13 Compressed air preparation

- Service units for preparing compressed air, consisting of different combinations of units in two series
- Filter regulators: space-saving design with filter and regulator integrated in a single unit
- Filters for purifying the compressed air for various quality classes
- Pressure regulators for air preparation
- Lubricators for improving the compressed air as lubricant for pneumatic components
- On-off valves for switching on and exhausting systems
- Soft-start valves for gradual pressure build-up
- Adsorption dryers with a defined pressure dew point
- Branching modules and distributor blocks

MSB★

Service unit combinations, MS series

+ Combinations of filter regulator, filter, lubricator, on-off valve and soft-start valve
+ Sizes 4, 6

➔ page 1293

MS-LR★

Pressure regulators, MS series

+ Sizes 4, 6, 9, 12
+ Flow rate 1000 ... 22,000 l/min
+ Pressure gauge with bar, psi, MPa

➔ page 1321

MS-EE★

Solenoid actuated on-off valves, MS series

+ Sizes 4, 6, 9, 12
+ Flow rate 1000 ... 32,000 l/min
+ 24 V DC, 110, 230 V AC
+ Solenoid actuated 3/2-way valve, normally closed

➔ page 1371

MS-FRM★

Branching modules, MS series

+ Sizes 4, 6, 9, 12
+ Flow rate 1200 ... 42,000 l/min

➔ page 1387

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Software tool

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 • on the Internet at www.festo.com/catalogue by clicking on the blue "Engineering" button • 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 relevant 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

Type	 **Service unit combinations** **MSB4, MSB6,** MSB9 ★	 **Service unit combinations** **MSE6**
Pneumatic connection 1	G1, G1 1/2, G1 1/4, G1/2, G1/4, G1/8, G3/4	G1/2
Standard nominal flow rate	750 ... 18,000 l/min	4500 l/min
Pressure regulation range	0.5 ... 16 bar	
Flow measuring range		50 ... 5000 l/min
Operating pressure	0 ... 20 bar	4 ... 10 bar
Grade of filtration	0.01 ... 40 µm	
Fieldbus interface		Sub-D socket, 9-pin; 2x M12x1 socket, 4-pin, D-coded; 2x RJ45 push-pull socket, AIDA; 2x SCRJ push-pull socket, AIDA
Description	• Combination of filter regulator MS-LFR, lubricator MS-LOE, on-off valve MS-EM, MS-EE, soft-start valve MS-DL, branching module MS-FRM • Sizes: 4, 6, 9	• 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
➔ Page/online	**1293,** msb9	mse6

Service unit combinations: D series, polymer

Type	Service unit combinations FRC-K	Service unit combinations 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
➔ Page/online	frc	lfr

Filter regulators/lubricators: MS series

Type	**Service unit combinations MSB4-FRC, MSB6-FRC** ★
Pneumatic connection 1	G1/8, G1/4, G3/8, G1/2
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
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
➔ Page/online	**1305**

Filter regulators/lubricators: D series, polymer

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

Product overview

Filter regulators: MS series

Type	Filter regulators MS4-LFR, MS6-LFR, MS9-LFR, MS12-LFR ★
Pneumatic connection 1	G1/8, G1/4, G3/8, G1/2, internal
Standard nominal flow rate	850 ... 24,000 l/min
Pressure regulation range	0.3 ... 16 bar
Operating pressure	0.8 ... 20 bar
Grade of filtration	5 ... 40 µm
Description	• MS4-LFR, MS6-LFR: directly actuated diaphragm regulator, MS9-LFR: piloted or directly actuated filter-diaphragm regulator, MS12-LFR: piloted diaphragm regulator without internal air consumption • Good regulation characteristics with primary pressure compensation and minimal hysteresis • Good particle and condensate separation • With or without secondary exhausting • High flow rate • Lockable rotary knob • Return flow option for exhausting from output 2 to input 1 already integrated • Sizes: 4, 6, 9, 12
→ Page/online	1309, ms12-lfr

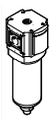
Filter regulators: D series, polymer

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

Filters: MS series

Type	Filters MS4-LF, MS6-LF, MS9-LF, MS12-LF	Fine filters MS4-LFM-B, MS6-LFM-B, MS9-LFM-B, MS12-LFM-B	Micro filters MS4-LFM-A, MS6-LFM-A, MS9-LFM-A, MS12-LFM-A	Activated carbon filters MS4-LFX, MS6-LFX, MS9-LFX, MS12-LFX
Pneumatic connection 1	G1/8, G1/4, G3/8, G1/2, internal	G1/8, G1/4, G3/8, G1/2, G3/4, G1, manifold module	G1/8, G1/4, G3/8, G1/2, G3/4, G1, manifold module	G1/2, G1/4, G1/8, G3/8
Standard nominal flow rate	1000 ... 16,000 l/min	54 ... 23,300 l/min	54 ... 23,300 l/min	360 ... 7090 l/min
Operating pressure	0 ... 20 bar	0 ... 20 bar	0 ... 20 bar	0 ... 20 bar
Grade of filtration	5 ... 40 µm	1 µm	0.01 µm	
Description	• Good particle and condensate separation • High flow rate with minimal pressure drop • Optionally with manual, semi-automatic, fully automatic or fully automatic, electrically actuated condensate drain • Sizes: 4, 6, 9, 12	• High-efficiency filter for exceptionally clean compressed air • Removal of oil aerosols from compressed air • Optionally with differential pressure indicator for indication of contamination • Optionally with electronic filter pollution indicator • Sizes: 4, 6, 9, 12	• High-efficiency filter for exceptionally clean compressed air • Removal of oil aerosols from compressed air • Optionally with differential pressure indicator for indication of contamination • Optionally with electronic filter pollution indicator • 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 • Elimination of odours and vapours • Residual oil content ≤ 0.003 mg/m³ • Sizes: 4, 6, 9, 12
→ Page/online	ms4-lf	ms4-lfm-b	ms4-lfm-a	ms4-lfx

Filters: individual devices

Type	 Micro filters PFML	Filter silencers LFU
Size	90 mm, 186 mm	G1/4, G3/8
Grade of filtration	0.01 µm	1 µm
Operating pressure	0 ... 50 bar	0 ... 16 bar
Flow rate with respect to atmosphere	3406 ... 138,233 l/min	4000 ... 12,500 l/min
Noise reduction		Reduction by 40 dB
Description	• For high-pressure applications • For use with food see www.festo.com/sp/pfml › tab "Certificates"	• Removes up to 99.99% of oil and other contaminants from exhaust air • Manual rotary condensate drain • Reduced exhaust noise regardless of frequency
➔ Page/online	pfml	lfu

Regulators: MS series

Type	**Pressure regulators MS4-LR, MS6-LR, MS9-LR** ★	Pressure regulators MS12-LR	**Pressure regulators MS4-LRB, MS6-LRB**
Pneumatic connection 1	G1/8, G1/4, G3/8, G1/2	Connecting plate	G1/4, G1/2
Standard nominal flow rate	1000 ... 26,000 l/min	12000 ... 22,000 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
Description	• High flow rate with minimal pressure drop • Good regulation characteristics with minimal hysteresis and primary pressure compensation • Available with or without secondary exhausting • Lockable rotary knob • Optional pressure sensor and rotary knob pressure gauge • Sizes: 4, 6, 9	• High flow rate with minimal pressure drop • Good regulation characteristics with minimal hysteresis and primary pressure compensation • With secondary exhausting • Lockable rotary knob • MS12-LR-...-PO: pneumatically actuated (pressure range determined by means of 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 hysteresis and primary pressure compensation • Lockable rotary knob • With and without secondary exhausting • Integrated return flow option for exhausting from output 2 to input 1 • Optional pressure sensor and rotary knob pressure gauge • Sizes: 4, 6
➔ Page/online	**1321**	ms12-lr	**1333**

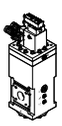
Regulators: MS series

Type	Precision pressure regulators MS6-LRP, MS6-LRPB	Electrical pressure regulators MS6-LRE
Pneumatic connection 1	G1/4, G3/8, G1/2	G1/4, G3/8, G1/2
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 hysteresis and primary pressure compensation • High secondary exhausting • Lockable rotary knob • Optionally 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 • Optionally with operator unit with display • Optional pressure sensor • With or without secondary exhausting • Size: 6
→ Page/online	1341	ms6-lre

Regulators: D series, polymer

Type	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	• Set values are secured by the detent on the rotary knob • Optionally with pressure gauge • Size: mini	• Regulator manifold with through air supply for pressure ranges that can be adjusted independently of another • Set values are secured by the detent on the rotary knob • Without pressure gauge • Size: mini
→ Page/online	lr-db	lrb-db

Regulators: individual devices

Type	Precision pressure regulators LRP, LRPS ★	 Electrical pressure regulators PREL
Pneumatic connection 1	G1/8, G1/4, for connecting plate Ø 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
Description	• Lockable design • Good regulation characteristics with minimal hysteresis and primary pressure compensation • High secondary exhausting	• For high-pressure applications • For use with food see www.festo.com/sp/prel › tab "Certificates" • Size: 186 mm
→ Page/online	1411	prel

Lubricators: MS series

Type	Lubricators MS4-LOE, MS6-LOE, MS9-LOE, MS12-LOE
Pneumatic connection 1	G1/4, G1/8, G3/8, G1/2, internal
Standard nominal flow rate	1100 ... 27,000 l/min
Operating pressure	1 ... 16 bar
Minimum flow rate for lubricator function	40 ... 400 l/min
Description	• Proportional lubricator with precision oil metering • Quick and easy top-up even under pressure • Oil capacity 30 ... 1500 cm³ • Sizes: 4, 6, 9, 12
➔ Page/online	ms4-loe

On-off and soft-start valves: MS series

Type	Soft-start/quick exhaust valves MS6-SV-E, MS6-SV-D	Soft-start/quick exhaust valves MS6-SV-C, MS9-SV-C ★	On-off valves MS4-EM1, MS6-EM1, MS9-EM, MS12-EM ★
Pneumatic connection 1	G1/2	G1/2	Manifold module, G1/8, G1/4, G3/8, G1/2
Standard nominal flow rate	4300 l/min	5700 ... 16,550 l/min	1200 ... 32,000 l/min
Operating pressure	3.5 ... 10 bar	3 ... 16 bar	0 ... 20 bar
Type of actuation	Electric	Electric	Manual
Description	• Reliable 2-channel exhausting with self-monitoring up to Performance Level e and category 4 to EN ISO 13849-1 • SIL 3 • For reducing pressure quickly and reliably and for building up pressure gradually • Adjustable pressure build-up time • Optionally 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 exhausting pneumatic systems • 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
➔ Page/online	ms6-sv-e, 1349	1349	1363

Product overview

On-off and soft-start valves: MS series

Type	**On-off valves MS4-EE, MS6-EE, MS9-EE, MS12-EE** ★	**Soft-start valves MS4-DL, MS6-DL, MS12-DL** ★	**Soft-start valves MS4-DE, MS6-DE, MS12-DE**
Pneumatic connection 1	Manifold module, G1/8, G1/4, G3/8, G1/2	Manifold module, G1/8, G1/4, G3/8, G1/2	Manifold module, G1/8, G1/4, G3/8, G1/2
Standard nominal flow rate	1000 ... 32,000 l/min	1000 ... 42,000 l/min	1000 ... 42,000 l/min
Operating pressure	3 ... 18 bar	2 ... 20 bar	3 ... 18 bar
Type of actuation	Electric	Pneumatic	Electric
Description	• Electrical 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	• 2/2-way valve for slowly pressurising pneumatic systems (for use with on-off valves EM1 and EE) • For building up pressure gradually • Adjustable pressure build-up time • Sizes: 4, 6, 12	• 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
➔ Page/online	**1371**	**1381**	**ms4-de**

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

Type	**On-off valves HE-DB**
Pneumatic connection 1	G1/4
Standard nominal flow rate	2300 l/min
Operating pressure	0 ... 10 bar
Type of actuation	Manual
Description	• 3/2-way manual on-off valve • The switching position is recognisable • Commercially available padlock for security
➔ Page/online	**he-db**

On-off and soft-start valves: individual devices

Type	**On-off valves PVEL**	**Shut-off valves HE-LO**
Pneumatic connection 1	SAE flange	G3/8, G1/2, G3/4, G1
Standard nominal flow rate		5200 ... 10,000 l/min
Operating pressure	0 ... 50 bar	1 ... 10 bar
Nominal size DN		54
Type of actuation	Manual, pneumatic	Manual
Description	• For use with food see www.festo.com/sp/pvel › tab "Certificates" • For high-pressure applications • Size: 124 mm	• For shutting off the compressed air supply whilst simultaneously exhausting systems powered by compressed air • Can be locked in the closed position • Screwed into piping, through-holes for wall mounting • To OSHA 29 CFR 147
➔ Page/online	**pvel**	**he-lo**

Air dryers: MS series

Type	 Membrane air dryers MS4-LDM1, MS6-LDM1
Pneumatic connection 1	G1/4, G1/2
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
→ Page/online	ms4-ldm1

Air dryers: individual devices

Type	 Adsorption dryers PDAD
Pneumatic connection 1	G3/8, G1/2
Input 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
→ Page/online	pdad

Compressed air distributors: MS series

Type	 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, manifold module	G1/4, G1/2
Standard nominal flow rate in main flow direction 1->2	1200 ... 50,000 l/min	4050 ... 14,600 l/min
Operating pressure	0 ... 20 bar	0 ... 20 bar
Description	• Optionally with integrated non-return function and pressure switch • Outlet at top and bottom • Can be used as an intermediate distributor for varying air qualities • Optionally with pressure sensor • 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
→ Page/online	1387	1395

Compressed air distributors: individual devices

Type	 Branching modules PMBL
Pneumatic connection 3	G1
Pneumatic connection 3	G1
Operating pressure	0 ... 50 bar
Description	• For high-pressure applications • For use with food see www.festo.com/sp/pmbl › tab "Certificates" • Sizes: 90 mm, 186 mm
➔ Page/online	pmbl

Condensate drain

Type	 Water separators MS6-LWS, MS9-LWS, MS12-LWS	 Condensate drain PWEA	 Condensate drain WA
Pneumatic connection		G1/2	M9
Pneumatic connection 1	G1/4, G3/8, G1/2		
Operating pressure	0.8 ... 16 bar	0.8 ... 16 bar	1.5 ... 16 bar
Description	• Replacement of filter cartridges not required • Constantly high condensate separation (99%) up to the maximum flow rate • Optionally 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 higher-order 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
➔ Page/online	1399	pwea	wa

Pressure boosters

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

Pressure indicators

Type	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	0 ... 16 bar	0 ... 25 bar	0 ... 16 bar	0 ... 16 bar
Pneumatic connection	Cartridge 10 mm, R1/8	G1/8, G1/4, M5, QS-4, QS-6, QS-8, R1/8, R1/4	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, available 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
➔ Page/online	pagn	ma	fma	fmap

Pressure indicators

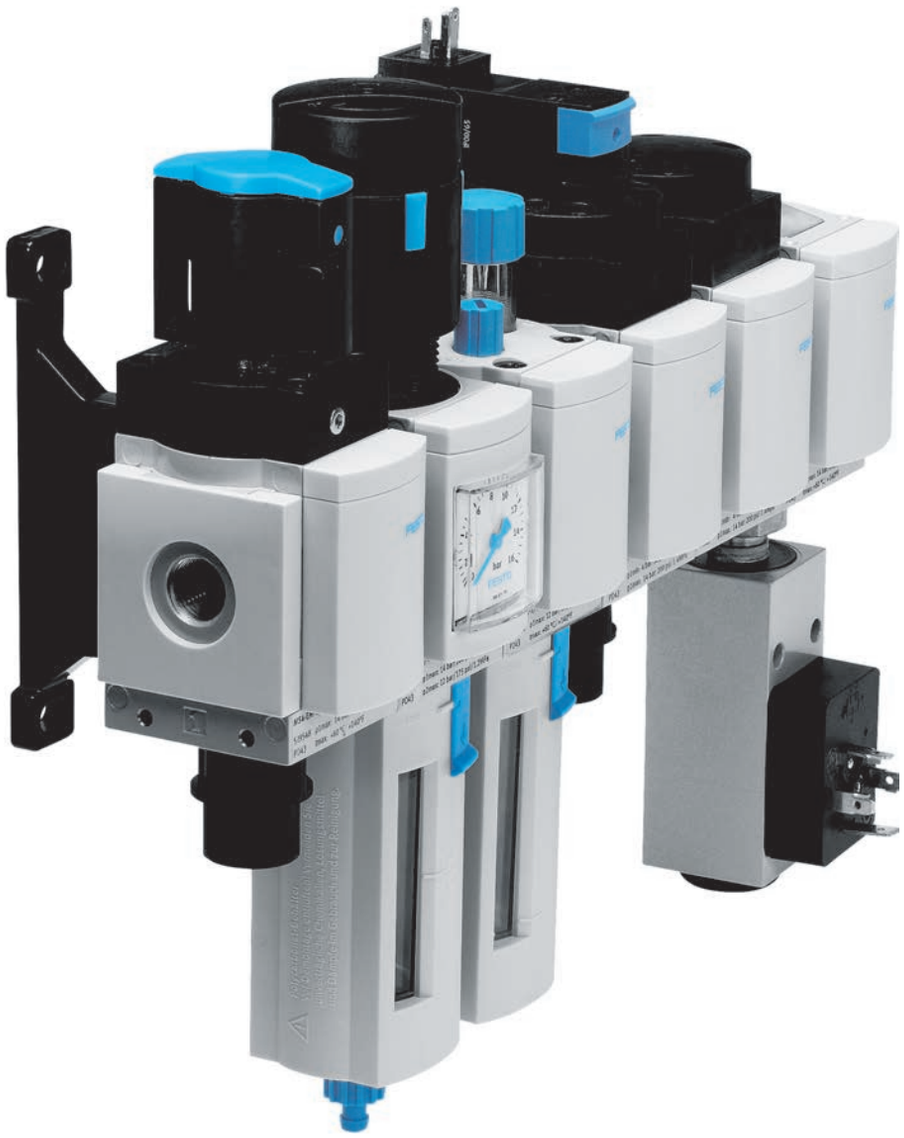
Type	Pressure gauge kits DPA-MA-SET	Vacuum gauges VAM, FVAM	Pressure gauges PAGL
Type of mounting	Via male thread	Front panel mounting, screw-in	Front panel mounting, screw-in
Indicating range		-1 ... 9 bar	0 ... 60 bar
Pneumatic connection	G1/8, G1/4, R1/8	G1/8, G1/4, R1/8, R1/4	G1/4
Operating pressure	10 ... 16 bar	-1 ... 9 bar	0 ... 60 bar
Measurement accuracy class	2.5, 4	2.5	1.6
Description	• For pressure booster DPA • For monitoring the input and output pressure • Pneumatic connection via R or G thread	• Designs based on DIN EN 837-1, available with red-green range • Screw-in or front panel mounting • 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
➔ Page/online	dpa	vam	pagl

Customised components – for your specific requirements

Components for compressed air preparation with customised designs
Can't find the compressed air preparation components you need in our catalogue?
We can offer you customised components that are tailored to your specific requirements.

