> <li>Grid dimensions 40, 62 mm (size 4, 6)</li> </ul>
online: ➔	msb4-frc

Filter regulators/lubricators &gt;

## D series, polymer

Service units  
FRC-DB

Pneumatic connection 1	G1/4
Standard nominal flow rate	≥550 l/min
Pressure regulation range	0.5 ... 7 bar
Operating pressure	1.5 ... 10 bar
Grade of filtration	5 µm, 40 µm
Description	<ul style="list-style-type: none"> <li>• Filter, regulator and lubricator functions in a single unit</li> <li>• With manual or semi-automatic condensate drain</li> <li>• Size mini</li> </ul>
online: →	<a href="#">frc</a>

Filter regulators &gt;

## MS series

Filter regulators  
MS2-LFR, MS4-LFR, MS6-LFR, MS9-LFR, MS12-LFR

Pneumatic connection 1	Internal, G1/2, G1/4, G1/8, G3/8, M5, QS-6
Standard nominal flow rate	140 ... 24000 l/min
Pressure regulation range	0.3 ... 16 bar
Operating pressure	0.8 ... 20 bar
Grade of filtration	5 µm, 40 µm
Description	<ul style="list-style-type: none"> <li>• MS2-LFR, 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</li> <li>• Good control characteristics with minimal pressure hysteresis and primary pressure compensation</li> <li>• Good particle and condensate separation</li> <li>• With or without secondary exhausting</li> <li>• High flow rate</li> <li>• Lockable rotary knob</li> <li>• Return flow option for exhausting from output 2 to input 1 already integrated</li> <li>• Grid dimensions 25, 40, 62, 90, 124 mm (size 2, 4, 6, 9, 12)</li> </ul>
online: →	<a href="#">ms4-lfr</a>

## Product overview

[Filter regulators >](#)

### D series, polymer



Filter regulators  
LFR-DB

Pneumatic connection 1	G1/4
Standard nominal flow rate	≥1000 l/min
Pressure regulation range	0.5 ... 7 bar
Operating pressure	1.5 ... 10 bar
Grade of filtration	5 µm, 40 µm
Description	<ul style="list-style-type: none"> <li>• With manual or semi-automatic condensate drain</li> <li>• Size mini</li> </ul>
online: ➔	<a href="#">lfr</a>

[Filter regulators >](#)

### D series, metal



Filter regulators  
LFR-EX4

Pneumatic connection 1	G1/2, G1/4, NPT1/2-14, NPT1/4-18
Standard nominal flow rate	1150 ... 3400 l/min
Pressure regulation range	0.5 ... 16 bar
Operating pressure	1 ... 20 bar
Grade of filtration	5 µm, 40 µm
Description	<ul style="list-style-type: none"> <li>• Sturdy thanks to full metal design</li> <li>• High corrosion resistance (corrosion resistance class CRC 3 to Festo standard 940 070) and chemical resistance</li> <li>• Ambient temperature -40 ... +80 °C</li> <li>• Resistant to UV radiation and corrosive environments</li> <li>• To EU Explosion Protection Directive (ATEX)</li> <li>• Reliable manual drain</li> <li>• Energy efficient: excellent leakage values</li> <li>• Attractive price</li> <li>• Size: Midi</li> </ul>
online: ➔	<a href="#">lfr</a>

Filter regulators &gt;

## Individual devices

		<b>Filter regulators</b> <b>PCRP</b>	<b>NEW</b>
<b>Pneumatic connection 1</b>	1/2 NPT, 1/4 NPT, G1/2, G1/4, NPT1/2-14, NPT1/4-18		
<b>Standard nominal flow rate</b>	1600 ... 4115 l/min		
<b>Pressure regulation range</b>	0.5 ... 12 bar		
<b>Operating pressure</b>	1 ... 20 bar		
<b>Grade of filtration</b>	5 µm, 40 µm		
<b>NEW</b>	<ul style="list-style-type: none"> <li>New for 12/2020: additional versions</li> </ul>		
<b>Description</b>	<ul style="list-style-type: none"> <li>Robust housing for the specific requirements of the process automation industry</li> <li>Suitable for use outdoors and at temperatures down to -60 °C</li> <li>Resistant to UV radiation and corrosive environments</li> <li>With manual condensate drain, rotating</li> <li>Size: 44, 64</li> </ul>		
online: →	<a href="#">pcrp</a>		

Compressed air filters &gt;

## MS series

		<b>Filters</b> <b>MS4-LF, MS6-LF, MS9-LF, MS12-LF</b>		<b>Fine filters</b> <b>MS4-LFM-B, MS6-LFM-B, MS9-LFM-B, MS12-LFM-B</b>		<b>Micro filters</b> <b>MS4-LFM-A, MS6-LFM-A, MS9-LFM-A, MS12-LFM-A</b>		<b>Activated carbon filters</b> <b>MS4-LFX, MS6-LFX, MS9-LFX, MS12-LFX</b>
<b>Pneumatic connection 1</b>	Internal, G1/2, G1/4, G1/8, G3/8	1 1/2 NPT, 1 1/4 NPT, 1 NPT, 1/2 NPT, 3/4 NPT, Manifold module, G1, G1 1/2, G1 1/4, G1/2, G1/4, G1/8, G3/4, G3/8	1 1/2 NPT, 1 1/4 NPT, 1 NPT, 1/2 NPT, 3/4 NPT, Manifold module, G1, G1 1/2, G1 1/4, G1/2, G1/4, G1/8, G3/4, G3/8	1 1/2 NPT, 1 1/4 NPT, 1 NPT, 1/2 NPT, 3/4 NPT, Manifold module, G1, G1 1/2, G1 1/4, G1/2, G1/4, G1/8, G3/4, G3/8	1 1/2 NPT, 1 1/4 NPT, 1 NPT, 1/2 NPT, 3/4 NPT, Manifold module, G1, G1 1/2, G1 1/4, G1/2, G1/4, G1/8, G3/4, G3/8			
<b>Standard nominal flow rate</b>	1000 ... 16000 l/min	54 ... 10000 l/min	54 ... 7800 l/min	54 ... 7800 l/min	360 ... 6500 l/min			
<b>Operating pressure</b>	0 ... 20 bar	0 ... 20 bar	0 ... 20 bar	0 ... 20 bar	0 ... 20 bar			
<b>Grade of filtration</b>	5 µm, 40 µm	0.01 µm, 1 µm	0.01 µm, 1 µm	0.01 µm, 1 µm	0.01 µm, 1 µm			
<b>Description</b>	<ul style="list-style-type: none"> <li>Good particle and condensate separation</li> <li>High flow rate performance with minimal pressure drop</li> <li>Available with manual, semi-automatic, fully automatic or fully automatic, electrically actuated condensate drain</li> <li>Grid dimensions 40, 62, 90, 124 mm (size 4, 6, 9, 12)</li> </ul>	<ul style="list-style-type: none"> <li>High-efficiency filter for exceptionally clean compressed air</li> <li>Removing oil aerosols from compressed air</li> <li> Optionally with differential pressure indicator for indication of contamination</li> <li> Available with electronic filter contamination indicator</li> <li> Grid dimensions 40, 62, 90, 124 mm (size 4, 6, 9, 12)</li> </ul>	<ul style="list-style-type: none"> <li>High-efficiency filter for exceptionally clean compressed air</li> <li>Removing oil aerosols from compressed air</li> <li> Optionally with differential pressure indicator for indication of contamination</li> <li> Available with electronic filter contamination indicator</li> <li> Grid dimensions 40, 62, 90, 124 mm (size 4, 6, 9, 12)</li> </ul>	<ul style="list-style-type: none"> <li>High-efficiency filter for exceptionally clean compressed air</li> <li>Removing oil aerosols from compressed air</li> <li> Optionally with differential pressure indicator for indication of contamination</li> <li> Available with electronic filter contamination indicator</li> <li> Grid dimensions 40, 62, 90, 124 mm (size 4, 6, 9, 12)</li> </ul>	<ul style="list-style-type: none"> <li>Removal of gaseous oil particles from compressed air using activated carbon</li> <li>Air quality class at the output [1.4.1] to ISO 8573-1</li> <li>Eliminates odours and vapours</li> <li>Residual oil content = 0.003 mg/m³</li> <li>Grid dimensions 40, 62, 90, 124 mm (size 4, 6, 9, 12)</li> </ul>			
online: →	<a href="#">ms4-lf</a>	<a href="#">ms4-lfm-b</a>	<a href="#">ms4-lfm-a</a>	<a href="#">ms4-lfx</a>				

## Product overview

### Compressed air filters >

#### Individual devices

		
	<b>Filter silencers LFU</b>	<b>Micro filters PFML</b>
<b>Size</b>	G1/4, G3/8	186, 90
<b>Grade of filtration</b>	1 µm	0.01 µm
<b>Operating pressure</b>	0 ... 16 bar	0 ... 50 bar
<b>Flow rate with respect to atmosphere</b>	4000 ... 12500 l/min	
<b>Noise reduction</b>	Reduction by 40 dB	
<b>Description</b>	<ul style="list-style-type: none"> <li>Removes up to 99.99% of oil and other contaminants from the exhaust air</li> <li>Manual rotary condensate drain</li> <li>Exhaust noise reduced regardless of frequency</li> </ul>	<ul style="list-style-type: none"> <li>For high-pressure applications</li> <li>Food-safe, see <a href="http://www.festo.com/sp/pfml">www.festo.com/sp/pfml</a> -&gt; "Certificates" tab</li> </ul>
<b>online:</b> →	<a href="#">lfu</a>	<a href="#">pfml</a>

### Pressure regulators >

#### MS series

			
	<b>Pressure regulators MS2-LR, MS4-LR, MS6-LR, MS9-LR</b>	<b>Pressure regulators MS12-LR</b>	<b>Pressure regulators MS4-LRB, MS6-LRB</b>
<b>Pneumatic connection 1</b>	G1/2, G1/4, G1/8, G3/8, M5, QS-6	Sub-base	G1/2, G1/4
<b>Standard nominal flow rate</b>	170 ... 30000 l/min	12000 ... 22000 l/min	300 ... 7300 l/min
<b>Pressure regulation range</b>	0.3 ... 16 bar	0.15 ... 16 bar	0.3 ... 16 bar
<b>Operating pressure</b>	0.8 ... 20 bar	0.8 ... 21 bar	0.8 ... 20 bar
<b>Max. pressure hysteresis</b>	0.25 ... 0.5 bar	0.04 ... 0.4 bar	0.25 bar
<b>Description</b>	<ul style="list-style-type: none"> <li>High flow rate performance with minimal pressure drop</li> <li>Good control characteristics with minimal pressure hysteresis and primary pressure compensation</li> <li>With or without secondary exhausting</li> <li>Lockable rotary knob</li> <li>Optional pressure sensor and rotary knob pressure gauge</li> <li>Grid dimensions 25, 40, 62, 90 mm (size 2, 4, 6, 9)</li> </ul>	<ul style="list-style-type: none"> <li>High flow rate performance with minimal pressure drop</li> <li>Good control characteristics with minimal pressure hysteresis and primary pressure compensation</li> <li>With secondary exhausting</li> <li>Lockable rotary knob</li> <li>MS12-LR-...-PO: pneumatically actuated (pressure range determined by pilot regulator)</li> <li>MS12-LR-...-PE6: electrically actuated (pilot control by proportional pressure regulator)</li> <li>Grid dimensions 124 mm (size 12)</li> </ul>	<ul style="list-style-type: none"> <li>To build a regulator manifold with through air supply for pressure ranges that can be adjusted independently of one another</li> <li>Good control characteristics with minimal pressure hysteresis and primary pressure compensation</li> <li>Lockable rotary knob</li> <li>With or without secondary exhausting</li> <li>Integrated return flow option for exhausting from output 2 to input 1</li> <li>Optional pressure sensor and rotary knob pressure gauge</li> <li>Grid dimensions 40, 62 mm (size 4, 6)</li> </ul>
<b>online:</b> →	<a href="#">ms4-lr</a>	<a href="#">ms12-lr</a>	<a href="#">ms4-lrb</a>

## Pressure regulators &gt;

## MS series

		Precision pressure regulators MS6-LRP, MS6-LRPB		Electrical pressure regulators MS6-LRE
Pneumatic connection 1	G1/2, G1/4, G3/8		G1/2, G1/4	
Standard nominal flow rate	800 ... 5000 l/min		2200 ... 7500 l/min	
Pressure regulation range	0.05 ... 12 bar		0.3 ... 16 bar	
Operating pressure	1 ... 14 bar		0.8 ... 20 bar	
Max. pressure hysteresis	0.02 bar		0.25 bar	
Description	<ul style="list-style-type: none"> <li>• As individual device and for manifold assembly</li> <li>• Manifold assembly with through air supply</li> <li>• Good control characteristics with minimal pressure hysteresis and primary pressure compensation</li> <li>• High secondary exhausting</li> <li>• Lockable rotary knob</li> <li>• Optionally with pressure sensor with display</li> </ul>		<ul style="list-style-type: none"> <li>• Grid dimension 62 mm</li> <li>• With integrated electric drive unit for remotely setting the outlet pressure</li> <li>• Constant output pressure even in the event of a power cut thanks to the fail-safe function</li> <li>• Available with control unit with display</li> <li>• Optional pressure sensor</li> <li>• With or without secondary exhausting</li> </ul>	
online: →	<a href="#">ms6-lrp</a>		<a href="#">ms6-lre</a>	

## Pressure regulators &gt;

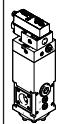
## D series, polymer

		Pressure regulators LR-DB		Pressure regulator manifolds LRB-DB
Pneumatic connection 1	G1/4		G1/2	
Standard nominal flow rate	≥1300 l/min		≥1000 l/min	
Pressure regulation range	0.5 ... 7 bar		0.5 ... 7 bar	
Operating pressure	1.5 ... 10 bar		1.5 ... 10 bar	
Max. pressure hysteresis	0.5 bar		0.5 bar	
Description	<ul style="list-style-type: none"> <li>• Setting values secured by locking the rotary knob</li> <li>• Available with pressure gauge</li> <li>• Size mini</li> </ul>		<ul style="list-style-type: none"> <li>• Regulator manifold with through air supply for pressure ranges that can be adjusted independently of one another</li> <li>• Setting values secured by locking the rotary knob</li> <li>• Without pressure gauge</li> <li>• Size mini</li> </ul>	
online: →	<a href="#">lr-db</a>		<a href="#">lrb-db</a>	

## Product overview

### 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	1 ... 12 bar	0 ... 50 bar		
Max. pressure hysteresis	0.02 bar	0.1 bar		
Description	<ul style="list-style-type: none"> <li>• Lockable design</li> <li>• Good control characteristics with minimal pressure hysteresis and primary pressure compensation</li> <li>• High secondary exhausting</li> </ul>	<ul style="list-style-type: none"> <li>• For high-pressure applications</li> <li>• Food safe, see <a href="http://www.festo.com/sp/prel">www.festo.com/sp/prel</a> -&gt; "Certificates" tab</li> <li>• Size 90 mm, 186 mm</li> </ul>		
online: ➔	<a href="#">lrp</a>			<a href="#">prel</a>

### 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	<ul style="list-style-type: none"> <li>• Proportional lubricator with precision oil metering</li> <li>• Quick and easy top-up even under pressure</li> <li>• Oil capacity 30 ... 1500 cm<sup>3</sup></li> <li>• Grid dimensions 40, 62, 90, 124 mm (size 4, 6, 9, 12)</li> </ul>			
online: ➔	<a href="#">ms4-loe</a>			

On/off and soft-start valves &gt;

## MS series

			
	<b>Soft-start/quick exhaust valves</b> <b>MS6-SV-E, MS6-SV-D</b>	<b>Soft-start/quick exhaust valves</b> <b>MS6-SV-C, MS9-SV-C</b>	<b>On/off valves</b> <b>MS4-EM1, MS6-EM1, MS9-EM, MS12-EM</b> 
<b>Pneumatic connection 1</b>	G1/2	G1/2	Manifold module, G1/2, G1/4, G1/8, G3/8
<b>Standard nominal flow rate</b>	4300 ... 5700 l/min	4300 ... 16550 l/min	1200 ... 32000 l/min
<b>Operating pressure</b>	3 ... 10 bar	3 ... 16 bar	0 ... 20 bar
<b>Actuation type</b>	Electric	Electric	Manual
<b>Description</b>	<ul style="list-style-type: none"> <li>Reliable 2-channel exhausting with and without self-monitoring up to Performance Level c and category 4 as per EN ISO 13849-1</li> <li>For reducing pressure quickly and reliably and for building up pressure gradually</li> <li>SIL 3</li> <li>Adjustable pressure build-up time</li> <li>Available with silencer</li> <li>Supply voltage 24 V DC</li> </ul>	<ul style="list-style-type: none"> <li>Single-channel exhausting up to Performance Level c and category 1 to EN ISO 13849-1</li> <li>For reducing pressure quickly and reliably and for building up pressure gradually</li> <li>Adjustable pressure build-up time</li> <li>Adjustable switch-through pressure</li> <li>Supply voltage 24 V DC</li> <li>Grid dimensions 62, 90 mm (size 6, 9)</li> </ul>	<ul style="list-style-type: none"> <li>Manual 3/2-way valve for pressurising and exhausting pneumatic systems</li> <li>A silencer can be attached or the exhaust air ducted at port 3</li> <li>Switching position is immediately recognisable</li> <li>Optionally with pressure gauge and pressure sensor</li> <li>Grid dimensions 40, 62, 90, 124 mm (size 4, 6, 9, 12)</li> </ul>
<b>online:</b> →	<a href="#">ms6-sv-e</a>	<a href="#">ms6-sv-c</a>	<a href="#">ms4-em1</a>

On/off and soft-start valves &gt;

## MS series

			
	<b>On/off valves</b> <b>MS4-EE, MS6-EE, MS9-EE, MS12-EE</b> 	<b>Soft-start valves</b> <b>MS4-DL, MS6-DL, MS12-DL</b> 	<b>Soft-start valves</b> <b>MS4-DE, MS6-DE, MS12-DE</b>
<b>Pneumatic connection 1</b>	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
<b>Standard nominal flow rate</b>	1000 ... 32000 l/min	1000 ... 42000 l/min	1000 ... 42000 l/min
<b>Operating pressure</b>	3 ... 18 bar	2 ... 20 bar	3 ... 18 bar
<b>Actuation type</b>	Electric	Pneumatic	Electric
<b>Description</b>	<ul style="list-style-type: none"> <li>Electric 3/2-way valve for pressurising and exhausting pneumatic installations</li> <li>A silencer can be attached or the exhaust air ducted at port 3</li> <li>Supply voltage 24 V DC, 110, 230 V AC</li> <li>Optionally with pressure gauge and pressure sensor</li> <li>With solenoid coil, without plug socket</li> <li>Grid dimensions 40, 62, 90, 124 mm (size 4, 6, 9, 12)</li> </ul>	<ul style="list-style-type: none"> <li>2/2-way valve for slowly pressurising pneumatic systems (for use with on/off valves EM(1) and EE)</li> <li>For building up pressure gradually</li> <li>Adjustable pressure build-up time</li> <li>Grid dimensions 40, 62, 124 mm (size 4, 6, 12)</li> </ul>	<ul style="list-style-type: none"> <li>2/2-way valve for slowly pressurising pneumatic installations with electrically switchable pressure switching point</li> <li>Supply voltage 24 V DC, 110, 230 V AC</li> <li>Switchable pressure switching point</li> <li>For advancing the drives slowly and reliably into the initial position</li> <li>For avoiding sudden and unexpected movements</li> <li>Adjustable pressure build-up time</li> <li>Grid dimensions 40, 62, 124 mm (size 4, 6, 12)</li> </ul>
<b>online:</b> →	<a href="#">ms4-ee</a>	<a href="#">ms4-dl</a>	<a href="#">ms4-de</a>

## Product overview

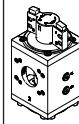
[On/off and soft-start valves >](#)

### D series, polymer

 <b>On/off valves</b> <b>HE-DB</b>	
<b>Pneumatic connection 1</b>	G1/4
<b>Standard nominal flow rate</b>	2300 l/min
<b>Operating pressure</b>	0 ... 10 bar
<b>Actuation type</b>	Manual
<b>Description</b>	<ul style="list-style-type: none"> <li>• 3/2-way shut-off valve</li> <li>• Switching position is immediately recognisable</li> <li>• Commercially available padlock for security</li> </ul>
<b>online:</b> →	<a href="#">he-db</a>

[On/off and soft-start valves >](#)

### Individual devices

 <b>Shut-off valves</b> <b>HE-LO</b>	 <b>On/off valves</b> <b>PVEL</b>
<b>Pneumatic connection 1</b>	G1, G1/2, G3/4, G3/8
<b>Standard nominal flow rate</b>	5200 ... 10000 l/min
<b>Nominal size DN</b>	54
<b>Operating pressure</b>	0 ... 50 bar
<b>Actuation type</b>	Manual, Pneumatic
<b>Description</b>	<ul style="list-style-type: none"> <li>• For shutting off the compressed air supply whilst simultaneously exhausting systems powered by compressed air</li> <li>• Can be locked in the closed position</li> <li>• Screwed into piping, through-holes for wall mounting</li> <li>• To OSHA 29 CFR 147</li> </ul> <ul style="list-style-type: none"> <li>• Food-safe, see <a href="#">www.festo.com/sp/pvel</a> -&gt; "Certificates" tab</li> <li>• For high-pressure applications</li> <li>• Grid dimension 124 mm</li> </ul>
<b>online:</b> →	<a href="#">he-lo</a>
	<a href="#">pvel</a>

Air dryers &gt;

## 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	20 K
Description	<ul style="list-style-type: none"> <li>Final dryer with excellent operational reliability</li> <li>Suitable for use as an individual device or for integration into existing service unit combinations</li> <li>Flow rate-dependent dew point reduction</li> <li>Wear-free function requiring no external energy</li> <li>Grid dimensions 40, 62 mm (size 4, 6)</li> </ul>
online: ➔	<a href="#">ms4-ldm1</a>

Air dryers &gt;

## 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	<ul style="list-style-type: none"> <li>Ideal for decentralised compressed air drying</li> <li>Integrated filtering of oil and particulates</li> <li>Defined pressure dew point</li> <li>Low purge air consumption</li> </ul>
online: ➔	<a href="#">pdad</a>

## Product overview

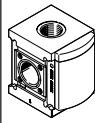
### Compressed air distributors >

#### MS series

		<b>Branching modules</b> <b>MS4-FRM, MS6-FRM, MS9-FRM, MS12-FRM</b>		<b>Distributor blocks</b> <b>MS4-FRM-FRZ, MS6-FRM-FRZ</b>
<b>Pneumatic connection 1</b>	1 1/2 NPT, 1 1/4 NPT, 1 NPT, 1/2 NPT, 3/4 NPT, G1/4, G1/2, G1, G2, Manifold module, G1, G1 1/2, G1 1/4, G1/2, G1/4, G1/8, G3/4, G3/8	G1/4, G1/2		
<b>Standard nominal flow rate in main flow direction 1-&gt;2</b>	1200 ... 50000 l/min	4050 ... 14600 l/min		
<b>Operating pressure</b>	0 ... 20 bar	0 ... 20 bar		
<b>Description</b>	<ul style="list-style-type: none"> <li>• Optionally with integrated non-return function and pressure switch</li> <li>• Outlet at top and bottom</li> <li>• Can be used as an intermediate distributor for varying air qualities</li> <li>• Optionally with pressure sensor</li> <li>• Grid dimensions 40, 62, 90, 124 mm (size 4, 6, 9, 12)</li> </ul>	<ul style="list-style-type: none"> <li>• Slim compressed air distributor</li> <li>• Outlet at top and bottom</li> <li>• Can be used as an intermediate distributor for varying air qualities</li> <li>• Can be used as an adapter between two pressure regulators size 4 with pressure gauge with large rotary knob</li> <li>• Grid dimensions 40, 62 mm (size 4, 6)</li> </ul>		
<b>online:</b> →	<a href="#">ms*-frm</a>		<a href="#">ms*-frm-frz</a>	

### Compressed air distributors >

#### Individual devices

		<b>Branching modules</b> <b>PMBL</b>
<b>Pneumatic connection 3</b>	G1	
<b>Pneumatic connection 4</b>	G1	
<b>Operating pressure</b>	0 ... 50 bar	
<b>Description</b>	<ul style="list-style-type: none"> <li>• For high-pressure applications</li> <li>• Food-safe, see <a href="http://www.festo.com/sp/pmbl">www.festo.com/sp/pmbl</a> -&gt; "Certificates" tab</li> <li>• Size 90 mm, 186 mm</li> </ul>	
<b>online:</b> →	<a href="#">pmbl</a>	

