FESTO

Product Overview

Product Overview

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

All technical data are subject to change according to technical updates.

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The systematically faster route to the right solution

It couldn't be simpler:

1. Select the product group you require from the Table of contents ➔ 3.
   E.g.: Electromechanical drives 31

2. Go to the product pages and find the products you want using the technical features and descriptions.

3. The blue arrow points to the search term with which you can find all product information and process your order on the Internet. Simply type or add the search term after the Internet address.
   Example using search term:
   ➔ **Internet: www.festo.com/catalogue**/spindle-axis
   Example using type:
   ➔ **Internet: www.festo.com/catalogue**/egc-bs

   Are you already in the product catalogue?
   Enter the search term in the search field next to the magnifying glass.

   You can also search offline. The electronic product catalogue can be found on the DVD inside the cover. Follow the installation instructions next to the DVD.

   The electronic product catalogue offers additional productivity-boosting applications. See page 6 for more information.

4. Should you require individually tailored advice, please contact us. Contact details can be found on the next page.

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Online or offline - get the ideal solution fast

Quick start - from product family to product

There are three options available:

1. Click on a product group [1] or a product illustration. You will then be shown a selection of products with a list [2] of technical features and options [3]
   - "Engineering" starts the selection and dimensioning software
   - "Documentation" provides detailed information in PDF format
   - "Feature search" lets you further narrow down the product selection
2. Full text search: Enter the search term in the search field [5]. This can be made up of complete or incomplete keywords, part numbers, type designations or names of favourites. Depending on your input, the result shown is a selection of products as described under 1 or the product you are looking for is displayed directly. The search field [5] saves your search terms.
3. Quick link: Use the quick link [4] to jump directly to the respective product family.

Retrieving information on the product

Explanation of the fields in the configuration window:

1. Tab navigation [1]:
   - "Select features": Select the appropriate features
   - "Product list": Lists all products in the product family
2. Input field for type designation [2]:
   Enter the exact type designation here.
3. Other actions [3], which are available following a correct configuration:
   - "Add to basket": Adds your product to the basket, see also section "Export basket" and "Basket management"
   - "2D/3D view": Creates a CAD model, see section "Viewing CAD models"
   - "Accessories": Lists the matching accessories
   - "Data Sheet": Contains all relevant technical data
   - "Print Overview": Provides a summary of all selected features
4. Details [4]:
   In this section you will find information such as part number, price, delivery time, product graphic, product illustration and circuit symbol.

Product configuration for complex products

1. Select the product characteristics:
   - Navigate using the menu [1] or the tabs [4].
   - Configure your product by selecting the required features [3] on the tabs [4] going from left to right.
   - The menu [1] or the tabs [4] will provide you with a quick overview of all selected features. Missing features are marked with an exclamation mark [2], while incorrect features will be in red. Clicking on the feature takes you directly to it, so you can change it.
2. Graphical representation [5]:
   A dynamic graphic is created of your current configuration.
3. Add the product to the basket:
   When you have completed the configuration process you can add the product to your basket by clicking on the "Add to basket" option. A message is displayed to confirm that the product has been added successfully. To find out how to initiate an order, see the section "Basket management"

Online or offline - get the ideal solution fast

New function: My favourites
You can now save as many product configurations as you like as favourites.
To display the list of all stored favourites 1:
– Click on the "My favourites" tab 2. A table containing your saved favourites is displayed. The delivery time, name of the favourite, part number, type designation and an option 4 for deleting the favourite are also displayed.
– You can click on the option 3 or double-click on a configuration line to open the corresponding configuration window.
– You can sort your favourites by clicking on the table header 5.
– You can select multiple favourites and compare them by selecting "Product compare" in the "Select action" box 6.

Viewing CAD models
Clicking on the "2D/3D view" option opens a window containing a CAD preview of the product. The "Export" function lets you export the files to your CAD system in the desired format.

Exporting the basket contents ...
1. ... as a csv file:
   To do this, click "Export" 1, choose "Save As" in the new window and specify where you want to save it to. This file can then be opened in Excel, for example, and edited.
2. ... to your choice of format:
   To do this, click on "Settings" 3 and choose the information you wish to export.

Basket management
1. Upload your basket directly to the online shop and place your order. To upload a basket directly to the online shop, simply click on "Export to online basket" 2. An Internet connection is established and the products are transferred to the online basket. After logging in via "Login", your net prices and delivery times are displayed. Now just place your order and you're done!
2. Placing an order: To place an order, simply print out your basket and send it to Festo by fax or export it as an e-mail.

The detailed instructions "info_en.pdf" can be found on the DVD.

Software tool

Pneumatic sizing using ProPneu

Perfect simulations replace expensive actual tests. ProPneu is an expert system that supports you in the selection and configuration of the entire pneumatic control sequence.
If one parameter is changed, the program automatically adapts all the others.

This tool can be found in the electronic catalogue for the product family, on the website under Support, Engineering Software (in the menu on the left), Downloads for Windows or on the DVD under Selection and sizing.

Standards-based cylinders

Type	Mode of operation	Piston Ø	Theoretical force at 6 bar, advance stroke	Stroke	Cushioning	Description
Standard cylinder DSNU, ESNU, DSN, ESN 	Double-acting, Pushing, Single-acting	8 mm, 10 mm, 12 mm, 16 mm, 20 mm, 25 mm	19 ... 295 N	1 ... 500 mm	P: elastic cushioning rings/pads at both ends, PPS: self-adjusting pneumatic end-position cushioning, PPV: pneumatic cushioning, adjustable at both ends	• ISO 6432 • Low-cost round cylinder • For position sensing: DSNU, ESNU • Without position sensing: DSN, ESN • Wide range of variants • Good running performance and long service life • Piston rod with male or female thread ➔ **Internet: .../dsnu**
Standard cylinder DSNUP 	Double-acting	16 mm, 20 mm, 25 mm	121 ... 295 N	25 ... 100 mm	P: elastic cushioning rings/pads at both ends	• ISO 6432 • Cost-optimised round cylinder • Wrought aluminium alloy cylinder barrel • Polyamide bearing and end caps • For position sensing ➔ **Internet: .../dsnup**
Standard cylinder DNCB 	Double-acting	32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm	483 ... 4,712 N	2 ... 2,000 mm	PPV: pneumatic cushioning, adjustable at both ends	• ISO 15552 (ISO 6431, VDMA 24562) • For position sensing • Saves up to 11% on fitting space compared with ordinary standard cylinders • Profile slot for proximity sensors and air connections on one side • Proximity sensors fit flush in the profile slot • Male piston rod thread ➔ **Internet: .../dncb**

Standards-based cylinders

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Type	Mode of operation	Piston Ø	Theoretical force at 6 bar, advance stroke	Stroke	Cushioning	Description
Standard cylinder DNC 	Double-acting	32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm, 125 mm	415 ... 7,363 N	2 ... 2,000 mm	P: elastic cushioning rings/pads at both ends, PPV: pneumatic cushioning, adjustable at both ends	• ISO 15552 (ISO 6431, VDMA 24562) • For position sensing • Saves up to 11% on fitting space compared with ordinary standard cylinders • Wide range of variants • Profile slot for proximity sensors on three sides • No protruding proximity sensors • Male piston rod thread ➔ **Internet: .../dnc**
Standard cylinder DNG 	Double-acting	32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm, 125 mm, 160 mm, 200 mm, 250 mm, 320 mm	415 ... 48,250 N	1 ... 2,000 mm	PPV: pneumatic cushioning, adjustable at both ends	• ISO 15552 (ISO 6431, VDMA 24562) • Sturdy tie rod design • Proximity sensors mounted using kit • Wide range of accessories ➔ **Internet: .../dng**
Standard cylinder, Clean Design CDN 	Double-acting	32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm	483 ... 4,712 N	10 ... 2,000 mm	PPV: pneumatic cushioning, adjustable at both ends	• ISO 15552 (ISO 6431, VDMA 24562) • Easy-to-clean design • Increased corrosion protection • For position sensing • Wide range of variants • Piston rod with male or female thread ➔ **Internet: .../cdn**
Compact cylinder CDC 	Double-acting	20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm, 80 mm	141 ... 3,016 N	1 ... 500 mm	P: elastic cushioning rings/pads at both ends	• ISO 21287 • Up to 50% less installation space than comparable standard cylinder to ISO 15552 • Easy-to-clean design • Increased corrosion protection • For position sensing • Wide range of variants • Piston rod with male or female thread ➔ **Internet: .../cdc**

Round cylinders

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Type	Mode of operation	Piston Ø	Theoretical force at 6 bar, advance stroke	Stroke	Cushioning	Description
Round cylinder DSNU, ESNU 	Double-acting, Pushing, Single-acting	32 mm, 40 mm, 50 mm, 63 mm	406 ... 1,870.3 N	1 ... 500 mm	P: elastic cushioning rings/pads at both ends, PPS: self-adjusting pneumatic end-position cushioning, PPV: pneumatic cushioning, adjustable at both ends	• For position sensing • Wide range of variants • Good running performance and long service life • Piston rod with male or female thread ➔ **Internet: .../dsnu-32**
Round cylinder DSEU, ESEU 	Double-acting, Pushing, Single-acting	8 mm, 10 mm, 12 mm, 16 mm, 20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm	24.6 ... 1,870 N	10 ... 320 mm	P: elastic cushioning rings/pads at both ends	• For position sensing • Compact design • Greater flexibility thanks to different end caps • Male piston rod thread ➔ **Internet: .../dseu**
Round cylinder EG 	Pushing, Single-acting	6 mm, 12 mm, 16 mm, 25 mm	17 ... 295 N	1 ... 80 mm	None	• Miniature cylinder • Good running performance • Male piston rod thread ➔ **Internet: .../eg**
Round cylinder EG-PK 	Pushing, Single-acting	2.5 mm, 4 mm, 6 mm	1.5 ... 17 N	5... 25 mm	None	• Miniature cylinder with air connection • Barbed fitting connection for plastic tubing with standard I.D. ➔ **Internet: .../eg-pk**

Stainless steel cylinders

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Type	Mode of operation	Piston Ø	Theoretical force at 6 bar, advance stroke	Stroke	Cushioning	Description
Standard cylinder, round cylinder CRDSNU 	Double-acting	12 mm, 16 mm, 20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm	51 ... 1,870 N	1 ... 500 mm	P: elastic cushioning rings/pads at both ends, PPS: self-adjusting pneumatic end-position cushioning, PPV: pneumatic cushioning, adjustable at both ends	• Piston Ø 12 ... 25 to ISO 6432 • Corrosion-resistant in harsh ambient conditions • Easy-to-clean design • Long service life thanks to optional unlubricated seal • For position sensing • Wide range of variants • Wide range of accessories ➔ **Internet: .../crdsnu**
Standard cylinder CRDNG, CRDNGS 	Double-acting	32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm, 125 mm	483 ... 7,363 N	10 ... 2,000 mm	PPV: pneumatic cushioning, adjustable at both ends	• ISO 15552 (ISO 6431, VDMA 24562) • Corrosion-resistant in harsh ambient conditions • Easy-to-clean design • Threaded mounting, mounting via accessories • For position sensing • Variants: through piston rod, heat-resistant design ➔ **Internet: .../crdng**
Round cylinder CRDSW 	Double-acting	32 mm, 40 mm, 50 mm, 63 mm	483 ... 1,870 N	10 ... 500 mm	P: elastic cushioning rings/pads at both ends	• Corrosion-resistant in harsh ambient conditions • Easy-to-clean design • For position sensing • Male piston rod thread ➔ **Internet: .../crdsw**
Round cylinder CRHD 	Double-acting	32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm	483 ... 4,712 N	10 ... 500 mm	PPV: pneumatic cushioning, adjustable at both ends	• Corrosion-resistant in harsh ambient conditions • Easy-to-clean design, optimised for intensive demands • Greater flexibility thanks to different end caps • For position sensing • Male piston rod thread ➔ **Internet: .../crhd**
Round cylinder CRDG 	Double-acting	12 mm, 16 mm, 20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm	68 ... 1,870 N	10 ... 500 mm	P: elastic cushioning rings/pads at both ends	• Corrosion-resistant in harsh ambient conditions • Easy-to-clean design • Threaded mounting, mounting via slotted nut or hex nut • For position sensing • Male piston rod thread ➔ **Internet: .../crdg**

Short-stroke cylinders and compact cylinders

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Type	Mode of operation	Piston Ø	Theoretical force at 6 bar, advance stroke	Stroke	Cushioning	Description
Compact cylinder ADN, AEN 	Double-acting, Pushing, Single-acting, Pulling	12 mm, 16 mm, 20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm, 125 mm	51 ... 7,363 N	1 ... 500 mm	P: elastic cushioning rings/pads at both ends	• ISO 21287 • Up to 50% less installation space than comparable standard cylinder to ISO 15552 • For position sensing • Piston rod with male or female thread • Wide range of variants ➔ **Internet: .../adn**
Compact cylinder ADNP 	Double-acting	20 mm, 25 mm, 32 mm, 40 mm, 50 mm	188 ... 1,178 N	5 ... 80 mm	P: elastic cushioning rings/pads at both ends	• ISO 21287 • Up to 50% less installation space than comparable standard cylinder to ISO 15552 • With polymer end caps and piston rod made from aluminium • Low-cost cylinder for standard applications • For position sensing • Piston rod with male or female thread ➔ **Internet: .../adnp**
Short-stroke cylinder ADVC, AEVC 	Double-acting, Pushing, Single-acting	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	4.9 ... 4,712 N	2.5 ... 25 mm	P: elastic cushioning rings/pads at both ends	• Short-stroke cylinder with standard hole pattern to VDMA 24562 from Ø 32 mm • Low space requirement • High clamping forces in a compact size • For position sensing via proximity sensor for T-slot and for C-slot • Piston rod with male or female thread ➔ **Internet: .../advc**
Compact cylinder ADVU, AEVU, AEVUZ 	Double-acting, Pushing, Single-acting, Pulling	12 mm, 16 mm, 20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm, 125 mm	42 ... 7,363 N	1 ... 400 mm	P: elastic cushioning rings/pads at both ends	• 50% less installation space than comparable standard cylinder to ISO 15552 • For position sensing • Wide range of variants • Piston rod with male or female thread ➔ **Internet: .../advu**
Flat cylinder DZF 	Double-acting	Equivalent diameter, 12 mm, 18 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm	68 ... 1,870 N	1 ... 320 mm	P: elastic cushioning rings/pads at both ends	• Extremely flat design • Protected against torsion thanks to special piston shape • Ideal for block mounting • Wide range of installation options • For position sensing • Piston rod with male or female thread ➔ **Internet: .../dzf**

Short-stroke cylinders and compact cylinders

FESTO

Type	Mode of operation	Piston Ø	Theoretical force at 6 bar, advance stroke	Stroke	Cushioning	Description
Flat cylinder DZH 	Double-acting	Equivalent diameter, 16 mm, 20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm	104 ... 1,870 N	1 ... 1,000 mm	PPV: pneumatic cushioning, adjustable at both ends	• Flat design • Protected against torsion thanks to special piston shape • Ideal for block mounting • Wide range of installation options • For position sensing • Male piston rod thread ➔ **Internet: .../dzh**
Flat cylinder EZH 	Pushing, Single-acting	Equivalent diameter, 1.5 mm, 2.5 mm, 5 mm, 10 mm	3 ... 180 N	10 ... 50 mm	None	• Extremely flat design • Protected against torsion thanks to special piston shape • Wide range of installation options • For position sensing ➔ **Internet: .../ezh**

Cartridge cylinders and multimount cylinders

Type	Mode of operation	Piston Ø	Theoretical force at 6 bar, advance stroke	Stroke	Cushioning	Description
Multimount cylinder DMM, EMM, DMML, EMML 	Double-acting, Pushing, Single-acting	10 mm, 16 mm, 20 mm, 25 mm, 32 mm	37 ... 483 N	1 ... 50 mm	P: elastic cushioning rings/pads at both ends	• Wide range of mounting options • Wide selection of piston rod variants • For position sensing • Male piston rod thread ➔ **Internet: .../dmm**
Cartridge cylinder EGZ 	Single-acting, Pushing	6 mm, 10 mm, 16 mm	13.9 ... 109 N	5 ... 15 mm	None	• Minimal fitting space • Installation with or without mounting attachments • Male piston rod thread ➔ **Internet: .../egz**
Flanged cylinder DFK, EFK 	Double-acting, single-acting, pushing	8 mm, 10 mm, 12 mm, 16 mm, 20 mm, 25 mm	30 ... 295 N	10 ... 80 mm	P: elastic cushioning rings/pads at both ends	• Polymer design • Integrated mounting flange and connection • Male piston rod thread ➔ **Internet: .../dfk**

Cylinders with clamping unit

FESTO

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Type	Mode of operation	Piston Ø	Theoretical force at 6 bar, advance stroke	Stroke	Cushioning	Description
Standard cylinder DSNU-KP 	Double-acting	8 mm, 10 mm, 12 mm, 16 mm, 20 mm, 25 mm	30... 295 N	1 ... 500 mm	P: elastic cushioning rings/pads at both ends, PPS: self-adjusting pneumatic end-position cushioning, PPV: pneumatic cushioning, adjustable at both ends	• Piston rod can be held or clamped in any position • Piston rod can be held in position for long periods even with alternating loads, fluctuating operating pressure or leaks in the system • Mounting hole pattern to ISO 6432 • For position sensing ➔ **Internet: .../dsnu-kp**
Standard cylinder DNC-KP 	Double-acting	32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm, 125 mm	415 ... 7,363 N	2 ... 2,000 mm	P: elastic cushioning rings/pads at both ends, PPV: pneumatic cushioning, adjustable at both ends	• Piston rod can be held or clamped in any position • Piston rod can be held in position for long periods even with alternating loads, fluctuating operating pressure or leaks in the system • Mounting hole pattern to ISO 15552 • For position sensing • Wide range of variants • Piston rod with male or female thread ➔ **Internet: .../dnc-kp**
Cylinder with clamping unit DNCKE, DNCKE-...-S 	Double-acting	40 mm, 63 mm, 100 mm	754 ... 4,712 N	10 ... 2,000 mm	PPV: pneumatic cushioning, adjustable at both ends	• Cylinder for holding, clamping and cushioning • Mounting hole pattern to ISO 15552 • Variant DNCKE-...-S approved for braking tasks in safety-relevant control systems of category 1 • Piston rod can be clamped in any position • For position sensing • Male piston rod thread ➔ **Internet: .../dncke**
Compact cylinder with clamping unit ADN-KP 	Double-acting	20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm	188... 4,712 N	10 ... 500 mm	P: elastic cushioning rings/pads at both ends	• Mounting hole pattern to ISO 21287 • Piston rod can be held or clamped in any position during clamping, processing or handling operations • For position sensing • Piston rod with male or female thread ➔ **Internet: .../adn-kp**

Rodless cylinders

FESTO

Type	Piston Ø	Theoretical force at 6 bar, advance stroke	Stroke	Cushioning	Position sensing	Description
Linear drive DGC 	8 mm, 12 mm, 18 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm	30 ... 1,870 N	1 ... 8,500 mm	P: elastic cushioning rings/pads at both ends, PPV: pneumatic cushioning, adjustable at both ends, YSR: shock absorber, hard characteristic curve, YSRW: shock absorber, soft characteristic curve	Via proximity sensor	• Basic design, plain or recirculating ball bearing guides • Optimised mounting options • High-precision guide • Optimised sealing system • All settings accessible from one side • Available with variable end stops and intermediate position module • Exchangeable with DGPL thanks to foot mountings • Software tool available for bearing calculation ➔ **Internet: .../dgc**
Linear drive DGP, DGPL 	18 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm, 80 mm	153 ... 3,016 N	10 ... 3,000 mm	PPV: pneumatic cushioning, adjustable at both ends, YSR: shock absorber, hard characteristic curve, YSRW: shock absorber, soft characteristic curve	Via proximity sensor, Via attached displacement encoder, Via integrated displacement encoder	• Low space requirement • High precision and load capacity • Basic design, plain, recirculating ball bearing or heavy-duty guides • Wide range of variants ➔ **Internet: .../dgp**
Linear drive SLG 	8 mm, 12 mm, 18 mm	30 ... 153 N	100 ... 900 mm	P: elastic cushioning rings/pads at both ends, YSR: shock absorber, hard characteristic curve	Via proximity sensor	• Extremely flat design • Integrated precision guide • Adjustable end stops • Choice of supply ports • Available with intermediate position module ➔ **Internet: .../slg**
Linear drive DGO 	12 mm, 16 mm, 20 mm, 25 mm, 32 mm, 40 mm	68 ... 754 N	10 ... 4,000 mm	P: elastic cushioning rings/pads at both ends, PPV: pneumatic cushioning, adjustable at both ends	Via proximity sensor	• Magnetic force transmission • Pressure-tight and zero leakage • Dirt-proof and dust-proof ➔ **Internet: .../dgo**

Rodless cylinders

FESTO

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Type	Piston Ø	Theoretical force at 6 bar, advance stroke	Stroke	Cushioning	Position sensing	Description
Linear drive SLM 	12 mm, 16 mm, 20 mm, 25 mm, 32 mm, 40 mm	68 ... 754 N	10 ... 1,500 mm	P: elastic cushioning rings/pads at both ends, YSR: shock absorber, hard characteristic curve	Via proximity sensor, For inductive sensors	• Recirculating ball bearing guide • Magnetic force transmission • Individual choice of end-position cushioning and sensing ➔ **Internet: .../slm**

Software tool

Mass moment of inertia

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

This tool can be found on the website under Support, Engineering software (in the menu on the left), Downloads for Windows or on the DVD under Selection and sizing.

Semi-rotary drives

Type	Size	Torque at 6 bar	Swivel angle	Permissible mass moment of inertia	Position sensing	Description
Semi-rotary drive DRQD 	6, 8, 12, 16, 20, 25, 32, 40, 50	0.16 ... 78.6 Nm	0 ... 360 °	0.075 ... 11,000 kgcm2	Via proximity sensor	• With twin pistons based on the rack and pinion principle • High accuracy • Extremely good rigidity • Wide range of variants • With spigot or flanged shafts ➔ **Internet: .../drqd**
Swivel module DSM 	6, 8, 10, 12, 16, 25, 32, 40, 63	0.15 ... 40 Nm	0 ... 270 °	0 ... 4,700 kgcm2	Via proximity sensor, None	• Force transmitted directly to the drive shaft via a rotary vane • With spigot or hollow flanged shafts ➔ **Internet: .../dsm**
Semi-rotary drive DSR, DSRL 	10, 12, 16, 25, 32, 40	0.5 ... 20 Nm	0 ... 180°	0 ... 150 kgcm2	Via proximity sensor	• Force transmitted directly to the drive shaft via a rotary vane • With spigot or hollow flanged shafts ➔ **Internet: .../dsr**

Semi-rotary drives

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Type	Size	Torque at 6 bar	Swivel angle	Permissible mass moment of inertia	Position sensing	Description
Semi-rotary drive DRQ 	16, 20, 25, 32, 40, 50, 63, 80, 100	0.5 ... 150 Nm	0 ... 360°	2 ... 2,000 kgcm2	Via proximity sensor	• Conversion of linear motion into rotary motion via a play-compensating gear unit • High precision thanks to backlash-free transmission of force from the gear rack to the pinion ➔ **Internet: .../drq**
Swivel/linear drive unit DSL-B 	16, 20, 25, 32, 40	1.25 ... 20 Nm	0 ... 270 °	0.35 ... 40 kgcm2	Via proximity sensor	• Rotary and linear motion can be controlled individually or simultaneously • High repetition accuracy • With plain or recirculating ball bearing guide • Through piston rod ➔ **Internet: .../dsl**

Tandem/high-force cylinders

Type	Piston Ø	Theoretical force at 6 bar, advance stroke	Stroke	Description
Tandem cylinder DNCT 	32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm, 125 mm	898 ... 14,244 N	2 ... 500 mm	• Mounting hole pattern to ISO 15552 • Max. 2 cylinders can be combined • Thrust and return force increase • For position sensing • Male piston rod thread ➔ **Internet: .../dnct**
Tandem cylinder ADVUT 	25 mm, 40 mm, 63 mm, 100 mm	542 ... 17,966 N	1... 150 mm	• Max. 4 cylinders can be combined • Thrust increase • Only 2 connections are required to pressurise all cylinders • For position sensing • Piston rod with male or female thread ➔ **Internet: .../advut**
High-force cylinder ADNH 	25 mm, 40 mm, 63 mm, 100 mm	1,036 ... 18,281 N	1 ... 150 mm	• Mounting hole pattern to ISO 21287 • Max. 4 cylinders can be combined • Thrust increase • Only 2 connections are required to pressurise all cylinders • For position sensing • Piston rod with male or female thread ➔ **Internet: .../adnh**

Multi-position cylinders

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Type	Piston Ø	Theoretical force at 6 bar, advance stroke	Max. total of all individual strokes	Description
Multi-position cylinder ADNM 	25 mm, 40 mm, 63 mm, 100 mm	295 ... 4,712 N	1000 ... 2,000 mm	• Mounting hole pattern to ISO 21287 • Piston rod with male or female thread • 2 ... 5 cylinders can be combined • Max. 5 positions can be approached • Piston rod with male or female thread • For position sensing ➔ **Internet: .../adnm**
Multi-position cylinder ADVUP 	25 mm, 40 mm, 63 mm, 100 mm	295 ... 4,712 N	1000 ... 2,000 mm	• Piston rod with male or female thread • 2 ... 5 cylinders can be combined • Max. 5 positions can be approached • Male piston rod thread • For position sensing ➔ **Internet: .../advup**

Drives with slides

Type	Piston Ø	Theoretical force at 6 bar, advance stroke	Stroke	Cushioning	Position sensing	Description
Mini slide DGSL 	6 mm, 8 mm, 10 mm, 12 mm, 16 mm, 20 mm, 25 mm, 32 mm	17 ... 483 N	10 ... 200 mm	E: short elastic cushioning rings/pads at both ends, P1: elastic cushioning rings/pads at both ends with fixed stop, P: elastic cushioning rings/pads at both ends, Y3: progressive shock absorber at both ends	Via proximity sensor	• High load capacity and positioning accuracy • Maximum movement precision thanks to ground-in ball bearing cage guide • Maximum flexibility thanks to 8 sizes • Reliable in the event of pressure drop thanks to clamping cartridge or end-position locking • Versatile mounting options thanks to piggy-back • Compact ➔ **Internet: .../dgsl**
Mini slide SLT 	6 mm, 10 mm, 16 mm, 20 mm, 25 mm	34 ... 590 N	10 ... 200 mm	CC: shock absorber at both ends, P: elastic cushioning rings/pads at both ends	Via proximity sensor	• Powerful twin piston drive • Ball bearing guide • Versatile mounting options • Easy adjustment of end positions ➔ **Internet: .../slt**
Mini slide SLS 	6 mm, 10 mm, 16 mm	17 ... 121 N	5 ... 30 mm	P: elastic cushioning rings/pads at both ends	Via proximity sensor	• Slim design • Ball bearing guide • Versatile mounting options ➔ **Internet: .../sls**

Drives with slides

FESTO

Type	Piston Ø	Theoretical force at 6 bar, advance stroke	Stroke	Cushioning	Position sensing	Description
Mini slide SLF 	6 mm, 10 mm, 16 mm	17 ... 121 N	10 ... 80 mm	P: elastic cushioning rings/pads at both ends	Via proximity sensor	• Flat design • Ball bearing guide • Versatile mounting options • Easy adjustment of end positions ➔ **Internet: .../slf**
Mini slide SPZ 	10 mm, 16 mm, 20 mm, 25 mm, 32 mm	60 ... 724 N	10 ... 100 mm	P: elastic cushioning rings/pads at both ends	Via proximity sensor	• Twin piston • High force with excellent protection against torsion • Widely spaced piston rods for high load capacity • Plain or recirculating ball bearing guides ➔ **Internet: .../spz**

Drives with guide rods

Type	Piston Ø	Theoretical force at 6 bar, advance stroke	Stroke	Cushioning	Position sensing	Description
Guided drive DFP 	10 mm, 16 mm, 25 mm, 32 mm, 50 mm, 80 mm	31 ... 3,016 N	25 ... 500 mm	P: elastic cushioning rings/pads at both ends, PPV: pneumatic cushioning, adjustable at both ends	Via proximity sensor	• High-precision guidance thanks to recirculating ball bearing guide on piston rod • Able to absorb high torques • Saves space in comparison with standard cylinders ➔ **Internet: .../dfp**
Compact cylinder ADNGF 	12 mm, 16 mm, 20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm	68 ... 4,712 N	1 ... 400 mm	P: elastic cushioning rings/pads at both ends	Via proximity sensor	• Mounting hole pattern to ISO 21287 • Piston rod secured against rotation by means of guide rod and yoke plate • Plain-bearing guide • Available with through piston rod ➔ **Internet: .../adngf**
Compact cylinder ADVUL 	12 mm, 16 mm, 20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm	51 ... 4,712 N	1 ... 400 mm	P: elastic cushioning rings/pads at both ends	Via proximity sensor	• Piston rod secured against rotation by means of guide rod and yoke plate • For position sensing • Plain-bearing guide • Available with through piston rod ➔ **Internet: .../advul**

Drives with guide rods

FESTO

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Type	Piston Ø	Theoretical force at 6 bar, advance stroke	Stroke	Cushioning	Position sensing	Description
Mini guided drive DFC 	4 mm, 6 mm, 10 mm	7.5 ... 47 N	5 ... 30 mm	P: elastic cushioning rings/pads at both ends	Via proximity sensor, None	• Smallest guided drive • High precision and load capacity • Minimal space requirement • Drive and guide unit in a single housing • Plain or recirculating ball bearing guides ➔ **Internet: .../dfc**
Guided drive DFM, DFM-B 	12 mm, 16 mm, 20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm	68... 4,712 N	10 ... 400 mm	P: elastic cushioning rings/pads at both ends, PPV: pneumatic cushioning, adjustable at both ends, YSRW: shock absorber, soft characteristic curve	Via proximity sensor	• Drive and guide unit in a single housing • Plain or recirculating ball bearing guides • High resistance to torques and lateral forces • Wide range of mounting options • Wide range of variants ➔ **Internet: .../dfm**
Twin-piston cylinder DPZ, DPZJ 	10 mm, 16 mm, 20 mm, 25 mm, 32 mm	60 ... 966 N	10 ... 100 mm	P: elastic cushioning rings/pads at both ends	Via proximity sensor	• Twin pistons provide twice the force in half the space • Plain or recirculating ball bearing guides • Precision stroke adjustment in the end position ➔ **Internet: .../dpz**
Linear drive unit SLE 	10 mm, 16 mm, 20 mm, 25 mm, 32 mm, 40 mm, 50 mm	47 ... 1,178 N	10 ... 500 mm	YSR: shock absorber, hard characteristic curve	Via proximity sensor, For inductive sensors	• Combination of guide unit and standard cylinder • Multi-axis and drive combinations • Recirculating ball bearing guide ➔ **Internet: .../sle**

Linear modules

Type	Mode of operation	Piston Ø	Stroke	Theoretical force at 6 bar, advance stroke	Position sensing	Description
Linear module HMP 	Double-acting	16 mm, 20 mm, 25 mm, 32 mm	50 ... 400 mm	121 ... 483 N	Via proximity sensor	• Precision, backlash-free guidance • High rigidity with a long stroke • Infinitely adjustable end stops • Flexible thanks to intermediate position • Adjustable end-position cushioning ➔ **Internet: .../hmp**

Stopper cylinders

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Type	Piston Ø	Permissible impact force on the advanced piston rod	Stroke	Position sensing	Description
Stopper cylinder DFST 	50 mm, 63 mm, 80 mm	3,000 ... 6,000 N	30 ... 40 mm	Via proximity sensor, Inductive proximity sensor for toggle lever	• Toggle lever design • Integrated adjustable shock absorber for smooth and adapted stopping • Up to 800 kg impact load • For position sensing at toggle lever and piston • Lever locking mechanism • Toggle lever deactivator ➔ **Internet: .../dfst**
Stopper cylinder STA, STAF 	20 mm, 32 mm, 50 mm, 80 mm	170 ... 14,600 N	15 ... 40 mm	Via proximity sensor	• Trunnion and roller version • Absorption of high lateral forces • Direct mounting of solenoid valves on flange plate ➔ **Internet: .../sta**

Clamping modules

Type	Clamping area	Stroke	Description
Clamping module EV 	10x30, 15x40, 15x63, 20x75, 20x120, 20x180, Ø 12, Ø 16, Ø 20, Ø 25, Ø 32, Ø 40, Ø 50, Ø 63	3 ... 5 mm	• Single-acting, with reset function • Clamping force 55 ... 1,690 N • Compact cylinders without piston rod with diaphragm • Flat, space-saving design • Hermetically sealed • Pressure plates and foot mounting as accessories ➔ **Internet: .../ev**

Linear/swivel clamps

Type	Piston Ø	Theoretical clamping force at 6 bar	Clamping stroke	Swivel angle	Description
Linear/swivel clamp CLR 	12 mm, 16 mm, 20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm	51 ... 1,682 N	10 ... 50 mm	90 ° +/- 2 °, 90 ° +/- 3 °, 90 ° +/- 4 °	• Double-acting • Swivelling and clamping in one step • Swivel direction adjustable • Compact • Clamping fingers as accessories • Available with dust and welding spatter protection • For position sensing ➔ **Internet: .../clr**

Bellows cylinders

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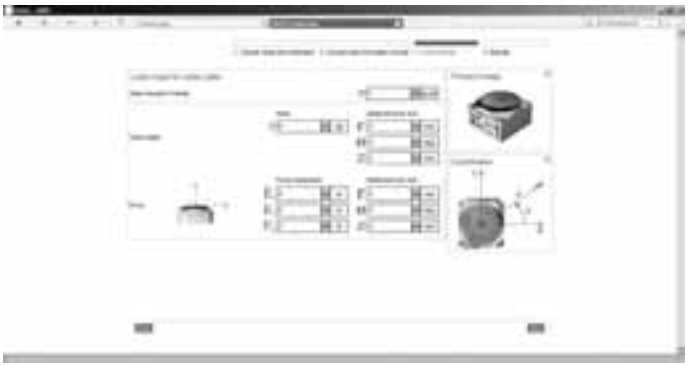
Type	Size	Stroke	Description
Bellows cylinder EB 	145, 165, 215, 250, 325, 385	60 ... 230 mm	• Use as a spring element or for reducing oscillations • Single-bellows or double-bellows cylinder • High forces with a short stroke • Uniform movement: no stick-slip effect • Use in dusty environments or in water • Maintenance-free ➔ **Internet: .../eb**

Fluidic muscle

Type	Size	Theoretical force at 6 bar	Nominal length	Max. contraction	Description
Fluidic muscle DMSP, MAS 	10, 20, 40	480 ... 6,000 N	40 ... 9,000 mm	25% of nominal length	• Single-acting, pulling • With press-fitted (DMSP) or screwed (MAS) connection • Three integrated adapter variants • Ten times the initial force of a comparable pneumatic cylinder • Judder-free movements • Hermetically sealed design offers protection against dust, dirt and moisture ➔ **Internet: .../dmsp**

Software tool



Rotary indexing table selection

This tool helps you to select the right rotary indexing table of the type DHTG from Festo for your application. Enter the general parameters and let yourself be guided by the program. You will be provided with at least one suggestion for the product best suited to your application.
Use expert mode to set more parameters.