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

Many additional variants are possible. Ask your Festo sales engineer, who will be happy to help.
➔ **www.festo.com/contact**



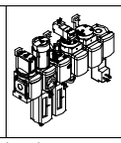
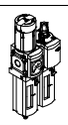
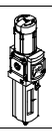
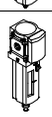
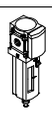
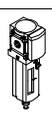
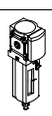
MS series ›

Selection aid

Service unit combinations and individual devices, MS series

MS series service units

Product range overview

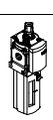
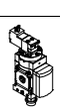
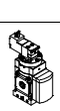
Type	Size	Pneumatic connection in housing	Connecting plate	Pressure regulation range [bar]						Grade of filtration [µm]			
				0.05 ... 0.7	0.05 ... 2.5	0.1 ... 4	0.3 ... 7	0.1 ... 12	0.5 ... 16	0.01	1	5	40
Code			AG...	D2	D4	D5	D6	D7	D8	A	B	C	E
Service unit combinations (additional variants can be ordered using the configurator ➔ online: msb4, msb6 or msb9)													
MSB		4	G¼	G⅛, G¼, G⅜	–	–	–	■	■	–	–	–	■	■
		6	G½	G¼, G⅜, G½, G¾	–	–	–	■	■	–	–	–	■	■
		9	–											
		12	–											
Service unit combinations													
MSB-FRC		4	G⅛, G¼	G⅛, G¼, G⅜	–	–	–	■	■	–	–	–	■	■
		6	G¼, G⅜, G½	G¼, G⅜, G½, G¾	–	–	–	■	■	–	–	–	■	■
		9	–											
		12	–											
Individual devices													
Filter regulators **MS-LFR**		4	G⅛, G¼	G⅛, G¼, G⅜	–	–	■	■	■	–	–	–	■	■
		6	G¼, G⅜, G½	G¼, G⅜, G½, G¾	–	–	■	■	■	■	–	–	■	■
		9	G¾, G1	G½, G¾, G1, G1¼, G1½	–	–	■	■	■	■	–	–	■	■
		12	–	G1, G1¼, G1½, G2	–	–	–	■	■	■	–	–	■	■
Filters **MS-LF**		4	G⅛, G¼	G⅛, G¼, G⅜	–	–	–	–	–	–	–	–	■	■
		6	G¼, G⅜, G½	G¼, G⅜, G½, G¾	–	–	–	–	–	–	–	–	■	■
		9	G¾, G1	G½, G¾, G1, G1¼, G1½	–	–	–	–	–	–	–	–	■	■
		12	–	G1, G1¼, G1½, G2	–	–	–	–	–	–	–	–	■	■
Fine and micro filters **MS-LFM**		4	G⅛, G¼	G⅛, G¼, G⅜	–	–	–	–	–	–	■	■	–	–
		6	G¼, G⅜, G½	G¼, G⅜, G½, G¾	–	–	–	–	–	–	■	■	–	–
		9	G¾, G1	G½, G¾, G1, G1¼, G1½	–	–	–	–	–	–	■	■	–	–
		12	–	G1, G1¼, G1½, G2	–	–	–	–	–	–	■	■	–	–
Activated carbon filters **MS-LFX**		4	G⅛, G¼	G⅛, G¼, G⅜	–	–	–	–	–	–	–	–	–	–
		6	G¼, G⅜, G½	G¼, G⅜, G½, G¾	–	–	–	–	–	–	–	–	–	–
		9	G¾, G1	G½, G¾, G1, G1¼, G1½	–	–	–	–	–	–	–	–	–	–
		12	–	G1, G1¼, G1½, G2	–	–	–	–	–	–	–	–	–	–
Water separators **MS-LWS**		4	–										
		6	G¼, G⅜, G½	G¼, G⅜, G½, G¾	–	–	–	–	–	–	–	–	–	–
		9	G¾, G1	G½, G¾, G1, G1¼, G1½	–	–	–	–	–	–	–	–	–	–
		12	–	G1, G1¼, G1½, G2	–	–	–	–	–	–	–	–	–	–

Product range overview

Type	Size	Bowl guard		Condensate drain				Pressure indicator					Security		Options		➔ Page/ online
		Plastic bowl guard	Metal bowl guard	Manual rotary	Semi-automatic	Fully automatic	External, fully automatic, electric	Cover plate (without pressure gauge)	Integrated MS pressure gauge	Adapter for EN pressure gauge G1/8	Adapter for EN pressure gauge G¼	Pressure sensor	Rotary knob with detent, can be locked using accessories	Rotary knob with integ-rated lock	Silencers	Direction of flow from right to left	
Code		R	U	M	H	V	E...	VS	AG	A8	A4	AD...	AS	E11	S	Z	
Service unit combinations																	
MSB	4	■	■	■	–	■	–	–	■	–	–	–	■	–	–	■	1295
	6	■	■	■	–	■	–	–	■	–	–	–	■	–	–	■	
	9	–															
	12	–															
Service unit combinations																	
MSB-FRC	4	■	–	■	–	■	–	–	■	–	–	–	■	–	–	■	1307
	6	■	■	■	–	■	–	–	■	–	–	–	■	–	–	■	
	9	–															
	12	–															
Individual devices																	
Filter regulators	4	■	■	■	■	■	–	■	■	■	■	■	■	■	–	■	1311
MS-LFR	6	■	■	■	■	■	■	■	■	–	■	■	■	■	–	■	
	9	–	■	■	■	■	■	■	■	–	■	■	■	■	–	■	
	12	–	■	■	–	■	■	■	■	–	■	–	■	■	–	■	
Filters	4	■	■	■	■	■	–	–	–	–	–	–	–	–	–	■	ms*-lf
MS-LF	6	■	■	■	■	■	■	–	–	–	–	–	–	–	–	■	
	9	–	■	■	■	■	■	–	–	–	–	–	–	–	–	■	
	12	–	■	■	–	■	■	–	–	–	–	–	–	–	–	■	
Fine and micro	4	■	■	■	■	■	–	–	–	–	–	–	–	–	–	■	ms*-lfm
filters	6	■	■	■	■	■	■	–	–	–	–	–	–	–	–	■	
MS-LFM	9	–	■	■	■	■	■	–	–	–	–	–	–	–	–	■	
	12	–	■	■	–	■	■	–	–	–	–	–	–	–	–	■	
Activated carbon	4	■	■	–	–	–	–	–	–	–	–	–	–	–	–	■	ms*-lfx
filters	6	■	■	–	–	–	–	–	–	–	–	–	–	–	–	■	
MS-LFX	9	–	■	–	–	–	–	–	–	–	–	–	–	–	–	■	
	12	–	■	–	–	–	–	–	–	–	–	–	–	–	–	■	
Water separators	4	–															1401
MS-LWS	6	–	■	–	–	■	■	–	–	–	–	–	–	–	–	■	
	9	–	■	–	–	■	■	–	–	–	–	–	–	–	–	■	
	12	–	■	–	–	■	■	–	–	–	–	–	–	–	–	■	

MS series service units

Product range overview

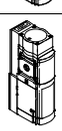
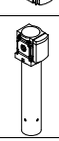
Type		Size	Pneumatic connection in housing	Connecting plate	Pressure regulation range [bar]						Supply voltage			
					0.05 ... 0.7	0.05 ... 2.5	0.1 ... 4	0.3 ... 7	0.1 ... 12	0.5 ... 16	24 V DC, connection pattern to EN 175301	24 V DC, connection M12 to IEC 61076-2-101	110 V AC, pin allocation to EN 175301	230 V AC, connection pattern to EN 175301
Code				AG...	D2	D4	D5	D6	D7	D8	V24	V24P	V110	V230
Individual devices														
Pressure regulators **MS-LR**		4	G⅛, G¼	G⅛, G¼, G⅜	–	–	■	■	■	–	–	–	–	–
		6	G¼, G⅜, G½	G¼, G⅜, G½, G¾	–	–	■	■	■	■	–	–	–	–
		9	G¾, G1	G½, G¾, G1, G1¼, G1½	–	–	■	■	■	■	–	–	–	–
		12	–	G1, G1¼, G1½, G2	–	–	–	■	■	■	–	–	–	–
Pressure regulators **MS-LRB**		4	G¼	G⅛, G¼, G⅜	–	–	■	■	■	–	–	–	–	–
		6	G½	G¼, G⅜, G½, G¾	–	–	■	■	■	■	–	–	–	–
		9	–											
		12	–											
Precision pressure regulators **MS-LRP**		4	–											
		6	G¼, G⅜, G½	G¼, G⅜, G½, G¾	■	■	■	–	■	–	–	–	–	–
		9	–											
		12	–											
Precision pressure regulators **MS-LRPB**		4	–											
		6	G½	G¼, G⅜, G½, G¾	■	■	■	–	■	–	–	–	–	–
		9	–											
		12	–											
Electric pressure regulators **MS-LRE**		4	–											
		6	G¼, G⅜, G½	G¼, G⅜, G½, G¾	–	–	■	■	■	■	–	–	–	–
		9	–											
		12	–											
Lubricators **MS-LOE**		4	G⅛, G¼	G⅛, G¼, G⅜	–	–	–	–	–	–	–	–	–	–
		6	G¼, G⅜, G½	G¼, G⅜, G½, G¾	–	–	–	–	–	–	–	–	–	–
		9	G¾, G1	G½, G¾, G1, G1¼, G1½	–	–	–	–	–	–	–	–	–	–
		12	–	G1, G1¼, G1½, G2	–	–	–	–	–	–	–	–	–	–
On-off valves **MS-EM(1)**		4	G⅛, G¼	G⅛, G¼, G⅜	–	–	–	–	–	–	–	–	–	–
		6	G¼, G⅜, G½	G¼, G⅜, G½, G¾	–	–	–	–	–	–	–	–	–	–
		9	G¾, G1	G½, G¾, G1, G1¼, G1½	–	–	–	–	–	–	–	–	–	–
		12	–	G1, G1¼, G1½, G2	–	–	–	–	–	–	–	–	–	–
On-off valves **MS-EE**		4	G⅛, G¼	G⅛, G¼, G⅜	–	–	–	–	–	–	■	–	■	■
		6	G¼, G⅜, G½	G¼, G⅜, G½, G¾	–	–	–	–	–	–	■	–	■	■
		9	G¾, G1	G½, G¾, G1, G1¼, G1½	–	–	–	–	–	–	■	■	■	■
		12	–	G1, G1¼, G1½, G2	–	–	–	–	–	–	■	■	■	■
Soft-start valves **MS-DL**		4	G⅛, G¼	G⅛, G¼, G⅜	–	–	–	–	–	–	–	–	–	–
		6	G¼, G⅜, G½	G¼, G⅜, G½, G¾	–	–	–	–	–	–	–	–	–	–
		9	–											
		12	–	G1, G1¼, G1½, G2	–	–	–	–	–	–	–	–	–	–
Soft-start valves **MS-DE**		4	G⅛, G¼	G⅛, G¼, G⅜	–	–	–	–	–	–	■	–	■	■
		6	G¼, G⅜, G½	G¼, G⅜, G½, G¾	–	–	–	–	–	–	■	–	■	■
		9	–											
		12	–	G1, G1¼, G1½, G2	–	–	–	–	–	–	■	■	■	■

Product range overview

Type	Size	Bowl guard		Pressure indicator					Security		Options		➔ Page/ online
		Plastic bowl guard	Metal bowl guard	Cover plate (without pressure gauge)	Integrated MS pressure gauge	Adapter for EN pressure gauge G1/8	Adapter for EN pressure gauge G¼	Pressure sensor	Rotary knob with detent, can be locked using accessories	Rotary knob with integ-rated lock	Silencers	Direction of flow from right to left	
Code		R	U	VS	AG	A8	A4	AD...	AS	E11	S	Z	
Individual devices													
Pressure regulators **MS-LR**	4	–	–	■	■	■	■	■	■	■	–	■	1323
	6	–	–	■	■	–	■	■	■	■	–	■	
	9	–	–	■	■	–	■	■	■	■	–	■	
	12	–	–	■	■	–	■	–	■	■	–	■	
Pressure regulators **MS-LRB**	4	–	–	■	■	■	■	■	■	■	–	■	1335
	6	–	–	■	■	–	■	■	■	■	–	■	
	9	–											
	12	–											
Precision pressure regulators **MS-LRP**	4	–											1343
	6	–	–	■	–	■	■	■	■	■	–	■	
	9	–											
	12	–											
Precision pressure regulators **MS-LRPB**	4	–											ms6-lrpb
	6	–	–	■	–	■	■	■	■	■	–	■	
	9	–											
	12	–											
Electric pressure regulators **MS-LRE**	4	–											ms6-lre
	6	–	–	■	■	–	■	–	–	–	–	■	
	9	–											
	12	–											
Lubricators **MS-LOE**	4	■	■	–	–	–	–	–	–	–	–	■	ms*-loe
	6	■	■	–	–	–	–	–	–	–	–	■	
	9	–	■	–	–	–	–	–	–	–	–	■	
	12	–	■	–	–	–	–	–	–	–	–	■	
On-off valves **MS-EM(1)**	4	–	–	■	■	■	■	■	–	–	■	■	1365
	6	–	–	■	■	–	■	■	–	–	■	■	
	9	–	–	■	■	–	■	–	–	–	■	■	
	12	–	–	■	■	–	■	–	–	–	■	■	
On-off valves **MS-EE**	4	–	–	■	■	■	■	■	–	–	■	■	1373
	6	–	–	■	■	–	■	■	–	–	■	■	
	9	–	–	■	■	–	■	–	–	–	■	■	
	12	–	–	■	■	–	■	–	–	–	■	■	
Soft-start valves **MS-DL**	4	–	–	■	■	■	■	■	–	–	–	■	1383
	6	–	–	■	■	–	■	■	–	–	–	■	
	9	–											
	12	–	–	■	■	–	■	–	–	–	–	■	
Soft-start valves **MS-DE**	4	–	–	■	■	■	■	■	–	–	–	■	ms*-de
	6	–	–	■	■	–	■	■	–	–	–	■	
	9	–											
	12	–	–	■	■	–	■	–	–	–	–	■	

MS series service units

Product range overview

Type		Size	Pneumatic connection in housing	Connecting plate	Performance Level			Supply voltage				
					Category 1, 1-channel	Category 3, 2-channel	Category 4, 2-channel with self-monitoring	24 V DC, Sub-D, 9-pin	24 V DC, connection pattern to EN 175301	24 V DC, connection M12 to IEC 61076-2-101	110/230 V AC, connection pattern to EN 175301	22 ... 31.6 V DC, connection M12, AS-i Safety at Work
Code				AG...	C	D	E	10V24	10V24/ V24	10V24P	V110/ V230	ASIS
Individual devices												
Soft-start/quick exhaust valves **MS-SV-C**		4	–									
		6	G½	G¼, G⅜, G½, G¾	■	–	–	–	■	■	–	–
		9	G¾, G1	G½, G¾, G1, G1¼, G1½	■	–	–	–	■	■	■	–
		12	–									
Soft-start/quick exhaust valves **MS-SV-D**		4	–									
		6	G½	G¼, G⅜, G½, G¾	–	■	–	–	■	■	–	–
		9	–									
		12	–									
Soft-start/quick exhaust valves **MS-SV-E**		4	–									
		6	G½	G¼, G⅜, G½, G¾	–	–	■	■	–	–	–	■
		9	–									
		12	–									
Membrane air dryers **MS-LDM1**		4	G⅛, G¼	G⅛, G¼, G⅜	–	–	–	–	–	–	–	–
		6	G¼, G⅜, G½	G¼, G⅜, G½, G¾	–	–	–	–	–	–	–	–
		9	–									
		12	–									
Branching modules **MS-FRM**		4	G⅛, G¼	G⅛, G¼, G⅜	–	–	–	–	–	–	–	–
		6	G¼, G⅜, G½	G¼, G⅜, G½, G¾	–	–	–	–	–	–	–	–
		9	G¾, G1	G½, G¾, G1, G1¼, G1½	–	–	–	–	–	–	–	–
		12	–	G1, G1¼, G1½, G2	–	–	–	–	–	–	–	–
Distributor blocks **MS-FRM-FRZ**		4	–	–	–	–	–	–	–	–	–	–
		6	–	–	–	–	–	–	–	–	–	–
		9	–									
		12	–									
Flow sensors **SFAM**		4	–									
		6	G½	G½	–	–	–	–	–	–	–	–
		9	–	G1, G1½	–	–	–	–	–	–	–	–
		12	–									

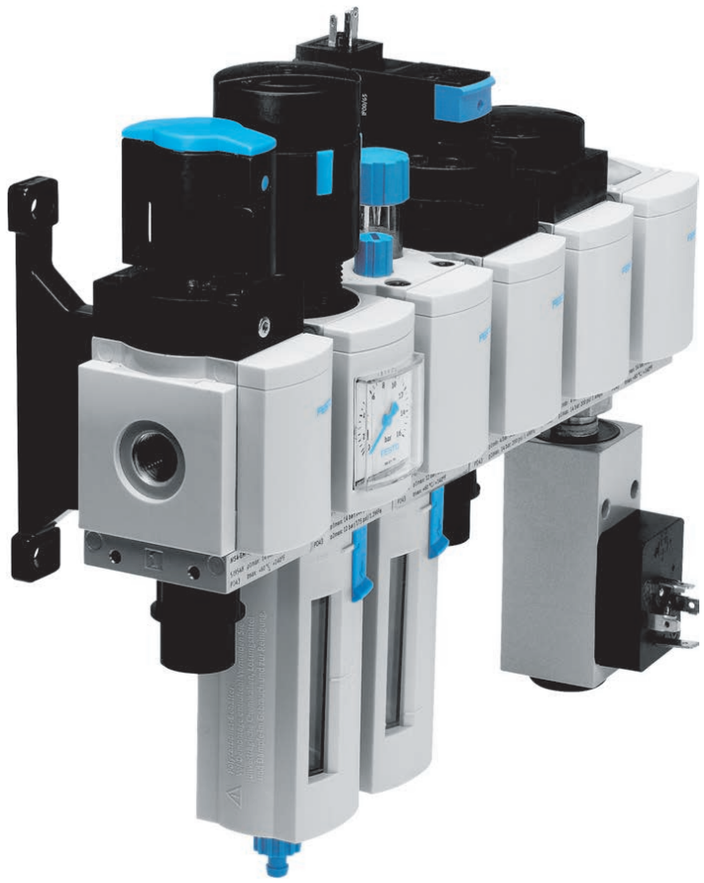
Product range overview

Type	Size	Bowl guard		Pressure indicator					Switching output		Options		➔ Page/ online
		Plastic bowl guard	Metal bowl guard	Cover plate (without pressure gauge)	Integrated MS pressure gauge	Adapter for EN pressure gauge G1/8	Adapter for EN pressure gauge G1/4	Pressure sensor	2x PNP or NPN, 1 analogue output 4 ... 20 mA	2x PNP or NPN, 1 analogue output 0 ... 10 V	Silencers	Direction of flow from right to left	
Code		R	U	VS	AG	A8	A4	AD...	2SA	2SV	S	Z/R	
Individual devices													
Soft-start/quick exhaust valves **MS-SV-C**	4	–											1351
	6	–	–	■	■	–	■	■	–	–	■	■	
	9	–	–	■	■	–	■	■	–	–	■	■	
	12	–											
Soft-start/quick exhaust valves **MS-SV-D**	4	–											1358
	6	–	–	■	■	–	■	■	–	–	■	■	
	9	–											
	12	–											
Soft-start/quick exhaust valves **MS-SV-E**	4	–											ms6-sv
	6	–	–	■	■	–	■	■	–	–	■	■	
	9	–											
	12	–											
Membrane air dryers **MS-LDM1**	4	–	■	–	–	–	–	–	–	–	–	■	ms*-ldm1
	6	–	■	–	–	–	–	–	–	–	–	■	
	9	–											
	12	–											
Branching modules **MS-FRM**	4	–	–	■	■	■	■	■	–	–	–	■	1389
	6	–	–	■	■	–	■	■	–	–	–	■	
	9	–	–	■	■	–	■	■	–	–	–	■	
	12	–	–	■	–	–	–	–	–	–	–	–	
Distributor blocks **MS-FRM-FRZ**	4	–	–	–	–	–	–	–	–	–	–	■	1397
	6	–	–	–	–	–	–	–	–	–	–	■	
	9	–											
	12	–											
Flow sensors **SFAM**	4	–											sfam
	6	–	–	–	–	–	–	–	■	■	–	■	
	9	–	–	–	–	–	–	–	■	■	–	■	
	12	–											

MS series service units

Key features

- Solutions for every application from individual components through pre-assembled combinations ex-stock and application-specific combinations to complete turnkey solutions.
- Wealth of options ensures the right solution for every task.
- Reliable compressed air supply thanks to ultra-modern function modules with integrated sensors and remote adjustment function.
- Maximum flow rates with minimum space requirement.
- Flow rates up to 22000 l/min with size MS12.
- CAD models and configurator for easy selection of application-specific individual devices and MSB4, MSB6 and MSB9 combinations
  ➔ www.festo.com/catalogue
- Simple connection system saves time when replacing individual modules without dismantling the entire unit.
- Locking filter bowls and lockable valves fitted as standard for maximum control of the operating pressure and maximum safety.
- With soft-start valves, filter contamination indicator and fully automatic condensate drain for reliable operation of your system.