### Condensate drain >

#### MS series

		<b>Water separators</b> <b>MS6-LWS, MS9-LWS, MS12-LWS</b>
<b>Pneumatic connection 1</b>	G1/2, G1/4, G3/8	
<b>Operating pressure</b>	0.8 ... 16 bar	
<b>Description</b>	<ul style="list-style-type: none"> <li>• No replacement of filter cartridges necessary</li> <li>• Constantly high condensate separation (99%) up to the maximum flow rate</li> <li>• Available with fully automatic or fully automatic, electrically actuated condensate drain</li> <li>• Grid dimensions 62, 90, 124 mm (size 6, 9, 12)</li> </ul>	
<b>online:</b> →	<a href="#">ms6-lws</a>	

Condensate drain &gt;

## Individual devices

		<b>Condensate drains, electrical PWEA</b>		<b>Condensate drains, automatic WA</b>
<b>Pneumatic connection</b>	G1/2		M9	
<b>Operating pressure</b>	0.8 ... 16 bar		1.5 ... 16 bar	
<b>Description</b>	<ul style="list-style-type: none"> <li>Fully automatic condensate drain with independent electric controller</li> <li>Interface available for communicating with master control device</li> <li>Reliable thanks to contactless capacitive sensor</li> <li>Can be used with service units or simply in piping systems</li> <li>Ready status and switching status indicated via LEDs and electrical interface</li> </ul>		<ul style="list-style-type: none"> <li>For attaching to service units and compressed air networks/systems</li> <li>Automatic emptying after the max. fill level has been reached</li> <li>Automatic emptying after the operating pressure <math>p &lt; 0.5</math> bar is switched off</li> <li>Manual actuation during operation is possible</li> </ul>	
<b>online:</b> →	<a href="#">pwea</a>		<a href="#">wa</a>	

## Pressure amplifiers

## Pressure boosters

		<b>Pressure boosters DPA</b>	
<b>Pneumatic connection 1</b>	G1/2, G1/4, G3/8, QS-10, QS-12, QS-16		
<b>Outlet pressure 2</b>	4 ... 16 bar		
<b>Inlet pressure 1</b>	2 ... 10 bar		
<b>Description</b>	<ul style="list-style-type: none"> <li>Pneumatic pressure increase up to double the input pressure</li> <li>Available as pressure booster/air pressure reservoir combinations</li> <li>Any mounting position</li> <li>Short filling times</li> <li>Long service life</li> <li>Compact design</li> <li>Available with sensing option</li> </ul>		
<b>online:</b> →	<a href="#">dpa</a>		

## Product overview

### Pressure gauges

				
<b>Pressure gauges PAGN</b>				<b>Flanged pressure gauges FMA</b>
<b>Type of mounting</b>	In-line installation	In-line installation	Front panel mounting	Front panel mounting, In-line installation
<b>Display range</b>	0 ... 16 bar	0 ... 25 bar	0 ... 16 bar	0 ... 16 bar
<b>Pneumatic connection</b>	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
<b>Operating pressure</b>	0 ... 16 bar	0 ... 25 bar	0 ... 16 bar	0 ... 16 bar
<b>Measurement accuracy class</b>	1.6, 2.5, 4, 5	1.6, 2.5, 4, 5	1.6, 2.5	1, 1.6
<b>Description</b>	<ul style="list-style-type: none"> <li>Designs based on EN 837-1</li> <li>Display units bar, psi, MPa</li> </ul>	<ul style="list-style-type: none"> <li>Designs based on DIN EN 837-1, available with red-green range</li> <li>Pneumatic connection via R, G or metric thread, push-in connector</li> <li>Display units bar, psi, MPa</li> </ul>	<ul style="list-style-type: none"> <li>Designs based on EN 837-1</li> <li>Pneumatic connection via G thread</li> <li>Display units bar, psi</li> </ul>	<ul style="list-style-type: none"> <li>Designs based on EN 837-1</li> <li>Pneumatic connection via R or G thread</li> <li>Display units bar, psi</li> </ul>
<b>online: ➔</b>	<a href="#">pagn</a>	<a href="#">ma</a>	<a href="#">fma</a>	<a href="#">fmap</a>

### Pressure gauges

			
<b>Pressure gauge kits DPA</b>		<b>Vacuum gauges VAM, FVAM</b>	<b>Pressure gauges PAGL</b>
<b>Type of mounting</b>	Via male thread	Front panel mounting, Screw-in	In-line installation
<b>Display range</b>		-1 ... 9 bar	0 ... 60 bar
<b>Pneumatic connection</b>	G1/4, G1/8, R1/8	G1/4, G1/8, R1/4, R1/8	G1/4
<b>Operating pressure</b>	10 ... 16 bar	-1 ... 9 bar	0 ... 60 bar
<b>Measurement accuracy class</b>	2.5, 4	2.5	1.6
<b>Description</b>	<ul style="list-style-type: none"> <li>For pressure booster DPA</li> <li>For monitoring the supply and output pressure</li> <li>Pneumatic connection via R or G thread</li> </ul>	<ul style="list-style-type: none"> <li>Designs based on DIN EN 837-1, available with red-green range</li> <li>Pneumatic connection via R or G thread</li> <li>Double or single scale</li> <li>Display units bar, in Hg, psi</li> </ul>	<ul style="list-style-type: none"> <li>For high-pressure applications</li> <li>Display units bar, psi, MPa</li> </ul>
<b>online: ➔</b>	<a href="#">dpa</a>	<a href="#">vam</a>	<a href="#">pagl</a>

### 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](http://www.festo.com/contact)



## Product overview

### Software tools

<b>Configurator</b>		<p>Design a product with numerous features reliably and quickly with the help of the configurator.</p> <p>Select all the required product features step-by-step. The use of logic checks ensures that only correct configurations are available for selection.</p> <p>A dynamic graphic generated on the basis of the configuration provides a visual aid for selecting the correct product features.</p> <p>The configurator is part of the electronic catalogue and is not available as a separate software program.</p>
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### Connecting cables >

#### Connecting cables, universal

		<b>Connecting cables NEBU</b>		<b>Connecting cables NEBB</b>		<b>Connecting cables/plug sockets with cable SIM</b>		<b>Connecting cables KM12</b>
<b>Electrical connection, connection type</b>	Socket, Cable, Plugs	Socket, Cable	Socket, Cable	Socket, Cable	Socket, Cable	Socket, Cable	Socket, Plugs	Socket, Plugs
<b>Electrical connection, cable outlet</b>	Straight, Angled, Angled, can be aligned in increments of 15°	Straight, Angled	Straight, Angled	Straight, Angled	Straight, Angled	Straight, Angled	Straight	Straight
<b>Electrical connection, design</b>	Round	Round	Round	Round	Round	Round	Round	Round
<b>Electrical connection, connection technology</b>	G7/8 coded to NFPA/T3.5.29 R1-2007, 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	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, Open end, M8 snap-locking A-coded to EN 61076-2-104	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, Open end, M8 snap-locking A-coded to EN 61076-2-104	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, Open end, M8 snap-locking A-coded to EN 61076-2-104
<b>Electrical connection, number of pins/wires</b>	3, 4, 5, 8	3, 4, 5	3, 4, 5	3, 4, 8	3, 4, 8	3, 4, 8	8	8
<b>Cable length</b>	0.1 ... 30 m	2.5 ... 10 m	2.5 ... 10 m	2 ... 25 m	2 ... 25 m	2 ... 25 m	2 m	2 m
<b>Description</b>	<ul style="list-style-type: none"> <li>Designs for static, standard, energy chain and robot applications</li> <li>Versions with switching status indication</li> <li>Designs for connecting sensors and actuators</li> </ul>	<ul style="list-style-type: none"> <li>For connecting sensors and actuators</li> <li>For static applications</li> <li>Degree of protection IP65, IP68, IP69K, when mounted</li> <li>Pre-assembled</li> </ul>	<ul style="list-style-type: none"> <li>Pre-assembled at one or both ends</li> </ul>	<ul style="list-style-type: none"> <li>For connecting inputs and outputs</li> <li>Type of mounting: union nut, threaded connector</li> </ul>				
<b>online:</b> ➔	<a href="#">nebu</a>	<a href="#">nebb</a>	<a href="#">sim</a>	<a href="#">km12</a>				

Connecting cables &gt;

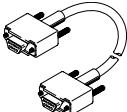
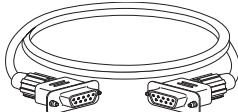
## Connecting cables for control systems

		Connecting cables NEBC 		Connecting cables NEBP		Connecting cables NEBL 		Diagnostic cable SBOA
<b>Electrical connection</b>	25-pin, 5-pin, Straight plug, Straight plug connector/open at one end, Sub-D/-, Sub-D/Sub-D, Square design/angled, M12x1							
<b>Electrical connection, connection type</b>	Socket, Plugs, Plug and socket strip, Hybrid plug, Cable		Socket, Plugs		Socket, Cable, Plugs			
<b>Electrical connection, cable outlet</b>	Straight, Angled		Angled		Straight, Angled			
<b>Electrical connection, design</b>	Angular, Round		Round		Round			
<b>Electrical connection, connection technology</b>	M12x1, Festo-specific coding, HR25, M12x1, A-coded to EN 61076-2-101, M8x1, D-coded according to EN 61076-2-114, M9x0.5, USB 3.0 type A, Open end, M8x1, A-coded, to EN 61076-2-104, RJ45, RJ45 and socket strip 12 pins, 2 rows, Sub-D, USB 3.0 type B micro	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				
<b>Electrical connection, number of pins/wires</b>	4, 5, 8, 9, 10, 15, 17, 20	5, 6		4				
<b>Cable length</b>	0.2 ... 30 m	2 m		0.3 ... 15 m				
<b>Description</b>	<ul style="list-style-type: none"> <li>• Variants with an easy-to-clean design</li> <li>• Standard variants, variants with shielding or as a hybrid cable</li> <li>• Variant suitable for use with energy chains</li> <li>• Variants with Ethernet, CANopen, I-Port or RS232</li> </ul>	<ul style="list-style-type: none"> <li>• Connection between displacement encoder MME and measuring module CPX-CMIX</li> </ul>		<ul style="list-style-type: none"> <li>• For power supply</li> <li>• Suitable for use with energy chains</li> </ul>		<ul style="list-style-type: none"> <li>• Ethernet diagnostic cable</li> </ul>		
<b>online: →</b>	<a href="#">nebc</a>		<a href="#">nebp</a>		<a href="#">nebl</a>		<a href="#">sboa</a>	

## Product overview

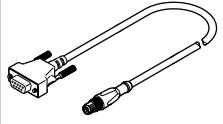
### Connecting cables >

#### Connecting cables for control systems

			
	<b>Programming cables KDI</b>	<b>Programming cables PS1-ZK11</b>	<b>Connecting cables KV-M12</b>
<b>Electrical connection</b>	9-pin/9-pin, Straight socket/straight plug connector, Sub-D/Sub-D	9-pin, Sub-D	
<b>Electrical connection, connection type</b>			Socket, Plugs
<b>Electrical connection, cable outlet</b>			Straight
<b>Electrical connection, design</b>			Round
<b>Electrical connection, connection technology</b>			M12x1, A-coded to EN 61076-2-101
<b>Electrical connection, number of pins/wires</b>			5
<b>Cable length</b>	3 m	2 m	1.5 ... 3.5 m
<b>Description</b>	<ul style="list-style-type: none"> <li>Pre-assembled at both ends</li> </ul>	<ul style="list-style-type: none"> <li>For motor controller CMMS-ST, etc.</li> <li>The null modem cable ZK11 is only intended as a programming cable for direct connection to a PC</li> </ul>	<ul style="list-style-type: none"> <li>Plug socket with cable for diagnostic interface (to CPX terminal)</li> <li>Pre-assembled at both ends</li> <li>5-pin/4-wire</li> </ul>
<b>online: ➔</b>	<a href="#">kdi</a>	<a href="#">cmms-st</a>	<a href="#">kv-m12</a>

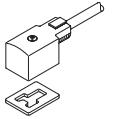
### Connecting cables >

#### Connecting cables for motors

		
	<b>Motor, encoder, resolver cables NEBM</b>	<b>Fieldbus adapters FBA</b>
<b>Electrical connection, connection type</b>	Socket, Hybrid socket, Cable, Plugs, Plugs and cables	Socket, Plugs
<b>Electrical connection, cable outlet</b>	Straight, Angled	Straight
<b>Electrical connection, design</b>	Angular, Round	Angular, Round
<b>Electrical connection, connection technology</b>	Connection pattern F1, Connection pattern H6, coded for motor, Connection pattern H7, coded for motor brake, Connection pattern L4, Connection pattern L5, Connection pattern RE, ITT M3, M12x1, A-coded to EN 61076-2-101, RJ45, RJ45 and open end, Sub-D, M16x0.75, M23x1, Open end, M40x1.5	M12x1, A-coded to EN 61076-2-101, Sub-D
<b>Electrical connection, number of pins/wires</b>	2, 4, 6, 8, 9, 10, 12, 14, 15, 18, 28, 31	5, 9
<b>Cable length</b>	0.2 ... 100 m	0.1 m
<b>Description</b>	<ul style="list-style-type: none"> <li>For servo motors EMMB-AS, EMME-AS, EMMS-AS, EMMT-AS and stepper motor EMMS-ST</li> <li>Can be used in a wide temperature range</li> <li>For motor controllers CMMS-ST, CMMO-ST, CMMP-AS</li> <li>Suitable for use with energy chains</li> </ul>	<ul style="list-style-type: none"> <li>9-pin Sub-D plug to 5-pin round plug/M12 socket</li> <li>For CANopen and DeviceNet</li> </ul>
<b>online: ➔</b>	<a href="#">nebm</a>	<a href="#">fba</a>

Connecting cables &gt;

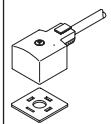
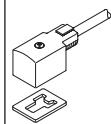
## Connecting cables for valves

						
Connecting cables 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	2-pin, 3-pin, 4-pin, 5-pin, Angled socket, Type C, To DIN EN 175301-803	Socket			
Electrical connection, connection type	2x single wires, Socket, Socket, narrow, Cable with socket, Cable, Plugs, Twin wire					
Electrical connection, cable outlet	Straight, Angled					
Electrical connection, design	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, Connection pattern HP, Connection pattern Q7, M12x1, A-coded to EN 61076-2-101, 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					
Electrical connection, number of pins/wires	2, 3, 4, 5, 8, 10, 25, 26, 27, 36, 37, 44					
Cable length	0.1 ... 30 m	0.5 ... 10 m	2.5 ... 10 m	0.2 m		
Description	<ul style="list-style-type: none"> <li>Pre-assembled at one or both ends</li> </ul>	<ul style="list-style-type: none"> <li>For valves with EB solenoid coil</li> <li>With PVC or PU cable</li> <li>Mounting via central screw</li> </ul>	<ul style="list-style-type: none"> <li>For valves with F solenoid coil</li> <li>Mounting via central screw</li> <li>Polyvinyl chloride cable</li> <li>Ambient temperature -20 ... +80 °C</li> </ul>	<ul style="list-style-type: none"> <li>For proportional valves VPWP</li> <li>For connecting to sub-base VABP-S3</li> <li>Pre-assembled</li> </ul>		
online: ➔	<a href="#">nebv</a>	<a href="#">kmeb-1</a>	<a href="#">kmf</a>	<a href="#">nedv</a>		

## Product overview

[Connecting cables >](#)

### Connecting cables for valves

				
<b>Plug sockets with cable KMYZ-2, KMYZ-4</b>	<b>Plug sockets with cable KME</b>	<b>Plug sockets with cable KMC</b>	<b>Plug sockets with cable KMV</b>	
<b>Electrical connection</b>	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		Socket, Type A	Socket, Type B
<b>Electrical connection, connection type</b>				
<b>Electrical connection, cable outlet</b>				
<b>Electrical connection, design</b>				
<b>Electrical connection, connection technology</b>	M8x1, open end			
<b>Electrical connection, number of pins/wires</b>				
<b>Cable length</b>	0.5 ... 10 m	2.5 ... 10 m	2.5 ... 10 m	2.5 ... 10 m
<b>Description</b>	<ul style="list-style-type: none"> <li>For valves with ZB solenoid coil</li> <li>For valves with ZC solenoid coil</li> <li>Mounting via central screw</li> </ul>	<ul style="list-style-type: none"> <li>For valves with E solenoid coil</li> <li>Mounting via central screw</li> <li>Polyvinyl chloride cable</li> <li>Ambient temperature -20 ... +80 °C</li> </ul>	<ul style="list-style-type: none"> <li>For valves with D solenoid coil</li> <li>For valves with N1 solenoid coil</li> <li>Polyvinyl chloride cable</li> <li>Mounting via central screw</li> <li>Ambient temperature -20 ... +80 °C</li> </ul>	<ul style="list-style-type: none"> <li>For valves with V solenoid coil</li> <li>Mounting via central screw M3</li> <li>Polyvinyl chloride cable</li> <li>Ambient temperature -20 ... +80 °C</li> </ul>
<b>online: ➔</b>	<a href="#">kmyz-2</a>	<a href="#">kme</a>	<a href="#">kmc</a>	<a href="#">kmv</a>

[Connecting cables >](#)

### Connecting cables for valves

				
	<b>Connecting cables KRP</b>	<b>Electrical plug-in bases MHAP-PI</b>	<b>Plug sockets with cable KMPPE</b>	
<b>Electrical connection</b>	2-pin, Angled socket	2-pin, Socket		
<b>Electrical connection, connection type</b>			Socket, Cable	
<b>Electrical connection, cable outlet</b>			Angled	
<b>Electrical connection, design</b>			Round	
<b>Electrical connection, connection technology</b>			M16x0.75 to EN 61076-2-106, Open end	
<b>Electrical connection, number of pins/wires</b>			8	
<b>Cable length</b>	2.5 ... 5 m	0.5 ... 1 m	2.5 ... 5 m	
<b>Description</b>	<ul style="list-style-type: none"> <li>Plug socket with cable for connecting relay plates (valve terminal CPV10 and CPV14)</li> <li>Pre-assembled</li> <li>Mounting via self-tapping central screw</li> </ul>	<ul style="list-style-type: none"> <li>Plug socket with cable for connecting individual valves</li> <li>Pre-assembled</li> <li>Mounting via clip</li> </ul>	<ul style="list-style-type: none"> <li>For proportional pressure regulators MPPE and MPPEs</li> <li>Mounting with union nut M16x0.75</li> <li>Polyvinyl chloride cable</li> <li>Ambient temperature -30 ... +80 °C</li> </ul>	
<b>online: ➔</b>	<a href="#">krp</a>	<a href="#">mhap</a>	<a href="#">kmppe</a>	

Connecting cables &gt;

## Connecting cables for valves

		
	<b>Connecting cables</b> KMPYE-AIF, KMPYE-5, KMPYE-...	<b>Connecting cables</b> MHJ9-KMH
<b>Electrical connection</b>		2-pin/2-pin/4-wire, Straight socket/straight socket/cable
<b>Electrical connection, connection type</b>	Socket, Plugs	
<b>Electrical connection, cable outlet</b>	Straight	
<b>Electrical connection, design</b>	Round	
<b>Electrical connection, connection technology</b>	M12x1, A-coded to EN 61076-2-101, M9x0.5	
<b>Electrical connection, number of pins/wires</b>	4, 7	
<b>Cable length</b>	0.3 ... 5 m	0.5 ... 2.5 m
<b>Description</b>	<ul style="list-style-type: none"> <li>Plug socket with cable, shielded, for proportional directional control valves MPYE</li> </ul>	<ul style="list-style-type: none"> <li>For valves MHJ9</li> <li>With plug sockets KMH</li> <li>With control electronics for two valves</li> </ul>
<b>online:</b> ➔	<a href="#">kmpye</a>	<a href="#">mhj9-kmh</a>

Connecting cables &gt;

## Connecting cables for valve terminals

				
	<b>Connecting cables</b> NEBV-S1	<b>Flat cables</b> KASI	<b>Addressing cables</b> KASI-ADR	<b>Connecting cables</b> KMP3, KMP4, KMP6
<b>Electrical connection</b>				
<b>Electrical connection, connection type</b>	Socket, Cable		Socket	Socket, Cable
<b>Electrical connection, cable outlet</b>	Angled		Straight, Angled	Straight, Angled
<b>Electrical connection, design</b>	Angular		Angular, Round	Angular
<b>Electrical connection, connection technology</b>	Open end, Sub-D	open cable end	AS-Interface, M12x1, A-coded to EN 61076-2-101	Open end, Sub-D
<b>Electrical connection, number of pins/wires</b>	10, 26, 27, 37		2, 4	9, 10, 15, 18, 20, 25, 26
<b>Cable length</b>	2.5 ... 10 m	100 m		1 ... 99 m
<b>Description</b>	<ul style="list-style-type: none"> <li>For multi-pin plug connection at valve terminal VTSA and VTSA-F</li> <li>Pre-assembled at one end</li> </ul>	<ul style="list-style-type: none"> <li>For AS-Interface</li> <li>Reverse polarity protected</li> <li>Contact using insulation displacement technology</li> <li>No need to strip cable and wire insulation</li> <li>Two different colours: yellow (preferred for the AS-Interface® network) and black (for auxiliary power supply)</li> </ul>	<ul style="list-style-type: none"> <li>For AS-Interface</li> <li>For any slaves such as individual valve interface, valve terminal with AS-Interface® connection</li> <li>Reverse polarity protected</li> </ul>	<ul style="list-style-type: none"> <li>Plug socket with cable for multi-pin plug connection</li> <li>Pre-assembled</li> <li>Mounting via union nut, with 2 screws</li> </ul>
<b>online:</b> ➔	<a href="#">nebv</a>	<a href="#">kasi</a>	<a href="#">kasi-adr</a>	<a href="#">kmp</a>

## Product overview

### 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
<b>Electrical connection</b>		15-pin, Socket, Sub-D		Cable with plug
<b>Electrical connection, connection type</b>	Socket, Plugs		Socket, Plugs	
<b>Electrical connection, cable outlet</b>	Straight		Straight, Angled	
<b>Electrical connection, design</b>	Round		Round	
<b>Electrical connection, connection technology</b>	M12x1, A-coded to EN 61076-2-101		M9x0.5	
<b>Electrical connection, number of pins/wires</b>	5		5	
<b>Cable length</b>	1.5 ... 3.5 m	5 ... 10 m	0.25 ... 8 m	2.5 ... 10 m
<b>Description</b>	<ul style="list-style-type: none"> <li>Plug socket with cable for diagnostic interface (to CPX terminal)</li> <li>Pre-assembled at both ends</li> <li>5-pin/4-wire</li> </ul>	<ul style="list-style-type: none"> <li>Plug socket with cable for multi-pin plug connection</li> <li>Pre-assembled</li> </ul>	<ul style="list-style-type: none"> <li>For fieldbus connection (for valve manifold CPV and installation system CPI)</li> <li>Pre-assembled at both ends</li> <li>Suitable for use with energy chains</li> </ul>	<ul style="list-style-type: none"> <li>Plug socket with cable for multi-pin connection (to valve terminal MPA)</li> <li>Variant suitable for use with energy chains</li> <li>Cable outlet straight or to the side</li> <li>Pre-assembled at one end</li> <li>With PVC or PU cable</li> </ul>
<b>online:</b> ➔	<a href="#">kv-m12</a>	<a href="#">kmpv</a>	<a href="#">kvi</a>	<a href="#">vmpa-kms</a>

### Connecting cables >

#### Connecting cables for sensors

				
Connecting cables NEBB		Connecting cables NEBS	Connecting cables NEBU	
<b>Electrical connection, connection type</b>	Socket, Cable	Socket, Plugs, Cable	Socket, Cable, Plugs	
<b>Electrical connection, cable outlet</b>	Straight, Angled	Straight	Straight, Angled, Angled, can be aligned in increments of 15°	
<b>Electrical connection, design</b>	Round	Angular, Round	Round	
<b>Electrical connection, connection technology</b>	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, M16x0.75, Open end	G7/8 coded to NFPA/T3.5.29 R1-2007, 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	
<b>Electrical connection, number of pins/wires</b>	3, 4, 5	4, 5, 12, 24, 25	3, 4, 5, 8	
<b>Cable length</b>	2.5 ... 10 m	0.3 ... 15 m	0.1 ... 30 m	
<b>Description</b>	<ul style="list-style-type: none"> <li>For connecting sensors and actuators</li> <li>For static applications</li> <li>Degree of protection IP65, IP68, IP69K, when mounted</li> <li>Pre-assembled</li> </ul>	<ul style="list-style-type: none"> <li>Degree of protection IP40, IP65, IP67, IP69K, when mounted</li> </ul>	<ul style="list-style-type: none"> <li>Designs for static, standard, energy chain and robot applications</li> <li>Versions with switching status indication</li> <li>Designs for connecting sensors and actuators</li> </ul>	
<b>online:</b> ➔	<a href="#">nebb</a>	<a href="#">nebs</a>	<a href="#">nebu</a>	

