Bemak

FESTO

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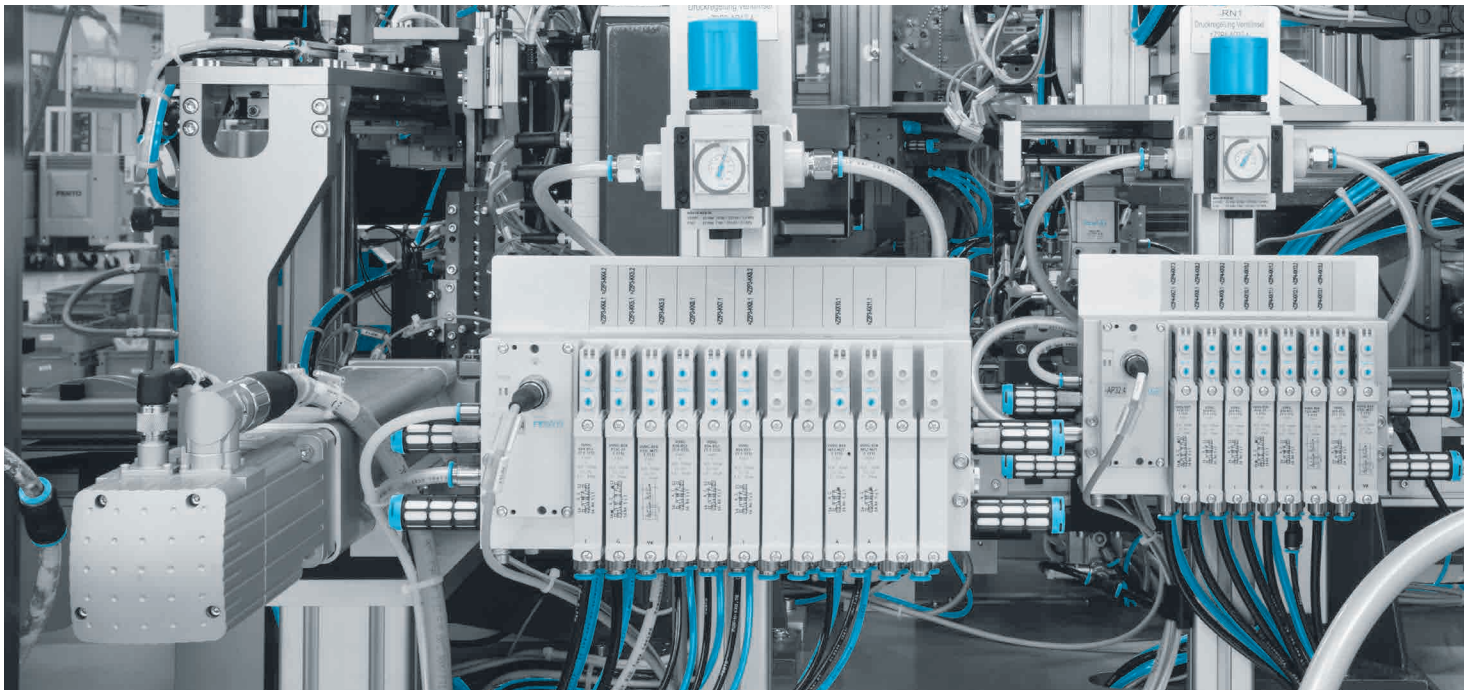
Product overview

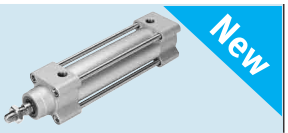


Standards-based cylinders

FESTO

	 **Compact cylinders ADN**	 **Compact cylinders AEN**	 **Compact cylinders ADN-EL**	 **Compact cylinders, Clean Design CDC**
Mode of operation	Double-acting	Single-acting, pushing, pulling	Double-acting	Double-acting
Piston diameter	12 mm, 16 mm, 20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm, 125 mm	12 mm, 16 mm, 20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm	20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm	20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm, 80 mm
Theoretical force at 6 bar, advancing	51 ... 7363 N	54 ... 4416 N	188 ... 4712 N	141 ... 3016 N
Stroke	1 ... 500 mm	1 ... 25 mm	10 ... 500 mm	1 ... 500 mm
Cushioning	Elastic cushioning rings/pads at both ends, self-adjusting pneumatic end-position cushioning	Elastic cushioning rings/pads at both ends	Elastic cushioning rings/pads at both ends	Elastic cushioning rings/pads at both ends
Quick ordering of selected basic designs	★			
Description	• ISO 21287 • Up to 50% less installation space than comparable standards-based cylinders to ISO 15552 • Piston rod with female or male thread • Wide range of variants for customised applications • For position sensing	• ISO 21287 • Up to 50% less installation space than comparable standards-based cylinders to ISO 15552 • Piston rod with female or male thread • Wide range of variants for customised applications • For position sensing	• Mounting hole pattern to ISO 21287 • With end-position locking at both ends, front or rear • For position sensing • Piston rod with male or female thread	• ISO 21287 • Up to 50% less installation space than comparable standards-based cylinders to ISO 15552 • Easy-to-clean design • Increased corrosion protection • Wide range of variants for customised applications • Piston rod with female or male thread • For position sensing
online: →	**adn**	**aen**	**adn-el**	**cdc**

Standards-based cylinders

	 New **Standards-based cylinders DSBC**	 New **Standards-based cylinders DSBG**	 **Standards-based cylinders DSBG**	 **Standards-based cylinder, Clean Design DSBF**
Mode of operation	Double-acting	Double-acting	Double-acting	Double-acting
Piston diameter	32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm, 125 mm	32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm, 125 mm	160 mm, 200 mm, 250 mm, 320 mm	32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm, 125 mm
Theoretical force at 6 bar, advancing	415 ... 7363 N	415 ... 7363 N	12064 ... 48255 N	415 ... 7363 N
Stroke	1 ... 2800 mm	1 ... 2800 mm	1 ... 2700 mm	1 ... 2800 mm
Cushioning	Elastic cushioning rings/pads at both ends, self-adjusting pneumatic end-position cushioning, pneumatic cushioning adjustable at both ends	Elastic cushioning rings/pads at both ends, self-adjusting pneumatic end-position cushioning, pneumatic cushioning adjustable at both ends	Elastic cushioning rings/pads at both ends, pneumatic cushioning adjustable at both ends	Elastic cushioning rings/pads at both ends, self-adjusting pneumatic end-position cushioning, pneumatic Cushioning, adjustable at both ends
New	• Optimised for low friction, with clamping profile	• Optimised for low friction, with tie rods		
Quick ordering of selected basic designs	★			
Description	• ISO 15552 (ISO 6431, VDMA 24562) • Self-adjusting pneumatic end-position cushioning which adapts optimally to changes in load and speed • Wide range of variants for customised applications • Comprehensive range of mounting accessories for just about every type of installation • For position sensing	• ISO 15552 (ISO 6431, VDMA 24562) • Sturdy tie rod design • Self-adjusting pneumatic end-position cushioning which adapts optimally to changes in load and speed • Comprehensive range of mounting accessories for just about every type of installation • For position sensing	• ISO 15552 (ISO 6431, VDMA 24562) • Sturdy tie rod design • Pneumatic end-position cushioning, adjustable at both ends • Optionally without end-position cushioning, adjustable at both ends, and position sensing, resulting in a price advantage • New: optionally with spacer bolt attachment • For position sensing	• ISO 15552 • Increased corrosion protection • Easy-to-clean design • FDA-approved lubrication and sealing on the basic version • Long service life thanks to optional seal for unlubricated operation • Self-adjusting pneumatic end-position cushioning which adapts optimally to changes in load and speed • For position sensing
online: →	dsbc	dsbg	dsbg	dsbf

Standards-based cylinders

FESTO

	 **Standards-based cylinders DNC**	 **Round cylinders DSNU**	 **Round cylinders ESNU**
Mode of operation	Double-acting	Double-acting	Single-acting, pushing
Piston diameter	32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm, 125 mm	8 mm, 10 mm, 12 mm, 16 mm, 20 mm, 25 mm	8 mm, 10 mm, 12 mm, 16 mm, 20 mm, 25 mm
Theoretical force at 6 bar, advancing	415 ... 7363 N	23 ... 295 N	19 ... 271 N
Stroke	2 ... 2000 mm	1 ... 500 mm	1 ... 50 mm
Cushioning	Elastic cushioning rings/pads at both ends, pneumatic cushioning adjustable at both ends	Elastic cushioning rings/pads at both ends, self-adjusting pneumatic end-position cushioning, pneumatic cushioning adjustable at both ends	Elastic cushioning rings/pads at both ends
Quick ordering of selected basic designs		★	
Description	• ISO 15552 (ISO 6431, VDMA 24562) • Wide range of variants for customised applications • Comprehensive range of mounting accessories for just about every type of installation • For position sensing	• ISO 6432 • Wide range of variants for customised applications • Good running performance and long service life • Self-adjusting pneumatic end-position cushioning which adapts optimally to changes in load and speed • Piston rod with male or female thread • For position sensing	• ISO 6432 • Wide range of variants for customised applications • Good running performance and long service life • Piston rod with female or male thread • For position sensing
online: →	**dnc**	**dsnu**	**esnu**

Round cylinders

	 **Round cylinders DSNU**	 **Round cylinders ESNU**	 **Round cylinders EG-PK**
Mode of operation	Double-acting	Single-acting, pushing	Single-acting, pushing
Piston diameter	32 mm, 40 mm, 50 mm, 63 mm	32 mm, 40 mm, 50 mm, 63 mm	4 mm, 6 mm, 2,5 mm
Theoretical force at 6 bar, advancing	482.5 ... 1870.3 N	406 ... 1765 N	1.9 ... 11.8 N
Stroke	1 ... 500 mm	1 ... 50 mm	5 ... 25 mm
Cushioning	Elastic cushioning rings/pads at both ends, self-adjusting pneumatic end-position cushioning, pneumatic cushioning adjustable at both ends	Elastic cushioning rings/pads at both ends	At one end, non-adjustable, no cushioning
Description	• Wide range of variants for customised applications • Good running performance and long service life • Self-adjusting pneumatic end-position cushioning which adapts optimally to changes in load and speed • Piston rod with male or female thread • For position sensing	• Wide range of variants for customised applications • Good running performance and long service life • Piston rod with female or male thread • For position sensing	• Micro cylinder • Barbed fitting for plastic tubing with standard I. D. • Without position sensing
online: →	dsnu	esnu	eg-pk

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Stainless-steel cylinders

FESTO

	 Round cylinders CRDSNU, CRDSNU-B	 Round cylinders CRDSNU, CRDSNU-B	 Standards-based cylinders CRDNG, CRDNGS	 Round cylinders CRHD
Mode of operation	Double-acting	Double-acting	Double-acting	Double-acting
Piston diameter	12 mm, 16 mm, 20 mm, 25 mm	32 mm, 40 mm, 50 mm, 63 mm	32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm, 125 mm	32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm
Theoretical force at 6 bar, advancing	68 ... 295 N	483 ... 1870 N	483 ... 7363 N	483 ... 4712 N
Stroke	1 ... 500 mm	1 ... 500 mm	10 ... 2000 mm	10 ... 500 mm
Cushioning	Elastic cushioning rings/pads at both ends, self-adjusting pneumatic end-position cushioning, pneumatic cushioning adjustable at both ends	Elastic cushioning rings/pads at both ends, self-adjusting pneumatic end-position cushioning, pneumatic cushioning adjustable at both ends	Pneumatic Cushioning adjustable at both ends	Pneumatic Cushioning adjustable at both ends
Description	• ISO 6432 • Corrosion-resistant against aggressive ambient conditions • Easy-to-clean design • Long service life thanks to optional dry-running seal • Wide range of variants for customised applications • Self-adjusting pneumatic end-position cushioning which adapts optimally to changes in load and speed • For position sensing	• Corrosion-resistant against aggressive ambient conditions • Easy-to-clean design • Long service life thanks to optional dry-running seal • Wide range of variants for customised applications • Self-adjusting pneumatic end-position cushioning which adapts optimally to changes in load and speed • For position sensing	• ISO 15552 (ISO 6431, VDMA 24562) • Corrosion-resistant against aggressive ambient conditions • Easy-to-clean design • Variants: through piston rod, heat-resistant design • Threaded mounting, mounting via accessories • For position sensing	• Corrosion-resistant against aggressive ambient conditions • Easy-to-clean design, optimised for very exacting demands • Flexible design thanks to different end caps • Piston rod with male thread • For position sensing
online: →	crdnsu	crdsnu	crdng	crhd

Compact, short-stroke and flat cylinders

	 **Compact cylinders ADN**	 **Compact cylinders AEN**	 **Compact cylinders ADNGF**	 **Compact cylinders ADN-EL**
Mode of operation	Double-acting	Single-acting, pushing, pulling	Double-acting	Double-acting
Piston diameter	12 mm, 16 mm, 20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm, 125 mm	12 mm, 16 mm, 20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm	12 mm, 16 mm, 20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm, Führungsstange mit Joch	20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm
Theoretical force at 6 bar, advancing	51 ... 7363 N	54 ... 4416 N	68 ... 4712 N	188 ... 4712 N
Stroke	1 ... 500 mm	1 ... 25 mm	1 ... 400 mm	10 ... 500 mm
Cushioning	Elastic cushioning rings/pads at both ends, self-adjusting pneumatic end-position cushioning	Elastic cushioning rings/pads at both ends	Elastic cushioning rings/pads at both ends, self-adjusting pneumatic end-position cushioning	Elastic cushioning rings/pads at both ends
Quick ordering of selected basic designs	★			
Description	• ISO 21287 • Up to 50% less installation space than comparable standards-based cylinders to ISO 15552 • Piston rod with female or male thread • Wide range of variants for customised applications • For position sensing	• ISO 21287 • Up to 50% less installation space than comparable standards-based cylinders to ISO 15552 • Piston rod with female or male thread • Wide range of variants for customised applications • For position sensing	• Mounting hole pattern to ISO 21287 • Piston rod secured against rotation by a guide rod and yoke plate • Plain-bearing guide • Optionally with through piston rod • For position sensing	• Mounting hole pattern to ISO 21287 • With end-position locking at both ends, front or rear • For position sensing • Piston rod with female or male thread
online: →	**adn**	**aen**	**adngf**	**adn-el**

Compact, short-stroke and flat cylinders

FESTO

	 **Compact cylinders, Clean Design CDC**	 **Short-stroke cylinders ADVC, AEVC**	 **Compact cylinders ADVU, AEVU, AEVUZ**	 **Compact cylinders ADVUL**
Mode of operation	Double-acting	Double-acting, single-acting, pushing	Double-acting, single-acting, pushing, pulling	Double-acting
Piston diameter	20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm, 80 mm	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	12 mm, 16 mm, 20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm, 125 mm, Square piston rod	12 mm, 16 mm, 20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm, Guide rod with yoke
Theoretical force at 6 bar, advancing	141 ... 3016 N	4.9 ... 4712 N	42 ... 7363 N	51 ... 4712 N
Stroke	1 ... 500 mm	2.5 ... 25 mm	1 ... 2000 mm	1 ... 400 mm
Cushioning	Elastic cushioning rings/pads at both ends	Elastic cushioning rings/pads at both ends	Elastic cushioning rings/pads at both ends	Elastic cushioning rings/pads at both ends
Quick ordering of selected basic designs		★		
Description	• ISO 21287 • Up to 50% less installation space than comparable standards-based cylinders to ISO 15552 • Easy-to-clean design • Increased corrosion protection • Wide range of variants for customised applications • Piston rod with female or male thread • For position sensing	• Mounting hole pattern to VDMA 24562 as of Ø 32 mm • Very short overall length • High forces in a compact size • Piston rod with female or male thread • For position sensing with proximity sensor for T-slot and for C-slot	• 50% less installation space than comparable standards-based cylinders to ISO 15552 • Wide range of variants for customised applications • Piston rod with female or male thread • For position sensing	• Piston rod secured against rotation by a guide rod and yoke plate • Plain-bearing guide • Optionally with through piston rod • For position sensing
online: →	**cdc**	**advc**	**advu**	**advul**

Compact, short-stroke and flat cylinders

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

Cartridge cylinders and multimount cylinders

	 **Multimount cylinders DMM, EMM**	 **Cartridge cylinders EGZ**
Mode of operation	Double-acting, single-acting, pushing, pulling	Single-acting, pushing
Piston diameter	10 mm, 16 mm, 20 mm, 25 mm, 32 mm	6 mm, 10 mm, 16 mm
Theoretical force at 6 bar, advancing	30 ... 483 N	13.9 ... 109 N
Stroke	1 ... 50 mm	5 ... 15 mm
Cushioning	Elastic cushioning rings/pads at both ends	No cushioning
Description	• Wide variety of mounting and attachment options • Wide selection of piston rod variants • Piston rod with male thread • For position sensing	• Minimal fitting space • Installation with or without mounting components • Piston rod with male thread
online: →	dmm	egz

Cylinders with clamping unit

FESTO

	 **Standards-based cylinders with clamping cartridge DSBC-C**	 **Compact cylinders with clamping cartridge ADN-KP**	 **Round cylinders with clamping cartridge DSNU-KP**
Mode of operation	Double-acting	Double-acting	Double-acting
Piston diameter	32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm, 125 mm	20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm	8 mm, 10 mm, 12 mm, 16 mm, 20 mm, 25 mm
Theoretical force at 6 bar, advancing	415 ... 7363 N	188 ... 4712 N	30 ... 295 N
Stroke	10 ... 2800 mm	10 ... 500 mm	1 ... 500 mm
Cushioning	Elastic cushioning rings/pads at both ends, self-adjusting pneumatic end-position cushioning, pneumatic cushioning adjustable at both ends	Elastic cushioning rings/pads at both ends	Elastic cushioning rings/pads at both ends, self-adjusting pneumatic end-position cushioning, pneumatic cushioning adjustable at both ends
Description	• Piston rod can be held in any position • Piston rod can be held in position for long periods even with alternating loads, fluctuating operating pressure or leaks in the system • Standard hole pattern • Piston rod with male or female thread • For position sensing	• Piston rod can be held in any position • The piston rod can be held in position for long periods even with alternating loads, fluctuating operating pressure in the system or loss of pressure • Mounting hole pattern to ISO 21287 • Piston rod with female or male thread • For position sensing	• Piston rod can be held in any position • The piston rod can be held in position for long periods even with alternating loads, fluctuating operating pressure in the system or loss of pressure • Mounting hole pattern to ISO 6432 • For position sensing
online: →	**dsbc-c**	**adn-kp**	**dsnu-kp**

Cylinders with clamping unit

	 **Round cylinders with clamping cartridge DSNU-KP**	 **Standards-based cylinders with clamping cartridge DNC-KP**	 **Cylinders with clamping unit DNCKE**
Mode of operation	Double-acting	Double-acting	Double-acting
Piston diameter	32 mm, 40 mm, 50 mm, 63 mm	32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm, 125 mm	40 mm, 63 mm, 100 mm
Theoretical force at 6 bar, advancing	483 ... 1870 N	415 ... 7363 N	754 ... 4712 N
Stroke	1 ... 500 mm	10 ... 2000 mm	10 ... 2000 mm
Cushioning	Elastic cushioning rings/pads at both ends, self-adjusting pneumatic end-position cushioning, pneumatic cushioning adjustable at both ends	Elastic cushioning rings/pads at both ends, pneumatic cushioning adjustable at both ends	Pneumatic cushioning adjustable at both ends
Description	• Piston rod can be clamped in any position • The piston rod can be held in position for long periods even with alternating loads, fluctuating operating pressure in the system or loss of pressure • For position sensing	• Mounting hole pattern to ISO 15552 • The piston rod can be clamped in any position • The piston rod can be held in position for long periods even with alternating loads, fluctuating operating pressure in the system or loss of pressure • Piston rod with male or female thread • For position sensing	• Piston rod can be held and braked in any position • Variant DNCKE-...-S approved for use in safety-oriented parts of control systems • Mounting hole pattern to ISO 15552 • Piston rod with male thread • For position sensing
online: →	**dsnu-kp**	**dnc-kp**	**dncke**

Rodless cylinders

	 **Linear drives DGC-K**	 **Linear drives DGC-G, DGC-GF, DGC-KF**	 **Linear drives with heavy-duty guide DGC-HD**	 **Linear drives SLG**
Piston diameter	18 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm, 80 mm	8 mm, 12 mm, 18 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm	18 mm, 25 mm, 40 mm	8 mm, 12 mm, 18 mm
Theoretical force at 6 bar, advancing	153 ... 3016 N	30 ... 1870 N	153 ... 754 N	30 ... 153 N
Stroke	1 ... 8500 mm	1 ... 8500 mm	1 ... 5000 mm	100 ... 900 mm
Cushioning	Pneumatic cushioning adjustable at both ends	Elastic cushioning rings/pads at both ends, pneumatic cushioning, adjustable at both ends, shock absorber, hard characteristic curve, shock absorber, soft characteristic curve	Shock absorber, hard characteristic curve, shock absorber, soft characteristic curve	Elastic cushioning rings/pads at both ends, shock absorber, hard characteristic curve
Position sensing	Via proximity sensor	Via proximity sensor	Via proximity sensor	Via proximity sensor
Description	• Compact design: 30% smaller than the basic design DGC-G • Basic drive without guide, for simple drive functions • Low moving dead weight • Symmetrical design • Fully interchangeable with linear drive DGP	• Basic design, plain or recirculating ball bearing guide • All settings accessible from one side • Optionally with variable end stops and intermediate position module • Exchangeable with DGPL thanks to foot mountings • Software tool available for bearing calculation • Optional: NSF-H1 lubricant for the food industry (See supplementary information on materials at www.festo.com/sp › Certificates) • Optional: clamping unit for holding loads	• For maximum loads and torques thanks to duo rail guide • Very good operating performance under torque load • Long service life • Ideal as a basic axis for linear gantries and cantilever axes • Wide range of options for mounting on drive units	• Extremely flat design • Highest precision thanks to integrated recirculating ball bearing guide • Adjustable end stops • Wide range of supply ports • Available with intermediate position module
online: →	dgc-k	dgc	dgc-hd	slg

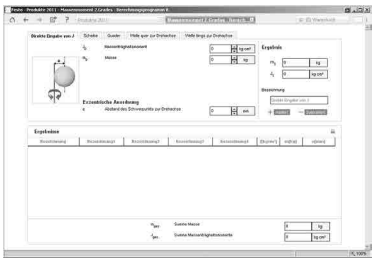
Rodless cylinders

FESTO

	 **Linear drives DGPL**	 **Linear drives DGO**	 **Linear units SLM**
Piston diameter	18 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm, 80 mm	12 mm, 16 mm, 20 mm, 25 mm, 32 mm, 40 mm	12 mm, 16 mm, 20 mm, 25 mm, 32 mm, 40 mm
Theoretical force at 6 bar, advancing	153 ... 3016 N	68 ... 754 N	68 ... 754 N
Stroke	10 ... 3000 mm	10 ... 4000 mm	10 ... 1500 mm
Cushioning	Pneumatic cushioning adjustable at both ends, shock absorber, hard characteristic curve	Elastic cushioning rings/pads at both ends, pneumatic cushioning adjustable at both ends	Elastic cushioning rings/pads at both ends, shock absorber, hard characteristic curve
Position sensing	Via proximity sensor, with attached displacement encoder, with integrated displacement encoder	Via proximity sensor	Via proximity sensor, via inductive sensors
Description	• Recirculating ball bearing guide or heavy-duty guide • High precision and load capacity • Wide range of variants for customised applications	• Magnetic power transmission • Pressure-tight and zero leakage • Dirt-proof and dust-proof	• Magnetic power transmission • Recirculating ball bearing guide: combination of slide unit and rodless linear drive • Individual choice of end-position cushioning and sensing
online: ➔	**dgpl**	**dgo**	**slm**

Software tool

Mass moment of inertia



Juggling pencils and pocket calculators is now a thing of the past. Whether you have discs, blocks, push-on flanges, grippers, etc., this tool does the job of calculating all the mass moments of inertia. Just save, send or print and you're finished. This tool can be found

- either in the electronic catalogue by clicking on the blue button "Engineering"
- or on the DVD under Engineering Tools.

Semi-rotary drives

	 New **Semi-rotary drives** **DRVS**	 **Semi-rotary drives** **DSM, DSM-B, DSM-HD-B**	 **Semi-rotary drives** **DSR, DSRL**
Size	6, 8, 12, 16, 25, 32, 40	6, 8, 10, 12, 16, 25, 32, 40, 63	10, 12, 16, 25, 32, 40
Theoretical torque at 6 bar	0.15 ... 20 Nm	0.15 ... 80 Nm	0.5 ... 20 Nm
Permissible mass moment of inertia	6.5 ... 350 kgcm²	6.5 ... 5000 kgcm²	0 ... 150 kgcm²
Position sensing	Via proximity sensor	Without, via proximity sensor	Without
Swivel angle	0 ... 270°	0 ... 270°	0 ... 180°
New	• With position sensor SRBS-Q1/Q12: quick to mount and infinitely adjustable • Push-on flange DARF and flange mounting DAMF□ versatile, quick and easy to mount		
Quick ordering of selected basic designs	★		
Description	• Double-acting semi-rotary drive with rotary vane • Lighter than other semi-rotary drives • Fixed swivel angle, adjustable swivel angle possible with the help of accessories • Housing protected against splash water and dust	• Semi-rotary vane drive • With spigot shaft, hollow flanged shaft, tandem rotary vane and spigot shaft, tandem rotary vane and flanged shaft or heavy-duty bearing (HD)	• Semi-rotary vane drive • With spigot or hollow flanged shaft
online: →	drvs	dsm	dsr

Semi-rotary drives

	 New **Semi-rotary drives** **DRRD**	 **Swivel/linear drive units** **DSL**
Size	8, 10, 12, 16, 20, 25, 32, 35, 40, 50, 63	16, 20, 25, 32, 40
Theoretical torque at 6 bar	0.2 ... 112 Nm	1.25 ... 20 Nm
Permissible mass moment of inertia	15 ... 420000 kgcm²	0.35 ... 40 kgcm²
Position sensing	Via proximity sensor	Via proximity sensor
Swivel angle	180°	0 ... 272°
New	• Additionally available, attachable drive shaft – for even greater versatility when it comes to designing your connections	
Quick ordering of selected basic designs	★	
Description	• Twin-piston rotary drive, power transmission via rack and pinion principle • Very high accuracy in the end positions • Very high bearing load capacity • Very good axial run-out at the flanged shaft	• Rotary and linear motion can be controlled individually or simultaneously • High repetition accuracy • With plain or recirculating ball bearing guide • Through piston rod
online: →	drrd	dsl

Tandem and high-force cylinders

	 **High-force cylinders** **ADNH**	 **Tandem cylinders** **DNCT**
Piston diameter	25 mm, 40 mm, 63 mm, 100 mm	32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100, mm 125 mm
Theoretical force at 6 bar, advancing	1036 ... 18281 N	898 ... 14244 N
Stroke	1 ... 150 mm	2 ... 500 mm
Description	• Mounting hole pattern to ISO 21287 • Max. 4 cylinders can be combined • Thrust increase • Only 2 connections are required to pressurise all cylinders • Piston rod with male or female thread • For position sensing	• Mounting hole pattern to ISO 15552 • Max. 2 cylinders can be combined • Thrust and return force increase • Piston rod with male thread • For position sensing
online: →	**adnh**	**dnct**

Multi-position cylinders

	 **Multi-position cylinder** **ADNM**
Piston diameter	25 mm, 40 mm, 63 mm, 100 mm
Theoretical force at 6 bar, advancing	295 ... 4712 N
Max. total of all individual strokes	1000 mm, 2000 mm
Description	• Mounting hole pattern to ISO 21287 • 2 ... 5 cylinders can be combined • Max. 5 positions can be approached • Piston rod with female or male thread • For position sensing
online: →	**adnm**

Drives with slides

	 **Mini slides DGSC**	 **Mini slides DGSL**	 **Mini slides SLF**
Piston diameter	6 mm	6 mm, 8 mm, 10 mm, 12 mm, 16 mm, 20 mm, 25 mm, 32 mm	6 mm, 10 mm, 16 mm
Theoretical force at 6 bar, advancing	17 N	17 ... 483 N	17 ... 121 N
Stroke	10 mm	10 ... 200 mm	10 ... 80 mm
Cushioning	Elastic cushioning rings/pads at both ends	Short elastic cushioning rings/pads at both ends, no cushioning, elastic cushioning rings/pads at both ends, elastic cushioning rings/pads at both ends with fixed stop, shock absorber, progressive, at both ends, shock absorber, self-adjusting, progressive, at both ends, with reducing sleeve	Elastic cushioning rings/pads at both ends
Position sensing	None	Via proximity sensor	Via proximity sensor
Quick ordering of selected basic designs		★	
Description	• Smallest guided slide unit on the market • Precision ball bearing cage guide: reliable and high-quality process • Long service life thanks to housing made from high-alloy steel • Low break-away pressure and uniform movement thanks to minimal friction of guide and seal	• 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 • Wide variety of mounting and attachment options • Compact design	• Flat design • Ball bearing cage guide • Versatile mounting options • Easy adjustment of end positions
online: →	dgsc	dgsl	slf

Drives with slides

	 **Mini slides SLS**	 **Mini slides SLT**	 **Slide units SPZ**
Piston diameter	6 mm, 10 mm, 16 mm	6 mm, 10 mm, 16 mm, 20 mm, 25 mm	10 mm, 16 mm, 20 mm, 25 mm, 32 mm
Theoretical force at 6 bar, advancing	17 ... 121 N	34 ... 590 N	60 ... 724 N
Stroke	5 ... 30 mm	10 ... 200 mm	10 ... 100 mm
Cushioning	Elastic cushioning rings/pads at both ends	Shock absorber at both ends, elastic cushioning rings/pads at both ends	Elastic cushioning rings/pads at both ends with metal fixed stop
Position sensing	Via proximity sensor	Via proximity sensor	Via proximity sensor
Description	• Flat design • Ball bearing cage guide • Versatile mounting options	• Powerful twin piston drive • Ball bearing cage guide • Versatile mounting options • Easy adjustment of end positions	• Twin-piston drive • High force with excellent protection against rotation • Plain or recirculating ball bearing guides • Widely spaced piston rods for high load capacity
online: →	sls	slt	spz

Drives with guide rods

FESTO

	 Guided drives DGRF	 Compact cylinders ADNGF	 Compact cylinders ADVUL	 Mini guided drives DFC
Piston diameter	20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm	12 mm, 16 mm, 20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm	12 mm, 16 mm, 20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm	4 mm, 6 mm, 10 mm
Theoretical force at 6 bar, advancing	189 ... 1870 N	68 ... 4712 N	51 ... 4712 N	7.5 ... 47 N
Stroke	10 ... 400 mm	1 ... 400 mm	1 ... 400 mm	5 ... 30 mm
Cushioning	Elastic cushioning rings/pads at both ends, self-adjusting pneumatic end-position cushioning, pneumatic cushioning adjustable at both ends	Elastic cushioning rings/pads at both ends, self-adjusting pneumatic end-position cushioning	Elastic cushioning rings/pads at both ends	Elastic cushioning rings/pads at both ends
Position sensing	Via proximity sensor	Via proximity sensor	Via proximity sensor	Without, via proximity sensor
Description	• Easy-to-clean design • Increased corrosion protection • FDA-approved lubrication and sealing on the basic design • Hygienic mounting of the sensors possible • Compact design with high guide precision and load capacity • Long service life thanks to optional seal for unlubricated operation • Self-adjusting pneumatic end-position cushioning which adapts optimally to changes in load and speed	• Mounting hole pattern to ISO 21287 • Piston rod secured against rotation by a guide rod and yoke plate • Plain-bearing guide • Optionally with through piston rod • For position sensing	• Piston rod secured against rotation by a guide rod and yoke plate • Plain-bearing guide • Optionally with through piston rod • For position sensing	• 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
online: →	**dgrf**	**adngf**	**advul**	**dfc**

Drives with guide rods

	 **Guided drives DFM, DFM-B**	 **Twin-piston cylinders DPZ**	 **Twin-piston cylinders DPZJ**	 **Linear units SLE**
Piston diameter	12 mm, 16 mm, 20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm	10 mm, 16 mm, 20 mm, 25 mm, 32 mm	10 mm, 16 mm, 20 mm, 25 mm, 32 mm	10 mm, 16 mm, 20 mm, 25 mm, 32 mm, 40 mm, 50 mm
Theoretical force at 6 bar, advancing	68 ... 4712 N	60 ... 966 N	60 ... 724 N	47 ... 1178 N
Stroke	10 ... 400 mm	10 ... 100 mm	10 ... 100 mm	10 ... 500 mm
Cushioning	Elastic cushioning rings/pads at both ends, pneumatic cushioning, adjustable at both ends, shock absorber, soft characteristic curve	Elastic cushioning rings/pads at both ends	Elastic cushioning rings/pads at both ends	Shock absorber, hard characteristic curve
Position sensing	Via proximity sensor	Via proximity sensor	Via proximity sensor	Via proximity sensor, via inductive sensors
Quick ordering of selected basic designs	★			
Description	• Drive and guide unit in a single housing • High resistance to torques and lateral forces • Plain or recirculating ball bearing guides • Wide variety of mounting and attachment options • Wide range of variants for customised applications	• Twin pistons provide twice the force in half the space • Plain or recirculating ball bearing guides • Precision stroke adjustment in the end position	• With yoke plate on rear of cylinder for higher lateral forces and precision • Twin pistons provide twice the force in half the space • Plain or recirculating ball bearing guides • Precision stroke adjustment in the end position	• Combination of guide unit and standards-based cylinder • Multi-axis and drive combinations • Recirculating ball bearing guide
online: →	**dfm**	**dpz**	**dpzj**	**sle**

Stopper cylinders

FESTO

	 Stopper cylinders DFSP	 Stopper cylinders DFST	 Stopper cylinders STAF
Piston diameter	16 mm, 20 mm, 32 mm, 40 mm, 50 mm	50 mm, 63 mm, 80 mm	32 mm, 80 mm
Impact force	710 ... 6280 N	3000 ... 6000 N	480 ... 14600 N
Stroke	5 ... 30 mm	30 ... 40 mm	20 ... 40 mm
Position sensing	Via proximity sensor	Via proximity sensor	Via proximity sensor
Toggle lever position sensing		Via inductive sensor	
Description	• Trunnion version with/without female thread, with/without protection against rotation • Roller version with protection against rotation • Compact design • Sensor slots on 3 sides • Long service life thanks to very good cushioning characteristics and sturdy piston rod guide • Workpiece carriers, pallets and packages weighing up to 90 kg can be safely stopped	• Toggle lever design • Integrated, adjustable shock absorber for smooth and adapted stopping • Up to 800 kg impact load • For position sensing on the piston • Lever locking mechanism • Toggle lever deactivator	• Roller version, toggle lever design • Absorption of high lateral forces • Direct mounting of solenoid valves on flange plate
online: ➔	**dfsp**	**dfst**	**staf**

Clamping cylinders

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

Linear/swivel clamps

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

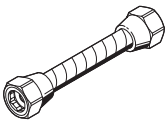
Hinge cylinders

	 **Hinge cylinders** **DFAW**
Piston diameter	50 mm, 63 mm, 80 mm
Stroke	10 ... 200 mm
Theoretical force at 6 bar, advancing	1178 ... 3016 N
Position sensing	Via proximity sensor
Cushioning	Self-adjusting pneumatic end-position cushioning
New	• Variants with clamping unit
Description	• Clamping of components during the welding process • Double-acting • Easy to mount thanks to swivel bearing on the bearing cap • Integrated flow control • Integrated, self-adjusting end-position cushioning • Variants with clamping unit
online: ➔	**dfaw**

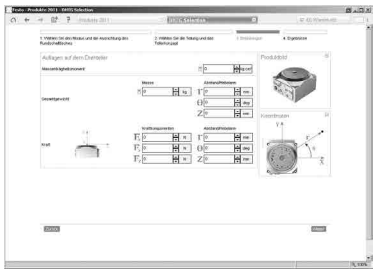
Bellows cylinders

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

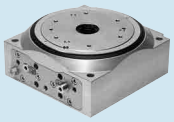
Fluidic muscles

	 **Fluidic muscles** **DMSP**	 **Fluidic muscles** **MAS**
Size	5, 10, 20, 40	10, 20, 40
Theoretical force at 6 bar	140 ... 6000 N	480 ... 6000 N
Nominal length	30 ... 9000 mm	40 ... 9000 mm
Max. contraction	25% of nominal length, 20% of nominal length	25% of nominal length
Description	• With press-fitted connection • Up to 30% less weight: a superb force/weight ratio • Single-acting, pulling • Three integrated adapter variants • 10 times the initial force of a comparable pneumatic cylinder • Uniform movement: no stick-slip effect • Hermetically sealed design offers protection against dust, dirt and fluids	• With screwed connection • Optionally with force retention • Single-acting, pulling • Use of customised mounting options • 10 times the initial force of a comparable pneumatic cylinder • Uniform movement: no stick-slip effect • Hermetically sealed design offers protection against dust, dirt and moisture
online: →	**dmsp**	**mas**

Software tool

Rotary indexing table		This tool helps you to select the right rotary indexing table of the type DHTG from Festo for your application. Let yourself be guided by the program – enter the general parameters and you will receive at least one suggestion for the product best suited to your application. This tool can be found • either in the electronic catalogue by clicking on the blue button “Engineering” • or on the DVD under Engineering Tools.

Rotary indexing tables

	 New **Rotary indexing tables** **DHTG**
Size	65, 90, 140, 220
Theoretical torque at 6 bar	2.1 ... 58.9 Nm
Indexing	2 ... 24
New	• Throughfeed for pneumatic and electrical energy
Description	• For swivelling or separating tasks • Sturdy mechanical system • Easy planning and commissioning • Rotary table diameters: 65, 90, 140, 220 mm • Free control of rotational direction
online: ➔	**dhtg**

Linear actuators for process automation

	 **Linear actuators with displacement encoder** **DFPI**	 New **Linear actuators with displacement encoder** **DFPI-NB3P**	 **Copac linear actuator** **DLP**
Design	Piston rod, cylinder barrel	Piston rod, cylinder barrel	Piston rod
Mode of operation	Double-acting	Double-acting	Double-acting
Size of valve actuator	100, 125, 160, 200, 250, 320	100, 125, 160, 200, 250, 320	80, 100, 125, 160, 200, 250, 320
Flange hole pattern	F07, F10, F14		
Operating pressure	3 ... 8 bar	3 ... 8 bar	2 ... 8 bar
Ambient temperature	–20 ... 60 °C	–20 ... 80 °C	–20 ... 80 °C
New		• Additional versions to ISO 15552	
Description	• Closed-loop controlled actuator for all linear process valves • Optionally with integrated positioner and valve block • Positional feedback via analogue 4 ... 20 mA signal for simple diagnostics • Easy integration into existing control architecture • Sturdy and compact housing for use outdoors • Connection for process valves to DIN 3358	• Standards-based linear actuators to ISO 15552 • Easy connection to external positioners • Ideal for use in harsh ambient conditions • IP65, IP67, IP69K, NEMA4 • ATEX 2GD certification	• NAMUR port pattern for solenoid valves to VDI/VDE 3845 • Integrated air supply • Connection for process valves to DIN 3358
online: ➔	**dfpi**	**dfpi**	**dlp**

Quarter turn actuators for process automation

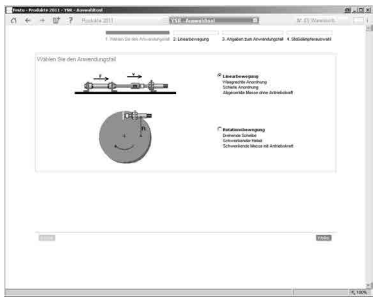
FESTO

	 New **Quarter turn actuators** **DFPD**	 **Quarter turn actuators** **DAPS**
Design	Rack and pinion	Scotch yoke system
Mode of operation	Double-acting, single-acting	Double-acting, single-acting
Size of valve actuator	10, 20, 40, 80, 120, 160, 240, 300, 480	0008, 0015, 0030, 0053, 0060, 0090, 0106, 0120, 0180, 0240, 0360, 0480, 0720, 0960, 1440, 1920, 2880, 3840, 4000, 5760, 8000
Flange hole pattern	F03, F04, F05, F0507, F0710, F1012	F03, F04, F05, F07, F10, F12, F14, F16, F25
Operating pressure	2 ... 8 bar	1 ... 8.4 bar
Ambient temperature	–50 ... 150 °C	–50 ... 150 °C
New	• New series	
Quick ordering of selected basic designs	★	
Description	• NAMUR port pattern for solenoid valves to VDI/VDE 3845 • Flange hole pattern to ISO 5211 • Uniform torque characteristic across the entire rotation angle range of 90° • Mounting hole pattern to VDI/VDE 3845 • Increased corrosion protection	• High break-away torques • Approved in accordance with Directive 2014/34/EU (ATEX) • Flange hole pattern to ISO 5211 • Mounting hole pattern to VDI/VDE 3845 • Available with handwheel as a manual emergency override • Corrosion-resistant variant made from stainless steel
online: →	dfpd	daps

Cylinder/valve combinations

	 **Standards-based cylinders** **DNC-V**
Mode of operation	Double-acting
Piston diameter	32 mm, 40 mm, 50 mm, 63 mm, 80 mm, 100 mm
Theoretical force at 6 bar, advancing	415 ... 4712 N
Stroke	100 ... 2000 mm
Cushioning	Elastic cushioning rings/pads at both ends, pneumatic Cushioning, adjustable at both ends
Description	• Mounting hole pattern to ISO 15552 • Assembled and fitted with tubing ready for connection • Particularly suitable for decentralised use in larger systems • Valve variants: single or double solenoid valves, mounted on the right or left • For position sensing • Wide range of variants for customised applications
online: →	dnc-v

Software tool

Shock absorbers		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 • either in the electronic catalogue by clicking on the blue button “Engineering” • or on the DVD under Engineering Tools.