Select your optimum service combination

+ Individually configurable
+ Reliable thanks to integrated pressure and flow sensors
+ Ready-to-install complete solutions with high flow rates

Service unit combinations

MSB4★
MSB6★

MS series

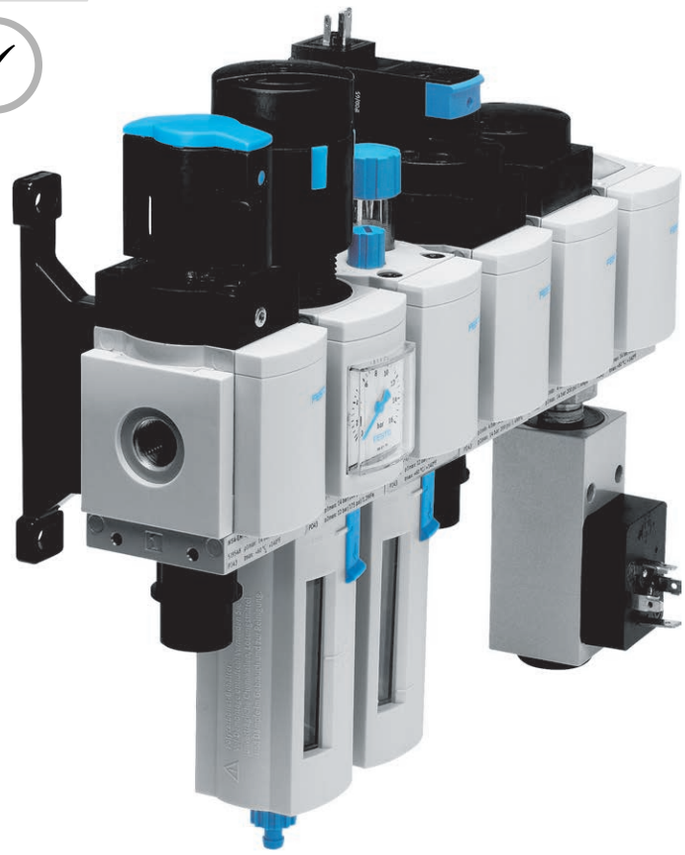
Service unit combinations

MSB4★ / MSB6★

Overview, configuration and ordering
➔ **www.festo.com/catalogue/msb**

Additional information, support and user documentation
➔ **www.festo.com/sp/msb**

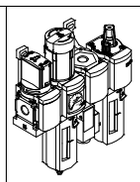
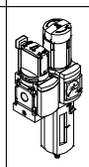
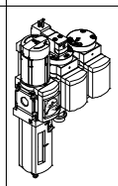
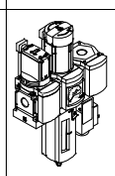
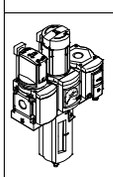
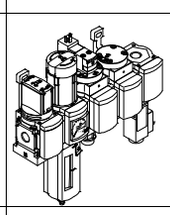
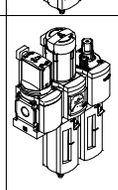
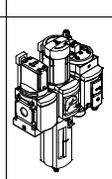
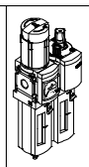
★ Quick ordering of basic designs
➔ page 1297, 1300, 1303



+ Service unit combinations in sizes 4 and 6
+ Versatile combinations of filter, regulator and on-off valves in a single unit
+ High flow rate and highly efficient in removing contaminants
+ Good regulation characteristics with minimal pressure hysteresis

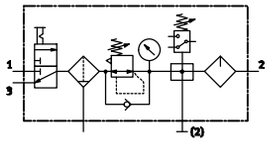
Service unit combinations MSB ★

Product range overview

Combi-nation	Version		Size	Pneumatic connection	Flow rate [l/min]	➔ Page/ online
Service unit combination						
1		• On-off valve MS-EM1, manually operated • Filter regulator MS-LFR with pressure gauge • Branching module MS-FRM-Y with pressure switch • Lubricator MS-LOE • Mounting bracket MS-WP	4	G¼	950	1296
2		• On-off valve MS-EM1, manually operated • Filter regulator MS-LFR with pressure gauge • Mounting bracket MS-WP	4	G¼	950 … 1700	1297
			6	G½	4800 … 5500	
3		• Filter regulator MS-LFR with pressure gauge • On-off valve MS-EE-V24, solenoid actuated (24 V DC) • Soft-start valve MS-DL, pneumatically actuated • Mounting bracket MS-WP	4	G¼	750	1298
			6	G½	3100	
4		• On-off valve MS-EM1, manually operated • Filter regulator MS-LFR with pressure gauge • Branching module MS-FRM-Y with pressure switch • Mounting bracket MS-WP	4	G¼	1300	1299
			6	G½	4500	
		• On-off valve MS-EM1, manually operated • Filter regulator MS-LFR with pressure gauge • Branching module MS-FRM-AD7 with pressure sensor for operational status indicator • Mounting bracket MS-WP	4	G¼	1600 … 1750	1299
			6	G½	4500 … 5300	
5		• On-off valve MS-EM1, manually operated • Filter regulator MS-LFR with pressure gauge • On-off valve MS-EE-V24, solenoid actuated (24 V DC) • Soft-start valve MS-DL, pneumatically actuated • Branching module MS-FRM-Y with pressure switch • Mounting bracket MS-WP	4	G¼	750	1301
			6	G½	3000 … 3100	
6		• On-off valve MS-EM1, manually operated • Filter regulator MS-LFR with pressure gauge • Lubricator MS-LOE • Mounting bracket MS-WP	4	G¼	750	1302
			6	G½	3100	
7		• On-off valve MS-EM1, manually operated • Filter regulator MS-LFR with pressure gauge • On-off valve MS-EE-10V24P-AD7, solenoid actuated (24 V DC), with pressure sensor for operational status indicator • Mounting bracket MS-WP	4	G¼	1400 … 1600	1303
			6	G½	4000 … 4400	
Filter regulator/lubricator						
MSB-FRC		• Filter regulator MS-LFR with pressure gauge • Lubricator MS-LOE	4	G⅛, G¼	850 … 1400	1307
			6	G¼, G⅜, G½	1900 … 4800	

Service unit combinations MSB ★

Data sheet – Service unit combination 1



- Manual on-off valve
- Filter regulator with pressure gauge
- Branching module with pressure switch
- Lubricator
- Mounting bracket

Branching module version	Description	➔ Page/ online
Pressure switch PEV-1/4-B-OD	With adjustable pressure switching point, plug socket, EN 175301, type A, square	pev

Technical data Download CAD data ➔ **www.festo.com**

Size		MSB4
Pneumatic connection		G¼
Regulating function		With primary pressure compensation, with return flow action, with secondary exhausting, outlet pressure constant
Type of mounting		Via accessories
Mounting position		Vertical ±5°
Grade of filtration	[µm]	40
Air purity class at the output		Compressed air to ISO 8573-1:2010 [7:4:4]
Bowl guard		Plastic bowl guard
Condensate drain		Manual rotary
Actuator lock		Rotary knob with detent, can be locked using accessories
Pressure regulation range	[bar]	1 ... 12
Pressure indication		Via pressure gauge for indicating the outlet pressure
Length/width/height	[mm]	80/160/219

Standard nominal flow rate q_{nN}

Size		MSB4
Grade of filtration 40 µm	[l/min]	950

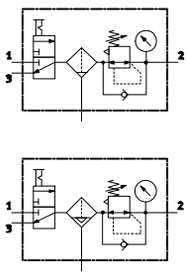
Operating conditions

Condensate drain		Manual rotary
Size		MSB4
Operating medium		Compressed air to ISO 8573-1:2010 [7:4:4]
		Inert gases
Note on operating/pilot medium		Lubricated operation possible (in which case lubricated operation will always be required)
Operating pressure	[bar]	1.5 ... 14
Ambient temperature	[°C]	–10 ... +60
Oil viscosity		ISO VG 32

Ordering data

Size	Condensate drain	Connection	Grade of filtration [µm]	Part no.	Type
MSB4	Manual rotary	G¼	40	**542295**	**MSB4-1/4:C3J1F3M1-WP**

Data sheet – Service unit combination 2



- Manual on-off valve
- Filter regulator with pressure gauge
- Mounting bracket

Technical data Download CAD data ➔ **www.festo.com**

Size		MSB4		MSB6	
Pneumatic connection		G¼		G½	
Regulating function		With primary pressure compensation, with return flow action, with secondary exhausting, outlet pressure constant			
Type of mounting		Via accessories			
Mounting position		Vertical ±5°			
Grade of filtration	[µm]	40	5	40	5
Air purity class at the output		Compressed air to ISO 8573-1:2010 [7:4:4]	Compressed air to ISO 8573-1:2010 [6:4:4]	Compressed air to ISO 8573-1:2010 [7:4:4]	Compressed air to ISO 8573-1:2010 [6:4:4]
Bowl guard		Plastic bowl guard			
Condensate drain		Manual rotary			
		Fully automatic			
Actuator lock		Rotary knob with detent, can be locked using accessories			
Pressure regulation range	[bar]	0.5 ... 7			
		0.5 ... 12			
Pressure indication		Via pressure gauge for indicating the outlet pressure			
Length/width/height	[mm]	80/80/219 (222)[2]		100/124/301 (304)[1]	

1) Value in brackets with fully automatic condensate drain.

Standard nominal flow rate q_{nN}

Condensate drain		Manual rotary				Fully automatic	
Size		MSB4		MSB6		MSB4	MSB6
Pressure regulation range	[bar]	0.5 ... 7	0.5 ... 12	0.5 ... 7	0.5 ... 12	0.5 ... 12	0.5 ... 12
Grade of filtration 40 µm	[l/min]	1150	1700	5500	5100	1000	5100
Grade of filtration 5 µm	[l/min]	–	950	–	4800	950	4800

Operating conditions

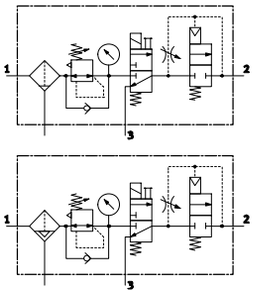
Condensate drain		Manual rotary		Fully automatic	
Size		MSB4	MSB6	MSB4	MSB6
Operating medium		Compressed air to ISO 8573-1:2010 [7:4:4]			
		Inert gases			
Note on operating/pilot medium		Lubricated operation possible (in which case lubricated operation will always be required)			
Operating pressure	[bar]	0.8 ... 14	0.8 ... 18	2 ... 12	2 ... 12
Ambient temperature	[°C]	–10 ... +60	–10 ... +60	+5 ... +60	+5 ... +60

Ordering data

Size	Condensate drain	Connection	Grade of filtration [µm]		Part no.	Type code
Pressure regulation range 0.5 ... 7 bar, pressure gauge with outer scale in MPa						
MSB4	Manual rotary	G¼	40		**8042668**	**MSB4-1/4:C3:J120-WP**
MSB6	Manual rotary	G½	40		**8042672**	**MSB6-1/2:C3:J120-WP**
Pressure regulation range 0.5 ... 12 bar, pressure gauge with outer scale in bar and inner scale in psi						
MSB4	Manual rotary	G¼	40	★	**8025354**	**MSB4-1/4:C3:J1-WP**
		G¼	5		**542304**	**MSB4-1/4:C3J3-WP**
	Fully automatic	G¼	40		**542298**	**MSB4-1/4:C3J2-WP**
		G¼	5		**542310**	**MSB4-1/4:C3J4-WP**
MSB6	Manual rotary	G½	40	★	**8025355**	**MSB6-1/2:C3:J1-WP**
		G½	5		**542280**	**MSB6-1/2:C3J3-WP**
	Fully automatic	G½	40		**542274**	**MSB6-1/2:C3J2-WP**
		G½	5		**542286**	**MSB6-1/2:C3J4-WP**

Service unit combinations MSB ★

Data sheet – Service unit combination 3



- Filter regulator with pressure gauge
- Electric on-off valve (24 V DC)
- Pneumatic soft-start valve
- Mounting bracket

Technical data Download CAD data ➔ **www.festo.com**

Size		MSB4	MSB6
Pneumatic connection		G¼	G½
Regulating function		With primary pressure compensation, with return flow action, with secondary exhausting, outlet pressure constant	
Type of mounting		Via accessories	
Mounting position		Vertical ±5°	
Grade of filtration	[µm]	40	
Air purity class at the output		Compressed air to ISO 8573-1:2010 [7:4:4]	
Bowl guard		Plastic bowl guard	
Condensate drain		Manual rotary	
		–	Fully automatic
Actuator lock		Rotary knob with detent, can be locked using accessories	
Pressure regulation range	[bar]	4 ... 12	
Pressure indication		Via pressure gauge for indicating the outlet pressure	
Length/width/height	[mm]	80/120/219	100/186/301 (304)[1)]

1) Value in brackets with fully automatic condensate drain.

Standard nominal flow rate q_{nN}

Size		MSB4	MSB6
Grade of filtration 40 µm	[l/min]	750	3100

Electrical data – Electric on-off valve

Coil characteristics	24 V DC: 1.5 W; perm. voltage fluctuations –25%/+10%
Electrical connection	Plug, square design to EN 175301-803, type C

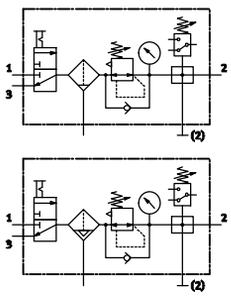
Operating conditions

Condensate drain		Manual rotary		Fully automatic
Size		MSB4	MSB6	MSB6
Operating medium		Compressed air to ISO 8573-1:2010 [–:4:–]		Compressed air to ISO 8573-1:2010 [7:4:–]
		Inert gases		
Note on operating/pilot medium		Lubricated operation possible (in which case lubricated operation will always be required)		
Operating pressure	[bar]	4.5 ... 14	4.5 ... 18	4.5 ... 12
Ambient temperature	[°C]	–10 ... +60	–10 ... +60	+5 ... +60

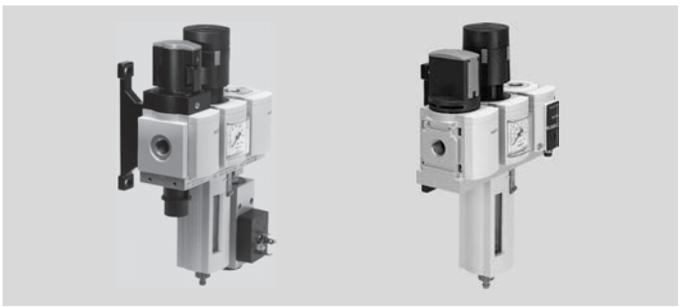
Ordering data

Size	Condensate drain	Connection	Grade of filtration [µm]	Part no.	Type
MSB4	Manual rotary	G¼	40	**531101**	**MSB4-1/4:J1D1A1-WP**
MSB6	Manual rotary	G½	40	**530222**	**MSB6-1/2:J1D1A1-WP**
	Fully automatic	G½	40	**530224**	**MSB6-1/2:J2D1A1-WP**

Data sheet – Service unit combination 4



- Manual on-off valve
- Filter regulator with pressure gauge
- Branching module with pressure switch or with pressure sensor
- Mounting bracket



Branching module version	Description	➔ Page/ online
Pressure switch PEV-1/4-B-OD	With adjustable pressure switching point, plug socket, EN 175301, type A, square	pev
Pressure sensor SDE5-D10-O-...-P-M8	With 3-pin plug M8x1, threshold value comparator, 1 switching output PNP, N/O contact	1247

Technical data Download CAD data ➔ **www.festo.com**

Size		MSB4		MSB6	
Branching module with		Pressure switch	Pressure sensor	Pressure switch	Pressure sensor
Pneumatic connection		G¼		G½	
Regulating function		With primary pressure compensation, with return flow action, with secondary exhausting, outlet pressure constant			
Type of mounting		Via accessories			
Mounting position		Vertical ±5°			
Grade of filtration	[µm]	40			
Air purity class at the output		Compressed air to ISO 8573-1:2010 [7:4:4]			
Bowl guard		Plastic bowl guard			
Condensate drain		Manual rotary	Manual rotary	Manual rotary	Manual rotary
		Fully automatic	–	Fully automatic	–
Actuator lock		Rotary knob with detent, can be locked using accessories			
Pressure regulation range	[bar]	–	0.5 ... 7	–	0.5 ... 7
		0.5 ... 12	0.5 ... 10	0.5 ... 12	0.5 ... 10
Pressure indication		Via pressure gauge for indicating the outlet pressure			
Length/width/height	[mm]	80/120/219 (222)[1]	82/120/219	100/186/301 (304)[1]	102/186/301

1) Value in brackets with fully automatic condensate drain.