Connecting cables &gt;

## Connecting cables for sensors

		
<b>Connecting cables/plug sockets with cable SIM</b>		
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	<ul style="list-style-type: none"> <li>• Pre-assembled at one or both ends</li> </ul>	
online: ➔	<a href="#">sim</a>	
<b>km12</b>		

## Product overview

[Plugs >](#)

### Universal plug connectors

				
<b>Electrical connection</b>			3-pin, 4-pin, 7-pin, 8-pin, A-coded, Spring-loaded terminal, Type A, Screw terminal, Straight plug/insulation displacement connector, Straight plug connector/screw terminal, Straight plug, Square design, M8x1, M12x1	4-pin/4-pin/4-pin, A-coded/A-coded/A-coded, Socket/socket/plug connector, M12x1/M12x1
<b>Electrical connection, connection type</b>	2x socket, 2x cable, Cable, Plugs		Socket, Plugs	
<b>Electrical connection, design</b>	Angular, Round		Angular, Round	
<b>Electrical connection, connection technology</b>	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, 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		Connection pattern FC, Spring-loaded terminal, Connection pattern PP, coding on pins 2 and 5, Insulation displacement connector, Screw terminal, M8x1, A-coded, to EN 61076-2-104	
<b>Electrical connection, number of pins/wires</b>	2, 3, 4, 5		4, 5, 40	
<b>Degree of protection</b>	IP65, IP67, IP68, IP69K	IP20, IP65, IP67, In assembled state, To IEC 60529	IP20, IP40, IP65, IP67	IP65, IP67
<b>Connection cross section</b>			0.08 ... 2.5 mm <sup>2</sup>	
<b>Description</b>	<ul style="list-style-type: none"> <li>• Collecting signals between field devices (sensors) and double-assigned controller inputs</li> <li>• Distributing signals between double-assigned controller outputs and field devices (actuators, e.g. valves)</li> </ul>	<ul style="list-style-type: none"> <li>• Cable socket for branching the AS-Interface network at any required point</li> <li>• Reconnecting AS-Interface flat cable to 5-pin M12 socket</li> <li>• Reverse polarity protected</li> </ul>	<ul style="list-style-type: none"> <li>• Power supply socket for fieldbus connection</li> <li>• NECU-HX: reconnectable M8 and M12 round plug connector with Harax® quick connection technology for low-voltage applications</li> <li>• Plug and socket for power supply</li> <li>• Can be assembled with any cable lengths</li> </ul>	<ul style="list-style-type: none"> <li>• For fieldbus interface</li> <li>• Branch line for connecting and disconnecting fieldbus components</li> </ul>
<b>online:</b> →	<a href="#">nedy</a>	<a href="#">nefu</a>	<a href="#">necu</a>	<a href="#">nedu</a>

Plugs &gt;

## Universal plug connectors

			
	<b>Multi-pin plug distributors NEDU</b>	<b>Multi-pin plug distributors MPV-E/A</b>	<b>Plug connectors SEA</b>
<b>Electrical connection</b>			3-pin, 4-pin, 5-pin, Type A, Straight plug/soldered connection, Straight plug/insulation displacement connector, Straight plug connector/screw terminal, M8x1, M12x1, M12x1 Round plug connector
<b>Electrical connection, connection type</b>			Plugs
<b>Electrical connection, design</b>			Round
<b>Electrical connection, connection technology</b>			M12x1, A-coded to EN 61076-2-101, Screw terminal
<b>Electrical connection, number of pins/wires</b>			4
<b>Degree of protection</b>	IP68	IP65, In assembled state, To IEC 60529	IP65, IP67
<b>Connection cross section</b>			0.14 ... 0.75 mm <sup>2</sup>
<b>Description</b>	<ul style="list-style-type: none"> <li>Particularly compact</li> <li>LED switching status indication</li> </ul>	<ul style="list-style-type: none"> <li>Mounting: H-rail mounting or via through-holes</li> <li>LED switching status indication</li> </ul>	<ul style="list-style-type: none"> <li>Sensor plug for inputs/outputs</li> <li>Can be assembled with any cable lengths</li> </ul>
<b>online: →</b>	<a href="#">nedu</a>	<a href="#">mpv</a>	<a href="#">sea</a>

Plugs &gt;

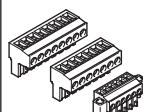
## Universal plug connectors

		
	<b>Cable distributors ASI-KVT</b>	<b>Cable sockets ASI-SD</b>
<b>Electrical connection</b>		2-pin, 4-pin, Straight socket, Screw terminal
<b>Electrical connection, connection type</b>		
<b>Electrical connection, design</b>		
<b>Electrical connection, connection technology</b>	Insulation displacement technology	
<b>Electrical connection, number of pins/wires</b>		
<b>Degree of protection</b>	IP65	IP65, IP67
<b>Connection cross section</b>	1.5 mm <sup>2</sup>	0.75 ... 1.5 mm <sup>2</sup>
<b>Description</b>	<ul style="list-style-type: none"> <li>Flat cable distributor for branching or for reconnecting AS-Interface flat cables</li> <li>Reverse polarity protected</li> </ul>	<ul style="list-style-type: none"> <li>For AS-Interface</li> <li>Flat-cable socket for connecting AS-Interface stations to the AS-Interface bus system</li> <li>M12 connection</li> <li>Reverse polarity protected</li> <li>Detachable connection</li> </ul>
<b>online: →</b>	<a href="#">asi-kvt</a>	<a href="#">asi-sd</a>

## Product overview

[Plugs >](#)

### Plug connectors for control systems

				
<b>Electrical connection</b>		9-pin/9-pin, Sub-D/screw terminal	10-pin/30-pin, Socket/terminal strip	
<b>Electrical connection, connection type</b>		Socket		Plug
<b>Electrical connection, design</b>		Angular		straight
<b>Electrical connection, connection technology</b>	Screw connector	Spring-loaded terminal, Connection pattern L8		Type A, M12x1, screw terminal
<b>Electrical connection, number of pins/wires</b>		5		
<b>Degree of protection</b>		IP20, IP40		IP40
<b>Connection cross section</b>			0.08 ... 0.75 mm <sup>2</sup>	
<b>Description</b>	<ul style="list-style-type: none"> <li>For motor controllers CMMS-ST, CMMO-ST, CMMP-AS</li> <li>For servo drive CMMT-AS</li> </ul>	<ul style="list-style-type: none"> <li>Encoder plug for motor controller CMMS-ST</li> <li>For controllers CECC</li> <li>2-pin, 4-pin, 6-pin, 8-pin, 11-pin, 18-pin</li> </ul>	<ul style="list-style-type: none"> <li>For power supply</li> <li>Cable connection using clamping technology</li> <li>Individually or as a set</li> </ul>	<ul style="list-style-type: none"> <li>Plug connector for CAN bus and PROFIBUS bus connection</li> <li>Cable connection 2x horizontal or 2x vertical</li> <li>PCB terminal block with screw connector</li> </ul>
<b>online: ➔</b>	<a href="#">nekm</a>	<a href="#">necc</a>	<a href="#">ps1</a>	<a href="#">fbs-sub-9-ws</a>

[Plugs >](#)

### Plug connectors for control systems

			
<b>Electrical connection</b>			5-pin, Plugs, M12x1
<b>Electrical connection, connection type</b>			Socket, Plugs
<b>Electrical connection, design</b>			Round
<b>Electrical connection, connection technology</b>	RJ45 jack		M12x1, A-coded to EN 61076-2-101
<b>Electrical connection, number of pins/wires</b>			5, 8
<b>Degree of protection</b>	IP65, IP67, To IEC 60529	IP40	IP20, IP65, IP67
<b>Connection cross section</b>			
<b>Description</b>	<ul style="list-style-type: none"> <li>Ethernet plug with 8-pin RJ45 connection</li> <li>High transmission quality</li> <li>Detachable connection</li> </ul>	<ul style="list-style-type: none"> <li>For operation of an interlock-capable valve terminal interface in pure I-Port mode</li> </ul>	<ul style="list-style-type: none"> <li>Adapter, 5-pin M12, for mini USB socket with controller software for CPX terminal</li> <li>Adapter for rotary drive unit ERMS which forms a connection between the motor and IO-Link master</li> <li>Plug and manifold block for motor controller CMMO-ST to form a connection from the I/O interface to the controller</li> </ul>
<b>online: ➔</b>	<a href="#">fbs-rj</a>	<a href="#">neff</a>	<a href="#">nefc</a>

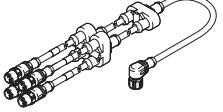
Plugs &gt;

## Plugs for motors

		<b>Adapter NEFM</b>	
<b>Description</b>	<ul style="list-style-type: none"> <li>Pre-assembled</li> <li>For the encoder connection of the servo motor EMMB to the servo drive CMMT-AS</li> </ul>		
online: ➔	<a href="#">nefm</a>		

Plugs &gt;

## Plug connectors for valves

		<b>Plug sockets MSSD</b>			<b>Adapters NEFV</b>		<b>Soldering bases PCBC</b>		<b>Multi-pin plug sockets NECA</b>
<b>Electrical connection</b>	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				
<b>Electrical connection, connection type</b>	Socket	Socket, 4x plug connectors							
<b>Electrical connection, design</b>	Angular	Angular, Round							
<b>Electrical connection, connection technology</b>	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							
<b>Electrical connection, number of pins/wires</b>	3	5, 8, 12							
<b>Connection cross section</b>	0.25 ... 1.5 mm <sup>2</sup>					0.34 ... 1 mm <sup>2</sup>			
<b>Degree of protection</b>	IP50, IP65, IP67, To IEC 60529	IP40, IP65, IP67			IP40		IP65, To IEC 60529		
<b>Description</b>	<ul style="list-style-type: none"> <li>For valves with F, D, N1, V, E, EB, N2, Y, Z, ZB, ZC, MD-2 and MH-2 solenoid coils</li> <li>For connecting individual valves</li> <li>Available with LED display</li> </ul>	<ul style="list-style-type: none"> <li>Adapter for connecting a proportional valve to the controller</li> </ul>	<ul style="list-style-type: none"> <li>For mounting miniature valves MHA1 and MHP1 on a PCB with plug connection underneath (-PI)</li> <li>For soft-start/quick exhaust valves MS6-SV, MS series</li> <li>Electrical connection via 9-pin Sub-D, 9-pin screw terminal</li> </ul>						
online: ➔	<a href="#">mssd</a>	<a href="#">nefv</a>			<a href="#">pcbc</a>		<a href="#">neca</a>		

## Product overview

[Plugs >](#)

### Plug connectors for valves

				
<b>Angled plug sockets MPPE-3-B</b>	<b>Time delay inserts MFZ</b>		<b>Illuminating seals MC-LD, ME-LD, MEB-LD, MF-LD, MV-LD</b>	<b>Indicating inserts MCL, MCLZ, MFL, MFLZ</b>
<b>Electrical connection</b>	8-pin, Angled socket, Solderable		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	Plugs, To DIN 43650
<b>Electrical connection, connection type</b>		for connector socket or device plug		
<b>Electrical connection, design</b>		Type F		
<b>Electrical connection, connection technology</b>				
<b>Electrical connection, number of pins/wires</b>				
<b>Connection cross section</b>	0.75 mm <sup>2</sup>			
<b>Degree of protection</b>	IP67	IP64	IP65	IP65
<b>Description</b>	<ul style="list-style-type: none"> <li>For proportional pressure regulators MPPE and MPPES</li> <li>Mounting via union nut</li> </ul>	<ul style="list-style-type: none"> <li>Electronic timer with adjustable delay time of between 0 ... 10 s</li> <li>For mounting between the solenoid coil and connector socket or device plug</li> </ul>	<ul style="list-style-type: none"> <li>The seal lights up yellow when the power is switched on</li> <li>For mounting between the solenoid coil and connector socket or device plug</li> <li>For F, D, N1, V, E and EB solenoid coils</li> </ul>	<ul style="list-style-type: none"> <li>Variant with integrated protective circuit</li> <li>For mounting between the solenoid coil and connector socket or device plug</li> <li>With yellow LED display</li> </ul>
<b>online:</b> →	<a href="#">mppe-3-b</a>	<a href="#">mfz</a>	<a href="#">mc-ld</a>	<a href="#">mcl</a>

[Plugs >](#)

### Plug connectors for valve terminals

				
<b>Plug sockets FBSD-GD, FBSD-WD</b>	<b>Plug sockets NTSD-GD, NTSD-WD</b>		<b>Bus connections FBA-1, FBA-2</b>	<b>Plug connectors FBS-SUB, FBS-SCRJ, FBS-M12</b>
<b>Electrical connection</b>	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	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
<b>Degree of protection</b>	IP20, IP67	IP67	IP40, IP65, To IEC 60529	IP65, IP67, In assembled state, To IEC 60529
<b>Connection cross section</b>	0.2 ... 2.5 mm <sup>2</sup>	0.75 ... 2.5 mm <sup>2</sup>		0.75 mm <sup>2</sup>
<b>Description</b>	<ul style="list-style-type: none"> <li>For fieldbus interface</li> <li>Straight or angled design</li> <li>Can be assembled with any cable lengths</li> </ul>	<ul style="list-style-type: none"> <li>Straight or angled design</li> <li>For power supply</li> <li>Can be assembled with any cable lengths</li> </ul>	<ul style="list-style-type: none"> <li>Can be assembled with any cable lengths</li> </ul>	<ul style="list-style-type: none"> <li>Variants for different fieldbus systems</li> <li>Position of DIL switches can be read externally</li> <li>Easy assembly</li> </ul>
<b>online:</b> →	<a href="#">fbs</a>	<a href="#">ntsd</a>	<a href="#">fba</a>	<a href="#">fbs-sub</a>

## Plugs &gt;

## Plug connectors for valve terminals

			
<b>Sensor sockets, angled plug sockets SIE-GD, SIE-WD</b>		<b>Cover caps ISK</b>	<b>Plug sockets, plug connectors SD-SUB</b>
<b>Electrical connection</b>	4-pin, Straight socket/screw terminal, Angled socket/screw terminal, M12x1		25-pin, Plugs, Sub-D
<b>Degree of protection</b>	IP67	IP65	IP65
<b>Connection cross section</b>	0.25 ... 0.75 mm <sup>2</sup>		
<b>Description</b>	<ul style="list-style-type: none"> <li>For customised fabrication of cables</li> <li>Pin adapter for fieldbus interface</li> <li>With screw terminals</li> <li>Straight or angled design</li> </ul>	<ul style="list-style-type: none"> <li>For sealing unused ports/openings</li> <li>Thread M8, M12</li> </ul>	<ul style="list-style-type: none"> <li>Plug socket for multi-pin plug connection</li> <li>Plug for inputs/outputs</li> <li>Can be assembled with any cable lengths</li> </ul>
online: →	sie-gd	isk	sd-sub

## Plugs &gt;

## Plug connectors for valve terminals

		
<b>Bus connections FBSD-KL</b>		<b>T-adapter FB-TA</b>
<b>Electrical connection</b>	5-pin/5-pin, Angled socket/screw terminal	5-pin, M12x1/M12x1, Plug connectors/sockets
<b>Degree of protection</b>	IP20	IP67
<b>Connection cross section</b>	0.2 ... 2.5 mm <sup>2</sup>	
<b>Description</b>	<ul style="list-style-type: none"> <li>5-pin angled socket, 5-pin screw terminal</li> </ul>	<ul style="list-style-type: none"> <li>Branch line for connecting and disconnecting fieldbus components</li> </ul>
online: →	fbsd-kl	fb-ta

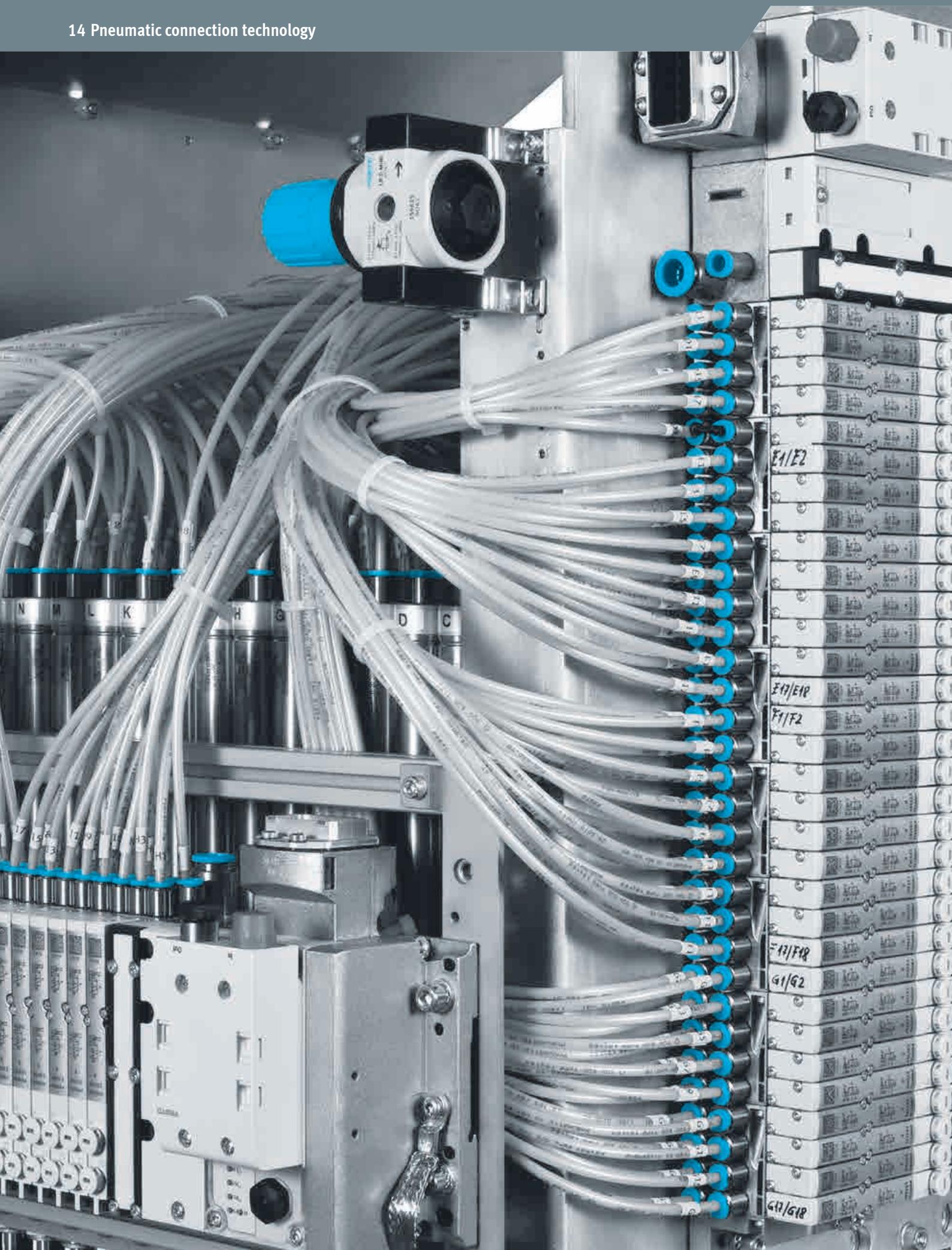
## Plugs &gt;

## Plug connectors for sensors

		
<b>Angled plug sockets PEV-...-WD</b>		<b>Plug sockets SD-4-WD</b>
<b>Electrical connection</b>	4-pin, Angled socket	Plug, Sub-D, 4-pin
<b>Degree of protection</b>	IP65	IP65, To IEC 60529
<b>Description</b>	<ul style="list-style-type: none"> <li>For pressure switch PEV</li> <li>15 ... 30, 180 V DC, 230 V AC</li> <li>Available with LED display</li> <li>Angled design</li> </ul>	<ul style="list-style-type: none"> <li>For swivel module DSMI</li> <li>Angled design</li> </ul>
online: →	pev*wd	sd-4-wd

## Product overview

## 14 Pneumatic connection technology



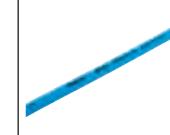
## Product overview

### Software tools

<b>Product Finder for tubing</b>		Simply enter parameters such as working pressure, chemicals and required resistance to cleaning agents and have the program calculate the right tubing for your application.
<b>Festo Design Tool 3D</b>		<p>This tool can be found</p> <ul style="list-style-type: none"> <li>• on our website under <a href="http://www.festo.com/catalogue">www.festo.com/catalogue</a> by clicking on the blue icon "Product Finder".</li> </ul> <p>The Festo Design Tool 3D is a 3D product configurator for generating specific CAD product combinations from Festo.</p> <p>The configurator makes your search for the right accessory easier, more reliable and faster.</p> <p>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.</p> <p>This considerably reduces your bill of materials, and downstream processes such as product ordering, order picking and assembly are significantly simplified.</p> <p>This tool can be found at  <a href="http://www.festo.com/x/festo-design-tool">www.festo.com/x/festo-design-tool</a></p>

Tubing >

### Standard O.D. tubing

	 Plastic tubing PUN-H, PUN-H-DUO	 Plastic tubing PUN, PUN-DUO	 Plastic tubing PTFEN	 Plastic tubing PUN-CM
<b>Outside diameter</b>	2 ... 16 mm	3 ... 16 mm	4 ... 16 mm	4 ... 12 mm
<b>Inside diameter</b>	1.2 ... 11 mm	2.1 ... 11 mm	2.9 ... 11 mm	2.5 ... 8 mm
<b>Temperature-dependent operating pressure</b>	-0.95 ... 10 bar	-0.95 ... 10 bar	-0.95 ... 15 bar	-0.95 ... 10 bar
<b>Ambient temperature</b>	-35 ... 60°C	-35 ... 60°C	-20 ... 150°C	-35 ... 60°C
<b>Description</b>	<ul style="list-style-type: none"> <li>• Polyurethane</li> <li>• High resistance to microbes and hydrolysis</li> <li>• Food-safe, see <a href="http://www.festo.com/sp/pun-h">www.festo.com/sp/pun-h</a> -&gt; "Certificates" tab</li> <li>• Suitable for use with energy chains</li> <li>• Also available as DUO plastic tubing</li> <li>• Operating medium: compressed air, vacuum</li> </ul>	<ul style="list-style-type: none"> <li>• Polyurethane</li> <li>• High resistance to stress cracks</li> <li>• Suitable for use with energy chains</li> <li>• Also available as DUO plastic tubing</li> <li>• Operating medium: compressed air, vacuum</li> </ul>	<ul style="list-style-type: none"> <li>• Polytetrafluoroethylene</li> <li>• Food-safe, see <a href="http://www.festo.com/sp/ptfen">www.festo.com/sp/ptfen</a> -&gt; "Certificates" tab</li> <li>• High resistance to chemicals</li> <li>• High temperature resistance</li> <li>• Operating medium: compressed air, vacuum</li> </ul>	<ul style="list-style-type: none"> <li>• Polyurethane</li> <li>• Plastic tubing, antistatic, electrically conductive</li> <li>• Suitable for use with energy chains</li> <li>• Operating medium: compressed air, vacuum</li> </ul>
<b>online:</b> ➔	<a href="http://www.festo.com/x/pun-h">pun-h</a>	<a href="http://www.festo.com/x/pun">pun</a>	<a href="http://www.festo.com/x/ptfen">ptfen</a>	<a href="http://www.festo.com/x/pun-cm">pun-cm</a>

Tubing &gt;

## Standard O.D. tubing

				
<b>Outside diameter</b>	4 ... 16 mm	4 ... 16 mm	4 ... 16 mm	3 ... 16 mm
<b>Inside diameter</b>	2 ... 11.8 mm	2.7 ... 10.8 mm	2.9 ... 12 mm	2 ... 12 mm
<b>Temperature-dependent operating pressure</b>	-0.95 ... 30 bar	-0.95 ... 10 bar	-0.95 ... 19 bar	-0.95 ... 35 bar
<b>Ambient temperature</b>	-35 ... 60°C	-30 ... 60°C	-30 ... 80°C	-60 ... 100°C
<b>Description</b>	<ul style="list-style-type: none"> <li>Polyurethane</li> <li>Flame retardant to UL 94 VO ... V2</li> <li>For use in the immediate vicinity of welding applications</li> <li>High resistance to microbes and hydrolysis</li> <li>Suitable for use with energy chains</li> <li>Operating medium: compressed air, vacuum, water</li> </ul>	<ul style="list-style-type: none"> <li>Polyethylene</li> <li>High resistance to chemicals and very high resistance to hydrolysis</li> <li>Resistant to most cleaning agents and lubricants</li> <li>Suitable for use with energy chains</li> <li>Operating medium: compressed air, vacuum, water</li> </ul>	<ul style="list-style-type: none"> <li>Polyamide</li> <li>High thermal and mechanical load capacities</li> <li>Highly resistant to microbes</li> <li>Operating medium: compressed air, vacuum</li> </ul>	<ul style="list-style-type: none"> <li>Individual lengths: delivered in units of 25, 50, 100, 200 ... 500 m</li> <li>Minimum quantity: 3000 m</li> <li>Individual design: labelled with your company name and/or your part number</li> <li>Easy to recognise and handle: individual colour selection</li> <li>Choose from 9 basic colours; further colours available on request</li> <li>Select, size and order quickly, easily and reliably with the configurator</li> </ul>
<b>online:</b> ➔	<a href="#">pun-v0</a>	<a href="#">pen</a>	<a href="#">pan</a>	<a href="#">pan</a>