This tool can be found in the electronic catalogue for the product family under Engineering or on the DVD under Selection and sizing.

Rotary indexing tables

Type	Size	Torque at 6 bar	Indexing stations	Description
Rotary indexing table DHTG 	65, 90, 140, 220	2.1 ... 58.9 Nm	2 ... 24	• Sturdy mechanical system • Simple planning and commissioning • Rotary table diameters: 65, 90, 140, 220 mm • Free direction of rotation controller ➔ **Internet: .../dhtg**

Quarter-turn actuators for process automation

Type	Torque at rated operating pressure and 0° swivel angle	Torque at 6 bar	Swivel angle	Description
Quarter-turn actuator DAPS 	8 ... 8,000 Nm		90 °	• High breakaway torques • Approved in accordance with Directive 94/9/EC (ATEX) • Flange hole pattern to ISO 5211 • Mounting hole pattern to VDI/VDE 3845 • Port pattern as per NAMUR for solenoid valves/sensor boxes to VDI/VDE 3845 → **Internet: .../daps**
Quarter-turn actuator DFPB 	7 ... 945 Nm		90 °	• Identical torque characteristic across the entire rotation angle range of 90° • Process valve connection to ISO 5211 on both sides • Can be mounted on all process valves using pressure relief slot • Mounting hole pattern to VDI/VDE 3845 • Sturdy, non-slip and easy-to-clean aluminium housing • Long service life, low wear • Increased corrosion protection → **Internet: .../dfpb**
Quarter-turn actuator DRD, DRE 		7.44 ... 8,814 Nm	90 °	• For automating swivel valves in the process industry • Sturdy and precise • For highly accurate advancing to various positions • Flange hole pattern to ISO 5211 • Mounting hole pattern to VDI/VDE 3845 • Port pattern as per NAMUR for solenoid valves/sensor boxes to VDI/VDE 3845 → **Internet: .../drd**

Linear actuators for process automation

FESTO

Type	Piston Ø	Theoretical force at 6 bar, advance stroke	Stroke	Description
Linear actuator DFPI 	100 mm, 125 mm, 160 mm, 200 mm, 250 mm, 320 mm	4,712 ... 48,255 N	40 ... 990 mm	• Actuation of linear process valves in process engineering systems • With integrated displacement encoder (potentiometer) • Available with integrated positioning controller and valve manifold • Sturdy and compact housing with high degree of protection • Ideal for outdoor use thanks to high degree of corrosion protection • Suitable for use in water, industrial process water and sewage technology, as well as the silage and bulk goods industry • Easy to integrate into an existing control architecture ➔ **Internet: .../dfpi**
Linear actuator DLP 	80 mm, 100 mm, 125 mm, 160 mm, 200 mm, 250 mm, 320 mm	3,016 ... 48,255 N	40 ... 600 mm	• Approved in accordance with Directive 94/9/EC (ATEX) • Port pattern as per NAMUR for solenoid valves to VDI/VDE 3845 • Mounting hole pattern to ISO 5210 • Male piston rod thread • For position sensing ➔ **Internet: .../dlp**

Accessories for actuators for process automation

Type		Description
Measuring unit ASDLP 		• For linear actuators DLP, for the mechanical, stepless sensing of movement • For the closed-loop and open-loop control of gate slides, flat slide valves and penstock valves particularly in the area of water and sewage technology and the bulk goods industry • Interface to the position controllers to VDI/VDE 3845 (Namur) ➔ **Internet: .../asdlp**
Local controller DLP-VSE 		• Convenient manual control unit for actuating process actuators • Using a local controller, a pneumatic drive can assume the functionality of an electric drive • Controller mounting options on and separately from the actuator (wall mounting) • Operated on site or remote-controlled • High corrosion protection ➔ **Internet: .../dlp-vse**

Software tool

Shock absorber selection

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

This tool can be found on the website under Support, Engineering Software (in the menu on the left), Downloads for Windows or on the DVD under Selection and sizing.

Shock absorbers

Type	Stroke	Max. energy consumption per stroke	Cushioning	Description
Shock absorber YSR-C 	4 ... 60 mm	0.6 ... 380 J	Self-adjusting	• Hydraulic shock absorber with path-controlled flow control function • Rapidly increasing cushioning force curve • Short cushioning stroke • Suitable for rotary drives → **Internet: .../ysr-c**
Shock absorber YSRW 	8 ... 34 mm	1.3 ... 70 J	Self-adjusting, Soft characteristic curve	• Hydraulic shock absorber with path-controlled flow control function • Gently increasing cushioning force curve • Long cushioning stroke • Suitable for low-vibration operation • Short cycle times possible → **Internet: .../ysrw**
Shock absorber DYSR 	8 ... 60 mm	4 ... 384 J	Adjustable	• Cushioning characteristics adjustable • Easy adjustment → **Internet: .../dysr**
Shock absorber YSRWJ 	8 ... 14 mm	1 ... 3 J	Self-adjusting, Soft characteristic curve	• Cushioning with self-adjusting, progressive hydraulic shock absorber • Gently increasing cushioning force curve • Adjustable cushioning stroke • End-position sensing with proximity sensor SME/SMT-8 • Precision end-position adjustment → **Internet: .../ysrwj**
Shock absorber DYEF 	1.7 ... 5 mm	0.005 ... 0.25 J	Elastic cushioning rings/pads at both ends with metal fixed stop	• Mechanical shock absorber with flexible rubber buffer • Flexible rubber buffer allows a defined metal end position • Adjustable cushioning hardness • Ideal for cushioning low energy • With precise metal end position → **Internet: .../dyef**

Shock absorbers

FESTO

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Type	Stroke	Max. energy consumption per stroke	Cushioning	Description
Shock absorber DYSC 	5 ... 18 mm	1 ... 25 J	Self-adjusting	• Hydraulic shock absorber with path-controlled flow control function • Rapidly increasing cushioning force curve • Short cushioning stroke • Suitable for rotary drives • With metal fixed stop → **Internet: .../dysc**
Shock absorber DYSW 	6 ... 20 mm	0.8 ... 12 J	Self-adjusting, Soft characteristic curve	• Hydraulic shock absorber with path-controlled flow control function • Gently increasing cushioning force curve • Long cushioning stroke • Suitable for low-vibration operation • Short cycle times possible • With metal fixed stop → **Internet: .../dysw**
Hydraulic cushioning cylinder YDR 	20 ... 60 mm	32 ... 384 J	Adjustable, Hard characteristic curve	• Energy is dissipated by displacing oil through a flow control valve • A built-in compression spring returns the piston rod to the initial position • Linear, adjustable • Suitable for slow feed speeds in the range of 0.1 m/s → **Internet: .../ydr**

Accessories for pneumatic drives

Type	Size	Stroke	Round material to be clamped	Static holding force	Description
Guide unit FEN, FENG 	8/10, 12/16, 20, 25, 32, 40, 50, 63, 80, 100	1 ... 500 mm			• For protecting standard cylinders against rotation at high torque loads • High guide precision for workpiece handling • Plain or recirculating ball bearing guide → **Internet: .../fen**
Clamping cartridge KP 			4 ... 32 mm	80 ... 7,500 N	• For installation of clamping units • Not certified for use in safety-relevant control systems → **Internet: .../kp**
Clamping unit KPE, KEC, KEC-S 			4 ... 32 mm	80 ... 8,000 N	• KPE: Ready-to-install combination of clamping cartridge KP and housing • KEC: For use as holding device (static application) • KEC-S: For safety-related applications → **Internet: .../kpe**

Axis controllers

FESTO

Type	No. of axis strings	Axes per string	Description
Axis controller CPX-CMAX 	1	1	• Axis controller as CPX module, supports pneumatic piston rod, rodless and semi-rotary drives • Force and position control • Use with all fieldbus/Ethernet and CEC controller available in CPX • Simple commissioning thanks to auto identification function • Rapid commissioning and comprehensive diagnostics with the parameterisation software FCT ➔ **Internet: .../cpx-cmax**
End-position controller CPX-CMPX 	1	1	• Electronic end-position control for pneumatic drives • Smart Soft Stop for smooth braking and quick acceleration • Use with all fieldbus/Ethernet available in CPX • Simple commissioning, Festo plug & work® • Approx. 30% shorter travel times and 30% less air consumption than with comparable standard pneumatics ➔ **Internet: .../cpx-cmpx**
Axis controller SPC200 	2	2	• Positioning controller in modular design with I/O or fieldbus interface • Supports pneumatic piston rod, rodless and rotary drives as well as stepper motor drives • Commissioning software: WinPISA • For dynamic positioning applications • Programming language to DIN 66025 ➔ **Internet: .../spc200**
End-position controller SPC11 	1	1	• Quickly and smoothly into the end position with two additional intermediate positions • Electronic end-position cushioning • Quick and easy commissioning: configure, teach, done • Supports pneumatic piston rod, rodless and rotary drives ➔ **Internet: .../spc11**
CPX-CMIX 	1	1	• Movement and measurement with measuring module CPX-CMIX • Records the position and speed of a drive with displacement encoder • Uninterrupted digital signal processing • Use with all fieldbus/Ethernet and CEC controller available in CPX • Measurement accuracy ±0.01 ... 0.02 mm • Quick and easy commissioning ➔ **Internet: .../cpx-cmix**

Software tool

FESTO

Smart Soft Stop

Smart Soft Stop virtually makes the impossible possible. Travel times are reduced by as much as 30% for pneumatic drives and vibration is also greatly reduced. The selection program performs all of the necessary calculations.

This tool can be found on the website under Support, Engineering software (in the menu on the left), Downloads for Windows or on the DVD under Selection and sizing.

Linear drives with displacement encoder

Type	Piston Ø	Theoretical force at 6 bar, advance stroke	Max. load, horizontal	Max. load, vertical	Stroke	Description
Standard cylinder DNCI 	32 mm, 40 mm, 50 mm, 63 mm	415 ... 1,870 N	45 ... 180 kg	15 ... 60 kg	10 ... 2,000 mm	• Standards-based cylinder to ISO 15552 • With integrated, contactless and relative analogue displacement measuring encoder • Suitable for servopneumatic applications with CPX-CMAX, -CMPX, -CMIX, SPC200 and SPC11 • Piston rod variants • Male piston rod thread → **Internet: .../dnci**
Standard cylinder DNCM 	32 mm, 50 mm	483 ... 1,178 N	45 ... 120 kg	15 ... 40 kg	100 ... 500 mm	• Standards-based cylinder to ISO 15552 • With analogue, external displacement encoder • Suitable for servopneumatic applications with CPX-CMAX, -CMPX, -CMIX, SPC200 and SPC11 • With attached potentiometer • Piston rod variants • Male piston rod thread → **Internet: .../dncm**
Linear drive DGCI 	18 mm, 25 mm, 32 mm, 40 mm, 63 mm	153 ... 1,870 N			100 ... 2,000 mm	• With contactless absolute displacement measuring encoder • Suitable for servopneumatic applications with CPX-CMAX, -CMPX, -CMIX, SPC200 and SPC11 • With guide • Supply ports optionally on end face or front → **Internet: .../dgci**
Linear drive DGPI, DGPIL 	25 mm, 32 mm, 40 mm, 50 mm, 63 mm	295 ... 1,870 N				• With integrated contactless absolute displacement measuring encoder • Suitable for servopneumatic applications with CPX-CMAX, -CMPX, -CMIX, SPC200 and SPC11 • With or without guide → **Internet: .../dgpi**

Semi-rotary drives with displacement encoder

FESTO

Type	Piston Ø	Torque at 6 bar	Max. mass moment of inertia, horizontal	Max. mass moment of inertia, vertical	Swivel angle	Description
Swivel module DSMI 	25 mm, 40 mm, 63 mm	5 ... 40 Nm	0.03 ... 0.6 kgm2	0.03 ... 0.6 kgm2	0 ... 272 °	• Rotary encoder integrated • Suitable for servopneumatic applications with CPX-CMAX, -CMPX, -CMIX, SPC200 and SPC11 • With rotary vane • Compact design ➔ **Internet: .../dsmi**

Displacement encoders

Type	Stroke	Measuring principle of displacement encoder	Output signal	Displacement resolution	Description
Displacement encoder MLO 	100 ... 2,000 mm	Analogue	Analogue	0.01 mm	• Absolute measurements with high resolution • System product for servopneumatic positioning technology and Smart Soft Stop • Design: profile or connecting rod ➔ **Internet: .../mlo**
Displacement encoder MME 	225 ... 2,000 mm	Digital	CAN protocol type SPC-AIF	0 ... 0.01 mm	• Method of measurement: magnetostrictive • Contactless with absolute measurements • High speeds of travel • System product for servopneumatic positioning technology and Smart Soft Stop ➔ **Internet: .../mme**

Sensor interfaces

Type	Diagnostic function	Electrical connection, displacement encoder	Electrical connection, control interface	Control interface	Description
Sensor interface CASM 	Display via LED	5-pin, 8-pin, Socket, M12	5-pin, M9, Plug	CAN bus with Festo protocol, Digital, Without terminating resistor	• For the actuation of pneumatic positioning drives with the latest servopneumatic systems such as CPX-CMAX, -CMPX and -CMIX • Short cables for analogue signals, secure digitised bus transmission • Convenient plug & work® concept with auto identification and comprehensive diagnostics • High protection class IP67 ➔ **Internet: .../casm**
Measured-value transducer DADE 	Display via LED	8-pin, Socket, M12			• For standard cylinder DNCI • Converts sensor signals into voltage or current signals • Mounting via through-holes • Diagnostic display via LED ➔ **Internet: .../dade**

Sensor interfaces

FESTO

2

Type	Diagnostic function	Electrical connection, displacement encoder	Electrical connection, control interface	Control interface	Description
Axis interface SPC-AIF 	Display via LED	Cable with plug, 8-pin socket, M12, 5-pin socket, M9	5-pin, 7-pin, M9, Plug and socket	CAN bus with Festo protocol, Digital, Without terminating resistor	• Interface for signal distribution of the control signal from the SPC200 to the drive/displacement encoder and proportional valve MPYE • Transmission of control signals to a second axis interface for a second positioning axis • High protection class IP65 • Short cables for analogue signals • Pre-assembled cables → **Internet: .../spc-aif**

Software tool

PositioningDrives

Which electromechanical linear drive best meets your needs? Enter the data for your application such as position values, effective loads and mounting position and the software will suggest a number of solutions.

This tool can be found on the website under Support, Engineering software (in the menu on the left), Downloads for Windows or on the DVD under Selection and sizing.

Linear drives and slides

Type	Size	Max. feed force Fx	Repetition accuracy	Working stroke	Description
Electric cylinder DNCE 	32, 40, 63	300 ... 2,500 N	+/-0.02 mm, +/-0.07 mm	100 ... 800 mm	• Lead screw or ball screw • Standard hole pattern to ISO 15552 • Axial or parallel motor interface • Integrated reference switch • Freely positionable • Non-rotating piston rod • Larger strokes available on request ➔ **Internet: .../dnce**
Toothed belt axis EGC-TB 	50, 70, 80, 120, 185	50 ... 2,500 N	+/-0.08 mm, +/-0.1 mm	50 ... 8,500 mm	• Recirculating ball bearing guide for high forces and torques • Profile with optimised rigidity • Highly dynamic response and minimum vibration • Small toothed disc diameter • Reference switch optional • Freely positionable ➔ **Internet: .../egc-tb**
Spindle axis EGC-BS 	70, 80, 120, 185	300 ... 3,000 N	+/-0.02 mm	50 ... 3,000 mm	• Recirculating ball bearing guide for high forces and torques • Profile with optimised rigidity • Highly dynamic response and minimum vibration • Various spindle pitches • Reference switch optional • Freely positionable ➔ **Internet: .../egc-bs**

Linear drives and slides

FESTO

Type	Size	Max. feed force Fx	Repetition accuracy	Working stroke	Description
Toothed belt axis ELGR 	35, 45, 55	50 ... 350 N	+/-0.1 mm	50 ... 1,500 mm	• Ideal price/performance ratio • Ready-to-install unit for quick and easy design • High reliability thanks to tested service life of 5,000 km • Choice of motor assembly on 4 sides • With plain or recirculating ball bearing guide • Kit for easy and space-saving end-position sensing • Quick commissioning following simple design using the PositioningDrives software as well as predefined parameter sets in the parameterisation software FCT ➔ **Internet: .../elgr**
Toothed belt axis DGE-ZR 	8, 12, 18, 25, 40, 63	15 ... 1,500 N	+/-0.08 mm, +/-0.1 mm	1 ... 5,000 mm	• Without guide, recirculating ball bearing guide, roller bearing guide or heavy-duty guide • Optional protected version • Compact dimensions • Reference switch optional • Freely positionable ➔ **Internet: .../dge-zr**
Spindle axis DGE-SP 	18, 25, 40, 63	140 ... 1,600 N	+/-0.02 mm	100 ... 2,000 mm	• Without guide, recirculating ball bearing guide or heavy-duty guide • Optional protected version • Compact dimensions • Reference switch optional • Freely positionable ➔ **Internet: .../dge-sp**
Cantilever axis DGEA-ZR 	18, 25, 40	230 ... 1,000 N	+/-0.05 mm	100 ... 1,000 mm	• Toothed belt drive with recirculating ball bearing guide • Dynamic cantilever operation • Stationary drive head • Reference switch optional • Freely positionable ➔ **Internet: .../dgea**
Positioning axis DMES 	18, 25, 40, 63	240 ... 3,000 N	+/-0.05 mm, +/-0.07 mm	50 ... 1,800 mm	• Mechanical linear drive • Without guide, plain or recirculating ball bearing guide • High mechanical torques • High feed forces of up to 3,000 N • Compact dimensions • Reference switch optional • Freely positionable ➔ **Internet: .../dmes**
Cantilever axis EGSA 	50, 60	100 ... 200 N	+/-0.01 mm	100 ... 300 mm	• Electromechanical cantilever axis with recirculating ball bearing spindle • High rigidity • Maximum precision • Highly dynamic response • Freely positionable • Integrated reference switch ➔ **Internet: .../egsa**

Linear drives and slides

FESTO

Type	Size	Max. feed force Fx	Repetition accuracy	Working stroke	Description
Mini slide SLTE 	10, 16		+/-100,000 µm	50 ... 150 mm	• Electromechanical linear axis with plain bearing spindle • With DC servo motor • Easy actuation via I/O interface, Profibus, CANopen, DeviceNet • Precise and rigid guide • Freely positionable • Fast positioning times ➔ **Internet: .../slte**
Electric slide EGSK, EGSP 	15, 20, 26, 33, 46	19 ... 466 N	+/-0.003 - +/-0.004 mm, +/-0.003 - +/-0.01 mm, +/-0.01 mm	25 ... 840 mm	• Electromechanical linear axis with recirculating ball bearing spindle • Recirculating ball bearing guide with and without caged recirculating ball bearings • Standardised mounting interfaces • Compact design • High rigidity • Long service life ➔ **Internet: .../egsk**

Semi-rotary drives

Type	Max. driving torque	Max. input speed	Rotation angle	Description
Rotary module ERMB 	0.7 ... 8.5 Nm	900 ... 1,350 rpm	Infinite	• Electromechanical rotary module with toothed belt • Compact design • Multi-directional mounting interfaces • Stable arrangement of the output shaft bearings • Unlimited and flexible rotation angle ➔ **Internet: .../ermb**

Direct drives

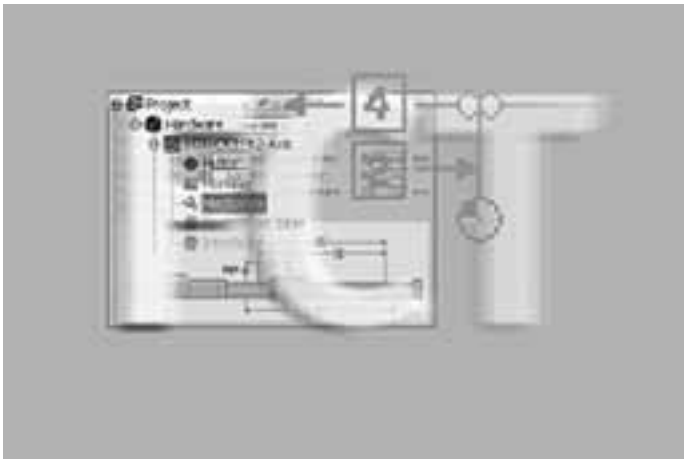
Type	Size	Max. feed force Fx	Repetition accuracy	Working stroke	Stroke	Description
Linear module HME 	16, 25		+/-0.015 mm, +/-0.0225 mm		100 ... 400 mm	• Electric linear module with linear motor • Recirculating ball bearing guide • Easy actuation via I/O interface, Profibus, CANopen including interpolated position mode, DeviceNet • Extremely rigid basic profile • Freely programmable position, speed and acceleration ➔ **Internet: .../hme**

Direct drives

FESTO

Type	Size	Max. feed force Fx	Repetition accuracy	Working stroke	Stroke	Description
Linear drive ELGL 	30, 64, 120	56 ... 475 N	+/-0.01 mm	1 ... 5,750 mm		• Electric linear drive with linear motor, air cushion bearing and displacement encoder • Ready-to-install system offering greater flexibility, precision and dynamic response • Air cushion bearing provides high precision, high linearity and wear-free characteristics • Actuation via motor controller CMMP-AS ➔ **Internet: .../elgl**
Electric cylinder DNCE-LAS 	32, 40	93.7 ... 202 N	+/-0.02 - +/-0.03 mm, +/-0.02 mm			• Linear motor axis with piston rod • Consisting of freely positionable linear motor, integrated displacement encoder, reference switch and plain bearings • Positioning with very high dynamic response for small loads • Easy actuation via I/O interface, Profibus, CANopen including interpolated position mode, DeviceNet • Festo plug & work® for clear logistics and rapid assembly • Configuration and commissioning with the parameterisation software FCT • Available with clamping unit ➔ **Internet: .../dnce*las**
Guided drive DFME 	32, 40	94 ... 202 N	+/-0.015 mm			• Recirculating ball bearing guide • Consisting of freely positionable linear motor, integrated displacement encoder and reference switch • Positioning with very high dynamic response for small loads • Long service life and maintenance-free operation • Easy actuation via I/O interface, Profibus, CANopen including interpolated position mode, DeviceNet • Configuration and commissioning with the parameterisation software FCT • Festo plug & work® for smooth logistics and assembly ➔ **Internet: .../dfme*las**
Linear drive ADNE-LAS 	32, 40	8 ... 55 N	+/-0.1 mm			• Electric short-stroke cylinder with integrated linear module • Highly dynamic movement between two end positions • Electronic end position cushioning • Simple commissioning, Festo plug & work® • Also for harsh ambient conditions ➔ **Internet: .../adne*las**

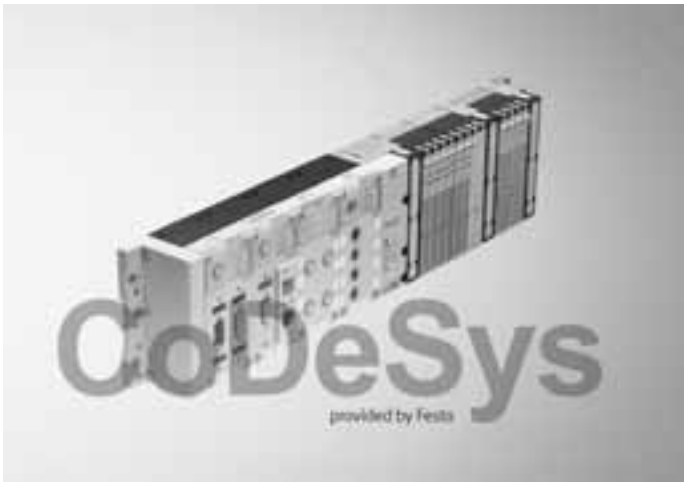
Software tool



Festo Configuration Tool (FCT)
FCT is a configuration and parameterisation software program, which supports all Festo components, in particular motor controllers.

It is extremely flexible and supports all the component properties and is simple and intuitive to operate. The user is guided step by step through commissioning with accompanying checking of the individual steps.

The FCT parameterisation software can be found on the website under Support, in the Download area for software. Enter FCT in the search box to retrieve it.



CoDeSys
CoDeSys makes your life easier with simple commissioning, fast programming and parameterisation thanks to standardised programming of embedded devices to IEC 61131-3.

Advantages
- Hardware-independent software platform for quick and easy configuration, programming and commissioning of pneumatic and electrical automation solutions
- Extensive module libraries for single or multi-axis positioning motions
- The IEC 61131-3 standard means that CoDeSys is flexible and open for all types of control tasks
- Modular: offline and online functions, as well as components for hardware configuration and visualisation
- Convenient IEC function block extension
- Re-use of existing application parts

The CoDeSys parameterisation software can be found on the website under Support, in the Download: Software area. Enter CoDeSys in the search box to retrieve it.

Servo motors

Type	Nominal torque	Nominal speed	Peak torque	Max. speed	Motor holding torque	Description
Servo motor EMMS-AS 	0.2 ... 20.05 Nm	2,000 ... 10,300 rpm	1 ... 48.8 Nm	2,210 ... 11,180 rpm		• Permanently excited, electrodynamic, brushless servo motor • Digital absolute displacement encoder, single turn or multi-turn • Available with holding brake • Optimised connection technology → **Internet: .../emms-as**

Stepper motors

FESTO

Type	Nominal torque	Nominal speed	Peak torque	Max. speed	Motor holding torque	Description
Motor unit MTR-DCI 		3,000 ... 3,400 rpm		3,000 ... 3,400 rpm		• DC motor with encoder • Gear unit, controller integrated power electronics • Parameterisation interface RS232 • Interface for I/O, Profibus, CANopen, Profibus DP, DeviceNet • Control panel with display, optional • Gear unit ratio: 7:1, 14:1, 22:1 ➔ **Internet: .../mtr-dci**
Stepper motor EMMS-ST 				500 ... 3,000 rpm	0.5 ... 9.3 Nm	• 2-phase hybrid technology • Step angle 1.8° • Standard industrial connection technology • Optional: encoder, brake ➔ **Internet: .../emms-st**

Controllers for AC servo motors

Type	Nominal current	Nominal operating voltage AC	Phases of nominal operating voltage	Controller rated output	Fieldbus link	Description
Motor controller CMMS-AS 	4 A	230 V	1-phase	600 VA	CANopen, DeviceNet, Profibus DP	• For servo motor • Digital absolute shaft encoder in single-turn and multi-turn versions • Can be operated as a torque, speed or position controller • Position controller, integrated brake chopper • I/O interface • Electronic gear unit ➔ **Internet: .../cmms-as**
Motor controller CMMP-AS 	2 ... 11 A	230 ... 400 V	1-phase, 3-phase	500 ... 5,000 VA	CANopen, DeviceNet, Ethernet, Profibus DP, Sercos	• For servo motor • Flying saw • For cam disk control and highly dynamic movements • Standardised interfaces allow seamless integration in mechatronic multi-axis modular systems • Reliable and convenient commissioning, programming and parameterisation via software tools ➔ **Internet: .../cmmp-as**

Controllers for DC servo motors

FESTO

Type	Nominal current, load supply	Nominal voltage, load supply DC	Controller rated output	Fieldbus link	Description
Motor controller SFC-DC 	3 A	24 V	75 VA	CANopen, DeviceNet, Profibus DP	• High protection class IP54 • Easy actuation via I/O interface, Profibus, CANopen, DeviceNet • With or without control panel • Parameterisation via control panel or parameterisation software FCT • For actuation of mini slide SLTE, parallel gripper HGPLE ➔ **Internet: .../sfc-dc**
Motor controller SFC-LAC 	10 A	48 V	480 VA	CANopen, DeviceNet, Profibus DP	• High protection class IP54 • Easy actuation via I/O interface, Profibus, CANopen including interpolated position mode, DeviceNet • With or without control panel • Parameterisation via control panel or parameterisation software FCT • For actuation of linear module HME, DNCE-LAS, DFME-LAS ➔ **Internet: .../sfc-lac**
Motor controller SFC-LACI 	10 A	48 V	480 VA	CANopen, Profibus DP	• High protection class IP54 • Open and closed-loop position controller • Easy actuation via I/O interface, Profibus, CANopen including interpolated position mode • With or without control panel • Parameterisation via control panel or parameterisation software FCT • For actuation of electric cylinder DNCE-LAS and guided drive DFME-LAS ➔ **Internet: .../sfc-laci**

Controllers for stepper motors

Type	Nominal current	Nominal current, load supply	Max. step frequency	Controller operating mode	Fieldbus link	Description
Motor controller CMMS-ST 		8 A	4 kHz	PWM MOSFET power amplifier	CANopen, Profibus DP	• For stepper motors • Can be operated as a torque, speed or position controller • Position controller, integrated brake chopper • I/O interface • Electronic gear unit ➔ **Internet: .../cmms-st**
Motor controller SEC-ST 	1.25 ... 6 A		40 kHz	Bipolar chopper driver		• For stepper motors • Compact unit, ready for installation • Current reduction • Pre-assembled electrical connection accessories ➔ **Internet: .../sec-st**

Multi-axis controllers

FESTO

Type	Operating voltage	Operating voltage range DC	Control interface	Fieldbus link	Supported kinematic systems	Description
Controller CMXR-C1 	24 VDC +20%/-15%			2 x CANopen masters	2-axis gantries X-Z/Y-Z/X-Y, 3-axis gantries X-Y-Z, Any interpolation, Tripod	• Multi-axis control for linear and three-dimensional gantries, tripod kinematic systems • Optional handheld terminal CDSA • Point to point and complex path control • Ethernet and CAN bus interface ➔ **Internet: .../cmxr-c1**
Control block CPX-CMXX 		18 ... 30 V	CAN bus		2-axis gantries X-Z/Y-Z/X-Y, 3-axis gantries X-Y-Z	• Intelligent module in the CPX terminal for the actuation of electric drive units • Coordination of the entire motion sequence • Actuation of 2 axis groups with max. 4 axes per group • Ethernet and CAN bus interface ➔ **Internet: .../cmxx**

Software tool

Gripper selection

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 of the parallel, 3-point, angle or swivel/gripper units best matches your requirements, and in which size.

This tool can be found in the electronic catalogue for the product family, on the website under Support, Engineering software (in the menu on the left), Downloads for Windows or on the DVD under Selection and sizing.