Standard nominal flow rate q_{nN}

Size		MSB4			MSB6		
Branching module with		Pressure switch	Pressure sensor		Pressure switch	Pressure sensor	
Pressure regulation range	[bar]	0.5 ... 12	0.5 ... 7	0.5 ... 10	0.5 ... 12	0.5 ... 7	0.5 ... 10
Grade of filtration 40 µm	[l/min]	1300	1750	1600	4500	5300	4500

Operating conditions

Condensate drain		Manual rotary		Fully automatic	
Size		MSB4	MSB6	MSB4	MSB6
Operating medium		Compressed air to ISO 8573-1:2010 [7:4:4]			
		Inert gases			
Note on operating/pilot medium		Lubricated operation possible (in which case lubricated operation will always be required)			
Operating pressure	[bar]	0.8 ... 14	0.8 ... 18	2 ... 12	2 ... 12
Ambient temperature	[°C]	–10 ... +60 (0 ... +50)[2]	–10 ... +60 (0 ... +50)[2]	+5 ... +60	+5 ... +60

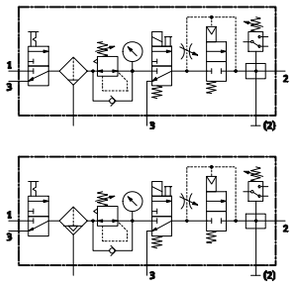
2) Value in brackets applies to branching module with pressure sensor.

Service unit combinations MSB ★

Ordering data

Size	Condensate drain	Connection	Grade of filtration [µm]		Part no.	Type code
Branching module with pressure switch						
MSB4	Manual rotary	G¼	40		**542294**	**MSB4-1/4:C3J1F3-WP**
	Fully automatic	G¼	40		**542300**	**MSB4-1/4:C3J2F3-WP**
MSB6	Manual rotary	G½	40		**542270**	**MSB6-1/2:C3J1F3-WP**
	Fully automatic	G½	40		**542276**	**MSB6-1/2:C3J2F3-WP**
Branching module with pressure sensor						
Pressure regulation range 0.5 ... 7 bar, pressure gauge with outer scale in MPa						
MSB4	Manual rotary	G¼	40		**8042667**	**MSB4-1/4:C3:J120:F12-WP**
MSB6	Manual rotary	G½	40		**8042671**	**MSB6-1/2:C3:J120:F12-WP**
Pressure regulation range 0.5 ... 10 bar, pressure gauge with outer scale in bar and inner scale in psi						
MSB4	Manual rotary	G¼	40	★	**8025356**	**MSB4-1/4:C3:J1:F12-WP**
MSB6	Manual rotary	G½	40	★	**8025357**	**MSB6-1/2:C3:J1:F12-WP**

Data sheet – Service unit combination 5



- Manual on-off valve
- Filter regulator with pressure gauge
- Electric on-off valve (24 V DC)
- Pneumatic soft-start valve
- Branching module with pressure switch
- Mounting bracket

Branching module version	Description	➔ Page/ online
Pressure switch PEV-1/4-B-OD	With adjustable pressure switching point, plug socket, EN 175301, type A, square	pev

Technical data Download CAD data ➔ **www.festo.com**

Size		MSB4	MSB6	
Pneumatic connection		G¼	G½	
Regulating function		With primary pressure compensation, with return flow action, with secondary exhausting, outlet pressure constant		
Type of mounting		Via accessories		
Mounting position		Vertical ±5°		
Grade of filtration	[µm]	40	40	5
Air purity class at the output		Compressed air to ISO 8573-1:2010 [7:4:4]	Compressed air to ISO 8573-1:2010 [7:4:4]	Compressed air to ISO 8573-1:2010 [6:4:4]
Bowl guard		Plastic bowl guard		
Condensate drain		Manual rotary		
		Fully automatic		
Actuator lock		Rotary knob with detent, can be locked using accessories		
Pressure regulation range	[bar]	4 ... 12		
Pressure indication		Via pressure gauge for indicating the outlet pressure		
Length/width/height	[mm]	80/200/219 (222)[1]	100/310/301 (304)[1]	

1) Value in brackets with fully automatic condensate drain.

Standard nominal flow rate q_{nN}

Size		MSB4	MSB6
Grade of filtration 40 µm	[l/min]	750	3100
Grade of filtration 5 µm	[l/min]	–	3000

Electrical data – Electric on-off valve

Coil characteristics	24 V DC: 1.5 W; perm. voltage fluctuations –25%/+10%
Electrical connection	Plug, square design to EN 175301-803, type C

Operating conditions

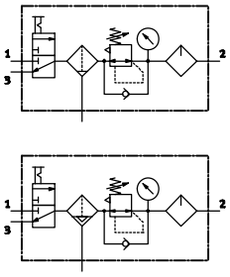
Condensate drain		Manual rotary		Fully automatic	
Size		MSB4	MSB6	MSB4	MSB6
Operating medium		Compressed air to ISO 8573-1:2010 [7:4:4]			
		Inert gases			
Note on operating/pilot medium		Lubricated operation possible (in which case lubricated operation will always be required)			
Operating pressure	[bar]	4.5 ... 14	4.5 ... 18	4.5 ... 12	4.5 ... 12
Ambient temperature	[°C]	–10 ... +60	–10 ... +60	+5 ... +60	+5 ... +60

Ordering data

Size	Condensate drain	Connection	Grade of filtration [µm]	Part no.	Type
MSB4	Manual rotary	G¼	40	**542293**	**MSB4-1/4:C3J1D1A1F3-WP**
	Fully automatic	G¼	40	**542299**	**MSB4-1/4:C3J2D1A1F3-WP**
MSB6	Manual rotary	G½	40	**542269**	**MSB6-1/2:C3J1D1A1F3-WP**
		G½	5	**542281**	**MSB6-1/2:C3J3D1A1F3-WP**
	Fully automatic	G½	40	**542275**	**MSB6-1/2:C3J2D1A1F3-WP**
		G½	5	**542287**	**MSB6-1/2:C3J4D1A1F3-WP**

Service unit combinations MSB ★

Data sheet – Service unit combination 6



- Manual on-off valve
- Filter regulator with pressure gauge
- Lubricator
- Mounting bracket

Technical data Download CAD data ➔ **www.festo.com**

Size		MSB4	MSB6
Pneumatic connection		G¼	G½
Regulating function		With primary pressure compensation, with return flow action, with secondary exhausting, outlet pressure constant	
Type of mounting		Via accessories	
Mounting position		Vertical ±5°	
Grade of filtration	[µm]	40	
Air purity class at the output		Compressed air to ISO 8573-1:2010 [7:4:4]	
Bowl guard		Plastic bowl guard	
Condensate drain		Manual rotary	
		–	Fully automatic
Actuator lock		Rotary knob with detent, can be locked using accessories	
Pressure regulation range	[bar]	1 ... 12	
Pressure indication		Via pressure gauge for indicating the outlet pressure	
Length/width/height	[mm]	80/120/219	100/186/301 (304)[1]

1) Value in brackets with fully automatic condensate drain.

Standard nominal flow rate q_{nN}

Size		MSB4	MSB6
Grade of filtration 40 µm	[l/min]	750	3100

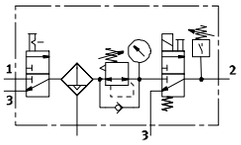
Operating conditions

Condensate drain		Manual rotary		Fully automatic
Size		MSB4	MSB6	MSB6
Operating medium		Compressed air to ISO 8573-1:2010 [7:4:4]		
		Inert gases		
Note on operating/pilot medium		Lubricated operation possible (in which case lubricated operation will always be required)		
Operating pressure	[bar]	1.5 ... 14	1.5 ... 18	2 ... 12
Ambient temperature	[°C]	–10 ... +60	–10 ... +60	+5 ... +60
Oil viscosity		ISO VG 32		

Ordering data

Size	Condensate drain	Connection	Grade of filtration [µm]	Part no.	Type
MSB4	Manual rotary	G¼	40	**542296**	**MSB4-1/4:C3J1M1-WP**
MSB6	Manual rotary	G½	40	**542272**	**MSB6-1/2:C3J1M1-WP**
	Fully automatic	G½	40	**542278**	**MSB6-1/2:C3J2M1-WP**

Data sheet – Service unit combination 7



- Manual on-off valve
- Filter regulator with pressure gauge
- Electric on-off valve (24 V DC) with pressure sensor
- Mounting bracket

Branching module version	Description	➔ Page/ online
Pressure sensor SDE5-D10-O-...-P-M8	With 3-pin plug M8x1, threshold value comparator, 1 switching output PNP, N/O contact	1247

Technical data Download CAD data ➔ **www.festo.com**

Size		MSB4	MSB6
Pneumatic connection		G¼	G½
Regulating function		With primary pressure compensation, with return flow action, with secondary exhausting, outlet pressure constant	
Type of mounting		Via accessories	
Mounting position		Vertical ±5°	
Grade of filtration	[µm]	40	
Air purity class at the output		Compressed air to ISO 8573-1:2010 [7:4:4]	
Bowl guard		Plastic bowl guard	
Condensate drain		Manual rotary	
Actuator lock		Rotary knob with detent, can be locked using accessories	
Pressure regulation range	[bar]	0.5 ... 7	
		0.5 ... 10	
Pressure indication		Via pressure sensor with operational status indicator for indicating the outlet pressure and with electrical output	
		Via pressure gauge for indicating the outlet pressure	
Length/width/height	[mm]	82/120/219	102/186/301

Standard nominal flow rate q_{nN}

Size		MSB4		MSB6	
Pressure regulation range	[bar]	0.5 ... 7	0.5 ... 10	0.5 ... 7	0.5 ... 10
Grade of filtration 40 µm	[l/min]	1600	1400	4400	4000

Electrical data – Electric on-off valve

Coil characteristics	24 V DC: 1.8 W; perm. voltage fluctuations –15%/+10%
Electrical connection	Plug M12x1 to IEC 61076-2-101

Operating conditions

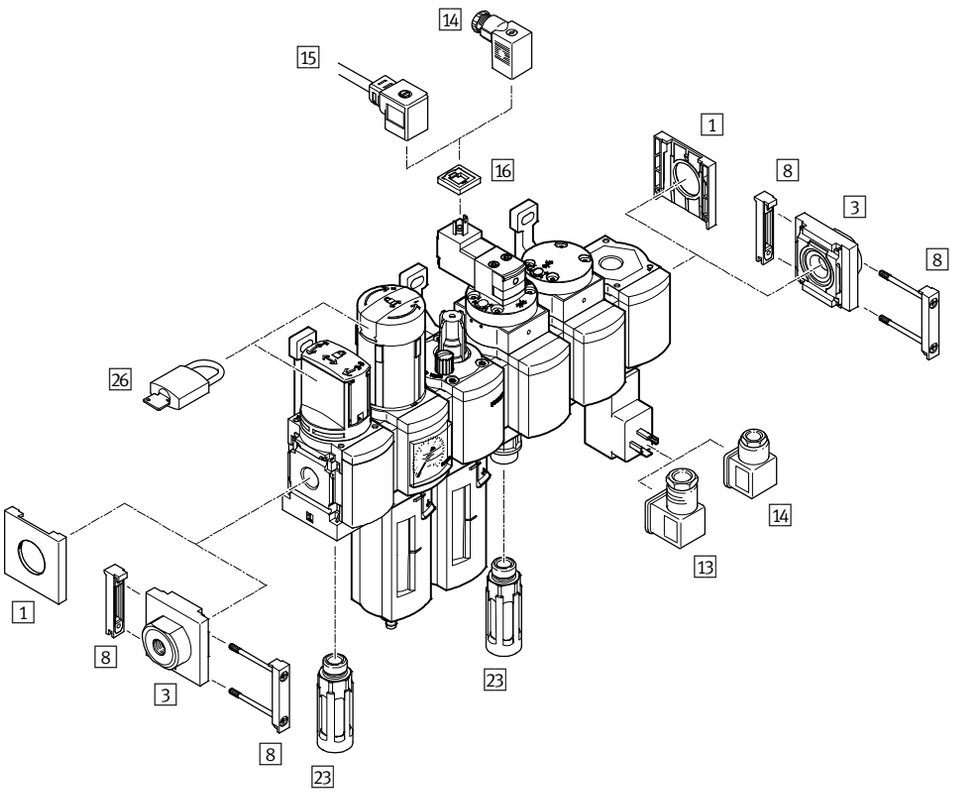
Condensate drain		Manual rotary	
Size		MSB4	MSB6
Operating medium		Compressed air to ISO 8573-1:2010 [7:4:4]	
		Inert gases	
Note on operating/pilot medium		Lubricated operation possible (in which case lubricated operation will always be required)	
Operating pressure	[bar]	0.8 ... 14	0.8 ... 18
Ambient temperature	[°C]	0 ... +50	0 ... +50

Ordering data

Size	Condensate drain	Connection	Grade of filtration [µm]		Part no.	Type
Pressure regulation range 0.5 ... 7 bar, pressure gauge with outer scale in MPa						
MSB4	Manual rotary	G¼	40		**8042666**	**MSB4-1/4:C3:J120:D14-WP**
MSB6	Manual rotary	G½	40		**8042670**	**MSB6-1/2:C3:J120:D14-WP**
Pressure regulation range 0.5 ... 10 bar, pressure gauge with outer scale in bar and inner scale in psi						
MSB4	Manual rotary	G¼	40	★	**8025358**	**MSB4-1/4:C3:J1:D14-WP**
MSB6	Manual rotary	G½	40	★	**8025359**	**MSB6-1/2:C3:J1:D14-WP**

Service unit combinations MSB ★

Accessories



Note
The range of accessories depends on the service unit combination selected.

Accessories		➔ Page/online
1	Cover cap MS4/6-END	1406
3	Connection plate kit MS4/6-AG...	1406
8	Module connector MS4/6-MV	1406
13	Angled plug socket PEV-1/4-WD-LED	1407
14	Plug socket MSSD-C-4P for pressure switch PEV	1407
	Plug socket MSSD-EB for on-off valve MS4/6-EE	
15	Plug socket with cable KMEB	1407

Accessories		➔ Page/online
16	Illuminating seal MEB-LD	1407
23	Silencer U	1409
26	Padlock LRVS-D	1409
–	Connecting cable NEBU-M8...-LE3 for pressure sensor SDE5	1407
–	Special oil OFSW	1409
–	Filter cartridge MS4/6-LFP	1409

For when you need lubricated compressed air

+ High flow rate
+ Efficient condensate and particle separation
+ Flow rate-dependent oil metering

Filter regulators/lubricators

MSB-FRC★

MS series

Filter regulators/lubricators

MSB-FRC ★

Overview, configuration and ordering
➔ **www.festo.com/catalogue/msb-frc** ✓

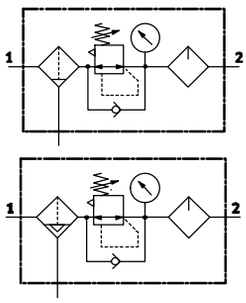
Additional information, support and user documentation
➔ **www.festo.com/sp/msb-frc** ✓

★ Quick ordering of basic designs
➔ page 1308 ✓

+ Size 4 and 6
+ Flow rate 800 ... 4800 l/min
+ Pressure gauge with indication in bar, psi, MPa
+ Grade of filtration 40 µm, 5 µm
+ Manual or fully automatic condensate drain
+ Plastic bowl with plastic bowl guard
+ Metal bowl guard

Service unit combinations MSB-FRC ★

Data sheet



- Filter regulator with pressure gauge
- Lubricator

Technical data

Download CAD data ➔ **www.festo.com**

Size		MSB4		MSB6		
Pneumatic connection 1, 2		G1⁄8	G1⁄4	G1⁄4	G3⁄8	G1⁄2
Design		Filter regulator with pressure gauge and proportional standard mist lubricator				
Regulating function		With primary pressure compensation, with secondary exhausting, with return flow action, outlet pressure constant				
Type of mounting		Via accessories				
Mounting position		Vertical ±5°				
Grade of filtration	[µm]	40				
		–	5	–		5
Air purity class at the output		Compressed air to ISO 8573-1:2010 [7:4:–] (grade of filtration 40 µm)				
		Compressed air to ISO 8573-1:2010 [6:4:–] (grade of filtration 5 µm)				
Bowl guard		Plastic bowl guard		Plastic bowl guard		
		–		Integrated as metal bowl guard		
Condensate drain		Manual rotary				
		–	Fully automatic	–		Fully automatic
Actuator lock		Rotary knob with detent, can be locked using accessories				
Pressure regulation range	[bar]	–	0.3 ... 7	–		0.3 ... 7
		0.5 ... 12				
Pressure indication		Via pressure gauge for indicating the outlet pressure				
Length/width/height	[mm]	57/80/222		77/124/303		

Standard nominal flow rate q_{nN}[1)]

Size		MSB4		MSB6		
Pneumatic connection 1, 2		G1⁄8	G1⁄4	G1⁄4	G3⁄8	G1⁄2
Pressure regulation range 0.3 ... 7 bar						
Grade of filtration 40 µm	[l/min]	–	1400	–	–	4800
Pressure regulation range 0.5 ... 12 bar						
Grade of filtration 40 µm	[l/min]	850	900	1900	3500	3700
Grade of filtration 5 µm	[l/min]	–	850	–	–	3600

1) Measured at p1 = 10 bar and p2 = 6 bar, Δp = 1 bar.