Tubing &gt;

## Standard O.D. tubing

			
<b>Outside diameter</b>	4 ... 16 mm	4 ... 28 mm	6 ... 14 mm
<b>Inside diameter</b>	2.5 ... 12 mm	2.5 ... 23 mm	2.5 ... 9 mm
<b>Temperature-dependent operating pressure</b>	-0.95 ... 31 bar	-0.95 ... 35 bar	-0.95 ... 12 bar
<b>Ambient temperature</b>	-60 ... 100°C	-30 ... 80°C	-30 ... 90°C
<b>Description</b>	<ul style="list-style-type: none"> <li>Polyamide</li> <li>High thermal and mechanical load capacities</li> <li>Meets the requirements to DIN 73378 "Polyamide tubing for use in motor vehicles"</li> <li>Operating media: compressed air, mineral oil</li> </ul>	<ul style="list-style-type: none"> <li>Polyamide</li> <li>For applications with high pressure ranges</li> <li>Highly resistant to microbes</li> <li>Operating medium: compressed air, vacuum</li> </ul>	<ul style="list-style-type: none"> <li>Polyvinyl chloride, polyamide</li> <li>Flame retardant according to UL 94 VO</li> <li>High resistance to microbes and UV radiation</li> <li>Double-sheath tubing</li> <li>Operating medium: compressed air, vacuum, water, mineral oil</li> <li>Resistant to welding spatter</li> </ul>
<b>online:</b> ➔	<a href="#">pan</a>	<a href="#">pan-r</a>	<a href="#">pan-v0</a>

## Product overview

Tubing >

### Standard O.D. tubing

		
	<b>Plastic tubing PLN</b>	<b>Plastic tubing PFAN</b>
<b>Outside diameter</b>	4 ... 16 mm	3 ... 12 mm
<b>Inside diameter</b>	2.9 ... 12 mm	2.3 ... 8.4 mm
<b>Temperature-dependent operating pressure</b>	-0.95 ... 14 bar	-0.95 ... 16 bar
<b>Ambient temperature</b>	-30 ... 80°C	-20 ... 150°C
<b>Description</b>	<ul style="list-style-type: none"> <li>Polyethylene</li> <li>High resistance to chemicals, microbes and hydrolysis</li> <li>Food-safe, see <a href="http://www.festo.com/sp/pln">www.festo.com/sp/pln</a> -&gt; "Certificates" tab</li> <li>Resistant to most cleaning agents and lubricants</li> <li>Operating medium: compressed air, vacuum, water</li> </ul>	<ul style="list-style-type: none"> <li>Perfluoroalkoxy alkane</li> <li>Pneumatic tubing with resistance to high temperatures and chemicals</li> <li>Food-safe, see <a href="http://www.festo.com/sp/pfan">www.festo.com/sp/pfan</a> -&gt; "Certificates" tab</li> <li>High resistance to chemicals, microbes, UV radiation, hydrolysis and stress cracks</li> <li>Operating medium: compressed air, vacuum, water</li> </ul>
<b>online:</b> ➔	<a href="#">pln</a>	<a href="#">pfan</a>

Tubing >

### Standard I.D. tubing

	
	<b>Plastic tubing PU</b>
<b>Outside diameter</b>	11.6 ... 17.6 mm
<b>Inside diameter</b>	9 ... 13 mm
<b>Temperature-dependent operating pressure</b>	-0.95 ... 10 bar
<b>Ambient temperature</b>	-35 ... 60°C
<b>Description</b>	<ul style="list-style-type: none"> <li>Polyurethane with fabric</li> <li>High resistance to abrasion and kinks</li> <li>Operating media: compressed air, vacuum (PU-13)</li> </ul>
<b>online:</b> ➔	<a href="#">pu</a>

## Tubing &gt;

## Spiral tubing

			
<b>Spiral plastic tubing PUN-S, PUN-S-DUO</b>		<b>Spiral plastic tubing PUN-SG</b>	<b>Spiral plastic tubing PPS</b>
<b>Outside diameter</b>	4 ... 12 mm	9.5 ... 11.7 mm	6.3 ... 7.8 mm
<b>Inside diameter</b>	2.6 ... 8 mm	6.4 ... 7.9 mm	4.7 ... 6.2 mm
<b>Working length</b>	0.5 ... 6 m	2.4 ... 6 m	7.5 ... 15 m
<b>Temperature-dependent operating pressure</b>	-0.95 ... 10 bar	-0.95 ... 15 bar	-0.95 ... 21.2 bar
<b>Ambient temperature</b>	-35 ... 60°C	-40 ... 60°C	-30 ... 80°C
<b>Description</b>	<ul style="list-style-type: none"> <li>Polyurethane</li> <li>Also available as DUO plastic tubing</li> <li>Operating medium: compressed air, vacuum</li> <li>High resistance to UV radiation and stress cracks</li> </ul>	<ul style="list-style-type: none"> <li>Polyurethane, nickel-plated brass, polyacetal</li> <li>Pre-assembled with captive rotatable fittings</li> <li>High resistance to microbes and hydrolysis</li> <li>Operating medium: compressed air, vacuum</li> </ul>	<ul style="list-style-type: none"> <li>Polyamide, brass, galvanised steel</li> <li>Pre-assembled with 2 rotatable connectors and captive sealing rings OL</li> <li>Highly resistant to microbes</li> <li>Operating medium: compressed air, vacuum</li> </ul>
online: ➔	<a href="#">pun-s</a>	<a href="#">pun-sg</a>	<a href="#">pps</a>

## Fittings &gt;

## Push-in fittings

				
<b>Push-in fittings/connectors, mini series QSM, QSMC, QSMF, QSMI, QSMP, QSMS, QSMT, QSMX, QS MY</b>		<b>Push-in fittings/connectors, standard series QS, QSC, QSF, QSH, QSL, QSS, QST, QSW, QSX, QSY</b>	<b>Push-in fittings/connectors NPQH</b>	<b>Push-in fittings NPQR</b>
<b>Pneumatic connection 1</b>	Male thread M8x1.25, 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 QS-2, QS-3, QS-4, QS-6	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 QS-10, QS-12, QS-14, QS-4, QS-6, QS-8	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-14, QS-4, QS-6, QS-8	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, M7
<b>Pneumatic connection 2</b>	For tubing O.D. 2 mm, 3 mm, 4 mm, 6 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 QS-10, QS-12, QS-16, QS-4, QS-6, QS-8	For tubing O.D. 10 mm, 12 mm, 14 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
<b>Operating pressure for entire temperature range</b>	-0.95 ... 6 bar	-0.95 ... 14 bar	-0.95 ... 20 bar	-0.95 ... 16 bar
<b>Ambient temperature</b>	-10 ... 80°C	-20 ... 80°C	0 ... 150°C	-20 ... 150°C
<b>Description</b>	<ul style="list-style-type: none"> <li>Mini series</li> <li>Compact for maximum component density in confined installation spaces</li> <li>PBT and nickel-plated brass</li> <li>Operating medium: compressed air, vacuum</li> </ul>	<ul style="list-style-type: none"> <li>Standard series</li> <li>Wide range of variants: wide selection for maximum flexibility in standard applications</li> <li>PBT and nickel-plated brass</li> <li>Operating media: compressed air, vacuum, (water)</li> </ul>	<ul style="list-style-type: none"> <li>Solid-metal brass, chemically nickel-plated</li> <li>High corrosion and chemical resistance</li> <li>Highly resistant to temperatures and pressure</li> <li>Food-safe, see <a href="#">www.festo.com/sp/npqh</a> → "Certificates" tab</li> <li>Operating medium: compressed air, vacuum, water</li> </ul>	<ul style="list-style-type: none"> <li>Very easy to clean thanks to chamfered O-ring and fewer edges where dirt can accumulate</li> <li>Optimal price/performance ratio, perfect for applications from a single source</li> <li>Maximum corrosion resistance (corrosion resistance class CRC 4 to Festo standard 940 070) and chemical resistance</li> <li>High temperature resistance</li> <li>Stainless steel</li> <li>Operating media: compressed air, vacuum, (water)</li> </ul>
online: ➔	<a href="#">qsm</a>	<a href="#">qs</a>	<a href="#">npqh</a>	<a href="#">npqr</a>

## Product overview

Fittings >

### Push-in fittings

				
	Push-in fittings/connectors, metal, standard series NPQM	Push-in fittings/connectors, resistant to media NPQP	Cartridges, polymer, black QSPK, QSPLK	Cartridges QSPK, QSPLK, NPT
Pneumatic connection 1	For tubing O.D. 10 mm, 12 mm, 14 mm, 4 mm, 6 mm, 8 mm, Push-in sleeve QS-10, QS-12, QS-14, QS-4, QS-6, QS-8, G1/2, G1/4, G1/8, G3/8, M5, M7	For tubing O.D. 10 mm, 12 mm, 4 mm, 6 mm, 8 mm, Push-in sleeve QS-10, QS-12, QS-4, QS-6, QS-8, R1/2, R1/4, R1/8, R3/8	Cartridge 10 mm, 18 mm	QSP...18
Pneumatic connection 2	For tubing O.D. 10 mm, 12 mm, 14 mm, 3 mm, 4 mm, 6 mm, 8 mm	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	For tubing O.D. 3/8 in "
Operating pressure for entire temperature range	-0.95 ... 16 bar		-0.95 ... 10 bar	-0.95 ... 10 bar
Ambient temperature	-20 ... 70°C	-20 ... 60°C	-5 ... 60°C	-5 ... 60°C
Description	<ul style="list-style-type: none"> <li>• Solid-metal brass, nickel-plated</li> <li>• Attractively priced metal push-in fitting</li> <li>• Sturdy</li> <li>• Operating medium: compressed air, vacuum</li> </ul>	<ul style="list-style-type: none"> <li>• Polypropylene</li> <li>• Low-cost alternative to stainless steel: resistant to most cleaning agents in combination with tubing PLN</li> <li>• For use with extreme media influences</li> <li>• Food-safe, see <a href="http://www.festo.com/sp/npqp">www.festo.com/sp/npqp</a> → "Certificates" tab</li> <li>• Operating medium: compressed air, vacuum</li> </ul>	<ul style="list-style-type: none"> <li>• Compact installation space</li> <li>• Threadless mounting</li> </ul>	<ul style="list-style-type: none"> <li>• Compact installation space</li> <li>• Threadless mounting</li> </ul>
online: ➔	<a href="#">npqm</a>	<a href="#">npqp</a>	<a href="#">qsp</a>	<a href="#">qsp</a>

Fittings &gt;

## Push-in fittings

				
<b>Pneumatic connection 1</b>	Cartridge 10 mm, 14 mm, 18 mm, 20 mm	QSP...10, QSP...14, QSP...18, QSP...20	For tubing O.D. 10 mm, 12 mm, 16 mm, 4 mm, 6 mm, 8 mm, Male thread M5, R1/2, R1/4, R1/8, R3/8	For tubing O.D. 10 mm, 12 mm, 4 mm, 6 mm, 8 mm, G1/2, G1/4, G1/8, G3/8, R1/2, R1/4, R1/8, R3/8
<b>Pneumatic connection 2</b>	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 " , 3/16 in " , 3/8 in " , 5/16 in " , 5/32 in "	For tubing O.D. 10 mm, 12 mm, 16 mm, 4 mm, 6 mm, 8 mm	For tubing O.D. 10 mm, 12 mm, 4 mm, 6 mm, 8 mm
<b>Operating pressure for entire temperature range</b>	-0.95 ... 10 bar	-0.95 ... 10 bar	-0.95 ... 10 bar	-0.95 ... 10 bar
<b>Ambient temperature</b>	-5 ... 60°C	-5 ... 60°C	-15 ... 120°C	0 ... 60°C
<b>Description</b>	<ul style="list-style-type: none"> <li>Compact installation space</li> <li>Threadless mounting</li> </ul>	<ul style="list-style-type: none"> <li>Compact installation space</li> <li>Threadless mounting</li> </ul>	<ul style="list-style-type: none"> <li>Maximum corrosion resistance (corrosion resistance class CRC 4 to Festo standard 940 070) and chemical resistance</li> <li>Food-safe; see <a href="http://www.festo.com/sp/crqs">www.festo.com/sp/crqs</a> -&gt; "Certificates" tab</li> <li>Operating media: compressed air, vacuum, (water)</li> <li>Stainless steel</li> </ul>	<ul style="list-style-type: none"> <li>PBT, reinforced</li> <li>Resistant to welding spatter</li> <li>For use in all areas where there is a risk of fire</li> <li>Reliable even for applications in close proximity to welding spatter</li> <li>Operating medium: compressed air, vacuum, water</li> </ul>
<b>online: ➔</b>	<a href="#">qsp</a>	<a href="#">qsp</a>	<a href="#">crqs</a>	<a href="#">qs-v0</a>

Fittings &gt;

## Push-in fittings

				
<b>Pneumatic connection 1</b>	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
<b>Pneumatic connection 2</b>	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	For tubing O.D. 4 mm, 6 mm
<b>Operating pressure for entire temperature range</b>	-0.95 ... 6 bar	-0.95 ... 6 bar	-0.95 ... 7 bar	-0.95 ... 10 bar
<b>Ambient temperature</b>	-10 ... 80°C	0 ... 60°C	-25 ... 70°C	-10 ... 60°C
<b>Description</b>	<ul style="list-style-type: none"> <li>Standard series</li> <li>Self-sealing push-in fitting blocks the air flow after the tubing is disconnected</li> <li>PBT and nickel-plated brass</li> <li>Operating medium: compressed air, vacuum</li> </ul>	<ul style="list-style-type: none"> <li>Push-in fitting, rotatable with swivel connection, rotatable by 360° with max. 500 rpm</li> <li>Compact installation space</li> </ul>	<ul style="list-style-type: none"> <li>Assembling and disassembling without tools</li> <li>For pipes PQ-PA, PQ-AL and tubing PAN and PUN</li> <li>Sturdy, air-tight connection</li> </ul>	<ul style="list-style-type: none"> <li>Plug-in cartridges</li> <li>Straight or angled design</li> <li>PBT and nickel-plated brass</li> <li>Operating medium: compressed air, vacuum</li> </ul>
<b>online: ➔</b>	<a href="#">qsk</a>	<a href="#">qsr</a>	<a href="#">cq</a>	<a href="#">qsp</a>

## Product overview

Fittings >

### Barbed fittings

				
<b>Nominal size</b>	2 ... 6.2 mm	1.3 ... 5.3 mm	4 ... 16.5 mm	2 ... 12 mm
<b>Pneumatic connection 1</b>	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 1 NPT, Male thread 3/4 NPT, Male thread R1, 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, Male thread G1/2, G1/4, G1/8, G3/8, M5, R1/4, R1/8, R3/8
<b>Pneumatic connection 2</b>	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. 19 mm, For tubing I.D. 6 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 I.D. 13 mm, 9 mm, For tubing O.D. 4 mm, 6 mm, 8 mm
<b>Operating pressure for entire temperature range</b>	-0.95 ... 12 bar	-0.95 ... 10 bar	-0.95 ... 16 bar	0 ... 10 bar
<b>Ambient temperature</b>	-20 ... 120°C	0 ... 60°C		-10 ... 60°C
<b>Description</b>	<ul style="list-style-type: none"> <li>Stainless steel design</li> <li>Food-safe, see <a href="http://www.festo.com/sp/npck">www.festo.com/sp/npck</a> -&gt; "Certificates" tab</li> <li>Fulfils all clean design requirements</li> <li>Straight shape</li> <li>Operating medium: compressed air, vacuum</li> </ul>	<ul style="list-style-type: none"> <li>Straight shape, T-shape, L-shape, Y-shape</li> <li>Operating medium: compressed air, vacuum</li> <li>Brass, POM, aluminium or stainless steel</li> </ul>	<ul style="list-style-type: none"> <li>Barbed hose fitting with or without sealing ring</li> <li>Tubing clip to DIN 3017</li> <li>Operating medium: compressed air, vacuum</li> <li>Brass or aluminium, steel</li> </ul>	<ul style="list-style-type: none"> <li>Bulkhead quick connector</li> <li>Sealing cap for plastic tube fittings and barbed fittings</li> <li>Multiple distributor</li> <li>Union nut for CK tube fitting</li> <li>Operating media: compressed air, vacuum, (water)</li> <li>Aluminium, steel, POM or zinc</li> </ul>
<b>online: ➔</b>	<a href="#">npck</a>	<a href="#">n_070302</a>	<a href="#">n_cnp</a>	<a href="#">ck</a>

Fittings >

### Threaded fittings

			
<b>Pneumatic connection 1</b>	Male thread 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	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
<b>Pneumatic connection 2</b>		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
<b>Operating pressure</b>		-0.95 ... 50 bar	2 ... 8 bar
<b>Ambient temperature</b>		-20 ... 150°C	
<b>Nominal size</b>			6 mm
<b>Description</b>	<ul style="list-style-type: none"> <li>Aluminium, stainless steel</li> <li>With sealing ring</li> </ul>	<ul style="list-style-type: none"> <li>Brass, nickel-plated</li> <li>Sleeve</li> <li>Extension</li> <li>Double nipple</li> <li>Reducing nipple</li> <li>L-, T-, Y- or X-fitting</li> <li>Operating medium: compressed air, vacuum</li> </ul>	<ul style="list-style-type: none"> <li>Adapter with filter</li> <li>From male thread G1/4 to female thread G1/4 or NPT1/4 and male thread NPT1/4 to female thread NPT1/4</li> <li>Adapter material: high-alloy stainless steel</li> <li>Operating medium compressed air</li> </ul>
<b>online: ➔</b>	<a href="#">b-1</a>	<a href="#">npfc</a>	<a href="#">npfv</a>

## Fittings &gt;

## Threaded fittings

		
<b>Reducers, sleeve, double nipple D, QM, ESK, G, FR, TJK, LJK, AD, QSP10</b>		
Pneumatic connection 1	G1, G1/2, G1/4, G1/8, G3/4, G3/8, M5, R1/2, R1/4, R1/8, R3/8	Male thread G1/4, G1/8, G3/8, M5
Pneumatic connection 2	G1, G1/2, G1/4, G1/8, G3/4, G3/8, M5, M7, R1/2, R1/4, R1/8, R3/8	For barbed connector I.D. 3 mm Via union nut, 4 mm Via union nut, 6 mm Via union nut
Operating pressure		
Ambient temperature		
Nominal size		
Description	<ul style="list-style-type: none"> <li>• Brass or aluminium</li> <li>• Reducing nipple</li> <li>• Elbow piece</li> <li>• Sleeve</li> <li>• Double nipple</li> <li>• Distributor</li> <li>• Elbow fitting</li> <li>• T-fitting</li> <li>• Adapter</li> <li>• Operating medium: compressed air, vacuum</li> </ul>	<ul style="list-style-type: none"> <li>• Multiple distributor consisting of hollow bolt VT and ring piece LK or TK</li> <li>• With two to six outlets and one common air feed</li> <li>• Operating medium: compressed air, vacuum</li> <li>• Galvanised steel</li> </ul>
online: →	<a href="#">esk</a>	<a href="#">lk</a>

## Fittings &gt;

## Click fitting

	
<b>Click fittings NPKA</b>	
Pneumatic connection 1	Male thread G1/8
Pneumatic connection 2	For tubing O.D. 6 mm
Temperature-dependent operating pressure	-0.95 ... 10 bar
Nominal size	4 mm
Ambient temperature	-10 ... 60°C
Description	<ul style="list-style-type: none"> <li>• POM, polyamide 66</li> <li>• Quick and easy one-handed tube installation</li> <li>• Completely made of polymer</li> <li>• Food-safe, see <a href="http://www.festo.com/sp/npka">www.festo.com/sp/npka</a> -&gt; "Certificates" tab</li> <li>• Operating medium: compressed air, vacuum, water</li> <li>• No copper, fluor or silicone</li> <li>• Cleanroom compatible</li> <li>• Easy-to-clean design with few corners and edges</li> </ul>
online: →	<a href="#">npka</a>

## Product overview

### Pipes

			
	<b>Plastic pipes PQ-PA</b>	<b>Pipes PQ-AL</b>	<b>Plastic-coated metal tubes PM</b>
<b>Outside diameter</b>	12 ... 28 mm	12 ... 28 mm	6 ... 8 mm
<b>Information on tubing materials</b>	PA	Wrought aluminium alloy	Wrought aluminium alloy, PE
<b>Temperature-dependent operating pressure</b>	-0.95 ... 15 bar	-0.95 ... 15 bar	-0.95 ... 30 bar
<b>Ambient temperature</b>	-25 ... 75°C	-30 ... 75°C	-29 ... 65°C
<b>Description</b>	<ul style="list-style-type: none"> <li>Rigid pipe made from high-quality polyamide</li> <li>Smooth inside wall ensures optimum flow conditions</li> <li>Operating media: compressed air, vacuum, liquid media</li> </ul>	<ul style="list-style-type: none"> <li>Rigid aluminium pipe</li> <li>Smooth inside wall ensures optimum flow conditions</li> <li>Operating media: compressed air, vacuum, liquid media</li> </ul>	<ul style="list-style-type: none"> <li>Polyethylene, aluminium</li> <li>Can be bent straight and reshaped several times without a pipe-bending device and without being damaged</li> <li>Resistant to deformation</li> <li>Operating medium: compressed air, vacuum</li> </ul>
<b>online:</b> ➔	<a href="#">pq-pa</a>	<a href="#">pq-al</a>	<a href="#">pm</a>

### Push-in fittings for piping PQ

	
	<b>Push-in fittings CQ, CQC, CQH, CQL, CQT</b>
<b>Pneumatic connection 1</b>	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
<b>Pneumatic connection 2</b>	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
<b>Nominal size</b>	8 ... 24.9 mm
<b>Temperature-dependent operating pressure</b>	-0.95 ... 15 bar
<b>Ambient temperature</b>	-25 ... 70°C
<b>Description</b>	<ul style="list-style-type: none"> <li>For pipes PQ-PA, PQ-AL and tubing PAN and PUN</li> <li>Operating media: compressed air, vacuum, liquid media</li> <li>POM</li> </ul>
<b>online:</b> ➔	<a href="#">cq</a>

## Couplings

				
	Quick coupling sockets, quick coupling plugs NPHS-D6, NPHS-S6	Quick coupling sockets, quick coupling plugs KD, KD1, KD2, KD3, KD4, KS, 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-2, PK-3, PK-4
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 ... 80°C	-10 ... 60°C	-10 ... 60°C
Description	<ul style="list-style-type: none"> <li>Safety coupling</li> <li>Shut-off at one end</li> <li>Exhaust the air on the connector side without releasing the coupling</li> <li>Combination of coupling and hand slide valve</li> <li>Can be used as an on/off valve</li> <li>Nickel-plated brass or galvanised hardened steel</li> </ul>	<ul style="list-style-type: none"> <li>Quick connection coupling for standard applications without safety function</li> <li>Shut-off at one or both ends</li> <li>With male or female thread or with barbed fitting or quick connector</li> <li>Nickel-plated brass, PP</li> <li>Operating medium: compressed air, vacuum</li> </ul>	<ul style="list-style-type: none"> <li>POM, aluminium, brass</li> <li>Multi-plug, multi-socket</li> <li>Terminal plug and terminal socket</li> <li>Operating medium: compressed air, vacuum</li> </ul>	<ul style="list-style-type: none"> <li>Polymer, brass</li> <li>For max. 22 lines</li> <li>Used as control cabinet outlets</li> <li>Operating medium: compressed air, vacuum</li> </ul>
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	<ul style="list-style-type: none"> <li>PBT and nickel-plated brass</li> <li>L-shape, T-shape</li> <li>Rotatable 360°</li> <li>Reducing design</li> <li>Operating media: compressed air, vacuum, (water)</li> </ul>	<ul style="list-style-type: none"> <li>PBT and nickel-plated brass</li> <li>Y-shape</li> <li>Rotatable 360°</li> <li>Operating media: compressed air, vacuum, (water)</li> </ul>	<ul style="list-style-type: none"> <li>Aluminium</li> <li>4, 8, 9 or 12 connections</li> <li>Operating medium: compressed air, vacuum</li> </ul>	
online: ➔	qslv	qsytf	fr	