Parallel grippers

Type	Total gripping force at 6 bar, closing	Stroke per gripper jaw	Position sensing	Gripping force backup	Description
Parallel gripper HGPT 	72 ... 3,102 N	1.5 ... 20 mm	Via proximity sensor	During closing, G2, During opening, G1	• Sturdy and powerful • With T-slot guide • Suitable for external and internal gripping • Protection against dust in gripper jaw guide via sealing air • Gripping force backup • High-force variant (F) available ➔ **Internet: .../hgpt**
Parallel gripper HGPL 	160 ... 1,210 N	40 ... 80 mm	Via proximity sensor		• Space-saving, high forces and torques • Reliable, precise and centred gripping • Long stroke: long guide length for the gripper jaws • Suitable for external and internal gripping • Opening stroke can be adjusted to optimise time ➔ **Internet: .../hgpl**
Parallel gripper HGPP 	80 ... 830 N	2 ... 12.5 mm	For Hall sensor, For inductive sensors	During closing, G2, During opening, G1	• High-precision gripper jaw guide • Suitable for external and internal gripping • Highly flexible thanks to versatile attachment, mounting and application options • Gripping force backup ➔ **Internet: .../hgpp**
Parallel gripper HGPC 	44 ... 126 N	3 ... 7 mm	Via proximity sensor	During closing, G2	• Compact, low cost, reliable operation, long service life • High force with minimal volume • Suitable for external and internal gripping • Gripping force backup ➔ **Internet: .../hgpc**

Parallel grippers

FESTO

Type	Total gripping force at 6 bar, closing	Stroke per gripper jaw	Position sensing	Gripping force backup	Description
Parallel gripper HGP 	20 ... 700 N	2 ... 12.5 mm	For Hall sensor, Via proximity sensor	During closing, G2, During opening, G1	• Self-centring • Suitable for external and internal gripping • Versatile thanks to externally adaptable gripper fingers • High gripping force and compact size • Max. repetition accuracy ➔ **Internet: .../hgp**
Parallel gripper HGPM 	16 ... 35 N	2 ... 3 mm	None		• Micro gripper: compact, handy design • Versatile thanks to externally adaptable gripper fingers • Mounting options with clamping spigot, with flange mounting, with Z stroke compensation ➔ **Internet: .../hgpm**
Three-point gripper HGPPI 	20 ... 120 N	0 ... 10 mm	With integrated Hall sensor		• Servopneumatic proportional gripper • In comparison with electric grippers: high performance with low weight and installation space • Gripper jaws can be positioned freely and independently • Pressure/force regulation • Speed regulation and metering of the gripping force ➔ **Internet: .../hgppi**
Parallel gripper HGPLE 		40 mm	Via integrated angular displacement encoder		• Electrically driven gripper with long stroke • Free, speed-controlled selection of gripping positions • Long stroke allows use with workpieces of different sizes • Adjustable gripping force for highly sensitive and large, heavy workpieces • Very high torque resistance, very high accuracy • Short opening and closing times • Minimal installation costs • See product documentation on our website for gripping force ➔ **Internet: .../hgple**

Three-point grippers

Type	Total gripping force at 6 bar, closing	Stroke per gripper jaw	Position sensing	Gripping force backup	Description
Three-point gripper HGDT 	246 ... 2,592 N	1.5 ... 10 mm	Via proximity sensor	During closing, G2, During opening, G1	• Synchronous movement of gripper jaws • With T-slot guide • Gripping force backup • Suitable for external and internal gripping • Dust-proof via sealing air • High-force variant (F) available ➔ **Internet: .../hgdt**

Three-point grippers

Type	Total gripping force at 6 bar, closing	Stroke per gripper jaw	Position sensing	Gripping force backup	Description
Three-point gripper HGD 	90 ... 880 N	2.5 ... 6 mm	For Hall sensor, Via proximity sensor		• Self-centring • Suitable for external and internal gripping • Versatile thanks to externally adaptable gripper fingers • High precision and high holding forces → **Internet: .../hgd**

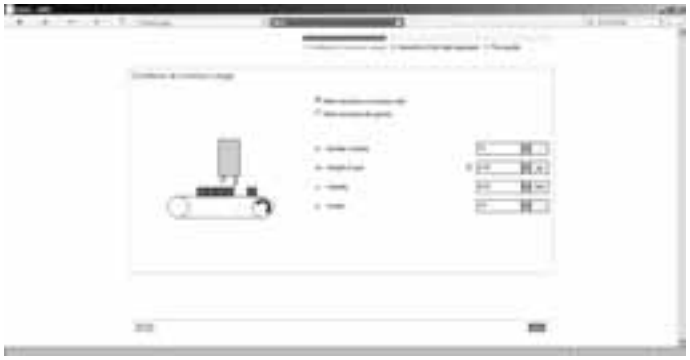
Angle grippers

Type	Total gripping torque at 6 bar, closing	Max. opening angle	Position sensing	Description
Angle gripper HGWM 	22 ... 64 Ncm	14 ... 18.5 °	None	• Micro angle gripper: compact, handy design • Mounting options with clamping spigot, with flange mounting, with Z stroke compensation • Versatile thanks to externally adaptable gripper fingers → **Internet: .../hgwm**
Angle gripper HGW 	22 ... 880 Ncm	40 °	Via proximity sensor	• Self-centring • Suitable for external and internal gripping • Versatile thanks to externally adaptable gripper fingers • Constant gripping torque over the entire angle range → **Internet: .../hgw**
Angle gripper HGWC 	22 ... 144 Ncm	30 ... 80 °	Via proximity sensor	• Internal fixed flow control, does away with the need for external flow control in 90% of applications • High force with minimal volume • Suitable for external and internal gripping • Repetition accuracy 0.05 mm • Compact and cost-effective → **Internet: .../hgwc**
Radial gripper HGR 	13 ... 500 Ncm	180 °	Via proximity sensor	• Self-centring • Suitable for internal and external gripping • Constant gripping torque over the entire angle range • Versatile thanks to externally adaptable gripper fingers → **Internet: .../hgr**
Radial gripper HGRC 	22 ... 144 Ncm	180 °	Via proximity sensor	• Internal fixed flow control, does away with the need for external flow control in 90% of applications • High force with minimal volume • Suitable for external and internal gripping • Repetition accuracy 0.05 mm • Compact and cost-effective → **Internet: .../hgrc**

Swivel/gripper units

Type	Total gripping force at 6 bar, opening	Stroke per gripper jaw	Swivel angle	Position sensing, gripper	Description
Swivel/gripper unit HGDS 	58 ... 170 N	2.5 ... 7 mm	210 °	Via proximity sensor	• Combination of parallel gripper and swivel module • Swivel angle infinitely adjustable • Precise end stop with flexible cushioning or integrated shock absorber ➔ **Internet: .../hgds**

Software tool



Feed separators

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

This tool can be found in the electronic catalogue for the product family, on the website under Support, Engineering Software (in the menu on the left), Online area or on the DVD under Selection and sizing.

Feed separators

Type	Mode of operation	Piston Ø	Stroke	Theoretical force at 6 bar, advance stroke	Description
Feed separator HPV 	Double-acting	10 mm, 14 mm, 22 mm	10 ... 60 mm	45 ... 225 N	• For separating workpieces in the supply process • Low-cost and reliable • Just one valve required for actuation • For position sensing ➔ **Internet: .../hpv**

Software tool

Configurator

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

The configurator is part of the electronic catalogue and is not available as a separate software program.

Handling modules

Type	Size	Effective load	Y-stroke	Z-stroke	Swivel angle	Repetition accuracy	Description
Handling module HSP 	12, 16, 25	0 ... 1.6 kg	52 ... 170 mm	20 ... 70 mm		+/-0.01 mm, +/-0.02 mm	• Function module for the automatic transfer, feed and removal of small parts in extremely confined spaces • Guided vertical and horizontal motion sequence • High precision and good rigidity • Compact design • Extremely short cycle times • Cost-optimised • Stroke adjustment along Y and Z-axes ➔ **Internet: .../hsp**
Handling module HSW 	10, 12, 16	0 ... 1.6 kg		80 ... 100 mm	80 ... 100°	+/-0.02 mm	• Function module for the automatic transfer, feed and removal of small parts in extremely confined spaces • Guided swivel and linear motion • High precision and good rigidity • Compact design • Extremely short cycle times • Cost-optimised • Angle and stroke adjustment ➔ **Internet: .../hsw**

Pick & Place

FESTO

Type	Effective load	Description
Pick & Place 1.0 DGSL, SLT, SLTE 	0 ... 4 kg	• Compact design • Lightweight components • High load carrying capacity and precision • Range of stroke lengths • Very short cycle times • Various cushioning variants • High functionality thanks to the optimal clamping unit and end-position locking • Freely positionable ➔ **Internet: .../pick**
Pick & Place 2.0 HMP, HME, DGSL, SLT, SLTE, EGSA 	0 ... 6 kg	• Very rigid and precise even with long strokes • Intermediate position along Y and Z-axes • Clamping unit along Y and Z-axes • Freely positionable along Y and Z-axes • Narrow front end area • High dynamic response ➔ **Internet: .../pick**
Pick & Place 3.0 HMP, HME 	0 ... 10 kg	• Very rigid and precise even with long strokes • Very high load carrying capacity thanks to high-quality guides • Intermediate position • Clamping unit and electrical interface along both axes • High dynamic response with effective loads up to 6 kg ➔ **Internet: .../pick**

Linear gantries

Type	Effective load	Description
Linear gantry 1.0 SLG, DGSL, SLT, SLTE 	0 ... 2 kg	• Very compact design thanks to the flat drive along the Y-axis and mini slide along the Z-axis • Multiple intermediate positions along the Y-axis • Positionable anywhere along the Z-axis • High precision in end and intermediate positions thanks to metal stops ➔ **Internet: .../portal**
Linear gantry 2.0 DGPL, DGC, DGE 	0 ... 4 kg	• Choice of pneumatic or electric drive (toothed belt or spindle) for horizontal axis • Any number of intermediate positions along the Y-axis with servopneumatic or electric axis • Additional functions such as intermediate positions and clamping unit along the Z-axis • DUO system structure for particularly high loads ➔ **Internet: .../portal**

Linear gantries

Type	Effective load	Description
Linear gantry 3.0 DGPL, DGC, DGE, DGSL, SLT, SLTE 	0 ... 6 kg	• Choice of pneumatic or electric drive (toothed belt or spindle) for horizontal axis • Very high dynamic response thanks to small moving load along the Y and Z-axes • Any number of intermediate positions along the Y-axis with servopneumatic or electric axis • DUO system structure for particularly high loads ➔ **Internet: .../portal**
Linear gantry 4.0 DGPL, DGC, DGE, HMP, DGEA 	0 ... 10 kg	• Choice of pneumatic or electric drive (toothed belt or spindle) for horizontal axis • Any number of intermediate positions along the Y and Z-axes • Extremely rigid Z-axis with additional functions such as intermediate positions and clamping unit • High dynamic response along the Z-axis due to the low moving load of the drive • DUO system structure for particularly high loads ➔ **Internet: .../portal**

Three-dimensional gantries

Type	Effective load	Description
Three-dimensional gantry 1.0 DGE, DGPL, DGC 	0 ... 4 kg	• Choice of pneumatic or electric drive for horizontal X and Y-axes • Any number of intermediate positions along the X and Y-axes with servopneumatic or electric axes • Additional functions such as intermediate positions (with through-travel) and clamping cartridge along the Z-axis • DUO system type for particularly high loads ➔ **Internet: .../portal**
Three-dimensional gantry 2.0 DGE, DGPL, DGC, DGSL, SLT, SLTE 	0 ... 6 kg	• Choice of pneumatic or electric drive for horizontal X and Y-axes • Any number of intermediate positions along the X and Y-axes with servopneumatic or electric axes • Very high dynamic response thanks to twin-piston slide along the X-axis • Pneumatic or electric drive on the Z-axis • DUO system type for particularly high loads ➔ **Internet: .../portal**

Three-dimensional gantries

FESTO

Type	Effective load	Description
Three-dimensional gantry 3.0 DGE, DGPL, DGC, DGEA 	0 ... 10 kg	• Choice of pneumatic or electric drive for all axes • Any number of intermediate positions along the X and Y-axes with servopneumatic or electric axes • Choice of guide characteristics and drive concepts • DUO system type for particularly high loads ➔ **Internet: .../portal**
Three-dimensional gantry 4.0 DGE, DGPL, DGC, HMP 	0 ... 10 kg	• Choice of pneumatic or electric drive for horizontal X and Y-axes • Any number of intermediate positions along the X and Y-axes with servopneumatic or electric axes • Additional functions such as intermediate positions and clamping unit along the Z-axis • DUO system type for particularly high loads ➔ **Internet: .../portal**

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Planar surface gantries

Type	Effective load	Description
Planar surface gantry 1.0 – 3.0 DGE, DGP 	0 ... 6 kg	• Repetition-accurate, centralised direct connection of axes • High level of process reliability thanks to integration of cables in energy chains • Defined mounting interface for the handling system on a mounting frame • Electric with toothed belt or spindle drive, pneumatic or servopneumatic • Any number of intermediate positions along the X and Y-axes ➔ **Internet: .../portal**
Planar surface gantry 4.0 – 5.0 DGE, FDG 	0 ... 50 kg	• Repetition-accurate, centralised direct connection of axes • High level of process reliability thanks to integration of cables in energy chains • Defined handling system mounting interfaces for a mounting frame • Electric with toothed belt or spindle drive, pneumatic or servopneumatic • Any number of intermediate positions along the X and Y-axes ➔ **Internet: .../portal**

Software tool

Vacuum selection

Which suction cup on which surface for which movement? Don't experiment - calculate! This software tool even enables a differentiation between linear and rotary movements.

This tool can be found on the website under Support, Engineering Software (in the menu on the left), Downloads for Windows or on the DVD under Selection and sizing.

Vacuum generators

Type	Nominal size of laval nozzle	Max. vacuum	Max. suction rate with respect to atmosphere	Description
Vacuum generator VN 	0.45 ... 3 mm	86 ... 93%	6.1 ... 339 l/min	• Pneumatic • High vacuum • Can be used directly in the work space • Available as straight or T-shaped housing • No wearing parts • With or without vacuum switch • Integrated ejector pulse, electrical actuation for vacuum ON/OFF, combination of ejector pulse and actuation optional ➔ **Internet: .../vn**
Vacuum generator VAD 	0.5 ... 1.5 mm	80%		• Pneumatic • High vacuum • Sturdy aluminium housing • Connection for additional external reservoir • Maintenance-free • See product documentation on our website for max. suction rate ➔ **Internet: .../vad**
Vacuum generator VAK 	1 mm	80%		• Pneumatic • Sturdy aluminium housing • Connection for additional external reservoir • Maintenance-free • Built-in reservoir • Reliable setting down of workpieces • See product documentation on our website for max. suction rate ➔ **Internet: .../vak**
Vacuum generator cartridge VN 	0.45 ... 3 mm	86 ... 93%	6.1 ... 339 l/min	• High vacuum • For fitting into in-house designs • High suction rate ➔ **Internet: .../vn**

Vacuum generators

FESTO

Type	Nominal size of laval nozzle	Max. vacuum	Max. suction rate with respect to atmosphere	Description
Vacuum generator OVEM 	0.45 ... 0.95 mm	93%	6 ... 19.5 l/min	• High vacuum, high suction rate • Compact design • Monitoring and visualisation of the vacuum by means of vacuum sensor with LCD display • Central electrical connection via M12 plug • Maintenance-free operation and reduced noise level through integrated, open silencer • Integrated filter with inspection window for maintenance display • Adjustable ejector pulse ➔ **Internet: .../ovem**
Vacuum generator VADM, VADMI 	0.45 ... 3 mm	85%		• Electropneumatic with vacuum monitoring • High vacuum • Compact and sturdy design • Built-in solenoid valve (on/off) • Filter with contamination indicator • Available with air-saving circuit, vacuum switch • Reliable setting down of workpieces • See product documentation on our website for max. suction rate ➔ **Internet: .../vadm**
Vacuum generator VAD-M, VAD-M-I 	0.5 ... 1.5 mm	80%		• Electropneumatic • High vacuum • Compact and sturdy design • Built-in solenoid valve (on/off) • Reliable setting down of workpieces • Maintenance-free because there are no moving parts ➔ **Internet: .../vad-m**

Suction cups

Type	Suction cup size	Suction cup diameter	Breakaway force at 70% vacuum	Design	Information on suction cup materials	Description
Suction gripper ESG 	10x30 mm, 15x45 mm, 20x60 mm, 25x75 mm, 30x90 mm, 4x10 mm, 4x20 mm, 6x10 mm, 6x20 mm, 8x20 mm, 8x30 mm	2 ... 200 mm	0.1 ... 1,610 N	Oval, standard, Round, bellows, 1.5 convolutions, Round, bellows, 3.5 convolutions, Round, bell-shaped, Round, standard, Round, extra deep	FPM, NBR, PUR, VMQ (silicone)	• Modular product system for suction cup holders and suction cups with over 2,000 variants • Available with angle compensator, height compensator, filter • 15 suction cup Ø • 5 suction cup shapes • Suction cup volume: 0.002 ... 245 cm³ • Min. workpiece radius: 10 ... 680 mm • Vacuum port: push-in connector or barbed fitting connection for plastic tubing, threaded connection ➔ **Internet: .../esg**

Suction cups

FESTO

Type	Suction cup size	Suction cup diameter	Breakaway force at 70% vacuum	Design	Information on suction cup materials	Description
Suction cup ESS 	10x30 mm, 15x45 mm, 20x60 mm, 25x75 mm, 30x90 mm, 4x10 mm, 4x20 mm, 6x10 mm, 6x20 mm, 8x20 mm, 8x30 mm	2 ... 200 mm	0.1 ... 1,610 N	Bellows, Oval, standard, Round, bellows, 1.5 convolutions, Round, bellows, 3.5 convolutions, Round, bell-shaped, Round, standard, Round, extra deep	FPM, NBR, PUR, TPE-U(PU), VMQ (silicone)	• Suction cup consisting of the suction cup itself, plus the support plate with mounting • Suction cup volume: 0.002 ... 245 cm³ • Min. workpiece radius: 10 ... 680 mm • Mounting for suction cup holder: female thread, male thread, push-in connector → **Internet: .../ess**
Suction cup, bellows suction cup ESV 		20 ... 200 mm	9.8 ... 1,610 N	Bellows, Round, bellows, 1.5 convolutions, Round, bellows, 3.5 convolutions, Round, bell-shaped, Round, standard, Round, extra deep	FPM, NBR, PUR, TPE-U(PU), VMQ (silicone)	• Suction cup wearing part • Easily interchangeable • Suction cup volume: 0.318 ... 245 cm³ • Min. workpiece radius: 10 ... 680 mm → **Internet: .../esv**
Suction cup, bellows suction cup VAS, VASB 		1 ... 125 mm	0.035 ... 606 N	Vacuum port on top, Vacuum port on side, Round, bellows, 1.5 convolutions, Round, standard	NBR, TPE-U(PU), VMQ (silicone)	• Sturdy and reliable • Suction cups with fixed connecting thread • 12 suction cup Ø • Round suction cup shape, bellows • Vacuum connection on top, at side • Free of copper, PTFE and silicone • Screw-in thread → **Internet: .../vas**

Standards-based directional control valves

FESTO

Type	Valve function	Standard nominal flow rate	Pneumatic connection 1	Actuation type	Description
Solenoid valve VSVA, VSPA 	2/2-way, closed, single solenoid, 2x2/2-way, closed, single solenoid, 2x3/2-way, closed, single solenoid, 2x3/2-way, open, single solenoid, 2x3/2-way, open/closed, single solenoid, 3/2-way, open/closed, single solenoid, 5/2-way, double solenoid, 5/2-way, double solenoid, with dominant signal, 5/2-way, single solenoid, 5/3-way, pressurised, 5/3-way, exhausted, 5/3-way, closed, 5/3-way, port 2 pressurised, 4 exhausted	400 ... 2,900 l/min	Sub-base size 1 to ISO 5599-1, Sub-base size 1 to ISO 5599-2, Sub-base size 18 mm to ISO 15407-1, Sub-base size 18 mm to ISO 15407-2, Sub-base size 2 to ISO 5599-1, Sub-base size 2 to ISO 5599-2, Sub-base size 26 mm to ISO 15407-1, Sub-base size 26 mm to ISO 15407-2	Electric, pneumatic	• Port pattern to ISO 15407-1, ISO 15407-2 and ISO 5599-2 • Sub-base valve • Electrically actuated, piloted or pneumatically actuated • ISO sizes 18 mm (01), 26 mm (02) to ISO 15407, ISO size 1 to ISO 5599 • Electrical connection via plug, square design to EN 175301-803, type C, 12 V/24 V DC/AC, 110 V/230 V AC • Electrical connection via standardised socket M12 or M8 24 V DC (EN 61076-2-101) ➔ **Internet: .../vspa**
Solenoid valve MN1H, MFH, MDH, MEBH, JMN1H, JMFH, JMDH, JMEBH, VL, J, JD 	5/2-way, double solenoid, 5/2-way, double solenoid, with dominant signal, 5/2-way, single solenoid, 5/3-way, pressurised, 5/3-way, exhausted, 5/3-way, closed	1,200 ... 6,000 l/min	Sub-base, Sub-base size 1 to ISO 5599-1, Sub-base size 2 to ISO 5599-1, Sub-base size 3 to ISO 5599-1, Sub-base size 4 to ISO 5599-1	Electric, pneumatic	• Port pattern to ISO 5599-1 • Sub-base valve • Electrically actuated, piloted or pneumatically actuated • ISO size 1, 2, 3, 4 • Pneumatic reset or mechanical spring return • Electrical connection via plug, square design to EN 175301-803, type A, 24 V DC, 110/230 V AC, plug vanes for plug sockets 12 ... 48 V DC, 24 ... 240 V AC, central plug, round design, M12x1, 24 V DC ➔ **Internet: .../iso 5599-1**
Solenoid valve NVF3, MGTBH 	5/2-way, single solenoid	400 ... 900 l/min	Sub-base, G1/4	Electric	• Port pattern to NAMUR VDE/VDI 3845 • Mechanical spring return • Selected types approved in accordance with Directive 94/9/EC (ATEX) • Can be changed from 5/2 to 3/2-way function • Electrical connection via plug, 3-pin, cable, 3-wire or plug, square design to DIN EN 175301-803, 12 ... 48 V DC, 24 ... 240 V AC ➔ **Internet: .../namur**

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Standards-based directional control valves

Type	Valve function	Standard nominal flow rate	Pneumatic connection 1	Actuation type	Description
Solenoid valve VSNB 	5/2-way, double solenoid, 5/2-way, single solenoid, 5/2-way and 3/2-way, single solenoid	950 l/min	G1/4	Electric	• Port pattern to NAMUR VDE/VDI 3845 • Mechanical spring return • Can be changed from 5/2 to 3/2-way function • Electrical connection via plug, square design to DIN EN 175301-803, type A, 24 V DC, 24 ... 110, 230 V AC ➔ **Internet: .../namur**

Universal directional control valves

Type	Valve function	Standard nominal flow rate	Pneumatic connection 1	Actuation type	Description
Solenoid valve CPE10, CPE14, CPE18, CPE24 	3/2-way, closed, single solenoid, 3/2-way, open, single solenoid, 5/2-way, double solenoid, 5/2-way, single solenoid, 5/3-way, pressurised, 5/3-way, exhausted, 5/3-way, closed	180 ... 3,200 l/min	G1/4, G1/8, G3/8, M5, M7, QS-10, QS-12, QS-4, QS-6, QS-8	Electric, Pneumatic	• Compact Performance: minimal width and low power consumption at high flow rates • In-line valve • Electrically actuated, piloted, pneumatic spring return • Width 10, 14, 18, 24 mm • Simple manifold structure consisting of fixed-grid manifold blocks with 2 to 10 valve positions or modular manifold blocks • Electrical connection via square or round plug M8x1, 4-pin, pilot valve with port pattern to DIN EN 175301-803 type C, 24 V DC, 110, 220 V AC ➔ **Internet: .../cpe**
Solenoid valve VUVB 	3/2-way, closed, single solenoid, 3/2-way, open, single solenoid, 4/2-way, double solenoid, 4/2-way, single solenoid	200 ... 1,000 l/min	QS-4, QS-6, QS-8, QS-10	Electric	• In-line valve • Semi in-line valve • Sub-bases for individual valves • Manifold rail for valve manifold with individual electrical connection or for valve terminal with electrical multi-pin connection • Electrical connection via plug, square design to EN 175301-803, type C ➔ **Internet: .../vuvb**

Universal directional control valves

FESTO

Type	Valve function	Standard nominal flow rate	Pneumatic connection 1	Actuation type	Description
Solenoid valve VMPA1 	2x2/2-way, closed, single solenoid, 2x3/2-way, closed, single solenoid, 2x3/2-way, open, single solenoid, 2x3/2-way, open/closed, single solenoid, 3/2-way, closed, single solenoid, 3/2-way, open, single solenoid, 5/2-way, double solenoid, 5/2-way, single solenoid, 5/3-way, pressurised, 5/3-way, exhausted, 5/3-way, closed	230 ... 360 l/min	M7	Electric	• Slim, high-performance valves in sturdy metal housing • Sub-base valve • Also available as a modular multi-functional valve terminal for up to 128 valve functions • Integrated holding current reduction • Electrical M8 connection, 4-pin with screw connection ➔ **Internet: .../vmpa1**
Solenoid valve CPASC1, CPPSC1 	2x2/2-way, closed, single solenoid, 2x3/2-way, closed, single solenoid, 2x3/2-way, open, single solenoid, 3/2-way, closed, single solenoid, 5/2-way, double solenoid, 5/2-way, single solenoid, 5/3-way, pressurised, 5/3-way, exhausted, 5/3-way, closed	150 ... 220 l/min	Sub-base	Electric	• Smart Cubic: space-saving thanks to small valve dimensions • Semi in-line valve • Sub-base valve • Electrically actuated, piloted, pneumatic spring return • Electrical connection via individual connection or via manifold block with horizontal connector or plug-in ➔ **Internet: .../cpasc1**
Solenoid/pneumatic valve, Tiger 2000 MFH, MVH, JMFH, JMVH, VL, J 	5/2-way, double solenoid, 5/2-way, single solenoid, 5/3-way, pressurised, 5/3-way, exhausted, 5/3-way, closed	750 ... 2,600 l/min	G1/8, G1/4, G3/8	Electric, Pneumatic	• In-line valve • Sturdy and reliable • Manifold assembly with manifold rail for 2 to 10 valve positions • Electrical connection for F solenoid coil via plug vanes for plug sockets MSSD-F, KMF; for V solenoid coil to DIN EN 175301-803 type B • Voltage 12 ... 230 V DC, 12 ... 240 V AC (50 ... 60 Hz) ➔ **Internet: .../tiger 2000**

Universal directional control valves

FESTO

Type	Valve function	Standard nominal flow rate	Pneumatic connection 1	Actuation type	Description
Solenoid/pneumatic valve, Tiger Classic MFH, MOFH, JMFH, JMFDH, VL/O, VL, JH, JDH 	3/2-way, closed, single solenoid, 3/2-way, open, single solenoid, 5/2-way, double solenoid, 5/2-way, double solenoid, with dominant signal, 5/2-way, single solenoid	500 ... 7,500 l/min	Manifold module, G1/8, G1/4, G1/2, G3/4	Electric, Pneumatic	• In-line valve • Sturdy and reliable • Manifold assembly with manifold rail for 2 ... 6 valve positions • Electrical connection for F solenoid coil via plug vanes for plug sockets MSSD-F, KMF; for V solenoid coil to DIN EN 175301-803 type B • Operating voltage 12 ... 230 V DC, 12 ... 240 V AC (50 ... 60 Hz) ➔ **Internet: .../tiger classic**
Solenoid/pneumatic valve, midi pneumatic MEBH, MOEBH, MEH, MOEH, JMEBH, JMEH, VL, J 	3/2-way, closed, single solenoid, 3/2-way, open, single solenoid, 5/2-way, double solenoid, 5/2-way, single solenoid, 5/3-way, pressurised, 5/3-way, exhausted, 5/3-way, closed	200 ... 700 l/min	Sub-base, G1/8	Electric, Pneumatic	• Semi in-line valve • Sub-base valve • Midi pneumatic: 18 mm width • Manifold assembly for 2 to 10 valves or individual mounting • Electrical connection via plug, square design to EN 175301-803, type C • Operating voltage 24 V DC, 110/230 V AC (50 ... 60 Hz) ➔ **Internet: .../midi**
Solenoid valve VUVG 	2x3/2-way, closed, single solenoid, 2x3/2-way, open, single solenoid, 2x3/2-way, open/closed, single solenoid, 5/2-way, double solenoid, 5/2-way, single solenoid, 5/3-way, pressurised, 5/3-way, exhausted, 5/3-way, closed	90 ... 780 l/min	G1/8, M3, M5, M7	Electric	• In-line valves can be used as individual valves or manifold valves • Identical sub-base valves for M5 or M7 manifold rail • M5 and M7 in-line valves can be combined on one manifold rail • Valve manifolds with pressure zones • Connection technology can be easily changed via electric sub-base (electronics box) • Secure mounting on wall or H-rail ➔ **Internet: .../vuvg**

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Application-specific directional control valves

Type	Valve function	Standard nominal flow rate	Pneumatic connection 1	Operating pressure	Description
Solenoid valve MHA1, MHP1 	2/2-way, closed, single solenoid, 2x2/2-way, closed, single solenoid, 3/2-way, closed, single solenoid, 3/2-way, open, single solenoid	10 ... 30 l/min	Sub-base, QS-3, QS-4, Prepared for QSP10	-0.9 ... 8 bar	• Semi in-line valve • Sub-base valve • Miniature valve: grid dimension 10 mm • Connecting plates • Manifold block for 2 ... 10 valves • Response times down to 4 ms • Operating voltage 5, 12 or 24 V DC ➔ **Internet: .../mh1**

Application-specific directional control valves

FESTO

Type	Valve function	Standard nominal flow rate	Pneumatic connection 1	Operating pressure	Description
Solenoid valve MHE2, MHP2, MHA2, MHE3, MHP3, MHA3, MHE4, MHP4, MHA4 	3/2-way, closed, single solenoid, 3/2-way, open, single solenoid, 5/2-way, single solenoid	90 ... 400 l/min	Sub-base, G1/4, G1/8, M7, QS-4, QS-6, QS-8	-0.9 ... 8 bar	• In-line valve • Semi in-line valve • Sub-base valve • Fast-switching valve: response times down to 2 ms • Direct mounting, individual sub-base, manifold assembly • Manifold block for 2 ... 10 valves • Grid dimension 14, 19, 24 mm • Operating voltage 24 V DC ➔ **Internet: .../mh2**
Solenoid valve MHJ9, MHJ10 	2/2-way, closed, single solenoid	100 l/min	Sub-base, QS-4	0.5 ... 6 bar	• Sub-base valve • Individual valve with integrated QS fitting • For very fast sorting applications with up to 1,000 Hz • Very long service life › 2 billion switching cycles • Outstanding reproducibility ➔ **Internet: .../mhj9**
Solenoid valve VOVG 	3/2-way, closed, single solenoid, 3/2-way, open, single solenoid, 5/2-way, single solenoid	180 ... 200 l/min	Sub-base, M5, M7	-0.9 ... 8 bar	• In-line valve • Semi in-line valve • Sub-base valve • Direct mounting, manifold assembly • Manifold rail for 2 ... 10 valves • Width 10, 12, 25 mm • Operating voltage 5, 12 or 24 V DC ➔ **Internet: .../vovg**
Solenoid valve VOFC 	3/2-way, closed, single solenoid, 5/2-way, single solenoid	600 ... 3,000 l/min	G1/2, G1/4, NPT1/4-18, Namur G1/2, Namur G1/4	2... 8 bar	• For outdoor use under harsh ambient conditions, e.g. in refining thanks to sturdy design and high corrosion resistance • Piloted piston spool and piston poppet valves • In-line valve • Variants with TÜV approval up to SIL4 to IEC 61508 • Shuttle valve can switch between internal and external pilot air ➔ **Internet: .../vofc**

Application-specific directional control valves

FESTO

Type	Valve function	Standard nominal flow rate	Pneumatic connection 1	Operating pressure	Description
Solenoid valve CDVI5.0 	2/2-way, closed, single solenoid, 2/2-way, open, single solenoid, 2x3/2-way, closed, single solenoid, 2x3/2-way, open, single solenoid, 3/2-way, closed, single solenoid, 3/2-way, open, single solenoid, 5/2-way, double solenoid, 5/2-way, single solenoid, 5/3-way, pressurised, 5/3-way, exhausted, 5/3-way, closed	300 ... 650 l/min	Sub-base	-0.9 ... 10 bar	• Sub-base valve • Corrosion-resistant • Easy-to-clean design • Also available as valve terminal type 15 CDVI • Operating voltage 24 V DC → **Internet: .../cdvi5.0**

Mechanically/manually actuated directional control valves: with plug connector

Type	Valve function	Standard nominal flow rate	Pneumatic connection 1	Pneumatic working line	Operating pressure	Description
Roller lever valve R/O 	3/2-way, open/closed, monostable	80 l/min	PK-3	PK-3	0 ... 8 bar	• With roller lever • Directly actuated • Polymer design • Ducted exhaust air → **Internet: .../r/o**
Stem actuated valve V/O 	3/2-way, open/closed, monostable	80 ... 140 l/min	PK-3	PK-3	-0.95 ... 8 bar	• With plunger • Directly actuated • Polymer design • Ducted exhaust air → **Internet: .../v/o**
Micro stem actuated valve S, SO 	3/2-way, closed, monostable, 3/2-way, open, monostable	60 l/min	PK-3	PK-3	-0.95 ... 8 bar	• With plunger for actuator attachments such as pushbutton actuators, toggle levers • Dimensions to DIN 41635, type A • Directly actuated • Polymer design → **Internet: .../s-3-pk**
Roller lever valve with idle return L/O 	3/2-way, open/closed, monostable	80 l/min	PK-3	PK-3	0 ... 8 bar	• With roller lever with idle return • Directly actuated • Polymer design • Ducted exhaust air → **Internet: .../l/o**

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Mechanically/manually actuated directional control valves: with plug connector

FESTO

Type	Valve function	Standard nominal flow rate	Pneumatic connection 1	Pneumatic working line	Operating pressure	Description
Pushbutton valve K/O 	3/2-way, open/closed, monostable	80 l/min	PK-3	PK-3	0 ... 8 bar	• With button switch • Directly actuated • Polymer design • Ducted exhaust air ➔ **Internet: .../k/o**
Finger lever valve TH/O 	3/2-way, open/closed, monostable	80 l/min	PK-3	PK-3	0 ... 8 bar	• With finger lever • Directly actuated • Polymer design • Ducted exhaust air ➔ **Internet: .../th/o**
Toggle lever valve KH/O 	3/2-way, open/closed, monostable	80 l/min	PK-3	PK-3	0 ... 8 bar	• With toggle lever • Directly actuated • Polymer design • Ducted exhaust air ➔ **Internet: .../kh/o**
Front panel valve SV/O 	2x3/2-way, closed, monostable	70 l/min	PK-3	PK-3	0 ... 8 bar	• Basic valve for actuator attachments such as toggle levers, selector switches • Directly actuated • Polymer design • Reliable coupling system for rapid assembly and dismantling ➔ **Internet: .../sv/o**

Mechanically/manually actuated directional control valves: with threaded connection M5