Operating conditions

Condensate drain		Manual rotary		Fully automatic	
Size		MSB4	MSB6	MSB4	MSB6
Operating medium		Compressed air to ISO 8573-1:2010 [–:4:–]		Compressed air to ISO 8573-1:2010 [7:4:–]	
		Inert gases			
Note on operating/pilot medium		Lubricated operation possible (in which case lubricated operation will always be required)			
Operating pressure	[bar]	1.5 ... 14	1.5 ... 20	2 ... 12	2 ... 12
Ambient temperature	[°C]	–10 ... +60	–10 ... +60	+5 ... +60	+5 ... +60
Oil viscosity		ISO VG 32			

Materials

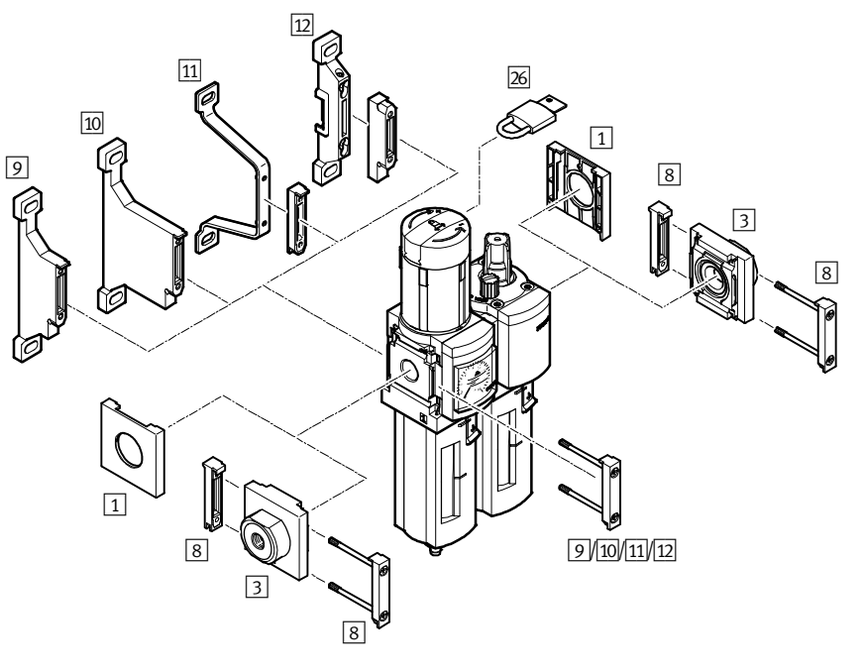
Housing		Die-cast aluminium
Rotary knob		PA, POM
Bowl	Plastic bowl guard	PC
	Metal bowl guard	Wrought aluminium alloy
Seals		NBR

Service unit combinations MSB-FRC ★

Ordering data

Size	Condensate drain	Connection	Grade of filtration [µm]		Part no.	Type
Pressure regulation range 0.3 ... 7 bar						
Plastic bowl guard, pressure gauge with outer scale in MPa						
MSB4	Manual rotary	G¼	40		**8042669**	**MSB4-1/4-FRC13:J120M1**
MSB6	Manual rotary	G½	40		**8042673**	**MSB6-1/2-FRC13:J120M1**
Plastic bowl guard, pressure gauge with outer scale in bar and inner scale in psi						
MSB4	Manual rotary	G¼	40		**531109**	**MSB4-1/4-FRC1:J5M1**
MSB6	Manual rotary	G½	40		**530230**	**MSB6-1/2-FRC1:J5M1**
Pressure regulation range 0.5 ... 12 bar						
Plastic bowl guard						
MSB4	Manual rotary	G⅛	40		**531133**	**MSB4-1/8-FRC5:J1M1**
		G¼	40	★	**531117**	**MSB4-1/4-FRC5:J1M1**
			5		**531121**	**MSB4-1/4-FRC7:J3M1**
	Fully automatic	G¼	40		**531119**	**MSB4-1/4-FRC6:J2M1**
MSB6	Manual rotary	G¼	40		**530268**	**MSB6-1/4-FRC5:J1M1**
		G⅜	40		**530292**	**MSB6-3/8-FRC5:J1M1**
		G½	40	★	**530244**	**MSB6-1/2-FRC5:J1M1**
			5		**530248**	**MSB6-1/2-FRC7:J3M1**
	Fully automatic	G½	40		**530246**	**MSB6-1/2-FRC6:J2M1**
Metal bowl guard						
MSB6	Manual rotary	G½	40		**530252**	**MSB6-1/2-FRC9:J11M2**
			5		**530234**	**MSB6-1/2-FRC11:J9M2**
	Fully automatic	G½	40		**530232**	**MSB6-1/2-FRC10:J12M2**
			5		**530236**	**MSB6-1/2-FRC12:J10M2**

Accessories – MS4/MS6



Accessories		➔ Page/online
1	Cover cap MS4/6-END	1406
3	Connection plate kit MS4/6-AG...	1406
8	Module connector MS4/6-MV	1406
9	Mounting bracket MS4/6-WP	1406
10	Mounting bracket MS4/6-WPB	1406

Accessories		➔ Page/online
11	Mounting bracket MS4/6-WPE	1406
12	Mounting bracket MS4/6-WPM	1406
26	Padlock LRVS-D	1409
–	Special oil OFSW	1409
–	Filter cartridge MS4/6-LFP	1409

Filtration and pressure control in one module

+ High flow rate
+ Efficient condensate and particle separation

Filter regulators

MS-LFR★

MS series

Filter regulators

MS-LFR ★

Overview, configuration and ordering
➔ **www.festo.com/catalogue/ms-lfr** ✓

Additional information, support and user documentation
➔ **www.festo.com/sp/ms-lfr** ✓

Quick ordering of basic designs
➔ page 1317 ✓

Selected types in accordance with the ATEX Directive for explosive atmospheres
➔ **www.festo.com/catalogue/ex** ✓

+ Good regulation characteristics with minimal hysteresis and primary pressure compensation
+ Good particle and condensate separation
+ Available with or without secondary exhausting
+ MS4-LFR, MS6-LFR: directly actuated diaphragm regulator
+ MS9-LFR: piloted or directly actuated diaphragm regulator
+ MS12-LFR: piloted diaphragm regulator
+ Lockable rotary knob

Filter regulators MS-LFR ★

Product range overview

Size	Pneumatic connection	Product options																		
		D5	D6	D7	E	C	R	U	M	H	V	DI	VS	AG	A8	A4	AD...	BAR	AS	Z
4	⅛, ¼	■	■	■	■	■	■	■	■	■	■	–	■	–[1]	■	■	■	–[1]	■	■
6	¼, ⅜, ½	■	■	■	■	■	■	■	■	■	■	–	■	–[1]	–	■	■	–[1]	■	■
9	¾, 1, G	■	■	■	■	■	–	■	■	■	■	■	■	■	–	■	■	■	■	■
12	G	–	■	■	■	■	–	■	■	–	■	–	■	–[1]	–	■	–	–[1]	■	■

1) MS pressure gauge with indicating range in bar included in the basic configuration by default.

Product options

⅛ Female thread G⅛
¼ Female thread G¼
⅜ Female thread G⅜
½ Female thread G½
¾ Female thread G¾
1 Female thread G1
AGA Connecting plate G1/8
AGB Connecting plate G¼
AGC Connecting plate G3/8
AGD Connecting plate G½
AGE Connecting plate G¾
AGF Connecting plate G1
AGG Connecting plate G1¼
AGH Connecting plate G1½
AGI Connecting plate G2
N¾ Female thread NPT¾
N1 Female thread NPT1
AQK Connecting plate NPT1/8
AQN Connecting plate NPT¼
AQP Connecting plate NPT3/8
AQR Connecting plate NPT½
AQS Connecting plate NPT¾
AQT Connecting plate NPT1
AQU Connecting plate NPT1¼
AQV Connecting plate NPT1½
G Module without connecting thread, without connecting plate
NG Module without connecting thread, without connecting plate (inch)

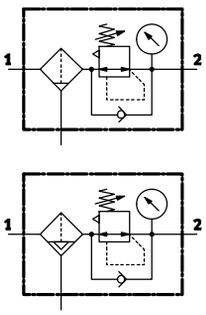
D5 Pressure regulation range 0.3 ... 4 bar
D6 Pressure regulation range 0.3 ... 7 bar
D7 Pressure regulation range 0.5 ... 12 bar
D8 Pressure regulation range 0.5 ... 16 bar
E Grade of filtration 40 µm
C Grade of filtration 5 µm
R Plastic bowl with plastic bowl guard
U Metal bowl guard
M Manual condensate drain
H Semi-automatic condensate drain
V Fully automatic condensate drain
E2 External condensate drain, fully automatic, electric, 110 V AC, terminals
E3 External condensate drain, fully automatic, electric, 230 V AC, terminals
E4 External condensate drain, fully automatic, electric, 24 V DC, terminals
DI Directly actuated regulator
VS Cover plate
AG MS pressure gauge
A8 Adapter for EN pressure gauge ⅛, without pressure gauge
A4 Adapter for EN pressure gauge ¼, without pressure gauge

RG Integrated pressure gauge, red/green scale
AD1 Pressure sensor with LCD display, plug M8, 1 switching output PNP, 3-pin
AD2 Pressure sensor with LCD display, plug M8, 1 switching output NPN, 3-pin
AD3 Pressure sensor with LCD display, plug M12, 1 switching output PNP, 4-pin, analogue output 4 ... 20 mA
AD4 Pressure sensor with LCD display, plug M12, 1 switching output NPN, 4-pin, analogue output 4 ... 20 mA
AD7 Pressure sensor with operational status indicator, plug M8, threshold value comparator, PNP, N/O
AD8 Pressure sensor with operational status indicator, plug M8, threshold value comparator, PNP, N/C
AD9 Pressure sensor with operational status indicator, plug M8, window comparator, PNP, N/O
AD10 Pressure sensor with operational status indicator, plug M8, window comparator, PNP, N/C
BAR Pressure gauge scale in bar
PSI Pressure gauge scale in psi
MPA Pressure gauge scale in MPa
OS Without secondary exhausting

LD Long rotary knob
AS Rotary knob with detent, can be locked using accessories
E11 Rotary knob with integrated lock
WR Mounting bracket with knurled nut for regulator head
WP Mounting bracket standard design
WPM Mounting bracket for hooking in service units
WPB Mounting bracket for large wall gap
WB Mounting bracket centrally at rear (wall mounting top and bottom), connecting plates not required
WBM Mounting bracket centrally at rear (wall mounting top), connecting plates not required
EX4 EU certification (II 2GD to EU Explosion Protection Directive (ATEX))
UL1 UL certification (cULus, ordinary locations for Canada and USA)
Z Direction of flow from right to left

Filter regulators MS-LFR ★

Data sheet



Technical data Download CAD data ➔ **www.festo.com**

Size		MS4		MS6			MS9		
Pneumatic connection 1, 2		G1⁄8	G1⁄4	G1⁄4	G3⁄8	G1⁄2	G3⁄4	G1	–[1]
Design		Filter regulator with/without pressure indication							
		–					Piloted diaphragm regulator		
		Directly actuated diaphragm regulator							
Regulating function		With return flow action, with secondary exhausting, with primary pressure compensation							
Type of mounting		Via accessories							
		In-line installation							
Assembly position		Vertical ±5°							
Grade of filtration [µm]		40							
		5							
Air purity class at the output		Compressed air to ISO 8573-1:2010 [7:4:4] (grade of filtration 40 µm)							
		Compressed air to ISO 8573-1:2010 [6:4:4] (grade of filtration 5 µm)							
Bowl guard		Plastic bowl guard					–		
		Integrated as metal bowl guard							
Condensate drain		Manual rotary							
		Semi-automatic							
		Fully automatic							
Actuator lock		Rotary knob with detent, can be locked using accessories							
Pressure regulation range [bar]	D5	0.5 ... 4							
	D6	0.5 ... 7							
	D7	0.5 ... 12 (0.5 ... 10 bar with pressure sensor AD...)							
Pressure indication		Via pressure gauge for indicating the outlet pressure							
	AD1/AD3	Via pressure sensor with LCD display for indicating the outlet pressure and with electrical output					–		
	AD7/AD9	Via pressure sensor with operational status indicator for indicating the outlet pressure and with electrical output							
Length [mm]	Standard	57		77			109		
	With cover plate VS	54		76			109		
	With adapter A8/A4	59		79			110		
	With pressure sensor AD1/AD3	83		103			–		
	With pressure sensor AD7/AD9	59		79			112		
Width [mm]		40		62			104		90
Height [mm]	Plastic bowl guard	219 ... 223[2] + 25[3]		301 ... 306[2] + 68[3]			–		
	Metal bowl guard	237 ... 240[2] + 25[3]		313 + 68[3]			450 + 150[3]		

1) Module without connecting thread/without connecting plate. The connecting plate must be ordered separately as an accessory ➔ page 1406.
2) Value is dependent on the condensate drain.
3) Installation dimension for removing the filter bowl.

Data sheet

Standard nominal flow rate q_{nN}								
Size		MS4		MS6			MS9	
Pneumatic connection 1, 2		G⅛	G¼	G¼	G⅜	G½	G¾	G1
Pressure regulation range D5[1]								
Grade of filtration 40 µm	[l/min]	1100	1900	2200	6000	7200	18000 ±15% (16000 ±15%)[3]	23000 ±15% (20000 ±15%)[3]
Grade of filtration 5 µm	[l/min]	900	1800	2000	5500	6900	17000 ±15% (16000 ±15%)[3]	20000 ±15% (18000 ±15%)[3]
Pressure regulation range D6[2]								
Grade of filtration 40 µm	[l/min]	1000	1700	2800	5700	6200	16000 ±15% (12000 ±15%)[3]	20000 ±15% (10000 ±15%)[3]
Grade of filtration 5 µm	[l/min]	900	1500	2700	5000	5600	15000 ±15% (12000 ±15%)[3]	18000 ±15% (10000 ±15%)[3]
Pressure regulation range D7[2]								
Grade of filtration 40 µm	[l/min]	900	1500	2500	4000	4500	16000 ±15%	20000 ±15%
Grade of filtration 5 µm	[l/min]	850	1200	2200	3500	4000	15000 ±15%	18000 ±15%

1) MS4/MS6: Measured at p1 = 10 bar and p2 = 3 bar, Δp = 1 bar.
MS9: Measured at p1 = 10 bar and p2 = 4 bar, Δp = 1 bar.
2) Measured at p1 = 10 bar and p2 = 6 bar, Δp = 1 bar.
3) Value in brackets applies to the directly actuated filter regulator MS9-LFR-...-DI.

Operating conditions						
Condensate drain		Manual rotary			Semi-automatic	Fully automatic
Size		MS4	MS6	MS9	MS4/MS6/MS9	MS4/MS6/MS9
Operating medium		Compressed air to ISO 8573-1:2010 [–:4:–]				Compressed air to ISO 8573-1:2010 [7:4:–]
		Inert gases				
Operating pressure	[bar]	0.8 ... 14	0.8 ... 20	1 ... 20	1.5 ... 12	2 ... 12
Ambient temperature	[°C]	–10 ... +60 (0 ... +50)[4]			+5 ... +60 (+5 ... +50)[4]	+5 ... +60 (+5 ... +50)[4]

4) Value in brackets applies to MS4/MS6/MS9-LFR with pressure sensor AD...

Materials		
Housing		Die-cast aluminium
Rotary knob		PA, POM
Bowl	Plastic bowl guard	PC
	Metal bowl guard	Wrought aluminium alloy, die-cast aluminium
Seals		NBR

Filter regulators MS-LFR ★

Order code – MS4

MS | 4 | – | LFR | – | | – | | – | | | | – | | – | AS | –

Series

MS	Standard service unit

Size

4	Grid dimension 40 mm

Type code

LFR	Filter regulator

Pneumatic connection

1/8	Female thread G⅛
1/4	Female thread G¼

Pressure regulation range

D5	0.3 ... 4 bar
D6	0.3 ... 7 bar
D7	0.5 ... 12 bar

Grade of filtration

E	40 µm
C	5 µm

Bowl guard

R	Plastic bowl guard
U	Integrated as metal bowl guard

Condensate drain

M	Manual rotary
H	Semi-automatic
V	Fully automatic

Pressure gauge alternatives

–	With MS pressure gauge, bar	
VS	Cover plate	
A8	Adapter for EN pressure gauge ⅛	
A4	Adapter for EN pressure gauge ¼	
AD1	Pressure sensor with display, plug M8, 1 switching output PNP, 3-pin	1
AD3	Pressure sensor with display, plug M12, 1 switching output PNP, 4-pin, analogue output 4 ... 20 mA	1
AD7	Pressure sensor without display, plug M8, threshold value comparator, PNP, N/O	1
AD9	Pressure sensor without display, plug M8, window comparator, PNP, N/O	1

Security

AS	Rotary knob with detent, can be locked using accessories

Flow direction

–	From left to right
Z	From right to left

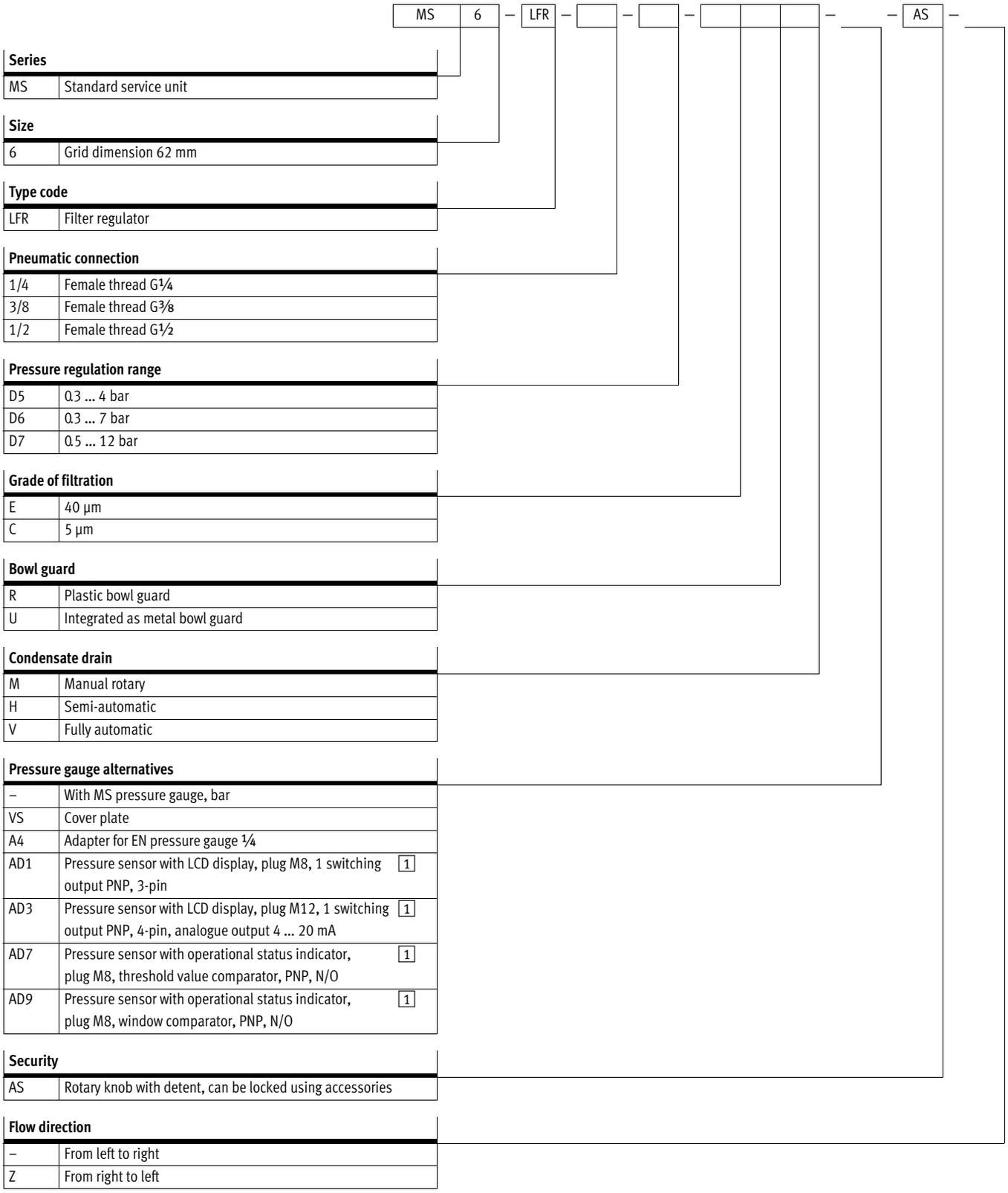
1 Measuring range max. 10 bar.