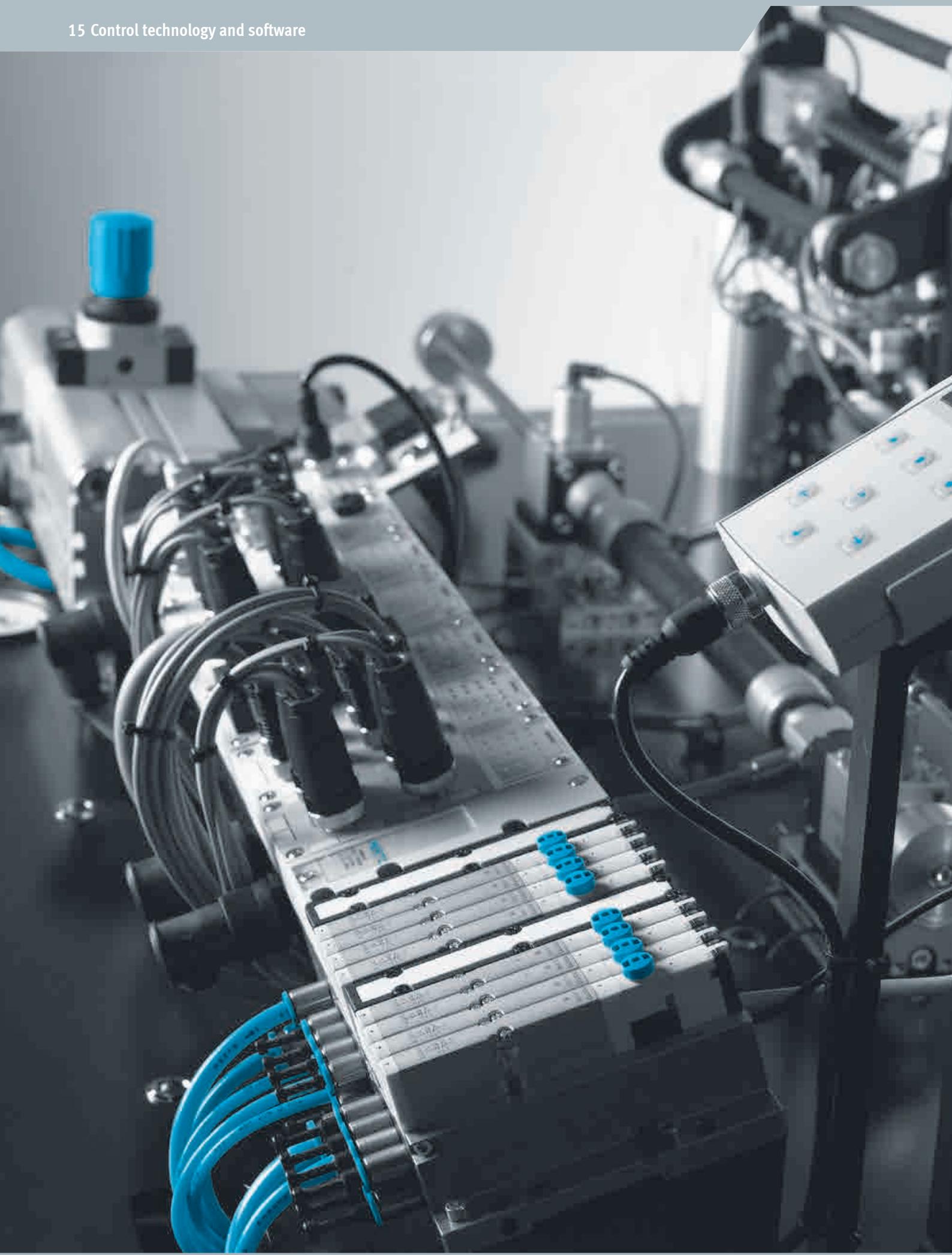
## Product overview

### Distributors

		
<b>Distributors CQD</b>		<b>Rotary distributors GF</b>
<b>Pneumatic connection 1</b>	Female thread G1/2	Male thread G1/4, G3/8, G1/2, G1/4, G1/8
<b>Pneumatic connection 2</b>	Female thread G1/2	Female thread G1/4, G3/8, G1/2, G1/4, G1/8, M5
<b>No. of supply lines</b>	1	
<b>No. of outlets</b>	4	
<b>Max. rotational speed</b>		300 ... 3000 rpm
<b>Description</b>	<ul style="list-style-type: none"> <li>• POM</li> <li>• Operating medium: compressed air, vacuum</li> </ul>	<ul style="list-style-type: none"> <li>• 2 or 4 axial and radial outlets</li> <li>• Single or multiple rotary distributor</li> <li>• Operating medium: compressed air, vacuum</li> <li>• Brass, hardened steel</li> </ul>
<b>online:</b> ➔	cq	gf

### Protective conduit systems

		
<b>Protective conduits MK, MKG, MKR, MKV</b>		<b>Fittings HMZAS, HMZV, MKA, MKGV, MKM, MKRL, MKRS, MKRT, MKRV, MKVM, MKVV, MKY</b>
<b>Inside diameter</b>	7.5 ... 48 mm	
<b>Outside diameter</b>	10 ... 56 mm	
<b>Threaded connection</b>		Pg9, Pg11, Pg13, Pg15, Pg16, Pg21, Pg29, Pg36, Pg48
<b>Design</b>	Strip-wound metal conduit, internally and externally corrugated all-plastic conduit, separable	
<b>Ambient temperature</b>	-20 ... 100°C	-40 ... 200°C
<b>Description</b>	<ul style="list-style-type: none"> <li>• For protecting pneumatic tubing and electrical cables</li> <li>• Galvanised steel, PA, PP, PVC spring steel</li> <li>• Metal or polymer design</li> <li>• High alternating bending strength</li> </ul>	<ul style="list-style-type: none"> <li>• Installation kit</li> <li>• Junction box</li> <li>• Reducing connector</li> <li>• Protective conduit fitting</li> <li>• Lock nut</li> <li>• Protective conduit connector</li> <li>• Y-distributor</li> <li>• Polymer, polyamide, nickel-plated brass</li> </ul>
<b>online:</b> ➔	mkg	mka

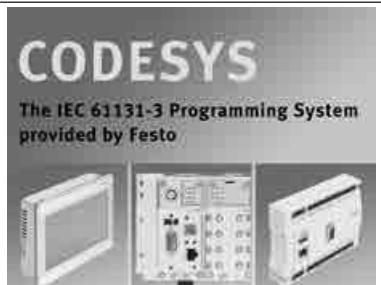


## Product overview

### Pneumatic and electropneumatic controllers

	<b>Steppers</b> <b>TAA, TAB</b>		<b>Memory modules</b> <b>SBA-2N</b>		<b>Pulse generators</b> <b>VLG</b>
<b>Pneumatic connection</b>	Barbed fitting for 3 mm plastic tubing, on mounting frame				
<b>Type of mounting</b>					Through-hole in housing
<b>Nominal size</b>	2 mm	3 mm			3.5 mm, 7 mm
<b>Standard nominal flow rate</b>	60 l/min	70 l/min			120 l/min, 600 l/min
<b>Description</b>	<ul style="list-style-type: none"> <li>For ensuring a logical program sequence</li> <li>Poppet valve with integrated AND as well as OR element</li> </ul>	<ul style="list-style-type: none"> <li>For input logic operations</li> <li>For simplifying the design and installation of pneumatic controllers</li> </ul>		<ul style="list-style-type: none"> <li>For generating infinitely adjustable signals in controllers</li> <li>For high-speed cylinder movements of diaphragm cylinders, single- and double-acting cylinders</li> </ul>	
<b>online:</b> →	<a href="#">taa</a>	<a href="#">sba</a>			<a href="#">vlg</a>

### Software tools

<b>CODESYS</b>		CODESYS for standardised programming of embedded devices according to IEC 61131-3. It makes your life easier with simple commissioning, fast programming and parameterisation.
		<p>The benefits:</p> <ul style="list-style-type: none"> <li>Hardware-neutral software platform for quick and easy configuration, programming and commissioning of pneumatic and electrical automation solutions</li> <li>Extensive module libraries for single- or multi-axis positioning motions.</li> <li>The IEC 61131-3 standard means that CODESYS is flexible and open for all types of control tasks.</li> <li>Modular: offline and online functions as well as components for hardware configuration and visualisation.</li> <li>User-friendly IEC function block extension.</li> <li>Re-use of existing application parts.</li> </ul> <p>The parameterisation software can be found at <a href="http://www.festo.com">www.festo.com</a> &gt; "Support Portal" tab &gt; "CODESYS" search term &gt; "Software" tab.</p>

### Electronic controllers

	<b>Controllers</b> <b>CECC-D, CECC-LK, CECC-S</b>
<b>Operating voltage</b>	19.2 - 30 V DC, 20.4 - 30 V DC
<b>CPU data</b>	400 MHz processor
<b>Fieldbus interface</b>	CAN bus
<b>Description</b>	<ul style="list-style-type: none"> <li>Compact programmable logic controller</li> <li>Programming with CoDeSys to IEC 61131-3</li> <li>12 digital inputs, 8 digital outputs, additionally 2 high-speed counters up to 250 kHz</li> <li>Ethernet 10/100 Mbit/s</li> <li>USB interface for data transfer</li> <li>CECC-LK with CANopen, IO-Link®, I-Port and Modbus TCP protocol</li> </ul>
<b>online:</b> →	<a href="#">cecc</a>

## Software tools

<b>Commissioning software</b> <b>Festo Automation Suite</b>		Quickly and reliably to a ready-to-use drive system – the Festo Automation Suite combines the parameterisation, programming and maintenance of Festo components in one program and enables the entire drive package, from the mechanical system to the controller, to be commissioned. Perfect for making industrial automation simple, efficient and seamless.
		<p><b>Plug-in automation system CPX-E</b></p> <ul style="list-style-type: none"> <li>• Controller programming in CODESYS as a system expansion for SoftMotion – up to robotic applications</li> <li>• Just 2 mouse clicks instead of 100: greatly simplified integration of the servo controller CMMT-AS into the control program with CPX-E-CEC</li> <li>• Conveniently install the plug-in using the software</li> </ul> <p>This tool can be found</p> <ul style="list-style-type: none"> <li>• on our website at <a href="http://www.festo.com/AutomationSuite">www.festo.com/AutomationSuite</a></li> </ul>

## Electrical peripherals

	Automation systems CPX-E	Terminal CPX	Terminal CPX-P	Electrical interfaces CPX-CTEL
<b>Address capacity, inputs</b>	64 Byte	64 Byte	64 Byte	32 Byte
<b>Max. no. of inputs</b>				
<b>Address capacity, outputs</b>	64 Byte	64 Byte	64 Byte	32 Byte
<b>Max. no. of outputs</b>				
<b>No. of module positions</b>	10	max. 9 electric input/output modules	10	max. 4 modules with I-Port interface
<b>Electrical actuation</b>	Fieldbus, Integrated controller	Fieldbus, Integrated controller	Fieldbus, Integrated controller	
<b>Protocol</b>				I-Port, IO-Link®
<b>Description</b>	<ul style="list-style-type: none"> <li>• Modern control system with high performance</li> <li>• Fieldbus master interfaces, EtherCAT® master, fieldbus slave interfaces, PROFINET, EtherNet/IP, PROFIBUS, EtherCAT® digital input modules (16DI), digital output modules (8DO/0.5A)</li> <li>• Analogue input modules (current, voltage), analogue output modules (current, voltage)</li> <li>• Modern programming with CoDeSys V3 to IEC 61131-3</li> <li>• Integration of SoftMotion functions (SoftMotion)</li> <li>• Compact I/O assembly</li> <li>• Easy mounting of the control system</li> </ul>	<ul style="list-style-type: none"> <li>• Automation platform</li> <li>• Open to all common fieldbus protocols and Ethernet</li> <li>• Integrated diagnostic and maintenance functions</li> <li>• Can be used as stand-alone remote I/O or with valve terminals MPA-S, MPA-L, VTSA/VTSA-F</li> <li>• Choice of polymer or metal interlinking block with individual linking</li> <li>• Analogue inputs and outputs, 2-way/4-way, with optional HART protocol</li> </ul>	<ul style="list-style-type: none"> <li>• Use of matching remote I/O and valve terminals in a control cabinet</li> <li>• Combination with modules of the electrical terminal CPX, which can then be used for hybrid applications</li> <li>• Unique modular structure</li> <li>• Comprehensive integrated diagnostic and service functions</li> <li>• Analogue inputs and outputs with HART protocol</li> </ul>	<ul style="list-style-type: none"> <li>• CPX-CTEL master module with 4 I-Port connections</li> <li>• Decentralised pneumatic components and sensors for fast processes</li> <li>• Standardised M12 connections</li> </ul>
<b>online:</b> ➔	<a href="#">cpx-e</a>	<a href="#">cpx</a>	<a href="#">cpx-p</a>	<a href="#">cpx-ctel</a>

## Product overview

### Electrical peripherals

			
<b>Automation systems CPX-AP-I</b>	<b>Measuring modules CPX-CMIX</b>	<b>Input modules for installation system CTEL CTSL</b>	
<b>Address capacity, inputs</b>	244 ... 2048 Byte		
<b>Max. no. of inputs</b>			16
<b>Address capacity, outputs</b>	244 ... 2048 Byte		
<b>Max. no. of outputs</b>			
<b>No. of module positions</b>	56, 80	9	
<b>Electrical actuation</b>		via fieldbus	
<b>Protocol</b>	IO-Link®		I-Port, IO-Link®
<b>Description</b>	<ul style="list-style-type: none"> <li>Simple integration into the controller of your choice: PROFINET, PROFIBUS, EtherCAT®, EtherNet/IP, ModbusTCP</li> <li>Powerful remote I/O system that flexibly links 80 modules at a data rate of 200 Mbaud in real-time</li> <li>Cable lengths of up to 50 m between every module enable vast system dimensions</li> <li>Real-time capability and deterministic system behaviour enable cycle times of up to 250 µs</li> <li>The IO-Link master and parameterisation software enable simple integration of any IO-Link® devices</li> <li>Ethernet performance up to the valve terminal and digital as well as analogue input/output modules</li> <li>Seamless connectivity along with advanced diagnostics option increase the machine availability and productivity</li> </ul>	<ul style="list-style-type: none"> <li>Pneumatics and electrics – movement and measurement on one platform</li> <li>Innovative measurement technology for piston rod drives, rodless drives, rotary drives</li> <li>Control via fieldbus</li> <li>Remote maintenance, remote diagnostics, web server, SMS and e-mail alerts are all possible via TCP/IP</li> <li>Modules can be quickly exchanged and expanded without altering the wiring</li> </ul>	<ul style="list-style-type: none"> <li>For installation system CTEL</li> <li>For recording sensor input signals</li> <li>Display of the input statuses for each input signal via an assigned LED</li> <li>Diagnostic LED for short circuit/overload in sensor supply</li> </ul>
<b>online:</b> →	<a href="#">cpx-ap</a>	<a href="#">cpx-cmix</a>	<a href="#">ctsl</a>

### Electrical peripherals

			
<b>CPI installation systems CTEC</b>	<b>Fieldbus modules CTEU</b>	<b>AS-Interface® module ASI</b>	
<b>Address capacity, inputs</b>		2 ... 64 Byte	
<b>Max. no. of inputs</b>	128		
<b>Address capacity, outputs</b>		2 ... 64 Byte	
<b>Max. no. of outputs</b>	128		
<b>No. of module positions</b>			
<b>Electrical actuation</b>	Fieldbus, Integrated controller		AS-Interface®
<b>Protocol</b>		AS-Interface, CANopen, CC-Link, CPI-B, DeviceNet, EtherCAT, EtherNet/IP, PROFINET, Modbus® TCP, PROFIBUS DP	
<b>Description</b>	<ul style="list-style-type: none"> <li>CPX master module for four CPI strings</li> <li>Combination of centralised and decentralised installation possible</li> <li>Decentralised pneumatic components and sensors for fast processes</li> <li>Can be connected to valve terminal CPV, MPA-S, CPV-SC</li> </ul>	<ul style="list-style-type: none"> <li>For valve terminals VTUB-12, VTUG, MPA-L, CPV, VTOC</li> <li>Can be expanded into the installation system CTEL</li> <li>Fieldbus-typical LEDs, interfaces and switching elements</li> <li>Isolated power supply for electronics and valves</li> </ul>	<ul style="list-style-type: none"> <li>Accessories for the AS-Interface installation system</li> <li>Compact I/O modules (IP65, IP67)</li> </ul>
<b>online:</b> →	<a href="#">ctec</a>	<a href="#">cteu</a>	<a href="#">as-interface</a>

## Operator units

			
<b>Operator units CDSA</b>		<b>IO-Link Master USB CDSU-1</b>	<b>Operator units CDSB</b> 
<b>Conforms to standard</b>		EN 61131-9	
<b>Electrical connection for IO-Link®, connection type</b>		Socket	
<b>Electrical connection for IO-Link®, connection technology</b>		M12x1, A-coded to EN 61076-2-101	
<b>Electrical connection for IO-Link®, number of pins/wires</b>		5	
<b>Protocol</b>		IO-Link®	
<b>Display</b>	LCD display, With backlighting		Colour TFT
<b>Display size</b>	7 in "		1.77"
<b>Recipe memory</b>			
<b>Display resolution</b>	WSVGA, 600x1024 pixels		128x160 pixels
<b>Ethernet interface</b>			
<b>Description</b>	<ul style="list-style-type: none"> <li>• For mobile commissioning and optimisation</li> <li>• Integrated reporting system and user administration in combination with the robotics library from Festo</li> <li>• Terminal box for installation in a control cabinet and various cable lengths available</li> <li>• Interfaces for Ethernet, RS-422-A/RS-232-C, USB host/USB client</li> <li>• With colour touchscreen</li> </ul>	<ul style="list-style-type: none"> <li>• Allows Festo IO-Link® products to be commissioned quickly and intuitively</li> <li>• Compact, cost-effective, powerful</li> <li>• Universal connections</li> <li>• Galvanic isolation</li> <li>• Connecting cables for almost all IO-Link® devices from Festo</li> <li>• For IO-Link® devices with protocol version 1.1 or 1.0</li> <li>• Supports data storage</li> </ul>	<ul style="list-style-type: none"> <li>• Plug-in display and control unit for the servo drive CMMT and automation system CPX-E</li> <li>• Colour touchscreen</li> <li>• Diagnostic function</li> <li>• Compact size</li> <li>• Mini USB interface</li> <li>• Update function for basic unit</li> </ul>
<b>online:</b> ➔	<a href="#">cdsa</a>	<a href="#">cdsu</a>	<a href="#">cdsb</a>

## Product overview

### Operator units

		<b>Operator units CDPX</b>		<b>Simulators CDSM</b>
<b>Conforms to standard</b>				
<b>Electrical connection for IO-Link®, connection type</b>				
<b>Electrical connection for IO-Link®, connection technology</b>				
<b>Electrical connection for IO-Link®, number of pins/wires</b>				
<b>Protocol</b>				
<b>Display</b>	Colour TFT			
<b>Display size</b>	10.4", 7 in ", 4.3 in "			
<b>Recipe memory</b>	32000 Byte			
<b>Display resolution</b>	SVGA, 800x600 pixels, WVGA, 800x480 pixels, 480x272 Pixels			
<b>Ethernet interface</b>	RJ45 10/100 MBd			
<b>Description</b>	<ul style="list-style-type: none"> <li>Powerful processors combined with wide-screen technology</li> <li>Remote access, remote control</li> <li>FTP and HTTP servers</li> <li>Open for web and multimedia applications</li> <li>With touchscreen</li> </ul>	<ul style="list-style-type: none"> <li>Straightforward design of man-machine dialogues</li> <li>Semi-graphical display of process values makes them easier to read</li> <li>Suitable for commissioning the following motor controllers: CMMO-ST, CMMP-AS, CMMS-ST</li> <li>To simulate input and output signals during commissioning</li> </ul>		
<b>online:</b> ➔	<a href="#">cdpx</a>		<a href="#">cdsm</a>	

### Software

		<b>Motion Apps GAMM</b>		<b>Software packages GSAY</b>		<b>Software (FluidDraw® P6/365) GSWF</b>
<b>Description</b>	<ul style="list-style-type: none"> <li>Open and closed-loop control programs for valves VEVM</li> <li>A new dimension in flexibility thanks to Motion Apps – a single valve with a wide range of different functions</li> <li>Accelerated engineering processes</li> <li>Short response times without the need to adapt the hardware</li> <li>Reduced system complexity</li> <li>Shorter time to market for your application</li> </ul>	<ul style="list-style-type: none"> <li>Modular operating software for the servo press kit YJKP</li> </ul>		<ul style="list-style-type: none"> <li>Quick and easy creation of pneumatic circuit diagrams</li> <li>Comprehensive library of pneumatic and electrical symbols</li> <li>User-specific product databases and translation tables</li> <li>Terminal plans, cable diagrams, cable lists, parts lists</li> <li>Sizing function for preparing simple control cabinet and system layouts</li> <li>Consistent equipment identification</li> <li>Multi-level project tree</li> </ul>		
<b>online:</b> ➔	<a href="#">gamm</a>		<a href="#">gsay</a>		<a href="#">gswf</a>	

## Software

		Eplan projects (Schematic Solution) GDDE		Smartenance GASM	NEW		Dashboards GASD
<b>NEW</b>							
<b>Description</b>	<ul style="list-style-type: none"> <li>Create EPLAN documentation for a complex Festo product in just a few minutes</li> <li>Automated generation to IEC 61355, IEC 81346 and ISO 1219</li> <li>Available at any time via the web service</li> </ul>	<ul style="list-style-type: none"> <li>New for 7/2020: additional versions</li> </ul>	<ul style="list-style-type: none"> <li>Digital maintenance and incident management for production managers and system operators</li> <li>Simple, straightforward operation thanks to clear structure and buttons</li> <li>Quick and easy to install on mobile devices with Android or iOS operating system</li> <li>Self-explanatory</li> <li>Easy and cost-effective introduction to digitalisation</li> <li>For auditing: detailed proof with one click</li> <li>Cloud-based: mobile access everywhere</li> <li>All functions in one application: autonomous maintenance, incident management, system logbook, data interface (REST API)</li> </ul>	<ul style="list-style-type: none"> <li>Cloud-based web application for fast and efficient condition monitoring</li> <li>Available at a glance: asset data, specific information for preventive maintenance, diagnostic functions and errors in plain text</li> <li>Huge time savings: no need for programming</li> <li>Data can be called up from anywhere at any time</li> <li>Messaging function</li> <li>Available for energy efficiency module MSE6-E2M, valve terminal MPA/CPX, servo drive CMMT</li> </ul>			
online: →	gdde		gasm			gasd	

## Documentation

		Descriptions
<b>Description</b>	<ul style="list-style-type: none"> <li>Manuals, operating instructions</li> </ul>	
online: →	p.be	