Shock absorbers

	 **Shock absorbers DYSR**	 **Shock absorbers YSR-C**	 **Shock absorbers YSRW**	 **Shock absorbers YSRW-DGC**
Stroke	8 ... 60 mm	4 ... 60 mm	8 ... 34 mm	
Max. energy absorption per stroke	4 ... 384 J	0.6 ... 380 J	1.3 ... 70 J	
Cushioning	Adjustable	Self-adjusting	Self-adjusting, soft characteristic curve	Self-adjusting, soft characteristic curve
Description	• Hydraulic shock absorber with spring return • Adjustable cushioning hardness	• Hydraulic shock absorber with path-controlled flow control function • Rapidly increasing cushioning force curve • Short cushioning stroke • Suitable for rotary drives	• Hydraulic shock absorber with path-controlled flow control function • Gently increasing cushioning force curve • Long cushioning stroke • Suitable for low-vibration operation • Short cycle times possible	• For linear drives DGC • Gently increasing cushioning force curve • Sizes: 12, 18, 25, 32, 40, 50, 63
online: ➔	**dysr**	**ysr-c**	**ysrw**	**ysrw-dgc**

Shock absorbers

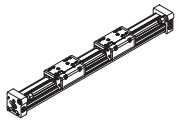
FESTO

	 **Shock absorbers YSRWJ**	 **Shock absorbers DYEF-Y1, DYEF-Y1F**	 **Shock absorbers DYSC**
Stroke	8 ... 14 mm	0.9 ... 7 mm	4 ... 25 mm
Max. energy absorption per stroke	1 ... 3 J	0.005 ... 1.2 J	0.6 ... 100 J
Cushioning	Self-adjusting, soft characteristic curve	Elastic cushioning rings/pads at both ends with metal fixed stop, elastic cushioning rings/pads at both ends without metal fixed stop	Self-adjusting
Description	• Cushioning with self-adjusting, progressive hydraulic shock absorber • Gently increasing cushioning force curve • Adjustable cushioning stroke • End-position sensing with proximity sensor SME/SMT-8 • Precision end-position adjustment	• Mechanical shock absorber with flexible rubber buffer • Elastic rubber buffer allows a defined metal end position • Adjustable cushioning hardness • Ideal for cushioning low energy • With precise metal end position	• 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
online: →	ysrwj	dyef	dysc

Shock absorbers

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

Accessories for pneumatic drives

	 Guide units FEN, FENG	 Guide axes DGC-FA	 Guide axes FDG	 Clamping cartridge KP
Size	8/10, 12/16, 20, 25, 32, 40, 50, 63, 80, 100	8 mm, 12 mm, 18 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm	18, 25, 32, 40, 50, 63	
Stroke	1 ... 500 mm	1 ... 8500 mm	1 ... 4500 mm	
Round material to be clamped				4 ... 32 mm
Static holding force				80 ... 7500 N
Description	• For protecting standards-based cylinders against rotation at high torque loads • Plain or recirculating ball bearing guides • High guide precision for workpiece handling	• Without drive • With recirculating ball bearing guide • With guide and freely movable slide unit • Increased torsional resistance • Reduced vibrations with dynamic loads • For supporting force and torque capacity in multi-axis applications	• Without drive • With recirculating ball bearing guide • With guide and freely movable slide unit • Increased torsional resistance • Reduced vibrations with dynamic loads • For supporting force and torque capacity in multi-axis applications	• For in-house assembly of clamping units • Not certified for use in safety-relevant control systems
online: →	fen	dgc-fa	fdg	kp

Accessories for pneumatic drives

	 Clamping units KPE, KEC, KEC-S	 Clamping units, clamping components DADL	 Mounting attachments	 Piston rod attachments
Size		16, 20, 25, 32, 35, 40, 50, 63		
Stroke				
Round material to be clamped	4 ... 32 mm			
Static holding force	80 ... 8000 N			
Quick ordering of selected basic designs			★	★
Description	• KPE: ready-to-install combination of clamping cartridge KP and housing • KEC: for use as a holding device (static application) • KEC-S: for safety-related applications	• Clamping unit DADL-EL: for semi-rotary drive DRRD, for mechanical locking in the end positions to prevent unwanted movement in unpressurised condition • Clamping component DADL-EC: for semi-rotary drive DRRD, for securing an intermediate position in combination with the clamping unit DADL-EL • Without drive	• Mounting kits DARQ • Direct mountings • Foot mountingsFlange mountings • Swivel mountings • Clevis feet LNG, trunnion supports LNZ • Slot nuts NST/NSTL • Centring pins/sleeves NSTH	• Rod clevises SG, CRSG • Rod eyes SGS • Coupling pieces KSG • Self-aligning rod couplers FK • Adapters AD
online: →	kpe	dadl	n_015001	n__03150

Customised components – for your specific requirements

Drives with customised designs
Can't find the pneumatic drive you need in our catalogue? We can offer you customised components that are tailored to your specific requirements – from minor product modifications to complete new product developments. Common product modifications:

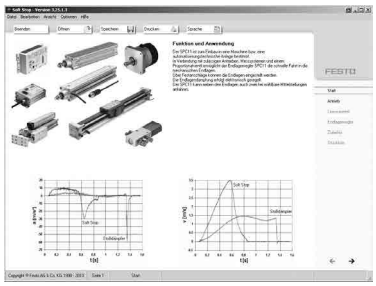
- Materials for special ambient conditions
- Customised dimensions
- Special strokes
- Customised mounting options
- Implementation of special cylinder functions (cylinder/valve combinations, single-acting principle, etc.)

Many additional variants are possible. Ask your Festo sales engineer, who will be happy to help.
Further information on customised components can be found on your local website
➔ **www.festo.com**

Software tool

FESTO

Soft Stop



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
- either in the electronic catalogue by clicking on the blue button “Engineering”
- or on the DVD under Engineering Tools.

Linear drives with displacement encoder

	 **Linear drives with displacement encoder DDLI**	 **Standards-based cylinders with displacement encoder DDPC**	 **Standards-based cylinders with displacement encoder DNCI**	 **Linear drives with displacement encoder DGCI**
Piston diameter	25, 32, 40, 63	80, 100	32, 40, 50, 63	18, 25, 32, 40, 63
Theoretical force at 6 bar, advancing	295 ... 1870 N	3016 ... 4712 N	415 ... 1870 N	153 ... 1870 N
Max. load, horizontal	30... 180 kg	300 ... 450 kg	45 ... 180 kg	300 ... 450 kg
Max. load, vertical	10 ... 60 kg	100 ... 150 kg	15 ... 60 kg	100 ... 150 kg
Stroke	100 ... 2000 mm	10 ... 2000 mm	10 ... 2000 mm	100 ... 2000 mm
Description	• Based on linear drive DGC-K • Without guide • With displacement encoder for contactless measurement • Suitable for positioning with axis controller CPX-CMAX • Suitable for end-position control with end-position controller CPX-CMPX or SPC11 • Can be used as a measuring cylinder • Supply ports on end face	• Standards-based cylinder to ISO 15552 • With displacement encoder for contactless measurement • Suitable for positioning with axis controller CPX-CMAX • Suitable for end-position control with end-position controller CPX-CMPX or SPC11 • Can be used as a measuring cylinder • Piston rod variants • Fixed cushioning	• Standards-based cylinder to ISO 15552 • With integrated displacement encoder for relative analogue, contactless measurement • Suitable for servo-pneumatic applications with axis controller CPX-CMAX, end-position controller CPX-CMPX or SPC11 and measuring module CPX-CMIX • Piston rod with male thread • Piston rod variants	• With guide • With displacement encoder for absolute and contactless measuring • Suitable for servo-pneumatic applications with axis controller CPX-CMAX, end-position controller CPX-CMPX or SPC11 and measuring module CPX-CMIX • Supply ports optionally on end face or front
online: ➔	**ddli**	**ddpc**	**dnci**	**dgci**

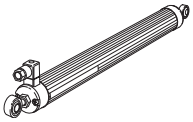
Semi-rotary drives with displacement encoder

	 **Semi-rotary drives with angular displacement encoder** **DSMI**
Piston diameter	25, 40, 63
Theoretical torque at 6 bar	5 ... 40 Nm
Max. mass moment of inertia, horizontal	0.03 ... 0.6 kgm²
Max. mass moment of inertia, vertical	0.03 ... 0.6 kgm²
Swivel angle	0 ... 272°
Description	• With rotary vane • Integrated rotary potentiometer • Suitable for servo-pneumatic applications with axis controller CPX-CMAX, end-position controller CPX-CMPX or SPC11 and measuring module CPX-CMIX • Compact design
online: ➔	dsmi

Axis controllers

	 **Axis controllers** **CPX-CMAX**	 **End-position controllers** **CPX-CMPX**	 **End-position controllers** **SPC11**
No. of axis strings	1	1	1
Axes per string	1	1	1
Description	• Axis controller as CPX module, supports pneumatic drives with piston rod, rodless drives and semi-rotary drives • Force and position control • Use with all fieldbus/Ethernet and controllers CEC available on CPX • Easy commissioning thanks to auto identification function • Rapid commissioning and comprehensive diagnostics with the parameterisation software FCT	• Electronic end-position control for pneumatic drives • Soft Stop for smooth braking and quick acceleration • Use with all fieldbus/Ethernet available on CPX • Easy commissioning with Festo plug and work • Approx. 30% shorter travel times and 30% less air consumption than with comparable standard pneumatics	• 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 drives with piston rod, rodless drives and semi-rotary drives
online: ➔	cpx-cmax	cpx-cmpx	spc11

Displacement encoders

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

Proportional valves

	 **Proportional directional control valves VPWP**	 **Proportional directional control valves MPYE**
Valve function	5/3-way proportional directional control valve, closed	5/3-way, closed
Pneumatic port 1	G1/4, G1/8, G3/8	G1/4, G1/8, G3/8, M5
Operating pressure for positioning/Soft Stop	4 ... 8 bar	
Operating pressure	0 ... 10 bar	0 ... 10 bar
Standard nominal flow rate	350 ... 2000 l/min	100 ... 2000 l/min
Description	• 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 servo-pneumatic applications with CPX-CMAX and CPX-CMPX	• Regulated piston spool valve • Analogue actuation • Setpoint input as analogue voltage signal (0 ... 10 V) • Suitable for servo-pneumatic applications with SPC11
online: ➔	**vpwp**	**mpye**

Sensor interfaces

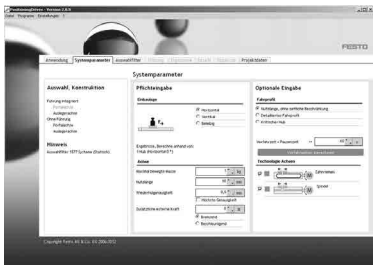
FESTO

2

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

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 suggests a number of solutions.
This tool can be found
- either in the electronic catalogue by clicking on the blue button “Engineering”
- or on the DVD under Engineering Tools.

Linear drives and slide units

	 **Electric cylinders EPCO**	 **Electric cylinders ESBF**	 **Spindle axes EGC-BS**	 **Toothed belt axes EGC-HD-TB**
Size	16, 25, 40	32, 40, 50, 63, 80, 100	70, 80, 120, 185	125, 160, 220
Max. feed force Fx	50 ... 650 N	1000 ... 17000 N	300 ... 3000 N	450 ... 1800 N
Repeat accuracy	+/–0.02	+/–0.01, +/–0.015, +/–0.05	+/–0.02	
Stroke	1 ... 400 mm	100 ... 400 mm	50 ... 3000 mm	50 ... 5000 mm
Description	• Linear drive with permanently attached motor • With ball screw • Optional: encoder, holding brake and female thread on the piston rod • Two different spindle pitches for high force or high speed • Suitable for simple applications in factory automation that in the past were mostly carried out using pneumatic solutions • Cost-optimised • Precision and backlash-free guide	• Available as spindle drive with ball screw (size 32 ... 100) or lead screw (size 32 ... 50) • Optional: high corrosion protection, protection class IP65, suitable for use in the food industry (see supplementary information on materials at www.festo.com/sp › Certificates), piston rod extension • Ball screw: three spindle pitches make it possible to select the optimal force-speed ratio • Ball screw: high rigidity and precision • Axial or parallel motor mounting	• Recirculating ball bearing guide for high loads and torques • Optionally with clamping unit, at one or both ends • Profile with optimised rigidity • Various spindle pitches • The spindle support enables maximum travel speed • Axial or parallel motor mounting	• With heavy-duty guide • For maximum loads and torques and high feed forces • Precise and resilient DUO guide • Motor can be mounted on any one of 4 sides
online: ➔	epco	esbf	egc	egc

Linear drives and slides

FESTO

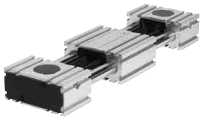
3

	 Toothed belt axes EGC-TB	 Spindle axes EGC-HD-BS	 Mini slides EGSL	 Mini slides SLTE
Size	50, 70, 80, 120, 185	125, 160, 220	35, 45, 55, 75	10, 16
Max. feed force Fx	50 ... 2500 N	300 ... 1300 N	75 ... 450 N	
Repeat accuracy	+/–0.08, +/–0.1	+/–0.02	+/–0.015	+/–100.000
Stroke	50 ... 8500 mm	50 ... 2400 mm	50 ... 300 mm	50 ... 150 mm
Description	• Recirculating ball bearing guide for high loads and torques • Optionally with clamping unit, at one or both ends • Profile with optimised rigidity	• With heavy-duty guide • With integrated ball screw • For maximum loads and torques, high feed forces and speeds and long service life • Precision DUO guide rail with high load capacity	• Very high rated slide loads, ideal for vertical applications such as press-fitting or joining • Reliable: the completely closed spindle stops dirt or stray small parts getting into the guide area • Flexible: motor can be attached laterally or axially, in this case turned by 4 x 90°	• Electromechanical linear axis with lead screw • With DC servo motor • Easy actuation via I/O interface, PROFIBUS, CANopen, DeviceNet • Precise and rigid guide
online: →	egc	egc	egsl	slte

Linear drives and slides

	 Electric slides EGSK	 Electric slides EGSP	 New Spindle axes ELGA-BS-KF	 New Toothed belt axes ELGA-TB-KF
Size	15, 20, 26, 33, 46	20, 26, 33, 46	70, 80, 120, 150	70, 80, 120, 150
Max. feed force Fx	19 ... 392 N	69 ... 466 N	300 ... 3000 N	260 ... 2000 N
Repeat accuracy	+/–0.003 – +/–0.004, +/–0.003 – +/–0.01, +/–0.01	+/–0.003 – +/–0.01	+/–0.02	+/–0.08, +/–0.1
Stroke	25 ... 840 mm	25 ... 840 mm	50 ... 3000 mm	50 ... 8500 mm
New			• New series	• Suitable for use in the food industry as per supplementary information on materials
Description	• Electromechanical linear axis with ball screw • Recirculating ball bearing guide and ball screw without caged ball bearings • Standardised mounting interfaces • Compact design • High rigidity	• Electromechanical linear axis with ball screw • Recirculating ball bearing guide with caged ball bearings • Size 33, 46: ball screw with caged ball bearings • Low maintenance • Uniform operating behaviour with very low noise levels • Standardised mounting interfaces • Compact design • High rigidity	• Internal, precision recirculating ball bearing guide with high load capacity for high torque loads • Guide and ball screw protected by cover strip • Precise and resilient guide • For the highest requirements in terms of feed force and accuracy • Speeds up to 2 m/s with high acceleration up to 15 m/s² • Space-saving position sensing • Flexible motor connection	• Internal, precision recirculating ball bearing guide with high load capacity for high torque loads • Guide and toothed belt protected by cover band • Precision guide rail with high load capacity • Speeds up to 5 m/s with high acceleration up to 50 m/s² • High feed forces • Flexible motor connection
online: →	egsk	egsp	elga	elga

Linear drives and slides

	 Toothed belt axes ELGA-TB-G	 Toothed belt axes ELGA-TB-RF	 Toothed belt axes ELGG	 Toothed belt axes ELGR
Size	70, 80, 120	70, 80, 120	35, 45, 55	35, 45, 55
Max. feed force Fx	350 ... 1300 N	260 ... 1000 N	50 ... 350 N	50 ... 350 N
Repeat accuracy	+/–0.08	+/–0.08	+/–0.1	+/–0.1
Stroke	50 ... 8500 mm	50 ... 7400 mm	50 ... 1200 mm	50 ... 1500 mm
Description	• Integrated plain-bearing guide • For small and medium loads • Low guide backlash • Driving component for external guides • Speeds up to 5 m/s with high acceleration up to 50 m/s² • Flexible motor connection • Motor can be mounted on 4 sides	• Integrated roller bearing guide • High speeds up to 10 m/s with high acceleration up to 50 m/s² • Guide backlash = 0 mm • Very good operating behaviour under torque load • Sturdy alternative to the recirculating ball bearing guide • As an actuator for external guides, especially for high speeds • Motor can be mounted on 4 sides	• Toothed belt axis with two opposing slides • With low-cost plain bearing and precise ball bearing guide • Optional central support improves the rigidity • Motor can be mounted on 4 sides	• Optimum price/performance ratio • Ready-to-install unit for quick and easy design • With plain or recirculating ball bearing guide • Motor can be mounted on 4 sides • Also available as OMS product
online: →	elga	elga	elgg	elgr

Linear drives and slides

	 Cantilever axes DGEA-ZR	 Toothed belt axes DGE-ZR, DGE-ZR-KF, DGE-ZR-HD	 Toothed belt axes DGE-ZR-RF
Size	18, 25, 40	8, 12, 18, 25, 40, 63	25, 40, 63
Max. feed force Fx	230 ... 1000 N	15 ... 1500 N	260 ... 1500 N
Repeat accuracy	+/–0.05	+/–0.08, +/–0.1	+/–0.1
Stroke	1 ... 1000 mm	1 ... 4500 mm	1 ... 5000 mm
Description	• Toothed belt drive with recirculating ball bearing guide • Dynamic cantilever operation • Stationary drive head	• Electromechanical axis with toothed belt; DGE-ZR: without guide; DGE-ZR-KF: with recirculating ball bearing guide • Optional protected version	• Electromechanical axis with toothed belt and internal roller bearing guide • High speeds possible
online: →	dgea	dge-zr	dge-zr

Linear drives and slides

	 Spindle axes DGE-SP	 Positioning axes DMES
Size	18, 25, 40, 63	18, 25, 40, 63
Max. feed force Fx	140 ... 1600 N	240 ... 3000 N
Repeat accuracy	+/–0.02	+/–0.05, +/–0.07
Stroke		50 ... 1800 mm
Description	• Without guide or with recirculating ball bearing guide • Optional protected version	• Mechanical linear drive with lead screw • Basic version or with recirculating ball bearing guide • High feed forces of up to 3000 N
online: →	dge-sp	dmes

Semi-rotary drives

	 Rotary drives ERMO	 Rotary modules ERMB
Size	12, 16, 25, 32	20, 25, 32
Max. driving torque	0.15 ... 5 Nm	0.7 ... 8.5 Nm
Max. input speed	50 ... 100 1/min	900 ... 1350 1/min
Rotation angle	Infinite	Infinite
Description	• Electric rotary drive with stepper motor and integrated gear unit • ServoLite – closed-loop operation with encoder • Heavy-duty bearing for high forces and torques • Backlash-free pre-stressed rotating plate with very good axial eccentricity and concentricity properties • Quick and accurate installation • For simple rotary indexing table applications and as a rotary axis in multi-axis applications	• Electromechanical rotary module with toothed belt • Compact design • Mounting interfaces on all sides • Stable output shaft bearings • Unlimited and flexible rotation angle
online: →	ermo	ermb

Electric handling modules

	 Rotary/lifting modules EHMB
Size	20, 25, 32
Max. driving torque	0.7 ... 6.7 Nm
Max. input speed	900 ... 1350 1/min
Rotation angle	Infinite
Description	• Complete module with combined and configurable rotary/lifting movement • Dynamic, flexible, economical thanks to the modular drive concept for the linear movement • Hollow axis with large internal diameter makes laying power supply lines easy, convenient and safe
online: →	ehmb

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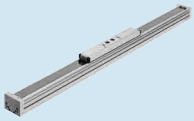
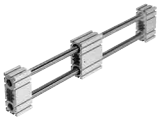
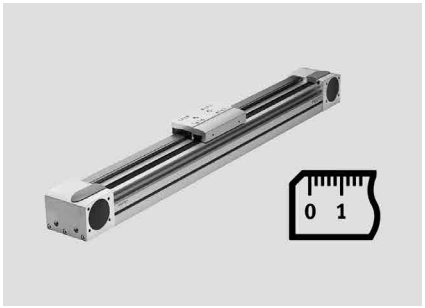
Linear guides

	 Guide units EAGF	 New Guide axes ELFA	 Guide axes ELFR
Size	16, 25, 32, 40, 50, 63, 80, 100	70, 80	35, 45, 55
Stroke	1 ... 500 mm	50 ... 7000 mm	50 ... 1500 mm
Guide	Recirculating ball bearing guide	Roller bearing guide	Plain-bearing guide, recirculating ball bearing guide
New		• New series	
Description	• For electric cylinders EPCO and ESBF • For absorption of high process forces and torques • High guide precision	• For drive axis ELGA • For supporting forces and torques in multi-axis applications • Increased torsional resistance • Reduced vibrations with dynamic loads	• Driveless guide unit with guide and freely movable slide • For supporting forces and torques in multi-axis applications • Increased torsional resistance
online: →	eagf	elfa	elfr

Linear guides

	 Guide axes EGC-FA	 Guide axes FDG-ZR-RF
Size	70, 80, 120, 185	25, 40, 63
Stroke	50 ... 8500 mm	1 ... 5000 mm
Guide	Recirculating ball bearing guide	Roller bearing guide
Description	• Driveless guide unit with guide and freely movable slide • For supporting forces and torques in multi-axis applications • Increased torsional resistance	• Driveless linear guide unit with guide and freely movable slide unit • For supporting forces and torques in multi-axis applications • Increased torsional resistance
online: →	egc	fdg

Customised components – for your specific requirements



Drives with customised designs
Can't find the electromechanical drive you need in our catalogue?
We can offer you customised components that are tailored to your specific requirements – from minor product modifications to complete new product developments.
Common product modifications:

- Special strokes
- Design for special ambient conditions
- Design optimised for the fitting space
- Design with opposing carriages
- Design with absolute encoder

Many additional variants are possible. Ask your Festo sales engineer, who will be happy to help.
Further information on customised components can be found on your local website
→ **www.festo.com**

Software tool

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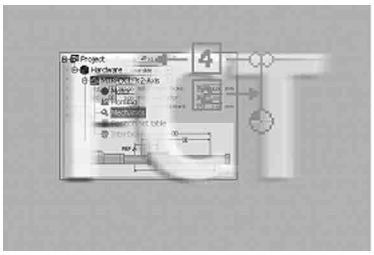
Festo Configuration Tool (FCT)		FCT is a configuration and parameterisation software program that supports all Festo devices, in particular motor controllers. It is extremely flexible, provides full support for the device properties and is simple and intuitive to operate. The user is guided step-by-step through the commissioning process while each individual step is checked. The parameterisation software can be found on the website under Support › Support Portal › enter search term.
CODESYS		CODESYS for standardised programming of embedded devices according to IEC 61131-3. It makes your life easier with simple commissioning, fast programming and parameterisation. The benefits: • Hardware-neutral 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 • User-friendly IEC function block extension • Re-use of existing application parts The parameterisation software can be found on the website under Support › Support Portal › enter search term.

4

Servo motors

	 New **Integrated drives EMCA**	 New **Servo motors EMME-AS**	 **Servo motor EMMS-AS**	 **Motor units MTR-DCI**
Nominal torque	0.37 ... 0.45 Nm	0.12 ... 6.4 Nm	0.14 ... 22.63 Nm	
Nominal speed	3100 ... 3150 1/min	3000 ... 9000 1/min	2000 ... 10300 1/min	3000 ... 3250 1/min
Peak torque	0.85 ... 0.91 Nm	0.7 ... 30 Nm	0.5 ... 120 Nm	
Maximum speed	3300 ... 3500 1/min	3910 ... 10000 1/min	2210 ... 23040 1/min	3000 ... 3300 1/min
New	• New series	• Additional versions		
Description	• 64 freely programmable position sets • Multi-turn encoder with buffering (resolution up to 32 bits or › 4 billion revolutions) • Degree of protection IP54 as standard, with IP65 available as an option, for direct installation in the system • Actuation via CANopen, EtherNet/IP and I/O interface	• Brushless, permanently excited synchronous servo motor • Digital absolute displacement encoder, single-turn or multi-turn • Reliable, dynamic, precise • Optimised connection technology • Over 40 types in stock • Available with holding brake	• Permanently excited, electrodynamic, brushless servo motor • Digital absolute displacement encoder, single-turn or multi-turn • 66 stock types • 490 built-to-order variants • Optionally with holding brake, IP65, resolver • Various winding variants	• DC motor with encoder • Gear unit, controller, power electronics integrated • Gear ratios: 7:1, 14:1, 22:1 • RS232 parameterisation interface • I/O, PROFIBUS, CANopen, PROFIBUS DP, DeviceNet interface • Control panel with display, optional
online: →	emca	emme	emms	mtr

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Stepper motors

	 **Stepper motors** **EMMS-ST**
Maximum speed	430 ... 6000 1/min
Motor holding torque	0.09 ... 9.3 Nm
Description	• Small increment and high driving torques thanks to 2-phase hybrid technology • Optimised connection technology • 28 types in stock • With incremental encoder for closed-loop operation • Available with holding brake
online: ➔	emms

Controllers for AC servo motors

	 New **Motor controllers** **CMMP-AS-M0, CMMP-AS-M3**
Nominal current	2 ... 13 A
Nominal operating voltage AC	230 ... 400 V
Nominal operating voltage phases	1-phase, 3-phase
Rated output of controller	500 ... 9000 VA
Fieldbus coupling	PROFIBUS DP, CANopen, DeviceNet, EtherCAT, EtherNet/IP, Modbus/TCP, PROFINET
New	• Additional variant
Description	• Many interfaces and functions for decentral motion functions (flying saw, flying measurement, modulo function, etc.) • For cam disk controllers and highly dynamic movements • Standardised interfaces allow seamless integration in mechatronic multi-axis modular systems • Reliable and easy commissioning and parameterisation with the Festo Configuration Tool (FCT) • Optionally with 3 slots for switch or safety module, for extension module • Integrated process interfaces: Modbus/TCP, CAN bus and digital I/O module • Further extension modules: PROFIBUS, PROFINET, EtherCAT®, etc.
online: ➔	cmmp

Controllers for DC servo motors

	 **Motor controllers SFC-DC**
Nominal current, load supply	3 A
Nominal voltage, load supply DC	24 V
Rated output of controller	75 VA
Fieldbus coupling	PROFIBUS DP, CANopen, DeviceNet
Description	• For actuating mini slide SLTE and parallel gripper HGPLE • Easy actuation via I/O interface, PROFIBUS, CANopen, DeviceNet • With or without control panel • Parameterisation via control panel or parameterisation software FCT • Field controller with protection class IP54 • Reliable and easy commissioning and parameterisation with the Festo Configuration Tool (FCT)
online: ➔	**sfc-dc**

Controllers for stepper motors

	 New **Controllers CMXH**	 **Motor controllers CMMO-ST**	 **Motor controllers CMMS-ST**
Nominal current, load supply	10 A	6 A	8 A
Max. step frequency			4 kHz
Controller operating mode	Direct mode, record selection	PWM MOSFET power output stage, cascade controller with P position controller, PI speed controller, PI current controller	PWM MOSFET power output stage
Fieldbus coupling	1x CANopen Slave	Ethernet	PROFIBUS DP, CANopen
New	• New series		
Description	• For controlling two servo motors • For controlling planar surface gantries • Supports the Safe Torque Off (STO) safety function • Simple actuation via digital I/O interface, CAN interface or Ethernet TCP/IP • H-rail mounting possible • Parameterisation with the Festo Configuration Tool (FCT)	• Motor controller of the Optimised Motion Series (for EPCO, ELGR, ERMO) • With convenient FCT commissioning for stepper motor EMMS-ST • Simple and quick parameters configuration via web browser and parameter cloud • Reliable and easy commissioning and parameterisation with the Festo Configuration Tool (FCT) • Simple control via digital I/O, IO-Link®, I-Port, Modbus TCP • Safety function Safe Torque Off (STO) PLe • Sinusoidal current injection for especially silent motor operation	• For controlling stepper motors EMMS-ST and Optimised Motion Series (for EPCO, ELGR, ERMO) • Easy and convenient: commissioning and firmware updates via SD card slot • Reliable and easy commissioning and parameterisation with the Festo Configuration Tool (FCT) • Integrated process interface: digital I/O, CAN, RS485 • Safety function Safe Torque Off (STO) PLd • Optional: PROFIBUS and DeviceNet®
online: ➔	**cmxh**	**cmmo**	**cmms**

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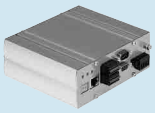
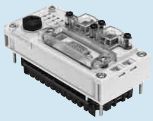
Multi-axis controllers

	 New **Controllers** **CMXH-ST2**	 New **Motor controllers** **CPX-CEC-C1, CPX-CEC-M1**	 **Controllers** **CECX-X-C1, CECX-X-M1**
CPU data		256 MB RAM, 32 MB flash, 400 MHz, 800 MHz processor	64 MB DRAM, Processor 400 MHz
Configuration support	FCT (Festo Configuration Tool)	CODESYS V2.3, CODESYS V3	
Processing time		Approx. 200 µs/1 k instruction	
Degree of protection	IP20	IP65, IP67	IP20
New	• New series	• One platform for fluid and motion control with modules for cloud connection via OPC UA	
Description	• The ideal controller for controlling planar surface gantries EXCM • Supports the Safe Torque Off (STO) safety function • Easy control via digital I/O interface, CAN interface or Ethernet TCP/IP	• Easy actuation of valve terminal configurations • Programming with CODESYS to IEC 61131-3 • Connection to all fieldbuses as a remote controller and for pre-processing • Actuation of electric drives via CANopen • SoftMotion functions for coordinated multi-axis movements	• Modular master controller with CODESYS or motion controller with CODESYS and SoftMotion. • Programming to standard IEC 61131-3 • Three plug-in slots for optional modules • Optional: communication module for PROFIBUS
online: →	cmxh	cpx-cec-m1	cecx-x

Positioners for process automation

	 New **Positioners** **CMSX**
Standard nominal flow rate	50 ... 130 l/min
Ambient temperature	–5 ... 60 °C
Reference value	0–10, 0–20 mA, 4–20 mA
Operating pressure	3 ... 8 bar
Safety note	Adjustable; holding, opening, closing
New	• Additional versions
Quick ordering of selected basic designs	★
Description	• For position control of double-acting pneumatic quarter turn actuators in process automation systems • Simple and efficient position control based on the PID control algorithm • Suitable for quarter turn actuators with a swivel angle of approx. 90° and a mechanical interface in accordance with VDI/VDE Directive 3845 • Power supply 24 V DC
online: →	cmsx

Safety systems

FESTO

	 **Safety modules CAMC**
Safety function	Safe Brake Control (SBC), Safe Speed Range (SSR), Safe Speed Monitor (SSM), Safe Torque Off (STO), Safely Limited Speed (SLS), Safe Torque off (STO), Safe Operating Stop (SOS), Safe Stop 1 (SS1), Safe Stop 2 (SS2)
Safety Integrity Level (SIL)	Safe Brake Control (SBC)/SIL 3, Safely Limited Speed (SLS)/SIL 3, Safe Operating Stop (SOS)/SIL 3, Safe Stop 1 (SS1)/SIL 3, Safe Stop 2 (SS2)/SIL 3, Safe Speed Monitor (SSM)/SIL 3, Safe Speed Range (SSR)/SIL 3, Safe Torque Off (STO)/SIL 3, Safe Torque Off (STO)/SIL 3 / SILCL 3
Characteristics of logic inputs	Electrically isolated, 4 safe, 2-channel inputs equivalent/antivalent switching, configurable test pulses, configurable function, 6 safe, 1-channel inputs, configurable test pulses
Number of digital logic inputs	2, 10
Digital output design	Potential-free signal contact, 3 safe, 2-channel semiconductor outputs
Description	• Plug-in module • For motor controller CMMP-AS-...-M3
online: →	camc

Gear units

	 New **Gear units EMGC**	 **Gear units EMGA-SST**	 **Gear units EMGA-EAS**	 **Gear units EMGA-SAS**
Continuous output torque	2 ... 44 Nm	11 ... 110 Nm	11 ... 110 Nm	11 ... 450 Nm
Max. input speed	4500 ... 6000 1/min	7000 ... 18000 1/min	7000 ... 18000 1/min	6500 ... 18000 1/min
Torsional rigidity	0.105 ... 2.4 Nm/arcmin	1 ... 6 Nm/arcmin	1 ... 6 Nm/arcmin	1 ... 38 Nm/arcmin
Backlash	0.5 ... 0.67°	0.12 ... 0.25°	0.12 ... 0.25°	0.1 ... 0.25°
Mass moment of inertia, gear unit	0.04 ... 0.4 kgcm²	0.019 ... 0.77 kgcm²	0.019 ... 0.77 kgcm²	0.019 ... 12.14 kgcm²
Max. efficiency	90%, 92%, 94%	98%	98%	98%
New	• New series			
Description	• Planetary gear units, one-stage or two-stage, for integrated drives EMCA • Gear ratio i = 3 to i = 40, available ex-stock • Life-time lubrication	• Planetary gear units for stepper motors EMMS-ST • Gear ratio i = 3 and i = 5, available ex-stock • Life-time lubrication	• Planetary gear unit for servo motors EMMS-AS • Gear ratio i = 3 and i = 5, available ex-stock • Life-time lubrication	• Planetary gear units for servo motors EMMS-AS • Gear ratio i = 3 and i = 5, available ex-stock • Life-time lubrication
online: →	emgc	emga	emga	emga

Power supply units

	 **Power supply units** **CACN**
Nominal output voltage DC	24 ... 48 V
Nominal output current	5 ... 20 A
Input voltage range AC	100 ... 500 V
Input current	0.9–1.65 A, 1.5–3.0 A, 2.2–1.2 A, 2.3–1.9 A, 5.1–2.3 A
Mains buffering	24 ... 110 ms
Description	• H-rail mounting • Mounting position: free convection
online: →	**cacn**

Software tool

FESTO

Product finder for grippers

A secure grip is a question of the right calculation. In this case, calculation of weight, direction of movement, distances, etc. The software tool immediately determines which type of gripper – parallel, three-point, angle or swivel/gripper – and which size best matches your requirements.
This tool can be found
- either in the electronic catalogue by clicking on the blue button “Product finder”
- or on the DVD under Engineering Tools.