Order example:

MS4-LFR-1/4-D7-ERM-AS

Standard service unit, grid dimension 40 mm - filter regulator - female thread G¼ - pressure regulation range 0.5 ... 12 bar - grade of filtration 40 µm - plastic bowl guard - manual rotary condensate drain - with MS pressure gauge, bar - rotary knob with detent, can be locked using accessories - flow direction from left to right

Order code – MS6



Series	
MS	Standard service unit

Size	
6	Grid dimension 62 mm

Type code	
LFR	Filter regulator

Pneumatic connection	
1/4	Female thread G¼
3/8	Female thread G⅜
1/2	Female thread G½

Pressure regulation range	
D5	0.3 ... 4 bar
D6	0.3 ... 7 bar
D7	0.5 ... 12 bar

Grade of filtration	
E	40 µm
C	5 µm

Bowl guard	
R	Plastic bowl guard
U	Integrated as metal bowl guard

Condensate drain	
M	Manual rotary
H	Semi-automatic
V	Fully automatic

Pressure gauge alternatives	
–	With MS pressure gauge, bar
VS	Cover plate
A4	Adapter for EN pressure gauge ¼
AD1	Pressure sensor with LCD display, plug M8, 1 switching output PNP, 3-pin [1]
AD3	Pressure sensor with LCD display, plug M12, 1 switching output PNP, 4-pin, analogue output 4 ... 20 mA [1]
AD7	Pressure sensor with operational status indicator, plug M8, threshold value comparator, PNP, N/O [1]
AD9	Pressure sensor with operational status indicator, plug M8, window comparator, PNP, N/O [1]

Security	
AS	Rotary knob with detent, can be locked using accessories

Flow direction	
–	From left to right
Z	From right to left

[1] Measuring range max. 10 bar.

Order example:

MS6-LFR-1/2-D7-CRM-AS

Standard service unit, grid dimension 62 mm - filter regulator - female thread G½ - pressure regulation range 0.5 ... 12 bar - grade of filtration 5 µm - plastic bowl guard - manual rotary condensate drain - with MS pressure gauge, bar - rotary knob with detent, can be locked using accessories - flow direction from left to right

Filter regulators MS-LFR ★

Order code – MS9

MS | 9 | – | LFR | – | | – | | – | | U | | – | | – | | – | AS | –

Series

MS	Standard service unit

Size

9	Grid dimension 90 mm

Type code

LFR	Filter regulator

Pneumatic connection

3/4	Female thread G¾
1	Female thread G1
G	Module without connecting thread, without connecting plate Connecting plates ➔ page 1406

Pressure regulation range

D5	0.5 ... 4 bar
D6	0.5 ... 7 bar
D7	0.5 ... 12 bar

Grade of filtration

E	40 µm
C	5 µm

Bowl guard

U	Integrated as metal bowl guard

Condensate drain

M	Manual rotary
H	Semi-automatic
V	Fully automatic

Regulator type

–	Piloted	
DI	Directly actuated	1

Pressure gauge/pressure gauge alternatives

VS	Cover plate	
AG	With MS pressure gauge	
A4	Adapter for EN pressure gauge ¼	
AD7	Pressure sensor with operational status indicator, plug M8, threshold value comparator, PNP, N/O	2
AD9	Pressure sensor with operational status indicator, plug M8, window comparator, PNP, N/O	2

Alternative pressure gauge scale

–	No pressure gauge scale	3
BAR	Bar	4

Security

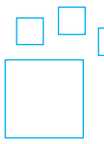
AS	Rotary knob with detent, can be locked using accessories

Flow direction

–	From left to right
Z	From right to left

1 Only with pressure regulation range D5, D6.
2 Measuring range max. 10 bar.
3 Not with MS pressure gauge AG.
4 Only with MS pressure gauge AG.

Ordering – Product options



Configurable product

This product and all its options can be ordered using the configurator.

The configurator can be found under Products on the DVD or
➔ **www.festo.com/catalogue/...**

Enter the type code in the search field.

★ Quick ordering[1)]

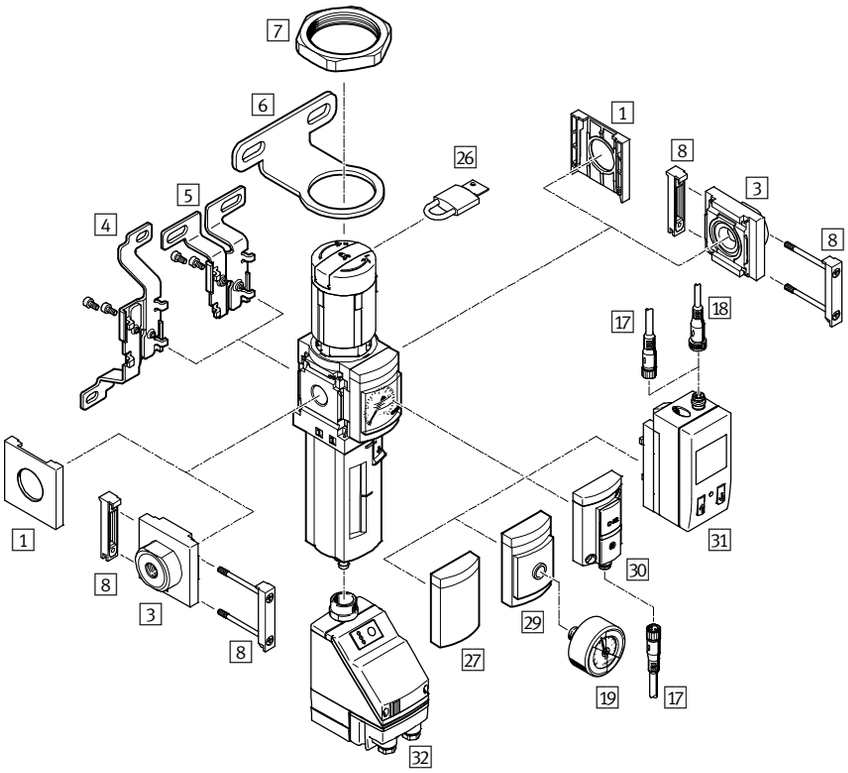
Part no.	Type code
MS4	
529144	**MS4-LFR-1/4-D6-CRM-AS**
529146	**MS4-LFR-1/4-D6-CRV-AS**
529148	**MS4-LFR-1/4-D6-ERM-AS**
529150	**MS4-LFR-1/4-D6-ERV-AS**
529152	**MS4-LFR-1/4-D7-CRM-AS**
529154	**MS4-LFR-1/4-D7-CRV-AS**
–	**–**
535720	**MS4-LFR-1/4-D7-CUV-AS**
529156	**MS4-LFR-1/4-D7-ERM-AS**
529158	**MS4-LFR-1/4-D7-ERV-AS**
535724	**MS4-LFR-1/4-D7-EUM-AS**
535722	**MS4-LFR-1/4-D7-EUV-AS**

Part no.	Type code
MS6	
529176	**MS6-LFR-1/2-D6-CRM-AS**
529178	**MS6-LFR-1/2-D6-CRV-AS**
529180	**MS6-LFR-1/2-D6-ERM-AS**
529182	**MS6-LFR-1/2-D6-ERV-AS**
529184	**MS6-LFR-1/2-D7-CRM-AS**
529186	**MS6-LFR-1/2-D7-CRV-AS**
530338	**MS6-LFR-1/2-D7-CUM-AS**
530340	**MS6-LFR-1/2-D7-CUV-AS**
529188	**MS6-LFR-1/2-D7-ERM-AS**
529190	**MS6-LFR-1/2-D7-ERV-AS**
529192	**MS6-LFR-1/2-D7-EUM-AS**
529194	**MS6-LFR-1/2-D7-EUV-AS**

1) All products in this table are easy to select and quick to order.

Filter regulators MS-LFR ★

Accessories – MS4/MS6



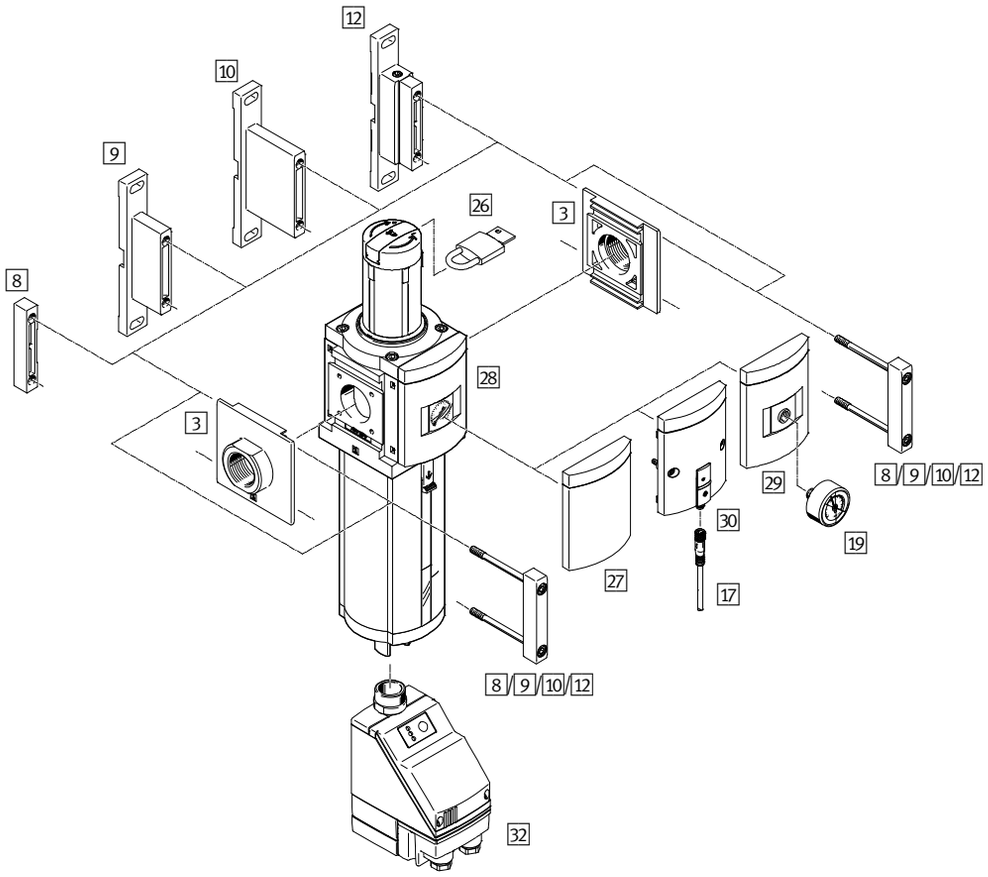
Accessories		➔ Page/online
1	Cover cap MS4/6-END	1406
3	Connecting plate kit MS4/6-AG...	1406
4	Mounting bracket MS4/6-WB[1)]	1406
5	Mounting bracket MS4-WBM[1)]	1406
6	Mounting bracket MS4/6-WR[1)]	1406
7	Hex nut MS4/6-WRS[1)]	1406
8	Module connector MS4/6-MV	1406
17	Connecting cable NEBU-M8...-LE3	1407
18	Connecting cable NEBU-M12...-LE4	1407
19	Pressure gauge MA	1408
26	Padlock LRVS-D	1409
27	Cover plate VS	1314
29	Adapter A8/A4 for EN pressure gauge ⅛/¼	1314
30	Pressure sensor with operational status indicator AD7/AD9	1314
31	Pressure sensor with LCD display AD1/AD3	1314

1) Mounting component for individual device.

Accessories		➔ Page/online
32	Fully automatic condensate drain, electrically actuated (for MS6 only)	**ms6-lfr**
–	Mounting plate MS4/6-AEND	1406
–	Mounting bracket MS4/6-WP[2)]	1406
–	Mounting bracket MS4/6-WPB[2)]	1406
–	Mounting bracket MS4/6-WPE[2)]	1406
–	Mounting bracket MS4/6-WPM[2)]	1406
–	Module connector MS4/6-RMV	1409
–	Module connector MS4-6-AMV	1409
–	Module connector MS6-9-AMV	1409
–	Module connector MS6-9-ARMV	1409
–	Filter cartridge MS4/6-LFP	1409
–	Power supply module MS4/6-E-IPM	**ms*-e-ipm***
–	Branching module MS4/6-A-IPM	**ms*-a*ipm***

2) Mounting component and connector for a combination of devices or individual devices with connecting plate kit MS4/6-AG... 3/with mounting plate MS4/6-AEND.

Accessories – MS9



Accessories		➔ Page/online
3	Connecting plate kit MS9-AG...[1]	1406
8	Module connector MS9-MV[1]	1406
9	Mounting bracket MS9-WP	1406
10	Mounting bracket MS9-WPB	1406
12	Mounting bracket MS9-WPM[1]	1406
17	Connecting cable NEBU-M8...-LE3	1407
19	Pressure gauge MA	1408
26	Padlock LRVS-D	1409
27	Cover plate VS	1316

Accessories		➔ Page/online
28	MS pressure gauge AG	1316
29	Adapter A4 for EN pressure gauge ¼	1316
30	Pressure sensor with operational status indicator AD7/AD9	1316
32	Fully automatic condensate drain, electrically actuated	ms9-lfr
–	Module connector MS9-RMV	1409
–	Module connector MS6-9-AMV	1409
–	Module connector MS6-9-ARMV	1409
–	Filter cartridge MS9-LFP	1409

1) Not suitable for individual devices with connecting thread G¾ or G1.

Low pressure fluctuations for high system safety

+ High flow rate
+ Good pressure control characteristics
+ Lockable pressure setting

Regulators › MS series ›

Pressure regulators

MS-LR★

MS series

Pressure regulators

MS-LR★

Overview, configuration and ordering
➔ **www.festo.com/catalogue/ms-lr** ✓

Additional information, support and user documentation
➔ **www.festo.com/sp/ms-lr** ✓

Quick ordering of basic designs
➔ page 1329 ✓

Selected types in accordance with the ATEX Directive for explosive atmospheres
➔ **www.festo.com/catalogue/ex** ✓

+ Good regulation characteristics with minimal hysteresis and primary pressure compensation
+ High flow rate with minimal pressure drop
+ Optionally available without secondary exhausting
+ Lockable rotary knob
+ With pressure sensor with display and rotary knob pressure gauge
+ Sizes 4, 6, 9, 12
+ Grid dimension 40, 62, 90, 124 mm

Pressure regulators MS-LR ★

Product range overview

Size	Pneumatic connection	Product options														
		D5	D6	D7	PO	DI	VS	AG	A8	A4	AD...	BAR	DM1	DM2	AS	Z
4	⅛, ¼	■	■	■	–	–	■	–[1]	■	■	■	–[1]	■	■	■	■
6	¼, ⅜, ½	■	■	■	–	–	■	–[1]	–	■	■	–[1]	–	■	■	■
9	¾, 1, G	■	■	■	■	■	■	■	–	■	■	■	–	–	■	■
12	G	–	■	■	■	–	■	–[1]	–	■	–	–[1]	–	–	■	■

1) MS pressure gauge with indicating range in bar included in the basic configuration by default.

Product options

⅛ Female thread G⅛
¼ Female thread G¼
⅜ Female thread G⅜
½ Female thread G½
¾ Female thread G¾
1 Female thread G1
AGA Connecting plate G⅛
AGB Connecting plate G¼
AGC Connecting plate G⅜
AGD Connecting plate G½
AGE Connecting plate G¾
AGF Connecting plate G1
AGG Connecting plate G1¼
AGH Connecting plate G1½
AGI Connecting plate G2
N¾ Female thread NPT¾
N1 Female thread NPT1
AQK Connecting plate NPT⅛
AQN Connecting plate NPT¼
AQP Connecting plate NPT⅜
AQR Connecting plate NPT½
AQS Connecting plate NPT¾
AQT Connecting plate NPT1
AQU Connecting plate NPT1¼
AQV Connecting plate NPT1½
G Module without connecting thread, without connecting plate
NG Module without connecting thread, without connecting plate (inch)

D5 Pressure regulation range 0.3 ... 4 bar, manually operated
D6 Pressure regulation range 0.3 ... 7 bar, manually operated
D7 Pressure regulation range 0.5 ... 12 bar, manually operated
D8 Pressure regulation range 0.5 ... 16 bar, manually operated
PO Pressure regulation range 0.5 ... 16 bar, pneumatically actuated
PE6 Pressure regulation range 0.15 ... 6 bar, solenoid actuated
DI Directly actuated regulator
VS Cover plate
AG MS pressure gauge
A8 Adapter for EN pressure gauge ⅛, without pressure gauge
A4 Adapter for EN pressure gauge ¼, without pressure gauge
RG Integrated pressure gauge, red/green scale
AD1 Pressure sensor with LCD display, plug M8, 1 switching output PNP, 3-pin
AD2 Pressure sensor with LCD display, plug M8, 1 switching output NPN, 3-pin

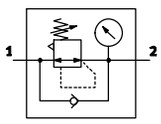
AD3 Pressure sensor with LCD display, plug M12, 1 switching output PNP, 4-pin, analogue output 4 ... 20 mA
AD4 Pressure sensor with LCD display, plug M12, 1 switching output NPN, 4-pin, analogue output 4 ... 20 mA
AD7 Pressure sensor with operational status indicator, plug M8, threshold value comparator, PNP, N/O
AD8 Pressure sensor with operational status indicator, plug M8, threshold value comparator, PNP, N/C
AD9 Pressure sensor with operational status indicator, plug M8, window comparator, PNP, N/O
AD10 Pressure sensor with operational status indicator, plug M8, window comparator, PNP, N/C
BAR Pressure gauge scale in bar
PSI Pressure gauge scale in psi
MPA Pressure gauge scale in MPa
OS Without secondary exhausting
LD Long rotary knob
DM1 Rotary knob pressure gauge, small
DM2 Rotary knob pressure gauge, large
KD Rotary knob underneath
AS Rotary knob with detent, can be locked using accessories
E11 Rotary knob with integrated lock

WR Mounting bracket with knurled nut for regulator head
WP Mounting bracket standard design
WPM Mounting bracket for hooking in service units
WPB Mounting bracket for large wall gap
WB Mounting bracket centrally at rear (wall mounting top and bottom), connecting plates not required
WBM Mounting bracket centrally at rear (wall mounting top), connecting plates not required
EX4 EU certification (II 2GD to EU Explosion Protection Directive (ATEX))
UL1 UL certification (cULus, ordinary locations for Canada and USA)
Z Direction of flow from right to left

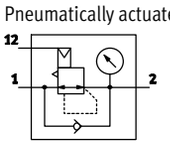
Pressure regulators MS-LR ★

Data sheet

Manually operated D5/D6/D7



Pneumatically actuated PO



Technical data Download CAD data ➔ **www.festo.com**

Size			MS4		MS6			MS9		
Pneumatic connection 1, 2			G1⁄8	G1⁄4	G1⁄4	G3⁄8	G1⁄2	G3⁄4	G1	–[1]
Pilot air connection 12 with pressure regulation range PO			–					G1⁄4		
Design			–					Piloted diaphragm regulator		
			Directly actuated diaphragm regulator							
Regulating function			With return flow action, with secondary exhausting, with primary pressure compensation							
Type of mounting			Via accessories							
			In-line installation							
			Front panel mounting							
Assembly position			Optional							
Actuator lock			Rotary knob with detent, can be locked using accessories							
Pressure regulation range/operation [bar]		D5	0.5 ... 4, manually operated[2]							
		D6	0.5 ... 7, manually operated[2]							
		D7	0.5 ... 12, manually operated (0.5 ... 10 bar with pressure sensor AD...)[2]							
		PO[3]	–					0.5 ... 16, pneumatically actuated		
Pressure indication			Via pressure gauge for indicating the outlet pressure							
		DM1/DM2	Via pressure gauge in rotary knob for indicating the outlet pressure					–		
		AD1/AD3	Via pressure sensor with LCD display for indicating the outlet pressure and with electrical output					–		
		AD7/AD9	Via pressure sensor with operational status indicator for indicating the outlet pressure and with electrical output							
Length [mm]	With MS pressure gauge		57		77			109		
	With cover plate VS		54		76			109		
	With adapter A8/A4		59		79			110		
	With pressure sensor AD1/AD3		83		103			–		
	With pressure sensor AD7/AD9		59		79			112		
Width [mm]	Standard		40		62			104		90
	With rotary knob pressure gauge DM2		52		62			–		
Height [mm]	With rotary knob with detent, can be locked using accessories AS		119		189			225 (218)[4]		
	With rotary knob pressure gauge DM1		113		–			–		
	With rotary knob pressure gauge DM2		115		178			–		
	With pressure regulation range PO		–		–			120		

1) Module without connecting thread/without connecting plate. The connecting plate must be ordered separately as an accessory ➔ page 1406.
2) MS4: The pressure regulation range for pressure regulators with rotary knob pressure gauge DM... starts at 0.8 bar.
3) Outlet pressure p2 corresponds roughly to the applied pilot pressure p12.
4) Value in brackets applies to the directly actuated pressure regulator MS9-LR-...-DI.