## Product overview

### Training systems

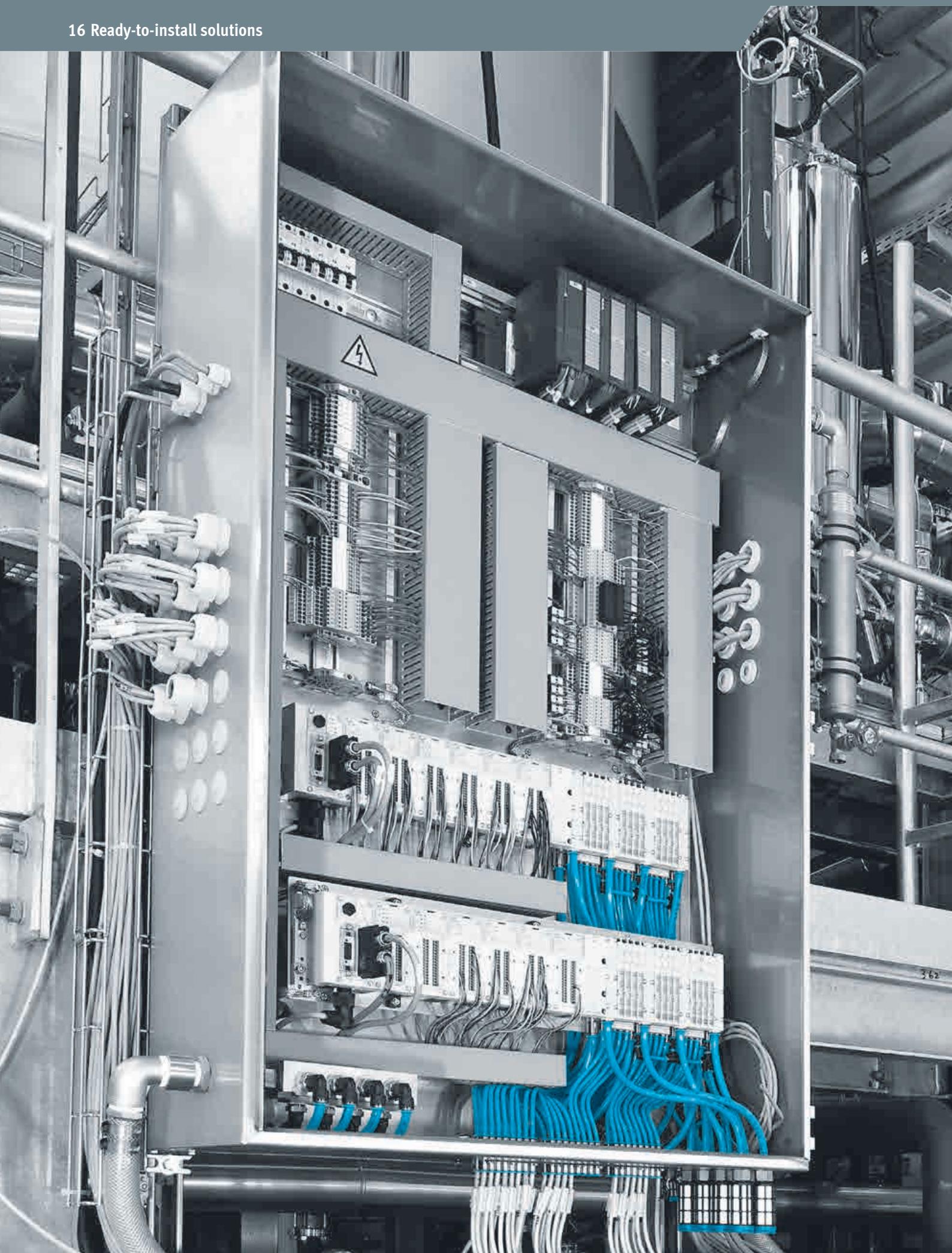
#### Learning systems



**EduTrainer Universal  
D:ET-SPS**

<b>Description</b>	<ul style="list-style-type: none"><li>• PLC EduTrainer® support system for use in teaching and training</li><li>• Equipped with PLCs from different manufacturers</li><li>• Two series: universal and compact</li><li>• Equipped with 19 simulation modules</li><li>• Individually configurable or pre-assembled</li></ul>
<b>online:</b> ➔	<a href="http://edutrainer">edutrainer</a>

## 16 Ready-to-install solutions



## Product overview

### Control cabinets

			
	Factory automation	Process automation	Control cabinets for handling systems
<b>Technical data</b>	<ul style="list-style-type: none"> <li>Simple to complex control cabinet designs</li> <li>Application-specific combination of components</li> <li>Fully tested, with test certificate</li> <li>Ready-to-install</li> <li>Complete documentation</li> <li>Design conforms to:               <ul style="list-style-type: none"> <li>EN 60204-1</li> <li>ATEX zone 1 and 21 (pneumatic only), ATEX zone 2 and 22 (electric and electropneumatic)</li> <li>UL-508 A</li> </ul> </li> <li>Implementation of safety functions</li> <li>Different bus technologies</li> </ul>	<ul style="list-style-type: none"> <li>Simple to complex control cabinet designs</li> <li>Application-specific combination of components</li> <li>Different operating voltages</li> <li>Fully tested, with test certificate</li> <li>Ready-to-install</li> <li>Complete documentation</li> <li>Design conforms to:               <ul style="list-style-type: none"> <li>EN 60204-1</li> <li>ATEX zone 1 and 21 (pneumatic only), ATEX zone 2 and 22 (electric and electropneumatic)</li> <li>UL-508 A</li> </ul> </li> <li>Implementation of safety functions</li> <li>Wide range of bus technologies</li> <li>Compliance with special cleanliness and hygiene requirements</li> <li>Special materials</li> <li>Protected against the ingress of liquids and foreign matter</li> <li>Heating or cooling elements</li> <li>Intrinsically safe valve terminal technology</li> <li>Hot swap inspection window</li> </ul>	<ul style="list-style-type: none"> <li>Simple to complex control cabinet designs</li> <li>Control of motion sequences with up to 6 axes</li> <li>Application-specific combination of components</li> <li>Use of the latest innovations and technologies</li> <li>Fully tested, with test certificate</li> <li>Ready-to-install</li> <li>Complete documentation</li> <li>Design conforms to:               <ul style="list-style-type: none"> <li>EN 60204-1</li> <li>ATEX zone 1 and 21 (pneumatic only), ATEX zone 2 and 22 (electric and electropneumatic)</li> <li>UL-508 A</li> </ul> </li> <li>Implementation of safety functions</li> <li>Wide range of bus technologies</li> <li>Function modules for motion applications</li> <li>Host modules for easy connection to the customer's control environment</li> </ul>
<b>Description</b>	<ul style="list-style-type: none"> <li>Made-to-measure control cabinets</li> <li>Pneumatic, electric, combined</li> <li>Individually configured</li> <li>Adapted to requirements in industrial automation</li> <li>Design and sizing included</li> </ul>	<ul style="list-style-type: none"> <li>Made-to-measure control cabinets</li> <li>Pneumatic, electric, combined</li> <li>Individually configured</li> <li>Adapted to requirements in process automation</li> <li>Design and sizing included</li> </ul>	<ul style="list-style-type: none"> <li>Made-to-measure control cabinets for handling systems</li> <li>Software package for third-party devices included</li> <li>Individually configurable</li> <li>Adapted to requirements for handling solutions</li> <li>→ chapter 5 „Handling systems“ on page 71</li> </ul>
<b>online:</b> ➔	<b>Ready-to-install solutions</b>	<b>Ready-to-install solutions</b>	<b>Ready-to-install solutions</b>

## Mounting and installation plates

			
<b>Mounting plates</b>		<b>Hall installation plates (HIP) for body assembly</b>	<b>Robot installation plates (RIP) for body assembly</b>
<b>Technical data</b>	<ul style="list-style-type: none"> <li>Customised support plate shape</li> <li>Support plate available in different materials</li> <li>Application-specific combination of components</li> <li>Fully assembled, connected and wired</li> <li>Defined interfaces</li> <li>Ready-to-install</li> <li>Fully tested, with test certificate</li> <li>Complete documentation</li> <li>Design conforms to:           <ul style="list-style-type: none"> <li>EN 60204-1</li> <li>ATEX zone 1 and 21 (pneumatic only), ATEX zone 2 and 22 (electric and electropneumatic)</li> <li>UL-508 A</li> </ul> </li> <li>Implementation of safety functions</li> </ul>	<ul style="list-style-type: none"> <li>Media supply for compressed air and cooling water for welding cells</li> <li>Made to measure: profile as support element, design perfectly adapted to the installation space, for installation within safety barriers</li> <li>Labelling: customised labelling for safe operation</li> <li>Fast installation: thanks to assembly according to the customer's specification</li> <li>Medium water: fittings for liquid media</li> </ul>	<ul style="list-style-type: none"> <li>Media supply for compressed air and cooling water for welding robots</li> <li>Protection against ambient conditions through the use of special materials, such as hoses and fittings resistant to welding spatter</li> <li>Protection against environmental influences to prevent damage to the installation</li> <li>Made to measure: profile as support element, design perfectly adapted to the installation space</li> <li>Cooling water suction cylinder for drawing in cooling water when changing welding caps</li> <li>Water flow sensor: measures flow rate, volume and cooling water temperature – to monitor the welding process</li> <li>Easy to maintain thanks to removable fittings</li> </ul>
<b>Description</b>	<ul style="list-style-type: none"> <li>Machine-specific pre-assembly of pneumatic and electric components on support plate</li> <li>Tubing and wiring included</li> <li>Defined interfaces for simple installation directly in the system</li> </ul>	<ul style="list-style-type: none"> <li>Controls and monitors the compressed air and cooling water supply for whole welding cells</li> </ul>	<ul style="list-style-type: none"> <li>Controls and monitors the compressed air and cooling water supply for individual welding guns</li> </ul>
online: ➔	<a href="http://www.festo.com/sp/hip">Ready-to-install solutions</a>	<a href="http://www.festo.com/sp/rip">www.festo.com/sp/rip</a>	<a href="http://www.festo.com/sp/rip">www.festo.com/sp/rip</a>

## Assemblies

			
<b>Assemblies</b>		<b>Cartridge solutions</b>	<b>Sheet-metal constructions and special housings</b>
<b>Technical data</b>	<ul style="list-style-type: none"> <li>Combination of various pneumatic and/or electric components to create a single unit</li> <li>Application-specific combination of components</li> <li>Accessories mounted on sub-assembly</li> <li>Use of the latest innovations and technologies</li> <li>Ready-to-install</li> <li>Fully tested, with test certificate</li> <li>Complete documentation</li> <li>Design conforms to:           <ul style="list-style-type: none"> <li>EN 60204-1</li> <li>ATEX zone 1 and 21 (pneumatic only), ATEX zone 2 and 22 (electric and electropneumatic)</li> <li>UL-508 A</li> </ul> </li> <li>Implementation of safety functions</li> </ul>	<ul style="list-style-type: none"> <li>Space-saving thanks to extremely compact design</li> <li>Pneumatic functions integrated in a single compact housing</li> <li>Housing in different materials</li> <li>No tubing required</li> <li>Minimal cabling required</li> <li>Significant design freedom</li> <li>Flexible integration options on and within the machine</li> <li>Sturdy design</li> <li>Fully tested</li> <li>Ready-to-install</li> <li>Complete documentation</li> </ul>	<ul style="list-style-type: none"> <li>Sheet-metal structures           <ul style="list-style-type: none"> <li>Customised shape and size</li> <li>Reduced weight and number of assembly parts</li> </ul> </li> <li>Special housing           <ul style="list-style-type: none"> <li>Customised shape</li> <li>Customised dimensions</li> <li>Various materials</li> <li>Compact, space-saving format</li> <li>Protection against environmental influences and unauthorised access</li> </ul> </li> <li>In combination           <ul style="list-style-type: none"> <li>Alternative to conventional control cabinets</li> <li>Variable integration options on and within the machine</li> <li>Short tubing and cable lengths</li> <li>Attractive design</li> </ul> </li> </ul>
<b>Description</b>	<ul style="list-style-type: none"> <li>Pneumatic and electric components pre-assembled to create a function unit</li> <li>Can be combined from around 30,000 catalogue components</li> <li>Connections included</li> <li>For integration in machines</li> </ul>	<ul style="list-style-type: none"> <li>Integration of various pneumatic functions in one component</li> <li>No need for single housings</li> <li>Ideal for applications that require a highly compact design</li> </ul>	<ul style="list-style-type: none"> <li>Reduced weight thanks to optimal use of materials with sheet-metal structures</li> <li>Protection against environmental influences and unauthorised access in the special housing</li> <li>Ideally combined as a control cabinet directly in the system</li> </ul>
online: ➔	<a href="http://www.festo.com/sp/rip">Ready-to-install solutions</a>	<a href="http://www.festo.com/sp/rip">Ready-to-install solutions</a>	<a href="http://www.festo.com/sp/rip">Ready-to-install solutions</a>

## Product overview

### Assemblies

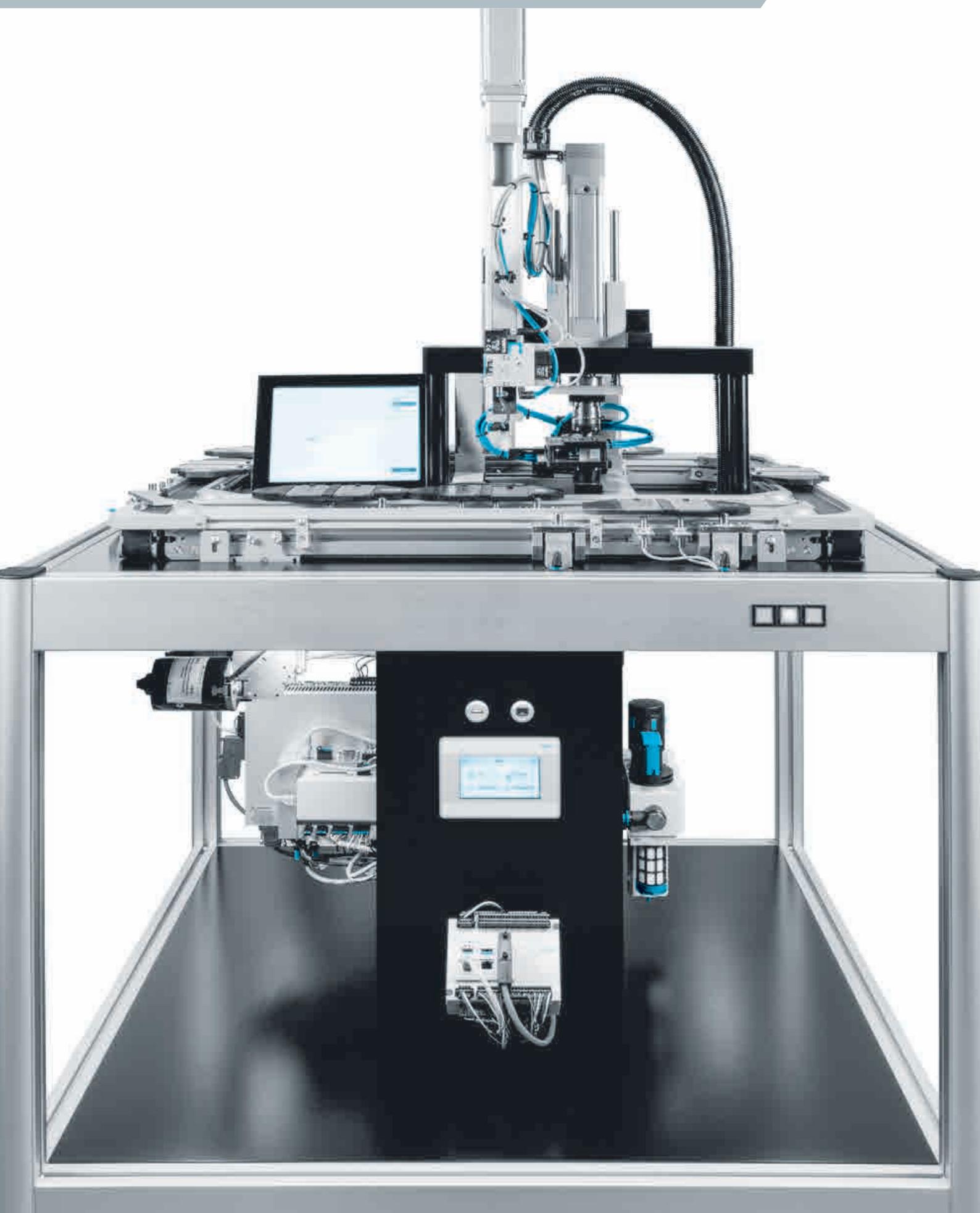


**Function blocks**



**Profile solutions**

<b>Technical data</b>	<ul style="list-style-type: none"> <li>No tubing required thanks to drilled ducts</li> <li>Housing available in different materials</li> <li>Customised design of the pneumatic interfaces for the system</li> <li>Ideal for a small number of components and variable connection options</li> <li>Extremely economical, even for small quantities</li> </ul>	<ul style="list-style-type: none"> <li>Profiles in customised cross sections and lengths</li> <li>Integrated ducts for straight-line routing of the compressed air</li> <li>Common air supply for multiple valves or valve terminals via a single duct</li> <li>Combination of exhaust air and supply air without tubing, even over long distances</li> <li>Supply of compressed air at different locations</li> <li>No tubing required</li> <li>Significantly reduced cabling</li> <li>Modular structure easy to achieve</li> <li>Optional: profile as mechanical mounting element for other components or as a supporting part of the machine frame</li> </ul>
<b>Description</b>	<ul style="list-style-type: none"> <li>Compressed air supply for pneumatic components via drilled ducts</li> <li>Ideal for a small number of pneumatic components and variable connection options</li> <li>Compact and easy to service</li> </ul>	<ul style="list-style-type: none"> <li>Extruded profiles in combination with valves as a valve terminal</li> <li>For the distribution of compressed air in the machine concept</li> <li>Customised profile cross sections available</li> </ul>
<b>online:</b> ➔	<a href="#">Ready-to-install solutions</a>	<a href="#">Ready-to-install solutions</a>



## Product overview

### Software tools

<b>Configurator</b>		<p>Design a product with numerous features reliably and quickly with the help of the configurator.</p> <p>Select all the required product features step-by-step. The use of logic checks ensures that only correct configurations are available for selection.</p> <p>A dynamic graphic generated on the basis of the configuration provides a visual aid for selecting the correct product features.</p> <p>The configurator is part of the electronic catalogue and is not available as a separate software program.</p>
<b>CODESYS</b>		<p>CODESYS for standardised programming of embedded devices according to IEC 61131-3. It makes your life easier with simple commissioning, fast programming and parameterisation.</p> <p>The benefits:</p> <ul style="list-style-type: none"> <li>• Hardware-neutral software platform for quick and easy configuration, programming and commissioning of pneumatic and electrical automation solutions</li> <li>• Extensive module libraries for single- or multi-axis positioning motions.</li> <li>• The IEC 61131-3 standard means that CODESYS is flexible and open for all types of control tasks.</li> <li>• Modular: offline and online functions as well as components for hardware configuration and visualisation.</li> <li>• User-friendly IEC function block extension.</li> <li>• Re-use of existing application parts.</li> </ul> <p>The parameterisation software can be found at <a href="http://www.festo.com">www.festo.com</a> &gt; "Support Portal" tab &gt; "CODESYS" search term &gt; "Software" tab.</p>

### Joining technology

#### Function-specific systems

		<b>Servo press kits YJPK</b>		<b>Commissioning service GFCA-Y2</b>
<b>Working stroke</b>	100 ... 400 mm			
<b>Pressing force</b>	0 ... 17 kN			
<b>Feed speed</b>	0 ... 250 mm/s			
<b>Accuracy in <math>\pm</math> % FS</b>	0.25 %FS			
<b>Protocol</b>	EtherNet/IP, TCP/IP, Modbus® TCP			
<b>Description</b>	<ul style="list-style-type: none"> <li>• Modular system kit comprising application software GSAY, electric cylinder with spindle drive ESBF, motor EMMS-AS, motor controller CMMP-AS, force sensor and controller CECC-X together with the required accessories</li> <li>• Less expensive than conventional press-fitting systems</li> <li>• Pre-installed application software GSAY offers precisely the required application-specific functions</li> <li>• Commissioning made easy: parameterisation instead of programming</li> <li>• For top quality: real-time monitoring of the press-fitting operation and clear visualisation of the force/displacement curves</li> <li>• Fit for Industry 4.0 thanks to the OPC UA interface at the controller</li> </ul>	<ul style="list-style-type: none"> <li>• Services for the servo press kit YJPK</li> <li>• Support with commissioning</li> <li>• Support with electrical installation</li> <li>• Checking the electrical connections and the travel path</li> <li>• Configuration and parameterisation</li> <li>• Testing the system, data backup and documentation</li> <li>• Introduction to WebVisu software</li> <li>• Remote or on-site service</li> </ul>		
<b>online:</b> →	<a href="http://yjpk">yjpk</a>		<a href="http://gfca">gfca</a>	

## Handling solutions



**Balancer kits  
YHBP**

<b>Stroke range</b>	100 ... 1990 mm
<b>Cylinder diameter</b>	50 ... 200 mm
<b>Max. travel speed</b>	1 m/s
<b>Load</b>	25 ... 999 kg
<b>Operating pressure</b>	4 ... 8 bar
<b>Nominal operating voltage DC</b>	24 V
<b>Description</b>	<ul style="list-style-type: none"><li>Very low operating forces of just 10 N</li><li>Extremely fast, automatic weight detection for a wide range of variants in production processes</li><li>Safety Performance Level d</li></ul>
<b>online:</b> →	<a href="#">yhbp</a>

## Product overview



## Product overview

### Tools



**Clip fix tools  
AGTC**

<b>Valve function</b>	3/2-way, closed, monostable
<b>Actuation type</b>	Mechanical
<b>Operating pressure</b>	2 ... 6 bar
<b>Pneumatic connection 1</b>	Female thread G1/4
<b>Description</b>	<ul style="list-style-type: none"> <li>Pneumatic mounting device for clips of various designs</li> <li>Material recommendation for polymer clip adapter, e.g. PBT, PE-UHMW or POM</li> </ul>
<b>online:</b> ➔	<a href="#">agt</a>

### Air reservoir

### Air reservoirs



**Air pressure reservoirs  
VZS**



**Air pressure reservoirs  
CRVZS**

<b>Volume</b>	20 l	0.1 l, 0.4 l, 0.75 l, 10 l, 21 l, 20 l, 5 l
<b>Information on air reservoir materials</b>	Powder-coated steel	High-alloy stainless steel
<b>Conforms to standard</b>	EN 286-1	AD 2000
<b>Condensate drain connection</b>	G3/8	G3/8
<b>Description</b>	<ul style="list-style-type: none"> <li>Compensation of pressure fluctuations and as accumulators in the event of sudden air consumption</li> <li>Providing large quantities of compressed air for supplying fast pulsing drives</li> <li>With connection for condensate drain</li> <li>Conforms to the requirements of Directive 2014/29/EC and EN 286-1</li> <li>Operating medium: compressed air, vacuum</li> </ul>	<ul style="list-style-type: none"> <li>Corrosion-resistant</li> <li>Compensation of pressure fluctuations and as accumulators in the event of sudden air consumption</li> <li>Providing large quantities of compressed air for supplying fast pulsing drives</li> <li>With connection for condensate drain in some cases</li> <li>Food-safe, see <a href="#">www.festo.com/sp/crvzs</a> -&gt; "Certificates" tab</li> <li>Designs to EU Pressure Equipment Directive EN 286-1</li> <li>Operating medium: compressed air, vacuum</li> </ul>
<b>online:</b> ➔	<a href="#">vzs</a>	<a href="#">crvzs</a>

**Silencers****Pneumatic silencers**

				
	Silencers AMTE	Silencers U	Silencers UC	Silencers AMTC
Information on silencer insert materials	Bronze	PE, Bronze	PE	PE
Pneumatic connection	1/8 NPT, 1/4 NPT, 3/8 NPT, 1/2 NPT, 10-32 UNF-2A, G1, G1/2, G1/4, G1/8, G3/4, G3/8, PK-3, PK-4	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	<ul style="list-style-type: none"> <li>Long or short design</li> <li>Metal version</li> <li>Operating medium compressed air</li> <li>High temperature resistance up to 80°C</li> <li>Slim width</li> <li>Many different variants</li> <li>Universal applications</li> </ul>	<ul style="list-style-type: none"> <li>Compact design, polymer or die-cast</li> <li>Barbed fitting or threaded connection</li> <li>Operating medium compressed air</li> </ul>	<ul style="list-style-type: none"> <li>Polymer version</li> <li>Operating medium compressed air</li> <li>For solenoid valves CPE</li> <li>Threaded connection or push-in sleeve for push-in fitting QS</li> </ul>	<ul style="list-style-type: none"> <li>For valve terminal VTUB-12</li> <li>Attached via pin (spring clip, included in the delivery of the valve)</li> <li>Polymer version</li> <li>Operating medium compressed air</li> </ul>
online: →	<a href="#">amte</a>	<a href="#">u</a>	<a href="#">uc</a>	<a href="#">amtc</a>

**Silencers****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, M7	G1	G1/4, G3/8
Noise level			
Description	<ul style="list-style-type: none"> <li>Special open minimal resistance silencer</li> <li>For vacuum generators</li> <li>Facilitates trouble-free operation of the vacuum generator</li> <li>Operating medium compressed air</li> </ul>	<ul style="list-style-type: none"> <li>Safety silencer for MS6-SV, MS series</li> <li>Operating medium compressed air</li> </ul>	<ul style="list-style-type: none"> <li>Special open minimal resistance silencer</li> <li>For vacuum generators</li> <li>Facilitates trouble-free operation of the vacuum generator</li> <li>Silencer extension for extending the silencer for further noise reduction</li> <li>Operating medium compressed air</li> </ul>
online: →	<a href="#">uo</a>	<a href="#">uos</a>	<a href="#">uom</a>

## Product overview

### Compressed air pistols

	<b>Air guns</b> LSP		<b>Air nozzles</b> LPZ
<b>Exhaust air function</b>	Metered blowing		
<b>Pneumatic connection</b>	Female thread G1/4	Male thread M12x1.25	
<b>Information on housing materials</b>	Wrought aluminium alloy, PA6 reinforced	Aluminium, Brass, Die-cast zinc, Chrome-plated, Nickel-plated	
<b>Description</b>	<ul style="list-style-type: none"> <li>Precise, infinitely variable, lever-operated flow metering</li> <li>Interchangeable nozzles</li> <li>Operating medium compressed air</li> </ul>	<ul style="list-style-type: none"> <li>With protective air shield or silencer</li> <li>Targeted, strong air jet or powerful, focused air jet</li> <li>Low noise level</li> <li>Operating medium compressed air</li> </ul>	
online: ➔	<a href="#">lsp</a>		<a href="#">lpz</a>