Type	Valve function	Standard nominal flow rate	Pneumatic connection 1	Pneumatic working line	Operating pressure	Description
Front panel valve SV 	3/2-way, closed, monostable, 5/2-way, smonostable	65 ... 95 l/min	M5	M5	-0.95 ... 8 bar	• Basic valve for actuator attachments such as pushbutton actuators, mushroom pushbuttons, mushroom pushbuttons with detent, selector switches, toggle levers • Front panel mounting • Suitable for vacuum operation • Directly actuated • Plastic design • Reliable coupling system for rapid assembly and dismantling ➔ **Internet: .../sv**
Finger lever valve TH 	3/2-way, closed, monostable, 5/2-way, monostable	80 ... 600 l/min	M5	M5	-0.95 ... 10 bar	• With finger lever • Suitable for vacuum operation • Directly actuated • Ducted exhaust air • Sturdy die-cast zinc design ➔ **Internet: .../th-3**

Mechanically/manually actuated directional control valves: with threaded connection M5

FESTO

Type	Valve function	Standard nominal flow rate	Pneumatic connection 1	Pneumatic working line	Operating pressure	Description
Foot valve F 	3/2-way, closed, monostable, 5/2-way, monostable	550 ... 600 l/min	M5	M5	-0.95 ... 10 bar	• With pedal • Suitable for vacuum operation • Directly actuated • Sturdy die-cast zinc design ➔ **Internet: .../f-3**
Pushbutton valve K 	3/2-way, closed, monostable	80 l/min	M5	M5	-0.95 ... 8 bar	• With button switch • Suitable for vacuum operation • Directly actuated • Sturdy die-cast zinc design ➔ **Internet: .../k-3**
Swivel lever valve RW 	3/2-way, closed, monostable	80 l/min	M5	M5	-0.95 ... 8 bar	• With swivel lever • Additional actuator attachments such as swivel lever short, long, swivel lever rod • Suitable for vacuum operation • Directly actuated • Sturdy die-cast zinc design ➔ **Internet: .../rw**

Mechanically/manually actuated directional control valves: with threaded connection G1/8

Type	Valve function	Standard nominal flow rate	Pneumatic connection 1	Pneumatic working line	Operating pressure	Description
Front panel valve SVS, SVOS 	3/2-way, closed, monostable, 4/2-way, monostable	120 l/min	G1/8	G1/8	3.5 ... 8 bar	• Basic valve for actuator attachments such as pushbutton actuators, mushroom pushbuttons, mushroom actuators, selector switches, toggle levers, key actuators • Directly actuated • Reliable coupling system enables rapid assembly and dismantling • Front panel mounting ➔ **Internet: .../svs**
Roller lever valve RS, ROS 	3/2-way, closed, monostable, 3/2-way, open, monostable, 4/2-way, monostable	120 l/min	G1/8	G1/8	3.5 ... 8 bar	• With roller lever • Indirectly actuated • Aluminium design • Minimal actuating force with pilot control • Can also be used as 2/2-way valve by sealing the exhaust ➔ **Internet: .../rs**
Stem actuated valve V/O 	3/2-way, open/closed, monostable	80 ... 140 l/min	G1/8	G1/8	-0.95 ... 8 bar	• With plunger for actuator attachments such as roller levers, roller levers with idle return • Directly actuated • Suitable for vacuum operation • Aluminium design ➔ **Internet: .../v/o**

Mechanically/manually actuated directional control valves: with threaded connection G1/8

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Type	Valve function	Standard nominal flow rate	Pneumatic connection 1	Pneumatic working line	Operating pressure	Description
Swivel lever valve RW/O 	3/2-way, open/closed, monostable	80 ... 140 l/min	G1/8	G1/8	-0.95 ... 8 bar	• Basic valve for actuator attachments such as swivel lever short, long, swivel lever rod • Suitable for vacuum operation • Directly actuated • Aluminium design ➔ **Internet: .../rw/o**
Stem actuated valve VS, VOS 	3/2-way, closed, monostable, 4/2-way, monostable	120 l/min	G1/8	G1/8	3.5 ... 8 bar	• With plunger • Indirectly actuated • Aluminium design • Minimal actuating force with pilot control • Can also be used as 2/2-way valve by sealing the exhaust ➔ **Internet: .../vs**
Toggle lever valve LS, LOS 	3/2-way, closed, monostable, 3/2-way, open, monostable, 4/2-way, monostable	120 l/min	G1/8	G1/8	3.5 ... 8 bar	• With toggle lever • Indirectly actuated • Aluminium design • Minimal actuating force with pilot control • Can also be used as 2/2-way valve by plugging the exhaust ➔ **Internet: .../ls**
Whisker valve FVS, FVSO 	3/2-way, closed, monostable, 3/2-way, open, monostable	120 l/min	G1/8	G1/8	3.5 ... 8 bar	• With whisker • Especially suitable for sensing of dissimilar workpieces or workpieces not precisely in position • Indirectly actuated • Aluminium design • Minimal actuating force with pilot control • Can also be used as 2/2-way valve by sealing the exhaust ➔ **Internet: .../fvs**

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Mechanically/manually actuated directional control valves: with threaded connection G1/4

Type	Valve function	Standard nominal flow rate	Pneumatic connection 1	Pneumatic working line	Operating pressure	Description
Stem actuated valve V, VO 	3/2-way, closed, monostable, 3/2-way, open, monostable, 5/2-way, monostable	600 l/min	G1/4	G1/4	-0.95 ... 10 bar	• With plunger • Suitable for vacuum operation • Directly actuated • Die-cast aluminium design ➔ **Internet: .../v-3**
Roller lever valve R, RO 	3/2-way, closed, monostable, 3/2-way, open, monostable, 5/2-way, monostable	600 l/min	G1/4	G1/4	-0.95 ... 10 bar	• With roller lever • Suitable for vacuum operation • Directly actuated • Die-cast aluminium design ➔ **Internet: .../r-3**

Mechanically/manually actuated directional control valves: with threaded connection G1/4

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Type	Valve function	Standard nominal flow rate	Pneumatic connection 1	Pneumatic working line	Operating pressure	Description
Roller lever valve with idle return L, LO 	3/2-way, closed, monostable, 3/2-way, open, monostable, 5/2-way, monostable	600 l/min	G1/4	G1/4	-0.95 ... 10 bar	• With roller lever • Suitable for vacuum operation • Directly actuated • Die-cast aluminium design ➔ **Internet: .../l-3**
Foot valve F, FO 	3/2-way, closed, monostable, 3/2-way, open, monostable, 5/2-way, monostable	550 ... 600 l/min	G1/4	G1/4	-0.95 ... 10 bar	• With foot pedal • Suitable for vacuum operation • Directly actuated • Sturdy die-cast zinc design ➔ **Internet: .../f-3**
Foot valve with detent FP, FPB 	3/2-way, closed, monostable, 5/2-way, monostable	550 ... 600 l/min	G1/4	G1/4	-0.95 ... 10 bar	• With foot pedal with detent • Suitable for vacuum operation • Directly actuated • Sturdy die-cast zinc design ➔ **Internet: .../fp-3**
Finger lever valve TH, THO 	3/2-way, closed, monostable, 3/2-way, open, monostable, 5/2-way, monostable	600 l/min	G1/4	G1/4	-0.95 ... 10 bar	• With finger lever • Suitable for vacuum operation • Directly actuated • Die-cast aluminium design ➔ **Internet: .../th-3**
Hand lever valve H 	3/2-way, bistable, 4/3-way, exhausted, 5/2-way, bistable, 5/3-way, closed	125 ... 2,700 l/min	G1/4	G1/4	-0.95 ... 10 bar	• With hand lever • Suitable for vacuum operation • Directly actuated • Die-cast aluminium design ➔ **Internet: .../h-3**

Mechanically/manually actuated directional control valves: hand lever valves

Type	Valve function	Standard nominal flow rate	Pneumatic working line	Operating pressure	Description
Hand lever valve VHER, HS, HSO 	4/3-way, exhausted, 4/3-way, closed	170 ... 4,300 l/min	G1/2, G1/4, G1/8, M5	-0.95 ... 10 bar	• With lever and detent • Lever in metal or polymer design • Front panel mounting, through or mounting holes • Directly actuated • Can also be used as 3/3-way valve by sealing port 2 ➔ **Internet: .../vher**

Mechanically/manually actuated directional control valves: multi-position valves

FESTO

Type	Valve function	Standard nominal flow rate	Pneumatic working line	Operating pressure	Description
Finger lever valve H 	3/2-way, bistable, 4/3-way, exhausted, 5/3-way, closed	125 ... 2,700 l/min	G1/2, G1/4, M5	-0.95 ... 10 bar	• With detenting finger lever • Directly actuated • Front panel mounting or mounting on sub-base • Aluminium design ➔ **Internet: .../h-4/3**
Toggle lever valve H	3/2-way, bistable, 4/3-way, exhausted, 5/3-way, closed	125 ... 2,700 l/min	G1/2, G1/4, M5	-0.95 ... 10 bar	• With toggle lever • Indirectly actuated • For positioning, for stopping in the event of an emergency-stop and for holding a double-acting cylinder in any position • Aluminium design ➔ **Internet: .../h-5/3**

Non-return valves and quick exhaust valves

Type	Pneumatic connection 1	Standard nominal flow rate	Standard flow rate exhaust 6->0 bar	Standard nominal flow rate pressurisation 6->5 bar	Standard nominal flow rate 1->2 (6-5)	Operating pressure	Description
Non-return valve H, HA, HB 	G1/8, G1/4, G3/8, G1/2, G3/4, M5, QS-4, QS-6, QS-8, QS-10, QS-12, R1/8, R1/4, R3/8, R1/2	115 ... 2,230 l/min			1,000 ... 5,900 l/min	-1 ... 12 bar	• Valve function: non-return function • Screw-in or in-line installation • With connecting thread at both ends, push-in connector at both ends, thread/push-in connector ➔ **Internet: .../h-qs**
Non-return valve HGL 	G1/8, G1/4, G3/8, G1/2, M5, QS-4, QS-6, QS-8, QS-10, QS-12				130 ... 1,600 l/min	0.5 ... 10 bar	• Valve function: piloted non-return function • Pneumatically piloted • Screw-in with male thread • Pilot air connection: M5, G1/8, G1/4, G3/8, QS-4 ➔ **Internet: .../hgl**
Manual override HAB 	G1/2, G1/4, G1/8, G3/8				165 l/min	0 ... 10 bar	• Valve function: exhaust component • For non-return valve HGL • For manual exhausting of a volume of air trapped in a cylinder ➔ **Internet: .../hab**

Non-return valves and quick exhaust valves

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Type	Pneumatic connection 1	Standard nominal flow rate	Standard flow rate exhaust 6->0 bar	Standard nominal flow rate pressuri-sation 6->5 bar	Standard nominal flow rate 1->2 (6-5)	Operating pressure	Description
Quick exhaust valve SE, SEU 	G1/8, G1/4, G3/8, G1/2, G3/4		1,000 ... 6,500 l/min	300 ... 4,560 l/min		0.2 ... 10 bar	• Valve function: quick exhaust • Non-return valve, piloted • Screw-in • With or without silencer ➔ **Internet: .../se**
OR gate OS 	G1/8, G1/4, G1/2, PK-3, PK-4	120 ... 5,000 l/min				1 ... 10 bar	• Valve function: OR function • Logic valve • Pneumatic control system • Mounting via through-holes ➔ **Internet: .../os**
Logic component ZK 	G1/8, PK-3, PK-4	100 ... 550 l/min				1 ... 10 bar	• Valve function: AND function • Dual-pressure valve • Connects two input signals in the AND operation • Mounting via through-holes ➔ **Internet: .../zk**

Ball valves and on-off valves

Type	Valve function	Pneumatic connection 1	Standard nominal flow rate	Operating pressure	Description
On-off valve HE 	2/2-way, double solenoid, 3/2-way, double solenoid	QS-6, QS-8, QS-10, QS-12, R1/8, R1/4, R3/8, R1/2	270 ... 840 l/min	-0.95 ... 10 bar	• Non-return valve, piloted • Connection: thread at both ends, push-in connector at both ends, thread/push-in connector ➔ **Internet: .../he**
Hand slide valve W 	3/2-way, double solenoid	G1/8, G1/4, G3/8, G1/2, G3/4, M5	120 ... 4,000 l/min	-0.95 ... 10 bar	• Ball valve, manually actuated • In-line installation • Suitable for vacuum operation • Metal design ➔ **Internet: .../w-3**
Ball valve QH, QHS 	2/2-way, double solenoid	G1/4, G3/8, G1/2, G3/4, G1, G1 1/2, QS-4, QS-6, R1/8	148 ... 84,000 l/min	-1 ... 10 bar	• Ball valve, manually actuated • In-line installation, can be screwed in, bulkhead fitting • Variants: thread at both ends, push-in connector at both ends, thread/push-in connector ➔ **Internet: .../qh**

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Pressure regulators

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Type	Pressure regulation range	Standard nominal flow rate	Nominal flow rate, closed	Nominal flow rate, open	Pneumatic connection 1	Pneumatic connection 2	Description
Pressure regulator LR-QS, LRMA-QS 	1 ... 8 bar	22 ... 150 l/min			G1/8, G1/4, M5, QS-4, QS-6, QS-8	QS-4, QS-6, QS-8	• Piston regulator with through pressure supply • Available with pressure gauge • Directly actuated • Connections: push-in connector at both ends, thread/push-in connector • Push-in connector, can be rotated 360° ➔ **Internet: .../lrma**
Differential pressure regulator LRL, LRLL 	2 ... 6 bar		30 ... 730 l/min	30 ... 760 l/min	G1/8, G1/4, G1/2, G3/8, M5	QS-4, QS-6, QS-8, QS-10, QS-12	• Piston regulator with through pressure supply • Without pressure gauge • Connections: thread/push-in connector on top or at side • Push-in connector, can be rotated 360° ➔ **Internet: .../lrll**

One-way flow control valves

Type	Valve function	Pneumatic connection 1	Standard nominal flow rate in flow control direction	Adjustment component	Description
One-way flow control valve GRLA, GRLZ, GRXA, GRLSA, GRGA, GRGZ, GR, GRA, GRE, GRU, GRF, GRP 	Exhaust air one-way flow control function, One-way flow control function, Supply air one-way flow control function	G1/8, G1/4, G3/8, G1/2, G3/4, M3, M5, PK-3, PK-3 with union nut, PK-4, PK-4 with union nut, PK-6 with union nut, QS-3, QS-4, QS-6, QS-8, QS-10, QS-12	0 ... 4,320 l/min	Rotary knob with scale, Internal hex, Knurled screw, Slotted head screw	• Flow control valve, flow control at one end • Exhaust air or supply air flow control • Standard, mini, inline variants with different flow rates • Functional combination with one-way flow control valve and piloted non-return valve • Flow control/silencer • Polymer, metal, stainless steel design • Connections: thread at both ends, push-in connector at both ends, thread/push-in connector ➔ **Internet: .../grla**
One-way flow control valve GRXA-HG 	One-way flow control function for exhaust air and piloted non-return valve	QS-4, QS-6, QS-8	130 ... 280 l/min	Slotted head screw	• Functional combination with one-way flow control valve and piloted non-return valve • Holding function and speed setting in one housing • Additional supply port for holding crossover interlinking ➔ **Internet: .../grxa-hg**

One-way flow control valves

Type	Valve function	Pneumatic connection 1	Standard nominal flow rate in flow control direction	Adjustment component	Description
One-way flow control valve VFOV, VFOC 	Exhaust air one-way flow control function, Supply air one-way flow control function	QS-4, QS-6, QS-8	0 ... 325 l/min	Rotary knob, Slotted head screw	• Shut-off valve, flow control at one end • Polymer, metal design • Precision adjustment for low and medium speeds • Thread/push-in connector, push-in connector/push-in sleeve ➔ **Internet: .../vfov**

Flow control valves

Type	Valve function	Pneumatic connection 1	Standard nominal flow rate in flow control direction	Adjustment component	Description
Flow control valve GRLO, GRGO, GRO, GRPO 	Flow control function	G1/8, G1/4, M3, M5, PK-3, PK-4, QS-3, QS-4, QS-6	1.65 ... 350 l/min	Rotary knob with scale, Knurled screw, Slotted head screw	• Flow control valve, flow control at both ends • Standard, mini, inline flow control valve • Polymer, metal design • Precision adjustment for low and medium speeds • Connections: thread at both ends, push-in connector at both ends, thread/push-in connector ➔ **Internet: .../grlo**
Time delay valve VZA, VZOA, VZB, VZOB 	3/2-way, closed, single solenoid, 3/2-way, open, single solenoid	G1/4	600 l/min	With duo-dial adjustment knob with setting scale and clamping device or with adjusting screw	• Time delay infinitely adjustable • Max. 30 s time delay • Mounting via through-hole or front panel mounting ➔ **Internet: .../vza**

Proportional valves

Type	Valve function	Pneumatic connection 1	Pressure regulation range	Standard nominal flow rate	Description
Proportional pressure regulator VPPM 	3-way proportional pressure regulator	Sub-base, G1/8, NPT1/8-27	0.02 ... 10 bar	380 ... 1,400 l/min	• In-line valve • Sub-base valve, flanged valve • Pilot-actuated diaphragm regulator • Integration in valve terminal MPA via fieldbus • Multi-sensor control • High repetition accuracy • User interface with LED displays, LCD display, adjustment/selection buttons • Setpoint value input as analogue voltage or current signal • Integrated pressure sensor • Electrical connection via plug, round design, 8-pin, M12 or terminal linking ➔ **Internet: .../vppm**

Proportional valves

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Type	Valve function	Pneumatic connection 1	Pressure regulation range	Standard nominal flow rate	Description
Proportional directional control valve VPWP 	5/3-way proportional directional control valve, closed	G1/4, G1/8		350 ... 1,400 l/min	• Regulated piston spool valve • Digital actuation • Integrated pressure sensors for monitoring function and force control • With auto identification • Diagnostic function • Integrated digital output, e.g. for a clamping/brake unit • Suitable for servopneumatic applications with CPX-CMAX and CPX-CMPX ➔ **Internet: .../vpwp**
Proportional pressure regulator VPPE 	3-way proportional pressure regulator, 3-way proportional pressure regulator, closed	G1/8	0.02 ... 10 bar	310 ... 1,250 l/min	• Pilot-actuated diaphragm regulator • Setpoint input as analogue voltage signal • Electrical connection via M12x1 plug, 4-pin • Available with setpoint module ➔ **Internet: .../vppe**
Proportional pressure regulator MPPE 	3-way proportional pressure regulator, closed	G1/8, G1/4, G1/2	0 ... 10 bar		• Pilot actuated piston regulator • Setpoint value input as analogue voltage or current signal • Pressure regulation ranges can be selected • Electrical connection via plug, round design to DIN 45326, M16 x 0.75, 8-pin • Available with setpoint module • See product documentation on our website for standard nominal flow rate ➔ **Internet: .../mppe**
Proportional pressure regulator MPPES 	3-way proportional pressure regulator, closed	G1/4, G1/8, G1/2	0 ... 10 bar		• Directly actuated or pilot actuated piston regulator • Setpoint value input as analogue voltage or current signal • Pressure regulation ranges can be selected, individual pressure regulation ranges on request • Electrical connection via plug, round design to DIN 45326, M16 x 0.75, 8-pin • Available with setpoint module • See product documentation on our website for standard nominal flow rate ➔ **Internet: .../mppes**
Proportional directional control valve MPYE 	5/3-way, closed	G1/8, G1/4, G3/8, M5		100 ... 2,000 l/min	• Regulated piston spool valve • Analogue actuation • Setpoint input as voltage signal (0 ... 10 V) • Suitable for servopneumatic applications with SPC200 and SPC11 ➔ **Internet: .../mpye**

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Process/media valves

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Type	Design	Valve function	Standard nominal flow rate	Flow rate Kv	Connection, process valve	Actuation type	Description
Ball valve VAPB 	2-way ball valve			5.9 ... 1,414 m3/h	NPT1, NPT1 1/2, NPT1 1/4, NPT1/2, NPT1/4, NPT2, NPT2 1/2, NPT3, NPT3/4, NPT3/8, NPT4, Rp1, Rp1 1/2, Rp1 1/4, Rp1/2, Rp1/4, Rp2, Rp2 1/2, Rp3, Rp3/4, Rp3/8, Rp4	Mechanical	• 2-way on-off valve • Brass design • Mechanically actuated • Manual actuation via accessories • Connecting thread to DIN 2999 • Mounting flange to ISO 5211 • Centring attachment for simple automation ➔ **Internet: .../vapb**
Ball valve VZBA 	3-way ball valve, L-hole, T-hole			4.5 ... 100 m3/h	Rp1, Rp1 1/2, Rp1 1/4, Rp1/2, Rp1/4, Rp2, Rp3/4, Rp3/8	Mechanical	• 3-way on-off valve • Stainless steel design • Mechanically actuated • Manual actuation via accessories • Connecting thread to DIN 2999 • Mounting flange to ISO 5211 • Centring attachment for simple automation ➔ **Internet: .../vzba**
Ball valve VZPR 	2-way ball valve, Semi-rotary drive	2/2-way			Rp1, Rp1 1/2, Rp1 1/4, Rp1/2, Rp1/4, Rp2, Rp2 1/2, Rp3/4, Rp3/8	Electric, Pneumatic	• Pneumatic quarter-turn actuator, double-acting and 2-way on-off valve • Flow is fully opened or closed in both directions • Brass or stainless steel design • Port pattern as per NAMUR to VDE/VDI 3845 ➔ **Internet: .../vzpr**
Solenoid valve VZWM 	Diaphragm valve	2/2-way, closed, single solenoid	1,400 ... 31,000 l/min	1.6 ... 39 m3/h	G1, G1 1/2, G1 1/4, G1/2, G1/4, G2, G3/4, G3/8	Electric	• Diaphragm valve • Indirectly actuated • Brass or special steel casting design • Wide range of coils • Electrical connection via solenoid armature tube system 8 or 13 • Voltage 24 V DC 110, 230 V AC ➔ **Internet: .../vzwm-l**

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Process/media valves

Type	Design	Valve function	Standard nominal flow rate	Flow rate Kv	Connection, process valve	Actuation type	Description
Solenoid valve MN1H-2, MN1H 	Diaphragm valve	2/2-way, single solenoid	2,000 ... 30,500 l/min		G1, G1 1/2, G1/2, G1/4, G3/4, G3/8	Electric	• Poppet valve • Brass design • Adjustable closing cushioning • In-line mounting or via through-holes • Operating voltage 24 V DC, 110/230 V AC (50 ... 60 Hz) • Electrical connection via plug, square design to EN 175301-803, type A → **Internet: .../mn1h-2**
Pneumatic valve VLX 	Diaphragm valve	2/2-way, single solenoid	2,400 ... 14,000 l/min		G1/2, G1/4, G2, G3/4, G3/8	Pneumatic	• Poppet valve • Indirectly actuated • Brass design • In-line mounting or via through-holes → **Internet: .../vlx**

Pneumatic control systems

Type		Description
M5 Compact System MUFH, MFH, JMFH, VL/O, J, VL, JD, VZ, VZO, OS, ZK, GRF, PE, VPE, PEN, PZA, PZV, PZVT 		• Complete system offering control components with all the functions required for pneumatic sequence controls • Solenoid and pneumatic valves • Time delay valves • Logic components • One-way flow control valves • Pressure switch • Pneumatic counters • Pneumatic timers • For control cabinet installation • Fast replacement of components → **Internet: .../m5-compact**
Quickstepper and commander FSS, FSSC 		• Quickstepper: pneumatic-mechanical sequencer with 12 steps and start logic circuits; ready-to-install sequence controller; acknowledgement-controlled motion sequences • Commander: command module for use with Quickstepper, including the most important functions for pneumatic sequencers → **Internet: .../fss**
Control block for two-hand start ZSB 		• Standard nominal flow rate ›50 l/min • Nominal size: 4 mm • Pneumatic connection: G1/8 • Safety component in accordance with EU Machinery Directive • Poppet valve • Mounting thread or through-holes in housing → **Internet: .../zsb**

Pneumatic control systems

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Type		Description
Counter PZA, PZV 		• Mechanical counter with pneumatic drive • Through-holes in housing or front panel mounting • Reset via pushbutton or pneumatic signal • Available with protective cap ➔ **Internet: .../pza**
Timer PZVT 		• Mechanical sequence counter with pneumatic drive • Adjustable delay time • Front panel mounting • Mounting on G or H rails • Available with protective cap ➔ **Internet: .../pzvt**

Standards-based valve terminals

FESTO

Type	Standard nominal flow rate	Max. number of valve positions	Electrical control	Protection class	Description
Valve terminal type 16 VTIA 	400 ... 1,000 l/min	16	Individual connection	IP65, NEMA 4	• Modular sub-base valves to ISO 15407-1 • Integration of innovative function modules possible: pressure regulator plate, flow control plate, vertical pressure shut-off plate, vertical supply plate • Vertical supply plates permit a flexible air supply and variable pressure zones • Large operating voltage range from 12 V DC ... 230 V AC • Electrical connection via central plug or pilot interface to ISO 15218 ➔ **Internet: .../vtia**
Valve terminal type 44 VTSA 	400 ... 2,900 l/min	32	Ethernet, Fieldbus, Multi-pin plug, Integrated controller	IP65, NEMA 4	• ISO 15407-2/ISO 5599-2 • High-performance valves in sturdy metal housing • Valve widths 18, 26, 42 and 52 mm can be combined on a single terminal without adapter • Supply plates enable a flexible air supply and variable pressure zones • Individual connection, fieldbus connection via CPX, multi-pin plug connection with pre-assembled cable or terminal strip, control block via CPX, AS-interface ➔ **Internet: .../vtsa**

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Universal valve terminals

Type	Standard nominal flow rate	Max. number of valve positions	Electrical control	Protection class	Description
Valve terminal type 32 MPA 	0 ... 700 l/min	64	Fieldbus, Multi-pin plug, Integrated controller, CPI installation system	IP65	• Slim high-performance valves in sturdy metal housing • Supply plates facilitate the creation of multiple pressure zones as well as numerous additional exhaust and supply ports • Multi-pin plug, AS-interface, CPI, fieldbus connections and control block • Terminal with CPX, available with integrated controllable pressure regulator, pressure sensors, diagnostics, electrical voltage zones ➔ **Internet: .../mpa**

Universal valve terminals

FESTO

Type	Standard nominal flow rate	Max. number of valve positions	Electrical control	Protection class	Description
Valve terminal type 33 MPAF 	0 ... 900 l/min	64	Fieldbus, Multi-pin plug, Integrated controller	IP65	• MPA sub-base valves • Manifold blocks, tubing connections and exhausts designed for optimum flow rates • Supply plates facilitate the creation of multiple pressure zones as well as numerous additional exhaust and supply ports • Valve width 10, 20 mm • Multi-pin, fieldbus connection and control block • Terminal with CPX, optionally available with pressure sensors, diagnostics, electrical voltage zones → **Internet: .../mpaf**
Valve terminal type 45 VTSA-F 	700 ... 1,400 l/min	32	Fieldbus, Multi-pin plug	IP65, NEMA 4	• High-performance valves in sturdy metal housing • Valve widths 18 and 26 mm can be combined on a single terminal without adapter • Individual connection, fieldbus connection via CPX, multi-pin plug connection with pre-assembled cable or terminal strip, control block via CPX, AS-interface • One valve series for a wide range of flow rates • Supply plates facilitate the creation of multiple pressure zones as well as numerous additional exhaust and supply ports → **Internet: .../vtsa-f**
Valve terminal type 10 CPV 	0 ... 1,600 l/min	8	AS-interface, CP installation system, Individual connection, Fieldbus, Multi-pin plug	IP65	• Compact Performance: cubic design for exceptional performance and low weight • Integrated diagnostics, condition monitoring (Fieldbus Direct) • Electrical connection via multi-pin plug, AS-interface, CP/CPI installation system, Fieldbus Direct, individual connection/ET200X/ET200pro • Highly flexible thanks to numerous valve variants, different pressure ranges, vacuum ejectors → **Internet: .../cpv**
Valve terminal type 12 CPA 	300 ... 600 l/min	22	AS-interface, Individual connection, Fieldbus, Multi-pin plug	IP65	• Compact Performance: compact valves in sturdy metal housing • Patented electrical linking system for flexible expansion options • Electrical connection technology: individual, multi-pin plug, AS-interface, fieldbus, CPX terminal connection • High pressure range • Wide range of valve functions • Multiple pressure zones → **Internet: .../cpa**

Universal valve terminals

FESTO

Type	Standard nominal flow rate	Max. number of valve positions	Electrical control	Protection class	Description
Valve terminal type 80, Smart Cubic CPV-SC 	170 l/min	16	Individual connection, Fieldbus, Multi-pin plug	IP40	• Smart Cubic: compact valve terminal for a wide range of pneumatic applications • Ideally suited for operating small pneumatic drives in tight spaces • Suitable for direct mounting even on moving system components • Electrical connection via individual valve connection, Sub-D plug, flat cable or fieldbus connection via DeviceNet/Profibus DP (direct integration or CPI) ➔ **Internet: .../cpv-sc**
Valve terminal type 82, Smart Cubic CPA-SC 	120 ... 180 l/min	20 ... 24	Individual connection, Fieldbus, Multi-pin plug	IP40	• Smart Cubic: compact valve terminal for a wide range of pneumatic applications • Wide range of selectable valve functions, e.g. for customised pressure supplies or vacuum application solutions • Valve width 10 mm • Electrical connection via individual valve connection, multi-pin plug connection or fieldbus connection via Fieldbus Direct ➔ **Internet: .../cpa-sc**
Valve terminal type 24 VTUB 	200 ... 1,000 l/min	16	Individual connection, Multi-pin plug	IP65	• Durable thanks to tried-and-tested piston spool valves • Sturdy thanks to the polymer housing and metal manifold rail • Two pressure zones (additional zones on request) • Individual valve or multi-pin plug connection • Large operating voltage range from 12 V DC ... 230 V AC ➔ **Internet: .../vtub**
Valve terminal type 23 VTUB-12 	400 l/min	35	Multi-pin plug	IP65	• Use in dusty environments • Pneumatic distributor integrated on the valve terminal • Sturdy thanks to the polymer housing and metal manifold rail • The flexibility of the pneumatic working lines provides a practical solution to different requirements • Valve width 12 mm • Electrical multi-pin plug connection ➔ **Internet: .../vtub-12**

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Application-specific valve terminals

FESTO

Type	Standard nominal flow rate	Max. number of valve positions	Electrical control	Protection class	Description
Valve terminal MH1 	10 l/min	24	Individual connection, Multi-pin plug	IP40	• Extremely miniaturised and fast switching valves • Individual sub-base, manifold assembly and PCB mounting • Individual connection, electrical multi-pin or pneumatic multiple connector plate • Operating voltage 5, 12, 24 V DC ➔ **Internet: .../mh1**
Valve terminal type 15, Clean Design CDVI 	300 ... 650 l/min	16	Fieldbus, Multi-pin plug	IP65, IP66, IP67, NEMA 4	• Hygienic, corrosion-resistant and easy to clean • Modular configuration in basic blocks for 4 or 8 valves • Valve width 24 mm • Multi-pin plug and fieldbus connection • Additional valve terminals and I/O modules can be connected via CP string extension • Up to 9 electrical voltage zones • Up to 9 pneumatic pressure zones ➔ **Internet: .../cdvi**
Valve terminal type 84 VTOC 	10 l/min	24	Multi-pin plug	IP40	• Sturdy thanks to polymer housing and metal manifold rail • Valve width 10 mm • Multi-pin plug connection • Operating voltage 24 V DC ➔ **Internet: .../vtoc**

Electrical peripherals

Type	Max. number of inputs	Max. number of outputs	Number of module positions	Electrical control	Description
Electrical terminal CPX 	Digital 512, Analogue 32	Digital 512, Analogue 18	Max. 9 electric input/output modules	Fieldbus, Integrated controller	• Centralised, decentralised, hybrid installation system with maximum modularity and flexibility • IP65 and IP67 or IP20 • Choice of plastic or metal housing with individual linking • Open to common fieldbus protocols and Ethernet • Integrated diagnostic and service function • Operating modes: stand-alone as remote I/O or with valve terminals type 12 CPA, type 32 MPA, type 44/45 VTSA/VTSA-F ➔ **Internet: .../cpx**

Electrical peripherals

FESTO

Type	Max. number of inputs	Max. number of outputs	Number of module positions	Electrical control	Description
Installation system CPI 	128	128	Max. 4 installation strings, Max. 4 CP modules per string	Fieldbus, Integrated controller	• Complete concept for decentralised machine and system structure • Combination of centralised and decentralised installation possible with electrical terminal CPX • Decentralised pneumatic components and sensors for fast processes • Centralised electrical components for fieldbus and common power supply • With valve terminal type 10 CPV, type 12 CPA, type 32 MPA, type 80 CPV-SC ➔ **Internet: .../ctec**
AS-interface® components ASI 	496	496		AS-interface	• Accessories for AS-interface installation system • Modules for actuation of individual valves ASI-EVA • Flat cable distributor ASI-KVT • Addressing device ASI-PRG-ADR • Compact I/O modules (IP65, IP67) • AS-interface power supply unit SVG.. ➔ **Internet: .../as-interface**

Control blocks

Type		Description
Control block CPX-FEC 		• Modular I/O system, up to 512 I/Os – full flexibility via CPX • Comprehensive solutions for diagnostics and condition monitoring • Stand-alone open and closed-loop control • Pre-processing with all common fieldbus/Ethernet protocols (remote control) – fast, stand-alone processes on site ➔ **Internet: .../cpx-fec**
Control block CPX-CEC 		• Modular I/O system, up to 512 I/Os, CAN master functionality – full flexibility via CPX • Comprehensive solutions for diagnostics and condition monitoring – thanks to special CoDeSys function library • Stand-alone open and closed-loop control • Pre-processing with all common fieldbus/Ethernet protocols (remote control) – fast, stand-alone processes on site ➔ **Internet: .../cpx-cec**

Software tool

Configurator

Compile 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.