Data sheet

Standard nominal flow rate q_{nN}

Size		MS4		MS6			MS9	
Pneumatic connection 1, 2		G⅛	G¼	G¼	G⅜	G½	G¾	G1
Pressure regulation range D5[1]	[l/min]	1200	2100	2400	5500	7500	19000 ±15% (14000 ±15%)[3]	26000 ±15% (20000 ±15%)[3]
Pressure regulation range D6[2]	[l/min]	1150	1800	3000	5800	6500	17000 ±15% (14000 ±15%)[3]	20000 ±15% (11000 ±15%)[3]
Pressure regulation range D7[2]	[l/min]	1000	1700[4]	2700	4500	5500	17000 ±15%	20000 ±15%
Pressure regulation range PO[2]	[l/min]	–	–	–	–	–	21000 ±15%	25000 ±15%

1) MS4/MS6: Measured at p1 = 10 bar and p2 = 3 bar, Δp = 1 bar.
MS9: Measured at p1 = 10 bar and p2 = 4 bar, Δp = 1 bar.
2) Measured at p1 = 10 bar and p2 = 6 bar, Δp = 1 bar.
3) Value in brackets applies to the directly actuated pressure regulator MS9-LR-...-DI.
4) q_{nN} = 800 l/min, $q_{n\,max}$ = 2200 l/min with rotary knob pressure gauge DM1/DM2.

Operating conditions

Size		MS4	MS6	MS9
Operating medium		Compressed air to ISO 8573-1:2010 [7:4:4]		
		Inert gases		–
Note on the operating/pilot medium		Lubricated operation possible (in which case lubricated operation will always be required)		
Operating pressure	[bar]	0.8 ... 14	0.8 ... 20	1 ... 20
Ambient temperature	[°C]	–10 ... +60 (0 ... +50)[5]	–10 ... +60 (0 ... +50)[5]	–10 ... +60 (0 ... +50)[5]

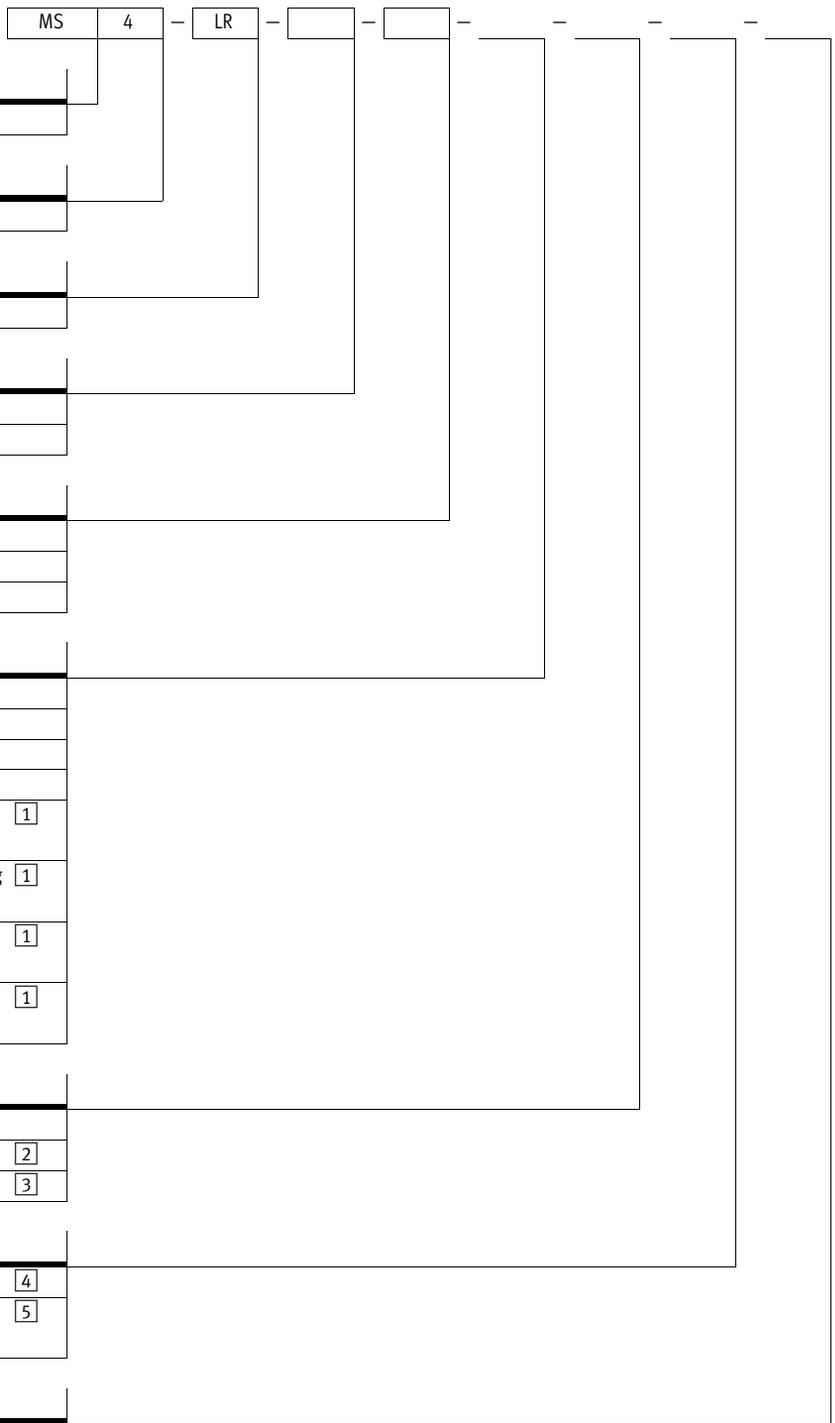
5) Value in brackets applies to MS4/MS6/MS9-LR with pressure sensor AD...

Materials

Housing	Die-cast aluminium
Rotary knob	PA/POM
Seals	NBR

Pressure regulators MS-LR ★

Order code – MS4



Series	
MS	Standard service unit

Size	
4	Grid dimension 40 mm

Type code	
LR	Pressure regulator

Pneumatic connection	
1/8	Female thread G⅛
1/4	Female thread G¼

Pressure regulation range/operation	
D5	0.3 ... 4 bar, manually operated
D6	0.3 ... 7 bar, manually operated
D7	0.5 ... 12 bar, manually operated

Pressure gauge alternatives		
–	With MS pressure gauge, bar	
VS	Cover plate	
A8	Adapter for EN pressure gauge ⅛	
A4	Adapter for EN pressure gauge ¼	
AD1	Pressure sensor with LCD display, plug M8, 1 switching output PNP, 3-pin	[1]
AD3	Pressure sensor with LCD display, plug M12, 1 switching output PNP, 4-pin, analogue output 4 ... 20 mA	[1]
AD7	Pressure sensor with operational status indicator, plug M8, threshold value comparator, PNP, N/O	[1]
AD9	Pressure sensor with operational status indicator, plug M8, window comparator, PNP, N/O	[1]

Rotary knob alternative		
–	Standard rotary knob	
DM1	Rotary knob pressure gauge, small	[2]
DM2	Rotary knob pressure gauge, large	[3]

Security		
–	None	[4]
AS	Rotary knob with detent, can be locked using accessories	[5]

Flow direction	
–	From left to right
Z	From right to left

[1] Measuring range max. 10 bar.
[2] Only with pressure gauge alternatives VS, A8, A4, AD1, AD3, AD7 or AD9.
[3] Only with pressure gauge alternatives VS, A8 or A4
[4] Only with rotary knob alternative DM1 or DM2.
[5] Not with rotary knob alternative DM1 or DM2.

Order example:

MS4-LR-1/4-D6-A4-DM2

Standard service unit, grid dimension 40 mm - pressure regulator - female thread G¼ - pressure regulation range 0.3 ... 7 bar, manually operated - with adapter for EN pressure gauge ¼ - rotary knob pressure gauge, large - no integrated lock - flow direction from left to right

Order code – MS6

MS | 6 | – | LR | – | | – | | – | – | – | –

Series	
MS	Standard service unit

Size	
6	Grid dimension 62 mm

Type code	
LR	Pressure regulator

Pneumatic connection	
1/4	Female thread G¼
3/8	Female thread G⅜
1/2	Female thread G½

Pressure regulation range/operation	
D5	0.3 ... 4 bar, manually operated
D6	0.3 ... 7 bar, manually operated
D7	0.5 ... 12 bar, manually operated

Pressure gauge alternatives		
–	With MS pressure gauge, bar	
VS	Cover plate	
A4	Adapter for EN pressure gauge ¼	
AD1	Pressure sensor with LCD display, plug M8, 1 switching output PNP, 3-pin	1
AD3	Pressure sensor with LCD display, plug M12, 1 switching output PNP, 4-pin, analogue output 4 ... 20 mA	1
AD7	Pressure sensor with operational status indicator, plug M8, threshold value comparator, PNP, N/O	1
AD9	Pressure sensor with operational status indicator, plug M8, window comparator, PNP, N/O	1

Rotary knob alternative		
–	Standard rotary knob	
DM2	Rotary knob pressure gauge, large	2

Security		
–	None	3
AS	Rotary knob with detent, can be locked using accessories	4

Flow direction	
–	From left to right
Z	From right to left

1 Measuring range max. 10 bar.
2 Only with pressure gauge alternatives VS, A4, AD1, AD3, AD7 or AD9.
3 Only with rotary knob alternative DM2.
4 Not with rotary knob alternative DM2.

Order example:

MS6-LR-1/2-D6-AS

Standard service unit, grid dimension 62 mm - pressure regulator - female thread G½ - pressure regulation range 0.3 ... 7 bar, manually operated - with MS pressure gauge, bar - standard rotary knob - rotary knob with detent, can be locked using accessories - flow direction from left to right

Pressure regulators MS-LR ★

Order code – MS9

MS	9	–	LR	–		–		–		–		–

Series

MS	Standard service unit

Size

9	Grid dimension 90 mm

Type code

LR	Pressure regulator

Pneumatic connection

3/4	Female thread G¾
1	Female thread G1
G	Module without connecting thread, without connecting plate Connecting plates ➔ page 1406

Pressure regulation range/operation

D5	0.5 ... 4 bar, manually operated
D6	0.5 ... 7 bar, manually operated
D7	0.5 ... 12 bar, manually operated
PO	0.5 ... 16 bar, pneumatically actuated

Regulator type

–	Piloted	
DI	Directly actuated	[1]

Pressure gauge/pressure gauge alternatives

AG	With MS pressure gauge	
VS	Cover plate	
A4	Adapter for EN pressure gauge ¼	
AD7	Pressure sensor with operational status indicator, plug M8, threshold value comparator, PNP, N/O	[2]
AD9	Pressure sensor with operational status indicator, plug M8, window comparator, PNP, N/O	[2]

Alternative pressure gauge scale

–	No pressure gauge scale	[3]
BAR	bar	[4]

Security

Pressure regulation range/operation PO	
–	None
Pressure regulation range/operation D5/D6/D7	
AS	Rotary knob with detent, can be locked using accessories

Flow direction

–	From left to right
Z	From right to left

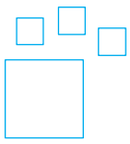
[1] Only with pressure regulation range/operation D5, D6.
[2] Measuring range max. 10 bar.
[3] Not with MS pressure gauge AG.
[4] Only with MS pressure gauge AG.

Order example:

MS9-LR-G-D6-DI-AG-BAR-AS

Standard service unit, grid dimension 90 mm - pressure regulator - module without connecting thread, without connecting plate - pressure regulation range 0.5 ... 7 bar, manually operated - directly actuated regulator - with MS pressure gauge - pressure gauge scale in bar - rotary knob with detent, can be locked using accessories - flow direction from left to right

Ordering – Product options



Configurable product

This product and all its options can be ordered using the configurator.

The configurator can be found under Products on the DVD or
➔ **www.festo.com/catalogue/...**

Enter the type code in the search field.

★ Quick ordering[1)]

Part no.	Type code
MS4	
529415	**MS4-LR-1/4-D5-AS**
529417	**MS4-LR-1/4-D6-AS**
529419	**MS4-LR-1/4-D7-AS**

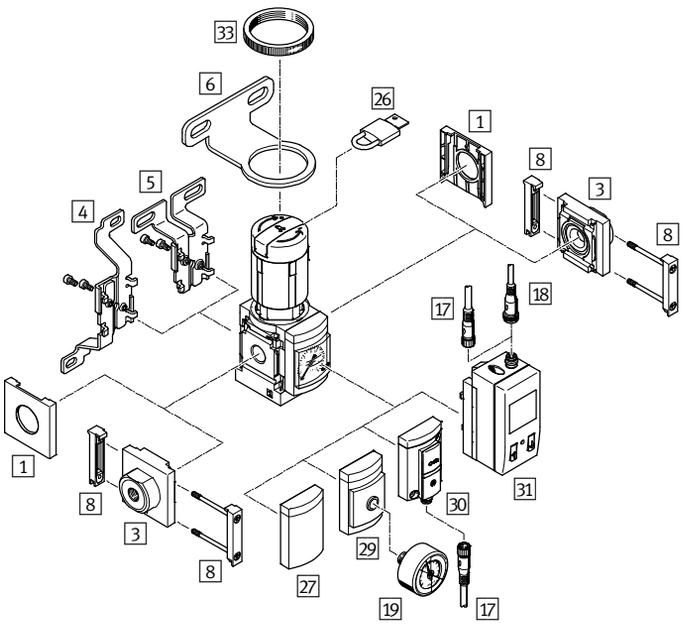
Part no.	Type code
MS6	
529989	**MS6-LR-1/2-D5-AS**
529991	**MS6-LR-1/2-D6-AS**
529993	**MS6-LR-1/2-D7-AS**

1) All products in this table are easy to select and quick to order.

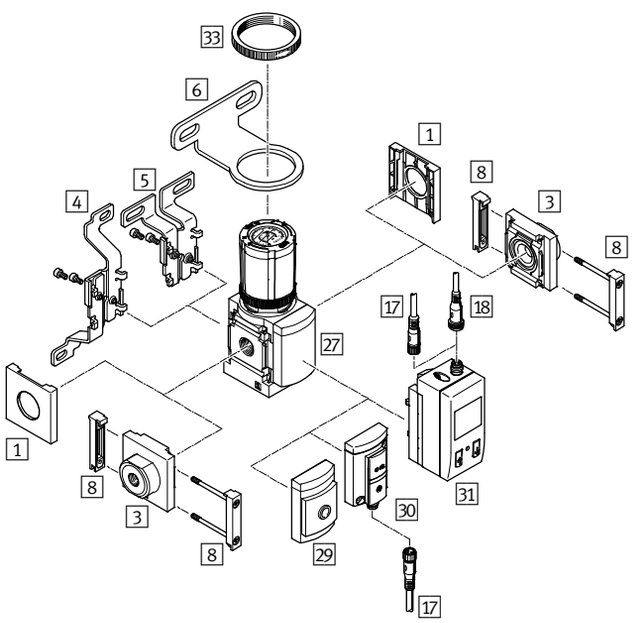
Pressure regulators MS-LR ★

Accessories – MS4/MS6

With standard rotary knob

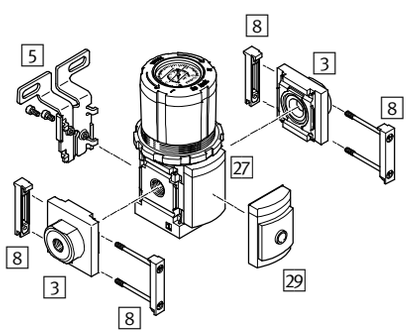


With rotary knob pressure gauge DM1 (MS4 only) or DM2 (MS6 only)



With rotary knob pressure gauge DM2 (MS4 only)

Note
Due to the protruding rotary knob, only a distributor block MS4-FRM-FRZ or a branching module MS4-FRM can be connected as a directly adjacent service unit component.