### Pressure indicators

	<b>Visual indicators</b> OH		<b>Pneumatic terminals, end clamps, distributors</b> LT, LTE, LTV
<b>Operating pressure</b>	-1 ... 8 bar	0.1 ... 8 bar	
<b>Pneumatic connection</b>	Barbed connector PK-3, G1/8	Barbed connector PK-3, PK-4	
<b>Pneumatic connection 2</b>		For tubing O.D. 4 mm, 6 mm	
<b>Type of mounting</b>	Installation into control panel in Ø22.5		
<b>Description</b>	<ul style="list-style-type: none"> <li>Visual indicator</li> <li>Indicator colours red, blue, yellow or green</li> <li>Aluminium or polymer</li> <li>Operating medium compressed air</li> </ul>	<ul style="list-style-type: none"> <li>Pneumatic terminal for checking incoming and outgoing signals at the controller input and output</li> <li>Up to 15 distributor pieces with common air supply, for easy connection</li> <li>Brass, polymer</li> <li>Operating medium compressed air</li> </ul>	
online: ➔	<a href="#">oh</a>		<a href="#">lt</a>

### Inscription systems

	<b>Inscription labels</b> ASLR, BZ, HWF, IBS, KM, KMC, MH, SBS		<b>Inscription label holders</b> ASCF, CPV10-VI-ST, CPV14-VI-ST, CPV18-VI-ST, CPVSC1-ST, CPX-ST, VMPA1-ST, VMPA14-ST, VMPAL-ST
<b>Type of mounting</b>	Can be pressed in manually	Plug-on, snap-in, clip-on	
<b>Width</b>		21 mm, 12 mm	
<b>Height</b>		7 mm, 2 mm	
<b>Description</b>	<ul style="list-style-type: none"> <li>For labelling items</li> <li>Can be inserted in holders or carriers on suitably equipped components</li> </ul>	<ul style="list-style-type: none"> <li>Holder for inscription labels</li> <li>For components without pre-assembled carriers</li> </ul>	
online: ➔	<a href="#">aslr</a>		<a href="#">ascf</a>

## 19 Process automation



## Product overview

### 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](http://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](http://www.festo.com/pa/valveterminals)

## Pilot valves

				
<b>Solenoid valves VSNC</b>		<b>Standards-based valves, NAMUR (VDI/VDE 3845) NVF3</b>	<b>Solenoid valves VOFC</b>	<b>Solenoid valves VOFD</b>
<b>Valve function</b>	5/2 double solenoid, 5/2-way or 3/2-way, convertible, 5/3-way, pressurised, 5/3 exhausted, 5/3 closed, Connections swapped	5/2- or 3/2-way monostable	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
<b>Operating pressure</b>	1.5 ... 10 bar	2 ... 10 bar	0 ... 10 bar	0 ... 12 bar
<b>Ambient temperature</b>	-20 ... 60°C	-5 ... 40°C	-25 ... 60°C	-50 ... 60°C
<b>Pneumatic connection 1</b>	1/4 NPT, G1/4, G1/8, QS-1/4, QS-10, QS-3/8, QS-5/16, QS-6, QS-8	G1/4	NAMUR port pattern, 1/4 NPT, 1/2 NPT, G1/2, G1/4, M5	NAMUR port pattern, 1/4 NPT, G1/4, M5
<b>Standard nominal flow rate</b>	500 ... 1350 l/min	900 l/min	766 ... 2686 l/min	52 ... 1900 l/min
<b>Explosion prevention and protection</b>	Class I, Div. 1 (US), AEx m II T4, II 2G, II 2D, For zone 1, 2, 21, 22, Class I, Div. 2 (US), II 3D, II 3G, Ex db IIC T4 Gb, Class II, Div. 1 (US), Ex db IIC T5 Gb, Class II, Div. 2 (US), Class III, Div. 1 (US), Class III, Div. 2 (US), EPL Da (IECEx), Ex ia IIB T135°C Da, EPL Db (IEC-EX), EPL Db (KR), Ex mb tb IIIC T80°C, Ex t IIC T80°C Db, EPL Dc (KR), Ex tb IIIC T100°C Db, Ex ia IIC T6 Ga, Ex tb IIIC T135°C Db, EPL Ga (IEC-EX), EPL Ga (KR), Ex ia IIC T6...T5 Ga, EPL Gb (IECEx), Ex mb IIC T6, EPL Gb (KR), Ex nA IIC T5 X Gc, EPL Gc (KR), Ex tc IIIC T95°C X Dc	II 2G, II 2D, Ex h IIIC T70°C Db, Ex h IIC T6 Gb	II 2G, II 2D, For zone 1, 2, 21, 22, Ex ia IIC T85°C, T125°C Db, EPL Db (IEC-EX), EPL Db (KR), Ex i IIC T6, T5 Gb, EPL Gb (IECEx), EPL Gb (KR)	For zone 1, 2, 21, 22
<b>Description</b>	<ul style="list-style-type: none"> <li>Namur connection pattern to VDI/VDE 3845</li> <li>Rotatable seal for 3/2- or 5/2-way valve</li> <li>Wide choice of EX solenoid systems</li> <li>Sturdy and powerful</li> <li>Extended temperature range</li> <li>Excellent value for money</li> <li>All solenoid coils can be used on an armature tube</li> <li>The VSNC-...FN variant achieves greater energy efficiency with reduced power consumption</li> </ul>	<ul style="list-style-type: none"> <li>Namur connection pattern to VDI/VDE 3845</li> <li>Electrically actuated, piloted</li> <li>Reset via mechanical return</li> <li>Variants to EU Explosion Protection Directive (ATEX)</li> </ul>	<ul style="list-style-type: none"> <li>Suitable for process automation, for applications in chemical and petrochemical plants</li> <li>Suitable for outdoor use under harsh ambient conditions</li> <li>Especially suitable for quarter turn actuators thanks to NAMUR flange pattern</li> <li>Valve can switch between internal and external pilot air</li> <li>Variants with TÜV approval up to SIL3 to IEC 61508</li> <li>Variants to EU Explosion Protection Directive (ATEX)</li> </ul>	<ul style="list-style-type: none"> <li>Suitable for process automation, for applications in chemical and petrochemical plants</li> <li>Suitable for outdoor use under harsh ambient conditions</li> <li>Especially suitable for quarter turn actuators thanks to NAMUR flange pattern</li> <li>Variants to EU Explosion Protection Directive (ATEX)</li> <li>Variants with TÜV approval up to SIL3 to IEC 61508</li> </ul>
<b>online:</b> ➔	<b>vsnc</b>	<b>namur</b>	<b>vofc</b>	<b>vofd</b>

## Product overview

### Limit switch attachments

#### Sensor boxes

			
	<b>End switch attachments SRBC</b>	<b>End switch attachments SRBG</b>	<b>End switch attachments SRBE</b>
<b>Information on housing materials</b>	Die-cast aluminium	PBT	Die-cast aluminium
<b>Operating voltage range AC</b>	0 ... 250 V		0 ... 250 V
<b>Operating voltage range DC</b>	0 ... 175 V	6 ... 60 V	0 ... 60 V
<b>Measuring principle</b>	Inductive, Magnetic reed, Mechanical/electrical	Inductive	Inductive, Magnetic reed, Mechanical/electrical, Via proximity switch
<b>Switching element function</b>	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
<b>Description</b>	<ul style="list-style-type: none"> <li>Pre-assembled mounting adapter for ease of installation</li> <li>The trip cams can be easily set without additional tools</li> <li>Sturdy, corrosion-resistant design, ideal for use in harsh ambient conditions</li> <li>Clearly visible 3D position indicator allows the current position of the quarter turn actuator to be quickly detected</li> </ul>	<ul style="list-style-type: none"> <li>Compact housing with M12 plug connection</li> <li>Direct mounting on quarter turn actuators to VDI/VDE 3845</li> <li>For quarter turn actuators for process automation with position indicators</li> <li>AS-Interface version with extended addressing options</li> <li>Intrinsically safe version to ATEX and SIL 2 to IEC 61508</li> <li>LED status indicator for switching status, supply voltage and solenoid valve output</li> </ul>	<ul style="list-style-type: none"> <li>The trip cams can be easily set without additional tools</li> <li>Sturdy, corrosion-resistant design, ideal for use in harsh ambient conditions</li> <li>Clearly visible 3D position indicator allows the current position of the quarter turn actuator to be quickly detected</li> </ul>
<b>online:</b> ➔	<a href="#">srbc</a>	<a href="#">srbg</a>	<a href="#">srbe</a>

### Limit switch attachments

#### Sensor boxes

		
	<b>Limit switch attachments SRAP</b>	<b>Limit switch attachments DAPZ</b>
<b>Information on housing materials</b>	Wrought aluminium alloy	
<b>Operating voltage range AC</b>		4 ... 250 V
<b>Operating voltage range DC</b>	15 ... 30 V	4 ... 250 V
<b>Measuring principle</b>	Magnetic Hall	Inductive, Mechanical/electrical
<b>Switching element function</b>		N/O contact, Changeover switch
<b>Description</b>	<ul style="list-style-type: none"> <li>Based on standard VDI/VDE 3845 (NAMUR)</li> <li>Analogue</li> <li>For monitoring the position of quarter turn actuators</li> <li>Sensors based on 2D Hall technology</li> </ul>	<ul style="list-style-type: none"> <li>Round design</li> <li>Drive interface to standard VDI/VDE 3845 (NAMUR)</li> <li>With display</li> <li>Integrated solenoid valve control</li> </ul>
<b>online:</b> ➔	<a href="#">srap</a>	<a href="#">dapz</a>

## Accessories for limit switch attachments



**Position indicators  
SASF**

<b>Setting range of swivel angle</b>	0 ... 360 deg
<b>Ambient temperature</b>	-25 - 70°C
<b>Type of mounting</b>	To VDI/VDE 3845
<b>Description</b>	<ul style="list-style-type: none"> <li>For limit switch attachments SRBG</li> <li>For mounting on drive shaft of standard actuators to VDI/VDE 3845</li> <li>Four fixed actuating lugs offset by 90°</li> <li>For clockwise and anticlockwise rotating actuators with 90° and 180° rotation</li> </ul>
<b>online:</b> →	<a href="#">sASF</a>

## Positioners



**Positioners  
CMSX**



<b>Standard nominal flow rate</b>	50 ... 130 l/min
<b>Ambient temperature</b>	-5 ... 60°C
<b>Reference value</b>	0 - 20 mA, 4 - 20 mA, 0 - 10 V
<b>Operating voltage range DC</b>	21.6 ... 26.4 V
<b>Operating pressure</b>	3 ... 8 bar
<b>Safety information</b>	Safety function: Opening or closing in the event of system failure, Hold position in the event of a system failure
<b>Degree of protection</b>	IP65
<b>Type of mounting</b>	With accessories
<b>Information on housing materials</b>	PC-reinforced
<b>Description</b>	<ul style="list-style-type: none"> <li>Digital electropneumatic positioner for single-acting or double-acting pneumatic quarter turn actuators and double-acting pneumatic linear actuators</li> <li>No air consumption in the adjusted state</li> </ul>
<b>online:</b> →	<a href="#">cmsx</a>

## Product overview

Drives >

### Linear actuators

		<b>NEW</b>			
<b>Design</b>	Linear actuators DFPC	Piston drives DFPK	Linear actuators with displacement encoder DFPI	Linear actuators with displacement encoder DFPI-NB3	
<b>Mode of operation</b>	Double-acting		Double-acting	Double-acting	
<b>Size of valve actuator</b>	80, 100, 125, 160, 200	46, 75	100, 125, 160, 200, 250, 320	100, 125, 160, 200, 250, 320	
<b>Stroke</b>	10 ... 1600 mm	17 ... 20 mm	40 ... 990 mm	40 ... 990 mm	
<b>Operating pressure</b>	0.6 ... 8 bar	5 ... 10 bar	3 ... 8 bar	3 ... 8 bar	
<b>Ambient temperature</b>	-20 ... 80°C	0 ... 60°C	-20 ... 80°C	-20 ... 80°C	
<b>NEW</b>	• New product, 7/2020				
<b>Description</b>	<ul style="list-style-type: none"> <li>• Robust and corrosion-resistant tie-rod design</li> <li>• Ideal for use in harsh ambient conditions</li> <li>• Numerous configuration options</li> <li>• Variants with fastening interface in accordance with ISO 5210 or ISO 15552 with extended tie rods</li> </ul>	<ul style="list-style-type: none"> <li>• Stainless steel design</li> <li>• Available as a valve actuator with angle seat valve VZXA and as a valve block solution</li> <li>• Linear actuating motion</li> <li>• High actuating forces</li> <li>• To EU Explosion Protection Directive (ATEX)</li> </ul>	<ul style="list-style-type: none"> <li>• Mounting interfaces for process valves to DIN EN ISO 5210</li> <li>• Integrated air supply</li> <li>• Optionally with integrated displacement encoder or fully integrated positioner</li> <li>• IP65, IP67, IP69K, NEMA4</li> <li>• To EU Explosion Protection Directive (ATEX)</li> </ul>	<ul style="list-style-type: none"> <li>• Mounting interfaces to ISO 15552</li> <li>• Robust and corrosion-resistant tie-rod design</li> <li>• Optionally with integrated displacement encoder or fully integrated positioner</li> <li>• IP65, IP67, IP69K, NEMA4</li> <li>• To EU Explosion Protection Directive (ATEX)</li> </ul>	
<b>online:</b> ➔	<a href="#">dfpc</a>	<a href="#">dfpk</a>	<a href="#">dfpi</a>	<a href="#">dfpi</a>	

Drives &gt;

## Quarter turn actuators and quarter turn actuator units

	 NEW			
	Quarter turn actuator units KDFP-DFPD	Quarter turn actuators DFPD	Quarter turn actuators DFPD-C	Quarter turn actuators DAPS
<b>Design</b>	Rack and pinion	Rack and pinion	Rack and pinion	Scotch yoke system
<b>Mode of operation</b>	Double-acting, Single-acting	Double-acting, Single-acting	Single-acting	Double-acting, Single-acting
<b>Size of valve actuator</b>	10 ... 2300	10, 20, 40, 80, 120, 160, 240, 300, 480, 700, 900, 1200, 2300	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
<b>Flange hole pattern</b>	F03, F04, F05, F07, F10, F12, F14, F16	F03, F04, F05, F07, F10, F12, F14, F16, F0507, F0710, F1012, F1216	F05, F07, F10, F12, F14, F16	F03, F04, F05, F07, F10, F12, F14, F16, F25
<b>Swivel angle</b>	90 deg	90 deg, 120 deg, 135 deg, 180 deg	90 deg	90 deg, 92 deg
<b>Ambient temperature</b>	-50 ... 150 °C	-50 ... 150°C	-20 ... 80°C	-50 ... 150°C
<b>Operating pressure</b>	2 ... 8 bar	2 ... 8 bar	2 ... 8 bar	1 ... 8.4 bar
<b>NEW</b>	• New product, 7/2020			
<b>Description</b>	<ul style="list-style-type: none"> <li>• Quarter turn actuator unit comprising quarter turn actuator DFPD and accessories</li> <li>• Select, size and order quickly, easily and reliably with the configurator</li> <li>• Optionally with pilot valve</li> <li>• Optionally with positioner</li> <li>• Optional with position indicator</li> <li>• Optionally with end position feedback</li> <li>• Optionally with the required mounting adapters or reducing sleeves for mounting on the valve body</li> </ul>	<ul style="list-style-type: none"> <li>• Uniform torque characteristic across the entire rotation angle of 90° with the double-acting version</li> <li>• Process valve connection to ISO 5211</li> <li>• Mounting hole pattern to VDI/VDE 3845</li> <li>• Sturdy, non-slip and easy-to-clean aluminium housing</li> <li>• Long service life, low wear</li> <li>• Version with swivel angle 120°, 135°, 180° for the sizes 40, 120, 240, 480, double-acting</li> </ul>	<ul style="list-style-type: none"> <li>• Suitable for process automation in the chemical and petrochemical industries</li> <li>• Extended NAMUR interface to VDI/VDE 3847</li> <li>• Anti-blow-out screws for end-position adjustment</li> <li>• Hard anodised cover to prevent surface damage</li> <li>• Non-ferrous metal-free spring sets</li> <li>• Version with compressed air ducts in the housing for direct attachment of positioner and pilot valve on the actuator, without extra barbed tubing connectors</li> </ul>	<ul style="list-style-type: none"> <li>• High breakaway torques</li> <li>• Flange hole pattern to ISO 5211</li> <li>• Mounting hole pattern to VDI/VDE 3845</li> <li>• Optionally with handwheel as a manual emergency override</li> <li>• Corrosion-resistant version made from stainless steel</li> <li>• To EU Explosion Protection Directive (ATEX)</li> </ul>
<b>online:</b> →	<a href="#">kdfp</a>	<a href="#">dfpd</a>	<a href="#">dfpd</a>	<a href="#">daps</a>

## Product overview

### Process valves >

#### Ball valves

				
<b>Design</b>	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
<b>Actuation type</b>	Mechanical	Mechanical	Mechanical	Mechanical
<b>Nominal size DN</b>	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
<b>Process valve connection</b>	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
<b>Flow rate Kv</b>	3.5 ... 436.3 m³/h	5 ... 435.2 m³/h	8.5 ... 2078.3 m³/h	5.9 ... 243 m³/h
<b>Temperature of medium</b>	-20 ... 200°C	-20 ... 200°C	-20 ... 200°C	-20 ... 130°C
<b>Nominal pressure process valve PN</b>	16	63	20	25, 40, 50
<b>Description</b>	<ul style="list-style-type: none"> <li>Electropolished surfaces SFV4</li> <li>PTFE seal with little dead space</li> <li>The high-performance ball valve for the pharmaceutical and cosmetics industry</li> <li>FDA-compliant seal to FDA 21 CFR 177.1550</li> </ul>	<ul style="list-style-type: none"> <li>2-way manual, with lockable hand lever</li> <li>2- and 3-way with ISO 5211 head flange, with optional lockable hand lever</li> <li>Stainless steel design</li> <li>Pipe thread according to ASME B1.20.1 or welded end according to ASME B16.11</li> <li>Optionally with pre-assembled hand lever</li> </ul>	<ul style="list-style-type: none"> <li>Flanged connections to ANSI B 16.5. class 150</li> <li>Static discharge ensured</li> <li>API 607 Fire Safe certification</li> <li>Stainless steel design</li> <li>Easy to service</li> <li>Optionally with pre-assembled hand lever</li> </ul>	<ul style="list-style-type: none"> <li>Brass design</li> <li>Pipe thread to EN 10226-1</li> </ul>
<b>online:</b> →	vzbd	vzbe	vzbf	vzbm

### Process valves >

#### Ball valves

			
<b>Design</b>	2-way ball valve	2-way ball valve	2-way ball valve, 3-way ball valve, L-hole, T-hole
<b>Actuation type</b>	Mechanical	Mechanical	Mechanical
<b>Nominal size DN</b>	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
<b>Process valve connection</b>	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
<b>Flow rate Kv</b>	5.9 ... 535 m³/h	19.4 ... 1414 m³/h	7 ... 1414 m³/h
<b>Temperature of medium</b>	-20 ... 150°C	-10 ... 200°C	-10 ... 200°C
<b>Nominal pressure process valve PN</b>	25, 40	16, 40	63
<b>Description</b>	<ul style="list-style-type: none"> <li>Automatable 2-way ball valve</li> <li>Brass design</li> <li>Blow-out proof shaft</li> <li>Manual operation possible using hand lever</li> <li>Connecting thread to EN 10226-1</li> <li>Mounting flange to ISO 5211</li> </ul>	<ul style="list-style-type: none"> <li>Automatable 2-way compact flanged ball valve</li> <li>Stainless steel design</li> <li>Short installation length</li> <li>Blow-out proof shaft</li> <li>Manual operation possible using hand lever</li> <li>Flange to DIN 1092-1</li> <li>Mounting flange to ISO 5211</li> <li>Use in zone 1, 21, 2, 22</li> </ul>	<ul style="list-style-type: none"> <li>Automatable 2-way or 3-way ball valve</li> <li>Stainless steel design</li> <li>Blow-out proof shaft</li> <li>Manual operation possible using hand lever</li> <li>Connecting thread to EN 10226-1</li> <li>Mounting flange to ISO 5211</li> <li>Use in zone 1, 21, 2, 22</li> </ul>
<b>online:</b> →	vapb	vzbc	vzba

## Process valves &gt;

## Angle seat valves

		
<b>Angle seat valves</b>		
	VZXF	VZXA 
<b>Design</b>	Poppet valve with piston drive	Poppet valve with piston drive, Poppet valve with diaphragm actuator
<b>Drive size</b>	50 mm, 80 mm	46 mm, 75 mm, 90 mm
<b>Valve function</b>	2/2-way, closed, monostable	2/2
<b>Control function</b>	Closed via spring force, N/C	Closed via reduced spring force, N/C, Double-acting, Opened via spring force, N/O, Closed via spring force, N/C
<b>Actuation type</b>	Pneumatic	Pneumatic
<b>Nominal size DN</b>	DN15 ... DN50	DN13 ... DN65
<b>Flow rate Kv</b>	3.3 ... 43 m³/h	4.6 ... 77.9 m³/h
<b>Medium pressure</b>	-0.9 ... 40 bar	-0.9 ... 30 bar
<b>Temperature of medium</b>	-40 ... 200°C	-30 ... 200°C
<b>Nominal pressure process valve PN</b>	16, 40	25, 40
<b>Description</b>	<ul style="list-style-type: none"> <li>• Sturdy design</li> <li>• Stainless steel and gunmetal process valves with stainless steel, brass or aluminium actuators</li> <li>• Safety position “closing”</li> <li>• Different actuator sizes and housing materials</li> <li>• Selection of different seat and shaft seals</li> <li>• For liquids, gases and other easily contaminated media</li> <li>• Easy-to-clean design</li> </ul>	
online: →	vzxf	vzxa

## Process valves &gt;

## Pinch valves

		
<b>Pinch valves</b>		
	VZQA	
<b>Design</b>	Pinch valve, pneumatically actuated	
<b>Actuation type</b>	Pneumatic	
<b>Valve function</b>	2/2-way, closed, monostable, 2/2 open, single solenoid	
<b>Nominal size DN</b>	6, 15, 25	
<b>Process valve connection</b>	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, G1, G1/2, G1/4	
<b>Flow rate Kv</b>	0.7 ... 18 m³/h	
<b>Medium pressure</b>	0 ... 6 bar	
<b>Temperature of medium</b>	-5 ... 150°C	
<b>Nominal pressure process valve PN</b>	10	
<b>Description</b>	<ul style="list-style-type: none"> <li>• Modular design</li> <li>• Quick and easy replacement of the diaphragm</li> <li>• For critical, abrasive and viscous media</li> <li>• Easy-to-clean design</li> <li>• Flow direction is freely selectable</li> <li>• Versions with end-position sensing</li> </ul>	
online: →	vzqa	

## Product overview

### Process valves >

#### Solenoid-actuated media valves

				
<b>Solenoid valves VZWD</b>				
<b>Design</b>	Directly actuated poppet valve	Diaphragm valve, Force pilot operated	Diaphragm valve, servo-controlled	Diaphragm valve
<b>Actuation type</b>	Electric	Electric	Electric	Electric
<b>Nominal size</b>	1 ... 6 mm	13.5 ... 50 mm	13 ... 50 mm	13 ... 40 mm
<b>Process valve connection</b>	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, NPT1, NPT1 1/2, NPT1 1/4, NPT1/2, NPT1/4, NPT2, NPT3/4, NPT3/8	G1, G1 1/2, G1 1/4, G1/2, G1/4, G2, G3/4, G3/8	G1, G1 1/2, G1/2, G1/4, G3/4, G3/8
<b>Flow rate Kv</b>	0.06 ... 430 l/min	1.8 ... 29900 l/min	1.6 ... 31000 l/min	2000 ... 30500 l/min
<b>Medium pressure</b>	0 ... 90 bar	0 ... 10 bar	0.5 ... 10 bar	0.5 ... 10 bar
<b>Temperature of medium</b>	-10 ... 80°C	-10 ... 80°C	-10 ... 60°C	-10 ... 60°C
<b>Description</b>	<ul style="list-style-type: none"> <li>• Extensive pressure range</li> <li>• Directly actuated poppet valve</li> <li>• No differential pressure required</li> <li>• Can also be used in vacuum technology</li> </ul>	<ul style="list-style-type: none"> <li>• High flow rates</li> <li>• Large nominal diameters with relatively small solenoids</li> <li>• No differential pressure required</li> <li>• Can also be used in vacuum technology</li> </ul>	<ul style="list-style-type: none"> <li>• Brass or stainless steel casting design</li> <li>• Electrical connection via solenoid armature tube</li> <li>• Comprehensive range of coils</li> <li>• Coil can be ordered separately</li> </ul>	<ul style="list-style-type: none"> <li>• Piloted diaphragm valve</li> <li>• Brass design</li> <li>• Can only be used for gaseous media</li> <li>• Adjustable closing cushioning, in-line mounting or through-hole</li> <li>• Operating voltage 24 V DC, 110/230 V AC (50 ... 60 Hz)</li> </ul>
<b>online:</b> ➔	vzwd	vzwf	vzwm	mn1h-2