The configurator is part of the electronic catalogue and is not available as a separate software program.

Proximity sensors, for T-slot

Type	Electrical connection	Operating voltage range DC	Switching element function	Switching output	Description
Proximity sensor SME-8, SME-8M, SME-8-SL 	2-wire, 3-wire, 3-pin, Cable, Cable with plug, M5x0.5, M8x1, Plug, Rotatable thread	0 ... 250 V	N/O contact, N/C contact	Contacting, Contacting, bipolar, Without LED function	• Method of measurement: magnetic reed • Screw-clamped or clamped in slot, insertable from above or lengthwise from end • Electrical connection via open cable end, plug M5, M8, M12 • Cable length 0.3, 2.5, 5, 7.5, 0.2 ... 10 m • Two-wire and three-wire design • Suitable for use with energy chains and robots • SME-8-...-S6: heat-resistant design → **Internet: .../sme-8**
Proximity sensor SMT-8, SMT-8G, SMT-8M, SMT-8-SL, CRSMT-8 	2-wire, 3-wire, 3-pin, Cable, Cable with plug, M12x1, M5x0.5, M8x1, Plug, Rotatable thread	5 ... 30 V	Namur, N/O contact, N/C contact	NPN, Namur, PNP, PNP/NPN, Non-contacting, 2-wire	• Method of measurement: magneto-resistive • Screw-clamped or clamped in slot, insertable from above or from end • Electrical connection via open cable end, plug M5, M8, M12 • Cable length 0.3, 2.5, 5, 7.5, 0.2 ... 30 m • Two-wire and three-wire design • Selected types acc. to ATEX Directive for explosive atmospheres • CRSMT-8: corrosion and acid-resistant design • Suitable for use with energy chains and robots → **Internet: .../smt-8**

Proximity sensors, for T-slot

FESTO

Type	Electrical connection	Operating voltage range DC	Switching element function	Switching output	Description
Proximity sensor SMEO-8 	2-wire, 3-wire, 3-pin, Cable, M12x1, M8x1, Plug	0 ... 250 V	N/O contact	Contacting, Contacting, bipolar, Without LED function	• Sturdy sensor in block design • Measuring principle: magnetic reed • Electrical connection via open cable end, plug M8, M12 • Cable length 2.5 m • Plug integrated in housing • LED switching status display ➔ **Internet: .../smeo-8**
Proximity sensor SMTO-8, SMTSO-8 	3-wire, 3-pin, Cable, M12x1, M8x1, Plug	10 ... 30 V	N/O contact	NPN, PNP	• Sturdy sensor in block design • Measuring principle: magneto-resistive • Electrical connection via plug M8, M12 • Plug integrated in housing • LED switching status display • SMTSO-8: welding field resistant design ➔ **Internet: .../smto-8**
Proximity sensor SMPO-8E 					• Pneumatic proximity sensor • Measuring principle: magnetic • Pneumatic connection via female thread M5 • Optical switching status display ➔ **Internet: .../smpo**

Proximity sensors, for C-slot

Type	Electrical connection	Operating voltage range DC	Switching element function	Switching output	Description
Proximity sensor SME-10, SME-10F 	2-wire, 3-wire, 3-pin, Cable, Cable with plug, M5x0.5, M8x1, Plug, Rotatable thread	0 ... 250 V	N/O contact, N/C contact	Contacting, Contacting, bipolar, Without LED function	• Measuring principle: magnetic reed • Clamped in C-slot, insertable from above or from end • Electrical connection via open cable end, plug M5, M8 • Cable length 0.3, 2.5 m • Two-wire and three-wire design ➔ **Internet: .../sme-10**
Proximity sensor SMT-10, SMT-10F, SMT-10G 	2-wire, 3-wire, 3-pin, Cable, Cable with plug, M12x1, M5x0.5, M8x1, Plug, Rotatable thread	5 ... 30 V	Namur, N/O contact, N/C contact	NPN, Namur, PNP, PNP/NPN, Non-contacting, 2-wire	• Measuring principle: magneto-resistive • Clamped in C-slot, insertable from above or from end • Cable length 0.3, 2.5 m • Electrical connection via open cable end, plug M5, M8 • Two-wire and three-wire design ➔ **Internet: .../smt-10**

Proximity sensors, round design

FESTO

Type	Electrical connection	Operating voltage range DC	Switching element function	Switching output	Description
Proximity sensor SMEO-4U, CRSMEO-4 	2-wire, 3-wire, 3-pin, Cable, M12x1, M8x1, Plug	0 ... 250 V	N/O contact	Contacting, Contacting, bipolar, Without LED function	• Measuring principle: magnetic reed • Electrical connection via open cable end, plug M8 • Cable length 2.5, 5 m • Two-wire and three-wire design • CRSMEO-4: corrosion-resistant design ➔ **Internet: .../smeo-4**
Proximity sensor SMTO-4U 	3-wire, 3-pin, Cable, M12x1, M8x1, Plug	10 ... 30 V	N/O contact	NPN, PNP	• Measuring principle: magneto-inductive • Electrical connection via open cable end, plug M8 • Cable length 2.5 m • Three-wire design ➔ **Internet: .../smto-4**

Proximity sensors, block design

Type	Electrical connection	Operating voltage range DC	Switching element function	Switching output	Description
Proximity sensor SMEO-1 	2-wire, 3-wire, 3-pin, Cable, M12x1, M8x1, Plug	0 ... 250 V	N/O contact	Contacting, Contacting, bipolar, Without LED function	• Measuring principle: magnetic reed • Electrical connection via open cable end, plug M8 • Cable length 2.5, 5 m • Two-wire and three-wire design • SMEO-1-S6: heat-resistant design • LED switching status display ➔ **Internet: .../smeo-1**
Proximity sensor SMTO-1, SMTSO-1 	3-wire, 3-pin, Cable, M12x1, M8x1, Plug	10 ... 30 V	N/O contact	NPN, PNP	• Measuring principle: magneto-resistive • Cable length 2.5 m • Electrical connection via open cable end, plug M8, M12 • Three-wire design • SMTSO-1: welding field resistant design • LED switching status display ➔ **Internet: .../smto-1**
Proximity sensor SMTO-6 	3-wire, 3-pin, Cable, M12x1, M8x1, Plug	10 ... 30 V	N/O contact	NPN, PNP	• Measuring principle: magneto-inductive • Electrical connection via plug M12 • LED switching status display ➔ **Internet: .../smto-6**

Proximity sensors, block design

FESTO

Type	Electrical connection	Operating voltage range DC	Switching element function	Switching output	Description
Proximity sensor SMPO-1 					• 3/2-way valve, normally closed • Pneumatic proximity sensor • Measuring principle: magnetic • Pneumatic connection via barbed fitting for tubing I.D. 3 mm • Optical switching status display ➔ **Internet: .../smpo**
Proximity sensor SMT-C1 	2-wire, 3-wire, 3-pin, Cable, Cable with plug, M12x1, M5x0.5, M8x1, Plug, Rotatable thread	5 ... 30 V	Namur, N/O contact, N/C contact	NPN, Namur, PNP, PNP/NPN, Non-contacting, 2-wire	• Measuring principle: inductive • Electrical connection via open cable end • Three-wire design • LED switching status display • For standard cylinders CDN-...-R with sensor strip ➔ **Internet: .../smt-c1**

Position sensors

Type	Design	Position measuring range	Analogue output	Electrical connection	Description
Position transmitter SMAT-8E, SMAT-8M 	For T-slot	40 ... 52 mm	0 - 10 V, 0 - 20 mA	4-pin, M8x1, Plug, Cable with plug, Rotatable thread	• Measuring principle: magnetic • Screw-clamped or clamped in slot, insertable from above or lengthwise from end • Integrated out-of-range sensor • LED status display ➔ **Internet: .../smat**
Position sensor SMH-S1 	For gripper			4-pin, Cable with plug, M8x1	• Method of measurement: magnetic Hall • For grippers • Freely selectable switching points • Three gripper positions can be detected using an evaluation unit ➔ **Internet: .../smh**

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Signal converters

Type	Signal range	Switching output	Switching function	Electrical connection, output	Electrical connection, input	Description
Signal converter SVE4 	0 - 10 V +/-0.3 V, 0 - 20 mA +/-0.6 mA, Adapted for position sensors SMH-S1-HG	2xNPN, 2xPNP	Freely programmable	4-pin, M8x1, Plug, To EN 60947-5-2	4-pin, Socket, M8x1, To EN 60947-5-2	• Converts analogue signals into switching points • Switching function freely programmable with teach-in • Threshold value, hysteresis or window comparator • Mounting directly on H-rail or via adapter plate • LED switching status display • Certification: cULus listed (OL), C-Tick ➔ **Internet: .../sve4**

Signal converters

Type	Signal range	Switching output	Switching function	Electrical connection, output	Electrical connection, input	Description
Evaluation unit SMH-AE 		NPN, PNP		5-pin, Plug, M12x1	4-pin, Socket, M8x1, to EN 60947-5-2	• Electronic evaluation unit for Hall sensor SMH-S1 • Amplifies the signal from the sensor • With 3 potentiometers for setting 3 switching points • LED operating and switching status display ➔ **Internet: .../smh-ae**

Pressure and vacuum sensors

Type	Pressure measuring range	Switching element function	Pneumatic connection	Electrical connection	Display type	Description
Pressure and vacuum switch PEV, VPEV 	-1 ... 10 bar	Changeover switch	G1/4, G1/8, M5	4-pin, Type A, M12x1, M8x1, Screw terminal, Plug, To DIN 43650, To EN 60947-5-2, Round design, Square design		• Mechanical pressure and vacuum switch • Adjustable switching point • Screw-in, via through-holes or via H-rail • Visual scale for pressure adjustment • Certification: CCC ➔ **Internet: .../pev**
PE converter PEN, PE, VPE 	-1 ... 8 bar	N/O contact, Changeover switch	G1/8, M5	3 connecting wires, 3-wire, 4-wire, Cable, Screw terminal		• Pneumatic/electric differential pressure switch • Pneumatic/electric pressure transducer • Design for vacuum • Mounting on mounting frame 2N • Splash-proof design • Certification: CCC ➔ **Internet: .../pen**
Pressure sensor SDE5 	-1 ... 10 bar	N/O contact, Switchable, N/C contact	QS-1/4, QS-4, QS-6, QS-5/32 inch, QS-1/4 inch	3-wire, 3-pin, Cable, M8x1, Plug, To EN 60947-5-2, Round design		• Programmable and configurable pressure switch for simple pressure sensing tasks • Trigger/window comparator • Teach-in function for programming • Integrated microprocessor • Switching status indicated by an LED visible from all sides • Certification: cULus listed (OL), C-Tick ➔ **Internet: .../sde5**

Pressure and vacuum sensors

FESTO

Type	Pressure measuring range	Switching element function	Pneumatic connection	Electrical connection	Display type	Description
Pressure sensor SDE3 	-1 ... 10 bar	Switchable	QS-4, QS-5/32 inch, QS-1/4 inch	4-pin, 5-pin, Cable, Cable with plug, M12x1, M8x1, Plug, To EN 60947-5-2, Round design	Illuminated LCD	• Five pressure measuring ranges • Measurement of relative or differential pressure or 2 independent pressure inputs • Switching output 2x PNP or 2x NPN • Numerical and graphical pressure display • Via H-rail, via wall/surface bracket, front panel mounting, via through-holes • Certification: C-Tick, Atex, c UL us - Listed (OL) ➔ **Internet: .../sde3**
Pressure sensor SDE1 	-1 ... 10 bar	Switchable	G1/8, QS-4, R1/4, R1/8	3-pin, 4-pin, 5-pin, Cable with plug, M12x1, M8x1, Plug, To EN 60947-5-2, Round design	Illuminated LCD, Back illuminated LCD	• Five pressure measuring ranges • Measurement of relative or differential pressure • Switching outputs PNP, NPN and with analogue current or voltage output • LCD or illuminated LCD display • Via H-rail, via wall/surface bracket, mounting on service unit, front panel mounting • Certification: cULus listed (OL), C-Tick ➔ **Internet: .../sde1**
Pressure sensor SPAB 	-1 ... 10 bar	Switchable	Male thread G1/8, Male thread NPT1/8-27, Male thread R1/8, Female thread M5	4-wire, 4-pin, Cable, M8x1, Plug, To EN 60947-5-2, Round design	Illuminated LCD, multi-colour	• Relative pressure measurement • Switching output PNP, NPN and analogue output • Two-part, multi-coloured display • Simple commissioning thanks to intuitive operation • Compact design 30x30 mm • Certification: cULus listed (OL), C-Tick ➔ **Internet: .../spab**
Pressure sensor SDET 	-1 ... 100 bar		G1/4	4-pin, M12x1, Plug, To EN 60947-5-2, Round design		• Eight pressure measuring ranges • Analogue output 0.1 ... 10 V or 4 ... 20 mA • Relative pressure measurement • Resistant to water and oils • Pressure monitoring of gaseous and liquid media • Pipe clamp included in scope of delivery ➔ **Internet: .../sdet**

Flow sensors

FESTO

Type	Flow measuring range	Operating medium	Operating pressure	Pneumatic connection	Electrical connection	Description
Flow sensor SFE3 	0.05 ... 50 l/min	G5: nitrogen, L83: air quality class 3:6:2 to DIN ISO 8573-1	-0.7 ... 7 bar	Female thread G1/8, QS-6	Cable	• Flow sensor with integrated digital display • With unidirectional flow input • Mounting: via through-holes or mounting bracket • Electrical connection via open cable end • Cable length 1 m • Certification: C-Tick ➔ **Internet: .../sfe3**
Flow sensor SFAB 	0.1 ... 1,000 l/min	G5: nitrogen, L78: air quality class 3:4:1 to DIN ISO 8573-1, L81: air quality class 5:4:3 to DIN ISO 8573-1	0 ... 10 bar	QS-1/4, QS-10, QS-12, QS-3/8, QS-5/16, QS-6, QS-8	5-pin, M12x1, Straight plug	• Flow sensor with integrated digital display • With unidirectional flow input • Mounting: H-rail mounting, wall or surface mounting • Certification: C-Tick ➔ **Internet: .../sfab**
Flow sensor SFET-F, SFET-R 	-0.05 ... 50 l/min	G5: nitrogen, L83: air quality class 3:6:2 to DIN ISO 8573-1	-0.7 ... 7 bar	Female thread G1/8, QS-4, QS-6	Cable	• With unidirectional (SFET-F) or bidirectional (SFET-R) flow input • Mounting: via through-holes or mounting bracket • Electrical connection via open cable end • Cable length 1, 3 m • Certification: C-Tick ➔ **Internet: .../sfet**
Flow sensor SFAM 	10 ... 5,000 l/min	G5: nitrogen, L81: air quality class 5:4:3 to DIN ISO 8573-1	0 ... 16 bar	Manifold module, G1/2, NPT1/2-14	5-pin, M12x1, Straight plug	• Stand-alone device or combined with MS series service units • Supplies absolute flow information and accumulated air consumption measurement • Covers large measuring range with specified accuracy thanks to highly dynamic response • Large, illuminated LCD display ➔ **Internet: .../sfam**

Inductive sensors

FESTO

Type	Size	Switching output	Switching element function	Electrical connection	Operating voltage range DC	Description
Proximity sensor SIEN 	4 mm, 6.5 mm, M12, M12x1, M18, M18x1, M30, M30x1.5, M5x 0.5, M8x1	NPN, PNP	N/O contact, N/C contact	3-wire, 3-pin, Cable, M12x1, M8x1, Plug	10 ... 30 V	• With standard switching distance • For DC voltage • Round design • Metric thread • Flush or non-flush mounting • With switching status display • Design with metal housing • Design with polyamide housing ➔ **Internet: .../sien**
Proximity sensor SIED 	M12, M18, M30	Non-contacting, 2-wire	N/O contact, N/C contact	2-wire, 2-pin, Cable, M12x1, Plug	10 ... 320 V	• With standard switching distance • For DC and AC voltage • Metric thread • Flush or non-flush mounting • With switching status display • Design with metal or polyamide housing ➔ **Internet: .../sied**
Proximity sensor SIES 	12x26x40 mm, 15x20x30 mm, 40x40x120 mm, 5x5x25 mm, 8x8x40 mm	NPN, PNP	Antivalent, N/O contact, N/C contact	3-wire, 3-pin, Cable, Cable with plug, M8x1, Screw terminal, Plug, Rotatable thread	10 ... 30 V	• Block-shaped design • Flush mounting • With switching status display ➔ **Internet: .../sies**
Proximity sensor SIEH 	3 mm, M12, M18	NPN, PNP	N/O contact, N/C contact	3-wire, 3-pin, Cable, Cable with plug, M12x1, M8x1, Plug	10 ... 30 V	• With increased switching distance • Flush mounting • Metric thread • With switching status display • Design with stainless steel housing ➔ **Internet: .../sieh**
Proximity sensor SIEA 	M8, M12, M18, M30			3-pin, 4-pin, M12x1, M8x1, Plug	15 ... 30 V	• With analogue output • Flush mounting • Metric thread ➔ **Internet: .../siea**
Proximity sensor SIEF 	40x40x65 mm, M8, M12, M18, M30	NPN, PNP	Antivalent, N/O contact	3-wire, 3-pin, 4-pin, Fixcon, Cable, M12x1, M8x1, Plug	10 ... 30 V	• Reduction factor 1 for all metals • Welding field immune • Flush, partially flush or non-flush mounting • With switching status display • Design with housing resistant to welding spatter ➔ **Internet: .../sief**

Inductive sensors

Type	Size	Switching output	Switching element function	Electrical connection	Operating voltage range DC	Description
Proximity sensor SIES-8M 	T-slot	NPN, PNP	N/O contact, N/C contact	3-wire, 3-pin, Cable, Cable with plug, M8x1, Rotatable thread	10 ... 30 V	• Suitable for position sensing for electric axes EGC and grippers with T-slot • With 2 LEDs for better visibility • Flush mounting → **Internet: .../sies-8m**

Opto-electrical sensors

Type	Method of measurement	Range	Size	Type of light	Switching output	Description
Opto-electronic sensor SOEG 	Distance sensor, Through-beam sensor, Receiver, Fibre-optic unit, Retro-reflective sensor, Diffuse sensor, Background suppression sensor, Transmitter, For transparent objects	0 ... 20,000 mm	20x32x12 mm, 30x30x15 mm, 4 mm, 50x50x17 mm, M12, M12x1, M18, M18x1, M5x0.5	Infrared, Red, Red polarised	NPN, PNP	• Variants: diffuse sensor standard, with cylindrical light beam or with background suppression, laser retro-reflective sensor also for transparent objects, through-beam sensor, fibre-optic unit, distance sensor • Round design, block design • Setting option: potentiometer, teach-in • Electrical connection via open cable end or plug → **Internet: .../soeg**
Opto-electronic sensor SOEL 	Distance sensor, Retro-reflective sensor, Diffuse sensor, Background suppression sensor	0 ... 20,000 mm	20x32x12 mm, 50x50x17 mm	Laser, Red, Red polarised	NPN, PNP	• Laser sensor • Variants: diffuse sensor as contrast sensor also with background suppression, retro-reflective sensor, distance sensor • Setting option: teach-in, potentiometer • Electrical connection via open cable end or plug → **Internet: .../soel**
Colour sensor SOEC 	Colour sensor	12 ... 32 mm	50x50x17 mm	White	PNP	• Diffuse sensor • Block design • Setting option: teach-in • Electrical connection via M12x1 plug, 8-pin • Display via 7 LEDs → **Internet: .../soec**

Opto-electrical sensors

FESTO

Type	Method of measurement	Range	Size	Type of light	Switching output	Description
Fibre-optic cable SOE4, SOOC 	Through-beam sensor, Fixed focus, Fork light barrier, Fibre-optic unit, Diffuse sensor	2 ... 650 mm		Red	NPN, PNP	• Use for precise and space-saving position sensing in electronics and light assembly • Operational with accessory fibre-optic cable SOOC • Variants: LED display, switching and analogue output • Setting option: teach-in • Four operating modes: standard, fine mode, fast mode, long-distance mode • H-rail mounting or via through-holes • With protection against mutual interference ➔ **Internet: .../soe4**
Fork light barrier SOOF 	Fork light barrier		Fork 120x60 mm, Fork 30x35 mm, Fork 50x55 mm, Fork 80x55 mm	Red	NPN, PNP	• Through-beam sensor with minimal installation effort • Design: polymer or metal • Sturdy housing: high shock and vibration resistance • Protection class IP67 • Electrical connection via M8x1 plug, 3-pin • Setting option: potentiometer or teach-in • LED displays ➔ **Internet: .../soof**

Air gap sensors

Type	Sensing range	Operating pressure	Display type	Operating medium	Description
Air gap sensor SOPA 	20 ... 200 µm	4 ... 7 bar	Illuminated LCD, multi-colour	LX3: filtered compressed air, grade of filtration 40 µm, lubricated or unlubricated	• Convenient solution for high-precision contact and distance monitoring • Setting option: teach-in or numerical setting using three buttons • Integrated air jet function • Multi-coloured LCD display • H-rail, wall mounting, via through-holes • Certification: C-Tick ➔ **Internet: .../sopa**

Function monitoring

Type	Sensor resolution	Working distance	Field of vision	Exposure time	Description
Compact Vision System SBOC-M 	640 x 480 pixels (VGA)	Depends on the lens chosen	Depends on the lens chosen	4... 1,000,000 µs	• High-speed camera for diagnostics and commissioning as well as for function monitoring of fast motion sequences • Recording and storage electronics integrated in the camera • For standard lens with C mount connection • Several cameras can be networked via Ethernet • Compact dimensions, low weight ➔ **Internet: .../sboc-m**
Compact Vision System SBOI-M 	640 x 480 pixels (VGA)	22 ... 1,000 mm	14 x 10 mm - 520 x 390 mm	40 ... 1,000,000 µs	• High-speed camera for diagnostics and commissioning as well as for function monitoring of fast motion sequences • Recording and storage electronics integrated in the camera • With integrated lens • Several cameras can be networked via Ethernet • Compact dimensions, low weight ➔ **Internet: .../sboi-m**

Position and quality inspection

Type	Sensor resolution	Max. number of test programs	Frame rate (full image)	Lens mount	Min. part length	Min. part diameter	Description
Compact Vision System SBOC-Q 	1,280 x 1,024 pixels (SXGA), 640 x 480 pixels (VGA), 752 x 480 pixels (WideVGA)	256	27 ... 185 fps	CS mount (C mount with lens protection tube)			• Intelligent field-based camera • For 2D quality inspection, position and rotary orientation sensing, reading of 1D and 2D codes, reading of optical characters (OCR) • Integrated full PLC (CoDeSys) • Ethernet and CAN for communicating with master controllers ➔ **Internet: .../sboc-q**
Compact Vision System SBOI-Q 	640 x 480 pixels (VGA), 752 x 480 pixels (WideVGA)	256	60 ... 185 fps	Integrated lens			• Intelligent field-based camera • For 2D quality inspection, position and rotary orientation sensing, reading of 1D and 2D codes, reading of optical characters (OCR) • Integrated full PLC (CoDeSys) • Ethernet and CAN for communicating with master controllers ➔ **Internet: .../sboi-q**

Position and quality inspection

FESTO

Type	Sensor resolution	Max. number of test programs	Frame rate (full image)	Lens mount	Min. part length	Min. part diameter	Description
Checkbox CHB 	512 pixels, 1024 pixels	48			3 mm	0.5 mm	• Intelligent, line-scan camera-based vision system • For orientation recognition and quality inspection of small moving parts • Available with conveyor unit and air ejector positions • Available with encoder connection • Teach-in function ➔ **Internet: .../chb**
Checkbox Compact CHB-C 	512 pixels, 1024 pixels	16			1 mm	0.5 mm	• Intelligent line-scan camera • For orientation recognition and quality inspection of small moving parts • Encoder connection • Teach-in function ➔ **Internet: .../chb-c**

Software tool

Air consumption

Calculate your system's air consumption quickly and conveniently. Simply enter all the drives and tubing and set the cycle times and working pressure to calculate the air consumption per minute and per day. Includes a feature for exporting the input table together with the result directly to Excel.

This tool can be found on the website under Support, Engineering software (in the menu on the left), Downloads for Windows or on the DVD under Selection and sizing.

Configurator

Design a product with numerous features reliably and quickly with the help of the configurator.
Select all the required product features step by step. The use of logic checks ensures that only correct configurations are available for selection.
A dynamic graphic generated on the basis of the configuration provides visual assistance in selecting the correct product features.

The configurator is part of the electronic catalogue and is not available as a separate software program.

Service units: D series, metal

Type	Pneumatic connection 1	Standard nominal flow rate	Pressure regulation range	Supply pressure 1	Grade of filtration	Description
Service unit FRC, FRCS 	G1, G1/2, G1/4, G1/8, G3/4, G3/8, M5, M7, QS-4, QS-6	80 ... 8,700 l/min	0.5 ... 12 bar	1 ... 16 bar	5 ... 40 µm	• Filter, regulator and lubricator functions in a single unit • High flow rate and highly efficient removal of contaminants • Good regulation characteristics with minimal pressure hysteresis • Setting values are secured by locking the rotary knob • Sizes: Micro, Mini, Midi, Maxi • Grid dimension 25, 40, 55, 66 mm → **Internet: .../frc**

Service units: D series, metal

FESTO

Type	Pneumatic connection 1	Standard nominal flow rate	Pressure regulation range	Supply pressure 1	Grade of filtration	Description
Service unit combination FRC-K 	G1/2, G1/4, G1/8, G3/4, G3/8	530 ... 8,200 l/min	0.5 ... 12 bar	1 ... 16 bar	40 µm	• Combination of filter regulator LFR, branching module FRM, lubricator LOE, on-off valve HE, HEE, soft-start valve HEL, mounting accessories • Sizes: Micro, Mini, Midi, Maxi ➔ **Internet: .../frc-*ka**
Service unit combination LFR-K, LFRS-K 	G1/2, G1/4, G1/8, G3/4, G3/8	575 ... 9,400 l/min	0.5 ... 12 bar	1 ... 16 bar	40 µm	• Combination of filter regulator LFR, LFRS, branching module FRM, on-off valve HE, HEE, soft-start valve HEL, mounting accessories • Sizes: Micro, Mini, Midi, Maxi ➔ **Internet: .../lfr-*ka**

Service units: D series, polymer

Type	Pneumatic connection 1	Standard nominal flow rate	Pressure regulation range	Supply pressure 1	Grade of filtration	Description
Service unit FRC-DB 	G1/4, G1/8	400 ... 650 l/min	0.5 ... 7 bar	1 ... 16 bar	5 ... 40 µm	• Filter, regulator and lubricator functions in a single unit • High flow rate and highly efficient removal of contaminants • Good regulation characteristics with minimal pressure hysteresis • Setting values are secured by means of the rotary knob with detent • With manual or semi-automatic condensate drain • Size: Mini ➔ **Internet: .../frc**

Service units: MS series

Type	Pneumatic connection 1	Standard nominal flow rate	Pressure regulation range	Supply pressure 1	Grade of filtration	Description
Service unit MSB4-FRC, MSB6-FRC 	G1/8, G1/4, G3/8, G1/2	800 ... 4,800 l/min	0.3 ... 12 bar	1.5 ... 20 bar	5 ... 40 µm	• Sizes: 4, 6 • Filter, regulator and lubricator functions in a single unit • High flow rate and highly efficient removal of contaminants • Good regulation characteristics with minimal pressure hysteresis • Setting values are secured by locking the rotary knob ➔ **Internet: .../msb**

Service units: MS series

FESTO

Type	Pneumatic connection 1	Standard nominal flow rate	Pressure regulation range	Supply pressure 1	Grade of filtration	Description
Service unit combination MSB4, MSB6 	G1/8, G1/4, G1/2	600 ... 4,800 l/min	0.5 ... 12 bar	0.8 ... 18 bar	0.01 ... 40 µm	• Sizes: 4, 6 • Combination of filter regulator MS-LFR, filter MS-LF, fine and micro filter MS-LFM, activated carbon filter MS-LFX, pressure regulator MS-LR, MS-LRB, precision pressure regulator MS-LRP, MS-LRPB, electrical pressure regulator MS-LRE, lubricator MS-LOE, on-off valve MS-EM, MS-EE, soft-start valve MS-DL, MS-DE, soft-start/quick exhaust valve MS-SV, membrane air dryer MS-LDM1 → **Internet: .../msb***

Filter regulators: D series, metal

Type	Pneumatic connection 1	Standard nominal flow rate	Pressure regulation range	Supply pressure 1	Grade of filtration	Description
Filter regulator LFR, LFRS 	G1, G1/2, G1/4, G1/8, G3/4, G3/8, M5, M7, QS-4, QS-6	110 ... 1,200 l/min	0.5 ... 12 bar	1 ... 12 bar	5 ... 40 µm	• Space-saving design with filter and regulator in a single unit • Good particle separation and high flow rate • Good regulation characteristics with minimal hysteresis • Two pressure gauge connections for flexible installation • Setting values are secured by locking the rotary knob • With manual, semi-automatic or fully automatic condensate drain • Lockable rotary knob → **Internet: .../lfr**

Filter regulators: D series, polymer

Type	Pneumatic connection 1	Standard nominal flow rate	Pressure regulation range	Supply pressure 1	Grade of filtration	Description
Filter regulator LFR-DB 	G1/4, G1/8	500 ... 1,200 l/min	0.5 ... 12 bar	1.5 ... 10 bar	5 ... 40 µm	• Space-saving design with filter and regulator in a single unit • Good particle separation and high flow rate • Good regulation characteristics with minimal hysteresis • With manual or semi-automatic condensate drain • Setting values are secured by locking the rotary knob → **Internet: .../lfr**

Filter regulators: MS series

FESTO

Type	Pneumatic connection 1	Standard nominal flow rate	Pressure regulation range	Supply pressure 1	Grade of filtration	Description
Filter regulator MS4-LFR, MS6-LFR, MS12-LFR 	G1, G1 1/2, G1 1/4, G1/2, G1/4, G1/8, G3/8, G3/4, G2	850 ... 17,000 l/min	0.3 ... 16 bar	0.8 ... 20 bar	5 ... 40 µm	• Good regulation characteristics with low hysteresis and primary pressure compensation • Good particle and condensate separation • Available with or without secondary venting • High flow rates • MS4-LFR, MS6-LFR: directly actuated diaphragm regulator, MS12-LFR: pilot-actuated diaphragm regulator • Lockable rotary knob • Return flow option for exhausting from outlet port 2 to outlet port 1 already integrated ➔ **Internet: .../ms*-lfr**

Filters: D series, metal

Type	Pneumatic connection 1	Standard nominal flow rate	Supply pressure 1	Operating pressure	Grade of filtration	Description
Filter LF 	Connecting plate, G1, G1/2, G1/4, G1/8, G3/4, G3/8, M5, M7, QS-4, QS-6	170 ... 5,300 l/min	0 ... 10 bar	0 ... 16 bar	5 ... 40 µm	• Good particle and condensate separation • High flow rate with minimal pressure drop • With manual or fully automatic condensate drain ➔ **Internet: .../lf**
Fine filter LFMB 	Connecting plate, G1, G1/2, G1/4, G1/8, G3/4, G3/8	250 ... 1,250 l/min		1 ... 16 bar	1 µm	• High efficiency filter for special requirements • Air quality to DIN ISO 8573-1 • Version with differential pressure indicator for optical indication of filter contamination ➔ **Internet: .../lfmb**
Micro filter LFMA 	Connecting plate, G1, G1/2, G1/4, G1/8, G3/4, G3/8	130 ... 950 l/min		1 ... 16 bar	0.01 µm	• High efficiency filter for special requirements • Air quality to DIN ISO 8573-1 • Version with differential pressure indicator for optical indication of filter contamination ➔ **Internet: .../lfma**

Filters: D series, metal

FESTO

Type	Pneumatic connection 1	Standard nominal flow rate	Supply pressure 1	Operating pressure	Grade of filtration	Description
Activated carbon filter LFX 	Connecting plate, Manifold module, G1, G1/2, G1/4, G1/8, G3/4, G3/8	300 ... 1,430 l/min		0 ... 16 bar		• Removal of liquid and gaseous oil particles from compressed air using activated carbon • Activated carbon filter cartridges provide odour and oil-free air to food industry standard • Residual oil content ≤0.003 mg/m3 • Air quality class at the output 1.7.1 to DIN ISO 8573-1 → **Internet: .../lfx**
Fine filter combination LFMBA 	G1, G1/2, G1/4, G1/8, G3/4, G3/8	125 ... 600 l/min		1 ... 16 bar	0.01 µm	• High efficiency filter for special requirements • Air quality to DIN ISO 8573-1 • Available as pre-assembled filter combination • Version with differential pressure indicator for optical indication of filter contamination → **Internet: .../lfmba**

Filters: MS series

Type	Pneumatic connection 1	Standard nominal flow rate	Supply pressure 1	Operating pressure	Grade of filtration	Description
Filter MS4-LF, MS6-LF, MS12-LF 	Connecting plate, G1, G1 1/2, G1 1/4, G1/2, G1/4, G1/8, G3/8, G3/4, G2	1000 ... 16,000 l/min	0 ... 20 bar		5 ... 40 µm	• Good particle and condensate separation • High flow rate with minimal pressure drop • Available with manual, semi-automatic, fully automatic or fully automatic, electrically actuated condensate drain → **Internet: .../ms*-lf**
Fine and micro filter MS4-LFM, MS6-LFM, MS9-LFM, MS12-LFM 	Connecting plate, G1, G1 1/2, G1 1/4, G1/2, G1/4, G1/8, G3/4, G3/8, G2	54 ... 23,000 l/min	0 ... 20 bar		0.01 ... 1 µm	• High-performance filter for exceptionally clean compressed air • Air quality to DIN ISO 8573-1 • Available with differential pressure indicator for indication of contamination • Available with electronic filter pollution indicator → **Internet: .../ms*-lfm**
Activated carbon filter MS4-LFX, MS6-LFX, MS9-LFX, MS12-LFX 	Connecting plate, G1, G1 1/2, G1 1/4, G1/2, G1/4, G1/8, G3/4, G3/8, G2	250 ... 7,090 l/min	0 ... 20 bar		0.01 ... 1 µm	• Removal of liquid and gaseous oil particles from compressed air using activated carbon • Eliminates odours and vapours → **Internet: .../ms*-lfx**