Parallel grippers

	 **Parallel grippers DHPS**	 **Parallel grippers HGPD**	 **Electric parallel grippers HGPLE**	 **Parallel grippers HGPT**
Total gripping force at 6 bar, closing	25 ... 910 N	94 ... 3716 N		106 ... 6300 N
Stroke per gripper jaw	2 ... 12.5 mm	3 ... 20 mm	30 ... 80 mm	1.5 ... 25 mm
Position sensing	Via Hall sensor, via proximity sensor	Via proximity sensor	Via integrated angular displacement encoder	Via proximity sensor
Gripping force backup	During opening, during closing	During opening, during closing		During opening, during closing
Description	• Heavy-duty, precision T-slot guide for gripper jaws • High gripping force with compact size • Max. repetition accuracy • Wide range of options for mounting on drive units	• Ideal for very harsh environments • Precise gripping even at high torque load • Max. gripping force with optimum installation space/force ratio • 8 sizes with up to 40 mm total stroke • Repetition accuracy of 0 ... 0.05 mm	• Electrically actuated 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	• Sturdy and powerful • With T-slot guide • Suitable for external and internal gripping • Gripper jaw guide protected by sealing air against dust • High-force variant available
online: →	**dhps**	**hgpd**	**hgple**	**hgpt**

Parallel grippers

	 New **Parallel grippers HGPL**	 **Parallel grippers HGPP**	 **Parallel grippers HGPC**
Total gripping force at 6 bar, closing	158 ... 2742 N	80 ... 830 N	44 ... 126 N
Stroke per gripper jaw	20 ... 150 mm	2 ... 12.5 mm	3 ... 7 mm
Position sensing	Via proximity sensor	Via Hall sensor, via inductive sensors	Via proximity sensor
Gripping force backup		During opening, during closing	During closing
New	• With expanded range of sensors		
Description	• Space-saving, high forces and torques • Controlled, 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	• High-precision gripper jaw guide • Suitable for external and internal gripping • Very flexible thanks to versatile attachment, mounting and application options	• Compact, low cost, reliable operation, long service life • High force with minimal volume • Suitable for external and internal gripping
online: →	**hgpl**	**hgpp**	**hgpc**

Parallel grippers

	 **Parallel grippers HGP**	 **Parallel grippers HGPM**
Total gripping force at 6 bar, closing	160 ... 340 N	16 ... 35 N
Stroke per gripper jaw	5 ... 7.5 mm	2 ... 3 mm
Position sensing	Via proximity sensor	None
Gripping force backup		
Description	• Double-acting piston drive • High gripping force with compact size • Self-centring • Suitable for external and internal gripping • With protective dust cap for use in dusty environments (protection class IP54) • Max. repetition accuracy • Internal fixed flow control • Versatile thanks to externally adaptable gripper fingers • Wide range of options for mounting on drive units	• Micro gripper: compact, handy design • Versatile thanks to externally adaptable gripper fingers • Mounting options with clamping spigot, with flange mounting, with Z stroke compensation
online: →	**hgp**	**hgpm**

Three-point grippers

FESTO

	 Three-point grippers DHDS	 Three-point grippers HGDT	 Three-point grippers HGDD
Total gripping force at 6 bar, closing	87 ... 750 N	207 ... 2592 N	336 ... 2745 N
Stroke per gripper jaw	2.5 ... 6 mm	1.5 ... 10 mm	4 ... 12 mm
Position sensing	Via Hall sensor, via proximity sensor	Via proximity sensor	Via proximity sensor
Gripping force backup	During closing	During opening, during closing	During opening, during closing
Description	• Heavy-duty, precision T-slot guide for gripper jaws • High gripping force with compact size • Max. repetition accuracy • Wide range of options for mounting on drive units	• Synchronous movement of the gripper jaws • With T-slot guide • Suitable for external and internal gripping • Gripper jaw guide protected by sealing air against dust • High-force variant available	• Precise gripping with centric movements despite high torque loads • Ideal for very harsh environments • 5 sizes with up to 12 mm stroke/jaw • Repetition accuracy of 0 ... 0.05 mm
online: →	**hgds**	**hgdt**	**hgdd**

Angle grippers

	 Angle grippers DHWS	 Angle grippers HGWC	 Angle grippers HGWM
Total gripping torque at 6 bar, closing	30 ... 1362 Ncm	22 ... 144 Ncm	22 ... 64 Ncm
Max. opening angle	40°	30 ... 80°	14 ... 18.5°
Position sensing	Via Hall sensor, via proximity sensor	Via proximity sensor	None
Gripping force backup	During closing		
Description	• Improved gripper jaw guide • Link guided movement • Internal fixed flow control, does away with the need for external flow control in 90% of applications • Max. repetition accuracy • Wide range of options for mounting on drive units	• High force with minimal volume • Internal fixed flow control, does away with the need for external flow control in 90% of applications • Suitable for external and internal gripping • Repetition accuracy 0.05 mm • Compact and cost-effective	• Micro gripper: compact, handy design • Mounting options with clamping spigot, with flange mounting, with Z stroke compensation • Versatile thanks to externally adaptable gripper fingers
online: →	**dhws**	**hgwc**	**hgwm**

FESTO

Radial grippers

	 **Radial grippers DHRS**	 **Radial grippers HGRT**	 **Radial grippers HGRC**
Total gripping torque at 6 bar, closing	15 ... 660 Ncm	158 ... 7754 Ncm	22 ... 144 Ncm
Max. opening angle	180°	180°	180°
Position sensing	Via Hall sensor, via proximity sensor	Via proximity sensor, via inductive sensors	Via proximity sensor
Description	• Lateral gripper jaw support for high torque loads • Self-centring • Gripper jaw centring options • Max. repetition accuracy	• Secure gripping thanks to precise, polished plain-bearing guides • Gripping force backup via compression springs holds the gripped workpiece securely in the event of pressure failure • Compression spring also boosts the gripping force for applications involving heavier loads • Optimum cycle times thanks to freely adjustable opening angle of up to max. 90° per gripper finger. This prevents possible collisions due to the gripper jaws opening too wide	• High force with minimal volume • Internal fixed flow control, does away with the need for external flow control in 90% of applications • Suitable for external and internal gripping • Repetition accuracy 0.05 mm • Compact and cost-effective
online: →	**dhrs**	**hgrt**	**hgrc**

Swivel/gripper units

	 **Swivel/gripper units HGDS**
Total gripping force at 6 bar, closing	74 ... 168 N
Stroke per gripper jaw	2.5 ... 7 mm
Swivel angle	210°
Position sensing, gripper	Via proximity sensor
Description	• Combination of parallel gripper and swivel module • Swivel angle infinitely adjustable • Precise end stop with elastic cushioning or integrated shock absorber
online: →	**hgds**

Bellows grippers

FESTO

	 **Bellows grippers** **DHEB**
Stroke of bellows	3.5 ... 25 mm
Min. diameter to be gripped	8 ... 66 mm
Max. diameter to be gripped	11 ... 85 mm
Max. operating frequency of gripper	≤4 Hz
Description	• 11 sizes for gripping diameter from 8 to 85 mm • Direction of movement: bellows upwards or downwards • Different bellows materials: EPDM or silicone • Air connection on the side or from above • Optimised process sequence with increased quality: prevents the workpieces from being scratched • Additional reliability: optional sensing via proximity or position sensor
online: ➔	**dheb**

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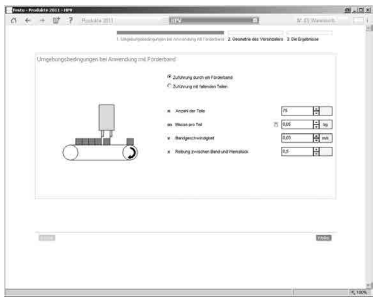
Gripper accessories

	 New **Adaptive gripper fingers** **DHAS**
New	• New series
Description	• Self-adjusting to different workpiece shapes • Adaptive gripper fingers for smooth and flexible gripping, with the Fin Ray Effect® derived from the movement of a fish's tail fin • Sizes 60, 80, 120 • For workpiece diameters from 6 to 120 mm
online: ➔	**dhas**

Software tool

FESTO

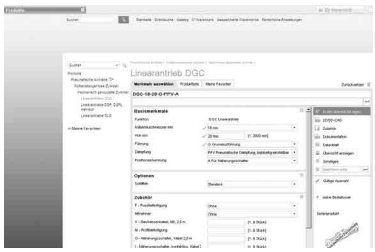
Feed separators		This tool helps you to select the right separator of the type HPV from Festo for your application. Let yourself be guided by the program – enter the general parameters and you will receive at least one suggestion for the product best suited to your application. This tool can be found • either in the electronic catalogue by clicking on the blue button “Engineering” • or on the DVD under Engineering Tools.

Feed separators

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

Software tool

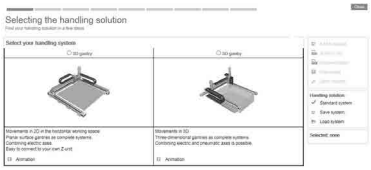
FESTO

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.

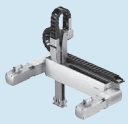
Handling modules

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

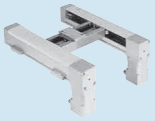
Software tool

Configurator: Handling Guide Online (HGO)		Planning complex handling systems takes a lot of time. You can use the “Handling Guide Online” (HGO) configurator to design a customised handling system for your application in just a few steps. **Advantages :** • Automatic selection of all relevant components • Automatic design and calculation of the workload • CAD model available immediately • Fully automated processing • Fully assembled or unassembled systems This tool can be found in the electronic catalogue by clicking on the blue button “Engineering”.

Cartesian systems

	 Single-axis system YXCS	 2D linear gantry YXCL	 New Linear gantries EXCT	 2D planar surface gantry YXCF
New			• New series	
Description	• Ready-to-install single-axis solution including energy chain for cable and tubing routing as well as matching motor and motor controller package • For any single-axis movement • Ideal for long gantry strokes and heavy loads • High mechanical rigidity and sturdy design	• Ideal for long gantry strokes and heavy loads • High mechanical rigidity and sturdy design • Frequently used in feeding or loading applications • Use of tried and tested drives/axes from Festo	• Short cycle times thanks to high dynamic response • Perfectly matched drive and controller package for quick commissioning • Especially economical due to the low moving dead weight	• • Can be used universally for handling light to heavy workpieces or high effective loads • Especially suitable for very long strokes • High mechanical rigidity and sturdy design • Freely positionable; any intermediate positions
online: →	yxcs	yxcl	exct	yxcf

Cartesian systems

	 New 2D planar surface gantry EXCM	 New 2D planar surface gantry EXCH	 3D gantry YXCR
New	• Additional size	• New series	
Description	• Excellent functionality in confined spaces • Small moving loads • Actuation via two stepper motors with integrated optical encoder and two-axis controller • With plain or recirculating ball bearing guide	• Optimal dynamic response when compared with other Cartesian gantry systems • Drive concept with low moving dead weight • Flat system design • High acceleration in both axial directions	• Can be used universally for handling light to heavy workpieces or high effective loads • Especially suitable for very long strokes • High mechanical rigidity and sturdy design • Pneumatic and electric components – freely combinable • As an electrical solution – freely positionable/any intermediate positions
online: →	excm	exch	yxcr

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Parallel kinematic systems

	 **Tripod** **EXPT**
Max. payload	5 kg
Working space nominal diameter	450 ... 1200 mm
Working space nominal height	100 mm
Max. picking rate	150 picks/min in 12" cycle
Description	• Low moving mass – ideal for demanding requirements on dynamic response in three dimensions • Great path accuracy with a range of path profiles, even for very dynamic operation
online: ➔	**expt**

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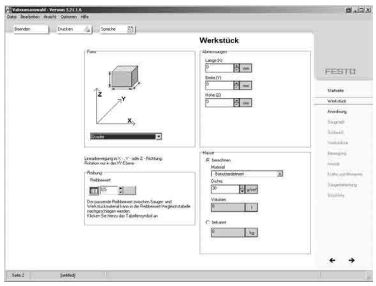
Control systems

	 **Control systems** **CMCA**
Electrical connection	Spring-loaded terminal
Mains voltage AC	230/400 V
Nominal operating voltage phases	3-phase
Mains frequency	50 ... 60 Hz
Safety function	Safe Stop 1 (SS1)
Description	• Control solution for handling systems from Festo • Available on a mounting plate with or without control cabinet housing • Includes the multi-axis controller CMXR and the motor controller CMMP required for control
online: ➔	**cmca**

Note:
Control cabinets for controllers in handling systems ➔ 181

Software tool

FESTO

Vacuum selection		Which suction cup for which surface and which movement? Don't experiment – calculate! This software tool even enables a differentiation to be made between linear and rotary movements. This tool can be found • either in the electronic catalogue by clicking on the blue button "Engineering" • or on the DVD under Engineering Tools

Vacuum generators

	 New **Vacuum generators OVEM**	 **Vacuum generators, pneumatic VN**	 **Vacuum generators VAD**	 **Vacuum generators VAK**
Nominal width of Laval nozzle	0.45 ... 2 mm	0.45 ... 3 mm	0.5 ... 1.5 mm	1 mm
Ejector characteristics	High suction rate, high vacuum, standard	High suction rate, high vacuum, standard, in-line, high vacuum, high suction rate	High vacuum	High vacuum
Integrated function	Electric ejector pulse valve, flow control valve, electric on-off valve, filter, electric air saving function, check valve, open silencer, vacuum switch	Pneumatic ejector pulse valve, open silencer, vacuum switch		Ejector pulse, pneumatic
Max. vacuum	93%	86 ... 93%	80%	80%
Max. suction rate with respect to atmosphere	6 ... 86.5 l/min	6.1 ... 339 l/min		
New	• Straightforward operation and diagnostics: can be controlled easily from the PLC using IO-Link® • Variant with LCD display			
Description	• Compact design • Monitoring with vacuum sensor with IO-Link® • Central electrical connection via an M12 plug • Maintenance-free operation and reduced noise level through an integrated, open silencer • Integrated filter with inspection window • Optionally with air-saving function and LCD display • Adjustable ejector pulse	• Can be used directly in the work space • Available as a straight type (inline: vacuum port in line with the supply port) or T-shape (standard: vacuum port at 90° to the supply port) • Compact and cost-effective • Maintenance-free operation and reduced noise level through an integrated, open silencer	• Sturdy aluminium housing	• Sturdy aluminium housing • Ejector pulse through built-in reservoir • Connection for external reservoir
online: →	ovem	vn	vad	vak

Vacuum generators

FESTO

	 Vacuum generators, electropneumatic VN	 Vacuum generators VADM, VADMI	 Vacuum generators VAD-M, VAD-M-I
Nominal width of Laval nozzle	0.45 ... 3 mm	0.45 ... 3 mm	0.7 ... 2 mm
Ejector characteristics	Standard, high vacuum, high suction rate	High vacuum	High vacuum
Integrated function	Pneumatic ejector pulse valve, electric on-off valve, open silencer	Electric ejector pulse valve, flow control valve, electric on-off valve, filter, electric air saving function, check valve, vacuum switch	Electric ejector pulse valve, electric on-off valve
Max. vacuum	92 ... 93%	85%	85 ... 90%
Max. suction rate with respect to atmosphere	7.2 ... 186 l/min		
Description	• Can be used directly in the work space • Cost effective • Maintenance-free operation and reduced noise level through an integrated, open silencer • With solenoid valve vacuum On/Off	• Compact and sturdy design • Built-in solenoid valve (on/off) • Integrated filter with inspection window • Optionally with air-saving function, vacuum sensor • Optionally with adjustable ejector pulse	• Compact and sturdy design • Built-in solenoid valve (on/off) • Optionally with ejector pulse
online: ➔	vn	vadm	vad-m

Vacuum generators

	 Vacuum generators for valve terminals CPV CPV10-M1H, CPV14-M1H, CPV18-M1H	 Vacuum generator cartridges VN
Nominal width of Laval nozzle	0.7 ... 1.4 mm	0.45 ... 2 mm
Ejector characteristics	High vacuum	Standard, high vacuum, high suction rate
Integrated function		
Max. vacuum	85%	92 ... 93%
Max. suction rate with respect to atmosphere		7.2 ... 184.4 l/min
Description	• Combinations of switching valves with vacuum generators are possible on a valve terminal • With solenoid valve vacuum on/off • Optionally with ejector pulse	• For fitting into customised housing for decentralised vacuum generation
online: ➔	cpv10-m1h	vn

Vacuum gripping technology

	 Bernoulli gripper OGGB	 Suction gripper ESG	 Suction cups with connection attachments ESS
Suction cup size		4x20 mm, 6x10 mm, 6x20 mm, 8x20 mm, 8x30 mm, 4x10 mm, 10x30 mm, 15x45 mm, 20x60 mm, 25x75 mm, 30x90 mm	4x20 mm, 6x10 mm, 6x20 mm, 8x20 mm, 8x30 mm, 4x10 mm, 10x30 mm, 15x45 mm, 20x60 mm, 25x75 mm, 30x90 mm
Suction cup diameter	60 mm, 100 mm, 140 mm	2 ... 200 mm	2 ... 200 mm
Holding force at nominal operating pressure	6 ... 10 N	0.1 ... 1610 N	0.1 ... 1610 N
Design		Vacuum port on top, vacuum port on the side, with height compensator, with long height compensator	Round, bell-shaped,
Information on materials: suction cup		BR, FPM, NBR, PUR, VMQ (silicone), Vulkollan®	BR, FPM, NBR, PUR, VMQ (silicone), Vulkollan®
Description	• Ideally suited to transporting thin, extremely delicate and brittle workpieces • Minimised workpiece contact, gentle workpiece handling • Low energy costs thanks to minimised air consumption	• Modular system of suction cup holders and suction cups with over 2000 variants • Optionally with angle compensator, height compensator, filter • 15 suction cup diameters • 6 suction cup shapes • Suction cup volume: 0.002 ... 245 cm³ • Min. workpiece radius: 10 ... 680 mm • Vacuum port: push-in connector or barbed fitting for plastic tubing, threaded connection	• 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
online: →	oggb	esg	ess

Vacuum gripping technology

	 Suction cups ESV	 Suction cups with connection attachments VAS, VASB
Suction cup size		
Suction cup diameter	20 ... 200 mm	2 ... 125 mm
Holding force at nominal operating pressure	8.2 ... 1610 N	0.14 ... 700 N
Design	Bell-shaped or round bellows	
Information on materials: suction cup	BR, FPM, NBR, PUR, VMQ (silicone), Vulkollan®	NBR, PUR, TPE-U (PU), VMQ (silicone)
Description	• Wearing part for suction cup • Easily interchangeable • Suction cup volume: 0.318 ... 245 cm³ • Min. workpiece radius: 10 ... 680 mm	• Sturdy and reliable • Suction cups with fixed connecting thread • 11 suction cup diameters • Round suction cup shape, bellows • Vacuum port on top, on the side • Screw-in thread
online: →	esv	vas

Assembly and connection components

FESTO

	 **Suction cup holders** **ESH**
Design	Vacuum port on top, vacuum port on the side, with height compensator
Description	• With or without height compensator • 6 holder sizes • 8 holder types • 3 tubing connections
online: ➔	esh

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Universal directional control valves

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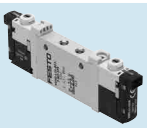
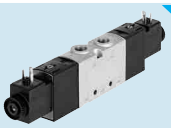
	 New **Solenoid valves, for individual connection VUVG**	 New **Solenoid valves, plug-in VUVG**	 **Pneumatic valves VUWG**	 New **Solenoid valves VUVS**
Type of control	Electric	Electric	Pneumatic	Electric
Pneumatic connection 1	G1/4, G1/8, M3, M5, M7		G1/4, G1/8, M3, M5, M7	G1/4, G1/8, G3/8
Pneumatic working port	G1/4, G1/8, M3, M5, M7, QS-1/4, QS-1/8, QS-10, QS-3, QS-3/16, QS-3/8, QS-4, QS-5/16, QS-5/32, QS-6, QS-8, flange	G1/4, G1/8, M5, M7, flange	G1/4, G1/8, M3, M5, M7, QS-1/4, QS-1/8, QS-10, QS-3, QS-3/16, QS-3/8, QS-4, QS-5/16, QS-5/32, QS-6, QS-8	G1/4, G1/8, G3/8, NPT1/4-18, NPT1/8-27, NPT3/8-18, QS-1/2, QS-1/4, QS-10, QS-12, QS-3/8, QS-4, QS-5/16, QS-5/32, QS-6, QS-8
Standard nominal flow rate	80 ... 1380 l/min	130 ... 1200 l/min	80 ... 1380 l/min	550 ... 2400 l/min
Valve function	2x3/2-way, single solenoid, closed, 2x3/2-way, single solenoid, open, 2x3/2-way, single solenoid, open/closed, 5/2-way, double solenoid, 5/2-way, single solenoid, 5/3-way, pressurised, 5/3-way, exhausted, 5/3-way, closed	2x3/2-way, single solenoid, closed, 2x3/2-way, single solenoid, open, 2x3/2-way, single solenoid, open/closed, 3/2-way, single solenoid, closed, 3/2-way, single solenoid, open, 5/2-way, double solenoid, 5/2-way, single solenoid, 5/3-way, pressurised, 5/3-way, exhausted, 5/3-way, closed	2x3/2-way, monostable, closed, 2x3/2-way, monostable, open, 2x3/2-way, monostable, open/closed, 5/2-way, bistable, 5/2-way, monostable, 5/3-way, pressurised, 5/3-way, exhausted, 5/3-way, closed	3/2-way, single solenoid, closed, 3/2-way, single solenoid, open, 5/2-way, double solenoid, 5/2-way, single solenoid, 5/3-way, pressurised, 5/3-way, exhausted, 5/3-way, closed
Electrical connection	Plug, via E-box, connection pattern H, horizontal connection, M8x1 A-coded to EN 61076-2-104, 2-pin, 3-pin	Via E-box		To EN 175301-803, type B, type C
New	• Additional versions	• Additional versions		• Additional size
Quick ordering of selected basic designs	★			★
Description	• Compact universal valve • Connection technology via E-box • High flow rate relative to its size • In-line valves can be used as individual valves or manifold valves	• Sub-base valve • For valve terminal VTUG with plug-in	• Compact universal valve • Pneumatically actuated • High flow rate relative to its size • In-line valves can be used as individual valves or manifold valves	• Universal valve, sturdy and durable • Low-cost, no performance limitations • Can be used as individual valves or manifold valves VTUS
online: →	**vuvg**	**vuvg**	**vuwg**	**vuvs**

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Universal directional control valves

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	 New **Pneumatic valves** **VUWS**	 New **Solenoid valves** **VMPA1, VMPA14, VMPA2**	 **Solenoid valves** **CPE10, CPE14, CPE18, CPE24**	 **Solenoid and pneumatic valves, Tiger 2000** **MFH, MVH, JMFH, JMVH, VL, J**
Type of control	Pneumatic	Electric	Electric, via pilot interface to ISO 15218	Electric, pneumatic
Pneumatic connection 1	G1/4, G1/8, G3/8	G1/8, M7	G1/4, G1/8, G3/8, M5, M7, QS-10, QS-12, QS-4, QS-6, QS-8	G1/4, G1/8, G3/8
Pneumatic working port	G1/4, G1/8, G3/8, NPT1/4-18, NPT1/8-27, NPT3/8-18, QS-1/4, QS-10, QS-3/8, QS-4, QS-5/16, QS-5/32, QS-6, QS-8	G1/8, M7	G1/4, G1/8, G3/8, M5, M7, QS-10, QS-12, QS-4, QS-6, QS-8	G1/4, G1/8, G3/8
Standard nominal flow rate	600 ... 2400 l/min	160 ... 900 l/min	180 ... 3200 l/min	750 ... 2600 l/min
Valve function	3/2-way, monostable, closed, 3/2-way, monostable, open, 5/2-way, bistable, 5/2-way, monostable, 5/3-way, pressurised, 5/3-way, exhausted, 5/3-way, closed	2x2/2-way, single solenoid, closed, 2x3/2-way, single solenoid, closed, 2x3/2-way, single solenoid, open, 2x3/2-way, single solenoid, open/closed, 3/2-way, single solenoid, closed, 3/2-way, single solenoid, open, 5/2-way, double solenoid, 5/2-way, single solenoid, 5/3-way, pressurised, 5/3-way, exhausted, 5/3-way, closed	3/2-way, single solenoid, closed, 3/2-way, single solenoid, open, 5/2-way, double solenoid, 5/2-way, single solenoid, 5/3-way, pressurised, 5/3-way, exhausted, 5/3-way, closed	5/2-way, bistable/double solenoid, 5/2-way, monostable/single solenoid, 5/3-way, pressurised, 5/3-way, exhausted, 5/3-way, closed
Electrical connection		M8x1, plug, to EN 60947-5-2, 4-pin	M8x1, Type C, 2-pin, 4-pin	Via F coil, to be ordered separately
New	• Additional size	• Additional versions		
Description	• Universal valve, sturdy and durable • Pneumatically actuated • Can be used as individual valves or manifold valves VTUS	• For valve terminal MPA • As individual valve mounted on sub-base • Comprehensive valve range	• Universally applicable individual valve • High flow rate relative to its size	• Sturdy and reliable • Wide range of voltages due to individual coils • Principle with armature guide tube
online: →	**vuws**	**vmpa1**	**cpe**	**tiger 2000**

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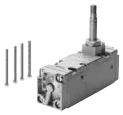
Universal directional control valves

	 **Solenoid and pneumatic valves, Tiger Classic MFH, MOFH, JMFH, JMFDH, VL/O, VL, JH, JDH**	 **Solenoid and pneumatic valves, midi pneumatic MEBH, MOEBH, MEH, MOEH, JMEBH, JMEH, VL, J**	 **Cassette valves C, CJ, CJM, CL, CM**
Type of control	Electric, pneumatic	Electric, pneumatic	Electric, pneumatic
Pneumatic connection 1	G1/2, G1/4, G1/8, G3/4, NPT1/8-27	G1/8, Sub-base	G1/2, G1/4, Sub-base
Pneumatic working port	G1/2, G1/4, G1/8, G3/4	G1/8, Sub-base	G1/2, G1/4, Sub-base
Standard nominal flow rate	500 ... 7500 l/min	300 ... 700 l/min	1400 l/min
Valve function	3/2-way, monostable/single solenoid, closed, 3/2-way, monostable/single solenoid, open, 3/2-way, monostable/single solenoid, open/closed, 5/2-way, bistable/double solenoid, 5/2-way, bistable/double solenoid, dominant signal, 5/2-way, monostable/single solenoid	3/2-way, monostable/single solenoid, closed, 3/2-way, monostable/single solenoid, open, 5/2-way, bistable/double solenoid, 5/2-way, monostable/single solenoid, 5/3-way, pressurised, 5/3-way, exhausted, 5/3-way, closed	5/2-way, double solenoid/bistable, 5/2-way, single solenoid/monostable
Electrical connection	Via F coil, to be ordered separately	Plug, square design, to EN 175301-803, type C, plug pattern type C to industry standard 9.4 mm	
Description	• Sturdy and reliable • Poppet valve • All-metal version • Principle with armature guide tube	• Sub-base valve, semi in-line valve • Individual mounting or manifold assembly for 2 ... 10 valves • Operating voltage 24 V DC, 110/230 V AC (50 ... 60 Hz)	• Sturdy • Direct mounting on sub-base • With or without manual override
online: →	tiger classic	mebh	cm

Universal directional control valves

FESTO

	 **Solenoid valves, supplementary product range BMCH, BMFH, JMC, JMF, MC, MCH, MF, MFH, MLC, MOCH, MOFH**	 **Pneumatic valves, supplementary product range A, VL**	 **Basic valves LC**
Type of control	Electric		Pneumatic, electric
Pneumatic connection 1	G1/2, G1/4, G1/8, M5	G1/4	G1/8, G1/4
Pneumatic working port	G1/2, G1/4, G1/8, M5	G1/4	
Standard nominal flow rate	46 ... 300 l/min	700 l/min	80 ... 600 l/min
Valve function	2/2-way, single solenoid, closed, 2x3/2-way, single solenoid, closed, 3/2-way, single solenoid, closed, 3/2-way, single solenoid, open, 3x3/2-way, single solenoid, closed, 4/2-way, double solenoid, 4/2-way, single solenoid, 5/4-way, closed	5/2-way, bistable, 5/4-way, closed	3/2-way, directly actuated, 5/4-way, indirectly actuated
Electrical connection	Plug connector		
Description	• Manifold mounting or individual valve • Especially suited for positioning, for stopping in the event of an emergency stop and for holding double-acting cylinders in any position • With or without manual override	• For activating cylinders for single stroke and oscillating movements • For positioning, for stopping in the event of an emergency stop and for holding double-acting cylinders in any position • For controlling functions of pneumatic feed units such as feed motions and reciprocal clamping • Actuation either manually using a switch lever, mechanically using a control stem or pneumatically	• Screw-in actuator attachments • For positioning, for stopping in the event of an emergency stop and for holding double-acting cylinders in any position
online: ➔	**bmch**	**vl**	**lc**

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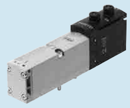
Standard directional control valves

FESTO

	 New **Solenoid valves VSNC**	 New **Standards-based valves with central plug VSVA-R5, VSVA-R2**	 **Standards-based valves with individual plug VSVA-C1, VSVA-P1**	 New **Standards-based valves, plug-in VSVA-T1**
Type of control	Electric	Electric	Electric	Electric
Pneumatic connection 1	G1/4, NPT1/4-18, QS-1/4, QS-10, QS-3/8, QS-5/16, QS-6, QS-8	Sub-base size 1 to ISO 5599-1, size 2 to ISO 5599-1	Sub-base size 18 to ISO 15407-1, size 26 to ISO 15407-1	Sub-base size 1 to ISO 5599-2, size 2 to ISO 5599-2, size 18 to ISO 15407-2, size 26 to ISO 15407-2
Standard nominal flow rate	800 ... 1350 l/min	400 ... 2800 l/min	400 ... 1400 l/min	370 ... 2900 l/min
Valve function	5/2-way, double solenoid, 5/2-way or 3/2-way, convertible, 5/3-way, pressurised, 5/3-way, exhausted, 5/3-way, closed	2x2/2-way, single solenoid, closed, 2x3/2-way, single solenoid, closed, 2x3/2-way, single solenoid, open, 2x3/2-way, single solenoid, open/closed, 5/2-way, double solenoid, 5/2-way, double solenoid, dominant signal, 5/2-way, single solenoid, 5/3-way, pressurised, 5/3-way, exhausted, 5/3-way, closed	2x2/2-way, single solenoid, closed, 2x3/2-way, single solenoid, closed, 2x3/2-way, single solenoid, open, 2x3/2-way, single solenoid, open/closed, 5/2-way, double solenoid, 5/2-way, double solenoid, dominant signal, 5/2-way, single solenoid, 5/3-way, pressurised, 5/3-way, exhausted, 5/3-way, closed	2x2/2-way, single solenoid, closed, 2x3/2-way, single solenoid, closed, 2x3/2-way, single solenoid, open, 2x3/2-way, single solenoid, open/closed, 5/2-way, double solenoid, 5/2-way, double solenoid, dominant signal, 5/2-way, single solenoid, 5/3-way, pressurised 1 to 2, 4 to 5 closed, 5/3-way, pressurised, 5/3-way, exhausted, 5/3-way, closed, 5/3-way, port 2 pressurised, 4 exhausted, 5/3-way, port 4 pressurised, 2 exhausted
Electrical connection	Plug, to EN 175301-803, to industry standard (11 mm), type A, type B, 3-pin	M8x1, M12x1, central plug, round design, 3-pin, 4-pin	To DIN EN 175301-803, type C, with protective earth conductor, without protective earth conductor	Plug, plug-in, to ISO 15407-2, to ISO 5599-2, 2-pin, 4-pin
New	• Additional versions	• Electrical timer function		• Option of manual override, non-detenting, heavy-duty • Electrical timer function
Quick ordering of selected basic designs	★	★	★	
Description	• NAMUR interface • Rotatable seal for 3/2- or 5/2-way valve • Wide choice of EX solenoid systems • Sturdy and powerful • Extended temperature range • Outstanding value for money	• Corresponds to ISO 5599-1 • Electrical connection via central plug • Robust metal housing • Manifold assembly with mixed sizes possible	• Corresponds to ISO 15407-1 and to ISO 15218 for pilot valve with interface • Electrical connection via type C plug • Robust metal housing • Manifold assembly with mixed sizes possible	• For valve terminal VTSA/VTSA-F • Robust metal housing
online: →	vsnc	vsva	vsva	vtsa

Standard directional control valves

FESTO

	 Pneumatic valves, to ISO 15407-1 VSPA	 Solenoid valves to ISO 5599-1 MN1H, MFH, MDH, MEBH, MDH, JMN1H, JMN1DH, JMFH, JMFDH, JMDH, JMEBH, JMEBDH, JMDDH	 Pneumatic valves, to ISO 5599-1 VL, J, JD
Type of control	Pneumatic	Electric	Pneumatic
Pneumatic connection 1	Sub-base size 18 to ISO 15407-1, size 26 to ISO 15407-1	Sub-base size 1 to ISO 5599-1, size 2 to ISO 5599-1, size 3 to ISO 5599-1, size 4 to ISO 5599-1	Sub-base size 1 to ISO 5599-1, size 2 to ISO 5599-1, size 3 to ISO 5599-1, size 4 to ISO 5599-1
Standard nominal flow rate	400 ... 1100 l/min	1200 ... 6000 l/min	1200 ... 6000 l/min
Valve function	2x3/2-way, monostable, closed, 2x3/2-way, monostable, open, 2x3/2-way, monostable, open/closed, 5/2-way, bistable, 5/2-way, bistable, dominant signal, 5/2-way, monostable, 5/3-way, pressurised, 5/3-way, exhausted, 5/3-way, closed	5/2-way, double solenoid, 5/2-way, double solenoid, dominant signal, 5/2-way, single solenoid, 5/3-way, pressurised, 5/3-way, exhausted, 5/3-way, closed	5/2-way, bistable, 5/2-way, bistable, dominant signal, 5/2-way, monostable, 5/3-way, pressurised, 5/3-way, exhausted, 5/3-way, closed
Electrical connection		M12x1, central plug, via F coil, to be ordered separately, via N1 coil, to be ordered separately, round design, to DIN EN 175301-803	
Description	• Conforms to ISO 15407-1 • Pneumatic actuation • Manifold assembly with mixed sizes possible	• Conforms to ISO 5599-1 • Robust metal housing • Manifold assembly with a mixture of ISO sizes 1, 2 and 3 possible • Extensive range of electrical connection options • Wide range of vertical stacking modules: pressure regulator, flow control valve, vertical pressure shut-off plate, etc. • Also available as a valve terminal	• Conforms to ISO 5599-1 • Pneumatic control
online: ➔	**vspa**	**iso 5599-1**	**iso 5599-1**

Standard directional control valves

	 Standards-based valves, to ISO 15218 (CNOMO) MD, MDH, MGXDH, MGXIAH, VSCS	 Standards-based valves, NAMUR (VDI/VDE 3845) NVF3
Type of control	Electric	Electric
Pneumatic connection 1	Sub-base	G1/4
Standard nominal flow rate	18 ... 50 l/min	900 l/min
Valve function	2/2-way, single solenoid, closed	5/2-way or 3/2-way, single solenoid
Electrical connection	M12x1, to DIN EN 175301-803, to IEC 61076-2-101, type A, type C	Plug, 3-pin, or cable, 3-wire
Description	• CNOMO port and connection pattern, to ISO 15218 • With or without manual override	• NAMUR interface • Variants for use in Ex zone I
online: ➔	**iso 15218**	**namur**

FESTO

Application-specific directional control valves

	 **Control blocks VOFA**	 New **Solenoid valves VOFD**	 **Solenoid valves VOFC**	 **Solenoid valves VOVG**
Design	Piston spool valve	Directly actuated poppet valve	Piston spool, piloted piston poppet valve	Piston spool valve
Valve function	3/2-way, monostable, closed, 5/2-way, monostable	3/2-way, closed, single solenoid, semi-automatic, 3/2-way, closed, single solenoid	3/2-way, single solenoid, closed, 5/2-way, double solenoid, 5/2-way, single solenoid	3/2-way, single-solenoid, closed, 3/2-way, single-solenoid, open, 5/2-way, single-solenoid
Operating pressure	3 ... 10 bar	0 ... 12 bar	0 ... 8 bar	–0.9 ... 8 bar
Ambient temperature	–5 ... 50 °C	–50 ... 60 °C	–25 ... 60 °C	–5 ... 50 °C
Pneumatic connection 1	G1/4	G1/4		M5, M7, Sub-base
Standard nominal flow rate	950 ... 1050 l/min	52 ... 1900 l/min	766 ... 2686 l/min	180 ... 200 l/min
New		• Additional versions		
Description	• Redundantly constructed valve block, can be used for safe reversing of a hazardous movement • Can be selected as a decentralised individual connection variant with electrical and pneumatic individual connection or as a feature integrated in the valve terminal VTSA/VTSA-F • Equipped with VSVA valves • Switching position sensing by sensors	• Suitable for process automation, for applications in the chemical and petrochemical industries • Suitable for outdoor use under harsh, dusty ambient conditions • Especially suitable for quarter turn actuators thanks to NAMUR flange pattern • Variants with TÜV approval up to SIL4 acc. to IEC 61508	• Suitable for process automation, for applications in the chemical and petrochemical industries • Suitable for outdoor use under harsh, dusty ambient conditions • Especially suitable for quarter turn actuators thanks to NAMUR flange pattern • Valve can switch between internal and external pilot air • Variants with TÜV approval up to SIL3 acc. to IEC 61508	• Very compact valve for solutions with extremely compact assembly • Suitable for applications in the electronics and light assembly industry • In-line, semi in-line and subbase valve • Manifold rail for 2 ... 10 valves
online: →	vofa	vofd	vofc	vofg

Application-specific directional control valves

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	 **Solenoid valves MHA1, MHP1**	 **Solenoid valves MHE2, MHP2, MHA2, MHE3, MHP3, MHA3, MHE4, MHP4, MHA4**	 **Solenoid valves CDVI5.0**
Design	Poppet valve with spring return	Pressure-relieved poppet valve	Piston spool
Valve function	2/2-way, single solenoid, closed, 2x2/2-way, single solenoid, closed, 3/2-way, single solenoid, closed, 3/2-way, single solenoid, open	3/2-way, single-solenoid, closed, 3/2-way, single-solenoid, open, 5/2-way, single-solenoid	2/2-way, single solenoid, closed, 2/2-way, single solenoid, open, 2x3/2-way, single solenoid, closed, 2x3/2-way, single solenoid, open, 3/2-way, single solenoid, closed, 3/2-way, single solenoid, open, 5/2-way, double solenoid, 5/2-way, single solenoid, 5/3-way, pressurised, 5/3-way, exhausted, 5/3-way, closed
Operating pressure	–0.9 ... 8 bar	–0.9 ... 8 bar	–0.9 ... 10 bar
Ambient temperature	–5 ... 50 °C	–5 ... 60 °C	–5 ... 50 °C
Pneumatic connection 1	QS-3, QS-4, Sub-base, prepared for QSP10	G1/4, G1/8, M7, QS-4, QS-6, QS-8, Sub-base	Sub-base
Standard nominal flow rate	10 ... 30 l/min	90 ... 400 l/min	300 ... 650 l/min
Description	• Directly actuated poppet valve • Miniature valve: grid dimension 10 mm • Switching times down to 4 ms • Sub-base valve • Manifold block for 2 ... 10 valves	• Directly actuated poppet valve • Fast-switching valve: switching times down to 2 ms • Direct mounting, individual sub-base, manifold assembly • Manifold block for 2 ... 10 valves	• Clean Design sub-base valve • Easy-to-clean design
online: ➔	**mh1**	**mh2**	**cdvi5.0**

Application-specific directional control valves

	 **Fast-switching valves MHJ9, MHJ10**	 **Solenoid and pneumatic valves, M5 Compact System J, JD, JMFH, MFH, MUFH, VD, VL, VL/O, VLL**
Design	Poppet valve without spring return	Piston valve, disc seat valve
Valve function	2/2-way, monostable, closed	3/2-way, bistable/double solenoid, 3/2-way, monostable/single solenoid, closed, 3/2-way, monostable/single solenoid, open, 5/2-way, bistable/double solenoid, 5/2-way, bistable/double solenoid, dominant signal, 5/2-way, monostable/single solenoid
Operating pressure	0.5 ... 8 bar	–0.9 ... 8 bar
Ambient temperature	–5 ... 60 °C	–10 ... 60 °C
Pneumatic connection 1	QS-4, QS-6, Sub-base	PK-3
Standard nominal flow rate	50 ... 160 l/min	50 ... 105 l/min
Description	• Directly actuated poppet valve • Individual valve with integrated QS fitting • Switching frequencies of up to 1000 Hz • Service life › 500 million switching cycles	• Control elements with all functions for pneumatic sequence controls • For control cabinet installation • Fast replacement of components
online: ➔	**mhj9**	**m5-compact**

FESTO

Manually actuated directional control valves: swivel lever valves

	 New **Hand lever valves** **VHER**	 **Hand lever valves** **H-3-1/4-B, H-5-1/4-B**
Valve function	4/3-way, pressurised, 4/3-way, exhausted, 4/3-way, closed	3/2-way, bistable, 5/2-way, bistable
Type of actuation	Direct	Direct
Standard nominal flow rate	170 ... 3800 l/min	550 ... 600 l/min
Pneumatic working port	G1/2, G1/4, G1/8, M5	G1/4
Operating pressure	0 ... 10 bar	–0.95 ... 10 bar
New	• Additional versions	
Description	• Lever in metal or polymer design • Front panel mounting, through or mounting holes	• Die-cast aluminium design
online: ➔	vher	n_v14

Manually actuated directional control valves: pushbutton valves

	 **Pushbutton valves** **VHEM-P**	 **Pushbutton valves** **K/O-3-PK**	 **Pushbutton valves** **K-3-M5**
Valve function	3/2-way, monostable, closed, 3/2-way, monostable, open, 5/2-way, bistable, 5/2-way, monostable	3/2-way, monostable, open/closed	3/2-way, monostable, closed
Type of actuation	Direct, piloted	Direct	Direct
Standard nominal flow rate	500 ... 1000 l/min	80 l/min	80 l/min
Pneumatic working port	G1/4, G1/8	PK-3	M5
Operating pressure	–0.95 ... 10 bar	0 ... 8 bar	–0.95 ... 8 bar
Description	• With button switch • Reverse operation possible	• With button switch • Polymer design • Ducted exhaust air	• With button switch • Suitable for vacuum operation • Sturdy die-cast zinc design
online: ➔	vhem-p	n_vpk	k-3

Manually actuated directional control valves: pushbutton valves

	 **Pushbutton valves** **T-5/3-1/4**	 **Pushbutton valves** **F-3-M5**
Valve function	5/3-way, closed	2/2-way, monostable, closed
Type of actuation	Piloted	Direct
Standard nominal flow rate	680 l/min	80 l/min
Pneumatic working port	G1/4	M5
Operating pressure	2 ... 10 bar	–0.9 ... 8 bar
Description	• With pushbutton • For positioning, for stopping in the event of an emergency stop and for holding double-acting cylinders in any position • Aluminium design	• With pedal • Suitable for vacuum operation • Sturdy die-cast zinc design
online: ➔	n_msv	f-3-m5