Process valves &gt;

## Solenoid-actuated media valves

				
	Solenoid valves VZWP	Reverse jet pulse valves VZWE-E, VZWE-F	Media separated solenoid valves VYKA	Media separated solenoid valves VYKB
<b>Design</b>	Piloted piston poppet valve	Angled design, Straight design with flange, Diaphragm valve	Rocker valve with diaphragm seal	Electrical connection at top, Electrical connection at the side, Rocker valve with diaphragm seal
<b>Actuation type</b>	Electric	Electric	Electric	Electric
<b>Nominal size</b>	13 ... 25 mm	20 ... 76 mm	1.2 mm	1.6 ... 2 mm
<b>Process valve connection</b>	1 NPT, 1/2 NPT, 1/4 NPT, 3/4 NPT, 3/8 NPT, G1, G1 1/2, G2, G2 1/2, G3/4, G3/8	G1, G1 1/2, G2, G2 1/2, G3/4, Flange Ø 60 mm, 75 mm, 89 mm		
<b>Flow rate Kv</b>	1.5 ... 12250 l/min	15 ... 210 m3/h	0.013 ... 0.021 m3/h	0.034 ... 0.056 m3/h
<b>Medium pressure</b>	0.5 ... 40 bar	0.35 ... 8 bar		-0.75 ... 3 bar
<b>Temperature of medium</b>	-10 ... 80°C		0 ... 50°C	0 ... 50°C
<b>NEW</b>			• New product, 7/2020	New product, 5/2021
<b>Description</b>	<ul style="list-style-type: none"> <li>• For all applications with a differential pressure of min. 0.5 bar</li> <li>• For high pressures and high flow rates with relatively small solenoids</li> <li>• For controlling gaseous and liquid media in open circuits</li> </ul>	<ul style="list-style-type: none"> <li>• High flow rates</li> <li>• For mechanically cleaning filters and dust filter systems</li> <li>• Fast opening and closing times</li> <li>• Sturdy pilot system</li> </ul>	<ul style="list-style-type: none"> <li>• Compact width of 7 mm</li> <li>• Maximum performance and precision in the smallest of spaces</li> <li>• High flow rate with small size</li> <li>• Very easy to clean thanks to media separation</li> <li>• Low media consumption thanks to small internal volume</li> <li>• FDA-listed materials</li> <li>• High-quality materials, therefore also suitable for aggressive media</li> <li>• High repetition accuracy, switching frequency and precision, therefore also suitable for extremely small volumes and dosing tasks</li> <li>• Very flexible in use thanks to 3/2-way and 2/2-way variants as well as 12 ... 26 V DC control</li> <li>• Developed according to ISO 13485</li> </ul>	<ul style="list-style-type: none"> <li>• Compact width of 10 mm or 12 mm</li> <li>• Very easy to clean thanks to media separation</li> <li>• FDA-listed materials</li> <li>• High-quality materials, therefore also suitable for aggressive media</li> <li>• Very flexible in use thanks to 3/2-way or 2/2-way variants as well as 12 or 24 V DC actuation</li> <li>• For dosing, aspirating and for continuous flow applications</li> <li>• Developed according to ISO 13485</li> </ul>
<b>online:</b> ➔	vzwp	vzwe	vyka	vykb

## Product overview

[Process valves >](#)

### Pneumatically actuated media valves

 <b>Pneumatic valves</b> <b>VLX</b>	 <b>Media separated pneumatic valves</b> <b>VZDB</b>	<span style="background-color: #0070C0; color: white; padding: 2px 5px;">NEW</span>
<b>Design</b>	Diaphragm valve	Rocker valve with diaphragm seal
<b>Valve function</b>	2/2-way, closed, monostable	2/2-way, closed, monostable, 3/2-way, monostable, open/closed
<b>Actuation type</b>	Pneumatic	Pneumatic
<b>Nominal size</b>	13 ... 25 mm	1.6 mm
<b>Process valve connection</b>	G1, G1/2, G1/4, G3/4, G3/8	Male thread/male thread
<b>Standard nominal flow rate</b>	2400 ... 14000 l/min	
<b>Flow rate Kv</b>		0.034 m <sup>3</sup> /h
<b>Temperature of medium</b>	-10 ... 80°C	0 ... 50°C
<b>Medium pressure</b>	1 ... 10 bar	
<b>Operating pressure</b>		-0.075 ... 0.1 MPa
<b>NEW</b>		New product, 5/2021
<b>Description</b>	<ul style="list-style-type: none"> <li>• Poppet valve</li> <li>• Indirectly actuated</li> <li>• Brass design</li> <li>• In-line mounting</li> </ul>	<ul style="list-style-type: none"> <li>• Compact width of 10 mm</li> <li>• Very easy to clean thanks to media separation</li> <li>• FDA-listed materials</li> <li>• High-quality materials, therefore also suitable for aggressive media</li> <li>• For dosing, aspirating and for continuous flow applications</li> <li>• Developed according to ISO 13485</li> </ul>
<b>online: ➔</b>	<a href="#">vlx</a>	<a href="#">vzdb</a>

[Process valve units >](#)

### Ball valve units

 <b>Ball valve units</b> <b>KVZB</b>	
<b>Description</b>	<ul style="list-style-type: none"> <li>• Manually actuated with hand lever</li> <li>• Automatically actuated with quarter turn actuator</li> <li>• Controlled operation with quarter turn actuator and valve positioner</li> <li>• Variants to EU Explosion Protection Directive (ATEX)</li> </ul>
<b>online: ➔</b>	<a href="#">kvzb</a>

## Process valve units &gt;

## Ball valve actuator units

				
<b>Ball valve actuator units VZBM</b>				
<b>Design</b>	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
<b>Actuation type</b>	Pneumatic	Pneumatic	Pneumatic	Electric, Pneumatic
<b>Nominal size DN</b>	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
<b>Process valve connection</b>	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
<b>Flow rate Kv</b>	5.9 ... 243 m³/h	19.4 ... 1414 m³/h	7 ... 1414 m³/h	
<b>Temperature of medium</b>	-20 ... 130°C	-10 ... 200°C	-10 ... 200°C	-20 ... 150°C
<b>Nominal pressure process valve PN</b>	25, 40	16, 40	63	25, 40
<b>Description</b>	<ul style="list-style-type: none"> <li>• Ball valve actuator unit with double-acting or single-acting quarter turn actuator DFPD</li> <li>• Brass ball valve</li> <li>• 2-way ball valve actuator unit with pipe thread to EN 10226-1</li> <li>• 3-way ball valve actuator unit with drilled L-hole and pipe thread to EN 10226-1</li> <li>• 3-way ball valve actuator unit with drilled T-hole and pipe thread to EN 10226-1</li> <li>• Flow is fully opened or closed in both directions</li> </ul>	<ul style="list-style-type: none"> <li>• Ball valve actuator unit with double- or single-acting quarter turn actuator DAPS</li> <li>• Stainless steel ball valve in compact design</li> <li>• NAMUR connection pattern for solenoid valves/limit switch attachments to VDI/VDE 3845</li> <li>• Flow is fully opened or closed in both directions</li> <li>• Use in zone 1, 21, 2, 22</li> </ul>	<ul style="list-style-type: none"> <li>• Ball valve actuator unit with double- or single-acting quarter turn actuator DAPS</li> <li>• Stainless steel ball valve</li> <li>• NAMUR connection pattern for solenoid valves/limit switch attachments to VDI/VDE 3845</li> <li>• Flow is fully opened or closed in both directions</li> <li>• Use in zone 1, 21, 2, 22</li> </ul>	<ul style="list-style-type: none"> <li>• Ball valve actuator unit with double-acting quarter turn actuator DAPS</li> <li>• Brass ball valve</li> <li>• NAMUR connection pattern for solenoid valves/limit switch attachments to VDI/VDE 3845</li> <li>• Flow is fully opened or closed in both directions</li> </ul>
<b>online:</b> ➔	<a href="#">vzbm</a>	<a href="#">vzbc</a>	<a href="#">vzba</a>	<a href="#">vzpr</a>

## Product overview

### Software tools

<b>Configurator</b>		<p>Design a product with numerous features reliably and quickly with the help of the configurator.</p> <p>Select all the required product features step-by-step. The use of logic checks ensures that only correct configurations are available for selection.</p> <p>A dynamic graphic generated on the basis of the configuration provides a visual aid for selecting the correct product features.</p> <p>The configurator is part of the electronic catalogue and is not available as a separate software program.</p>
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Process valve units >

### Butterfly valve units

	
	<b>Butterfly valve units KVZA</b>
<b>Description</b>	<ul style="list-style-type: none"> <li>For versatile use in various industry sectors</li> <li>Manually actuated with hand lever</li> <li>Automatically actuated with quarter turn actuator</li> <li>Controlled operation with quarter turn actuator and valve positioner</li> <li>Butterfly valve type: wafer or lug</li> <li>Nominal width DN25 ... DN200</li> <li>Connection standard DIN EN 1092-1 or ANSI CLASS 150</li> </ul>
<b>online:</b> ➔	<a href="#">kvza</a>

### Function-specific systems

	
	<b>Control systems YCCP</b>
<b>Operating pressure</b>	4 ... 10 bar
<b>Electrical connection</b>	Spring-loaded terminal, Push-in
<b>Degree of protection</b>	IP54
<b>Ambient temperature</b>	-20 ... 40°C
<b>Description</b>	<ul style="list-style-type: none"> <li>Configurable control cabinet systems for process automation</li> <li>Select, size and order quickly, easily and reliably with the configurator</li> <li>For the control of 4 to 20 pneumatic process valves</li> <li>Version for indoor or outdoor use</li> <li>Housings in stainless steel or steel</li> <li>For valve terminal VTSA-F or MPA, in combination with CPX modules</li> </ul>
<b>online:</b> ➔	<a href="#">yccp</a>

## 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](http://www.festo.com/pa/airprep)

## Pneumatic connection technology



- Pipes
  - Tubings
  - Plug connectors
  - Couplings
  - Distributors
  - Protective conduit systems
  - Accessories
- [www.festo.com/pa/fittings](http://www.festo.com/pa/fittings)

## Product overview



## Product overview

### Technical support

	
<b>Technical support</b>	
<b>Description</b>	<ul style="list-style-type: none"> <li>Support in the event of equipment downtime or malfunction</li> <li>Identifying the cause of the error</li> <li>Deriving technical solutions</li> <li>Error elimination</li> <li>Remote support/on-site support</li> </ul>
online: ➔	<a href="http://www.festo.com/support">www.festo.com/support</a>

### Commissioning services

			
<b>Installation service</b>		<b>On-site commissioning service for axis systems</b>	<b>Remote commissioning service for axis systems</b>
<b>Description</b>	<ul style="list-style-type: none"> <li>Mechanical installation</li> <li>Pneumatic installation</li> <li>Electric installation</li> <li>Available for products and system solutions from Festo</li> </ul>	<ul style="list-style-type: none"> <li>Inspecting the cabling, electrical and pneumatic connections as well as travel distances and energy chains</li> <li>Configuring and parameterising, incl. optimising the controller parameters and homing</li> <li>Activating components in test mode</li> <li>Data backup and documentation</li> <li>Instruction manual for operators</li> <li>Available for 1, 2 and 3-axis systems with and without safety module</li> <li>Service is performed on site</li> </ul>	<ul style="list-style-type: none"> <li>Checking electrical connections and of the travel paths</li> <li>Configuration and parameterisation</li> <li>System test</li> <li>Data backup and documentation</li> <li>Introduction to the Festo Automation Suite software</li> <li>Available for 1, 2 and 3-axis systems with and without safety module</li> <li>Service is provided via remote communication</li> </ul>
online: ➔	<a href="http://www.festo.com/service">www.festo.com/service</a>	<a href="http://www.festo.com/catalogue/gfch">www.festo.com/catalogue/gfch</a>	<a href="http://www.festo.com/catalogue/gfch">www.festo.com/catalogue/gfch</a>

### Commissioning services

		
<b>Commissioning service servo press kit GFCA-Y2-A5, GFCA-Y2-A5-R</b>		<b>PLC integration service servo press kit GFCA-Y2-A2, GFCA-Y2-A2-R</b>
<b>Description</b>	<ul style="list-style-type: none"> <li>Support with commissioning</li> <li>Support with the electrical installation</li> <li>Checking the electrical connections and the travel path</li> <li>Configuration and parameterisation</li> <li>Testing the system, data backup and documentation</li> <li>Introduction to WebVisu software</li> <li>Remote service/on-site service</li> </ul>	<ul style="list-style-type: none"> <li>On-site support for the integration of function blocks into the higher-level control system (based on an empty project)</li> <li>Testing the communication between the YJKP servo press kit and the higher-order controller</li> <li>Functional test of the relevant function blocks for controlling the servo press kit YJKP based on a sample project</li> <li>Introduction to the structure of the function blocks and their functionality</li> <li>Remote service/on-site service</li> </ul>
online: ➔	<a href="http://www.festo.com/catalogue/gfca">www.festo.com/catalogue/gfca</a>	<a href="http://www.festo.com/catalogue/gfca">www.festo.com/catalogue/gfca</a>

## Maintenance and repair services

		
<b>Maintenance service</b>		<b>Repair service</b>
<b>Description</b>	<ul style="list-style-type: none"> <li>• Checking for signs of damage and wear</li> <li>• Checking mechanical, pneumatic, and electrical connections and connectors</li> <li>• Checking the air preparation</li> <li>• Carrying out component-specific inspections</li> <li>• Lubricating/re-lubricating guides</li> <li>• Tightening connectors</li> <li>• Replacing air filters</li> <li>• Replacing silencers</li> <li>• Carrying out component-specific preventive maintenance tasks</li> <li>• Troubleshooting</li> <li>• Solution finding/error elimination</li> <li>• Eliminating leakages</li> <li>• Replacing or servicing components</li> </ul>	<ul style="list-style-type: none"> <li>• In-house repair components from Festo</li> <li>• Analysis of economic efficiency</li> <li>• Inspection</li> <li>• Cleaning</li> <li>• Replacement of worn-out parts</li> <li>• Function test</li> </ul>
online: ➔	<a href="http://www.festo.com/service">www.festo.com/service</a>	<a href="http://www.festo.com/service">www.festo.com/service</a>

## Energy Saving Services

				
	<b>Pre-audit energy efficiency air system</b>	<b>Audit energy efficiency air system</b>	<b>Analysing compressed air generation</b>	<b>Air quality analysis</b>
<b>Description</b>	<ul style="list-style-type: none"> <li>• Inspecting/analysing the compressor station: consumption, flow rate, pressure, capacity utilisation</li> <li>• Analysing the air preparation: design and type of dryer</li> <li>• Analysing the design of the compressed air network: pressure measurement at two points and calculating the pressure drop</li> <li>• Random check of air consumption: leakage detection and energy efficiency analysis of the system</li> <li>• Air quality measurement: water and oil content</li> <li>• Estimating the air savings potential</li> <li>• Recommendations for increasing the energy efficiency of the air system</li> <li>• Executing and documenting the results in compliance with DIN ISO 11011</li> </ul>	<ul style="list-style-type: none"> <li>• Pre-audit energy efficiency air system</li> <li>• Compressed air generation energy analysis</li> <li>• Leakage detection and documentation</li> <li>• Leakage repair</li> <li>• Optimisation</li> <li>• Executing and documenting the results in compliance with DIN ISO 11011</li> </ul>	<ul style="list-style-type: none"> <li>• Measuring the installed compressors</li> <li>• Current consumption</li> <li>• Delivery rate</li> <li>• Pressure band</li> <li>• Analysing the compressor output</li> <li>• Analysing the usage ratio (workload)</li> <li>• Calculating the leakages</li> <li>• Calculating the annual electricity and compressed air costs as well as potential savings by eliminating leakages</li> <li>• Executing and documenting the results in compliance with DIN ISO 11011</li> </ul>	<ul style="list-style-type: none"> <li>• Inspecting the decentralised air preparation</li> <li>• Measuring the residual oil content (up to ISO 8573-1:2010 class 2)</li> <li>• Measuring the pressure dew point (up to ISO 8573-1:2010 class 2)</li> <li>• Analysing the measurement results</li> <li>• Suggested improvements</li> <li>• Executing and documenting the results in compliance with DIN ISO 11011</li> </ul>
online: ➔	<a href="http://www.festo.com/energysaving">www.festo.com/energysaving</a>	<a href="http://www.festo.com/energysaving">www.festo.com/energysaving</a>	<a href="http://www.festo.com/energysaving">www.festo.com/energysaving</a>	<a href="http://www.festo.com/energysaving">www.festo.com/energysaving</a>

## Product overview

### Energy Saving-Services

				
	<b>Compressed air consumption analysis</b>	<b>Leakage detection and documentation</b>	<b>Leakage elimination</b>	<b>Energy efficiency analysis of systems</b>
<b>Description</b>	<ul style="list-style-type: none"> <li>• Installing and disassembling measuring devices, measuring devices with standard parts (fittings, tubing, etc.)</li> <li>• Measuring the static compressed air consumption of machines at standstill and in operation</li> <li>• Calculating losses due to leakages</li> <li>• Determining consumption per machine cycle</li> <li>• Determining the average consumption per minute</li> <li>• Determining max./min. pressure</li> <li>• Determining average pressure level</li> <li>• Determining max./min. air flow</li> <li>• Analysing the measurement results</li> <li>• Executing and documenting the results in compliance with DIN ISO 11011</li> </ul>	<ul style="list-style-type: none"> <li>• Detection of leakages with ultrasonic detectors in the entire compressed air system during operation</li> <li>• Classification of the leakages according to size and cost</li> <li>• 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</li> <li>• Results available online on the Festo Energy Saving Assessment Portal</li> <li>• Executing and documenting the results in compliance with DIN ISO 11011</li> </ul>	<ul style="list-style-type: none"> <li>• Comprehensive elimination of leakages</li> <li>• Repairing or replacing the affected components based on the report of the leakage detection</li> <li>• Final verification via leakage test</li> <li>• Executing and documenting the results in compliance with DIN ISO 11011</li> </ul>	<ul style="list-style-type: none"> <li>• Measuring compressed air consumption of machines/systems</li> <li>• Carrying out a leakage detection</li> <li>• Identifying the energy saving potential by assessing the energy efficiency of the system design</li> <li>• Proposing solutions for improving energy consumption including the calculation of possible annual savings potential</li> <li>• Calculating the amortisation time</li> <li>• Executing and documenting the results in compliance with DIN ISO 11011</li> </ul>
online: ➔	<a href="http://www.festo.com/energysaving">www.festo.com/energysaving</a>	<a href="http://www.festo.com/energysaving">www.festo.com/energysaving</a>	<a href="http://www.festo.com/energysaving">www.festo.com/energysaving</a>	<a href="http://www.festo.com/energysaving">www.festo.com/energysaving</a>

### System optimisation

	
	<b>System optimisation</b>
<b>Description</b>	<ul style="list-style-type: none"> <li>• Developing customer-specific solutions for the modernisation and optimisation of equipment and/or applications</li> <li>• Calculating, selecting and sizing products incl. CAD drawings and circuit diagrams</li> <li>• Simulating and testing in order to optimise the existing system/application</li> <li>• Implementing optimisation measures</li> <li>• Documentation</li> </ul>
online: ➔	<a href="http://www.festo.com/service">www.festo.com/service</a>

## Service contract

**Service contract**

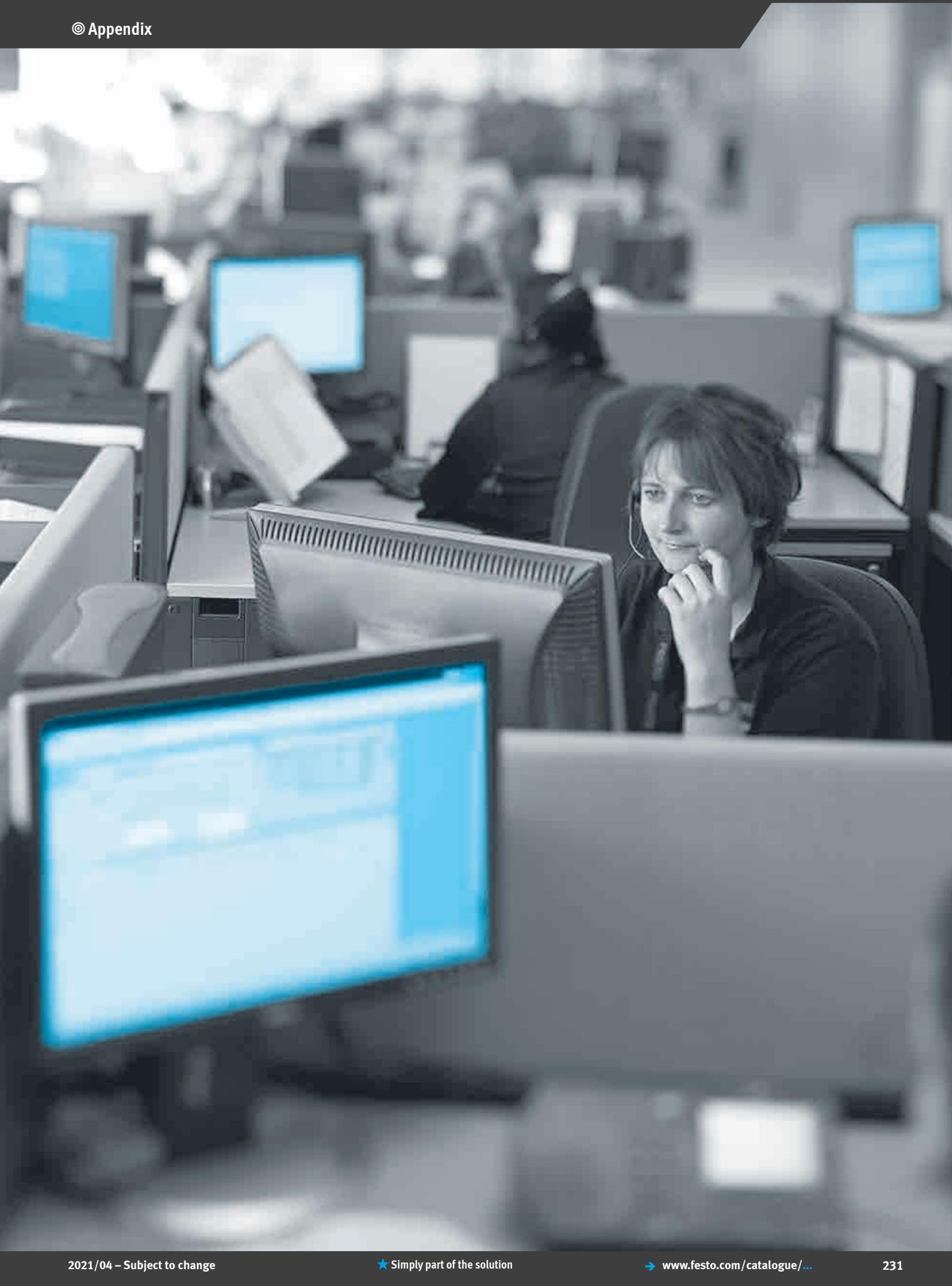
<b>Description</b>	<ul style="list-style-type: none"><li>Customer-specific service contract with a range of service options</li><li>Regular inspections according to recommendations by Festo</li><li>Regular preventive maintenance</li><li>Software updates</li><li>Replacing worn or defective components</li><li>Guaranteed availability</li><li>Guaranteed reaction times for on-site support in the event of machine downtime or malfunctions</li></ul>
<b>online:</b> ➔	<a href="http://www.festo.com/service">www.festo.com/service</a>

## Training programs and courses

**Energy Saving Services workshop**

<b>Description</b>	<ul style="list-style-type: none"><li>Basic principles of “energy efficiency in pneumatic systems”</li><li>Carrying out leakage detection using ultrasonic detection equipment</li><li>Documenting leakages</li><li>Theory and practical exercises</li></ul>
<b>online:</b> ➔	<a href="http://www.festo.com/service">www.festo.com/service</a>

## Product overview



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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.

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- You are unsure about the product's suitability for use in the planned application.
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