Filters: individual devices

FESTO

Type	Size	Grade of filtration	Supply pressure 1	Flow rate with respect to atmosphere	Noise reduction	Description
Filter silencer LFU 	G1/4, G3/8, G1/2, G1	1 µm	0 ... 16 bar	4,000 ... 12,500 l/min	Reduction by 40 dB	• Removes up to 99.99% of oil and other contaminants from exhaust air • Manual rotary condensate drain • Exhaust noise reduced regardless of frequency ➔ **Internet: .../lfu**

Regulators: D series, metal

Type	Pneumatic connection 1	Standard nominal flow rate	Pressure regulation range	Supply pressure 1	Operating pressure	Max. pressure hysteresis	Description
Pressure regulator LR, LRS 	G1, G1/2, G1/4, G1/8, G3/4, G3/8, M5, M7, QS-4, QS-6	120 ... 1,300 l/min	0.5 ... 12 bar	0 ... 20 bar	0 ... 16 bar	0.2 ... 0.5 bar	• Suitable for front panel mounting • Lockable design • Two pressure gauge connections for different fitting options • Mini and Midi sizes: directly actuated diaphragm regulator • Maxi size: pilot actuated piston regulator, diaphragm regulator LRS-DI • Good regulation characteristics with minimal pressure hysteresis • High flow rate • Return flow option for venting from outlet port 2 to inlet port 1 • Available with pressure gauge • Sizes: Micro, Mini, Midi, Maxi ➔ **Internet: .../lr-1*8**
Pressure regulator LRB, LRBS 	Connecting plate	1,600 ... 3,800 l/min	0.5 ... 12 bar		1 ... 16 bar	0.2 bar	• Manifold assembly with through air supply • Lockable design • Good regulation characteristics with low hysteresis and primary pressure compensation • For configuring a regulator manifold with independent pressure ranges • Settings secured via detent on rotary knob and push-in adjustment lock • Directly actuated diaphragm regulator • Without pressure gauge • Sizes: Mini, Midi ➔ **Internet: .../lrb-d**
Pressure regulator combination LRB-K 	G1/2, G1/4, G3/8	1,600 ... 3,800 l/min	0.5 ... 12 bar	1 ... 16 bar		0.2 ... 0.5 bar	• With through air supply • Regulator manifold with independent pressure ranges • Good regulation characteristics with low hysteresis and primary pressure compensation • Settings secured via detent on rotary knob and push-in adjustment lock • Directly actuated diaphragm regulator • Without pressure gauge • Sizes: Mini, Midi ➔ **Internet: .../lrb-1*4**

Regulators: D series, polymer

FESTO

Type	Pneumatic connection 1	Standard nominal flow rate	Pressure regulation range	Supply pressure 1	Operating pressure	Max. pressure hysteresis	Description
Pressure regulator LR-DB 	Connecting plate, G1/4, G1/8	≥1,300 l/min	0.5 ... 7 bar	1.5 ... 10 bar		0.5 bar	• High flow rate • Good regulation characteristics with minimal pressure hysteresis • Setting values are secured by locking the rotary knob • Available with pressure gauge • Size: Mini ➔ **Internet: .../lr-1*8-db**
Pressure regulator combination LRB-DB-K 	G1/2	≥1,000	0.5 ... 7 bar	1 ... 16 bar		0.5 bar	• With through air supply • Good regulation characteristics with low hysteresis and primary pressure compensation • Regulator manifold with independent pressure ranges • Setting values are secured by locking the rotary knob • Without pressure gauge • Size: Mini ➔ **Internet: .../lrb-1*4-db**

Regulators: MS series

Type	Pneumatic connection 1	Standard nominal flow rate	Pressure regulation range	Supply pressure 1	Operating pressure	Max. pressure hysteresis	Description
Pressure regulator MS4-LR, MS6-LR 	G1/2, G1/4, G1/8, G3/8	1,000 ... 7,500 l/min	0.3 ... 16 bar	0.8 ... 20 bar		0.25 bar	• Good regulation characteristics with low hysteresis and primary pressure compensation • High flow rate with minimal pressure drop • Available with secondary venting • Lockable rotary knob • With pressure sensor with display and rotary knob pressure gauge • Sizes 4, 6 • Grid dimension 40, 62 mm ➔ **Internet: .../ms*-lr**
Pressure regulator MS4-LRB, MS6-LRB 	G1/2, G1/4	300 ... 7,300 l/min	0.3 ... 16 bar	0.8 ... 20 bar		0.25 bar	• For manifold assembly with through air supply • For configuring a regulator manifold with independent pressure regulation ranges • Good regulation characteristics with low hysteresis and primary pressure compensation • Actuator lock to protect setting values against adjustment • With and without secondary venting • Integrated return flow option for exhausting from output 2 to output 1 • Optional pressure sensor • Optional rotary knob pressure gauge ➔ **Internet: .../ms*-lrb**

Regulators: MS series

FESTO

Type	Pneumatic connection 1	Standard nominal flow rate	Pressure regulation range	Supply pressure 1	Operating pressure	Max. pressure hysteresis	Description
Pressure regulator MS12-LR 	Manifold module	12,000 ... 22,000 l/min	0.15 ... 16 bar	0.8 ... 21 bar		0.04 ... 0.4 bar	• Good regulation characteristics with low hysteresis and primary pressure compensation • High flow rate with minimal pressure drop • Actuator lock to protect setting values against adjustment • With secondary venting • Pressure gauge connection for different fitting options • Size: 12 • Grid dimension 124 mm • MS12-LR-...-PO: pneumatically actuated (pressure range determined by means of pilot regulator) • MS12-LR-...-PE6: electrically actuated (pilot control by proportional pressure regulator) ➔ **Internet: .../ms12-lr**
Precision pressure regulator MS6-LRP, MS6-LRPB 	G1/2, G1/4, G3/8	800 ... 5,000 l/min	0.05 ... 12 bar	1 ... 14 bar		0.02 bar	• As individual device and for manifold assembly • Manifold assembly with through air supply • Good regulation characteristics with low hysteresis and primary pressure compensation • Actuator lock to protect setting values against adjustment • Available with pressure sensor with display • Size 6 • Grid dimension 62 mm ➔ **Internet: .../ms*-lrp**
Electrical pressure regulator MS6-LRE 	G1/2, G1/4, G3/8	2,200 ... 7,500 l/min	0.3 ... 16 bar	0.8 ... 20 bar		0.25 bar	• With integrated electric drive unit for indirectly setting the output pressure • Constant output pressure even in the event of a power failure thanks to the fail-safe function • Available with control unit with display • Available with integrated pressure sensor with electrical output • With or without secondary venting • Size 6 • Grid dimension 62 mm ➔ **Internet: .../ms*-lre**

Regulators: individual devices

FESTO

Type	Pneumatic connection 1	Standard nominal flow rate	Pressure regulation range	Supply pressure 1	Operating pressure	Max. pressure hysteresis	Description
Pressure regulator LR-G, LRS-G 	G1/8	600 ... 700 l/min	0.5 ... 12 bar	1 ... 20 bar		0.2 bar	• Lockable design • Sturdy design • For front panel mounting • Excellent flow rates • Precision diaphragm regulator ➔ **Internet: .../lr-1*8-g**
Precision pressure regulator LRP, LRPS 	G1/4	800 ... 2,300 l/min	0.05 ... 10 bar	1 ... 12 bar	1 ... 12 bar	0.02 bar	• Lockable design • Precision pressure adjustment possible both in static and dynamic applications • Good response characteristics during rapid modification of supply pressure and flow rate • Supply pressure fluctuations are almost entirely compensated ➔ **Internet: .../lrp**

Lubricators: D series

Type	Pneumatic connection 1	Standard nominal flow rate	Supply pressure 1	Min. flow rate for lubricator operation	Description
Lubricator LOE 	G1, G1/2, G1/4, G1/8, G3/4, G3/8, M5, M7, QS-4, QS-6	160 ... 9,000 l/min	0 ... 10 bar	3 ... 10 l/min	• Proportional lubricator with precision oil metering • Quick and easy top-up even under pressure • High flow rate • Sturdy metal housing and transparent lubricator bowl with metal bowl guard • Oil capacity 6.5 ... 190 cm³ • Sizes: Micro, Mini, Midi, Maxi • Grid dimension 25, 40, 55, 66 mm ➔ **Internet: .../loe**

Lubricators: MS series

Type	Pneumatic connection 1	Standard nominal flow rate	Supply pressure 1	Min. flow rate for lubricator operation	Description
Lubricator MS4-LOE, MS6-LOE, MS12-LOE 	G1, G1 1/2, G1 1/4, G1/2, G1/4, G1/8, G3/8, G2	1,100 ... 22,000 l/min	1 ... 16 bar	≥400 l/min	• Configurable proportional lubricator with precision oil metering • Quick and easy oil top-up even under pressure • Flow direction can be selected: left/right, right/left • Oil capacity 30 ... 1,500 cm • Sizes: 4, 6, 12 • Grid dimension 40, 60, 124 mm ➔ **Internet: .../ms*-loe**

On-off and soft-start valves: D series

FESTO

Type	Pneumatic connection 1	Standard nominal flow rate	Operating pressure	Actuation type	Description
On-off valve HE 	G1, G1/2, G1/4, G1/8, G3/4, G3/8	1,000 ... 10,000 l/min	0 ... 16 bar	Manual	• 3/2-way valve • Ducted exhaust possible via a threaded connection • The switching position is immediately recognisable • Size: Mini, Midi, Maxi • Grid dimension 40, 55, 66 mm ➔ **Internet: .../he-d**
On-off valve HEE 	G1, G1/2, G1/4, G1/8, G3/4, G3/8	1,000 ... 6,500 l/min	2.5 ... 16 bar	Electric	• For pressurising and venting pneumatic installations • With solenoid coil, without plug socket • Solenoid head can be repositioned by 4 x 90° • Detenting and non-detenting manual override • Supply voltage 24 V DC, 110, 230 V AC • Sizes: Mini, Midi, Maxi • Grid dimension 40, 55, 66 mm ➔ **Internet: .../hee-d**
On-off valve HEP 	G1, G1/2, G1/4, G1/8, G3/4, G3/8	1,000 ... 6,500 l/min	2 ... 16 bar	Pneumatic	• On-off valve for pressurising and venting pneumatic installations • As an individual device or in combination with other D series modules • Especially suitable for applications requiring explosion protection • Size: Mini, Midi, Maxi • Grid dimension 40, 55, 66 mm ➔ **Internet: .../hep**
Soft-start valve HEL 	G1, G1/2, G1/4, G1/8, G3/4, G3/8	1,000 ... 6,500 l/min	3 ... 16 bar	Pneumatic	• For gradual pressure build-up (for use with on-off valves HE and HEE) • For advancing drives slowly and reliably into the initial position • For avoiding sudden and unexpected movements • Adjustable switching time delay • Sizes: Mini, Midi, Maxi • Grid dimension 40, 55, 66 mm ➔ **Internet: .../hel**

On-off and soft-start valves: MS series

FESTO

Type	Pneumatic connection 1	Standard nominal flow rate	Operating pressure	Actuation type	Description
On-off valve MS4-EM1, MS6-EM1, MS12-EM 	Manifold module, G1, G1 1/2, G1 1/4, G1/2, G1/4, G1/8, G3/8, G2	1,200 ... 32,000 l/min	0 ... 21 bar	Manual	• For slowly pressurising and venting pneumatic installations • At port 3 a silencer can be attached or the exhaust air can be ducted • Available with pressure gauge and pressure sensor with display • Size: 4, 6, 12 • Grid dimension 40, 62, 124 mm ➔ **Internet: .../ms*-em**
On-off valve MS4-EE, MS6-EE, MS12-EE 	Manifold module, G1, G1 1/2, G1 1/4, G1/2, G1/4, G1/8, G3/8, G2	1,000 ... 32,000 l/min	3 ... 18 bar	Electric	• Supply voltage 24 V DC, 110, 230 V AC • For slowly pressurising and venting pneumatic installations • Available with pressure sensor with display • With solenoid coil, without plug socket • Sizes: 4, 6, 12 • Grid dimension 40, 62, 124 mm ➔ **Internet: .../ms*-ee**
Soft-start valve MS4-DL, MS6-DL, MS12-DL 	Manifold module, G1, G1 1/2, G1 1/4, G1/2, G1/4, G1/8, G3/8, G2	1,000 ... 42,000 l/min	2 ... 21 bar	Pneumatic	• For slowly pressurising and venting pneumatic installations (for use with on-off valves EM1 and EE) • For advancing the drives slowly and reliably into the initial position • For avoiding sudden and unexpected movements • Adjustable switching time delay • Sizes: 4, 6, 12 • Grid dimension 40, 62, 124 mm ➔ **Internet: .../ms*-dl**
Soft-start valve MS4-DE, MS6-DE, MS12-DE 	Manifold module, G1, G1 1/2, G1 1/4, G1/2, G1/4, G1/8, G3/8, G2	1,000 ... 42,000 l/min	3 ... 18 bar	Electric	• Supply voltage 24 V DC, 110, 230 V AC • For slowly pressurising and venting pneumatic installations • For advancing the drives slowly and reliably into the initial position • For avoiding sudden and unexpected movements • Adjustable switching time delay • Size 4, 6, 12 • Grid dimension 40, 62, 124 mm ➔ **Internet: .../ms*-de**
Soft-start and exhaust valve MS6-SV 	G1/2	4,300 l/min	3.5 ... 10 bar	Electric	• Complies with standard DIN EN ISO 13849-1 • For reducing pressure quickly and reliably and for building up pressure gradually • A switching time delay adjusted via a flow control valve for gradual pressure build-up • Available with silencer • Supply voltage 24 V DC • Size 6 • Grid dimension 62 mm ➔ **Internet: .../ms6-sv**

On-off and soft-start valves: individual devices

FESTO

Type	Pneumatic connection 1	Standard nominal flow rate	Operating pressure	Actuation type	Description
On-off valve HE-LO 	G1, G1/2, G1/4, G1/8, G3/4, G3/8	1,000 ... 10,000 l/min	0 ... 16 bar	Manual	• To safety standard • For shutting off the compressed air supply whilst simultaneously exhausting systems powered by compressed air • Can be locked in the closed position • Screwed into piping, through-holes for wall mounting ➔ **Internet: .../he*lo**
Solenoid/pneumatic valve MFHE, VLHE 	G1/2, G1/4, G3/8	1,200 ... 2,900 l/min	2 ... 12 bar	Electric, Pneumatic	• For F solenoid coils • Piloted • On-off valve in combination with service units • Soft-start valve • Manual override, detenting ➔ **Internet: .../mfhe**

Air dryers: D series

Type	Pneumatic connection 1	Standard nominal flow rate	Operating pressure	Supply pressure 1	Pressure dew point	Pressure dew point reduction	Description
Membrane air dryer LDM1 	G1, G1/2, G3/4	300 ... 1,000 l/min	3 ... 12.5 bar			17 ... 20 K	• Final dryer with excellent operational reliability • Flow rate-dependent dew point reduction • Wear-free function requiring no external energy • Size: Maxi • Grid dimension 66 mm • Individual device with or without sub-bases, for service unit combination ➔ **Internet: .../ldm1**

Air dryers: MS series

Type	Pneumatic connection 1	Standard nominal flow rate	Operating pressure	Supply pressure 1	Pressure dew point	Pressure dew point reduction	Description
Membrane air dryer MS4-LDM1, MS6-LDM1 	G1/2, G1/4, G3/8, G1/8	50 ... 400 l/min		3 ... 12.5 bar		20 K	• Final dryer with excellent operational reliability • Suitable for use as an individual device or for integration into existing service unit combinations • Flow rate-dependent dew point reduction • Wear-free function requiring no external energy • Sizes: 4, 6 • Grid dimension 40, 62 mm ➔ **Internet: .../ms*-ldm1**

Air dryers: individual devices

FESTO

Type	Pneumatic connection 1	Standard nominal flow rate	Operating pressure	Supply pressure 1	Pressure dew point	Pressure dew point reduction	Description
Adsorption dryer PDAD 	G1/2, G3/8	10 ... 1,000 l/min		4 ... 16 bar	-40 or -70 °C		• Produced for decentralised compressed air drying • Greater service life of pneumatic components • Additional filtering of oil and particles • Defined pressure dew point • High flow rate • Low purge air consumption and noise levels → **Internet: .../pdad**

Compressed air distribution units: D series

Type	Pneumatic connection 1	Standard nominal flow rate in main flow direction 1->2	Operating pressure	Description
Branching module FRM 	G1, G1/2, G1/4, G1/8, G3/4, G3/8	1,100 ... 20,000 l/min	0 ... 16 bar	• Designs with integrated non-return function, with pressure switch • Several additional air connections for greater flexibility • Can be used as an intermediate distributor for varying air qualities • Sizes: Mini, Midi, Maxi • Grid dimension 40, 55, 66 mm → **Internet: .../frm**
Distributor block FRZ 	Manifold module			• Sizes: Micro, Mini, Midi, Maxi • Grid dimension 25, 40, 55, 66 mm • Several additional air connections for greater flexibility → **Internet: .../frz**

Compressed air distribution units: MS series

Type	Pneumatic connection 1	Standard nominal flow rate in main flow direction 1->2	Operating pressure	Description
Distributor block MS4-FRM, MS6-FRM, MS12-FRM 	Manifold module, G1, G1 1/2, G1 1/4, G1/2, G1/4, G1/8, G3/8, G2	1,200 ... 42,000 l/min	0 ... 21 bar	• Designs with integrated non-return function, with pressure switch • Pneumatic manifold with 4 connections • Can be used as an intermediate distributor for varying air qualities • Outlet at top and underneath • Available with pressure sensor with display • Sizes 4, 6, 12 • Grid dimension 40, 62, 124 mm → **Internet: .../ms*-frm**

Compressed air distribution units: MS series

FESTO

Type	Pneumatic connection 1	Standard nominal flow rate in main flow direction 1->2	Operating pressure	Description
Distributor block MS4-FRM-FRZ, MS6-FRM-FRZ 	G1/2, G1/4	4,050 ... 14,600 l/min	0 ... 20 bar	• Pneumatic manifold with 4 connections • Outlet at top and underneath • Can be used as an intermediate distributor for varying air qualities • Can be used as an intermediate distributor between two pressure regulators with large rotary knob with pressure gauge on size MS4 • Sizes: 4, 6 • Grid dimension 40, 62 mm ➔ **Internet: .../ms*-frm-frz**

Condensate drains

Type	Pneumatic connection	Operating pressure	Description
Condensate drain WA 	M9	0 ... 16 bar	• For attachment to service units and compressed air networks/systems • Automatic emptying after the max. fill level has been reached • Automatic emptying after the operating pressure p ‹ 0.5 bar is switched off • Manual actuation during operation is possible ➔ **Internet: .../wa**
Condensate drain PWEA 	G1/2	0.8 ... 16 bar	• Fully automatic condensate drain with integrated electrical controller • Interface for communicating with master control device • Reliable thanks to non-contacting capacitive sensor • Can be used with service units or simply in piping systems • Ready status and switching status indicated via LEDs and electrical interface ➔ **Internet: .../pwea**

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Pressure amplifiers

Type	Pneumatic connection 1	Output pressure 2	Supply pressure 1	Description
Pressure booster DPA 	G1/2, G1/4, G3/8	4 ... 16 bar	2 ... 10 bar	• Minimal loss of volume due to valve activation • Designed as a pressure booster/air reservoir combination • Any mounting position • Short filling times • Long service life • Compact design • Available with sensing option ➔ **Internet: .../dpa**

Pressure indicators

FESTO

Type	Type of mounting	Indicating range	Pneumatic connection	Operating pressure	Measurement accuracy class	Description
Pressure gauge MA, MAP 	In-line installation	0 ... 25 bar	G1/4, G1/8, M5, QS-4, QS-6, QS-8, R1/4, R1/8	0 ... 25 bar	1.6, 2.5, 4, 5	• Designs based on DIN EN 837-1, available with red-green range • Precision pressure gauge • Accuracy of measurement class MA: 2.5, MAP: 1.6 • Pneumatic connection via R, metric or G thread, push-in connector • Display units bar, psi, MPa ➔ **Internet: .../ma**
Flanged pressure gauge FMA 	Front panel mounting	0 ... 16 bar	G1/4	0 ... 16 bar	1.6, 2.5	• Design to DIN ISO 837-1 • Pneumatic connection via G thread • Front panel mounting • Display units bar, psi ➔ **Internet: .../fma**
Flanged precision pressure gauge FMAP 	Front panel mounting	0 ... 16 bar	G1/4	0 ... 16 bar	1	• Complies with standard DIN EN 837-1 • Pneumatic connection via G thread • Display units bar, psi • Front panel mounting ➔ **Internet: .../fmap**
Pressure gauge kit DPA-MA-SET 	Via male thread		G1/4, G1/8, R1/8	10 ... 16 bar	2.5, 4	• For pressure booster DPA • For monitoring the supply and output pressure • Pneumatic connection via R, G thread ➔ **Internet: .../dpa*set**
Vacuum gauge VAM, FVAM 	Front panel mounting, Screw-in	-1 ... 9 bar	G1/4, G1/8, R1/4, R1/8	-1 ... 9 bar	2.5	• Designs based on standard DIN EN 837-1, available with red-green range • Pneumatic connection via R, G thread • Screw-in or front panel mounting • Double or single scale • Display units bar, inHg, psi ➔ **Internet: .../vam**
Pressure gauge PAGN 	In-line installation	0 ... 16 bar	M5, QS-1/4, QS-3/8, QS-4, QS-6, QS-8, QSP...10	0 ... 16 bar	2.5, 4, 5	• Display units bar, psi • Pneumatic connection via QSP-10 • Mounting via retaining clamp ➔ **Internet: .../pagn**

Software tool

Tube selection

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.

This tool can be found on the website under Support, Engineering software (in the menu on the left), Downloads for Windows or on the DVD under Selection and sizing.

Standard O.D. tubing

Type	Outside Ø	Inside Ø	Temperature-dependent operating pressure	Ambient temperature	Description
Plastic tubing PUN, PUN-DUO 	3 ... 16 mm	2 ... 11 mm	-0.95 ... 30 bar	-35 ... 60 °C	• Highly flexible plastic tubing • Polyurethane • RoHS-compliant • Operating media compressed air, vacuum • Suitable for use with energy chains • High resistance to stress cracks • Designed as DUO tubing ➔ **Internet: .../pun**
Plastic tubing PUN-H, PUN-H-DUO 	3 ... 16 mm	2.1 ... 11 mm	-0.95 ... 10 bar	-35 ... 60 °C	• Polyurethane • Designed as DUO tubing • Operating media compressed air, vacuum, water • Approved for use in the food industry • High resistance to microbes and hydrolysis • Suitable for use with energy chains ➔ **Internet: .../pun-h**
Plastic tubing PUN-CM 	4 ... 12 mm	2.5 ... 8 mm	-0.95 ... 10 bar	-35 ... 60 °C	• Highly flexible plastic tubing, antistatic, electrically conductive • Polyurethane • Operating media compressed air, vacuum • High resistance to UV radiation • Suitable for use with energy chains ➔ **Internet: .../pun-cm**

Standard O.D. tubing

FESTO

Type	Outside Ø	Inside Ø	Temperature-dependent operating pressure	Ambient temperature	Description
Plastic tubing PUN-V0 	6 ... 12 mm	4 ... 8 mm	-0.95 ... 10 bar	-35 ... 60 °C	• Highly flexible single-sheath plastic tubing • Flame retardant to UL 94 V0 ... V2 • For use in the immediate vicinity of welding applications • Polyurethane • Operating media compressed air, vacuum • High resistance to microbes and hydrolysis ➔ **Internet: .../pun-v0**
Plastic tubing PEN 	4 ... 16 mm	2.7 ... 10.8 mm	-0.95 ... 10 bar	-30 ... 60 °C	• Polyethylene • RoHS-compliant • Operating media compressed air, vacuum • Good resistance to chemicals and very good hydrolysis resistance • Resistant to most cleaning agents and lubricants ➔ **Internet: .../pen**
Plastic tubing PAN 	4 ... 16 mm	2.5 ... 12 mm	-0.95 ... 35 bar	-30 ... 80 °C	• High thermal and mechanical load capacities • High resistance to microbes • Polyamide • Operating media compressed air, vacuum ➔ **Internet: .../pan**
Heavy-duty tubing PAN-R 	4 ... 16 mm	2.5 ... 10 mm	-0.95 ... 35 bar	-30 ... 80 °C	• For applications with a high pressure range • High resistance to microbes • Polyamide • Operating media compressed air, vacuum ➔ **Internet: .../pan-r**
Plastic tubing PAN-V0 	6 ... 14 mm		-0.95 ... 12 bar	-30 ... 90 °C	• Double-sheath tubing • PVC, polyamide • Flame retardant to UL 94 V0 • Operating media compressed air, vacuum, water, mineral oil • High resistance to microbes, UV radiation • Suitable for use with energy chains ➔ **Internet: .../pan-v0**
Plastic tubing PLN 	4 ... 16 mm	2.9 ... 12 mm	-0.95 ... 14 bar	-30 ... 80 °C	• High resistance to chemicals, microbes, hydrolysis • Approved for use in the food industry • Resistant to most cleaning agents and lubricants • Operating media compressed air, vacuum, water • Polyethylene • RoHS-compliant ➔ **Internet: .../pln**

Standard O.D. tubing

FESTO

Type	Outside Ø	Inside Ø	Temperature-dependent operating pressure	Ambient temperature	Description
Plastic tubing PFAN 	4 ... 12 mm	2.9 ... 8.4 mm	-0.95 ... 16 bar	-20 ... 150 °C	• Pneumatic tubing with resistance to high temperatures and chemicals • Approved for use in the food industry • High resistance to chemicals, microbes, UV radiation, hydrolysis, stress cracks • Perfluoroalkoxy alkane • RoHS-compliant • Operating media compressed air, vacuum → **Internet: .../pfan**

Standard I.D. tubing

Type	Outside Ø	Inside Ø	Temperature-dependent operating pressure	Ambient temperature	Description
Plastic tubing PU, PU-DUO 	3.2 ... 17.6 mm	2.3 ... 13 mm	-0.95 ... 10 bar	-35 ... 60 °C	• Highly flexible plastic tubing • High resistance to abrasion and kinks • Polyurethane, PU-9 and PU-13: polyurethane with reinforcing fabric • Operating media compressed air, vacuum • Suitable for use with energy chains • Designed as DUO tubing → **Internet: .../pu**
Plastic tubing PL 	4.3 ... 17.6 mm	3 ... 13 mm	-0.95 ... 9 bar	-30 ... 60 °C	• High resistance to microbes • Operating medium compressed air • PL-3, PL-4, PL-6: food industry approval in accordance with Directive 2002/72/EC and FDA • Polyurethane, PL-9 and PL-13: PVC with reinforcing fabric • RoHS-compliant → **Internet: .../pl**
Plastic tubing PP 	4 ... 8 mm	2.9 ... 5.9 mm	-0.95 ... 19 bar	-30 ... 80 °C	• Polyamide • High resistance to microbes • Operating media compressed air, vacuum • Suitable for use with energy chains → **Internet: .../pp**
Plastic tubing PCN 	6.5 mm	4 mm	-0.5 ... 0.25 bar	-10 ... 60 °C	• For use with condensate drains on D series service units • PVC with reinforcing fabric • Operating media compressed air, water → **Internet: .../pcn**
Rubber hose P	13 ... 31 mm	6 ... 19 mm	-0.95 ... 16 bar	-20 ... 80 °C	• P-6 and P-9: nitrile rubber • P-13 and P-19: ethylene propylene rubber, styrene butadiene rubber • With tubing for barbed hose fitting N • Operating media compressed air, vacuum, water → **Internet: .../p**

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Spiral tubing

FESTO

Type	Outside Ø	Inside Ø	Working length	Temperature-dependent operating pressure	Description
Spiral plastic tubing PUN-S, PUN-S-DUO 	4 ... 12 mm	2.6 ... 8 mm	0.5 ... 6 m	-0.95 ... 10 bar	• Highly flexible plastic tubing • Suitable for use with energy chains • Polyurethane • High resistance to UV radiation, stress cracks • Operating media compressed air, vacuum • Designed as DUO tubing ➔ **Internet: .../spiral**
Spiral plastic tubing PUN-SG 	9.5 ... 11.7 mm	6.4 ... 7.9 mm	2.4 ... 6 m	-0.95 ... 15 bar	• Pre-assembled with captive rotatable fittings • Polyurethane, nickel-plated brass, polyacetal • High resistance to microbes, hydrolysis • Operating media compressed air, vacuum ➔ **Internet: .../spiral**
Spiral plastic tubing PPS 	6.3 ... 7.8 mm	4.7 ... 6.2 mm	7.5 ... 15 m	-0.95 ... 21.2 bar	• Pre-assembled with 2 rotatable fittings and captive OL sealing rings • Polyamide, brass, galvanised steel • Operating media compressed air, vacuum, water • Suitable for use with energy chains • High resistance to microbes • RoHS-compliant ➔ **Internet: .../pps**

Push-in fittings

Type	Pneumatic connection	Pneumatic connection, outlet	Operating pressure	Temperature-dependent operating pressure	Ambient temperature	Description
Push-in fitting QSM, QSM-I, QSMF, QSMP, QSMS, QSMC, QSM-H, QSMC-H, QSML, QSMLL, QSMLV-I, QSMLLV-I, QSML-H, QSMT, QSMTL, QSMX, QSMY 	Male thread G1/8, M3, M5, M6, M6x0.75, M7, M8x0.75, R1/8, Female thread M3, M5, Push-in sleeve QS-3, QS-4, QS-6, For tubing O.D. 3, 4, 6 mm	For tubing O.D. 3, 4, 6 mm		-0.95 ... 14 bar	-10 ... 80 °C	• Quick Star, Mini • For pneumatic applications with a temperature range up to 80 °C • Compact for maximum component density in confined spaces • Male or female thread with external or internal hex • Push-in fitting • Push-in connector • Push-in bulkhead connector • Push-in cap • Push-in connector with push-in sleeve • Blanking plug ➔ **Internet: .../qsm**

Push-in fittings

FESTO

Type	Pneumatic connection	Pneumatic connection, outlet	Operating pressure	Temperature-dependent operating pressure	Ambient temperature	Description
Push-in fitting QSM-B, QSM-B-I, QSML-B, QSMT-B 	Male thread M3, M5, M6, M7, R1/8, For tubing O.D. 3, 4, 6 mm	For tubing O.D. 3, 4, 6 mm		-0.95 ... 10 bar	-10 ... 60 °C	• Quick Star, Mini • Compact for maximum component density in confined spaces • For core pneumatic applications with a temperature range up to 60 °C • Male thread with external or internal hex ➔ **Internet: .../qsm-b**
Push-in fitting QS, QS-I, QSF, QSS, QS-F, QSSF, QSC, QS-H, QSH, QSC-H, QSL, QSLL, QSLF, QSLV-I, QSLV, QSL-H, QSL-HL, QST, QSTF, QSTL, QSW, QSW-HL, QSX, QSY, QSY-H, QSYL, QSYLV, QSYTF 	Male thread G1/2, G1/4, G1/8, G3/8, M5, R1/2, R1/4, R1/8, R3/8, Female thread G1/2, G1/4, G1/8, G3/8, Push-in sleeve QS-10, QS-12, QS-16, QS-4, QS-6, QS-8, For tubing O.D. 10, 12, 16, 4, 6, 8 mm	Female thread G1/2, G1/4, G1/8, G3/8, For tubing O.D. 10, 12, 16, 4, 6, 8 mm		-0.95 ... 14 bar	-10 ... 80 °C	• Quick Star, standard • For pneumatic applications with a temperature range up to 80 °C • Male or female thread with external or internal hex • Push-in fitting • Push-in connector • Push-in bulkhead connector • Push-in bulkhead connector with fixed collar • Push-in cap • Push-in connector with push-in sleeve • Push-in sleeve • Blanking plug ➔ **Internet: .../qs**
Push-in fitting QS-B, QS-B-I, QSL-B, QSLL-B, QST-B, QSTL-B, QSY-B 	Male thread R1/2, R1/4, R1/8, R3/8, For tubing O.D. 10, 12, 16, 4, 6, 8 mm	For tubing O.D. 10, 12, 16, 4, 6, 8 mm		-0.95 ... 10 bar	-10 ... 60 °C	• Quick Star, standard • For core pneumatic applications with a temperature range up to 60 °C • Male thread with external or internal hex • Push-in fitting • Push-in connector ➔ **Internet: .../qs-b**
Push-in fitting QS-F, QS-F-I, QSF-F, QSSF-F, QS-F-H, QSS-F, QSH-F, QSC-F-H, QSC-F-I, QSL-F, QSLL-F, QST-F, QSY-F 	G1/2, G1/4, G1/8, G3/8, M5, M7, Push-in sleeve QS-10, QS-12, QS-4, QS-6, QS-8, For tubing O.D. 10, 12, 4, 6, 8 mm	For tubing O.D. 10, 12, 4, 6, 8 mm	-0.95 ... 16 bar		0 ... 150 °C	• Quick Star, metal • For pneumatic applications with a temperature range up to 150 °C • Solid-metal push-in fitting with chrome plated surface coating. • High corrosion resistance (corrosion resistance class 3 according to Festo standard 940070) and chemical resistance • Approved for use in the food and packaging industry • Male or female thread with external or internal hex • Push-in fitting • Push-in bulkhead connector • Push-in fitting with push-in sleeve • Push-in connector • Push-in bulkhead connector • Push-in connector with push-in sleeve • Push-in sleeve • Blanking plug • Plug screw ➔ **Internet: .../qs-f**