Manually actuated directional control valves: finger lever valves

	 Finger lever valves VHEM-L	 Finger lever valves TH/O-3-PK-3	 Finger lever valves THO-3-1/4-B	 Finger lever valves H-4/3-M5
Valve function	3/2-way, monostable, closed, 3/2-way, monostable, open, 5/2-way, monostable	3/2-way, monostable, open/ closed,	3/2-way, monostable, closed, 3/2-way, monostable, open, 5/2-way, monostable	4/3-way, exhausted
Type of actuation	Direct	Direct	Direct	Piloted
Standard nominal flow rate	500 ... 1000 l/min	80 l/min	80 ... 600 l/min	125 l/min
Pneumatic working port	G1/4, G1/8	PK-3	G1/4, M5	M5
Operating pressure	–0.95 ... 10 bar	0 ... 8 bar	–0.95 ... 10 bar	0 ... 8 bar
Description	• With finger lever • Mechanical spring return • Quick mounting	• With finger lever • Polymer design • Ducted exhaust air	• With finger lever • Die-cast zinc or die-cast aluminium design	• With detenting finger lever • Front panel mounting or mounting on sub-base • Aluminium design
online: ➔	vhem-l	n_vpk	th-3-m5	h-4

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Manually actuated directional control valves: toggle lever valves

	 Toggle lever valves KH/O-3-PK-3	 Toggle lever valves H-5/3-1/4
Valve function	3/2-way, monostable, open/closed	5/3-way, closed
Type of actuation	Direct	Piloted
Standard nominal flow rate	80 l/min	680 l/min
Pneumatic working port	PK-3	G1/4
Operating pressure	0 ... 8 bar	2 ... 10 bar
Description	• With toggle lever • Polymer design • Ducted exhaust air	• With toggle lever • For positioning, for stopping in the event of an emergency stop and for holding double-acting cylinders in any position • Aluminium design
online: ➔	n_vpk	n_msv

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Manually actuated directional control valves: foot valves

	 **Foot valves** **F-3-1/4-B, FO-3-1/4-B, F-5-1/4-B**	 **Foot valves with detent** **FP-3-1/4-B, FPB-3-1/4, FP-5-1/4-B**
Valve function	3/2-way, monostable, closed, 3/2-way, monostable, open, 5/2-way, monostable	3/2-way, bistable, 5/2-way, bistable
Type of actuation	Direct	Direct
Standard nominal flow rate	550 ... 600 l/min	550 ... 600 l/min
Pneumatic working port	G1/4	G1/4
Operating pressure	–0.95 ... 10 bar	–0.95 ... 10 bar
Description	• With foot pedal • Sturdy die-cast zinc design	• With foot pedal with detent • Sturdy die-cast zinc design
online: ➔	fo-3	fpb-3

Manually operated directional control valves: selector switches

	 **Selector switch** **HW-6-38**
Valve function	8/6-way, monostable
Type of actuation	Direct
Standard nominal flow rate	180 l/min
Pneumatic working port	M5
Operating pressure	0 ... 8 bar
Description	• With rotary knob and arrow • Front panel mounting or mounting on sub-base • With six switching positions
online: ➔	hw-6

Manually operated directional control valves: front panel valves

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	 Front panel valves SV/O-3-PK-3x2	 Front panel valves SVS-3-1/8, SVS-4-1/8, SVSO-3-1/8	 Front panel valves SV-3-M5, SV-5-M5-B
Valve function	2x3/2-way, monostable, closed	3/2-way, monostable, closed, 3/2-way, monostable, open, 4/2-way, monostable	3/2-way, monostable, closed, 5/2-way, monostable
Type of actuation	Direct	Direct, piloted	Direct
Standard nominal flow rate	70 l/min	120 l/min	65 ... 95 l/min
Pneumatic working port	PK-3	G1/8	M5
Operating pressure	0 ... 8 bar	3.5 ... 8 bar	–0.95 ... 8 bar
Description	• For actuator attachments such as toggle and selector switches • Reliable coupling system for rapid mounting and dismounting • Polymer design	• For actuator attachments such as pushbutton actuators, mushroom pushbuttons, mushroom actuators, selector switches, toggle levers, key actuators • Reliable coupling system for quick mounting and dismounting	• For actuator attachments such as pushbutton actuators, mushroom pushbuttons, mushroom pushbuttons with detent, selector switches or toggle levers • Reliable coupling system for quick mounting and dismounting • Polymer design
online: ➔	sv	svos	sv-3

Mechanically operated directional control valves: stem actuated valves

	 Stem actuated valves VMEM-S	 Stem actuated valves V/O-3-PK-3, V/O-3-1/8	 Stem actuated micro valves S-3-PK-3-B, SO-3-PK-3-B	 Stem actuated valves VS-3-1/8, VS-4-1/8, VOS-3-1/8
Valve function	3/2-way, monostable, closed, 3/2-way, monostable, open, 5/2-way, monostable	3/2-way, monostable, open/ closed,	3/2-way, monostable, closed, 3/2-way, monostable, open	3/2-way, monostable, closed, 3/2-way, monostable, open, 4/2-way, monostable
Type of actuation	Direct, piloted	Direct	Direct	Piloted
Standard nominal flow rate	500 ... 1000 l/min	80 ... 140 l/min	60 l/min	140 ... 161 l/min
Pneumatic working port	G1/4, G1/8	PK-3, G1/8	PK-3	G1/8
Operating pressure	–0.95 ... 10 bar	–0.95 ... 8 bar	–0.95 ... 8 bar	3.5 ... 8 bar
Description	• Light weight • Small size • Various actuator attachments	• Through-holes in housing • Polymer or aluminium design	• Dimensions to DIN 41635, type A • Polymer design • Various actuator attachments	• Aluminium design • Minimal actuating force with pilot control
online: ➔	vmem	n_v18	s-3-pk	vos

Mechanically operated directional control valves: stem actuated valves

	 **Stem actuated valves** **V-3-1/4-B, V-5-1/4-B, VO-3-1/4-B**	 **Limit switches with push-in connector** **SDK**	 **Limit stop signal generators with push-in connector** **SDV**
Valve function	3/2-way, monostable, closed, 3/2-way, monostable, open, 5/2-way, monostable	3/2-way, monostable, closed	3/2-way, monostable, closed
Type of actuation	Direct	Direct	Direct
Standard nominal flow rate	550 ... 600 l/min	16 l/min	8 ... 16 l/min
Pneumatic working port	G1/4	PK-3	PK-3
Operating pressure	–0.95 ... 10 bar	0 ... 8 bar	0 ... 8 bar
Description	• Die-cast aluminium design	• For end-position sensing and position control • High accuracy • Stainless steel design	• For end-position sensing and position control • High precision and low actuating forces • Sturdy design
online: ➔	vo-3	sdk	sdv

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Mechanically operated directional control valves: roller lever valves

	 **Roller lever valves** **R/O-3-PK-3**	 **Roller lever valves** **RS-3-1/8, RS-4-1/8, ROS-3-1/8**	 **Roller lever valves** **R-3-M5, R-3-1/4-B, R-5-1/4-B, RO-3-1/4-B**
Valve function	3/2-way, monostable, open/closed	3/2-way, monostable, closed, 3/2-way, monostable, open, 4/2-way, monostable	3/2-way, monostable, closed, 3/2-way, monostable, open, 5/2-way, monostable
Type of actuation	Direct	Piloted	Direct
Standard nominal flow rate	80 l/min	128 ... 169 l/min	80 ... 600 l/min
Pneumatic working port	PK-3	G1/8	G1/4, M5
Operating pressure	0 ... 8 bar	3.5 ... 8 bar	–0.95 ... 10 bar
Description	• With roller lever • Polymer design • Ducted exhaust air	• With roller lever • Aluminium design • Minimal actuating force with pilot control	• With roller lever • Die-cast aluminium design
online: ➔	n_vpk	ros-3	ro-3

Mechanically operated directional control valves: roller lever valves with idle return

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	 **Toggle lever valves L/O-3-PK-3**	 **Roller lever valves with idle return LS-3-1/8, LS-4-1/8, LOS-3-1/8**	 **Roller lever valves with idle return L-3-M5, L-3-1/4-B, L-4-1/4-B, LO-3-1/4-B**
Valve function	3/2-way, monostable, open/closed	3/2-way, monostable, closed, 3/2-way, monostable, open, 4/2-way, monostable	3/2-way, monostable, closed, 3/2-way, monostable, open, 5/2-way, monostable
Type of actuation	Direct	Piloted	Direct
Standard nominal flow rate	80 l/min	128 ... 175 l/min	80 ... 600 l/min
Pneumatic working port	PK-3	G1/8	G1/4, M5
Operating pressure	0 ... 8 bar	3.5 ... 8 bar	–0.95 ... 10 bar
Description	• With roller lever with idle return • Polymer design • Ducted exhaust air	• With toggle lever • Aluminium design • Minimal actuating force with pilot control	• With roller lever • Die-cast aluminium design
online: ➔	n_vpk	los-3	lo-3

8

Mechanically operated directional control valves: swivel lever valves

	 **Swivel lever valves RW/O-3-1/8**	 **Pneumatic limit valves RWN/O-3-1/8-B**	 **Swivel lever valves RW-3-M5**
Valve function	3/2-way, monostable, open/closed	3/2-way, monostable, open/closed	3/2-way, monostable, closed
Type of actuation	Direct	Direct	Direct
Standard nominal flow rate	140 l/min	120 l/min	80 l/min
Pneumatic working port	G1/8	G1/8	M5
Operating pressure	–0.95 ... 8 bar	–0.95 ... 8 bar	–0.95 ... 8 bar
Description	• Basic valve for actuator attachments such as swivel lever short, long, swivel lever rod • Aluminium design	• Directly actuated in one direction • Aluminium design	• With swivel lever • Sturdy die-cast zinc design • Various actuator attachments
online: ➔	rw	rwn	rw-3

Mechanically operated directional control valves: whisker valves

	 **Whisker valves** **FVS-3-1/8, FVSO-3-1/8**
Valve function	3/2-way, monostable, closed, 3/2-way, monostable, open
Type of actuation	Piloted
Standard nominal flow rate	146 ... 175 l/min
Pneumatic working port	G1/8
Operating pressure	3.5 ... 8 bar
Description	• With whisker • For sensing dissimilar workpieces or workpieces not precisely in position • Aluminium design • Minimal actuating force with pilot control
online: ➔	fvs-3

8

Check valves and quick exhaust valves

	 **Check valves, piloted** **VBNF**	 **Quick exhaust valves** **VBQF**	 **Check valves** **H, HA, HB**
Pneumatic connection 1	QS-6, QS-8	G1/4, G1/8, QS-6, QS-8	G1/2, G1/4, G1/8, G3/4, G3/8, M5, QS-10, QS-12, QS-4, QS-6, QS-8, R1/2, R1/4, R1/8, R3/8
Standard nominal flow rate			115 ... 2230 l/min
Standard flow rate exhaust 6->0 bar		850 ... 2500 l/min	
Standard nominal flow rate pressurisation 6->5 bar		350 ... 960 l/min	
Standard nominal flow rate 1 -> 2 from 6 to 5 bar	260 ... 620 l/min		1000 ... 5900 l/min
Operating pressure		0.2 ... 10 bar	–1 ... 12 bar
Operating pressure for entire temperature range	0.2 ... 10 bar		
Description	• Minimal height • High flow rate • Can be rotated horizontally through 360° when mounted	• Minimal height • High flow rate • Reduced noise emission • Available with silencer • Available with ducted or unducted exhaust air	• Valve function: non-return • Screw-in or in-line installation • With connecting thread at both ends, push-in connector at both ends, thread/push-in connector
online: ➔	vbnf	vbqf	h-qs

Check valves and quick exhaust valves

FESTO

	 Check valves, piloted HGL	 Manual override HAB	 Quick exhaust valves SE, SEU
Pneumatic connection 1	G1/2, G1/4, G1/8, G3/8, M5, QS-10, QS-12, QS-4, QS-6, QS-8	G1/2, G1/4, G1/8, G3/8	G1/2, G1/4, G1/8, G3/4, G3/8
Standard nominal flow rate			
Standard flow rate exhaust 6->0 bar		165 l/min	550 ... 7500 l/min
Standard nominal flow rate pressurisation 6->5 bar			300 ... 4560 l/min
Standard nominal flow rate 1 -> 2 from 6 to 5 bar	130 ... 1600 l/min		
Operating pressure	0.5 ... 10 bar	0 ... 10 bar	0.2 ... 10 bar
Operating pressure for entire temperature range			
Quick ordering of selected basic designs	★		
Description	• 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	• Valve function: exhaust component • For check valve HGL • For manually exhausting air trapped in a cylinder	• Valve function: quick exhaust • Shut-off valve, piloted • Screw-in • With or without silencer
online: →	hgl	hab	se

Ball valves and on-off valves

	 New Hand slide valves VBOH	 On-off valves HE	 Ball valves QH, QHS
Valve function	3/2-way, monostable	2/2-way bistable, 3/2-way bistable	2/2-way, bistable
Pneumatic connection 1	G1/2, G1/4, G1/8, G3/4, G3/8, M5	QS-10, QS-12, QS-6, QS-8, R1/2, R1/4, R1/8, R3/8	G1, G1 1/2, G1/2, G1/4, G3/4, G3/8, QS-4, QS-6, R1/8
Standard nominal flow rate	236 ... 7691 l/min	270 ... 840 l/min	148 ... 84000 l/min
Operating pressure	–0.95 ... 12 bar	–0.95 ... 10 bar	–1 ... 10 bar
New	• Additional versions		
Description	• Used as a shut-off function for pressurising and exhausting compressed air systems, for example, upstream of service unit combinations, for air guns and also for exhausting pneumatic cylinders • Non-overlapping, so no pressure losses when switching • Minimal installation	• Shut-off valve, manually actuated • Connection: thread at both ends, push-in connector at both ends, thread/ push-in connector	• Shut-off valve, manually actuated • In-line installation, can be screwed in, bulkhead fitting • Variants: thread at both ends, push-in connector at both ends, threaded/ push-in connector
online: →	vboh	he	qh

Logic valves

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

Pressure regulators

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

One-way flow control valves

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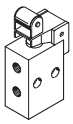
	 One-way flow control valves VFOH	 One-way flow control valves VFOF	 One-way flow control valves VFOC	 One-way flow control valves GRLA, GRLZ, CRGRLA, GRGA, GRGZ, GRLSA
Valve function	Exhaust air one-way flow control function	Exhaust air one-way flow control function	Supply air one-way flow control function	Exhaust air one-way flow control function, one-way flow control function, supply air one-way flow control function
Pneumatic connection 1	QS-10, QS-4, QS-6, QS-8	QS-6, QS-8	QS-4, QS-6	G1/2, G1/4, G1/8, G3/4, G3/8, M3, M5, PK-3, PK-3 with union nut, PK-4, PK-4 with union nut, PK-6 with union nut, QS-10, QS-12, QS-3, QS-4, QS-6, QS-8
Standard nominal flow rate in flow control direction	180 ... 530 l/min	240 ... 650 l/min	0 ... 270 l/min	0 ... 4320 l/min
Adjusting element	External hex	Internal hex	Slotted head screw	Knurled screw, slotted head screw, internal hex
Quick ordering of selected basic designs				★
Description	• Easy-to-clean design • Increased corrosion protection • Can be rotated horizontally through 360° when mounted	• Minimal height • High flow rate • Can be rotated horizontally through 360° when mounted • Functional combination of one-way flow control valve and piloted non-return valve	• Shut-off valve, flow control at one end • Metal design • Precision adjustment for low and medium speeds • Push-in connector/push-in sleeve	• Flow control valve, flow control at one end • Polymer, metal or stainless steel design • Standard, mini, in-line variants with different flow rates • Functional combination of one-way flow control valve and piloted non-return valve • Connections: thread at both ends, push-in connector at both ends, threaded/push-in connector
online: →	vfoh	vfof	vfoc	grla

One-way flow control valves

	 One-way flow control valves GRXA	 One-way flow control valves GR, GRA	 One-way flow control valves GG, GGO, GRR
Valve function	Exhaust air one-way flow control function	One-way flow control function	One-way flow control function
Pneumatic connection 1	QS-4, QS-6, QS-8	G1/2, G1/4, G1/8, G3/4, G3/8, M3, M5, QS-3, QS-4, QS-6, QS-8	G1/2, G1/4
Standard nominal flow rate in flow control direction	130 ... 280 l/min	29.5 ... 3300 l/min	870 ... 1300 l/min
Adjusting element	Slotted head screw	Knurled screw	Roller lever
Description	• Functional combination of one-way flow control valve and piloted check valve • Holding function and speed adjustment in one housing • Additional supply port for holding crossover connection	• Non-return and flow control valve • In-line installation	• Non-return and flow control valve • With roller lever
online: →	grxa-hg	gra	gg

One-way flow control valves

	 Precision one-way flow control valves GRP	 One-way flow control valves, M5 Compact System GRF
Valve function	One-way flow control function	One-way flow control function
Pneumatic connection 1	G1/8, PK-3, PK-4	PK-3
Standard nominal flow rate in flow control direction	3.8 ... 75.8 l/min	45 l/min
Adjusting element	Rotary knob with scale	Knurled screw
Description	• Non-return and flow control valve • Mounting on sub-base or for front panel mounting	• Complete system offering control components with all the functions required for pneumatic sequence controls • For control cabinet installation • Fast replacement of components
online: →	grp	m5-compact

Flow control valves

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

Flow control valves

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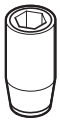
	 **Precision flow control valves GRPO**	 **Exhaust air flow control valves, flow control/silencers GRU, GRE**	 **Restrictors VMPA1-FT**
Valve function	Flow control function	Flow control/silencer function	Flow control function
Pneumatic connection 1	G1/8, PK-3, PK-4	G1/2, G1/4, G1/8, G3/4, G3/8	Sub-base
Standard flow rate in flow control direction 6->0 bar	5.2 ... 129 l/min		
Standard nominal flow rate in flow control direction	3.8 ... 75.8 l/min	520 ... 3600 l/min	3.5 ... 115 l/min
Standard flow rate 6-> 0 bar		0 ... 8000 l/min	
Adjusting element	Rotary knob with scale	Slotted head screw	
Description	• Connections: threaded connection at both ends, push-in connector at both ends • Metal design	• Exhaust air flow control valve GRE: sintered metal • Flow control/silencer GRU: polymer	• Flow control function • Mounting: screw-in
online: ➔	grpo	gre	vmpa1

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Time delay valves

	 **Time delay valves, M5 Compact System VLK, VZ, VZO**	 **Time delay valves VZA, VZOA, VZB, VZOB**
Pneumatic port	PK-3	G1/4, G1/8
Standard nominal flow rate	60 ... 90 l/min	600 l/min
Adjustable time delay	0.25 ... 5 s	0 ... 30 s
Operating pressure	2.5 ... 8 bar	0 ... 10 bar
Type of mounting	Optional: front panel mounting, on mounting frame	With through-hole
Description	• Complete system offering control components with all the functions required for pneumatic sequence controls • For control cabinet installation • Fast replacement of components	• Time delay infinitely adjustable
online: ➔	m5-compact	vza

Proportional valves

	 Proportional flow control valves VPCF	 Proportional pressure regulators VPPX	 Proportional pressure regulators VPPM	 Proportional directional control valves VPWP
Valve function	3-way proportional flow control valve	3-way proportional pressure regulator	3-way proportional pressure regulator	5/3-way proportional directional control valve, closed
Pneumatic connection 1	G3/8	G1/2, G1/4, G1/8, Sub-base	G1/2, G1/4, G1/8, Sub-base	G1/4, G1/8, G3/8
Pressure regulation range		0.1 ... 10 bar	0.02 ... 10 bar	
Operating pressure for positioning/Soft Stop				4 ... 8 bar
Operating pressure	1 ... 10 bar			0 ... 10 bar
Standard nominal flow rate	20 ... 1500 l/min	1400 ... 7000 l/min	380 ... 7000 l/min	350 ... 2000 l/min
Description	• Linear characteristic curve for simple programming • ATEX-certified • Highly dynamic • Piston spool with integrated sensor • Electrical connection via M12x1 plug, 8-pin	• Pressure regulator with additional sensor input • Multi-sensor control (cascade control) • Control characteristic adjustable via FCT software • Integrated pressure sensor with separate output • Pressure is maintained if the controller fails	• Pilot actuated pressure regulator • Multi-sensor control (cascade control) • Integration in valve terminal MPA • User interface with LED displays, LCD display, adjustment/selection buttons • Integrated pressure sensor • Electrical connection via plug, round design, 8-pin, M12 or terminal linking	• 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 servo-pneumatic applications with CPX-CMAX and CPX-CMPX
online: →	vpcf	vppx	vppm	vpwp

Proportional valves

FESTO

				 New
	Proportional pressure regulators MPPES	**Proportional pressure regulators VPPE**	**Proportional directional control valves MPYE**	**Proportional directional control valves VPPL**
Valve function	3-way proportional pressure regulator, closed	3-way proportional pressure regulator, 3-way proportional pressure regulator, closed	5/3-way, closed	3-way proportional pressure regulator, closed
Pneumatic connection 1	G1/2, G1/4, G1/8	G1/8	G1/4, G1/8, G3/8, M5	G1/4, Flange
Pressure regulation range	0 ... 10 bar	0.02 ... 10 bar		0.2 ... 40 bar
Operating pressure for positioning/Soft Stop				
Operating pressure	≤12 bar	8 bar	0 ... 10 bar	≤50 bar
Standard nominal flow rate		310 ... 1250 l/min	100 ... 2000 l/min	300 l/min
New				• New series
Description	• Directly actuated (G1/8), pilot actuated (G1/4, G1/2) • Setpoint value input as analogue voltage or current signal • Choice of pressure regulation ranges • Optionally with setpoint module • Electrical connection via plug, round design to DIN 45326, M16 x 0.75, 8-pin	• Pilot actuated pressure regulator • Setpoint input as analogue voltage signal (0 ... 10 V) • Electrical connection via M12x1 plug, 4-pin • Optionally with setpoint module	• Regulated piston spool valve • Analogue actuation • Setpoint input as analogue voltage signal (0 ... 10 V) • Suitable for servo-pneumatic applications with SPC11	• For high-pressure applications • Directly actuated piston regulator • Available in three variants: flanged valve, flanged valve with external pilot air supply, in-line valve
online: →	**mppes**	**vppe**	**mpye**	**vppl**

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Electrically actuated process and media valves

	 **Solenoid valves VZWD**	 **Reverse jet pulse valves VZWE-E, VZWE-F**	 **Solenoid valves VZWF**
Design	Directly actuated poppet valve	Angled version, straight version with flange, diaphragm valve	Diaphragm valve, force pilot operated
Type of actuation	Electric	Electric	Electric
Nominal width	1 ... 6 mm	20 ... 76 mm	13.5 ... 50 mm
Process valve connection	G1/4, G1/8, NPT1/4, NPT1/8		G1, G1 1/2, G1 1/4, G1/2, G1/4, G2, G3/4, G3/8, NPT1, NPT1 1/2, NPT1 1/4, NPT1/2, NPT1/4, NPT2, NPT3/4, NPT3/8
Process valve connection 1		Flange diameter 60 mm, 75 mm, 89 mm, G1, G1 1/2, G2, G2 1/2, G3/4	
Process valve connection 2		Flange diameter 145.5 mm, 162 mm, 59 mm, 74 mm, G1, G1 1/2, G2, G2 1/2, G3/4	
Temperature of medium	–10 ... 80 °C		–10 ... 80 °C
Operating pressure	0 ... 90 bar	0.35 ... 8 bar	0 ... 10 bar
Medium pressure of gaseous media			
Medium pressure of liquid media			
Flow rate Kv	0.06 ... 0.4 m³/h	15 ... 210 m³/h	1.8 ... 28 m³/h
Quick ordering of selected basic designs	★		★
Description	• Extensive pressure range • Directly actuated poppet valve • No pressure difference required • Can also be used in vacuum technology	• High flow rates • For mechanically cleaning filters and dust filter systems • Fast opening and closing times • Sturdy pilot system	• High flow rates • Large nominal diameters with relatively small solenoids • No pressure difference required • Can also be used in vacuum technology
online: →	**vzwd**	**vzwe**	**vzwf**

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Electrically actuated process and media valves

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	 **Solenoid valves VZWM**	 **Solenoid valves VZWP**	 **Solenoid valves MN1H**
Design	Poppet valve with diaphragm seal	Piloted piston poppet valve	Diaphragm valve
Type of actuation	Electric	Electric	Electric
Nominal width	13 ... 50 mm	13 ... 25 mm	13 ... 40 mm
Process valve connection	G1, G1 1/2, G1 1/4, G1/2, G1/4, G2, G3/4, G3/8	G1, G1/2, G1/4, G3/4, G3/8, NPT1, NPT1/2, NPT1/4, NPT3/4, NPT3/8	G1, G1 1/2, G1/2, G1/4, G3/4, G3/8
Process valve connection 1			
Process valve connection 2			
Temperature of medium	–10 ... 60 °C	–10 ... 80 °C	–10 ... 60 °C
Operating pressure		0.5 ... 40 bar	0.5 ... 10 bar
Medium pressure of gaseous media	0.5 ... 10 bar		
Medium pressure of liquid media	0.5 ... 6 bar		
Flow rate Kv	1.6 ... 39 m³/h	1.5 ... 11.5 m³/h	
Quick ordering of selected basic designs	★		
Description	• Poppet valve with diaphragm seal • Brass or stainless steel casting design • Electrical connection via solenoid armature • Wide range of coils • Coil can be ordered separately	• For all applications with a differential pressure of min. 0.5 bar • For high pressures and high flow rates with relatively small solenoids • For controlling gaseous and liquid media in open circuits	• Pilot operated diaphragm valve • Brass design • Can only be used for gaseous media • Adjustable closing cushioning, in-line mounting or through-hole
online: →	**vzwm**	**vzwp**	**mn1h-2**

Pneumatically and mechanically actuated process and media valves

	 **Pinch valves VZQA**	 **Angle seat valves VZXF**	 **Ball valves VAPB**	 **Ball valves VZBC**
Design	Pinch valve, pneumatically actuated	Poppet valve with spring return	2-way ball valve	2-way ball valve
Valve function	2/2-way closed, monostable, 2/2-way open, monostable	2/2-way, closed, monostable		2/2
Type of actuation	Pneumatic	Pneumatic	Mechanical	Mechanical
Nominal width		12 ... 45 mm		
Nominal width DN	6 mm, 15 mm, 25 mm	15 mm, 20 mm, 25 mm, 32 mm, 40 mm, 50 mm	15 mm, 20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm	15 mm, 20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 65 mm, 80 mm, 100 mm
Process valve connection	G1, G1/2, G1/4, NPT1/2, NPT1/4, Clamp to ASME-BPE type A, clamp to ASME-BPE type B, clamp to DIN 32676 series A	G1, G1 1/2, G1 1/4, G1/2, G2, G3/4, NPT1, NPT1 1/2, NPT1 1/4, NPT1/2, NPT2, NPT3/4	Rp1, Rp1 1/2, Rp1 1/4, Rp1/2, Rp1/4, Rp2, Rp2 1/2, Rp3/4, Rp3/8	Ring housing with threaded flange
Flow rate Kv	0.7 ... 18 m³/h	3.3 ... 43 m³/h	5.9 ... 535 m³/h	19.4 ... 1414 m³/h
Standard nominal flow rate				
Temperature of medium	–5 ... 100 °C	–40 ... 200 °C	–20 ... 150 °C	–10 ... 200 °C
Operating pressure	0 ... 6 bar	–0.9 ... 40 bar		
New	• Additional connection size • Modular, interchangeable component parts			
Quick ordering of selected basic designs		★		
Description	• Modular design • Quick and easy replacement of the diaphragm • Selection of different materials for housing and connector caps • Different connection cap designs (G and NPT thread), clamp ferrule to DIN 32676 and ASME-BPE) • For critical, abrasive and viscous media • Up to 2 million switching cycles • FDA-compliant materials • Easy-to-clean design • Flow direction is freely selectable	• Sturdy design • Stainless steel and gunmetal process valves with stainless steel, brass or aluminium actuators • For operating pressures up to 40 bar • Safety position “closing” • Different actuator sizes and housing materials • Selection of different seat and shaft seals • Flow direction is freely selectable • For liquids, gases and other easily contaminated media • Easy-to-clean design	• Automatable 2-way ball valve • Brass design • Blow-out proof shaft • Manual operation possible using hand lever • Connecting thread to DIN 2999 or DIN ISO 228-1 • Mounting flange to ISO 5211	• Automatable 2-way ball valve with compact flange • Stainless steel design • Short installation length • Blow-out proof shaft • Manual operation possible using hand lever • Connecting thread to DIN 2999 or DIN ISO 228-1 • Mounting flange to ISO 5211 • ATEX certification for zone 1, 21, 2, 22
online: →	vzqa	vzxf	vapb	vzbc

Pneumatically and mechanically actuated process and media valves

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	 **Ball valve actuator units VZBC**	 **Ball valves VZBA**	 **Ball valve actuator units VZBA**
Design	2-way ball valve, quarter turn actuator	2-way ball valve, 3-way ball valve, L-shaped hole, T-shaped hole	2-way ball valve, 3-way ball valve, L-shaped hole, quarter turn actuator, T-shaped hole
Valve function		2/2, 3/2	
Type of control	Pneumatic	Mechanical	Pneumatic
Nominal width			
Nominal width DN	15 mm, 20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 65 mm, 80 mm, 100 mm	8 mm, 10 mm, 15 mm, 20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 65 mm, 80 mm, 100 mm	8 mm, 10 mm, 15 mm, 20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 65 mm, 80 mm, 100 mm
Process valve connection	Ring housing with threaded flange	Rp1, Rp1 1/2, Rp1 1/4, Rp1/2, Rp1/4, Rp2, Rp2 1/2, Rp3, Rp3/4, Rp3/8, Rp4, Weld-on ends/weld-on ends	Rp1, Rp1 1/2, Rp1 1/4, Rp1/2, Rp1/4, Rp2, Rp2 1/2, Rp3, Rp3/4, Rp3/8, Rp4, Weld-on ends/weld-on ends
Flow rate Kv	19.4 ... 1414 m³/h	7 ... 1414 m³/h	7 ... 1414 m³/h
Standard nominal flow rate			
Temperature of medium	–10 ... 200 °C	–10 ... 200 °C	–10 ... 200 °C
Operating pressure			
Description	• Ball valve actuator unit with double-acting or single-acting quarter turn actuator • Stainless steel ball valve in compact design • NAMUR port pattern for solenoid valves/sensor boxes to VDI/VDE 3845 • Flow is fully opened or closed in both directions • ATEX certification for zone 1, 21, 2, 22	• Automatable 2-way or 3-way ball valve • Stainless steel design • Blow-out proof shaft • Manual operation possible using hand lever • Connecting thread to DIN 2999 or DIN ISO 228-1 • Mounting flange to ISO 5211 • ATEX certification for zone 1, 21, 2, 22	• Ball valve actuator unit with double-acting or single-acting quarter turn actuator • Stainless steel ball valve • NAMUR port pattern for solenoid valves/sensor boxes to VDI/VDE 3845 • Flow is fully opened or closed in both directions • ATEX certification for zone 1, 21, 2, 22
online: →	vzbc	vzba	vzba

Pneumatically and mechanically actuated process and media valves

	 **Pneumatic valves VLX**	 **Ball valve actuator units VZPR**
Design	Diaphragm valve	2-way ball valve, quarter turn actuator
Type of actuation	Pneumatic	Electric, pneumatic
Nominal width	13 ... 25 mm	
Nominal width DN		15 mm, 20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm
Process valve connection	G1, G1/2, G1/4, G3/4, G3/8	Rp1, Rp1 1/2, Rp1 1/4, Rp1/2, Rp1/4, Rp2, Rp2 1/2, Rp3/4, Rp3/8
Flow rate Kv		
Standard nominal flow rate	2400 ... 14000 l/min	
Temperature of medium	–10 ... 80 °C	–20 ... 150 °C
Operating pressure	1 ... 10 bar	
Description	• Poppet valve • Indirectly actuated • Brass design • In-line mounting or via through-holes	• Ball valve actuator unit with double-acting quarter turn actuator • Brass ball valve • NAMUR port pattern for solenoid valves/sensor boxes to VDI/VDE 3845 • Flow is fully opened or closed in both directions
online: →	vlx	vzpr

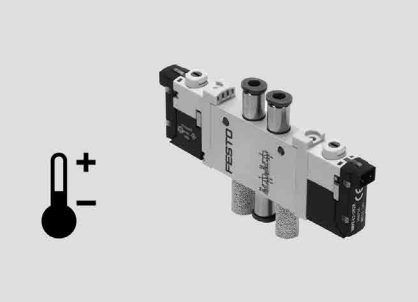
Pneumatic control systems

	 **Quickstepper FSS**	 **Control blocks for two-hand start ZSB**	 **Pneumatic counters, M5 Compact System PZ, PZA, PZV**
Design	Sequencer, additive		Mechanical sequence counter with pneumatic drive
Pneumatic connection			M5
Operating pressure	2 ... 6 bar	4 ... 8 bar	2 ... 8 bar
Type of mounting		Optionally: with through hole, with female thread	Front panel mounting, with through-hole
Description	• Pneumatic/mechanical sequencer with 12 steps and start logic circuits • Ready-to-install sequence controller • Feeback-controlled motion sequences • Fast replacement, tubing can be left in place	• Used wherever manual actuation poses a risk of accident to operating personnel • Safety component in accordance with EU Machinery Directive	• Complete system offering control components with all the functions required for pneumatic sequence controls • For control cabinet installation • Fast replacement of components • Available with protective cap
online: →	fss	zsb	pza

Pneumatic control systems

	 **Timers, M5 Compact System PZVT, PZVT-S, PZVT-FR, PZVT-AUT**	 **Electric counters CCES**
Design	Mechanical sequence counter with pneumatic drive	Electric adding counter with battery
Pneumatic connection	Female thread M5	
Operating pressure	2 ... 6 bar	
Type of mounting	Front panel mounting	Front panel mounting
Description	• Complete system offering control components with all the functions required for pneumatic sequence controls • For control cabinet installation • Fast replacement of components • Mechanical sequence counter with pneumatic drive • Adjustable time delay • Available with protective cap	• 8-digit LCD display • Independent power supply • Connection via terminal strip • Reset button
online: →	pzvt	cces

Customised components – for your specific requirements



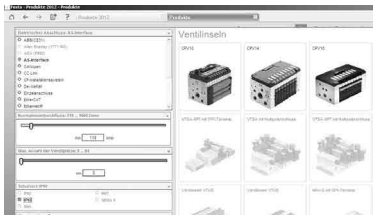
Valves with customised designs
Can't find the valve you need in our catalogue?
We can offer you customised components that are tailored to your specific requirements – from minor product modifications to complete new product developments.
Common product modifications:

- Coatings for special ambient conditions
- Customised cables: length, pin allocation, pre-assembled with plug
- Modified actuating elements
- Modified connecting thread
- Modified valve sub-bases

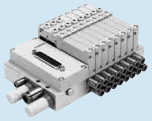
Many additional variants are possible. Ask your Festo sales engineer, who will be happy to help.
Further information on customised components can be found on your local website
➔ **www.festo.com**

Software tool

FESTO

Product finder for valve terminals		Find the right valve terminal quickly with the help of the product finder. Start the product finder by clicking on the blue button “Product finder " under “Products”. Select your technical features on the left-hand side step-by-step; the selection of suitable products on the right-hand side is automatically updated to reflect the chosen technical features. The use of logic checks ensures that only correct configurations are available for selection. The product finder for valve terminals is part of the electronic catalogue and is not available as a separate software program.