Push-in fittings

FESTO

Type	Pneumatic connection	Pneumatic connection, outlet	Operating pressure	Temperature-dependent operating pressure	Ambient temperature	Description
Push-in fitting NPQM 	G1/2, G1/4, G1/8, G3/8, M5, M7, Push-in sleeve QS-10, QS-12, QS-4, QS-6, QS-8, For tubing O.D. 10, 12, 4, 6, 8 mm	For tubing O.D. 10, 12, 3, 4, 6, 8 mm	-0.95 ... 16 bar		-20 ... 70 °C	• Low-cost metal variant • Push-in connector with push-in sleeve • Male or female thread with external or internal hex • Push-in bulkhead connector • Housing made from nickel-plated brass • Push-in L-fitting • Multiple distributor • Push-in T-fitting • Push-in T-connector • Push-in Y-connector ➔ **Internet: .../npqm**
Push-in fitting CRQS, CRQSS, CRQSL, CRQST, CRQSY 	Male thread M5, R1/2, R1/4, R1/8, R3/8, For tubing O.D. 10, 12, 16, 4, 6, 8 mm	For tubing O.D. 10, 12, 16, 4, 6, 8 mm	-0.95 ... 10 bar		-15 ... 120 °C	• Quick Star, stainless steel • For pneumatic applications with a temperature range up to 120 °C • Maximum corrosion resistance (corrosion resistance class 4 according to Festo standard 940 070) and chemical resistance • Approved for use in the food and packaging industry • Male thread with internal and external hex • Push-in fitting • Push-in connector • Push-in bulkhead connector ➔ **Internet: .../crqs**
Push-in fitting NPQP 	Male thread R1/2, R1/4, R1/8, R3/8, Push-in sleeve QS-10, QS-12, QS-4, QS-6, QS-8, For tubing O.D. 10, 12, 4, 6, 8 mm		-0.95 ... 10 bar		-20 ... 60 °C	• Low-cost alternative to stainless steel: in combination with tubing PLN resistant to most cleaning agents • Housing made from polypropylene • Male thread with external hex • Push-in bulkhead connector • Blanking plug • Push-in L-fitting • Push-in L-connector • Push-in T-fitting • Push-in T-connector • Push-in Y-fitting ➔ **Internet: .../npqp**
Push-in fitting QS-V0, QSL-V0, QST-V0 	G1/2, G1/4, G1/8, G3/8, R1/2, R1/4, R1/8, R3/8, For tubing O.D. 10, 12, 4, 6, 8 mm	For tubing O.D. 10, 12, 4, 6, 8 mm	-0.95 ... 10 bar		0 ... 60 °C	• Quick Star, flame-retardant • For use in all areas where there is a risk of fire • Male thread with external hex • Push-in fitting • Push-in connector ➔ **Internet: .../qs-v0**
Self-sealing/rotary push-in fitting QSK, QSSK, QSKL, QSR, QSRL 	Male thread G1/2, G1/4, G1/8, G3/8, M5, R1/2, R1/4, R1/8, R3/8, For tubing O.D. 10, 12, 4, 6, 8 mm	For tubing O.D. 10, 12, 4, 6, 8 mm		-0.95 ... 14 bar	-10 ... 80 °C	• Quick Star, standard • Male thread with external hex • Self-sealing push-in fitting • Self-sealing push-in connector • Push-in bulkhead connector • Rotary push-in fitting ➔ **Internet: .../qsk**

Barbed fittings

FESTO

Type	Nominal size	Pneumatic connection	Description
Barbed fitting N, CN, SCN, RTU, LCN, LCNH, L-PK, TCN, T-PK, V-PK, Y-PK, FCN, CRCN 	1.3 ... 16.5 mm	G1/2, G1/4, G1/8, G3/4, G3/8, M10x1, M12x1, M3, M3x0.5, M4, M5, M6x0.75, PK-13, PK-19, PK-2, PK-3, PK-4, PK-6, PK-9	• Barbed fitting • Barbed bulkhead fitting • Barbed tubing connector • Barbed T-connector • With male thread or with male thread and external hex • Stainless steel design ➔ **Internet: .../cn**
Barbed hose fitting C-P, N-P, N-MS, SK 	2.5 ... 16.5 mm	G1/2, G1/4, G1/8, G3/4, G3/8, M5, PK-13, PK-19, PK-3, PK-4, PK-6, PK-9	• For hose clip • Barbed hose fitting with or without sealing ring • Hose clip to DIN 3017 • Brass, aluminium design ➔ **Internet: .../c-1*8**
Quick connector ACK, CK, CK-KU, QCK, SCK, SCK-KU, CV-PK, GCK-KU, LCK, LCK-KU, LCKN, TCK, KCK-KU, FCK-KU, MCK, MCK-KU, LK, LK-KU, TK, TK-KU, VT-2, VT-3 	1.7 ... 12 mm	G1/2, G1/4, G1/8, G3/8, M10x1, M12x1, M16x1, M5, M6x0.75, PK-13 with union nut, PK-3 with union nut, PK-4 with union nut, PK-6 with union nut, PK-9 with union nut	• Quick connector • Bulkhead quick connector • Sealing cap for plastic tube fittings and barbed connectors • T-distributor • Union nut for CK tube fitting • Multiple distributor • Female or male thread with sealing ring • Aluminium or polymer design ➔ **Internet: .../ck**

Threaded fittings

FESTO

Type	Pneumatic connection 1	Pneumatic connection 2	Description
Threaded fitting NPFB-S, QM, NPFB-R, QMR, NPFB-E, NPFB-D, NPFB-R, SCM, NPFB-L, NPFB-T, NPFB-Y, NPFB-X 	G1, G1/2, G1/4, G1/8, G3/4, G3/8, M5	G1, G1/2, G1/4, G1/8, G3/4, G3/8, M5	• Sleeve • Reducing sleeve • Extension • Double nipple • Reducing nipple • Female bulkhead fitting • Fitting • With male and female thread ➔ **Internet: .../npfb**
Blanking plug, double nipple B, E, ESK, D 	G1/2, G1/4, G1/8, G3/4, G3/8, M3, M5, M7, R1/2, R1/4, R1/8, R3/8	G1, G1/2, G1/4, G1/8, G3/4, G3/8, M3, M5, M7, R1/2, R1/4, R1/8, R3/8	• Blanking plug • Double nipple • Reducing nipple • With male and female thread ➔ **Internet: .../esk**

Piping

Type	Outside Ø	Information on tubing materials	Operating pressure	Temperature-dependent operating pressure	Ambient temperature	Description
Plastic pipe PQ-PA 	12 ... 28 mm	PA	-0.95 ... 7 bar		-25 ... 75 °C	• Rigid pipe made from high-quality polyamide • Operating medium: compressed air, vacuum, fluids • Flexible, maintenance-free • Smooth inside wall ensures optimum flow conditions ➔ **Internet: .../pq**
Pipe PQ-AL 	12 ... 28 mm	Wrought aluminium alloy	-0.95 ... 7 bar		-30 ... 75 °C	• Rigid aluminium pipe • Operating medium: compressed air, vacuum, fluids • Resistant to corrosion • Smooth inside wall ensures optimum flow conditions ➔ **Internet: .../pq**

Piping

FESTO

Type	Outside Ø	Information on tubing materials	Operating pressure	Temperature-dependent operating pressure	Ambient temperature	Description
Plastic-coated metal tube PM	6 ... 8 mm	Wrought aluminium alloy, PE		-0.95 ... 30 bar	-29 ... 65 °C	• Operating media compressed air, vacuum • Resistant to deformation • Can be straightened and reshaped several times without a pipe-bending device and without being damaged • Polyethylene, wrought aluminium alloy • RoHS-compliant ➔ **Internet: .../pm**

Push-in fittings for piping PQ

Type	Pneumatic connection	Nominal size	Description
Push-in fitting CQ, CQ-H, CQH-QS, CQC-H, CQL, CQT, CQD, CQA, CQSR, CQO 	Male thread G1, G1/2, G3/4, G3/8, Push-in sleeve CQ-12, CQ-15, CQ-18, CQ-22, CQ-28, For pipe/tubing O.D. 12, 15, 18, 22, 28 mm	8.65 ... 24.9 mm	• For pipes PQ-PA, PQ-AL and tubing PAN and PUN • Operating medium: compressed air, vacuum, fluids • Push-in fitting • Push-in connector • Push-in connector with push-in sleeve • Push-in sleeve • Blanking plug • Distributor • Fluid separator • Retaining ring • Releasing tool • Male thread ➔ **Internet: .../cq**

Couplings

Type	Pneumatic connection	Standard nominal flow rate	Description
Quick coupling socket/plug KD1, KD2, KD3, KD4, KD5, KD3-A-R, KD4-A-R, KS1, KS2, KS3, KS4, KS5, KS3-A-R, KS4-A-R 	Male thread G1/2, G1/4, G1/8, M5, M3, Female thread G1/2, G1/4, G1/8, G3/8, M5, M3, PK-13, PK-2, PK-3, PK-4, PK-6, PK-9 with union nut, Barbed fitting PK-6, PK-9	44 ... 1,120 l/min	• Quick connection coupling for standard applications without safety function • With male or female thread or with barbed or quick connector • Shut-off at one or both ends ➔ **Internet: .../kd1**
Quick coupling socket/plug KDMS6, KDS6, KSS6 	Male thread G1/2, G1/4, G1/8, G3/8, Female thread G1/2, G1/8, G1/4, G3/8, PK-13, PK-9 with union nut, Barbed fitting PK-9	1,240 ... 1,818 l/min	• Safety coupling • Shut-off on one side • With male or female thread ➔ **Internet: .../kdms**

Distributors

FESTO

Type	Pneumatic connection, supply line	Pneumatic connection	Pneumatic connection, outlet	Number of supply lines	Number of outlets	Max. speed	Description
Multiple distributor QSLV2, QSLV3, QSLV4, QSLV6, QSQ, QST3 	Male thread G1/2, G1/4, G1/8, G3/8, R1/2, R1/4, R1/8, R3/8, For tubing O.D. 10, 6, 8 mm		For tubing O.D. 10, 12, 4, 6, 8 mm	1	2 ... 6		• Quick Star, standard • Temperature range up to 80 °C • L-shape, T-shape • Rotatable 360° • Connection via threaded connection or push-in connector • Reducing design ➔ **Internet: .../qslv2**
Distributor block FR 	G1/2, G1/8, G3/4, G3/8, R1/2, R1/4, R1/8, R3/8		G1/2, G1/4, G1/8, M3, M5, PK-3, PK-4, R1/2, R1/4, R1/8, R3/8	1	3 ... 12		• Die-cast aluminium or anodised aluminium • Operating pressure 0 ... 16 bar • 4, 8, 9 or 12 connections ➔ **Internet: .../fr**
Rotary distributor GF 		Male thread G1/4, G1/8, G3/8, G1/2, Female thread G1/4, G1/8, G3/8, G1/2	G1/2, G1/4, G1/8, M5			300 ... 3,000 rpm	• 4 outlets or 2 axial and radial outlets • Single or multiple rotary distributor • Speed 300 ... 3,000 rpm • Design with air through-feeds • Operating pressure -0.95 ... +10 bar ➔ **Internet: .../gf**

Software tool

Configurator

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

The configurator is part of the electronic catalogue and is not available as a separate software program.

Universal connecting cables

Type	Electrical connection	Cable length	Description
Connecting cable NEBU 	4-pin/3-wire, 4-pin/3-pin, 4-pin/4-wire, 4-pin/5-pin, 5-pin/4-pin, 8-pin, A-coded/A-coded, Straight socket/cable, Straight socket/straight plug, Angled socket, M12x1, M12x1/M12x1, M5x0.5/M12x1, M5x0.5/M8x1, M5x0.5/open end, Straight plug/straight socket, Square design/open end	0.1 ... 30 m	• Designs for static, standard, energy chain and robot applications • Design with switching status display • Designs for connecting sensors and actuators ➔ **Internet: .../nebu**
Plug socket with cable SIM 	3-pin, 4-pin, 8-pin, Straight socket, Angled socket, M12x1, Clip-in	2 ... 10 m	• Easy-to-clean design approved for use in the food industry • Welding field resistant design • Design with clip-on socket ➔ **Internet: .../sim**
Connecting cable KM8, KM12 	3-pin/3-pin, 4-wire, 4-pin/3-pin, 4-pin/4-pin, 8-pin/8-pin, Cable, M12x1/M12x1, M12x1/M8, M12x1/M8x1, M8x1/M8x1, Straight plug/straight socket, Straight plug/angled socket, Straight plug/straight socket, Straight plug/angled socket	0.5 ... 5 m	• For connecting inputs and outputs or for connecting individual valves or sensors • Pre-assembled at both ends: straight plug with straight or angled socket • Type of mounting: union nut, threaded connector ➔ **Internet: .../km8**

Universal connecting cables

Type	Electrical connection	Cable length	Description
Flat cable KASI 		100 m	• For AS-interface • 2-wire • Reverse polarity protected • Contact using insulation displacement technology • No need to strip cable and wire insulation • 2 different colours: yellow (preferred for the AS-interface network) and black (for auxiliary power supply) ➔ **Internet: .../kasi**
Connecting cable KEA 	25-pin, Socket, Sub-D	5 ... 10 m	• For multi-pin plug connection • Type of mounting: two M3x16 screws • Operating voltage range 250 V AC/DC ➔ **Internet: .../kea**

Connecting cables for control systems

Type	Electrical connection	Cable length	Description
Connecting cable SBOA-K 	Straight plug/straight socket/straight socket, Angled plug/straight socket	2 m	• For Compact Vision System SBOC-Q, SBOI-Q • Ethernet diagnostic cable, for integration in a CPI system or for I/O expansion ➔ **Internet: .../sboa-k**
Connecting cable KSPC-SECST, KSPC-AIF 	15-pin, Plug, Straight socket/angled socket, 5-pin/5-pin	1.5 m, 5 m, 8 m	• For connecting motor controller SEC-ST to axis controller SPC200 • For connecting motor controller SPC200 to axis controller SPC-AIF ➔ **Internet: .../kspc**
Connecting cable NEBC 	15-pin, 15-pin/9-pin, 5-pin, 5-pin/3-wire, 9-pin, Socket, Straight socket/straight socket, M12x1, M9/open end, Angled plug/cable, Straight plug, Sub-D, Sub-D/Sub-D, Square design/angled	0.3 ... 5 m	• For I/O interface • For connecting motor controller CMMS-ST to any controller ➔ **Internet: .../nebc**
Connecting cable FEC-KBG	RJ11 plug/Sub-D, socket, 15-pin, RJ12 plug/Sub-D, socket, 15-pin	1.2 m, 1.8 m	• For connecting CPX terminal to operator unit FED ➔ **Internet: .../fec-kbg**

Connecting cables for control systems

Type	Electrical connection	Cable length	Description
Addressing cable KASI-ADR 	4-pin/4-pin/2-pin, Straight socket/angled plug/straight socket		• For AS-interface • For any slaves such as individual valve interface, Midi/Maxi valve terminal with AS-interface connection, CP valve terminal • Reverse polarity protected → **Internet: .../kasi-adr**
Pilot line KES 		2.5 ... 10 m	• For I/O interface for connecting motor controller SFC-DC to any controller • For I/O interface for connecting motor controller MTR-DCI to any controller → **Internet: .../kes**
Programming cable KDI, KDTAM 		2.5 m	• Pre-assembled at both ends • For diagnostic interface • For servo motor MTR-DCI → **Internet: .../kdi**
Programming cable PS1-SM	10-pin, 10-pin/10-pin, 10-pin/30-pin, Socket/terminal strip, Screw terminal		• RS232C adapter for programming the controller FEC from a PC, complete with neutral modem cable • RS232C adapter for connecting any devices with a serial interface to the controller FEC, with H-rail clip, no neutral modem or RS232 cable • RS485 adapter for controller FEC, including H-rail bracket → **Internet: .../fec**
Plug FBS-RJ45 	Straight plug, 8-pin		• Ethernet plug with 8-pin RJ45 connection • Permissible cable diameter: 4 ... 8 mm • Reverse polarity protected • High transmission quality • Detachable connection → **Internet: .../fbs-rj**

Connecting cables for motors

Type	Electrical connection	Cable length	Description
Encoder cable NEBM 		5 ... 15 m	• For servo motor EMMS-AS and stepper motor EMMS-ST • Suitable for use with energy chains → **Internet: .../nebm**
Motor cable KMTR 		2.5 ... 10 m	• For connecting motor and motor controller SFC-LAC or SFC-DC → **Internet: .../kmtr**

Connecting cables for motors

FESTO

Type	Electrical connection	Cable length	Description
Motor cable KMTRE 		5 … 10 m	• Screened cable • Can be used at –40 … +125 °C • Suitable for use with energy chains • Protection class IP67 • For stepper motors MTRE-ST → **Internet: …/kmtre**
Supply cable KPWR 		2.5 … 10 m	• For motor units MTR-DCI • For motor controller SFC-DC for connecting load and logic supply → **Internet: …/kpwr**

Connecting cables for valves

Type	Electrical connection	Cable length	Description
Plug socket with cable KMYZ-2, KMYZ-3, KMYZ-4, KMYZ-9 	2-pin/2-wire, 2-pin/2-pin, 2-pin/3-pin, Angled socket/cable, Angled socket/straight plug, Angled socket/angled plug, Square design/M8x1, Square design/open end, Square design/square design	0.2 … 10 m	• For valve with ZB solenoid coil: MZBH, MOZBH • For valve with ZC solenoid coil: CPE10-M1BH, CPE14-M1BH, MH2, MH3 • RoHS-compliant • Mounting via central screw → **Internet: …/kmyz-2**
Plug socket with cable KMEB-1, KMEB-2, KMEB-3 	2-pin, 3-pin, 4-pin, 5-pin, Angled socket, Type C, To DIN EN 175301-803	0.5 … 10 m	• For valve with EB solenoid coil: CPE18, CPE24, MEBH, MOEBH, JMEBH, JMEBDH, JMN2DH • With PVC or polyurethane cable • Mounting via central screw → **Internet: …/kmeb-1**
Plug socket with cable KME 	3-pin, Angled socket, Type C, To DIN EN 175301-803	2.5 … 10 m	• For valve with E solenoid coil: MEH, MOEH, JMEH • Mounting via central screw • With PVC cable • Temperature range –20 … +80 °C → **Internet: …/kme**
Plug socket with cable KMF	Socket	2.5 … 10 m	• For valve with F solenoid coil: MFH, MOFH, JMFH, JMFDH, NVF3, MUFH • Mounting via central screw • PVC cable • Temperature range –20 … +80 °C → **Internet: …/kmf**
Plug socket with cable KMV	Socket, Type B	2.5 … 10 m	• For valves with V solenoid coils • Mounting via central screw M3 • With PVC cable • Temperature range –20 … +80 °C → **Internet: …/kmv**
Plug socket with cable KMC	Socket, Type A	2.5 … 10 m	• For valve with D solenoid coil: MDH, MODH, JMDH • For valve with N1 solenoid coil: MN1H, JMN1H, JMN1DH • PVC cable • Mounting via central screw • Temperature range –20 … +80 °C → **Internet: …/kmc**

Connecting cables for valves

FESTO

Type	Electrical connection	Cable length	Description
Plug socket with cable KMH 	2-pin, 3-pin, Socket	0.5 ... 5 m	• For miniature valve MHA1 and MHP1 • For fast-switching valve MHA2 and MHP2 • Mounting via clip • Temperature range -40 ... +80 °C • PVC cable ➔ **Internet: .../kmh**
Electrical plug base MHAP-PI 	2-pin, 3-pin, Socket	0.5 ... 1 m	• Plug base with cable for connecting individual valve • Pre-assembled • 2-pin or 3-pin plug socket • Mounting via clip ➔ **Internet: .../mhap**
Connecting cable KMPYE-AIF, KMPYE-5, KMPYE-... 			• Connecting cable for connecting proportional directional control valves MPYE to the axis interface of axis controller SPC200 • Plug socket with cable, screened, for proportional directional control valve MPYE with 5 m cable • Connecting cable, screened, for proportional directional control valves MPYE with max. 10 m cable ➔ **Internet: .../kmpye**
Plug socket with cable KMPPE 		2.5 m, 5 m	• For proportional pressure regulators MPPE and MPPES • Temperature range –30 ... +80 °C • Mounting via union nut M16x0.75 • With PVC cable ➔ **Internet: .../kmppe**

Connecting cables for valve terminals

FESTO

Type	Electrical connection	Cable length	Description
Connecting cable NEBV 	-/M12x1, 15-pin, 2-pin, 2-pin/5-pin, 25-pin, 3-pin/5-pin, 37-pin, 4-pin/2-wire, 4-pin/3-pin, 4-pin/5-pin, 44-pin, 8-pin/4-pin, 8-pin/4-pin/4-pin, Socket, Socket/plug/plug, Straight socket/straight plug, Angled socket/cable, Angled socket/straight plug, Type BI/A-coded, Type C/A-coded, Cable with plug, M12x1/M12x1, M12x1/M12x1/M12x1, M8x1, M8x1/M8x1, Sub-D, To DIN EN 175301-803/M12x1, Square design MSZC/A-coded	0.5 ... 10 m	• Connecting cable for AS-interface • Plug socket with cable for proportional directional control valves VPPM for connecting with analogue input and output modules of controller CPX • Connecting cable for multi-pin plug connection → **Internet: .../nebv**
Connecting cable KVI 	Straight plug/straight socket, Angled plug/angled socket	0.25 ... 8 m	• For fieldbus connection (CP bus valve terminal type 10 CPV and CPI installation system) • 5-pin round connector • Pre-assembled at both ends • Suitable for use with energy chains → **Internet: .../kvi**
Connecting cable KMP2, KMP3, KMP4, KMP6	15-pin, 25-pin, 26-pin, 9-pin, Socket, Sub-D	2.5 ... 10 m	• Plug socket with cable for multi-pin connection • Pre-assembled • Mounting via union nut, with 2 screws → **Internet: .../kmp**
Connecting cable KRP 	2-pin, Angled socket	2.5 ... 5 m	• Plug socket with cable for connecting relay plates, (valve terminal type 10 CPV10 and CPV14) • Pre-assembled • Mounting via self-tapping central screw → **Internet: .../krp**
Connecting cable KVIA	Straight plug, Straight plug/straight socket, Straight plug/angled socket	5 ... 10 m	• For inputs/outputs (valve terminal type 03/04, analogue connections) • Pre-assembled at both ends • 4-pin/5-pin round plug • Suitable for use with energy chains → **Internet: .../kvia**
Bus connection FBA-CO, FBA-PB			• 9-pin Sub-D plug to 5-pin round plug/M12 socket → **Internet: .../fba**

Connecting cables for valve terminals

FESTO

Type	Electrical connection	Cable length	Description
T-adapter FB-TA 	5-pin, 5-pin/5-pin, M12x1/M12x1, M12x1/M8x1, Plug/socket, Plugs/sockets		• For fieldbus connection (for valve terminal type 10 CPV and CP installation system) • Branch line for connecting and disconnecting fieldbus components • With open cable end or with 5-pin push-in connector ➔ **Internet: .../fb-ta**
Connecting cable VMPA-KMS1, VMPA-KMS2 	Socket, 25-pin, Sub-D	2.5 m, 5 m, 10 m	• Plug socket with cable for multi-pin plug connection (to valve terminal type 32 MPA) • Pre-assembled • Mounting via 3 screws • PVC or polyurethane cable ➔ **Internet: .../vmpa-kms**

Universal plug connectors

Type	Electrical connection	Connection cross section	Protection class	Description
Plug NECU, NECU-HX 	3-pin, 4-pin, 5-pin, 7/8'' round plug connector, A-coded, AIDA push-pull, Socket/spring-loaded terminal, Straight socket, Straight socket/screw terminal, M12x1, M12x1 round plug connector, M8x1, Screw terminal, Straight plug/insulation displacement connector, Straight plug, Straight plug/screw terminal, Pre-assembled, Screenable	0.14 ... 2.5 mm2	IP65, IP67, IP68	• Power supply socket for fieldbus connection • Plug and socket for power supply • Can be assembled with any cable lengths • NECU-HX: reconnectable M8 and M12 round plug connectors with Harax® quick connection technology for low-voltage applications ➔ **Internet: .../necu**
Push-in T-connector NEDU 	4-pin/3-pin, 4-pin/4-pin, A-coded/A-coded, M12x1/M12x1, M12x1/M8x1, M8x1/M8x1, Plugs/sockets, To EN 60947-5-2		IP65, IP67	• For fieldbus connection • Branch line for connecting and disconnecting fieldbus components ➔ **Internet: .../nedu**

Universal plug connectors

Type	Electrical connection	Connection cross section	Protection class	Description
Plug SEA 	3-pin, 4-pin, 5-pin, Angled socket/screw terminal, Type A, M12x1, M12x1 round plug connector, M8x1, Straight plug/solder connection, Straight plug/insulation displacement connector, Straight plug/screw terminal	0.08 ... 0.75 mm2	IP65, IP67	• Sensor plug/socket for inputs/outputs • Can be assembled with any cable lengths ➔ **Internet: .../sea**
Sensor socket SIE-GD, SIE-WD, SIE-GA 	4-pin, Type A, M12x1, Straight plug		IP67	• For customised assembly of cables • Pin adapter for fieldbus connection • With screw terminals • Straight or angled design ➔ **Internet: .../sie-gd**
Cable socket ASI-SD 	2-pin, 4-pin, 5-pin, Straight socket, Straight socket/insulation displacement connector, Screw terminal	0.75 ... 1.5 mm2	IP65, IP67	• For AS-interface • Flat cable socket for connecting AS-interface stations to the AS-interface bus system • M12 connection • Reverse polarity protected • Detachable connection ➔ **Internet: .../asi-sd**

Plug connectors for control systems

Type	Electrical connection	Connection cross section	Protection class	Description
Plug NECC 	11-pin, Spring-loaded terminal, Plug	0.2 ... 2.5 mm2		• Encoder plug for motor controller CMMS-ST, CMMS-AS • Plug for multi-axis control systems CMXR for interface housing CAMI-C, 11-pin • Plug for multi-axis control systems CMXR and for modular controllers CECX for peripheral modules • 2-pin, 4-pin, 6-pin, 8-pin, 11-pin, 18-pin ➔ **Internet: .../necc**
Plug PS1-SAC, PS1-ZC 	10-pin, 10-pin/10-pin, 10-pin/30-pin, Socket/terminal strip, Screw terminal	0.08 ... 0.75 mm2		• For power supply • Cable connection using clamping technology • Individually or as a set ➔ **Internet: .../ps1**

Plug connectors for control systems

Type	Electrical connection	Connection cross section	Protection class	Description
Plug FBS-SUB-9-WS 	Straight plug/screw terminal, D-Sub, 9-pin	0.75 mm2	IP40	• Plug connector for bus connection CAN bus and Profibus • Cable connection 2x horizontal or 2x vertical • Printed circuit terminal block with screw connector ➔ **Internet: .../fbs-sub-9-ws**
Assortment of plugs NEKM				• For motor controller CMMP-AS, CMMS-ST • Comprising plug for power supply and plug for motor connection ➔ **Internet: .../nekm**

Plug connectors for valves

Type	Electrical connection	Connection cross section	Protection class	Description
Plug socket MSSD 	3-pin, 4-pin, Socket, Angled socket, Type A, Type B, Type C, To DIN EN 175301-803, to DIN EN 61984, Round design, Square design, Square design MSC, Square design MSE, Square design MSEB, Square design MSF, Square design MSN1, Square design MSN2, Square design MSV	0.75 ... 1.5 mm2	IP40, IP65, IP67, In assembled condition, To IEC 60529	• For valves with F, D, N1, V, E, EB, N2, Y, Z, ZB, ZC, MD-2, MH-2 solenoid coils • For connecting individual valves (for valve terminal type 14) • Cable connection using clamping screws, insulation displacement technology or push-in connector • With or without LED ➔ **Internet: .../mssd**
Soldering base PCBC 	2-pin, 3-pin		IP40	• For mounting miniature valves MHA1 and MHP1 on a PCB with plug connection underneath (-PI) • For valve terminal type 82 CPA-SC for plug-in connection ➔ **Internet: .../pcbc**
Multi-pin plug socket NECA 	9-pin/9-pin, Sub-D/screw terminal	0.34 ... 1 mm2	IP65, To IEC 60529	• For soft-start and quick exhaust valves MS6-SV, MS series • Electrical connection via Sub-D 9-pin, screw terminal 9-pin ➔ **Internet: .../ms6-sv**

Plug connectors for valves

FESTO

Type	Electrical connection	Connection cross section	Protection class	Description
Angled plug socket MPPE-3-B 	8-pin, Angled socket, Solderable	0.75 mm2	IP67	• For proportional pressure regulators MPPE and MPPES • Mounting via union nut ➔ **Internet: .../mppe-3-b**
Illuminating seal MF-LD, MC-LD, MV-LD, ME-LD, MEB-LD 	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		IP65	• For mounting between the plug socket and solenoid coil • The seal is illuminated yellow when the power is switched on • For F, D, N1, V, E, EB solenoid coils ➔ **Internet: .../mc-ld**

Plug connectors for valve terminals

Type	Electrical connection	Connection cross section	Protection class	Description
Plug/plug socket FBS, FBSD 	4-pin, 5-pin, 5-pin/5-pin, Straight socket/screw terminal, Angled socket/screw terminal, Type A, M12x1, Straight plug/screw terminal	0.75 mm2, 0.2 ... 2.5 mm2	IP20, IP40, IP65, IP67, In assembled condition, To IEC 60529	• For fieldbus connection • Straight and angled design • Can be assembled with any cable length ➔ **Internet: .../fbs**
Power supply socket NTSD 	4-pin, 5-pin, Straight socket, Angled socket, Screw terminal, Straight plug/screw terminal	0.75 ... 2.5 mm2	IP67	• Straight and angled design • For power supply • Can be assembled with any cable length ➔ **Internet: .../ntsd**
Bus connection FBA-1, FBA-2, FBSD-KL 	9-pin/5-pin, Straight socket/plug and socket, Sub-D/M12x1		IP65, To IEC 60529	• Plug, plug socket for fieldbus connection • Adapter for Sub-D plug and socket ➔ **Internet: .../fba-1**
Plug FBS-SUB-9-B 	Plug, 9-pin, Sub-D, Socket, 9-pin, Sub-D	0.75 mm2	IP40, IP65, IP67, In assembled condition, To IEC 60529	• Fieldbus plug with 9-pin Sub-D connection • Variants for Profibus DP, Interbus nodes CPX and CPV, CC-Link CPX and CPV, CPX-FEC • Position of DIL switches can be read externally • Easy mounting ➔ **Internet: .../fbs-sub-9*b**

Plug connectors for valve terminals

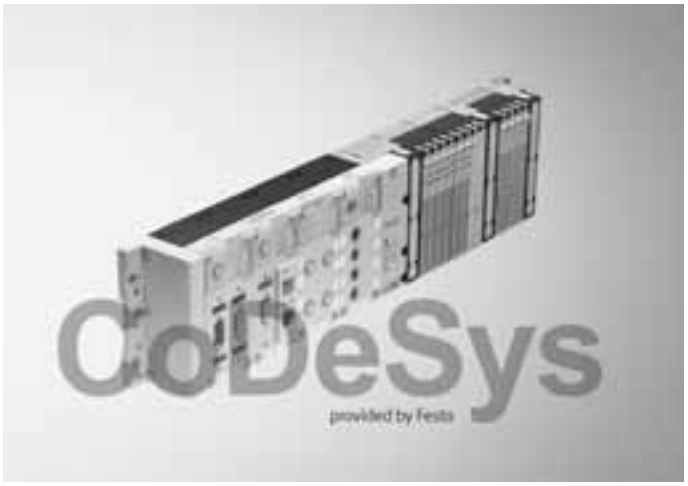
FESTO

Type	Electrical connection	Connection cross section	Protection class	Description
Multi-pin plug socket SD-SUB 	Socket, 9-pin, Sub-D, Socket, 25-pin, Sub-D, Socket, 15-pin, Sub-D, Plug, 15-pin, Sub-D, Plug, 25-pin, Sub-D		IP65, To IEC 60529	• Socket for multi-pin plug connection • Plug for inputs/outputs • Can be assembled with any cable length ➔ **Internet: .../sd-sub**
Multi-pin plug socket IMP1 	25-pin, 40-pin, 72-pin, Socket	0.75 ... 1.75 mm2	IP65	• For multi-pin cable connection • Can be assembled with any cable length ➔ **Internet: .../imp1**
Multi-pin plug socket IMP2 	26-pin, Socket		IP65	• For electrical inputs/outputs or valves • Can be assembled with any cable length ➔ **Internet: .../imp2**

Plug connectors for sensors

Type	Electrical connection	Connection cross section	Protection class	Description
Angled plug socket PEV-WD 	4-pin, Angled socket		IP65	• For pressure switch PEV • 15 ... 30, 180 V DC, 230 V AC • Angled design • Optionally with LED display ➔ **Internet: .../pev*wd**
Angled plug socket SD-4-WD 	25-pin, Plug, Sub-D		IP65, To IEC 60529	• For swivel module DSMI • Angled design ➔ **Internet: .../sd-4-wd**

Software tool



CoDeSys
CoDeSys makes your life easier with simple commissioning, fast programming and parameterisation thanks to standardised programming of embedded devices to IEC 61131-3

Advantages
- Hardware-independent software platform for quick and easy configuration, programming and commissioning of pneumatic and electrical automation solutions
- Extensive module libraries for single or multi-axis positioning motions
- The IEC 61131-3 standard means that CoDeSys is flexible and open for all types of control tasks
- Modular: offline and online functions, as well as components for hardware configuration and visualisation
- Convenient IEC function block extension
- Re-use of existing application parts

The CoDeSys parameterisation software can be found on the website under Support, in the Download: Software area. Enter CoDeSys in the search box to retrieve it.