Universal valve terminals

	 **Valve manifolds VTUG-S**	 New **Valve terminals with multi-pin plug/fieldbus connection VTUG**	 New **Valve manifolds VTUS**	 New **Valve terminals MPA-L**
Width	10 mm, 14 mm, 18 mm	10 mm, 14 mm, 18 mm	21 mm, 26.5 mm, 31 mm	10 mm, 14 mm, 20 mm
Standard nominal flow rate	1380 l/min at 18 mm, 380 l/min at 10 mm, 780 l/min at 14 mm	1200 l/min at 18 mm, 330 l/min at 10 mm, 630 l/min at 14 mm	600 ... 2300 l/min	360 l/min at 10 mm, 670 l/min at 14 mm, 870 l/min at 20 mm
Max. number of valve positions	16	24	16	32
Electrical actuation	An individual connection	Fieldbus, multi-pin plug, IO-Link®, I-Port	An individual connection	Fieldbus, multi-pin plug, IO-Link®, I-Port
Valve terminal design	Fixed grid	Fixed grid	Fixed grid	Modular, valve sizes can be mixed
New		• Control cabinet cover for enhanced corrosion protection	• Additional width	• Check valve kit ducts 3 and 5 for MPA14 and MPA2 valves
Description	• Compact with small VUVG valves • Connection technology easy to change via the E-box • Wide range of valve functions • Also with semi in-line valves	• Low-cost fixed grid • Extremely easy assembly • Exchangeable electrical actuation • IO-Link® capable • Valves VUVG with individual electrical connection can be integrated • Also available with pneumatic multiple connector plate	• Robust VUVS valves with long service life • Individual electrical connection • Pilot air supply in the manifold rail • Comprehensive range of accessories	• Maximum modularity • Single granular • Polymer sub-base • 3 valve sizes • Fieldbus connection via CPX • IO-Link® capable
online: →	vtug	vtug	vtus	mpa-l

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Universal valve terminals

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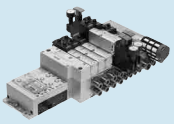
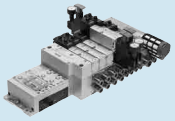
	 New **Valve terminals MPA-S**	 New **Valve terminals VTSA-F**	 **Valve terminals, Compact Performance CPV**
Width	10 mm, 20 mm	18 mm, 26 mm, 42 mm, 52 mm, 65 mm	10 mm, 14 mm, 18 mm
Standard nominal flow rate	360 l/min at 10 mm, 700 l/min at 20 mm	700 l/min at 18 mm, 1350 l/min at 26 mm, 1860 l/min at 42 mm, 2900 l/min at 52 mm, 4000 l/min at 65 mm	400 l/min at 10 mm, 800 l/min at 14 mm, 1600 l/min at 18 mm
Max. number of valve positions	64	32	8
Electrical actuation	Fieldbus, multi-pin plug, electrical terminal CPX, AS-Interface®, CP installation system	Ethernet, fieldbus, multi-pin plug, electrical terminal CPX, integrated controller, AS-Interface® connection	AS-Interface®, CPI installation system, individual connection, fieldbus, multi-pin plug
Valve terminal design	Modular, valve sizes can be mixed	Modular, valve sizes can be mixed	Fixed grid
New	• Check valve kit ducts 3 and 5 for MPA2 valves	• Additional safety-oriented 5/3-way valves	
Description	• Valve terminals for universal applications • High-performance valves in a sturdy metal housing • Metal linking • Two valve sizes can be combined • Excellent communication thanks to serial linking • Fieldbus connection via CPX • Max. 128 valves	• Flow rate-optimised VTSA valve terminal • Linking with increased flow rates • Functions as per VTSA	• Maximum performance in the smallest of spaces • Three sizes • Wide range of connection and mounting options • Multi-pin or fieldbus control • IO-Link® capable
online: →	mpa-s	vtsa	cpv

Universal valve terminals

	 **Valve manifolds, Compact Performance CPV10-EX**	 **Valve terminals CPV-SC**	 **Valve terminals VTUB-12**
Width	10 mm	10 mm	12 mm, 24 mm
Standard nominal flow rate	400 l/min, 400 l/min bei 10 mm	170 l/min at 10 mm	400 l/min at 12 mm
Max. number of valve positions	8	16	35
Electrical actuation	An individual connection	CPI installation system, individual connection, fieldbus, multi-pin plug	Fieldbus, multi-pin plug
Valve terminal design	Fixed grid	Fixed grid	Fixed grid
Description	• Intrinsically safe valve manifold design to ATEX Category 2 (zone 1) • Optimised for control cabinet assembly • Optimal for pilot control of process valves	• Small and compact • High flow rate even with compact design • Suitable for vacuum • Multi-pin or fieldbus control	• Compact dimensions • Poppet valves in polymer technology • Multi-pin or fieldbus control • IO-Link® capable
online: →	cpv10-ex	cpv-sc	vtub-12

Standards-based valve terminals

	 **Valve manifolds, to ISO 15407-1 VTIA**	 New **Valve terminals VTSA**
Width	18 mm, 26 mm	18 mm, 26 mm, 42 mm, 52 mm, 65 mm
Max. standard nominal flow rate	1100 l/min at 26 mm, 550 l/min at 18 mm	1100 l/min at 26 mm, 1300 l/min at 42 mm, 2900 l/min at 52 mm, 4000 l/min at 65 mm, 550 l/min at 18 mm
Max. number of valve positions	16	32
Electrical actuation	Individual connection	Individual connection, Ethernet, fieldbus, multi-pin plug, integrated controller
Valve terminal design	Modular, valve sizes can be mixed	Modular, valve sizes can be mixed
New		• Additional safety-oriented 5/3-way valves
Description	• Conforms to ISO 15407-1 • Wide range of individual electrical connections • Two valve sizes can be combined	• Conforms to ISO 15407-2/ISO 5599-2 • Multi-pin plug connection or fieldbus connection via the CPX system • Five valve sizes can be combined on one valve terminal • Integrated safety functions
online: ➔	vtia	vtsa

Application-specific valve terminals

	 New **Valve terminals MPA-C**	 **Valve terminals VTOC**	 **Valve terminals MH1**
Width	14 mm	10 mm	10 mm
Standard nominal flow rate	780 l/min at 14 mm	10 l/min at 10 mm	10 l/min at 10 mm
Max. number of valve positions	32	24	24
Electrical actuation	Multi-pin plug, IO-Link, I-Port	Multi-pin plug, IO-Link, I-Port	Individual connection, multi-pin plug
Valve terminal design	Modular and expandable	Fixed grid	Fixed grid
New	• Check valves in sub-base, ducts 3 and 5		
Description	• Valve terminals in Clean Design • Easy-to-clean design • High corrosion resistance • Protection class IP69K • FDA-compliant materials • Redundant sealing system	• Compact pilot valves • Compact assembly • Greater safety thanks to interlock function • Multi-pin or fieldbus control • IO-Link® capable	• Miniaturised poppet valves • Multi-pin or electrical individual connection
online: ➔	mpa-c	vtoc	mh1

9

Electrical peripherals

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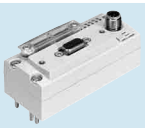
	 New **Fieldbus modules CTEU**	 **CPI installation systems CTEC**	 **Terminal CPX**	 **Terminal CPX-P**
Protocol	Modbus® TCP, PROFIBUS DP, AS-Interface®, CANopen, CC-Link, CPI-B, DeviceNet, EtherCAT, EtherNet/IP, PROFINET	INTERBUS, DeviceNet, PROFIBUS, CANopen, CC-Link, Ether-Net/IP, PROFINET, EtherCAT, ModbusTCP	INTERBUS, DeviceNet, PROFIBUS, CANopen, CC-Link, Ether-Net/IP, PROFINET, EtherCAT, ModbusTCP	DeviceNet, PROFIBUS, Ether-Net/IP, PROFINET, ModbusTCP
Max. address capacity, inputs	2 ... 64 byte	16 byte	64 byte	64 byte
Max. address capacity, outputs	2 ... 64 byte	16 byte	64 byte	64 byte
Parameterisation	Activate diagnostics, diagnostic behaviour, fail-safe and idle response, fail-safe response, watchdog disable, watchdog enable		Diagnostic behaviour, fail-safe response, forcing of channels, signal setup	Diagnostic behaviour, fail-safe response, forcing of channels, signal setup
Degree of protection	IP65, IP67	IP65, IP67	IP65, IP67	IP20, IP65
Nominal operating voltage DC	24 ... 30 V	24 V	24 V	24 V
Operating voltage range DC	18 ... 31.6 V	18 ... 30 V	18 ... 30 V	
New	• Further bus protocols			
Description	• For valve terminals VTUB-12, VTUG, MPA-L, CPV, VTOC • Can be expanded into the installation system CTEL • Fieldbus-typical LEDs, interfaces and switching elements • Isolated power supply for electronics and valves	• CPX master module for four CPI strings • Combination of centralised and decentralised installation possible • Decentralised pneumatic components and sensors for fast processes • Can be connected to valve terminal CPV, MPA-S, CPV-SC	• Automation platform • Open to all common fieldbus protocols and Ethernet • Integrated diagnostic and maintenance functions • Can be used as stand-alone remote I/O or with valve terminals MPA-S, MPA-L, VTSA/VTSA-F • Choice of polymer or metal housing with individual linking	• Use of matching remote I/O and valve terminals in a control cabinet • Combination with modules of the electrical terminal CPX, which enables use for hybrid applications • Unique modular structure • Comprehensive integrated diagnostic and service functions
online: →	cteu	ctec	cpx	cpx-p

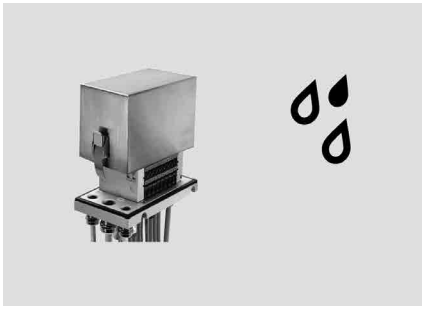
9

Electrical peripherals

	 AS-Interface® components ASI, CACC	 Electrical interfaces CPX-CTEL	 AS-Interface® module CESA
Protocol		I-Port, IO-Link	AS-Interface®, CANopen, PROFIBUS
Max. address capacity, inputs		32 byte	
Max. address capacity, outputs		32 byte	
Parameterisation		Diagnostic behaviour, fail-safe mode per channel, force mode per channel, idle mode per channel, module parameter, tool changeover mode	
Degree of protection	IP65	IP65, IP67	IP20
Nominal operating voltage DC	24 V	24 V	AS-Interface® voltage 30 V DC
Operating voltage range DC	26.5 ... 31.6 V	18 ... 30 V	
Description	• Accessories for AS-Interface® installation system • Modules for actuating individual valves ASI-EVA • Cable distributor ASI-KVT • Addressing device ASI-PRG-ADR • Compact I/O modules (IP65, IP67)	• CPX-CTEL master module with 4 I-Port connections • Decentralised pneumatic components and sensors for fast processes • Standardised M12 connections	• AS-Interface master gateway • Double address recognition • Direct operation via pushbuttons • Graphic display • Comprehensive diagnostics via LED and display • Specification 3.0
online: →	as-interface	cpx-ctel	cesa

9

Customised components – for your specific requirements



Valve terminals with customised designs
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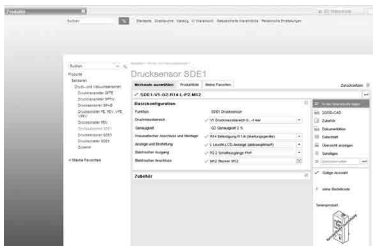
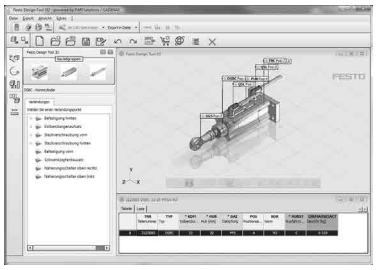
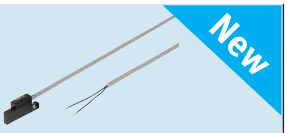
Software tool

FESTO

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.
Festo Design Tool 3D **FDT 3D**		The Festo Design Tool 3D is a 3D product configurator for generating specific CAD product combinations from Festo. The configurator makes your search for the right accessory easier, more reliable and faster. You can then order the module that has been created with a single order item – either completely pre-assembled or as individual parts in a single box. As a result, your bill of materials is considerably shortened and downstream processes such as product ordering, order picking and assembly are significantly simplified. All ordering options are available in the following countries: AT, BE, CH, CZ, DE, DK, ES, FI, FR, GB, HU, IE, IT, NL, NO, PL, RU, SE, SI, SK. This tool can be found • either via the address: www.festo.com/FDT-3D in the above listed countries, • or on the CD “FDT 3D” (part no. 135595 for the above listed countries) • or on the DVD.

Proximity sensors, for T-slot

FESTO

	 **Proximity sensor SDBT**	 **Proximity sensors SMT-8M-A**	 **Proximity sensors SME-8, SME-8M, SME-8-SL, SME-8-FM**	 **Proximity sensors SMT-8**
Electrical connection	M12x1, Cable, cable with plug, 2-pin, 3-pin, 2-wire, 3-wire, rotatable thread	M8x1, M12x1, Cable, cable with plug, 2-pin, 3-pin, 2-wire, 3-wire, rotatable thread	M8x1, Cable, cable with plug, plug, 3-pin, 2-wire, 3-wire, rotatable thread	M8x1, Cable, cable with plug, plug, 3-pin, 2-wire, 3-wire, rotatable thread
Operating voltage range DC	10 ... 30 V	5 ... 30 V	0 ... 230 V	10 ... 30 V
Switching element function	N/O contact	N/C contact, N/C contact or N/O contact, switchable, N/O contact	N/C contact, N/O contact	NAMUR, N/O
Switching output	NPN, PNP, non-contacting, 2-wire	NPN, PNP, PNP/NPN switchable, non-contacting, 2-wire	Contacting, bipolar, without LED function	NAMUR, PNP
Quick ordering of selected basic designs		★	★	
New	• EX6 design in accordance with the ATEX directive for explosive atmospheres			
Description	• Measuring principle: magneto-resistive • Oil-resistant, welding field-resistant, resistant to welding spatter • Screw-clamped in slot, insertable from above • LED switching status display • Cable length 0.3 ... 5 m	• Measuring principle: magneto-resistive • Short design • Variant EX2 for use in potentially explosive areas • Insertable in the slot from above, flush with the cylinder profile • LED switching status display • LED operating reserve indication • Cable length 0.1 ... 30 m	• Measuring principle: magnetic reed • SME-8-...-S6: heat-resistant design • Variants suitable for use with energy chains and robots • Screw-clamped or clamped in the slot, insertable in the slot from above or lengthwise • LED switching status display • Cable length 0.3, 2.5, 5, 7.5, 0.2 ... 10 m	• Measuring principle: magneto-resistive • SMT-8-F: in accordance with the ATEX directive for explosive atmospheres • SMT-8G: design ideally matched to gripper sensing • SMT-8-SL: sturdy thanks to long guides and plug directly at the sensor • Variants suitable for use with energy chains and robots • Insertable in the slot lengthwise or from above • LED switching status display • Cable length 0.3, 2.5, 5 m
online: →	**sdbt**	**smt-8 m**	**sme-8**	**smt-8**

Proximity sensors for T-slot

FESTO

	 Proximity sensors CRSMT-8	 Proximity sensors SMEO-8E	 Proximity sensors SMTO-8E
Electrical connection	Cable, 3-wire	M8x1, M12x1, Cable, plug, 3-pin, 2-wire	M8x1, M12x1, Plug connector, 3-pin
Operating voltage range DC	10 ... 30 V	0 ... 250 V	10 ... 30 V
Switching element function	N/O contact	N/O contact	N/O contact
Switching output	PNP	Contacting, contacting bipolar, without LED function	NPN, PNP
Description	• Measuring principle: magneto-resistive • Corrosion-resistant design • Suitable for use in the food industry (see supplementary information on materials at www.festo.com/sp › Certificates), resistant to acids and cooling lubricants • See supplementary information on food-safe materials at www.festo.com/sp › Certificates • Insertable in the slot lengthwise, flush with the cylinder profile • LED switching status display • Cable length 2.5, 5 m	• Measuring principle: magnetic reed • Sturdy sensor in block design • Plug integrated in housing • LED switching status display • Cable length 2.5 m	• Measuring principle: magneto-resistive • Sturdy sensor in block design • Plug integrated in housing • LED switching status display
online: →	crsmt-8	smeo	smto

10

Proximity sensors for T-slot

	 Proximity sensors SMTSO-8E	 Proximity sensors SMPO-8E
Electrical connection	M12x1, Plug connector, 3-pin	
Operating voltage range DC	10 ... 30 V	
Switching element function	N/O contact	
Switching output	NPN, PNP	
Description	• Measuring principle: magneto-inductive • Welding field-resistant design • Sturdy sensor in block design • Plug integrated in housing • LED switching status display	• Measuring principle: magnetic • Pneumatic proximity sensor • Function: 3/2-way valve, normally closed • Pneumatic connection via female thread M5 • Visual switching status indication
online: →	smtso	smpo

Proximity sensors, for C-slot

	 **Proximity sensors SME-10, SME-10M**	 **Proximity sensors SMT-10M, SMT-10G**
Electrical connection	M8x1, M12, Cable, cable with plug, open end, 2-pin, 3-pin, 3-wire, rotatable thread, snap collar	M8x1, M12, Cable, cable with plug, open end, 2-pin, 3-pin, 3-wire, rotatable thread, snap collar
Operating voltage range DC	5 ... 30 V	5 ... 30 V
Switching element function	N/O contact	N/O contact
Switching output	Contacting, bipolar	NPN, PNP, non-contacting, 2-wire
Quick ordering of selected basic designs	★	★
Description	• Measuring principle: magnetic reed • Clamped in C-slot, insertable in the slot from above or lengthwise • LED switching status display • Cable length 0.3, 2.5 m	• Measuring principle: magneto-resistive • Clamped in C-slot, insertable in the slot from above or lengthwise • LED switching status display • Cable length 0.3, 2.5 m
online: →	sme-10	smt-10

Proximity sensors, round design

	 **Proximity sensors SMEO-4**	 **Proximity sensors CRSMEO-4**	 **Proximity sensors SMTO-4**
Electrical connection	M8x1, Cable, plug, 3-pin, 2-wire, 3-wire	Cable, 3-wire	M8x1, Cable, plug, 3-pin, 3-wire
Operating voltage range DC	12 ... 250 V	12 ... 30 V	10 ... 30 V
Switching element function	N/O contact	N/O contact	N/O contact
Switching output	Contacting, bipolar, without LED function	Contacting, bipolar	NPN, PNP
Description	• Measuring principle: magnetic reed • U-shaped housing • LED switching status display • Cable length 2.5, 5 m	• Measuring principle: magnetic reed • Corrosion-resistant design • LED switching status display • Cable length 2.5 m	• Measuring principle: magneto-inductive • U-shaped housing • LED switching status display • Cable length 2.5 m
online: →	smeo-4	crsmeo-4	smto-4

Proximity sensors, block design

	 **Proximity sensors SME-1**	 **Proximity sensors SMT-C1**	 **Proximity sensors SMEO-1**
Electrical connection	M8x1, Cable, plug, 3-pin, 2-wire, 3-wire	M8x1, M12x1, Cable, cable with plug, 3-pin, 3-wire, rotatable thread	M8x1, Cable, plug, 3-pin, 2-wire, 3-wire
Operating voltage range DC	0 ... 200 V	10 ... 30 V	0 ... 200 V
Switching element function	N/O contact	N/O contact	N/O contact
Switching output	Contacting, bipolar	PNP	Contacting, bipolar
Description	• Measuring principle: magneto-inductive • For mounting kit • With or without LED switching status indication	• Measuring principle: magneto-inductive • For Clean Design standards-based cylinder DSBF with mounting rail for sensors • LED switching status display	• Measuring principle: magnetic reed • SMEO-1-S6: heat-resistant design • With or without LED switching status indication • Cable length 2.5, 5 m
online: ➔	**sme-1**	**smt-c1**	**smeo-1**

Proximity sensor, block design

10

	 **Proximity sensors SMTO-1**	 **Proximity sensors SMTSO-1**	 **Proximity sensors SMPO-1**
Electrical connection	M8x1, Cable, plug, 3-pin, 3-wire	M12x1, Plug connector, 3-pin	
Operating voltage range DC	10 ... 30 V	10 ... 30 V	
Switching element function	N/O contact	N/O contact	
Switching output	NPN, PNP	PNP	
Description	• Measuring principle: magneto-resistive • LED switching status display • Cable length 2.5 m	• Measuring principle: magneto-resistive • Welding field immune design • LED switching status display	• Measuring principle: magnetic • Pneumatic proximity sensor • Function: 3/2-way valve, normally closed • Pneumatic connection via barbed connector for tubing I. D. 3 mm • Visual switching status indication
online: ➔	**smto-1**	**smtso-1**	**smpo**

Cylinder signal generators

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

Inductive sensors

	 **Inductive sensors** **SIEA**	 **Inductive sensors** **SIED**	 **Inductive sensors** **SIEF**	 **Inductive sensors** **SIEH**
Size	M12, M18, M30, M8	M12, M18, M30	40x40x65 mm, M12, M18, M30, M8	3 mm, M12, M18
Switching output		Non-contacting, 2-wire	NPN, PNP	NPN, PNP
Switching element function		N/C contact, N/O contact	Antivalent, N/O contact	N/C contact, N/O contact
Electrical connection	M8x1, M12x1, Plug, 3-pin, 4-pin	M12x1, Cable, plug, 2-pin, 2-wire	M8x1, M12x1, Cable, plug, Fixcon, 3-pin, 4-pin, 3-wire	M8x1, M12x1, Cable, cable with plug, plug, 3-pin, 3-wire
Operating voltage range DC	15 ... 30 V	10 ... 320 V	10 ... 65 V	10 ... 30 V
Description	• With analogue output • Flush installation • Metric thread	• With standard switching distance • For DC and AC voltage • Metric thread • Flush or non-flush mounting • LED switching status display • Design with metal or polyamide housing	• Reduction factor 1 for all metals • Welding field-resistant • Design with housing resistant to welding spatter • Flush, partially flush or non-flush mounting • LED switching status display	• With increased switching distance • Flush installation • Metric thread • LED switching status display • Design with stainless steel housing
online: →	siea	sied	sief	sieh

Inductive sensors

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	 Inductive sensors SIEN	 Inductive sensors SIES-Q	 Inductive sensors SIES-8M
Size	4, 6.5, M12, M12x1, M18, M18x1, M30, M30x1.5, M5x0.5, M8x1	12x26x40, 15x20x30, 40x40x120, 5x5x25, 8x8x40, 8x8x59 mm	For T-slot
Switching output	NPN, PNP	NPN, PNP	NPN, PNP
Switching element function	N/C contact, N/O contact	Antivalent, N/C contact, N/O contact	N/C contact, N/O contact
Electrical connection	M8x1, M12x1, Cable, plug, 3-pin, 3-wire	M8x1, Cable, plug, screw terminal, 3-pin, 3-wire	M8x1, Cable, cable with plug, 3-pin, 3-wire, rotatable thread
Operating voltage range DC	10 ... 30 V	10 ... 30 V	10 ... 30 V
Quick ordering of selected basic designs	★		
Description	• With standard switching distance • For DC voltage • Round design • Metric thread • Flush or non-flush mounting • LED switching status display • Design with metal or polyamide housing	• Block design • Flush installation • LED switching status display	• Suitable for position sensing for electric axes and grippers with T-slot • Flush installation • Switching status indication with 2 LEDs for better visibility regardless of the direction from which it is approached
online: ➔	**sien**	**sies**	**sies**

10

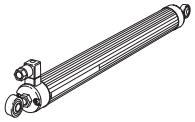
Position sensors

	 Position sensors SRBS	 Position transmitters SMAT-8E	 Position transmitters SDAT
Design	Round	For T-slot	For T-slot
Position measuring range	›270°	48 ... 52 mm	0 ... 160 mm
Analogue output	50 mA	0–10 V, 4–20 mA	4–20 mA, 100 mA
Electrical connection	M8, Cable with plug, 4-pin, rotatable thread	M8x1, Plug connector, 4-pin	M8, Cable with plug, 4-pin, rotatable thread
Quick ordering of selected basic designs	★		
Description	• Used to detect rotation of the shaft on rotary drives DRVS and DSM • The sensor can be quickly assembled without having to manually search for switching points • Simple and reliable operation using just one pushbutton directly on the device	• Measuring principle: magnetic Hall • Current and voltage signal at the analogue output • Insertable in the slot lengthwise • Suitable for use with energy chain and robot lines • LED status indications • Cable length 2.5, 5 m	• Measuring principle: magnetic Hall • Insertable in the slot from above, secured with screw • Suitable for use with energy chain and robot lines • LED status indications • Cable length 0.3 m
online: ➔	**srbs**	**smat-8e**	**sdat**

Position sensors

	 **Position transmitters** **SMAT-8M**	 **Position sensors** **SMH**
Design	For T-slot	For gripper
Position measuring range	40 mm	
Analogue output	0 – 10 V	
Electrical connection	M8x1, Cable with plug, 4-pin, rotatable thread	M8x1, Cable with plug, 4-pin
Description	• Measuring principle: magnetic Hall • Displacement-proportional analogue output signal • Insertable in the slot from above, central clamping • Suitable for use with energy chain and robot lines • LED status indications • Cable length 0.3 m	• Measuring principle: magnetic Hall • 3 gripper positions can be detected using an evaluation unit • Freely selectable switching points
online: ➔	**smat-8 m**	**smh-s1**

Position sensors

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

10

Pressure and vacuum sensors

FESTO

	 New **Pressure sensors SPAN**	 **Pressure sensors SPAE**	 **Pressure sensors SPAU**	 **Pressure sensors SPAW**
Pressure measuring range	–1 ... 16 bar	–1 ... 10 bar	–1 ... 16 bar	–1 ... 100 bar
Switching element function	N/C or N/O contact, switchable	N/C contact, N/O contact, switchable	N/C or N/O contact, switchable	Switchable
Pneumatic connection	Male thread G1/8, NPT1/8-27, R1/8, female thread G1/8, M5, QS-4	Push-in sleeve QS-4, QS-6, QS-3, QS-4, flange	G1/8, M5, M7, NPT1/8-27, QS-4, QS-5/32, QS-6, R1/4, R1/8	Male thread G1/2, female thread G1/4
Electrical connection	Plug connector, square design, 4-pin	Cable, open end, 3-wire	M8x1, M12x1, Plug, round design, to EN 60947-5-2, 4-pin	M12x1, Plug, round design, to EN 60947-5-2, 4-pin, 5-pin
Display type	Illuminated LCD	LED display, 2-digit	Illuminated LCD, LED	4-character alphanumeric, LED indicator
New	• New series			
Description	• For monitoring compressed air and non-corrosive gases • For network monitoring, regulator monitoring, leak test, object detection • Relative method of measurement based on a piezoresistive measuring cell • Serial communication integrated using IO-Link® 1.1	• Electronic pressure sensor with piezoresistive pressure measuring cell, integrated signal processing, numeric pressure indicator in percent, operating key and a switching output, PNP/NPN switchable • Display of minimum and maximum readings • All parameters entered can be transferred to other SPAEs (replicator function)	• For monitoring compressed air and non-corrosive gases • With or without display • Transfer of the pressure value as switch signal, analogue signal or via IO-Link® to the connected control system	• Highly robust • For liquid and gaseous media • Quick and easy setting of the switching outputs using three pushbuttons • Display is easy to read in any installation position
online: →	**span**	**spae**	**spau**	**spaw**

10

Pressure and vacuum sensors

	 Pressure switches SPBA	 Pressure transmitters SPTE	 Pressure transmitters SPTW	 Pressure sensors SPAB
Pressure measuring range		–1 ... 10 bar	–1 ... 100 bar	–1 ... 10 bar
Switching element function	Antivalent, changeover switch			Switchable
Pneumatic connection	G1/8	Push-in sleeve QS-4, QS-6, QS-3, QS-4, flange	G1/4	Male thread G1/8, NPT1/8-27, R1/8, female thread M5
Electrical connection	M12x1, Plug, round design, to EN 60947-5-2, 4-pin	Cable, open end, 3-wire	M12x1, Plug, round design, to EN 60947-5-2, 4-pin	M8x1, Cable, plug, round design, square design, to EN 60947-5-2, 4-pin, 4-wire
Display type				Illuminated LCD, multi-colour
Description	• Pressure sensor with permanently set switching point • For solenoid valve VSVA • Mounting: screw-in	• Piezoresistive pressure sensor • Measured variable: relative pressure • Cable length 2.5 m	• Sensor versions: piezoresistive pressure sensor or metal thin-film pressure sensor • Measured variable: relative pressure	• Relative pressure measurement • Switching output PNP, NPN and analogue output • Two-part, multi-coloured display • Easy commissioning thanks to intuitive operation • Compact design 30x30 mm • Certification: c UL us Listed (OL), C-Tick
online: →	spba	spte	sptw	spab

Pressure and vacuum sensors

	 Pressure switches, vacuum switches PEV, VPEV	 PE converters PEN, PE, VPE	 Pressure sensors SDE1
Pressure measuring range	–1 ... 10 bar	–1 ... 0 bar	–1 ... 10 bar
Switching element function	Changeover switch	N/O contact, changeover switch	Switchable
Pneumatic connection	G1/4, G1/8, M5	G1/8, M5, PK-3, PK-4	G1/8, QS-4, R1/4, R1/8
Electrical connection	M8x1, M12x1, Plug, screw terminal, round design, square design, to DIN 43650, to EN 60947-5-2, type A, 4-pin	Cable, screw terminal, 3 connector leads, open end, 3-wire, 4-wire	M8x1, M12x1, Cable with plug, plug, round design, to EN 60947-5-2, 3-pin, 4-pin
Display type			Illuminated LCD, back-lit LCD
Description	• Mechanical pressure and vacuum switch • Adjustable switching point • Mounting: screw-in, via through-holes or via H-rail • Visual scale for pressure adjustment • Certification: CCC	• Pneumatic/electric differential pressure switch • Pneumatic/electric pressure transducer • Design for vacuum • Mounting on mounting frame 2 N • Splash-proof design • Certification: CCC	• Five pressure measuring ranges • Measurement of relative or differential pressure • Switching output PNP, NPN and with analogue current or voltage output • LCD or illuminated LCD display • Mounting: via H-rail, via wall/surface bracket, mounting on service unit, front panel mounting • Certification: c UL us Listed (OL), C-Tick
online: →	pev	pen	sde1

FESTO

Pressure and vacuum sensors

	 **Pressure sensors SDE3**	 **Pressure sensors SDE5**
Pressure measuring range	–1 ... 10 bar	–1 ... 10 bar
Switching element function	Switchable	N/C contact, N/O contact, switchable
Pneumatic connection	QS-4, QS-5/32	QS-1/4, QS-4, QS-5/32, QS-6
Electrical connection	M8x1, M12x1, Cable, cable with plug, plug, round design, to EN 60947-5-2, 4-pin, 5-pin	M8x1, Cable, plug, round design, to EN 60947-5-2, 3-pin, 3-wire
Display type	Illuminated LCD	
Quick ordering of selected basic designs		★
Description	• Five pressure measuring ranges • Measurement of relative or differential pressure or two independent pressure inputs • Switching output 2x PNP or 2x NPN • Numerical and graphical pressure indication • Mounting: via H-rail, via wall/surface bracket, front panel mounting, with through-holes • Certification: C-Tick, ATEX, c UL us Listed (OL)	• Programmable and configurable pressure switch for simple pressure sensing tasks • Threshold/window comparator • Switching point adjustment by teach-in function • Integrated microprocessor • Switching status indicated by an LED visible from all sides • Certification: c UL us listed (OL), C-Tick
online: →	sde3	sde5

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Flow sensors

	 New **Flow sensors SFAW**	 **Flow sensors SFAB**	 **Flow sensors SFAM**
Flow measuring range final value	32 ... 100 l/min	10 ... 1000 l/min	1000 ... 15000 l/min
Operating medium	Liquid media, water, neutral liquids	Compressed air to ISO 8573-1:2010 [7:4:4], ISO 8573-1:2010 [6:4:4], nitrogen	Compressed air to ISO 8573-1:2010 [7:4:4], nitrogen
Operating pressure	0 ... 12 bar	0 ... 10 bar	0 ... 16 bar
Pneumatic connection		QS-1/4, QS-10, QS-12, QS-3/8, QS-5/16, QS-6, QS-8	G1, G1 1/2, G1/2, NPT1 1/2-11 1/2, NPT1-11 1/2, NPT1/2-14, Manifold module
Electrical connection	M12x1, Straight plug, 5-pin, A-coded	M12x1, Straight plug, 5-pin	M12x1, Straight plug, 5-pin
New	• New series		
Description	• Cooling circuit monitoring, leakage or line break monitoring, process water monitoring, fill level monitoring • Input connection: clamped terminal connection DN15, DN20, barbed hose fitting 13 mm, female thread G1/2, G3/4, G1, user-specific connection • With optional integrated temperature sensor • Connection to higher-level systems is provided by two switching outputs, an analogue output and/or an IO-Link interface • Certification: RCM, c UL us Listed (OL)	• Flow sensor with integrated digital display • With unidirectional flow input • Mounting: H-rail mounting, wall or surface mounting • Certification: C-Tick	• Stand-alone device or combined with MS series service units • Supplies absolute flow information and accumulated air consumption measurements • Covers large measuring range with great precision thanks to high dynamic response • Large, illuminated LCD display
online: →	sfaw	sfab	sfam

Flow sensors

	 Flow sensors SFE3	 Flow sensors SFET	 Flow indicators SFEV
Flow measuring range final value	0.5 ... 50 l/min	0.05 ... 50 l/min	
Operating medium	Compressed air to ISO 8573-1:2010 [1:4:2], nitrogen	Compressed air to ISO 8573-1:2010 [1:4:2], nitrogen	
Operating pressure	–0.7 ... 7 bar	–0.9 ... 7 bar	
Pneumatic connection	Female thread G1/8, QS-6	Female thread G1/8, QS-4, QS-6	
Electrical connection	Cable	Cable	Cable
Description	• 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	• 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 m, 3 m • Certification: C-Tick	• For flow sensor SFET • 3 1/2-digit alphanumeric display • Indicating range: 0.05 ... 50 l/min (flow sensor SFET-F); 0.05 ... 10 l/min (flow sensor SFET-R)
online: →	sfe3	sfet	sfev

10

Opto-electronic sensors

	 Diffuse sensors, retro-reflective sensors SOEG-RT, SOEG-RS	 Through-beam sensors SOEG-E, SOEG-S	 Fibre-optic units SOEG-L	 Laser diffuse sensors, laser retro-reflective sensors SOEL-RT, SOEL-RS
Method of measurement	Distance sensor, retro-reflective sensor, diffuse sensor, diffuse sensor with background suppression, for transparent objects	Through-beam sensor, receiver, transmitter	Fibre-optic unit	Distance sensor, retro-reflective sensor, diffuse sensor, diffuse sensor with background suppression
Working range	0 ... 5500 mm	0 ... 20000 mm	0 ... 250 mm	0 ... 20000 mm
Size	20x32x12 mm, 30x30x15 mm, 4 mm, 50x50x17 mm, M12, M12x1, M18, M18x1, M5x0.5	20x32x12 mm, 30x30x15 mm, 50x50x17 mm, M18x1	20x32x12 mm, 30x30x15 mm	20x32x12 mm, 50x50x17 mm
Type of light	Infrared, red, red polarised	Infrared, red	Red	Laser, pulsed laser, red, red 650 nm, red polarised
Switching output	NPN, PNP	NPN, PNP	NPN, PNP	NPN, PNP
Description	• Round or block design • Setting option: teach-in via button and via electrical connection • Electrical connection via open cable end or plug connector	• Round or block design • Setting option: teach-in, teach-in via electrical connection, potentiometer • Electrical connection via open cable end or plug connector	• Block design • Setting option: teach-in, teach-in via electrical connection, potentiometer • Electrical connection via open cable end or plug connector	• Setting option: teach-in, teach-in via electrical connection, potentiometer • Electrical connection via open cable end or plug connector
online: →	soeg	soeg	soeg	soel

Opto-electronic sensors

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	 **Colour sensors SOEC**	 **Fibre-optic units SOE4**	 **Fork light barriers SOOF**	 **Fibre-optic cables SOEZ, SOOC**
Method of measurement	Colour sensor	Fibre-optic unit	Fork light barrier	Through-beam sensor, fixed focus, fork light barrier, fibre-optic cable, diffuse sensor
Working range	12 ... 32 mm	2 ... 2000 mm		2 ... 650 mm
Size	50x50x17 mm		Fork 120x60 mm, 30x35 mm, 50x55 mm, 80x55 mm	M3, M4, M6, Fork pit 5x29 mm, fork pit 41x15x7 mm, rectangle 10x10x5 mm, rectangle 13x19.9x5 mm, rectangle 19x25x6 mm
Type of light	White	Red	Red	
Switching output	PNP	NPN, PNP	NPN, PNP	
Description	• Diffuse sensor • Block design • Setting option: teach-in, teach-in via electrical connection • Electrical connection via M12x1 plug, 8-pin • Display via 7 LEDs	• Use for precise and space-saving position sensing in electronics and light assembly • Switching frequencies of up to 8000 Hz • Operational with fibre-optic cable SOOC as accessory • Variants: LED or LED display, timer function • Setting option: teach-in • Mounting: H-rail mounting or via through-holes • With protection against mutual interference	• Through-beam sensor with minimal installation effort • Design: polymer or metal • Sturdy housing: high shock and vibration resistance • IP67 degree of protection • Electrical connection via M8x1 plug, 3-pin • Setting option: potentiometer or teach-in • LED displays	• Cable connection, push-in connector
online: →	soec	soe4	soof	soez

10

Signal converters

	 **Signal converters SVE4**
Signal range	0–10 V +/–0.3, 0–20 mA +/–0.6, Adapted for position sensors SMH-S1-HG
Switching output	2xNPN, 2xPNP
Switching function	Freely programmable
Electrical connection, output	M8x1, Plug, 4-pin, to EN 60947-5-2
Electrical connection, input	M8x1, Socket, 4-pin, to EN 60947-5-2
Description	• Converts analogue signals into switching points • Switching function freely programmable with teach-in • Threshold value, hysteresis or window comparator • Mounting: H-rail mounting or via adapter plate • LED switching status display • Certification: c UL us Listed (OL), C-Tick
online: →	sve4

Air gap sensors

	 Air gap sensors SOPA	 Micro reflex sensors, reflex sensors RML, RFL	 Back pressure end stops SD-2, SD-3, SD-3-N	 Air barriers SFL, SML
Sensing range	20 ... 200 µm	Distance between nozzles 4.8 ... 5.1 mm, 4.5 ... 15.5 mm	Distance between nozzles 0 ... 0.5 mm	Distance between nozzles 5 ... 50 mm, up to 100 mm
Operating pressure	4 ... 7 bar	0.075 ... 0.5 bar, 0.1 ... 1.5 bar	0 ... 8 bar	0.1 ... 0.4 bar, 0.1 ... 4 bar, 0 ... 8 bar
Display type	Illuminated LCD, multi-colour	Signal pressure ≥0.5 mbar	Pressure signal 0 ... 8 bar	Pressure signal
Operating medium	Compressed air to ISO 8573-1:2010 [7:4:4]	Filtered, unlubricated compressed air	Compressed air, filtered, lubricated or unlubricated	Filtered, unlubricated compressed air
Description	• Convenient solution for high-precision contact and distance monitoring • Setting option: teach-in or numerical setting using three-button operation • Integrated air jet function • Multi-coloured LCD display • Mounting: H-rail mounting, wall mounting, through-hole • Certification: C-Tick	• Back pressure actuated valve • For contactless sensing of indicating instruments, checking pressing and stamping tools, edge control, magazine control, for measuring and counting • Can be used even in very dirty environments, in complete darkness, with translucent or magnetic objects	• Can be used for stroke-dependent signal generation as a limit switch and fixed stop • Ideal for end-position sensing and position control with high accuracy requirements and small actuating forces • SD-3-N for sensing fluid levels and heavily foaming liquids • For use in inaccessible places	• Sender nozzle, receiver nozzle, gap sensor • Back pressure actuated valve • Operational reliability even in very dirty environments • Reliable even with high ambient temperatures • Insensitive to mechanical influences and sound waves • Reliable even in complete darkness and when sensing translucent objects
online: →	sopa	rfl	sd	sfl

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Sensor boxes

	 New Sensor boxes SRBG	 New Sensor boxes SRBC	 New Sensor boxes SRBE
Measured variable			
Operating voltage range AC		0 ... 250 V	0 ... 250 V
Operating voltage range DC	6 ... 60 V	0 ... 175 V	0 ... 60 V
Electrical connection	Screw terminal, plug M12, A-coded	Screw terminal, 10-pin	Screw terminal, 10-pin, 14-pin
Type of mounting		On flange to ISO 5211, with mounting bracket	On flange to ISO 5211, with mounting bracket
New	• Additional versions	• New series	• New series
Quick ordering of selected basic designs		★	
Description	• Compact housing with M12 plug connection • Direct mounting on quarter turn actuators to VDI/VDE 3845 • AS-Interface® version with extended addressing options • Intrinsically safe version to ATEX and SIL 2 to IEC 61508	• Pre-assembled mounting adapter for ease of installation • Trip cams can be set easily without additional tools • Sturdy, corrosion-resistant design, ideal for use in harsh operating conditions • Clearly visible 3D position indicator allows rapid detection of the current position of the quarter turn actuator	• Trip cams can be set easily without additional tools • Sturdy, corrosion-resistant design, ideal for use in harsh operating conditions • Clearly visible 3D position indicator allows rapid detection of the current position of the quarter turn actuator
online: →	srbg	srbc	srbe

Sensor boxes

	 **Limit switch attachments** **SRAP**	 **Limit switch attachments** **DAPZ**
Measured variable	Rotation angle	
Operating voltage range AC		4 ... 250 V
Operating voltage range DC	15 ... 30 V	4 ... 250 V
Electrical connection	Screw terminal, 9-pin, plug-in	Screw terminal
Type of mounting		
Description	• Based on standard VDI/VDE 3845 (NAMUR) • Analogue • For monitoring the position of quarter turn actuators • Sensors based on 2D Hall technology	• Square or round design • Drive interface to standard VDI/VDE 3845 (NAMUR) • With pneumatic, electric or inductive sensing
online: ➔	**srap**	**dapz**

Electromechanical switches

	 **Micro switches** **S-3, SR-3**
Operating voltage range AC	12 ... 250 V
Operating voltage range DC	12 ... 250 V
Description	• Electric limit switch • N/C contact, N/O contact, changeover switch • Actuator attachments: roller lever type AR, roller lever with idle return type AL, whisker attachment type AF
online: ➔	**s-3**

Vision sensors

	 **Code readers, object sensors** **SBSI-B, SBSI-Q**
Sensor resolution	1280 x 1024 Pixel (SXGA), 736 x 480 Pixel WideVGA
Working distance	6 mm – infinite, 30 mm – infinite
Field of vision	min. 16 mm x 13 mm, min. 5 x 4 mm, min. 8 x 6 mm
Frame rate (full image)	40 fps, 50 fps
Max.no. of inspection programs	8, 255
Description	• Vision sensor with integrated lighting/lens • Enables reading of 1D/2D codes or quality inspection of parts • Intuitive software for simple parameter setting • All-in-one device with integrated lens, lighting, evaluation and communication
online: ➔	**sbsi**

Compact vision systems

	 **Compact vision systems** **SBOA-M**	 **Compact vision systems** **SBOC-M**
Sensor resolution	640 x 480 Pixel (VGA)	640 x 480 Pixel VGA
Working distance	Depends on the lens chosen	Depends on the lens chosen
Field of vision	Depends on the lens chosen	Depends on the lens chosen
Frame rate (full image)	27 ... 241 fps	241 fps
Exposure time	1 ... 1000000 µs	1 ... 1000000 µs
Description	• Systainer with compact vision system SBOC-M	• 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 • Can be networked via Ethernet • Compact dimensions, low weight
online: ➔	**sbox**	**sbox**

Compact vision systems

FESTO

	 Compact vision systems SBOC-Q	 Compact vision systems SBOI-Q	 New Checkbox Compact CHB-C-N
Sensor resolution	752 x 480 Pixel WideVGA	752 x 480 Pixel WideVGA	2048 pixels/line
Working distance	Depends on the lens chosen	20 ... 550 mm	
Field of vision	Depends on the lens chosen	7,9 x 5,5 mm - 195 x 125 mm	
Frame rate (full image)	60 fps	60 fps	
Exposure time	18 ... 200000 µs	18 ... 200000 µs	
New			• New series
Description	• 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 higher-order controllers	• 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 higher-order controllers	• Intelligent line-scan camera • For orientation recognition and quality inspection of small moving parts • Encoder connection • Teach-in function
online: →	**sbox**	**sbox**	**chb-c**

Software tool

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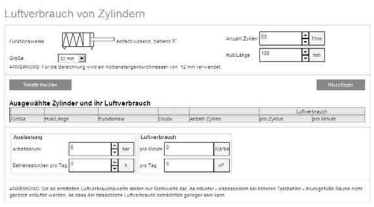
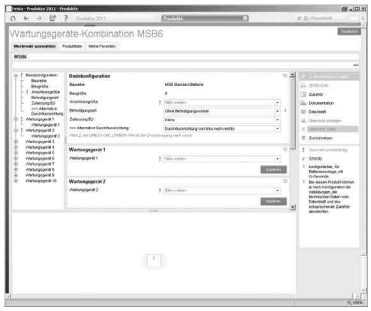
Air consumption		Calculate your system's air consumption quickly and conveniently. Simply enter all the drives and tubing, set the cycle times and working pressure and the air consumption per minute and per day will be calculated for you. It includes a feature for exporting the input table together with the result directly to Excel. This tool can be found • either in the electronic catalogue by clicking on the blue button "Engineering" • or on the DVD under Engineering Tools.
Configurator		Design a product with numerous features reliably and quickly with the help of the configurator. Select all the required product features step-by-step. The use of logic checks ensures that only correct configurations are available for selection. A dynamic graphic generated on the basis of the configuration provides 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 unit combinations: MS series

	 New **Service unit combinations MSE6 -E2M**	 **Service unit combinations MSB4, MSB6, MSB9**
Pneumatic connection 1	G1/2	G1, G1 1/2, G1 1/4, G1/2, G1/4, G1/8, G3/4, NPT1 1/2-11 1/2, NPT1 1/4-11 1/2, NPT1-11 1/2, NPT1/2-14, NPT3/4-14
Standard nominal flow rate	In main flow direction 1 -› 24500 l/min	750 ... 18000 l/min
Flow measuring range final value	5000 l/min	
Pressure regulation range		0.5 ... 16 bar
Operating pressure	4 ... 10 bar	0 ... 20 bar
Grade of filtration		0.01 ... 40 µm
Fieldbus interface	2x socket, M12x1, 4-pin, D-coded, 2x RJ45 push-pull socket, AIDA, 2x SCRJ push-pull socket, AIDA, Sub-D socket, 9-pin	
New	• Fieldbus interfaces: PROFINET, Ethernet/IP and Modbus TCP/IP	
Quick ordering of selected basic designs		★
Description	• Intelligent pneumatic service unit for optimising the use of compressed air as an energy source • Function: energy saving (2/2-way function DE, V24) • Equipped with measuring, control and diagnostic functions • Identification of production downtime and leakages • Use as process monitoring module • Electrical actuation via bus node • Size 6	• Combination of filter regulator, filter, lubricator, on-off valve, soft-start valve • Size 4, 6, 9
online: ➔	**mse6**	**msb4**

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Service unit combinations: D series, metal

	 **Service unit combinations with lubricator** **FRC-K**	 **Service unit combinations without lubricator** **LFR-K, LFRS-K**
Pneumatic connection 1	G1/2, G1/4, G1/8, G3/4, G3/8	G1/2, G1/4, G1/8, G3/4, G3/8
Standard nominal flow rate	530 ... 8200 l/min	575 ... 9400 l/min
Pressure regulation range	0.5 ... 12 bar	0.5 ... 12 bar
Operating pressure	1 ... 16 bar	1 ... 16 bar
Grade of filtration	40 µm	40 µm
Description	• Combination of filter regulator, branching module, lubricator, on-off valve, soft-start valve, mounting accessories • Size: mini, midi, maxi	• Combination of filter regulator, branching module, on-off valve, soft-start valve, mounting accessories • Size: mini, midi, maxi
online: ➔	frc	lfr

Service unit combinations: D series, polymer

	 **Service unit combinations with lubricator** **FRC-K**	 **Service unit combinations without lubricator** **LFR-DB**
Pneumatic connection 1	G1/4	G1/4
Standard nominal flow rate	400 ... 700 l/min	1900 l/min
Pressure regulation range	0.5 ... 7 bar	0.5 ... 7 bar
Operating pressure	1.5 ... 10 bar	1.5 ... 10 bar
Grade of filtration	40 µm	40 µm
Description	• Combination of on-off valve, filter regulator, distributor module and lubricator • Size: mini	• Combination of on-off valve, filter regulator and distributor module • Size: mini
online: ➔	frc	lfr

Filter regulators/lubricators: MS series

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

Filter regulators/lubricators: D series, metal

	 **Service units** **FRC, FRCS**
Pneumatic connection 1	G1, G1/2, G1/4, G1/8, G3/4, G3/8, M5, M7, QS-4, QS-6
Standard nominal flow rate	80 ... 8700 l/min
Pressure regulation range	0.5 ... 12 bar
Operating pressure	1 ... 16 bar
Grade of filtration	5 ... 40 µm
Description	• Filter, regulator and lubricator functions in a single unit • Size: micro, mini, midi, maxi
online: ➔	frc

Filter regulators/lubricators: D series, polymer

	 **Service units** **FRC-DB**
Pneumatic connection 1	G1/4
Standard nominal flow rate	550 ... 650 l/min
Pressure regulation range	0.5 ... 7 bar
Operating pressure	1.5 ... 10 bar
Grade of filtration	5 ... 40 µm
Description	• Filter, regulator and lubricator functions in a single unit • With manual or semi-automatic condensate drain • Size: mini
online: ➔	frc

Filter regulators: MS series

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	 **Filter regulators** **MS4-LFR, MS6-LFR, MS9-LFR, MS12-LFR**
Pneumatic connection 1	G1/2, G1/4, G1/8, G3/8, Internal
Standard nominal flow rate	850 ... 24000 l/min
Pressure regulation range	0.3 ... 16 bar
Operating pressure	0.8 ... 20 bar
Grade of filtration	5 ... 40 µm
Quick ordering of selected basic designs	★
Description	• MS4-LFR, MS6-LFR: directly actuated diaphragm regulator, MS9-LFR: piloted or directly actuated filter-diaphragm regulator, MS12-LFR: piloted diaphragm regulator without internal air consumption • Good regulation characteristics with minimal pressure hysteresis and primary pressure compensation • Good particle and condensate separation • With or without secondary venting • High flow rate • Lockable rotary knob • Return flow option for exhausting from output 2 to input 1 already integrated • Sizes: 4, 6, 9, 12
online: ➔	**ms4-lfr**

Filter regulators: D series, metal

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	 **Filter regulators** **LFR, LFRS**
Pneumatic connection 1	G1, G1/2, G1/4, G1/8, G3/4, G3/8, M5, M7, QS-4, QS-6
Standard nominal flow rate	110 ... 11000 l/min
Pressure regulation range	0.5 ... 12 bar
Operating pressure	1 ... 16 bar
Grade of filtration	5 ... 40 µm
Description	• Two pressure gauge connections for different installation options • With manual, semi-automatic or fully automatic condensate drain • Lockable rotary knob • Size: micro, mini, midi, maxi
online: ➔	**lfr**

Filter regulators: D series, polymer

	 **Filter regulators** **LFR-DB**
Pneumatic connection 1	G1/4
Standard nominal flow rate	1000 ... 1200 l/min
Pressure regulation range	0.5 ... 7 bar
Operating pressure	1.5 ... 10 bar
Grade of filtration	5 ... 40 µm
Description	• With manual or semi-automatic condensate drain • Size: mini
online: ➔	lfr

Filters: MS series

	 **Filters** **MS4-LF, MS6-LF, MS9-LF, MS12-LF**	 **Activated carbon filters** **MS4-LFX, MS6-LFX, MS9-LFX, MS12-LFX**	 **Fine filters** **MS4-LFM-B, MS6-LFM-B, MS9-LFM-B, MS12-LFM-B**	 **Micro filters** **MS4-LFM-A, MS6-LFM-A, MS9-LFM-A, MS12-LFM-A**
Pneumatic connection 1	G1/2, G1/4, G1/8, G3/8, Internal	G1/2, G1/4, G1/8, G3/8	G1, G1/2, G1/4, G1/8, G3/4, G3/8, Manifold module	G1, G1/2, G1/4, G1/8, G3/4, G3/8, Manifold module
Standard nominal flow rate	1000 ... 16000 l/min	360 ... 2500 l/min	54 ... 10000 l/min	54 ... 7800 l/min
Operating pressure	0 ... 20 bar	0 ... 20 bar	0 ... 20 bar	0 ... 20 bar
Grade of filtration	5 ... 40 µm	0.01 ... 1 µm	0.01 ... 1 µm	0.01 ... 1 µm
Description	• 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 • Sizes: 4, 6, 9, 12	• Removal of gaseous oil particles from compressed air using activated carbon • Air quality class at the output [1.4.1] to ISO 8573-1 • Eliminates odours and vapours • Residual oil content = 0.003 mg/m³ • Sizes: 4, 6, 9, 12	• High-efficiency filter for exceptionally clean compressed air • Removal of oil aerosols from compressed air • Available with differential pressure indicator for indication of contamination • Available with electronic filter contamination indicator • Sizes: 4, 6, 9, 12	• High-efficiency filter for exceptionally clean compressed air • Removal of oil aerosols from compressed air • Available with differential pressure indicator for indication of contamination • Available with electronic filter contamination indicator • Sizes: 4, 6, 9, 12
online: ➔	ms4-lf	ms4-lfx	ms4-lfm-b	ms4-lfm-a

Filters: D series, metal

	 Filters LF	 Fine filters LFMB	 Micro filters LFMA
Pneumatic connection 1	G1, G1/2, G1/4, G1/8, G3/4, G3/8, M5, M7, QS-4, QS-6, Sub-base	G1, G1/2, G1/4, G1/8, G3/4, G3/8, Sub-base	G1, G1/2, G1/4, G1/8, G3/4, G3/8, Sub-base
Standard nominal flow rate	170 ... 5300 l/min	125 ... 2780 l/min	80 ... 2200 l/min
Operating pressure	0 ... 16 bar	1 ... 16 bar	1 ... 16 bar
Grade of filtration	5 ... 40 µm	1 µm	0.01 µm
Description	• Good particle and condensate separation • With manual or fully automatic condensate drain • Size: micro, mini, midi, maxi	• High-efficiency filter for exceptionally clean compressed air • Removal of oil aerosols from compressed air • Version with differential pressure indicator for visual indication of filter contamination • Size: mini, midi, maxi	• High-efficiency filter for exceptionally clean compressed air • Removal of oil aerosols from compressed air • Version with differential pressure indicator for visual indication of filter contamination • Size: mini, midi, maxi
online: ➔	lf	lfmb	lfma

Filters: D series, metal

	 Filter combination LFMBA	 Activated carbon filters LFX
Pneumatic connection 1	G1, G1/2, G1/4, G1/8, G3/4, G3/8	G1, G1/2, G1/4, G1/8, G3/4, G3/8, Connecting plate, manifold module
Standard nominal flow rate	125 ... 600 l/min	360 ... 1100 l/min
Operating pressure	1 ... 16 bar	0 ... 16 bar
Grade of filtration	0.01 µm	
Description	• High-efficiency filter for exceptionally clean compressed air • Fully assembled filter combination, comprising LFMB and LFMA • Version with differential pressure indicator for visual indication of filter contamination • Size: mini, midi, maxi	• Removal of gaseous oil particles from compressed air using activated carbon • Air quality class at the output [1.4.1] to ISO 8573-1 • Eliminates odours and vapours • Residual oil content = 0.003 mg/m³ • Size: mini, midi, maxi
online: ➔	lfmba	lfx

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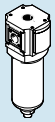
Filters: individual devices

	 Filter silencers LFU	 New Micro filters PFML
Size	G1/4, G3/8, G1/2, G1	90, 186
Grade of filtration	1 µm	0.01 µm
Operating pressure	0 ... 16 bar	0 ... 50 bar
Flow rate with respect to atmosphere	4000 ... 12500 l/min	
Noise reduction	Reduction by 40 dB	
New		• New series
Description	• Removes up to 99.99% of oil and other contaminants from exhaust air • Manual rotary condensate drain • Reduced exhaust noise regardless of frequency	• For high-pressure applications • See supplementary information on food-safe materials at www.festo.com/sp › Certificates
online: ➔	lfu	pfml

Regulators: MS series

	 Pressure regulators MS4-LR, MS6-LR, MS9-LR	 Pressure regulators MS12-LR	 Pressure regulators MS4-LRB, MS6-LRB
Pneumatic connection 1	G1/2, G1/4, G1/8, G3/8	Sub-base	G1/2, G1/4
Standard nominal flow rate	1000 ... 30000 l/min	12000 ... 22000 l/min	300 ... 7300 l/min
Pressure regulation range	0.3 ... 16 bar	0.15 ... 16 bar	0.3 ... 16 bar
Operating pressure	0.8 ... 20 bar	0.8 ... 21 bar	0.8 ... 20 bar
Max. pressure hysteresis	0.25 ... 0.4 bar	0.04 ... 0.4 bar	0.25 bar
Quick ordering of selected basic designs	★		
Description	• High flow rate with minimal pressure drop • Good regulation characteristics with minimal pressure hysteresis and primary pressure compensation • With or without secondary venting • Lockable rotary knob • Optional pressure sensor and rotary knob pressure gauge • Size 4, 6, 9	• High flow rate with minimal pressure drop • Good regulation characteristics with minimal pressure hysteresis and primary pressure compensation • With secondary venting • Lockable rotary knob • MS12-LR-...-PO: pneumatically actuated (pressure range determined by pilot regulator) • MS12-LR-...-PE6: solenoid actuated (pilot control by proportional pressure regulator) • Size: 12	• To build up a regulator manifold with through air supply for pressure ranges that can be adjusted independently of another • Good regulation characteristics with minimal pressure hysteresis and primary pressure compensation • Lockable rotary knob • With or without secondary venting • Integrated return flow option for exhausting from output 2 to input 1 • Optional pressure sensor and rotary knob pressure gauge • Sizes: 4, 6
online: ➔	ms4-lr	ms12-lr	ms4-lrb

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Regulators: MS series

	 Precision pressure regulators MS6-LRP, MS6-LRPB	 Electric pressure regulators MS6-LRE
Pneumatic connection 1	G1/2, G1/4, G3/8	G1/2, G1/4, G3/8
Standard nominal flow rate	800 ... 5000 l/min	2200 ... 7500 l/min
Pressure regulation range	0.05 ... 12 bar	0.3 ... 16 bar
Operating pressure	1 ... 14 bar	0.8 ... 20 bar
Max. pressure hysteresis	0.02 bar	0.25 bar
Description	• As individual device and for manifold assembly • Manifold assembly with through air supply • Good regulation characteristics with minimal pressure hysteresis and primary pressure compensation • High secondary venting • Lockable rotary knob • Available with pressure sensor with display • Size: 6	• With integrated electric drive unit for remotely 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 • Optional pressure sensor • With or without secondary venting • Size: 6
online: →	ms6-lrp	ms6-lre

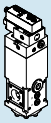
Regulators: D series, metal

	 Pressure regulators LR, LRS	 Pressure regulators LRB, LRBS	 Pressure regulator combinations LRB-K
Pneumatic connection 1	G1, G1/2, G1/4, G1/8, G3/4, G3/8, M5, M7, QS-4, QS-6	Sub-base	G1/2, G1/4, G3/8
Standard nominal flow rate	120 ... 12500 l/min	1600 ... 3800 l/min	1600 ... 3800 l/min
Pressure regulation range	0.5 ... 12 bar	0.5 ... 12 bar	0.5 ... 12 bar
Operating pressure	0 ... 16 bar	1 ... 16 bar	1 ... 16 bar
Max. pressure hysteresis	0.2 ... 0.4 bar	0.2 bar	0.2 bar
Description	• Lockable design • Two pressure gauge connections for different installation options • Micro, mini, midi size: directly actuated diaphragm regulator • Maxi size: piloted piston regulator, diaphragm regulator LRS-DI • Optional return flow option for venting from output 2 to input 1 • Available with pressure gauge • Size: micro, mini, midi, maxi	• To build up a regulator manifold with through air supply for pressure ranges that can be adjusted independently of another • Directly actuated diaphragm regulator • Settings secured via detent on rotary knob and push-in adjustment lock • Lockable design • Without pressure gauge • Size: mini, midi	• Regulator manifold with through air supply for pressure ranges that can be adjusted independently of one another • Directly actuated diaphragm regulator • Settings secured via detent on rotary knob and push-in adjustment lock • Without pressure gauge • Size: mini, midi
online: →	lr	lrb	lrb

Regulators: D series, polymer

	 **Pressure regulators** **LR-DB**	 **Pressure regulator combinations** **LRB-DB**
Pneumatic connection 1	G1/4	G1/2
Standard nominal flow rate	≥1300 l/min	≥1000 l/min
Pressure regulation range	0.5 ... 7 bar	0.5 ... 7 bar
Operating pressure	1.5 ... 10 bar	1.5 ... 10 bar
Max. pressure hysteresis	0.5 bar	0.5 bar
Description	• Setting values are secured by locking the rotary knob • Available with pressure gauge • Size: mini	• Regulator manifold with through air supply for pressure ranges that can be adjusted independently of one another • Setting values are secured by locking the rotary knob • Without pressure gauge • Size: mini
online: ➔	lr-db	lrb-db

Regulators: individual devices

	 New **Precision pressure regulators** **LRP, LRPS**	 New **Pressure regulators** **PREL**
Pneumatic connection 1	G1/4, G1/8, For connecting plate diameter 7 mm	G1
Standard nominal flow rate	240 ... 2300 l/min	
Pressure regulation range	0.05 ... 10 bar	0.2 ... 40 bar
Operating pressure	1 ... 12 bar	0 ... 50 bar
Max. pressure hysteresis	0.02 bar	0.1 bar
New	• Additional size	• New series
Description	• Lockable design • Good regulation characteristics with minimal pressure hysteresis and primary pressure compensation • High secondary venting	• For high-pressure applications • See supplementary information on food-safe materials at www.festo.com/sp › Certificates • Size: 186 mm
online: ➔	lrp	prel

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Lubricators: MS series

	 **Lubricators** **MS4-LOE, MS6-LOE, MS9-LOE, MS12-LOE**
Pneumatic connection 1	G1/2, G1/4, G1/8, G3/8, Internal
Standard nominal flow rate	1100 ... 22000 l/min
Operating pressure	1 ... 16 bar
Min. flow rate for lubricator operation	40 ... 400 l/min
Description	• Proportional lubricator with precision oil metering • Quick and easy top-up even under pressure • Oil capacity 30 ... 1500 cm³ • Sizes: 4, 6, 9, 12
online: ➔	**ms4-loe**

Lubricators: D series, metal

	 **Lubricators** **LOE**
Pneumatic connection 1	G1, G1/2, G1/4, G1/8, G3/4, G3/8, M5, M7, QS-4, QS-6
Standard nominal flow rate	160 ... 9000 l/min
Operating pressure	0 ... 16 bar
Min. flow rate for lubricator operation	3 ... 10 l/min
Description	• Proportional lubricator with precision oil metering • Quick and easy top-up even under pressure • Oil capacity 6.5 ... 190 cm³ • Size: micro, mini, midi, maxi
online: ➔	**loe**

On-off and soft-start valves: MS series

	 **Soft-start/quick exhaust valves MS6-SV-E, MS6-SV-D**	 **Soft-start/quick exhaust valves MS6-SV-C, MS9-SV-C**	 **On-off valves MS4-EM1, MS6-EM1, MS9-EM, MS12-EM**
Pneumatic connection 1	G1/2	G1/2	G1/2, G1/4, G1/8, G3/8, Manifold module
Standard nominal flow rate	4300 ... 5700 l/min	4300 ... 16550 l/min	1200 ... 32000 l/min
Operating pressure	3 ... 10 bar	3 ... 16 bar	0 ... 20 bar
Type of control	Electric	Electric	Manual
Quick ordering of selected basic designs		★	★
Description	• Reliable 2-channel exhausting with self-monitoring up to Performance Level e and category 4 to EN ISO 13849-1 • For reducing pressure quickly and reliably and for building up pressure gradually • SIL 3 • Adjustable pressure build-up time • Available with silencer • Supply voltage 24 V DC • Size: 6	• Single-channel exhausting up to Performance Level c and category 1 to EN ISO 13849-1 • For reducing pressure quickly and reliably and for building up pressure gradually • Adjustable pressure build-up time • Adjustable switch-through pressure • Supply voltage 24 V DC • Sizes: 6, 9	• Manual 3/2-way valve for pressurising and venting pneumatic installations • A silencer can be attached or the exhaust air can be ducted at port 3 • Switching position is immediately recognisable • Optionally with pressure gauge and pressure sensor • Sizes: 4, 6, 9, 12
online: →	ms6-sv-e	ms6-sv-c	ms4-em1

On-off and soft-start valves: MS series

	 **Soft-start valves MS4-DE, MS6-DE, MS12-DE**	 **Soft-start valves MS4-DL, MS6-DL, MS12-DL**	 **On-off valves MS4-EE, MS6-EE, MS9-EE, MS12-EE**
Pneumatic connection 1	G1/2, G1/4, G3/8, NPT1/2-14, Manifold module	G1/2, G1/4, G1/8, G3/8, Manifold module	G1/2, G1/4, G1/8, G3/8, Manifold module
Standard nominal flow rate	1000 ... 42000 l/min	1000 ... 42000 l/min	1000 ... 32000 l/min
Operating pressure	3 ... 18 bar	2 ... 20 bar	3 ... 18 bar
Type of control	Electric	Pneumatic	Electric
Quick ordering of selected basic designs		★	★
Description	• 2/2-way valve for slowly pressurising pneumatic systems with electrically switchable pressure switchover point • Supply voltage 24 V DC, 110, 230 V AC • Switchable pressure switching point • For advancing the drives slowly and reliably into the initial position • For avoiding sudden and unexpected movements • Adjustable pressure build-up time • Sizes 4, 6, 12	• 2/2-way valve for slowly pressurising pneumatic installations (for use with on-off valves EM1 and EE) • For building up pressure gradually • Adjustable pressure build-up time • Sizes 4, 6, 12	• Electric 3/2-way valve for pressurising and exhausting pneumatic systems • A silencer can be attached or the exhaust air can be ducted at port 3 • Supply voltage 24 V DC, 110, 230 V AC • Optionally with pressure gauge and pressure sensor • With solenoid coil, without plug socket • Sizes: 4, 6, 9, 12
online: →	ms4-de	ms4-dl	ms4-ee

On-off and soft-start valves: D series, metal

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	 On-off valves HE	 On-off valves HEE	 On/off valves HEP	 Soft-start valves HEL
Pneumatic connection 1	G1, G1/2, G1/4, G1/8, G3/4, G3/8	G1, G1/2, G1/4, G1/8, G3/4, G3/8	G1, G1/2, G1/4, G1/8, G3/4, G3/8	G1, G1/2, G1/4, G1/8, G3/4, G3/8
Standard nominal flow rate	1000 ... 10000 l/min	1000 ... 6500 l/min	1000 ... 6500 l/min	1000 ... 6500 l/min
Operating pressure	0 ... 16 bar	2.5 ... 16 bar	0 ... 16 bar	3 ... 16 bar
Type of control	Manual	Electric	Pneumatic	Pneumatic
Description	• Manual 3/2-way valve for pressurising and venting pneumatic installations • A silencer can be attached or the exhaust air can be ducted at port 3 • The switching position is immediately recognisable • Size: mini, midi, maxi	• Electric 3/2-way valve for pressurising and venting pneumatic installations • A silencer can be attached or the exhaust air can be ducted at port 3 • With solenoid coil, without plug socket • Solenoid actuator can be repositioned by 4x 90° • Detenting and non-detenting manual override • Supply voltage 24 V DC, 110, 230 V AC • Size: mini, midi, maxi	• Pneumatic 3/2-way valve for pressurising and exhausting pneumatic installations • Especially suitable for applications requiring explosion protection • Size: mini, midi, maxi	• 2/2-way valve for slowly pressurising pneumatic systems (for use with on-off valves HE and HEE) • For building up pressure gradually • Adjustable pressure build-up time • Size: mini, midi, maxi
online: →	he	hee	hep	hel

On-off and soft-start valves: D series, polymer

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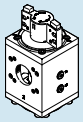
	 New On-off valves HE-DB
Pneumatic connection 1	G1/4
Standard nominal flow rate	2300 l/min
Operating pressure	0 ... 10 bar
Type of control	Manual
New	• New series
Description	• 3/2-way manual on-off valve • Switching position is immediately recognisable • Commercially available padlock for security
online: →	he-db

On-off and soft-start valves: individual devices

	 **Shut-off valves HE-LO**	 New **On-off valves PVEL**
Pneumatic connection 1	G1, G1/2, G3/4, G3/8	With SAE flange
Standard nominal flow rate	5200 ... 10000 l/min	
Operating pressure	1 ... 10 bar	0 ... 50 bar
Type of control	Manual	Manual, pneumatic
New		• New series
Description	• For shutting off the compressed air supply whilst simultaneously venting systems powered by compressed air • Can be locked in the closed position • Screwed into piping, through-holes for wall mounting • To OSHA 29 CFR 147	• For high-pressure applications • See supplementary information on food-safe materials at www.festo.com/sp › Certificates • Size: 124 mm
online: ➔	he-lo	pvel

Air dryers: MS series

	 **Membrane air dryers MS4-LDM1, MS6-LDM1**
Pneumatic connection 1	G1/4, G1/2, G3/8, G3/4
Standard nominal flow rate	50 ... 400 l/min
Operating pressure	3 ... 12.5 bar
Pressure dew point reduction	20 K
Description	• Final dryer with excellent operational reliability • Suitable for use as an individual device or for integration into existing service unit combinations • Flow rate-dependent dew point reduction • Wear-free function requiring no external energy • Sizes: 4, 6
online: ➔	ms4-ldm1

Air dryers: D series, metal

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	 **Membrane air dryers** **LDM1**
Pneumatic connection 1	G1, G1/2, G3/4
Standard nominal flow rate	300 ... 1000 l/min
Operating pressure	3 ... 12.5 bar
Pressure dew point reduction	17 ... 20 K
Description	• Final dryer with excellent operational reliability • Suitable for use as an individual device or for integration into existing service unit combinations • Flow rate-dependent dew point reduction • Wear-free function requiring no external energy • Individual device with or without connecting plates, for service unit combination • Size: maxi
online: ➔	**ldm1**

Air dryers: individual devices

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

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Compressed air distribution units: MS series

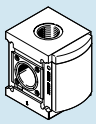
	 Branching modules MS4-FRM, MS6-FRM, MS9-FRM, MS12-FRM	 Distributor blocks MS4-FRM-FRZ, MS6-FRM-FRZ
Pneumatic connection 1	G1, G1 1/2, G1 1/4, G1/2, G1/4, G1/8, G3/4, G3/8, NPT1 1/2-11 1/2, NPT1 1/4-11 1/2, NPT1-11 1/2, NPT1/2-14, NPT3/4-14, G1/4, G1/2, G1, G2, NPT1-11 1/2, Manifold module	G1/4, G1/2
Standard nominal flow rate in main flow direction 1->2	1200 ... 50000 l/min	4050 ... 14600 l/min
Operating pressure	0 ... 20 bar	0 ... 20 bar
Quick ordering of selected basic designs	★	★
Description	• Optionally with integrated non-return function and pressure switch • Outlet at top and bottom • Can be used as an intermediate distributor for varying air qualities • Available with pressure sensor • Sizes: 4, 6, 9, 12	• Slim pneumatic distributor • Outlet at top and bottom • Can be used as an intermediate distributor for varying air qualities • Can be used as an adapter between two pressure regulators with large rotary knob with pressure gauge on size MS4 • Sizes: 4, 6
online: →	ms*-frm	ms*-frm-frz

Compressed air distributors: D series, metal

	 Branching modules FRM	 Distributor blocks FRZ
Pneumatic connection 1	G1, G1/2, G1/4, G1/8, G3/4, G3/8	Manifold module
Standard nominal flow rate in main flow direction 1->2	1100 ... 20000 l/min	
Operating pressure	0 ... 16 bar	
Description	• Outlet at top and bottom • Can be used as an intermediate distributor for varying air qualities • Optionally with integrated non-return function and pressure switch • Size: mini, midi, maxi	• Outlet at top and bottom • Can be used as an intermediate distributor for varying air qualities • Slim pneumatic distributor • Size: micro, mini, midi, maxi
online: →	frm	frz

Compressed air distributors: individual devices

FESTO

	 **Branching modules** **PMBL**
Pneumatic connection 3	G1
Pneumatic connection 4	G1
Operating pressure	0 ... 50 bar
New	• New series
Description	• For high-pressure applications • See supplementary information on food-safe materials at www.festo.com/sp › Certificates • Sizes: 90 mm, 186 mm
online: ➔	**pmbl**

Condensate drain

	 **Water separators** **MS6-LWS, MS9-LWS, MS12-LWS**	 **Condensate drains, electric** **PWEA**	 **Condensate drains, automatic** **WA**
Pneumatic connection		G1/2	M9
Pneumatic connection 1	G1/2, G1/4, G3/8, G1, Sub-base		
Operating pressure	0.8 ... 16 bar	0.8 ... 16 bar	1.5 ... 16 bar
Description	• Efficient and maintenance-free water separator • Constantly high condensate separation (99%) up to the maximum flow rate • Available with fully automatic or fully automatic, electrically actuated condensate drain • Sizes: 6, 9, 12	• Fully automatic condensate drain with independent 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	• 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
online: ➔	**ms6-lws**	**pwea**	**wa**

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Pressure boosters

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

Pressure indicators

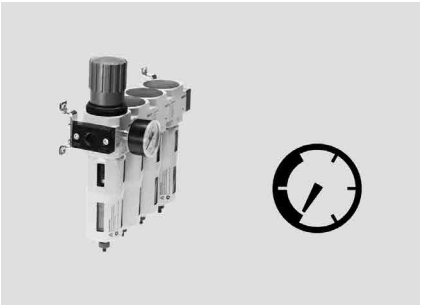
	 **Pressure gauges PAGN**	 **Pressure gauges MA**	 **Flanged pressure gauges FMA**	 **Flanged precision pressure gauges, precision pressure gauges FMAP, MAP**
Type of mounting	In-line installation	In-line installation	Front panel mounting	Front panel mounting, in-line installation
Indicating range [bar]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

Pressure indicators

FESTO

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

Customised components – for your specific requirements

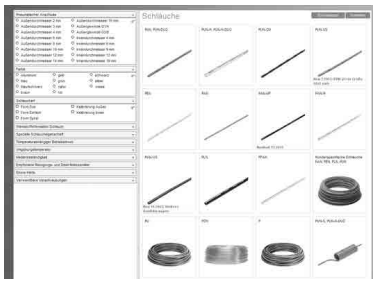
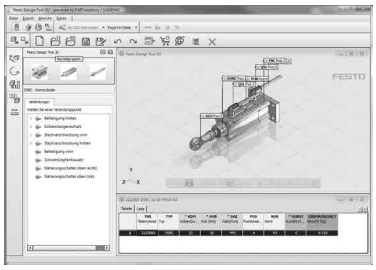


Components for compressed air preparation with customised designs
Can't find the compressed air preparation components you need in our catalogue? We can offer you customised components that are tailored to your specific requirements – from minor product modifications to complete new product developments.
Common product modifications:
- Modified pressure range
- Rotary knob: in a special colour, with protection against rotation
- Fitting: integrated throttling port, special thread
- Tubing with special printing
- Pressure gauge with red/green range

Many additional variants are possible. Ask your Festo sales engineer, who will be happy to help.
Further information on customised components can be found on your local website
➔ **www.festo.com**

Software tool

FESTO

Product Finder for tubing		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 • either in the electronic catalogue by clicking on the blue button “Product finder” • or on the DVD under Engineering Tools.
Festo Design Tool 3D **FDT 3D**		The Festo Design Tool 3D is a 3D product configurator for generating specific CAD product combinations from Festo. The configurator makes your search for the right accessory easier, more reliable and faster. You can then order the module that has been created with a single order item – either completely pre-assembled or as individual parts in a single box. As a result, your bill of materials is considerably shortened and downstream processes such as product ordering, order picking and assembly are significantly simplified. All ordering options are available in the following countries: AT, BE, CH, CZ, DE, DK, ES, FI, FR, GB, HU, IE, IT, NL, NO, PL, RU, SE, SI, SK. This tool can be found • either via the address: www.festo.com/FDT-3D in the above listed countries, • or on the CD “FDT 3D” (part no. 135595 for the above listed countries) • or on the DVD.

O. D. tubing

	 **Plastic tubing** **PUN, PUN-DUO**	 **Plastic tubing** **PUN-H, PUN-H-DUO**	 **Plastic tubing** **PUN-CM**	 **Plastic tubing** **PUN-V0**
Outside diameter	3 ... 16 mm	2 ... 16 mm	4 ... 12 mm	4 ... 16 mm
Inside diameter	2 ... 11 mm	1.2 ... 11 mm	2.5 ... 8 mm	2 ... 11.8 mm
Temperature-dependent operating pressure	–0.95 ... 30 bar	–0.95 ... 10 bar	–0.95 ... 10 bar	–0.95 ... 30 bar
Ambient temperature	–35 ... 60 °C	–35 ... 60 °C	–35 ... 60 °C	–35 ... 60 °C
New		• Transparent versions		
Quick ordering of selected basic designs	★	★		
Description	• Polyurethane • High resistance to stress cracks • Suitable for energy chains • Also available as DUO plastic tubing • Operating media: compressed air, vacuum	• Polyurethane • High resistance to microbes and hydrolysis • See supplementary information on food-safe materials at www.festo.com/sp › Certificates • Suitable for energy chains • Also available as DUO plastic tubing • Operating media: compressed air, vacuum, water	• Polyurethane • Plastic tubing, antistatic, electrically conductive • Suitable for energy chains • Operating media: compressed air, vacuum	• Polyurethane • Flame retardant to UL 94 V0 ... V2 • For use in the immediate vicinity of welding applications • High resistance to microbes and hydrolysis • Suitable for energy chains • Operating medium: compressed air, vacuum, water
online: →	pun	pun-h	pun-cm	pun-v0

O. D. tubing

FESTO

	 Plastic tubing PEN	 Plastic tubing PAN	 Plastic tubing PAN-MF	 Heavy-duty tubing PAN-R
Outside diameter	4 ... 16 mm	4 ... 16 mm	4 ... 16 mm	4 ... 28 mm
Inside diameter	2.7 ... 10.8 mm	2.5 ... 12 mm	2.5 ... 12 mm	2.5 ... 23 mm
Temperature-dependent operating pressure	–0.95 ... 10 bar	–0.95 ... 35 bar	–0.95 ... 31 bar	–0.95 ... 35 bar
Ambient temperature	–30 ... 60 °C	–60 ... 100 °C	–60 ... 100 °C	–30 ... 80 °C
Description	• Polyethylene • High resistance to chemicals and very high resistance to hydrolysis • Resistant to most cleaning agents and lubricants • Suitable for energy chains • Operating media: compressed air, vacuum, water	• Polyamide • High thermal and mechanical load capacities • High resistance to microbes • Operating media: compressed air, vacuum	• Polyamide • High thermal and mechanical load capacities • Meets the requirements to DIN 73378 “Polyamide tubing for use in motor vehicles” • Operating media compressed air, mineral oil	• Polyamide • For applications with a high pressure range • High resistance to microbes • Operating medium: compressed air, vacuum
online: ➔	**pen**	**pan**	**pan**	**pan-r**

O. D. tubing

	 Plastic tubing PAN-V0	 Plastic tubing PLN	 Plastic tubing PFAN
Outside diameter	6 ... 14 mm	4 ... 16 mm	4 ... 12 mm
Inside diameter	2.5 ... 9 mm	2.9 ... 12 mm	2.9 ... 8.4 mm
Temperature-dependent operating pressure	–0.95 ... 12 bar	–0.95 ... 14 bar	–0.95 ... 16 bar
Ambient temperature	–30 ... 90 °C	–30 ... 80 °C	–20 ... 150 °C
Description	• PVC, polyamide • Flame retardant to UL 94 V0 • High resistance to microbes and UV radiation • Double-sheath tubing • Suitable for energy chains • Operating media: compressed air, vacuum, water, mineral oil	• Polyethylene • High resistance to chemicals, microbes and hydrolysis • See supplementary information on food-safe materials at www.festo.com/sp › Certificates • Resistant to most cleaning agents and lubricants • Operating media: compressed air, vacuum, water	• Perfluoroalkoxy alkane • Pneumatic tubing with resistance to high temperatures and chemicals • See supplementary information on food-safe materials at www.festo.com/sp › Certificates • High resistance to chemicals, microbes, UV radiation, hydrolysis and stress cracks • Operating medium: compressed air, vacuum, water
online: ➔	**pan-v0**	**pln**	**pfan**

I. D. tubing

	 **Plastic tubing** **PU**
Outside diameter	11.6 ... 18 mm
Inside diameter	9 ... 13.1 mm
Temperature-dependent operating pressure	–0.95 ... 10 bar
Ambient temperature	–35 ... 60 °C
Description	• Polyurethane with reinforcing fabric • High resistance to abrasion and kinks • Operating media: compressed air, vacuum (PU-13)
online: ➔	pu

Spiral tubing

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

Push-in fittings

FESTO

	 **Push-in fittings NPQH**	 **Push-in fittings/connectors, metal, standard NPQM**	 **Push-in fittings/connectors, resistant to media NPQP**	 **Cartridges QSP10, QSPK, QSPKG, QSPLK, QSPLKG, QSPLLK, QSPLLKG**
Pneumatic connection 1	Male thread G1/2, G1/4, G1/8, G3/8, M5, M7, female thread G1/4, G1/8, push-in sleeve QS-10, QS-12, QS-14, QS-4, QS-6, QS-8, for tubing O. D. 10 mm, 12 mm, 14 mm, 4 mm, 6 mm, 8 mm	Push-in sleeve QS-10, QS-12, QS-14, QS-4, QS-6, QS-8, for tubing O. D. 10 mm, 12 mm, 14 mm, 4 mm, 6 mm, 8 mm, 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 mm, 12 mm, 4 mm, 6 mm, 8 mm, R1/2, R1/4, R1/8, R3/8	Cartridge 10 mm, 14 mm, 18 mm, 20 mm
Pneumatic connection 2	Push-in sleeve QS-10, QS-12, QS-14, QS-4, QS-6, QS-8, for tubing O. D. 10 mm, 12 mm, 14 mm, 4 mm, 6 mm, 8 mm	For tubing O. D. 10 mm, 12 mm, 14 mm, 3 mm, 4 mm, 6 mm, 8 mm	For tubing O. D. 10 mm, 12 mm, 4 mm, 6 mm, 8 mm	For tubing O. D. 10 mm, 12 mm, 3 mm, 4 mm, 6 mm, 8 mm
Temperature-dependent operating pressure			–0.95 ... 10 bar	
Operating pressure	–0.95 ... 20 bar	–0.95 ... 16 bar		–0.95 ... 10 bar
Ambient temperature	0 ... 150 °C	–20 ... 70 °C	–20 ... 60 °C	–10 ... 60 °C
Description	• Solid-metal brass, chemically nickel-plated • High corrosion and chemical resistance • Highly resistant to temperatures and pressure • See supplementary information on food-safe materials at www.festo.com/sp › Certificates • Operating media compressed air, vacuum, water	• Solid-metal brass, nickel-plated • Attractively priced metal push-in fitting • Sturdy • Operating media: compressed air, vacuum, water	• Polypropylene • Low-cost alternative to stainless steel: resistant to most cleaning agents in combination with tubing PLN • For use with extreme media influences • See supplementary information on food-safe materials at www.festo.com/sp › Certificates • Operating media compressed air, vacuum	• Cartridge fittings • Straight or angled design • PBT and nickel-plated brass • Operating medium: compressed air, vacuum
online: ➔	**npqh**	**npqm**	**npqp**	**qsp**