Controllers

Type	Operating voltage	CPU data	Type of fieldbus interface	Ethernet, connector plug	Description
Controller CECX-M1 	19.2 ... 30 V DC	64 MB DRAM, 400 MHz processor	CAN bus	RJ45 socket, 8-pin	• Motion controller with CoDeSys and SoftMotion • Programming to standard IEC 61131-3 • Three plug-in slots for optional modules ➔ **Internet: .../cecx**
Controller CECX-C1 	19.2 ... 30 V DC	64 MB DRAM, 400 MHz processor	CAN bus	RJ45 socket, 8-pin	• Modular master controller with CoDeSys • Programming to standard IEC 61131-3 • Three plug-in slots for optional modules ➔ **Internet: .../cecx**
Controller FED-CEC 		32-bit RISC processor, 24 MHz, Watchdog	CAN, Sub-D plug, 9-pin	RJ45	• Plug-in card with processor module • For fitting into operator units FD • Fieldbus interfaces CANopen • CoDeSys programming software provided by Festo ➔ **Internet: .../fed-cec**

Operator units, text-based

Type	Display	Display size	Recipe memory	Ethernet interface	Number of user LEDs	Number of function keys	Description
Operator unit FED-40, FED-50, FED-60, FED-90 	Mono-chrome LCD, with back-lighting	4x20 characters	16 KB	Optional, 10 MBd	5 ... 13	4 ... 12	• Straightforward designing of human-machine dialogues • Semi-graphical display of process values makes them easier to read • 4-line text display and operating buttons • Serial interface • Recipe handling • Password protection ➔ **Internet: .../fed**

Operator units, with touchscreen

Type	Display	Display size	Display resolution	Ethernet interface	Description
Operator unit FED-300, FED-301, FED-500, FED-501, FED-700, FED-710, FED-1000, FED-1010, FED-2000, FED-2010, FED-5000, FED-5010 	Monochrome LCD, Colour TFT, Colour STN	3.5 ... 15”	1/4 VGA, 320x240 pixels, VGA, 640x480 pixels, SVGA, 800x600 pixels, XGA, 1024x768 pixels	Optional, 10 MBd, RJ45 10/100 MBd	• Graphics-capable for maximum flexibility when displaying processes and data • No programming effort in the PLC program • Convenient FED Designer WYSIWYG design tool • Shorter project planning thanks to re-usable objects • Trend display • Program sequences display • Can be connected to all FEC® units • Extremely sturdy thanks to metal housing ➔ **Internet: .../fed**

Software

Type		Description
Diagnostic module GFDM		• Diagnostic system for the continuous monitoring of the pressure, flow and cycle consumption of a pneumatic system • The system includes sensors (a flow sensor and a pressure sensor) for recording the measured values, a controller for evaluation and one of two visualisation options • Limit monitoring and information concerning trends • Automatic reference data acquisition (teach-in) • Monitoring of up to 16 different process sequences on one system ➔ **Internet: .../gfdm**

Software

Type		Description
Software (FluidDraw) GSWF		• Quick and easy creation of pneumatic circuit diagrams • Comprehensive pneumatics symbol library • Easy, user-friendly operator guidance • Interface to Festo products (catalogue, online shop) ➔ **Internet: .../gswf**
Software GSWC		• Circuit diagram templates for modular electrical terminal CPX • CPX macros for circuit diagram design in EPLAN ➔ **Internet: .../gswc**

Reservoirs

FESTO

Type	Volume	Information on air reservoir materials	Conforms to	Condensate drain connection	Description
Air reservoir VZS 	10 l, 20 l, 5 l	Steel, painted	DIN EN 286-1	G3/8	• Compensation of pressure fluctuations • Provision of large quantities of compressed air for supplying fast pulsing drives • Volume up to 20 l • With condensate drain ➔ **Internet: .../vzs**
Air reservoir CRVZS 	0.1 l, 0.4 l, 0.75 l, 10 l, 2 l, 20 l, 5 l	High-alloy stainless steel	AD 2000	G3/8	• Corrosion-resistant • Volume up to 20 l • Available with condensate drain • The reservoirs can be used to compensate pressure fluctuations, and act as accumulators in the event of sudden air consumption • Provision of large quantities of compressed air for supplying fast pulsing drives • Designs in accordance with EU Pressure Equipment Directive ➔ **Internet: .../crvzs**

Silencers

Type	Information on silencer insert materials	Pneumatic connection	Noise level	Description
Silencer U 	Bronze, PE	G1, G1/2, G1/4, G1/8, G3/4, G3/8, M3, M5, PK-3, PK-4	65 ... 84 dB(A)	• Compact design, plastic or die-cast zinc • Barbed fitting or threaded connection • RoHS-compliant designs ➔ **Internet: .../u**
Silencer UC 	PE	G1/4, G1/8, M5, M7, QS-10, QS-3, QS-4, QS-6, QS-8	58 ... 68 dB(A)	• Design with push-in sleeve for push-in fitting QS or threaded connection for solenoid valves CPE • Plastic design ➔ **Internet: .../uc**
Silencer UO 	PE	G1/4, G1/8, M7		• Special minimal resistance silencer • For vacuum generator VN • Facilitates trouble-free operation ➔ **Internet: .../uo**

Silencers

Type	Information on silencer insert materials	Pneumatic connection	Noise level	Description
Silencer UOS-1 		G1	‹ 75 dB (A)	• For soft-start and quick exhaust valves MS6-SV, MS series • Mounted using male threads ➔ **Internet: .../uos-1**
Silencer UOM, UOMS 	PU foam	G1/4, G3/8		• Silencer and silencer extension • For vacuum generator VN • Special minimal resistance silencer • Facilitates trouble-free operation of the vacuum generator • Silencer extension for extending the silencer for further noise reduction ➔ **Internet: .../uom**

Air guns

Type	Exhaust air function	Pneumatic connection	Information on housing materials	Description
Low consumption air gun LSP 	Metered blowing	Female thread G1/4	Wrought aluminium alloy, PA6 reinforced	• Precise, infinitely variable, lever operated flow metering • Interchangeable nozzles • Pneumatic connection via female thread ➔ **Internet: .../lsp**

Product and system solutions

Customised drive

Customised valve

Product solutions
Do you have a specific requirement that isn't covered by our catalogue portfolio? We can provide customised solutions that are tailored to your needs - from small product modifications to complete new developments.

We involve you at every stage of the development of your tailor-made solution. In doing so, we employ the extensive know-how of our automation specialists and combine it with our many years of experience in standard product development.

This means you get an innovative solution based on the latest technological standards. Furthermore, extensive product testing guarantees the highest quality and precisely defined interfaces ensure seamless integration into your machine.

Possible product solutions:

Modification of technical data
- Operating pressure
- Air humidity/dew point
- Loads/forces/torques
- Media (compressed air, gases, fluid)
- Pneumatic connection
- Temperature range

Environmental adaptations
- Electromagnetic compatibility (EMC)
- Clean room (e.g. semiconductor/food technology, pharmaceuticals)
- Free of copper and PTFE
- Free of paint-wetting impairment substances

Design changes
- Piston rod, internal diameter, thread, undercut
- Space-optimised (e.g. dimensions, design, overall length)
- Mounting
- Precision (tolerances)
- Stroke

Material
- Aluminium
- Stainless steel
- Plastic

Customised control cabinet solution

Customised mounting plate

System solutions
Whether it's a simple solution or a complex system, Festo has been providing innovative system solutions tailored precisely to your application-specific requirements for over 30 years.

We do this by combining a wide range of technologies - pneumatic, servopneumatic, electrical or mechatronic - to suit your needs.

Turnkey systems relieve you of virtually all the complex work processes involved in development and construction. We design, order, commission, test, deliver, install and set up.

You benefit from certification to required standards, optimised connection, installation space and design, easy installation and maintenance.

Possible system solutions:

Ready-to-install control cabinets
- Areas of application: industrial automation, process industry
- Pneumatic, electrical or hybrid control components
- Certifications: ATEX, machinery directive, clean room classification, certification of suitability for use with food, UL and CSA certification
- Free of copper and PTFE
- Free of paint-wetting impairment substances
- Directive-compliant documentation

Ready-to-install pneumatics
- Function-integrated mounting plates
- Aluminium blocks and adapters
- Aluminium profiles
- Special housing and sheet-metal construction

Product and system solutions

Manifold made from polyurethane

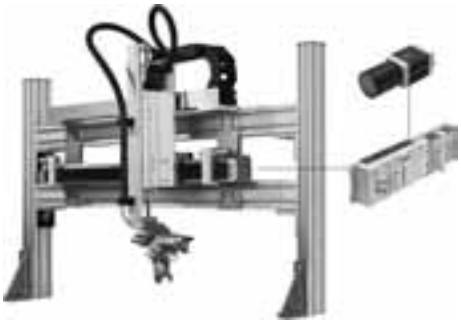
Integration technology
Ideal wherever optimised installation space, rapid installation and maintenance or a compact design are a priority.

The starting point for these solutions is provided by standard products ranging from service units to valve terminals. The know-how and experience of Festo engineers ensure individuality. They replace the conventional system design with an integrated system of lightweight and sturdy polyurethane plates that combine pneumatic and electronic components.

Thanks to integration technology, control systems are more compact, faster, more reliable and more intelligent. In a word: more economical.

You benefit from the extensive competence acquired by Festo engineers in over 30 years of developing innovative integrated solutions.

- Manifolds made from polyurethane
- Up to 60% less installation space and weight than conventional designs
- Closed system
- Low error rate
- Easy installation and maintenance
- No tubing



Customised handling system with profile configuration, handling components, gripper, camera and decentralised multi-axis control

Customised handling systems
Complete systems competence for your handling technology requirements, from pick & place to customised handling systems.

You benefit from a complete system that is fully tested and ready to install. We can also install and commission the system on request.

Chapter 6, starting on page 43, provides an overview of standardised handling systems from the multi-axis modular system.

Function structure
- Pick & place
- Linear gantries
- Cantilever axes
- Three-dimensional gantries

Key features
- Customised development and production based on the multi-axis modular system
- Fully assembled and tested
- Electrical and pneumatic drive components - freely combinable
- Includes energy chain
- Suitable aluminium and steel frames in line with the application
- Individual gripper systems
- Adapted vision systems
- Decentralised multi-axis control

Are you interested in any of these product and system solutions? Or are you looking for a solution that is not listed here? Ask your Festo sales engineer, who will be happy to help.

Service & Support - the advantage for your automation

With Service & Support from Festo, you consistently reduce your process costs, from engineering to the operation of a system.

When considering the overall costs of a system on the basis of TCO (Total Cost of Ownership) this offers enormous saving potential. A significant point is that the actual material costs are minor when compared to the engineering, procurement, assembly and operating costs of a system.

Festo's Service & Support philosophy is based on the continuous analysis of the value creation chain for different types of customers. Festo has used this knowledge to develop a sophisticated service and support portfolio, which is constantly being expanded. This enables us to offer you ongoing support across your entire value creation chain.

Engineering
Innovative solutions, leading-edge technology and short time-to-market thanks to competent engineering support ensure that you benefit right from the start.

- **Worldwide, personal advice -** automation technology specialists support you in all phases, from component selection through to the planning of complex solutions.
- **Electronic catalogue with engineering tools -** for fast selection, design, configuration and simulation as well as circuit diagram and BOM creation.
- **Over 20,000 2D/3D CAD models -** for easy integration into machine planning/documentation.

Procurement
Identical order processing and integrated logistics concept worldwide ensures reliability and maximum flexibility for your business.

- **Logistics optimisation service -** reduces warehouse administration and order processing costs. It also minimises the error rate.
- **Online shop -** always open, always up-to-date.
- **Fast delivery service worldwide -** state-of-the-art logistics centres ensure rapid and direct delivery to any location.

Delivery in Europe is even faster:
- 24-hour delivery service for the standard product range
- Production and delivery within 24 hours for X stroke cylinders and configurable valve terminals with the Special Manufacturing Service.

Assembly & commissioning
Reduced assembly and installation costs combined with maximum reliability and system performance mean you gain time and process reliability.

- **Compressed-air consumption analysis -** exact consumption metering for the optimum sizing of compressors and compressed air lines.
- **Festo plug & work® -** faster assembly and commissioning thanks to straightforward assembly principles, defined interfaces, teach-in or parameterisation functions.
- **Commissioning service for axis systems -** maximum system performance thanks to optimum installation and commissioning on site.

Operation
The production industry is focussed on economy of operation and 100% system availability, which means you can be sure of maximum reliability.

- **Worldwide technical customer service -** for rapid assistance.
- **Repair service -** for complex components and modules.
- **Spare parts service -** comprehensive lists of spare parts available online.
- **Modular service agreements -** for preventive and emergency maintenance.
- **Energy Saving Services -** for up to 60% less compressed air consumption.
- **Compressed air quality analysis -** for increased process reliability and longer service life of pneumatic components.
- **Condition Monitoring Service -** means that your critical processes are always under control. Our specialists will develop an individual solution for your system.

Everything from a single source: automation know-how for numerous industries

A wide range of industries and areas of automation rely on the excellent products and services from Festo. The result? An exemplary partnership offering increased productivity and process reliability. In factory automation - for the handling of discrete goods - and in process automation, which focuses on processes involving gaseous, liquid and paste-like fluids or bulk materials with particular flow characteristics, Festo is a competent partner, thanks to its excellent knowledge of the industry-specific requirements in production and the means of production - and a portfolio that meets these requirements.

Intelligent factory automation
The automotive industry trusts Festo. With good reason - Festo helps companies to stay ahead in the daily race for the most efficient production. Over 40 years of experience ensure a thorough understanding of the individual production stages in press shops, body shops, painting plants, engine production or assembly lines. Suppliers, machine manufacturers and plant constructors in the associated sectors also rely on Festo.

Electronics industry - Festo inside
Electronic products such as mobile phones, flat-panel screens, navigation systems, pulse monitors and even solar cells are following a clear trend towards miniaturisation combined with maximum functionality. Festo is involved in every production step - from production of the silicon wafers to the finished end product. Extensive know-how is consolidated in a product range that precisely meets the specific requirements for the handling and processing of components in electronics and precision mechanics for
– light assembly,
– flat panel production and
– solar cell production.

Festo products also offer optimised ESD protection, freedom from copper and PTFE, clean room suitability and connection technology as well as directives such as RoHS and WEEE.

Food and packaging industry - simply clean
Mixing, sterilising, pasteurising, packing, handling - components and system solutions from Festo contribute to efficient automation, mostly in a mix of continuous processes and production automation. With innovative Clean Design solutions, Festo can guarantee food safety in splash zones. Festo can also provide individual solutions worldwide thanks to the industry-specific expertise of our sales engineers.

Paper and printing industry
High speed combined with flexibility, fluctuating circulation figures, flexible pagination, colour changes. Modern printing and paper technologies require extremely fast paper processing, as well as flexibility and precision. Whether pneumatically controlled brakes, clutches or air motors are involved, or advancing and retracting cylinder motion, rollers and contact rollers, or swivel motion for maintenance purposes - components from Festo provide support for paper processing and printing processes at every workstation.

Mobile pneumatics
Locomotion in mobile automation is subject to a whole series of specific requirements. These requirements include a broad temperature range as well as numerous resistance factors, e.g. shock, corrosion or contamination. We work closely with our customers to develop price-sensitive, functional solutions and provide support along the entire value creation chain.

Everything from a single source: automation know-how for numerous industries

Intelligent process automation - utilising the synergy

Different industries, same targets. Our specialists not only provide competent advice in relation to technology, safety and quality, but also help you to consistently and lastingly reduce your Total Cost of Ownership. Festo makes good use of the synergy effects from production automation for process automation. What's more, you get everything you need from a single source - products, system solutions and services. All in all, you can choose from centralised and decentralised automation concepts for GMP, food or ATEX zones, high and low temperatures, harsh and corrosive atmospheres, with optional FDA and HACCP conformity. Condition Monitoring and comprehensive diagnostic strategies reduce production stoppages and downtime to a minimum.

Systematically faster for optimum water treatment

Festo provides individual automation solutions for communal and industrial water treatment and sewage treatment. Our solutions are economical, reliable and robust. What's more, you get everything you need from a single source - from process valves to management level, as a component or a pre-assembled system.

The ultimate goal: clean processes along with high system availability and process reliability

Minimum production costs coupled with maximum quality standards is the ultimate goal for the biotechnology/pharmaceutical, chemical and food industry. The processes often involve material batches that are extremely valuable or a continuous, reliable production process.

Festo in petrochemicals, oil and gas, power generation, mining and pulp and paper.

Thanks to its inherent benefits such as explosion and overload protection, pneumatics are ideal for the automation of systems in the petrochemical, oil and gas, power generation, mining and pulp and paper industries. Sturdy and corrosion-resistant components and systems from Festo help to avoid unplanned downtime, even in maintenance-free continuous operation and with aggressive chemicals flowing through the process valves.

Festo - partner to the automotive industry

Automotive manufacturers the world over trust Festo
With good reason - Festo combines more than five decades of experience in the production of standard components and application-optimised pneumatics for the automotive industry with a thorough understanding of the individual manufacturing sequences.

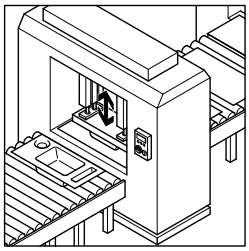
Apart from the automotive manufacturers themselves, suppliers, machine manufacturers and plant constructors also rely on partnership with Festo. With good reason - one of Festo's fundamental principles is to offer ongoing support in all the critical phases of the value creation chain. Within this context, innovation and quality of production and product are as important for Festo as quality of service and price, and will continue to be so in the future. This results in reliable and innovative products and tailored services. Furthermore, Festo promotes maximum productivity and implements strategies for reliable and creative system partnerships in the form of comprehensive support and services for processes and projects. Our worldwide presence means we can offer our customers a one-stop shop for all their needs.

Whether in press shops, body shops, painting plants, engine production or assembly lines, Festo is a partner to the automotive industry.

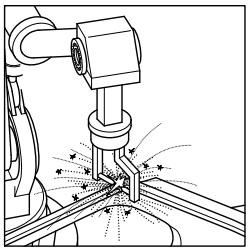
Festo - your contact
The automotive industry has always been one of the most important sectors for Festo. Decades of know-how has been consolidated within the Automotive Management department, which has its headquarters in Esslingen. Key Account Managers support end customers, system manufacturers and suppliers. For each project you are assigned a support and project manager, who guides you through all of the phases of the project from planning through to design, right up to commissioning and after sales. The latest information on the automotive industry is provided on our homepage at www.festo.com/automotive.

Catalogues and release lists
For the convenience of suppliers and manufacturers in the automotive industry, Festo produces manufacturer-specific catalogues. Festo also produces factory-specific and project-specific release lists in co-operation with end customers. These catalogues and release lists are constantly updated and can be downloaded from www.festo.com/automotive.

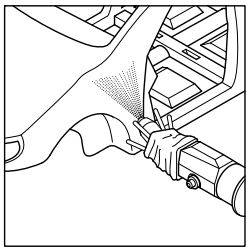
Production areas of vehicle manufacturers



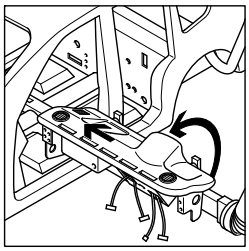
Press shop
Automation is a true workhorse when it comes to pressing and shaping body parts from sheet steel at the beginning of a car's life after all, the rolls or sheets weigh several hundred tonnes. The metal sheets are separated and fed to the press. This requires high precision, often in the tightest of spaces. This kind of work is made-to-measure for Festo, as the sheet supply must always function smoothly and without faults so that the sheets can be handled securely and efficiently.



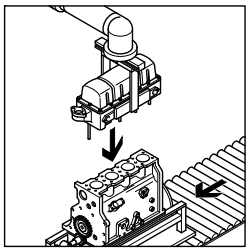
Body assembly
Flexibility is a customer demand right from the start. During body assembly, there are already several hundred different designs for one vehicle type. This requires the highest flexibility in automation. The correct parts have to be in the right place at the right time and need to be held in position with absolute precision. When welding, for instance, the repetition accuracy for the position of the spot welds is particularly important. And this is exactly why car body assembly is a main area of application for innovative pneumatic solutions from Festo - whether in welding facilities, on welding guns or for parts handling.



Paint shop
The technical brilliance is such that paintwork comprising four or five layers of protective and top coatings can look unbelievably thin. In painting systems, Festo pneumatics give a polished performance when controlling spray guns and in particular in the clean preparation of air for pilot and process air.



Final assembly
In no other area of automotive manufacturing are the tasks as diverse as in assembly - supplying parts as well as mounting, holding or fixing them automatically. Pneumatic components from Festo in assembly and testing equipment ensure that this work is performed even more smoothly and simply. Products that have been optimised with respect to installation space, weight and performance facilitate faster and more precise work processes, and time is a critical factor in determining international success in a highly competitive market.

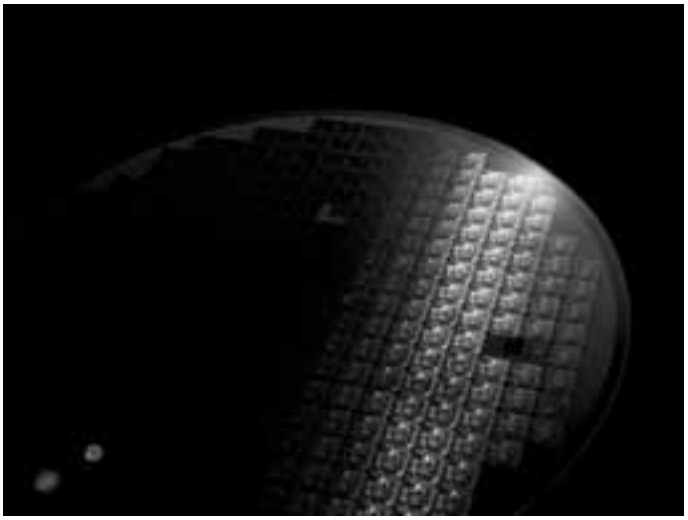


Engine and transmission production
Engine and transmission production is characterised by long conveyor belts, on which the parts are transported to the individual processing centres. Pneumatics from Festo contribute, among other things, towards optimising the processes and controlling the material flow. In processing machines, pneumatics from Festo ensure efficient and precise processes.

Tier 1

Automotive suppliers
The tasks of automotive suppliers are as varied as the delivered parts (Tier 3), components (Tier 2), systems and modules (Tier 1) and integrated systems (Tier 0.5). Festo offers product and system solutions for all areas of this sector, from drives (drivetrain) through to electrics & electronics, interiors through to the chassis and the exterior & body.

Festo - partner to the electronics industry



Concepts for maximum efficiency
The semiconductor, solar cell, flat panel and electronics industries are currently in a phase characterised by major challenges and innovation, which is set to continue. Standard products as well as customised products, solutions and services from Festo can help you consolidate your competitive advantage long-term.

Innovative solutions in the semiconductor industry
The semiconductor industry is divided into front end (wafer processing) and back end (testing, assembly, packaging).
For the front end segment, Festo offers a wide selection of aluminium and stainless steel pneumatic cylinders and various valve types. These valves are used for actuating cylinders and for pilot control of gas valves.
The focus in the back-end segment is on the miniaturisation of pneumatic drives and valves. Festo mini slides and valves in particular are highly flexible thanks to versatile direct mounting and connection options.

Staying clean
Many of the production steps in the semiconductor industry have to be carried out under clean room conditions. The more sensitive the production of a product, the cleaner the production method must be. Festo has responded to these requirements with a special range of clean room products.

Innovative solutions in solar cell production
Festo has been developing handling systems for transporting silicon wafers and solar cells for many years. These systems improve productivity for manufacturers thanks to their high speed and quiet running characteristics.
Thin-film solar cell technology is still relatively new and is an extremely promising alternative to conventional silicon solar cells in solar installations. Powerful handling systems are used for fast and reliable linking of the individual process stages so that expensive production plants can be fully utilised.
The multi-axis modular system from Festo delivers the necessary components, and even faster results can be achieved with pre-assembled and tested system solutions for your handling requirements.
The production of solar cells from silicon wafers is highly automated. Pneumatic drives and valves from Festo guarantee that the extremely sensitive raw wafers are transported quickly and positioned correctly. Vacuum generators and appropriate suction grippers hold the delicate wafers securely during transport.

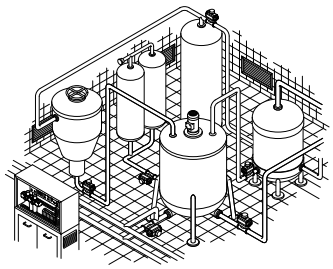
Innovative solutions in flat panel production
Festo provides handling systems for transporting glass substrate and flat-panel screens. These systems improve productivity for manufacturers thanks to their high speed, low noise levels and minimal maintenance.
Festo works together with customers to develop and optimise suitable handling and transport systems for glass substrate directly on site. Its 15 years of experience with electrical and pneumatic positioning systems thus stand Festo in good stead.

Innovative solutions in light assembly
Assembly and testing with pneumatics:
Small pneumatic automation components are particularly suitable for use in machines that produce and assemble small electronic devices. Examples include mobile phones, palmtops, organisers etc., which require various assembly, handling and test functions to be carried out in very small spaces and with limited functionality.
These products are also ideally suited to applications in similar areas such as medical technology, precision engineering, optics etc.

Festo - partner to the food processing and packaging industry

Spick and span solutions for automation in all four sectors of the food processing and packaging industry. From process automation for mixing or portioning in the food or splash zone to packaging in the non-food zone, Festo has an extensive and economical product portfolio to meet your requirements.

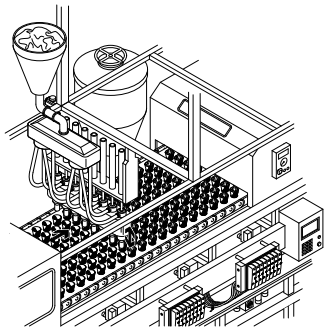
The Clean and Hygienic Design range has some particularly enticing offerings. Ease of cleaning and corrosion resistance in all performance classes are combined with selected services to make food production safer.



Process automation
From handling raw materials for food production to sewage treatment, Festo offers a range of suitable products and complete solutions for the automation of all continuous production processes. All products are, of course, certified for use in the food industry and meet all relevant requirements for the application in question.

Processes in the food zone
- Mixing and stirring
- Sterilising
- Pasteurising
- Homogenising
- Filtering
- Dispensing
- Weighing
- Bottling
- Ensiling

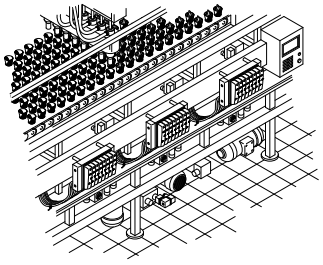
The food industry has many other possible applications for products from the process automation range, including processes in the non-food zone, for example:
- Media preparation
- Cleaning
- Wastewater disposal



Food zone
The food zone encompasses all system parts and components that come into contact with food. In other words, the component is mounted directly within the food flow or food come into contact with the component before being returned to the product flow. Parts that come into contact with food must be easy to clean and disinfect. They must also be corrosion-resistant, non-toxic, non-absorbent, smooth and of one-piece construction or sealed in order to prevent food particles collecting in small gaps. Parts that are difficult to remove pose a contamination hazard. In addition, only special food-compatible lubricants may be used. These requirements also apply to parts that are dismantled for cleaning.

Special features:
- Direct contact with food
- Food returns to the product flow

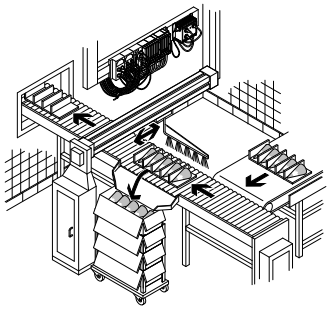
Functions:
- Portioning
- Bottling
- Moulding
- Filling



Splash zone
Machine parts and components in the splash zone come into direct contact with food. Food cannot be returned to the product flow from this zone. Despite this fact, the splash zone should still be planned and designed according to the same criteria as the food zone. The technical implementation can be less stringent, provided this does not have an unfavourable effect on the quality of the manufacturing process.

Special features:
- Direct contact with food
- Food does not return to the product flow

Functions:
- Portioning
- Bottling
- Sealing



Non-food zone
In the non-food zone, the machine components do not come into contact with food. Nevertheless, all of the parts and system components used in the non-food zone should be manufactured from corrosion-resistant materials and be easy to clean and disinfect in order to minimise any possible risk. Packaging installation components must meet very specific requirements. They need to be smaller, more versatile and more compatible than other components. Impurities such as mineral oils, metal particles etc. must not enter the food during the packaging process. Another important factor is compressed air preparation up to the required quality level in order to exclude the possibility of faults and material wear.

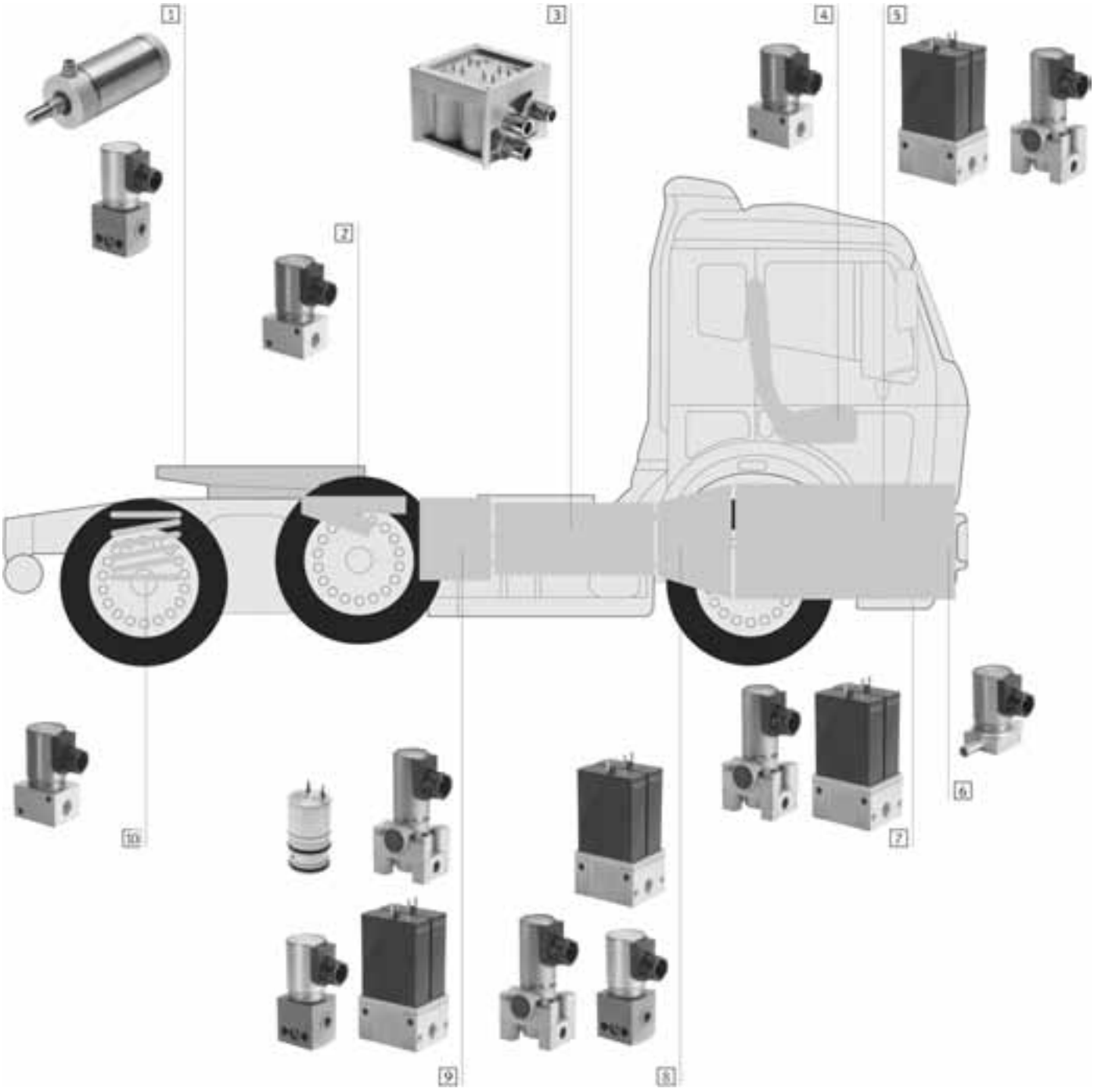
Special features:
- Dry: no contact with food and cleaning agents
- Wet: no contact with food, but contact with cleaning agents possible

Functions:
- Packaging
- Labelling
- Inspecting and checking

Mobile pneumatics for your vehicle

From vehicle manufacturing to pneumatics in vehicles
The automotive industry has been an important market for Festo for many decades. Many automotive manufacturers trust this partnership for an extensive range of production processes.
Festo now also supplies its customers with solutions for on-board pneumatic systems.
From components for seat comfort systems to pneumatic transmission control systems, Festo develops products for many applications in commercial vehicles and cars.
The specific requirements of the automotive industry are always taken into account.

Pneumatic commercial vehicle solutions from Festo



1 Fifth wheel coupling
2 Lift axle
3 Transmission control
4 Seat height adjustment
5 Turbocharger
6 Cooling circuit
7 Exhaust gas recirculation
8 Motor brake
9 Retarder
10 Pneumatic suspension