Push-in fittings

FESTO

	 **Push-in fittings, mini series QSM, QSMC, QSMF, QSMP, QSMS, QSML, QSMLL, QSMLV, QSMLLV, QSMT, QSMTL, QSMX, QSMY**	 **Push-in fittings, standard QS, QSF, QSS, QSSF, QSC, QSH, QSL, QSLL, QSLF, QSLV, QST, QSTF, QSTL, QSW, QSX, QSY, QSYL, QSYLV, QSYTF**	 **Push-in fittings, stainless steel CRQS, CRQSL, CRQSS, CRQST, CRQSY**
Pneumatic connection 1	Male thread G1/8, M3, M5, M6, M6x0.75, M7, M8x0.75, R1/8, female thread M3, M5, push-in sleeve QS-2, QS-3, QS-4, QS-6, for tubing O. D. 2 mm, 3 mm, 4 mm, 6 mm	Male thread G1/2, G1/4, G1/8, G3/4, 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 mm, 12 mm, 16 mm, 4 mm, 6 mm, 8 mm	Male thread M5, R1/2, R1/4, R1/8, R3/8, for tubing O. D. 10 mm, 12 mm, 16 mm, 4 mm, 6 mm, 8 mm
Pneumatic connection 2	For tubing O. D. 2 mm, 3 mm, 4 mm, 6 mm	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 mm, 12 mm, 16 mm, 22 mm, 4 mm, 6 mm, 8 mm	For tubing O. D. 10 mm, 12 mm, 16 mm, 4 mm, 6 mm, 8 mm
Temperature-dependent operating pressure	–0.95 ... 14 bar	–0.95 ... 14 bar	
Operating pressure	–0.95 ... 6 bar	–0.95 ... 14 bar	–0.95 ... 10 bar
Ambient temperature	–10 ... 80 °C	–20 ... 80 °C	–15 ... 120 °C
Quick ordering of selected basic designs	★	★	
Description	• Mini series • Compact for maximum component density in confined spaces • PBT and nickel-plated brass • Operating media: compressed air, vacuum, (water)	• Standard series • Wide range of variants: large selection for maximum flexibility in standard applications • PBT and nickel-plated brass • Operating media: compressed air, vacuum, (water)	• Maximum corrosion resistance (corrosion resistance class 4 according to Festo standard 940 070) and chemical resistance • See supplementary information on food-safe materials at www.festo.com/sp › Certificates • Operating media: compressed air, vacuum, (water) • Stainless steel
online: ➔	qsm	qs	crqs

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Push-in fittings

FESTO

	 **Push-in fittings, resistant to welding spatter QS-V0, QSL-V0, QST-V0**	 **Self-sealing/rotary push-in fittings and connectors QSK, QSSK, QSKL, QSR, QSRL**
Pneumatic connection 1	For tubing O. D. 10, 12, 4, 6, 8, G1/2, G1/4, G1/8, G3/8, R1/2, R1/4, R1/8, R3/8	Male thread G1/2, G1/4, G1/8, G3/8, M5, R1/2, R1/4, R1/8, R3/8, for tubing O. D. 10 mm, 12 mm, 4 mm, 6 mm, 8 mm
Pneumatic connection 2	For tubing O. D. 10 mm, 12 mm, 4 mm, 6 mm, 8 mm	For tubing O. D. 10 mm, 12 mm, 4 mm, 6 mm, 8 mm
Temperature-dependent operating pressure		–0.95 ... 14 bar
Operating pressure	–0.95 ... 10 bar	–0.95 ... 6 bar
Ambient temperature	0 ... 60 °C	–10 ... 80 °C
Description	• PBT, reinforced • Resistant to welding spatter • For use in all areas where there is a risk of fire • Reliable even for applications in close proximity to welding spatter • Operating medium: compressed air, vacuum, water	• Standard series • Self-sealing push-in fitting blocks the air flow after the tubing is disconnected • PBT and nickel-plated brass • Push-in fitting, rotatable with swivel connection, rotatable by 360° with max. 500 rpm • Operating medium: compressed air, vacuum
online: ➔	qs-v0	qsr

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Barbed fittings

FESTO

	 **Quick connectors NPCK**	 **Barbed fittings CN, CRCN, FCN, L-PK, LCN, N, RTU, SCN, LCNH, T-PK, TCN, V-PK, Y-PK**	 **Barbed hose fittings C-P, N-P, N-MS, SK**	 **Quick connectors ACK, CK, QCK, SCK, CV-PK, GCK-KU, LCK, LCKN, TCK, KCK-KU, FCK-KU, MCK, LK, TK, VT**
Nominal width	2 ... 6.2 mm	1.3 ... 5.3 mm	4 ... 16.5 mm	2 ... 12 mm
Pneumatic connection 1	Male thread G1/4, G1/8, G3/8, M5	Male thread G1/4, G1/8, G3/8, M3, M5, for tubing O. D. 3 mm, 4 mm, 6 mm, 8 mm	Male thread G1, G1/2, G1/4, G1/8, G3/4, G3/8, female thread G1/2, G1/4, G1/8, G3/8, NPT1-11 1/2, NPT3/4-14	Male thread G1/2, G1/4, G1/8, G3/8, M5, R1/4, R1/8, R3/8, female thread G1/2, G1/4, G1/8, G3/8, M5, for barbed connector I. D. 3 mm, 4 mm, 6 mm, 9 mm with union nut
Pneumatic connection 2	For tubing O. D. 10 mm, 4 mm, 6 mm, 8 mm	For tubing O. D. 3 mm, 4 mm, 6 mm, 8 mm	For tubing O. D. 8 mm, for tubing I. D. 19 mm, 13 mm, 9 mm	For tubing O. D. 4 mm, 6 mm, 8 mm, for tubing I. D. 13 mm, 9 mm, for barbed fitting I. D. 13 mm, 3 mm, 4 mm, 6 mm, 9 mm with union nut
Operating pressure	–0.95 ... 12 bar	–0.95 ... 10 bar	–0.95 ... 16 bar	0 ... 16 bar
Ambient temperature	–20 ... 120 °C	0 ... 60 °C		–10 ... 60 °C
Description	• Stainless steel design • See supplementary information on food-safe materials at www.festo.com/sp › Certificates • Fulfils all Clean Design requirements • Straight shape • Operating media: compressed air, vacuum, water	• Straight shape, T-shape, L-shape, Y-shape • Operating media: compressed air, vacuum • Brass, POM, aluminium or stainless steel	• Barbed hose fitting with or without sealing ring • Tubing clip to DIN 3017 • Operating media: compressed air, vacuum • Brass or aluminium, steel	• Bulkhead quick connector • Sealing cap for plastic tube fittings and barbed connectors • Multiple distributor • Union nut for CK tube fitting • Operating media: compressed air, vacuum, (water) • Aluminium, steel, POM or zinc
online: →	npck	n_070302	n_cnp	ck

Threaded fittings

FESTO

	 Threaded fittings NPFC	 Adapters NPFV	 Reducers, sleeves, double nipples D, E, ESK, FR, G, LJK, NPFA, QM, QMR, QSP10, SCM, TJK
Pneumatic connection 1	G1, G1/2, G1/4, G1/8, G3/4, G3/8, M5, M7, R1, R1/2, R1/4, R1/8, R3/4, R3/8	G1/4	G1, G1/2, G1/4, G1/8, G3/4, G3/8, M3, M5, M7, R1/2, R1/4, R1/8, R3/8
Pneumatic connection 2	G1, G1/2, G1/4, G1/8, G3/4, G3/8, M5, R1, R1/2, R1/4, R1/8, R3/4, R3/8	G1/4, NPT1/4-18	G1, G1/2, G1/4, G1/8, G3/4, G3/8, M3, M5, M7, R1/2, R1/4, R1/8, R3/8
Operating pressure	–0.95 ... 50 bar	2 ... 8 bar	0.9 ... 8 bar
Operating pressure for entire temperature range			
Ambient temperature	–20 ... 150 °C		
Nominal width		6 mm	2.6 ... 10.7 mm
Description	• Nickel-plated brass • Sleeve • Reducing sleeve • Extension • Double nipple • Reducing nipple • L-, T-, Y- or X-fitting • Operating media: compressed air, vacuum	• Aluminium • Adapter with filter • From G1/4 to NPT1/4 or G1/4 • Operating media: compressed air, vacuum	• Brass or aluminium • Reducing nipple • Reducing sleeve • Double nipple • Distributor block • Female bulkhead fitting • Sleeve • Operating medium: compressed air, vacuum
online: ➔	npfc	npfv	esk

Threaded fittings

	 Ring pieces, hollow bolts LK, TK, VT	 Blanking plugs B
Pneumatic connection 1	Male thread G1/4, G1/8, G3/8, M5	
Pneumatic connection 2	For barbed connector I. D. 3 mm with union nut, 4 mm, 6 mm with union nut	
Operating pressure		
Operating pressure for entire temperature range	0 ... 10 bar	
Ambient temperature		
Nominal width		
Quick ordering of selected basic designs		★
Description	• Multiple distributor consisting of hollow bolt VT and ring piece LK or TK • With two to six outlets and one common air feed • Operating media: compressed air, vacuum • Galvanised steel	• Aluminium, stainless steel • With sealing ring
online: ➔	lk	b-1

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Click fitting

	 **Click fittings** **NPKA**
Pneumatic connection 1	Male thread G1/8
Pneumatic connection 2	For tubing O. D. 6 mm
Temperature-dependent operating pressure	–0.95 ... 10 bar
Nominal width	4 mm
Ambient temperature	–10 ... 60 °C
Description	• POM, polyamide 66 • Quick and simple tube installation using one hand • Completely plastic • Suitable for use in cleaning-intensive areas. • See supplementary information on food-safe materials at www.festo.com/sp › Certificates • Operating media compressed air, vacuum, water
online: →	npka

Piping

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

Push-in fittings for piping PQ

FESTO

	 **Push-in fittings** **CQ, CQA, CQC, CQD, CQH, CQL, CQO, CQSR, CQT**
Pneumatic connection 1	Male thread G1, G1/2, G3/4, G3/8, female thread G1/2, push-in sleeve CQ-12, CQ-15, CQ-18, CQ-22, CQ-28, QS-16, for pipe/tubing O. D. 12 mm, 15 mm, 18 mm, 22 mm, 28 mm
Pneumatic connection 2	Female thread G1/2, push-in sleeve CQ-12, CQ-15, CQ-18, CQ-22, CQ-28, QS-12, QS-16, for pipe/tubing O. D. 12 mm, 15 mm, 18 mm, 22 mm, 28 mm
Nominal width	8 ... 24.9 mm
Temperature-dependent operating pressure	–0.95 ... 15 bar
Ambient temperature	–25 ... 70 °C
Description	• For pipes PQ-PA, PQ-AL and tubing PAN and PUN • Operating media: compressed air, vacuum, liquid media • POM
online: ➔	cq

Couplings

	 **Quick coupling sockets, quick coupling plugs** **KD1, KD2, KD3, KD4, KD5, KS1, KS2, KS3, KS4, KS5**	 **Multiple connectors** **KSV, KDV, KDVF**	 **Multi-tube connectors** **KM**
Pneumatic port		For tubing O. D. 3, 4, 6, 8, PK-2, PK-3, PK-4, PK-6	PK-2, PK-3, PK-4
Pneumatic connection 1	Male thread G1/2, G1/4, G1/8, G3/8, M3, M5, female thread G1/2, G1/4, G1/8, G3/8, M5, CK-13, CK-3, CK-4, CK-6, CK-9, CN-2, CN-4, CN-6, N-6, N-9, N-13		
Standard nominal flow rate	44 ... 2043 l/min		
Operating pressure		–0.95 ... 16 bar	–0.95 ... 8 bar
Ambient temperature	–10 ... 80 °C	–10 ... 60 °C	–10 ... 60 °C
Description	• Quick connection coupling for standard applications without safety function • Shut off at one or both ends • With male or female thread or with barbed fitting or quick connector • Nickel-plated brass • Operating media: compressed air, vacuum	• POM, aluminium, brass • Multi-plug, multi-socket • Terminal plug and terminal socket • Operating media: compressed air, vacuum	• Polymer, brass • For max. 22 lines • Used as control cabinet outlet • Operating medium: compressed air, vacuum
online: ➔	kd1	ksv	km

Distributors

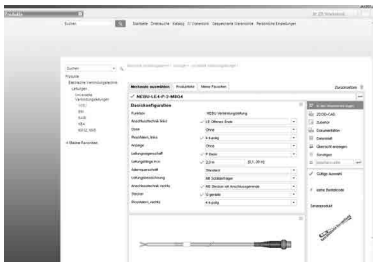
	 **Multiple distributors QSLV, QSQ, QST3**	 **Multiple distributors QSYTF**	 **Distributors FR**	 **Rotary distributors GF**
Pneumatic connection 1	Male thread G1/2, G1/4, G1/8, G3/8, R1/2, R1/4, R1/8, R3/8, for tubing O. D. 10 mm, 6 mm, 8 mm	Male thread G1/2, G1/4, G1/8, G3/8, R1/2, R1/4, R1/8, R3/8	Female thread G1/2, G1/4, G1/8, G3/8, G3/4	Male thread G1/4, G3/8, G1/2, G1/8
Pneumatic connection 2	For tubing O. D. 10 mm, 12 mm, 4 mm, 6 mm, 8 mm	Female thread G1/2, G1/4, G1/8, G3/8, for tubing O. D. 10 mm, 12 mm, 6 mm, 8 mm	Female thread G1/2, G1/4, G1/8, G3/8, M3, M5, for tubing O. D. 4 mm, 6 mm	Female thread G1/4, G3/8, G1/2, G1/8, M5
No. of supply lines	1	1	1	
No. of outlets	2, 3, 4, 6	3	3, 8, 9, 12	
Maximum speed				300 ... 3000 1/min
Description	• PBT and nickel-plated brass • L-shape, T-shape • Rotatable 360° • Reducing design • Operating media: compressed air, vacuum, (water)	• PBT and nickel-plated brass • Y-shape • Rotatable 360° • Operating media: compressed air, vacuum, (water)	• Aluminium • 4, 8, 9 or 12 connections • Operating medium: compressed air, vacuum	• 2 or 4 axial and radial outlets • Single or multiple rotary distributor • Operating media: compressed air, vacuum • Brass, hardened steel
online: →	qslv	qsytf	fr	gf

Protective conduit systems

	 **Protective conduits MK, MKG, MKR, MKV**	 **Fittings HMZAS, HMZV, MKA, MKGV, MKM, MKRL, MKRS, MKRT, MKRV, MKVM, MKVV, MKY**
Inside diameter	7.5 ... 48 mm	
Outside diameter	10 ... 52 mm	
Design	Strip-wound metal conduit, internally and externally corrugated all-plastic conduit, separable	
Ambient temperature	–20 ... 100 °C	–40 ... 200 °C
Description	• For protecting pneumatic tubing and electrical cables • Galvanised steel, PA, PP, PVC spring steel • Metal or plastic design • High alternate bending strength	• Installation kit • Junction box • Adapter connector • Protective conduit fitting • Lock nut • Protective conduit connector • Y-distributor • Polymer, polyamide, nickel-plated brass
online: →	mkg	mka

Software tool

FESTO

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

	 **Connecting cables NEBU**	 **Connecting cables/plug sockets with cable SIM**	 **Connecting cables KM12**
Electrical connection	M8x1, M12x1, straight plug, angled plug, straight socket, angled socket, rotatable socket, 7/8" round plug connector, open end, 2-pin, 3-pin, 4-pin, 5-pin, 2-wire, 3-wire, 4-wire, 5-wire, rotatable thread, straight plug / open end, angled socket / angled plug, angled socket / open end, straight socket / straight plug, straight socket / angled socket, straight socket / open end, M8x1 / -, M8x1 / M8x1, M8x1 / M12x1, M12x1 / -, M12x1 / M12x1, M12x1 / M8x1, 3-pin / 3-pin, 3-pin / 4-pin, 4-pin / 4-pin, 5-pin / 4-pin, 5-pin / 5-pin, 3-pin / 3-wire, 4-pin / 4-wire, 5-pin / 3-wire, 5-pin / 4-wire, 5-pin / 5-wire, – / rotatable thread	Straight socket, angled socket, 3-pin, 4-pin, clip-on, angled socket / open end, straight socket / open end, M8x1 / -, M12x1 / -, 3-pin / 3-wire, 4-pin / 4-wire, 5-pin / 3-wire, 5-pin / 4-wire, 5-pin / 5-wire	
Electrical connection 1 and 2, function	Field device side, controller side	Field device side, controller side	Field device side, controller side
Electrical connection 1 and 2, connection type	Socket, cable	Socket, cable	Socket, plug
Electrical connection 1 and 2, cable outlet	angled	Straight, angled	Straight
Electrical connection 1 and 2, design	Round	Round	Round
Electrical connection 1 and 2, connection technology	M12x1, A-coded to EN 61076-2-101, open end	M12x1, A-coded to EN 61076-2-101, open end	M12x1, A-coded to EN 61076-2-101
Electrical connection 1 and 2, number of pins/ wires	8	3, 4, 8	8
Cable length	0.1 ... 30 m	2 ... 10 m	2 m
Quick ordering of selected basic designs	★		
Description	• Designs for static, standard, energy chain and robot applications • Versions with switching status display • Designs for connecting sensors and actuators	• Pre-assembled, pre-assembled at both ends	• For connecting inputs and outputs • Type of mounting: union nut, threaded connector
online: →	**nebu**	**sim**	**km12**

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Connecting cables for control systems

FESTO

	 New **Connecting cables NEBC**	 **Connecting cables, diagnostic cables SBOA**	 **Cables FEC-KBG**	 **Connecting cables NEBP**
Electrical connection	M12x1, straight plug, socket, straight plug, USB 2.0 type B, 4-pin, straight plug, M12x1, 4-pin, D-coded, straight plug, RJ45, 4-pin, straight plug, M12x1, 4-pin, D-coded, screenable, angled plug, M9, 5-pin, straight plug, USB 2.0 type A, 4-pin, straight plug M12x1, 4-pin, D, open end, 26-wire, straight plug, Sub-D, 25-pin, open end, 4-wire, open end, 5-wire, Sub-D, 5-pin, 9-pin, 15-pin, 25-pin, straight plug / open end, straight socket / straight socket, square design angled Sub-D/Sub-D, Sub-D/-, 15-pin/9-pin	Straight plug connector/ straight socket/straight socket	RJ11 plug / Sub-D, socket, 15-pin, RJ12 plug / Sub-D, socket, 15-pin	Angled socket, M16x0.75, 6-pin Angled plug connector, M9x0.5, 5-pin
Electrical connection 1 and 2, function	Field device side, controller side			
Electrical connection 1 and 2, connection type	Plug, cable			
Electrical connection 1 and 2, cable outlet	Straight			
Electrical connection 1 and 2, design	Square			
Electrical connection 1 and 2, connection technology	Sub-D, open end			
Electrical connection 1 and 2, number of pins/ wires	15			
Cable length	0.25 ... 20 m	2 m	2.5 ... 5 m	2 m
New	• Additional versions			
Description	• For I/O interface • For connecting motor controller CMMS-ST to any control system	• Used as Ethernet diagnostic cable, for integration in a CPI system, for I/O extension, for compact vision system type SBOC-Q, SBOI-Q	• For connecting electrical terminal CPX to operator unit FED	• Connection between linear drive DGPI, DGPIL or displacement encoder MME and measuring module CPX-CMIX
online: →	**nebc**	**sboa**	**fec-kbg**	**575898**

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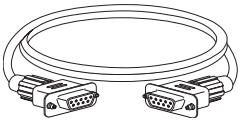
Connecting cables for control systems

FESTO

				
	Pilot cables KES	**Programming cables KDI**	**Programming cables PS1**	**Connecting cables KV-M12**
Electrical connection		Straight plugs / straight sockets, straight socket / straight plug, M8x1 / Sub-D, Sub-D / Sub-D, 4-pin / 9-pin, 9-pin / 9-pin	Sub-D, 9-pin	Straight socket, M12, 5-pin, A-coded, straight plug, M12x1, 5-pin, A-coded
Electrical connection 1 and 2, function	Field device side, controller side			
Electrical connection 1 and 2, connection type	Socket, cable			
Electrical connection 1 and 2, cable outlet	Straight			
Electrical connection 1 and 2, design	Square			
Electrical connection 1 and 2, connection technology	Sub-D, open end			
Electrical connection 1 and 2, number of pins/ wires	9, 10, 15, 18			
Cable length	2.5 ... 10 m	2.5 ... 3 m	1.5 m	1.5 ... 3.5 m
Description	• For I/O interface for connecting motor controller SFC-DC to any controller • For I/O interface for connecting motor unit MTR-DCI to any controller	• Pre-assembled at both ends • For diagnostic interface • For servo motor MTR-DCI	• Connecting cable for motor controller CMMS-ST	• Plug socket with cable for diagnostic interface (to CPX terminal) • Pre-assembled at both ends • 5-pin/4-wire • Round plug • Mounting via union nut M12
online: →	**kes**	**kdi**	**cmms-st**	**kv-m12**

Connecting cables for motors

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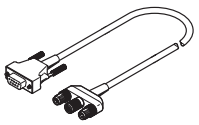
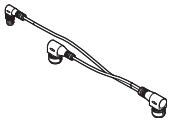
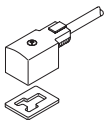
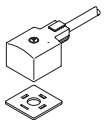
				
	Motor, encoder, resolver cables NEBM	**Motor cables KMTR**	**Power supply cables KPWR**	**Fieldbus adapters FBA**
Cable length	1 ... 25 m	2.5 ... 10 m	2.5 ... 10 m	0.1 ... 0.11 m
Description	• For servo motor EMMS-AS and stepper motor EMMS-ST • Suitable for energy chains	• For motor controllers SFC-DC	• For motor units MTR-DCI • For motor controllers SFC-DC for connecting load and logic supply	• 9-pin Sub-D plug to 5-pin round plug/M12 socket
online: →	**nebm**	**kmtr**	**kpwr**	**fba**

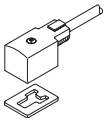
Connecting cables for valves

	 Connecting cables/plug sockets with cable NEBV-H1, NEBV-M8	 Connecting cables NEDV	 Plug sockets with cable KMYZ-2, KMYZ-4	 Plug sockets with cable KMEB-1, KMEB-2, KMEB-3
Electrical connection	M8x1, socket, 2-pin, angled socket / straight plug, angled socket / cable, M8x1 / M8x1, 4-pin / 3-pin, 4-pin / 2-wire	2x angled socket, M12, 3-pin, angled plug, M8, 4-pin	Cable, angled socket, square design MSZB, square design MSZC, angled socket / straight plug, angled socket / cable, square design / M8x1, square design / open end, 2-pin / 3-pin, 2-pin / 2-wire	Angled socket, to DIN EN 175301-803, type C, 2-pin, 3-pin, 4-pin, 5-pin
Cable length	0.2 ... 10 m	0.2 m	0.5 ... 10 m	0.5 ... 10 m
New	• Additional versions			
Quick ordering of selected basic designs	★			★
Description	• Connecting cable for valves with ZC solenoid coils (CPE10, CPE14), for valves VUVG • Pre-assembled	• For proportional valves VPWP • For connecting to connecting plate VAPV-S3 • Pre-assembled	• For valves with ZB solenoid coil: MZBH, MOZBH • For valves with ZC solenoid coil: CPE10-M1BH, CPE14-M1BH, MH2, MH3 • Mounting via central screw	• For valves with EB solenoid coil: CPE18, CPE24, MEBH, MOEBH, JMEBH, JMEBDH, JMN2DH • Polyvinyl chloride or polyurethane cable • Mounting via central screw
online: →	nebv	nedv	kmyz-2	kmeb-1

Connecting cables for valves

	 Plug sockets with cable KME	 Plug sockets with cable KMF	 Plug sockets with cable KMC	 Connecting cables/plug sockets with cable KMH
Electrical connection	Angled socket, square design, 3-pin, type C, open end, 2-wire	Socket	Socket, type A	Socket, 3-pin
Cable length	2.5 ... 10 m	2.5 ... 10 m	2.5 ... 10 m	0.5 ... 5 m
Quick ordering of selected basic designs		★		
Description	• For valves with E solenoid coil: MEH, MOEH, JMEH • Mounting via central screw • With polyvinyl chloride cable • Ambient temperature −20 ... +80 °C	• For valves with F solenoid coil: MFH, MOFH, JMFH, JMFDH, NVF3, MUFH • Mounting via central screw • With polyvinyl chloride cable • Ambient temperature −20 ... +80 °C	• For valves with D solenoid coil: MDH, MODH, JMDH • For valves with N1 solenoid coil: MN1H, JMN1H, JMN-1DH • With polyvinyl chloride cable • Mounting via central screw • Ambient temperature −20 ... +80 °C	• For miniature valves MHA1 and MHP1 • For fast-switching valves MHA2 and MHP2 • Mounting via clip • Ambient temperature −40 ... +80 °C • With polyvinyl chloride cable
online: →	kme	kmf	kmc	kmh

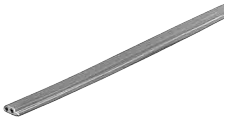
Connecting cables for valves

	 Connecting cables MHJ9-KMH	 Plug sockets with cable KMV	 Connecting cables KRP
Electrical connection	Straight socket / straight socket / cable, 2-pin / 2-pin / 4-wire	Socket, type B	Angled socket, 2-pin
Cable length	0.5 ... 2.5 m	2.5 ... 10 m	2.5 ... 5 m
Description	• For valves MHJ9 • With plug sockets KMH • With control electronics for two valves	• For valves with V solenoid coil • Mounting via central screw M3 • With polyvinyl chloride cable • Ambient temperature –20 ... +80 °C	• Plug socket with cable for connecting relay plates (valve terminal CPV10 and CPV14) • Pre-assembled • Mounting via self-tapping central screw
online: →	mhj9-kmh	kmv	krp

Connecting cables for valves

	 Electrical plug-in bases MHAP-PI	 Plug sockets with cable KMPPE	 Connecting cables KMPYE-AIF, KMPYE-5, KMPYE-...
Electrical connection	Socket, 2-pin, 3-pin	8-pin	
Cable length	0.5 ... 1 m	2.5 ... 5 m	0.3 ... 5 m
Description	• Plug base with cable for connecting individual valves • Pre-assembled • Socket, 2-pin or 3-pin • Mounting via clip	• For proportional pressure regulators MPPE and MPPES • Mounting via union nut M16x0.75 • With polyvinyl chloride cable • Ambient temperature –30 ... +80 °C	• Plug socket with cable, screened, 5 m cable, for proportional directional control valves MPYE
online: →	mhap	kmppe	kmpye

Connecting cables for valve terminals

	 New **Connecting cables/plug sockets with cable NEBV-S1**	 **Flat cables KASI**	 **Addressing cables KASI-ADR**	 **Connecting cables KMP3, KMP4, KMP6**
Electrical connection	Socket, Sub-D, 25-pin, 44-pin		Straight socket / angled plug / straight socket, 4-pin / 4-pin / 2-pin	Socket, Sub-D, 9-pin, 15-pin, 25-pin, 26-pin
Cable length	0.5 ... 30 m	100 m	2.5 m	2.5 ... 10 m
New	• Additional versions			
Description	• Connecting cable for multi-pin plug connection • Pre-assembled	• For AS-Interface® • 2-wire • Reverse polarity protected • Contact using insulation displacement technology • No need to strip cable and wire insulation • Two different colours: yellow (preferred for the AS-Interface® network) and black (for auxiliary power supply)	• For AS-Interface® • For any slaves such as individual valve interface, valve terminal with AS-Interface® connection • Reverse polarity protected	• Plug socket with cable for multi-pin plug connection • Pre-assembled • Mounting via union nut, with 2 screws
online: →	nebv	kasi	kasi-adr	kmp

Connecting cables for valve terminals

	 **Connecting cables KMPV**	 **Connecting cables KVI**	 **Connecting cables KVIA**	 **Connecting cables VMPA-KMS1, VMPA-KMS2, VMPAL-KM, VMPAL-KMSK**
Electrical connection	Socket, Sub-D, 15-pin	M9, plug, socket, 5-pin, straight socket/straight plug	Straight plug / straight socket, straight plug / angled socket	Cable with plug
Cable length	5 ... 10 m	0.25 ... 8 m	5 ... 10 m	2.5 ... 10 m
Description	• Plug socket with cable for multi-pin plug connection • Pre-assembled	• For fieldbus connection (for valve terminal CPV and installation system CPI) • Pre-assembled at both ends • Suitable for energy chains	• For inputs/outputs (analogue connections) • Pre-assembled at both ends • 4-pin/5-pin round plug • Suitable for energy chains	• Plug socket with cable for multi-pin connection (to valve terminal MPA) • Variant suitable for use with energy chains • Cable outlet straight or on the side • Pre-assembled at one end • With polyvinyl chloride or polyurethane cable
online: →	kmpv	kvi	kvia	vmpa-kms

Connecting cables for sensors

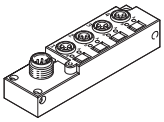
FESTO

	 **Connecting cables** **NEBS**
Electrical connection 1	Straight socket, M12x1, 12-pin, A-coded, straight socket, M12x1, 5-pin, A-coded, socket, square design L1, 4-pin
Electrical connection 2	Straight socket, M12x1, 12-pin, A-coded, open end, 12-wire, open end, 4-wire, open end, 5-wire
Cable length	0.3 ... 10 m
Description	• For pressure sensor SPAB • Protection class IP40
online: →	nebs

Universal plug connectors

	 **Distributors** **NEDY**	 **Cable sockets** **NEFU**	 **Plug connectors** **NECU, NECU-HX**	 **Push-in T-connectors** **NEDU**
Electrical connection	Straight plug, M8x1, straight plug, M12x1, plug, M8x1 A-coded, EN 61076-2-104, plug, M12x1 A-coded, EN 61076-2-101, open end	Angled socket, RJ45, 4-pin, straight socket, M12x1, 4-pin, D-coded	M8x1, M12x1, socket, Sub-D, 9-pin, straight plug, straight socket, 7/8", 4-pin, straight socket, 7/8“, 5-pin, IDC terminal, screw terminal, straight socket, M12x1, 5-pin, B-coded, screenable, socket, screw terminal, screenable, spring-loaded terminal, AIDA push-pull, straight plug, M8x1, 4-pin, straight plug, M12x1, 4-pin, D-coded, screenable, straight plug, M12x1, 5-pin, B-coded, screenable, plug, Sub-D, 9-pin, square design, type A, 3-pin, 4-pin, 5-pin, 7-pin, 8-pin, 2x20-pin, A-coded, R=2.54, pre-assembled, straight plug / insulation displacement connector, straight plug / screw terminal, socket / spring-loaded terminal	Straight socket, M12, 5-pin, A-coded, straight socket, M12x1, 5-pin, A-coded, straight plug, M12x1, 2-pin, A-coded, socket / socket / plug, M12x1 / M12x1 / M12x1, 4-pin / 4-pin / 4-pin, A-coded / A-coded / A-coded
Degree of protection	IP65, IP67, IP68, IP69K	IP20, IP65, IP67, to IEC 60529, in assembled state	IP20, IP40, IP65, IP67	IP65, IP67
Connection cross section			0.08 ... 2.5 mm²	
New	• New series			
Description	• Collection of signals between field devices (sensors) and double-assigned controller inputs • Distribution of signals between double-assigned controller outputs and field devices (actuators, e. g. valves)	• Cable socket for branching the AS-Interface® network at any required point • Reconnecting AS-Interface® flat cable to 5-pin M12 socket • Reverse polarity protected	• Power supply socket for fieldbus connection • NECU-HX: reconnectable M8 and M12 round plug connectors with Harax® quick connection technology for low-voltage applications • Plug connector and socket for power supply • Can be assembled with any cable lengths	• For fieldbus connection • Branch line for connecting and disconnecting fieldbus components
online: →	nedy	nefu	necu	nedu

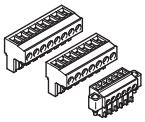
Universal plug connectors

	 **Multi-pin plug distributors** **NEDU**	 **Plug connectors** **SEA**	 **Cable distributors** **ASI-KVT**	 **Cable sockets** **ASI-SD**
Electrical connection	Straight socket, M8, 3-pin, straight plug, M12x1, 8-pin	M8x1, M12x1, M12x1 round plug connector, type A, 3-pin, 4-pin, 5-pin, straight plug / solder connection, straight plug / insulation displacement connector, straight plug / screw terminal, angled socket / screw terminal		Straight socket, screw terminal, 2-pin, 4-pin
Degree of protection	IP68	IP65, IP67	IP65	IP65, IP67
Connection cross section		0.08 ... 0.75 mm²	1.5 mm²	0.75 ... 1.5 mm²
Description	• Multi-pin plug distributor • Particularly compact	• Sensor plug and socket for inputs/outputs • Can be assembled with any cable lengths	• Flat cable distributor for branching or for reconnecting AS-Interface® flat cables • Reverse polarity protected	• For AS-Interface® • Flat-cable socket for connecting AS-Interface® stations to the AS-Interface® bus system • M12 connection • Reverse polarity protected • Detachable connection
online: ➔	nedu	sea	asi-kvt	asi-sd

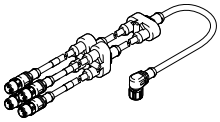
Plug connectors for control systems

	 **Plug connectors** **NECC**	 **Plug connectors** **PS1-SAC, PS1-ZC**	 **Plug connectors** **FBS-SUB-9-WS**
Electrical connection	Sub-D / screw terminal, 9-pin / 9-pin	Socket / terminal strip, 10-pin / 10-pin, 10-pin / 30-pin	5-pin, type A, M12x1, straight plug / screw terminal
Connection cross section	0.2 ... 2.5 mm²	0.08 ... 0.75 mm²	0.75 mm²
Degree of protection	IP40		IP40
Description	• Encoder plug for motor controllers CMMS-ST, CMMS-AS • Plug for multi-axis controllers CMXR for interface housing CAMI-C, 11-pin • Plug for multi-axis controllers CMXR and for modular controllers CECX for peripheral modules • 2-pin, 4-pin, 6-pin, 8-pin, 11-pin, 18-pin	• For power supply • Cable connection using clamping technology • Individually or as a set	• Plug connector for bus connection CAN bus and PROFIBUS • Cable connection 2x horizontal or 2x vertical • Printed circuit terminal block with screw connector
online: ➔	necc	ps1	fbs-sub-9-ws

Plug connectors for control systems

	 **Plug connectors** **FBS-RJ45**	 **Plug assortment** **NEKM**
Electrical connection	5-pin, type A, M12x1, straight plug / screw terminal	2 ... 9-pin, screw connector
Connection cross section	0.75 mm²	0.2 ... 2.5 mm²
Degree of protection	IP65, IP67, to IEC 60529	
Description	• Ethernet plug with 8-pin RJ45 connection • High transmission quality • Detachable connection	• For motor cable, encoder cable, power supply, reference switch, STO safety function • Comprising plug connector for power supply and plug connector for motor connection
online: ➔	fbs-rj	nekm

Plug connectors for valves

	 **Adapters** **NEFV**	 **Plug sockets** **MSSD**
Electrical connection		Socket, angled socket, angled socket, square design, 3-pin, type C, socket, to EN 175301-803, type C, square design, square design MSC, square design MSEB, square design MSF, square design MSN1, square design MSN2, square design MSV, to DIN EN 175301-803, to DIN EN 61984, type A, type B, type C, 3-pin, 4-pin
Electrical connection 1 and 2, function	Field device side, controller side, analogue output module (green), digital input module (white), analogue input module (yellow), digital output module (red)	
Electrical connection 1 and 2, connection type	Socket, 4x plug	
Electrical connection 1 and 2, cable outlet	Straight, angled	
Electrical connection 1 and 2, design	Round	
Electrical connection 1 and 2, connection technology	M12x1, A-coded to EN 61076-2-101	
Electrical connection 1 and 2, number of pins/ wires	8	
Connection cross section		0.25 ... 1.5 mm²
Degree of protection	IP65, IP67	IP50, IP65, IP67, to IEC 60529, in assembled state
Quick ordering of selected basic designs		★
Description	• Adapter for connecting a proportional valve to the control system	• For valves with F, D, N1, V, E, EB, N2, Y, Z, ZB, ZC, MD-2 and MH-2 solenoid coils • For connecting individual valves • Cable connection using clamping screws, insulation displacement technology or push-in connector • Optionally with LED display
online: ➔	nefv	mssd

Plug connectors for valves

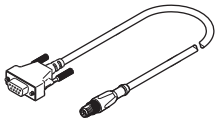
	 **Soldering base PCBC**	 **Multi-pin plug sockets NECA**	 **Angled plug sockets MPPE-3-B**
Electrical connection	2-pin	Socket, Sub-D, 9-pin	Angled socket, 8-pin, solderable
Connection cross section		0.34 ... 1 mm²	0.75 mm²
Degree of protection	IP40	IP65, to IEC 60529	IP67
Description	• For mounting miniature valves MHA1 and MHP1 on a PCB with plug connection underneath (-PI)	• For soft-start/quick exhaust valves MS6-SV, MS series • Electrical connection via 9-pin Sub-D, 9-pin screw terminal	• For proportional pressure regulators MPPE and MPPES • Mounting via union nut
online: ➔	pcbc	neca	mppe-3-b

Plug connectors for valves

	 **Time delay inserts MFZ**	 **Illuminating seals MC-LD, ME-LD, MEB-LD, MF-LD, MV-LD**	 **Indicator inserts MCL, MCLZ, MFL, MFLZ**
Electrical connection	For connector socket or device plug, type F	Square design MSC, square design MSE, square design MSEB, square design MSF, square design MSV, to DIN EN 175301-803, type A, type B, type C	Plug, to DIN 43650
Degree of protection	IP64	IP65	IP65
Description	• Electronic timer with adjustable time delay between 0 ... 10 s • For mounting between the solenoid coil and connector socket or plug	• The seal is illuminated yellow when the power is switched on • For mounting between the solenoid coil and connector socket or device plug • For F, D, N1, V, E and EB solenoid coils	• Variant with integrated protective circuit • For mounting between the solenoid coil and connector socket or device plug • With yellow LED display
online: ➔	mfz	mc-ld	mcl

Plug connectors for valve terminals

FESTO

	 **Plug sockets FBSD**	 **Plug sockets NTSD**	 **T-adapters FB-TA**	 **Bus connections FBA-1, FBA-2**
Electrical connection	M12x1, type A, 4-pin, 5-pin, angled socket / screw terminal, straight socket / screw terminal	Straight socket, angled socket, screw terminal, 4-pin, 5-pin, straight plug / screw terminal	5-pin, plugs / sockets, M12x1 / M12x1	Straight socket / straight plug, Sub-D / M12x1, Sub-D / -, 9-pin / 5-pin, straight socket / plug and socket
Degree of protection	IP67	IP67	IP67	IP40, IP65, to IEC 60529
Description	• For fieldbus connection • Straight or angled design • Can be assembled with any cable lengths	• Straight or angled design • For power supply • Can be assembled with any cable lengths	• For fieldbus connection	• Can be assembled with any cable lengths
online: ➔	fbs	ntsd	fb-ta	fba

Plug connectors for valve terminals

	 **Plug connectors FBS-SUB**	 **Sensor sockets, angled plug sockets SIE-GD, SIE-WD**	 **Cover cap ISK**
Electrical connection	M12x1, type A, 5-pin, straight plug / screw terminal	M12x1, straight socket, angled socket, 4-pin	
Degree of protection	IP65, IP67 to IEC 60529, in assembled state	IP67	IP65
Description	• 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 assembly	• For customised assembly of cables • Pin adapter for fieldbus connection • With screw terminals • Straight or angled design	• For sealing unused connections/openings • Thread M8, M12
online: ➔	fbs-sub	sie-gd	isk

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Plug connectors for valve terminals

	 **Plug sockets, plug connectors SD-SUB**	 **Bus connections FBSD-KL**
Electrical connection	Plug, Sub-D, 25-pin	Angled socket / screw terminal, 5-pin / 5-pin
Degree of protection	IP65	IP20
Description	• Socket for multi-pin plug connection • Plug for inputs/outputs • Can be assembled with any cable lengths	• 5-pin angled socket, 5-pin screw terminal
online: ➔	sd-sub	fbsd-kl

Plug connectors for sensors

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

Pneumatic and electropneumatic controllers

	 **Steppers** **TAA, TAB**	 **Memory modules** **SBA-2 N**	 **Pulse oscillators** **VLG**
Pneumatic connection	Barbed connections for plastic tubing NW3	Barbed connections for plastic tubing NW3	G1/8, G1/4
Type of mounting	On mounting frame	On mounting frame	Through-hole in housing
Nominal width	2 mm	3 mm	3.5 mm, 7 mm
Standard nominal flow rate	60 l/min	70 l/min	120 l/min, 600 l/min
Description	• For ensuring a logical program sequence • Poppet valve with integrated AND as well as OR element	• For input logic operations • For simplifying the design and installation of pneumatic controllers	• For generating infinitely adjustable signals in controllers • For high-speed cylinder movements of diaphragm cylinders, single- and double-acting cylinders
online: ➔	taa	sba	vlg

Software tool

CODESYS

CODESYS for standardised programming of embedded devices according to IEC 61131-3. It makes your life easier with simple commissioning, fast programming and parameterisation.

Advantages

- Hardware-neutral software platform for quick and easy configuration, programming and commissioning of pneumatic and electric 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.
- User-friendly IEC function block extension.
- Re-use of existing application parts.

The parameterisation software can be found on the website under Support › Support Portal › enter search term.

Electronic controllers

	 **Controllers CECC-D, CECC-LK, CECC-S**	 **Control systems CECX-X-C1, CECX-X-M1**	 **Input/output modules CECX-D-E8A, CECX-A-4E4A**	 **Input modules CECX-D-16E, CECX-A-4E-V**
Operating voltage	19.2 – 30 VDC, 20.4 – 30 VDC	19.2 – 30 VDC	19.2 – 30 VDC	19,2 ... 30 VDC
CPU data	400 MHz processor	64 DRAM, 400 MHz processor	64 MB DRAM, 400 MHz processor	64 MB DRAM, 400 MHz processor
Fieldbus interface	CAN-Bus	CAN-Bus		
Ethernet, connector plug	RJ45	RJ45, socket, 8-pin		
Description	• Compact programmable logic controller • Programming with CODESYS to IEC 61131-3 • 12 digital inputs, 8 digital outputs, additionally 2 high-speed counters up to 250 kHz • Ethernet 10/100 Mbit/s • USB interface for data transfer • CECC-LK with CANopen, IO-Link®, I-Port and Modbus TCP protocol	• Modular master controller with CODESYS or motion controller with CODESYS and SoftMotion. • Programming to standard IEC 61131-3 • Three plug-in slots for optional modules • Optional: communication module for PROFIBUS	• Digital modules: 6 or 8 digital inputs and 8 digital outputs • Analogue modules for voltage: 4 analogue voltage inputs and 4 analogue voltage outputs • Analogue modules for current: 4 analogue current inputs and 4 analogue current outputs • Address setting function, short circuit monitoring function for outputs, debounce function, interrupt function, sensor failure detection function	• Digital modules: 16 digital inputs • Analogue modules for voltage: 4 analogue voltage inputs • Temperature input modules: 4 or 6 temperature inputs
online: →	cecc	cecx-x	cecx	cecx

Electronic controllers

	 **Output modules CECX-D-14 A-2, CECX-A-4 A-V**	 **Encoder interfaces CECX-C-2G**	 **Bus interfaces CECX-F-PB-S-V, CECX-F-PB-V1, CECX-B-CO**
Operating voltage	24 +25% / –15% VDC	19.2 – 30 VDC	19.2 – 30 VDC
CPU data			
Fieldbus interface			CAN-Bus, Profibus-Master DP-V1, Profibus-Slave DP-V1
Ethernet, connector plug			
Description	• Digital modules: 14 digital outputs • Analogue modules: 4 analogue voltage outputs	• Displacement encoder function • Pulse counter • Speed measurement function • Shaft encoder monitoring function • Counter reading latching function • Sensor break monitoring • Status display function	• PROFIBUS master DP-V1 • Connection via CAN Bus to the modular controller • For connecting decentralised peripheral modules in series
online: →	cecx	cecx	cecx

Electronic controllers

	 **Electrical interfaces** **CECX-C-2S1**	 **AS-Interface® module** **CESA**
Operating voltage	9,2 ... 30 V DC	AS-Interface® voltage 30 VDC
CPU data		
Fieldbus interface		CANopen Device Specification CiA DS-301, PROFIBUS to DIN 19245 Part 3
Ethernet, connector plug	8-pin	
Description	• For extending the controller with two RS232 serial interfaces	• AS-Interface® master gateway • Duplicate address recognition • Direct operation via pushbuttons • Graphic display • Comprehensive diagnostics via LED and display • Specification 3.0
online: →	cecx	cesa

Electrical peripherals

	 **Terminal** **CPX-P**	 **Input modules for installation system CTEL** **CTSL**	 **Fieldbus modules** **CTEU**	 **CPI installation systems** **CTEC**
Max.no. of inputs	Digital 512, analogue 32	16	128	128
Max.no. of outputs	Digital 512, analogue 32		128	128
Number of module positions	10		32	Max. 4 installation strings, max. 4 CP modules per string
Electrical actuation	Fieldbus, integrated controller	IO-Link, I-Port	CANopen, DeviceNet, CC-Link, PROFIBUS, EtherCAT, I-Port	Fieldbus, integrated controller
New			• EtherNet/IP bus node	
Description	• Use of matching remote I/O and valve terminals in a control cabinet • Combination with modules of the electrical terminal CPX, which enables use for hybrid applications • Unique modular structure • Comprehensive integrated diagnostic and maintenance functions	• For installation system CTEL • For recording sensor input signals • Display of the input statuses for each input signal via an assigned LED • Diagnostic LED for short circuit/overload in sensor supply	• For valve terminals VTUB-12, VTUG, MPA-L, CPV, VTOC • Can be expanded into installation systems CTEL • Fieldbus-typical LEDs, interfaces and switching elements • Isolated power supply for electronics and valves	• CPX master module for four CPI strings • Combination of centralised and decentralised installation possible • Decentralised pneumatic components and sensors for fast processes • Can be connected to valve terminal CPV, MPA-S, CPV-SC
online: →	cpx-p	ctsl	cteu	ctec

Electrical peripherals

	 Terminal CPX	 Electrical interface CPX-CTEL	 Measuring modules CPX-CMIX	 AS-Interface® components ASI, CACC
Max.no. of inputs	Digital 512, analogue 32	256		4, 8
Max.no. of outputs	Digital 512, analogue 18	256		8
Number of module positions	Max. 9 electric input/output modules	Max. 4 modules with I-Port interface	9	
Electrical actuation	Fieldbus, integrated controller			AS-Interface®
Description	• Automation platform • Open to all common fieldbus protocols and Ethernet • Integrated diagnostic and maintenance functions • Can be used as stand-alone remote I/O or with valve terminals MPA-S, MPA-L, VTSA/VTSA-F • Choice of polymer or metal housing with individual linking	• CPX-CTEL master module with 4 I-Port connections • Decentralised pneumatic components and sensors for fast processes • Standardised M12 connections	• Pneumatics and electrics – movement and measurement on one platform • Innovative measurement technology for piston rod drives, rodless drives, rotary drives • Control via fieldbus • Remote maintenance, remote diagnostics, web server, SMS and e-mail alerts are all possible via TCP/IP • Modules can be quickly exchanged and expanded without altering the wiring	• Accessories for the AS-Interface® installation system • Modules for actuating individual valves ASI-EVA • Cable distributor ASI-KVT • Addressing device ASI-PRG-ADR • Compact I/O modules (IP65, IP67)
online: →	cpx	cpx-ctel	cpx-cmix	as-interface

Operator units

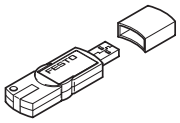
	 Operator units CDPX	 Simulators CDSM	 Operator units CPX-MMI
Display	Colour TFT		128x64 Pixel, LCD display, with background illumination
Display size	13.3", 7", 4.3", 10.4"		
Recipe memory	32000 byte		
Display resolution	480x272 Pixel, SVGA, 800x600 Pixel, WVGA, 800x480 Pixel, WXGA, 1280x800 Pixel		
Ethernet interface	RJ45 10/100 MBd		
Description	• Powerful processors combined with wide-screen technology • Remote access, remote control • FTP and HTTP servers • Open for web and multimedia applications	• Straightforward design of human-machine dialogues • Semi-graphical display of process values makes them easier to read • Suitable for commissioning the following motor controllers: CMMO-ST, CMMP-AS, CMMS-ST • To simulate input and output signals during commissioning	• Data polling, configuration and diagnostic functions for terminal CPX • Connection to the CPX bus nodes or control block via a pre-assembled M12 cable • 3 function keys, 4 arrow keys
online: →	cdpx	cdsm	cpx-mmi

Software

FESTO

	 Operator package GSIB	 Operator package P. BP	 Software GSPF
Description	• Information software and documentation for motor controllers CMMD-AS, CMMS-AS, CMMP-AS, CMMS-ST • The operator package contains a CD-ROM with user documentation for motor controller and configuration software FCT (Festo Configuration Tool) and a brief description	• Information software and documentation for motor controllers CMMP-AS and SFC-DC, handling module HSP/HSW and motor unit MTR-DCI • The operator package contains a CD-ROM with user documentation for motor controller and configuration software FCT (Festo Configuration Tool) and a brief description	• Programming software and documentation for motor controller CMMP-AS with additional functions for cam disc functionality • Software for configuring, programming, commissioning and maintaining the controller CECC • Programming software for creating custom application programs for safety systems CMGA • Operating software for configuring, programming and for AS-Interface® diagnostics with serial connecting cable • The software package contains a CD-ROM with user documentation for motor controllers
online: →	gsib	software	gspf

Software

	 Software and manual P. SW	 Software licence GSLO	 Software (FluidDraw P5®) GSWF-P5
Description	• For configuring the terminal CPX, for parameterising the CPX modules, for programming the controller CPX-FEC • Software for checkbox CHB-C for image evaluation, display, protocol and adaptation of the I/O parameters • Software for Checkbox CHB-C for the complete analysis of recognition processes	• For enabling tools on the compact vision system SBOC-Q/SBOI-Q	• Quick and easy creation of pneumatic circuit diagrams • Comprehensive library of pneumatic and electrical symbols • User-specific product databases and translation tables • Terminal plans, cable diagrams, cable lists, parts lists • Dimensioning function for preparing simple control cabinet and system layouts • Consistent equipment identification • Multi-level project tree
online: →	software	gslo	gswf-p5

Learning systems

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

Tools

	 **Clip fix tool** **AGTC**
Valve function	2/2-way, monostable, closed
Type of actuation	Mechanical
Operating pressure	2 ... 6 bar
Pneumatic connection 1	Female thread G1/4
Description	• Pneumatic mounting device for clips of various design • Material recommendation for polymer clip adapter: e. g. PBT, PE-UHMW or POM
online: ➔	agtc

Reservoirs

	 **Air pressure reservoirs** **VZS**	 **Air pressure reservoirs** **CRVZS**
Volume	20 l	0,1 l, 0,4 l, 0,75 l, 10 l, 2 l, 20 l, 5 l
Information on materials: air reservoir	Powder-coated steel	High-alloy stainless steel
Conforms to	EN 286-1	AD 2000
Condensate drain connection	G3/8	G3/8
Description	• 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 • With connection for condensate drain • Conforms to the requirements of Directive 2014/29/EC and EN 286-1 • Operating media compressed air, vacuum	• Corrosion resistant • Compensation of pressure fluctuations and as accumulators in the event of sudden air consumption • Provision of large volumes of compressed air for supplying fast pulsing drives • With port for condensate drain in some cases • See supplementary information on food-safe materials at www.festo.com/sp › Certificates • Designs to EU Pressure Equipment Directive EN 286-1 • Operating medium compressed air, vacuum
online: ➔	vzs	crvzs

Silencers

	 Silencers AMTE	 Silencers U	 Silencers AMTC	 Silencers UC
Information on materials: silencer insert	Bronze	PE, Bronze	PE	PE
Pneumatic connection	G1, G1/2, G1/4, G1/8, G3/4, G3/8, M3, M5, NPT1/2-14, NPT1/4-18, NPT1/8-27, NPT3/8-18, UNF10-32	G1, G1/2, G1/4, G1/8, G3/4, G3/8, NPT3/4-14, PK-3, PK-4	Cartridge 10	G1/4, G1/8, G3/8, M5, M7, QS-10, QS-3, QS-4, QS-6, QS-8
Noise level	55 ... 95 dB(A)	70 ... 85 dB(A)	58 dB(A)	58 ... 68 dB(A)
Quick ordering of selected basic designs	★	★		
Description	• Long or short design • Metal design • Operating medium: compressed air	• Compact design, polymer or die-cast • Barbed connector or threaded connection • Operating medium compressed air	• For valve terminal VTUB-12 • Attached via pin (spring clip, included in the scope of delivery of the valve) • Polymer version • Operating medium compressed air	• Threaded connection or push-in sleeve for push-in fitting QS • Polymer version • Operating medium compressed air
online: →	amte	u	amtc	uc

Silencers

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

Air guns

FESTO

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

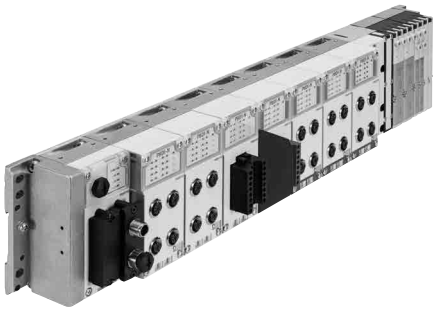
Pneumatic indicators

	 Pressure indicators OH	 Pneumatic terminals, end clamps, distributors LT, LTE, LTV
Design	Indicator plate with 16 pressure indicators, indicating pin with spring return, reflection principle	
Size	8, 10, 22	
Operating pressure	–1 ... 8 bar	0.1 ... 8 bar
Pneumatic connection	Barbed connector PK-3, G1/8	Barbed connector PK-3, PK-4
Description	• Visual indicator • Indicator colours: red, blue, yellow or green • Aluminium or polymer • Operating medium compressed air	• Pneumatic terminal for checking incoming and outgoing signals at the controller input and output • Up to 15 distributor pieces with common air supply, for easy connection • Brass, polymer • Operating medium compressed air
online: ➔	oh	lt

Inscription systems

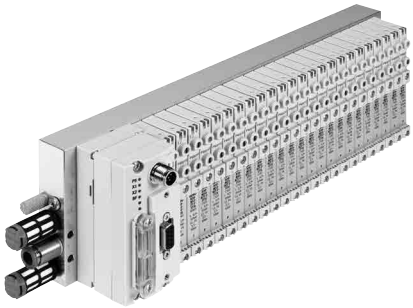
	 Inscription labels ASLR, BZ, HWF, IBS, KM, KMC, MH, SBS, SIEZ	 Inscription label holders ST, CPV10-VI-ST, CPV14-VI-ST, CPV18-VI-ST, CPVSC1-ST, CPX-ST, IBT, MN2H-BZT, MVH-BZ, VMPA1-ST
Type of mounting	Inscription label is pressed onto a cable, pressed into a holder or carrier, through-hole	Plug-on, snap-in, clip-on
Width	4.5 ... 11 mm	12 mm
Height	9 ... 20 mm	2 mm
Description	• For labelling items • Can be inserted in holders or carriers on suitably equipped components	• Holder for inscription labels • For components without pre-assembled carriers
online: ➔	aslr	ascf

Control technology and remote I/O



- Electronic controllers and remote I/Os including electrical peripherals for standard and potentially explosive atmospheres.
  → **www.festo.com/pa/control**

Valve terminals



- Valve modules with electrical multi-pin, individual, or fieldbus connections or integrated control, with or without electrical inputs and outputs
  → **www.festo.com/pa/valveterminals**

Pilot valves

FESTO

	 New **Solenoid valves VSNC**	 **Standards-based valves, NAMUR (VDI/VDE 3845) NVF3**	 **Solenoid valves VOFC**	 New **Solenoid valves VOFD**
Valve function	5/2-way double solenoid, 5/2 or 3/2-way convertible, 5/3-way pressurised, 5/3-way exhausted, 5/3-way closed	5/2 or 3/2-way single solenoid	3/2-way closed, single solenoid, 5/2-way double solenoid, 5/2-way single solenoid	3/2-way, closed, monostable, semi-automatic, 3/2-way, closed, monostable
Operating pressure	1.5 ... 10 bar	2 ... 10 bar	0 ... 8 bar	0 ... 12 bar
Ambient temperature	–20 ... 60 °C	–5 ... 40 °C	–25 ... 60 °C	–50 ... 60 °C
Pneumatic connection 1	G1/4, NPT1/4-18, QS-1/4, QS-10, QS-3/8, QS-5/16, QS-6, QS-8	G1/4		G1/4
Standard nominal flow rate	800 ... 1350 l/min	900 l/min	766 ... 2686 l/min	52 ... 1900 l/min
Explosion prevention and protection	II 2G, II 2D, For zone 1, 2, 21, 22, Ex t IIIC T80 °C Db, Ex ia IIC T6 Ga, EPL Db (IEC-EX), EPL Ga (IEC-EX)	II 2G, II 2D, EPL Db (RU), EPL Dc (RU), c T6, EPL Gb (RU), EPL Gc (RU), c 40 °C	For zone 1, 2, 21, 22	For zone 1, 2, 21, 22
New	• Additional versions			• Additional versions
Quick ordering of selected basic designs	★			
Description	• NAMUR interface • Rotatable seal for 3/2- or 5/2-way valve • Wide choice of EX solenoid systems • Sturdy and powerful • Extended temperature range • Outstanding value for money	• NAMUR interface • Variants for use in Ex zone I	• Suitable for process automation, for applications in the chemical and petrochemical industries • Suitable for outdoor use under harsh, dusty ambient conditions • Especially suitable for quarter turn actuators thanks to NAMUR flange pattern • Valve can switch between internal and external pilot air • Variants with TÜV approval up to SIL3 to IEC 61508	• Suitable for process automation, for applications in the chemical and petrochemical industries • Suitable for outdoor use under harsh, dusty ambient conditions • Especially suitable for quarter turn actuators thanks to NAMUR flange pattern • Variants with TÜV approval up to SIL4 to IEC 61508
online: →	**vsnc**	**namur**	**vofc**	**vofd**

Sensor boxes

	 New **Sensor boxes SRBG**	 New **Sensor boxes SRBC**	 New **Sensor boxes SRBE**
Information on materials: housing	PBT	Die cast aluminium	Die cast aluminium
Operating voltage range AC		0 ... 250 V	0 ... 250 V
Operating voltage range DC	6 ... 60 V	0 ... 175 V	0 ... 60 V
Measuring principle	Inductive	Inductive, magnetic reed, mechanical/ electrical, for proximity sensor	Inductive, magnetic reed, mechanical/ electrical, for proximity sensor
Switching element function	N/C contact, N/C contact or N/O contact, switchable, N/O contact	N/C contact, N/O contact, toggle switch, single-pole	N/C contact, N/O contact, toggle switch, single-pole, toggle switch, double-pole
New	• Additional versions	• New series	• New series
Quick ordering of selected basic designs		★	
Description	• Compact housing with M12 plug connection • Direct mounting on quarter turn actuators to VDI/VDE 3845 • AS-Interface® version with extended addressing options • Intrinsically safe version to ATEX and SIL 2 to IEC 61508	• Pre-assembled mounting adapter for ease of installation • Trip cams can be set easily without additional tools • Sturdy, corrosion-resistant design, ideal for use in harsh operating conditions • Clearly visible 3D position indicator allows rapid detection of the current position of the quarter turn actuator	• Trip cams can be set easily without additional tools • Sturdy, corrosion-resistant design, ideal for use in harsh operating conditions • Clearly visible 3D position indicator allows rapid detection of the current position of the quarter turn actuator
online: →	**srbg**	**srbc**	**srbe**

Sensor boxes

	 **Limit switch attachments SRAP**	 **Limit switch attachments DAPZ**
Information on materials: housing	Wrought aluminium alloy	
Operating voltage range AC		4 ... 250 V
Operating voltage range DC	15 ... 30 V	4 ... 250 V
Measuring principle	Magnetic Hall	Inductive, mechanical/electrical
Switching element function		N/C contact, N/O contact, changeover switch
Description	• Based on standard VDI/VDE 3845 (NAMUR) • Analogue • For monitoring the position of quarter turn actuators • Sensors based on 2D Hall technology	• Square or round design • Drive interface to standard VDI/VDE 3845 (NAMUR) • With pneumatic, electric or inductive sensing
online: →	**srap**	**dapz**

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Positioners

FESTO

	 New **Positioners** **CMSX**
Standard nominal flow rate	50 ... 130 l/min
Ambient temperature	–5 ... 60 °C
Setpoint value	0–10, 0–20 mA, 4–20 mA
Operating pressure	3 ... 8 bar
Safety note	Adjustable, holding, opening, closing
Operating voltage range DC	21.6 ... 26.4 V
New	• Additional versions
Quick ordering of selected basic designs	★
Description	• For controlling the position of double-acting pneumatic quarter turn actuators in process automation systems • Simple and efficient position control based on the PID control algorithm • Suitable for quarter turn actuators with a swivel angle of approx. 90° and a mechanical interface to VDI/VDE Directive 3845 • Power supply 24 V DC
online: →	**cmsx**

Linear actuators

	 **Linear actuators Copac** **DLP**	 **Linear actuators with displacement encoder** **DFPI**	 New **Linear actuators with displacement encoder** **DFPI-NB3P**
Piston diameter	80 mm, 100 mm, 125 mm, 160 mm, 200 mm, 250 mm, 320 mm	100 mm, 125 mm, 160 mm, 200 mm, 250 mm, 320 mm	100 mm, 125 mm, 160 mm, 200 mm, 250 mm, 320 mm
Stroke	40 ... 600 mm	40 ... 990 mm	40 ... 990 mm
Theoretical force at 6 bar, advancing	3016 ... 48255 N	4712 ... 48255 N	4712 ... 48255 N
Position sensing	Via proximity sensor	With integrated displacement encoder	With integrated displacement encoder
New			• Additional versions to ISO 15552
Description	• NAMUR port pattern for solenoid valves to VDI/VDE 3845 • Integrated air supply • Connection for process valves to DIN 3358	• Closed-loop controlled actuator for all linear process valves • Optionally with integrated positioner and valve block • Position feedback via analogue 4 ... 20 mA signal for simple diagnostics • Easy integration into existing control architecture • Sturdy and compact housing for use outdoors • Connection for process valves to DIN 3358	• Standards-based linear actuators to ISO 15552 • Easy connection to external positioners • Ideal for use in harsh ambient conditions • IP65, IP67, IP69K, NEMA4 • ATEX 2GD certification
online: →	**dlp**	**dfpi**	**dfpi**

Quarter turn actuators

	 New **Quarter turn actuators** **DFPD**	 **Quarter turn actuators** **DAPS**
Design	Rack and pinion	Scotch yoke system
Mode of operation	Double-acting, single-acting	Double-acting, single-acting
Size of valve actuator	10, 20, 40, 80, 120, 160, 240, 300, 480	0008, 0015, 0030, 0053, 0060, 0090, 0106, 0120, 0180, 0240, 0360, 0480, 0720, 0960, 1440, 1920, 2880, 3840, 4000, 5760, 8000
Flange hole pattern	F03, F04, F05, F0507, F0710, F1012	F03, F04, F05, F07, F10, F12, F14, F16, F25
Operating pressure	2 ... 8 bar	1 ... 8.4 bar
Ambient temperature	–50 ... 150 °C	–50 ... 150 °C
New	• New series	
Quick ordering of selected basic designs	★	
Description	• NAMUR port pattern for solenoid valves to VDI/VDE 3845 • Flange hole pattern to ISO 5211 • Uniform torque characteristic across the entire rotation angle range of 90° • Mounting hole pattern to VDI/VDE 3845 • Increased corrosion protection	• High break-away torques • Approved in accordance with Directive 2014/34/EU (ATEX) • Flange hole pattern to ISO 5211 • Mounting hole pattern to VDI/VDE 3845 • Available with handwheel as a manual emergency override • Corrosion-resistant variant made from stainless steel
online: →	**dfpd**	**daps**

Ball valves and ball valve units

	 **Ball valves** **VAPB**	 **Ball valves** **VZBC**	 **Ball valve actuator units** **VZBC**
Design	2-way ball valve	2-way ball valve	2-way ball valve, quarter turn actuator
Type of actuation	Mechanical	Mechanical	Pneumatic
Nominal width DN	15 mm, 20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm	15 mm, 20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 65 mm, 80 mm, 100 mm	15 mm, 20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 65 mm, 80 mm, 100 mm
Process valve connection	Rp1, Rp1 1/2, Rp1 1/4, Rp1/2, Rp1/4, Rp2, Rp2 1/2, Rp3/4, Rp3/8	Ring housing with threaded flange	Ring housing with threaded flange
Flow rate Kv	5.9 ... 535 m³/h	19.4 ... 1414 m³/h	19.4 ... 1414 m³/h
Temperature of medium	–20 ... 150 °C	–10 ... 200 °C	–10 ... 200 °C
Description	• Automatable 2-way ball valve • Brass design • Blow-out proof shaft • Manual operation possible using hand lever • Connecting thread to DIN 2999 or DIN ISO 228-1 • Mounting flange to ISO 5211	• Automatable 2-way ball valve with compact flange • Stainless steel design • Short installed length • Blow-out proof shaft • Manual operation possible using hand lever • Connecting thread to DIN 2999 or DIN ISO 228-1 • Mounting flange to ISO 5211 • ATEX certification for zone 1, 21, 2, 22	• Ball valve actuator unit with double- or single-acting quarter turn actuator • Stainless steel ball valve in compact design • NAMUR port pattern for solenoid valves/sensor boxes to VDI/VDE 3845 • Flow is fully opened or closed in both directions • ATEX certification for zone 1, 21, 2, 22
online: →	**vapb**	**vzbc**	**vzbc**

Ball valves and ball valve units

FESTO

	 **Ball valves VZBA**	 **Ball valve actuator units VZBA**	 **Ball valve actuator units VZPR**
Design	2-way ball valve, 3-way ball valve, L-shaped hole, T-shaped hole	2-way ball valve, 3-way ball valve, L-shaped hole, quarter turn actuator, T-shaped hole	2-way ball valve, quarter turn actuator
Type of actuation	Mechanical	Pneumatic	Electric, pneumatic
Nominal width DN	8 mm, 10 mm, 15 mm, 20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 65 mm, 80 mm, 100 mm	8 mm, 10 mm, 15 mm, 20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 65 mm, 80 mm, 100 mm	15 mm, 20 mm, 25 mm, 32 mm, 40 mm, 50 mm, 63 mm
Process valve connection	Rp1, Rp1 1/2, Rp1 1/4, Rp1/2, Rp1/4, Rp2, Rp2 1/2, Rp3, Rp3/4, Rp3/8, Rp4, Weld-on ends/weld-on ends	Rp1, Rp1 1/2, Rp1 1/4, Rp1/2, Rp1/4, Rp2, Rp2 1/2, Rp3, Rp3/4, Rp3/8, Rp4, Weld-on ends/weld-on ends	Rp1, Rp1 1/2, Rp1 1/4, Rp1/2, Rp1/4, Rp2, Rp2 1/2, Rp3/4, Rp3/8
Flow rate Kv	7 ... 1414 m^3/h	7 ... 1414 m^3/h	
Temperature of medium	–10 ... 200 °C	–10 ... 200 °C	–20 ... 150 °C
Description	• Automatable 2-way or 3-way ball valve • Stainless steel design • Blow-out proof shaft • Manual operation possible using hand lever • Connecting thread to DIN 2999 or DIN ISO 228-1 • Mounting flange to ISO 5211 • ATEX certification for zone 1, 21, 2, 22	• Ball valve actuator unit with double- or single-acting quarter turn actuator • Stainless steel ball valve • NAMUR port pattern for solenoid valves/sensor boxes to VDI/VDE 3845 • Flow is fully opened or closed in both directions • ATEX certification for zone 1, 21, 2, 22	• Ball valve actuator unit with double-acting quarter turn actuator • Brass ball valve • NAMUR port pattern for solenoid valves/sensor boxes to VDI/VDE 3845 • Flow is fully opened or closed in both directions
online: ➔	vzba	vzba	vzpr

Angle seat valves

	 **Angle seat valves VZXF**
Design	Poppet valve with spring return
Type of actuation	Pneumatic
Nominal width DN	15 mm, 20 mm, 25 mm, 32 mm, 40 mm, 50 mm
Nominal width	12 ... 45 mm
Process valve connection	G1, G1 1/2, G1 1/4, G1/2, G2, G3/4, NPT1, NPT1 1/2, NPT1 1/4, NPT1/2, NPT2, NPT3/4
Flow rate Kv	3.3 ... 43 m^3/h
Operating pressure	–0.9 ... 40 bar
Temperature of medium	–40 ... 200 °C
Quick ordering of selected basic designs	★
Description	• Sturdy design • Stainless steel and gunmetal process valves with stainless steel, brass or aluminium actuators • For operating pressures up to 40 bar • Safety position “closing” • Different actuator sizes and housing materials • Selection of different seat and shaft seals • Flow direction is freely selectable • For liquids, gases and other easily contaminated media • Easy-to-clean design
online: ➔	vzxf

Solenoid-actuated media valves

			
	Solenoid valves VZWD	**Solenoid valves VZWM**	**Solenoid valves MN1H**
Design	Directly actuated poppet valve	Poppet valve with diaphragm seal	Diaphragm valve
Type of actuation	Electric	Electric	Electric
Nominal width	1 ... 6 mm	13 ... 50 mm	13 ... 40 mm
Process valve connection	G1/4, G1/8, NPT1/4, NPT1/8	G1, G1 1/2, G1 1/4, G1/2, G1/4, G2, G3/4, G3/8	G1, G1 1/2, G1/2, G1/4, G3/4, G3/8
Flow rate Kv	0.06 ... 430 l/min	1.6 ... 31000 l/min	2000 ... 30500 l/min
Operating pressure	0 ... 90 bar	0.5 ... 10 bar	0.5 ... 10 bar
Temperature of medium	–10 ... 80 °C	–10 ... 60 °C	–10 ... 60 °C
Quick ordering of selected basic designs	★	★	
Description	• Extensive pressure range • Directly actuated poppet valve • No pressure difference required • Can also be used in vacuum technology	• Poppet valve with diaphragm seal • Brass or stainless steel casting design • Electrical connection via solenoid armature tube • Wide range of coils • Coil can be ordered separately	• Piloted diaphragm valve • Brass design • Can only be used for gaseous media • Adjustable closing cushioning, in-line mounting or through-hole
online: ➔	vzwd	vzwm	mn1h-2

Solenoid-actuated media valves

			
	Solenoid valves VZWP	**Solenoid valves VZWF**	**Reverse jet pulse valves VZWE-E, VZWE-F**
Design	Piloted piston poppet valve	Diaphragm valve, force pilot operated	Angled version, straight version with flange, diaphragm valve
Type of actuation	Electric	Electric	Electric
Nominal width	13 ... 25 mm	13.5 ... 50 mm	20 ... 76 mm
Process valve connection	G1, G1/2, G1/4, G3/4, G3/8, NPT1, NPT1/2, NPT1/4, NPT3/4, NPT3/8	G1, G1 1/2, G1 1/4, G1/2, G1/4, G2, G3/4, G3/8, NPT1, NPT1 1/2, NPT1 1/4, NPT1/2, NPT1/4, NPT2, NPT3/4, NPT3/8	Flange diameter 60, 75, 89, G1, G1 1/2, G2, G2 1/2, G3/4
Flow rate Kv	1.5 ... 12250 l/min	1.8 ... 29900 l/min	15 ... 210 m^3/h
Operating pressure	0.5 ... 40 bar	0 ... 10 bar	0.35 ... 8 bar
Temperature of medium	–10 ... 80 °C	–10 ... 80 °C	–20 ... 60 °C
Quick ordering of selected basic designs		★	
Description	• For all applications with a differential pressure of min. 0.5 bar • For high pressures and high flow rates with relatively small solenoids • For controlling gaseous and liquid media in open circuits	• High flow rates • Large nominal diameters with relatively small solenoids • No pressure difference required • Can also be used in vacuum technology	• High flow rates • For mechanically cleaning filters and dust filter systems • Fast opening and closing times • Sturdy pilot system
online: ➔	vzwp	vzwf	vzwe

Pneumatically actuated media valves

	 New **Pinch valves** **VZQA**	 **Pneumatic valves** **VLX**
Design	Pneumatically actuated pinch valve	Diaphragm valve
Valve function	2/2-way closed, monostable, 2/2-way open, monostable	2/2-way, closed, monostable
Type of control	Pneumatic	Pneumatic
Nominal width DN	6 mm, 15 mm, 25 mm	
Nominal width		13 ... 25 mm
Process valve connection	G1, G1/2, G1/4, NPT1/2, NPT1/4, Clamp to ASME-BPE type A, clamp to ASME-BPE type B, clamp to DIN 32676 series A	G1, G1/2, G1/4, G3/4, G3/8
Flow rate Kv	0.7 ... 18 m^3/h	2400 ... 14000 l/min
Operating pressure	0 ... 6 bar	1 ... 10 bar
Temperature of medium	–5 ... 100 °C	–10 ... 80 °C
New	• Additional connection size • Modular, interchangeable component parts	
Description	• Modular design • Quick and easy replacement of the diaphragm • Selection of different materials for housing and connector caps • Different connection cap designs (G and NPT thread, clamp ferrule to DIN 32676 and ASME-BPE) • For critical, abrasive and viscous media • Up to 2 million switching cycles • FDA-compliant materials • Easy-to-clean design • Flow direction is freely selectable	• Poppet valve • Indirectly actuated • Brass design • In-line mounting or via through-holes
online: →	**vzqa**	**vlx**

Air preparation

- Service unit combinations and individual units for compressed air preparation in two series: MS and D (in metal or polymer)
  → **www.festo.com/pa/airprep**

Pneumatic connection technology

- Piping
- Tubing
- Plug connectors
- Couplings
- Distributors
- Protective tubing systems
- Accessories
  → **www.festo.com/pa/fittings**

Control cabinets

Type	 Factory automation	 Process automation	 Control cabinets for control systems
Technical data	• Simple to complex control cabinet designs • Application-specific combination of components • Fully tested, with test certificate • Ready-to-install • Complete documentation • Design conforms to: – EN 60204-1 – ATEX zone 1 and 21 (pneumatic only), ATEX zone 2 and 22 (electric and electropneumatic) – UL-508 A • Implementation of safety functions • Different bus technologies	• Simple to complex control cabinet designs • Application-specific combination of components • Different operating voltages • Fully tested, with test certificate • Ready-to-install • Complete documentation • Design conforms to: – EN 60204-1 – ATEX zone 1 and 21 (pneumatic only), ATEX zone 2 and 22 (electric and electropneumatic) – UL-508 A • Implementation of safety functions • Wide range of bus technologies • Compliance with special cleanliness and hygiene requirements • Special materials • Protected against the ingress of liquids and foreign matter • Heating or cooling elements • Intrinsically safe valve terminal technology • Hot swap inspection window	• Simple to complex control cabinet designs • 1 ... 31 axes • Application-specific combination of components • Use of the latest innovations and technologies • Fully tested, with test certificate • Ready-to-install • Complete documentation • Design conforms to: – EN 60204-1 – ATEX zone 1 and 21 (pneumatic only), ATEX zone 2 and 22 (electric and electropneumatic) – UL-508 A • Implementation of safety functions • Wide range of bus technologies
Description	• Control cabinets made to measure • Pneumatic, electric, combined • Individually configured • Adapted to requirements in industrial automation • Design and sizing included	• Control cabinets made to measure • Pneumatic, electric, combined • Individually configured • Adapted to requirements in process automation • Design and sizing included	• Made-to-measure control cabinets for handling systems • Software package for third-party devices included • Individually configurable • Adapted to requirements for handling solutions ➔ “Cartesian systems” on page 67
online: ➔	**ready-to-install**	**ready-to-install**	**ready-to-install**

Mounting plates and assemblies

FESTO

Type	 Mounting plates	 Assemblies
Technical data	• Customised support plate shape • Support plate available in different materials • Application-specific combination of components • Fully assembled, connected and wired • Defined interfaces • Ready-to-install • Fully tested, with test certificate • Complete documentation • Design conforms to: – EN 60204-1 – ATEX zone 1 and 21 (pneumatic only), ATEX zone 2 and 22 (electric and electropneumatic) – UL-508 A • Implementation of safety functions	• Combination of various pneumatic and/or electric components to create a single unit • Application-specific combination of components • Accessories mounted on sub-assembly • Use of the latest innovations and technologies • Ready-to-install • Fully tested, with test certificate • Complete documentation • Design conforms to: – EN 60204-1 – ATEX zone 1 and 21 (pneumatic only), ATEX zone 2 and 22 (electric and electropneumatic) – UL-508 A • Implementation of safety functions
Description	• Machine-specific pre-assembly of pneumatic and electric components on support plate • Tubing and wiring included • Defined interfaces for simple installation directly in the system	• Pneumatic and electric components pre-assembled to create a function unit • Can be combined from around 30000 catalogue components • Connections included • For integration in machines
online: →	**ready-to-install**	**ready-to-install**

Integration solutions

FESTO

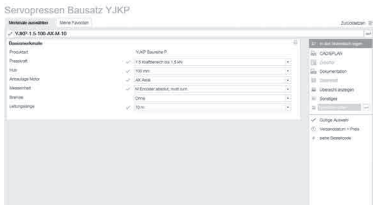
Type	 Manifold duct plates	 Cartridge solutions	 Sheet-metal constructions and special housings	 Function blocks
Technical data	• Freely selectable manifold duct plate shape • Combination of over 30000 catalogue components • High density of components • No tubing • Variable positioning of mechanical, pneumatic and electrical interfaces • Integration of customised components • Available with protective cover • Fully tested • Ready-to-install • Complete documentation • Implementation of safety functions	• Space-saving thanks to extremely compact design • Pneumatic functions integrated in a single compact housing • Housing in different materials • No tubing required • Minimal cabling required • Significant design freedom • Variable integration options on and within the machine • Sturdy design • Fully tested • Ready-to-install • Complete documentation	• Sheet-metal structures – Customised shape and size – Reduced weight and number of assembly parts • Special housing – Customised shape – Customised dimensions – Various materials – Compact, space-optimised format – Protection against environmental influences and unauthorised access • In combination – Alternative to conventional control cabinets – Variable integration options on and within the machine – Short tubing and cable lengths – Attractive design	• No tubing required thanks to drilled ducts • Housing available in different materials • Customised design of the pneumatic interfaces for the system • Ideal for a small number of components and variable connection options • Extremely economical, even for small quantities
Description	• Ideal for a large number of pneumatic connections in an extremely compact space • No tubing • Compact • Easy to service • Immune to malfunction	• Integration of various pneumatic functions in one component • No need for single housings • Ideal for applications that require a highly compact design	• Reduced weight thanks to optimal use of materials with sheet-metal constructions • Protection against environmental influences and unauthorised access • Ideally combined as a control cabinet directly in the system	• Compressed air supply for pneumatic components via drilled ducts • Ideal for a small number of pneumatic components and variable connection options • Compact and easy to service
online: →	ready-to-install	ready-to-install	ready-to-install	ready-to-install

Integration solutions

Type	 Profile solutions
Technical data	• Profiles in customised cross sections and lengths • Integrated ducts for straight-line routing of the compressed air • Common air supply for multiple valves or valve terminals via a single duct • Combination of exhaust air and supply air without tubing, even over long distances • Supply of compressed air at different locations • No tubing required • Significantly reduced cabling • Modular, easy to realise construction • Optional: profile as mechanical mounting element for other components or as a supporting part of the machine frame
Description	• Extruded profiles in combination with valves as a valve terminal • For the distribution of compressed air in the machine concept • Customised profile cross sections available
online: →	ready-to-install

Software tool

FESTO

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.

Function-specific systems

	 New **Servo press kits** **YJKP**
Working stroke	100 ... 400 mm
Press force	0 ... 17 kN
Feed speed	0 ... 250 mm/s
Accuracy in ± % FS	0.5 %FS
Protocol	Modbus® TCP, EtherNet/IP, TCP/IP
New	• New series
description	• Modular system kit comprising operating software GSAY, electric cylinder with spindle drive ESBF, motor EMMS-AS, motor controller CMMP-AS, force sensor and controller CECC-X together with the required accessories • Less expensive than conventional press-fitting systems • Pre-installed operating software GSAY offers precisely the required application-specific functions • Commissioning made easy: parameterisation instead of programming • For top quality: real-time monitoring of the press-fitting operation and clear visualisation of the force/displacement curves • Fit for Industry 4.0 thanks to the OPC UA interface at the controller
online: →	yjkp