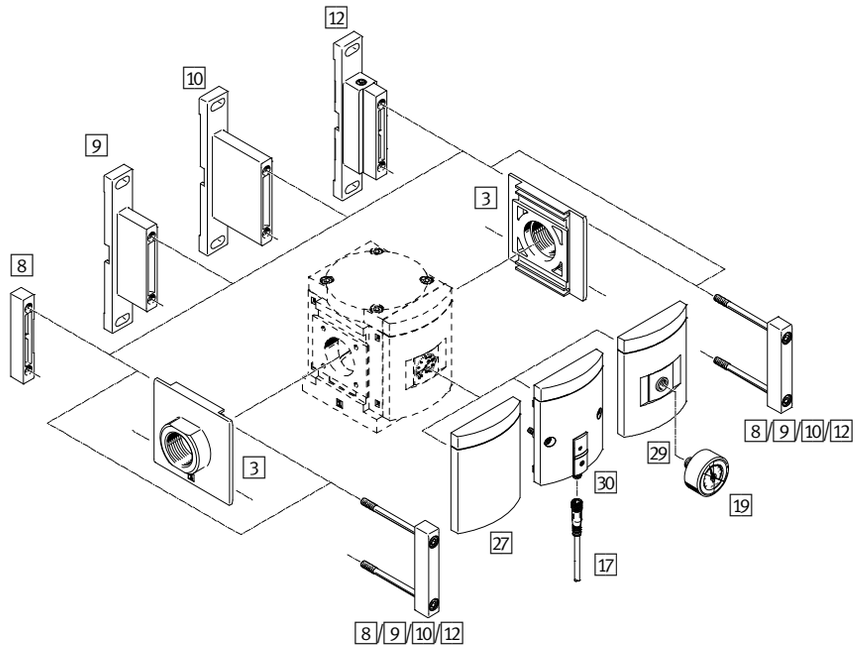
Accessories		➔ Page/online
1	Cover cap MS4/6-END	1406
3	Connecting plate kit MS4/6-AG...	1406
4	Mounting bracket MS4/6-WB[1)]	1406
5	Mounting bracket MS4-WBM[1)]	1406
6	Mounting bracket MS4/6-WR[1)]	1406
8	Module connector MS4/6-MV	1406
17	Connecting cable NEBU-M8...-LE3	1407
18	Connecting cable NEBU-M12...-LE4	1407
19	Pressure gauge MA	1408
26	Padlock LRVS-D	1409
27	Cover plate VS	1326
29	Adapter A8/A4 for EN pressure gauge ⅛/¼	1326
30	Pressure sensor with operational status indicator AD7/AD9	1326

1) Mounting component for individual device.

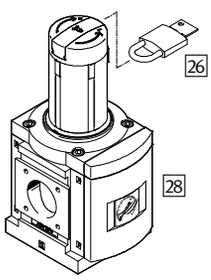
Accessories		➔ Page/online
31	Pressure sensor with LCD display AD1/AD3	1326
33	Knurled nut MS-LR (included in the scope of delivery)	–
–	Mounting plate MS4/6-AEND	1406
–	Mounting bracket MS4/6-WP[2)]	1406
–	Mounting bracket MS4/6-WPB[2)]	1406
–	Mounting bracket MS4/6-WPE[2)]	1406
–	Mounting bracket MS4/6-WPM[2)]	1406
–	Module connector MS4/6-RMV	1409
–	Module connector MS4-6-AMV	1409
–	Module connector MS6-9-AMV	1409
–	Module connector MS6-9-ARMV	1409
–	Power supply module MS4/6-E-IPM	**ms*-e-ipm***
–	Branching module MS4/6-A-IPM	**ms*-a*ipm***

2) Mounting component and connector for a combination of devices or individual devices with connecting plate kit MS4/6-AG... 3/with mounting plate MS4/6-AEND.

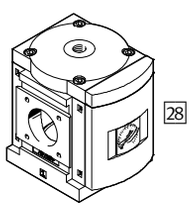
Accessories – MS9



Manually operated D5/D6/D7



Pneumatically actuated PO



Accessories		➔ Page/online
3	Connecting plate-SET MS9-AG...[1)]	1406
8	Module connector MS9-MV[1)]	1406
9	Mounting bracket MS9-WP	1406
10	Mounting bracket MS9-WPB	1406
12	Mounting bracket MS9-WPM[1)]	1406
17	Connecting cable NEBU-M8...-LE3	1407
19	Pressure gauge MA	1408

1) Not suitable for individual devices with connecting thread G¾ or G1.

Accessories		➔ Page/online
26	Padlock LRVS-D	1409
27	Cover plate VS	1328
28	MS pressure gauge AG	1328
29	Adapter A4 for EN pressure gauge ¼	1328
30	Pressure sensor with operational status indicator AD7/AD9	1328
–	Module connector MS9-RMV	1409
–	Module connector MS6-9-AMV	1409
–	Module connector MS6-9-ARMV	1409

Create compact solutions for different pressure ranges

+ High flow rate
+ Internal compressed air supply
+ Flexible pressure output

Regulators › MS series ›

Pressure regulators for manifold assembly

MS-LRB

MS series

Pressure regulators for manifold assembly

MS-LRB

Overview, configuration and ordering
➔ **www.festo.com/catalogue/ms-lrb**

Additional information, support and user documentation
➔ **www.festo.com/sp/ms-lrb**

Selected types in accordance with the ATEX Directive for explosive atmospheres
➔ **www.festo.com/catalogue/ex**

+ For manifold assembly with through air supply
+ For configuring a regulator manifold with independent pressure regulation ranges
+ Good regulation characteristics with minimal hysteresis and primary pressure compensation
+ Actuator lock to protect set values against adjustment
+ Integrated return flow option for exhausting from output 2 to output 1
+ Optionally without secondary exhausting
+ Optional pressure sensor
+ Optional rotary knob pressure gauge

Pressure regulators MS-LRB, for manifold assembly

Product range overview

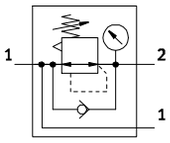
Size	Pneumatic connection	Product options												
		D5	D6	D7	VS	A8	A4	AD...	DM1	DM2	AS	BC	BD	BE	Z
4	¼	■	■	■	■	■	■	■	■	–	■	■	■	–	■
6	½	■	■	■	■	–	■	■	–	■	■	–	■	■	■

Product options

¼ Female thread G¼
½ Female thread G½
AGA Connecting plate G⅛
AGB Connecting plate G¼
AGC Connecting plate G⅜
AGD Connecting plate G½
AGE Connecting plate G¾
D5 Pressure regulation range 0.3 ... 4 bar, manually operated
D6 Pressure regulation range 0.3 ... 7 bar, manually operated
D7 Pressure regulation range 0.5 ... 12 bar, manually operated
D8 Pressure regulation range 0.5 ... 16 bar, manually operated
VS Cover plate
A8 Adapter for EN pressure gauge ⅛, without pressure gauge
A4 Adapter for EN pressure gauge ¼, without pressure gauge
RG Integrated pressure gauge, red/green scale
AD1 Pressure sensor with LCD display, plug M8, 1 switching output PNP, 3-pin
AD2 Pressure sensor with LCD display, plug M8, 1 switching output NPN, 3-pin
AD3 Pressure sensor with LCD display, plug M12, 1 switching output PNP, 4-pin, analogue output 4 ... 20 mA
AD4 Pressure sensor with LCD display, plug M12, 1 switching output NPN, 4-pin, analogue output 4 ... 20 mA
AD7 Pressure sensor with operational status indicator, plug M8, threshold value comparator, PNP, N/O
AD8 Pressure sensor with operational status indicator, plug M8, threshold value comparator, PNP, N/C
AD9 Pressure sensor with operational status indicator, plug M8, window comparator, PNP, N/O
AD10 Pressure sensor with operational status indicator, plug M8, window comparator, PNP, N/C
PSI Pressure gauge scale in psi
MPA Pressure gauge scale in MPa
OS Without secondary exhausting
LD Long rotary knob
DM1 Rotary knob pressure gauge, small
DM2 Rotary knob pressure gauge, large
KD Rotary knob underneath
AS Rotary knob with detent, can be locked using accessories
E11 Rotary knob with integrated lock
BC Angled outlet block QS-6
BD Angled outlet block QS-8
BE Angled outlet block QS-10
WR Mounting bracket with knurled nut for regulator head
WP Mounting bracket standard design
WPM Mounting bracket for hooking in service units
WPB Mounting bracket for large wall gap
WB Mounting bracket centrally at rear (wall mounting top and bottom), connecting plates not required
WBM Mounting bracket centrally at rear (wall mounting top), connecting plates not required
EX4 EU certification (II 2GD to EU Explosion Protection Directive (ATEX))
UL1 UL certification (cULus, ordinary locations for Canada and USA)
Z Pressure output to the front

Pressure regulators MS-LRB, for manifold assembly

Data sheet



Technical data Download CAD data ➔ **www.festo.com**

Size			MS4	MS6
Pneumatic connection 1			G¼	G½
Pneumatic connection 2			G¼	G½
			QS-6 (angled outlet block)	QS-8 (angled outlet block)
			QS-8 (angled outlet block)	QS-10 (angled outlet block)
Design			Directly actuated diaphragm regulator with through compressed air supply	
Regulating function			With return flow action, with secondary exhausting, with primary pressure compensation	
Type of mounting			Via accessories	
			In-line installation	
			Front panel mounting	
Assembly position			Optional	
Actuator lock			Rotary knob with detent, can be locked using accessories	
Pressure regulation range/operation [bar]		D5	0.3 ... 4, manually operated[1]	
		D6	0.3 ... 7, manually operated[1]	
		D7	0.5 ... 12, manually operated (0.5 ... 10 bar with pressure sensor AD...)[1]	
Pressure indicator			Via pressure gauge for indicating the outlet pressure	
		DM1/DM2	Via pressure gauge in the rotary knob for indicating the outlet pressure	
		AD1/AD3	Via pressure sensor with LCD display for indicating the outlet pressure and with electrical output	
		AD7/AD9	Via pressure sensor with operational status indicator for indicating the outlet pressure and with electrical output	
Length [mm]	With MS pressure gauge		57 (78)[2]	77 (100)[2]
	With cover plate VS		54 (75)[2]	76 (99)[2]
	With adapter A8/A4		59 (80)[2]	79 (102)[2]
	With pressure sensor AD1/AD3		83 (104)[2]	103 (126)[2]
	With pressure sensor AD7/AD9		59 (80)[2]	79 (102)[2]
Width [mm]			40	62
Height [mm]	With rotary knob with detent, can be locked using accessories AS		119	189
	With rotary knob pressure gauge DM1		113	–
	With rotary knob pressure gauge DM2		–	178

1) MS4: The pressure regulation range for pressure regulators with rotary knob pressure gauge DM1 starts at 0.8 bar.
2) Value in brackets with angled outlet block.

Standard nominal flow rate q_{nN}

Size		MS4			MS6		
		Standard	Angled outlet block		Standard	Angled outlet block	
			QS-6	QS-8		QS-8	QS-10
Pressure regulation range D5[3]	[l/min]	1900	300	650	7300	600	750
Pressure regulation range D6[4]	[l/min]	1700	350	840	6300	880	1000
Pressure regulation range D7[4]	[l/min]	1500[5]	350	640	5500	800	950

3) Measured at p1 = 10 bar and p2 = 3 bar, Δp = 1 bar.
4) Measured at p1 = 10 bar and p2 = 6 bar, Δp = 1 bar.
5) q_nN = 800 l/min, $q_{n\,max}$ = 2200 l/min with rotary knob pressure gauge DM1.

Pressure regulators MS-LRB, for manifold assembly

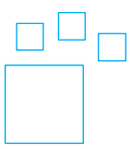
Data sheet

Operating conditions			
Size		MS4	MS6
Operating medium		Compressed air to ISO 8573-1:2010 [7:4:4]	
		Inert gases	
Note on the operating/pilot medium		Lubricated operation possible (in which case lubricated operation will always be required)	
Operating pressure	[bar]	0.8 ... 14	0.8 ... 20
Ambient temperature	[°C]	–10 ... +60 (0 ... +50)[1]	–10 ... +60 (0 ... +50)[1]

1) Value in brackets applies to MS4/MS6-LRB with pressure sensor AD...

Materials	
Housing	Die-cast aluminium
Rotary knob	PA/POM
Seals	NBR

Ordering – Product options



Configurable product

This product and all its options can be ordered using the configurator.

The configurator can be found under Products on the DVD or
➔ **www.festo.com/catalogue/...**

Enter the type code in the search field.

Pressure regulators MS-LRB, for manifold assembly

Order code – MS4

MS	4	–	LRB	–	1/4	–		–		–		–		–

Series

MS	Standard service unit

Size

4	Grid dimension 40 mm

Type code

LRB	Pressure regulator

Pneumatic connection

1/4	Female thread G¼

Pressure regulation range/operation

D5	0.3 ... 4 bar, manually operated
D6	0.3 ... 7 bar, manually operated
D7	0.5 ... 12 bar, manually operated

Pressure gauge alternatives

–	With MS pressure gauge, bar	
VS	Cover plate	[1]
A8	Adapter for EN pressure gauge ⅛	[2]
A4	Adapter for EN pressure gauge ¼	[2]
AD1	Pressure sensor with LCD display, plug M8, 1 switching output PNP, 3-pin	[2]/[3]
AD3	Pressure sensor with LCD display, plug M12, 1 switching output PNP, 4-pin, analogue output 4 ... 20 mA	[2]/[3]
AD7	Pressure sensor with operational status indicator, plug M8, threshold value comparator, PNP, N/O	[3]/[4]
AD9	Pressure sensor with operational status indicator, plug M8, window comparator, PNP, N/O	[3]/[4]

Rotary knob alternative

–	Standard rotary knob
DM1	Rotary knob pressure gauge, small [5]

Security

–	None	[6]
AS	Rotary knob with detent, can be locked using accessories	[7]

Pressure output

–	No angled outlet block
BC	Angled outlet block QS-6
BD	Angled outlet block QS-8

Alternative flow direction

–	Pressure output to the rear
Z	Pressure output to the front

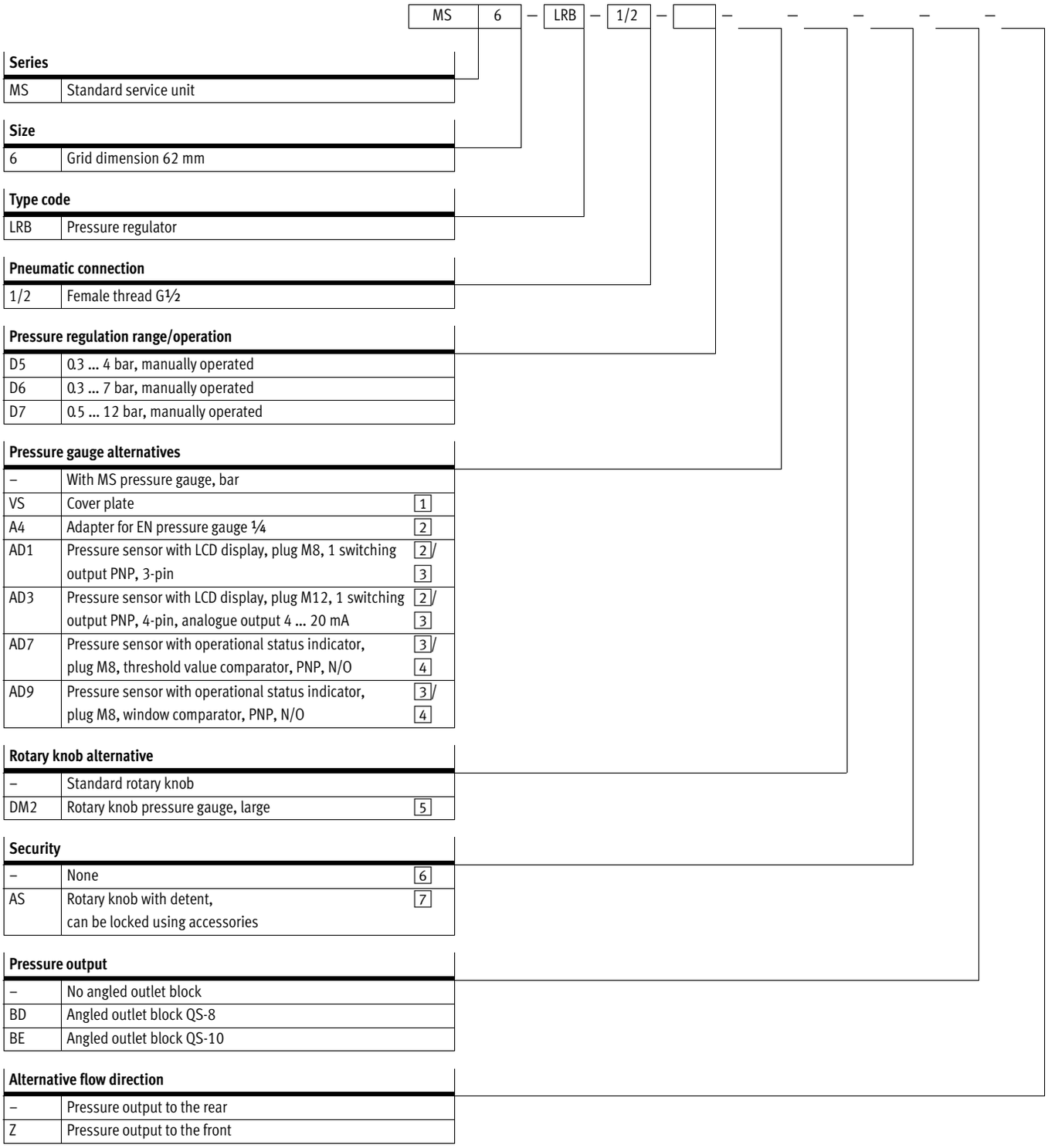
[1] Must be selected if alternative flow direction Z is selected without pressure output BC, BD.
[2] Not in combination with alternative flow direction Z.
[3] Measuring range max. 10 bar.
[4] In combination with alternative flow direction Z only with pressure output BC, BD.
[5] Only with pressure gauge alternatives VS, A8, A4, AD1, AD3, AD7 or AD9.
[6] Only with rotary knob alternative DM1.
[7] Not with rotary knob alternative DM1.

Order example:

MS4-LRB-1/4-D6-VS-DM1-BD

Standard service unit, grid dimension 40 mm - pressure regulator - female thread G¼ - pressure regulation range 0.3 ... 7 bar, manually operated - with cover plate - rotary knob pressure gauge, small - no integrated lock - angled outlet block QS-8 - pressure output to the rear

Order code – MS6



Series	
MS	Standard service unit

Size	
6	Grid dimension 62 mm

Type code	
LRB	Pressure regulator

Pneumatic connection	
1/2	Female thread G½

Pressure regulation range/operation	
D5	0.3 ... 4 bar, manually operated
D6	0.3 ... 7 bar, manually operated
D7	0.5 ... 12 bar, manually operated

Pressure gauge alternatives		
–	With MS pressure gauge, bar	
VS	Cover plate	1
A4	Adapter for EN pressure gauge ¼	2
AD1	Pressure sensor with LCD display, plug M8, 1 switching output PNP, 3-pin	2/3
AD3	Pressure sensor with LCD display, plug M12, 1 switching output PNP, 4-pin, analogue output 4 ... 20 mA	2/3
AD7	Pressure sensor with operational status indicator, plug M8, threshold value comparator, PNP, N/O	3/4
AD9	Pressure sensor with operational status indicator, plug M8, window comparator, PNP, N/O	3/4

Rotary knob alternative		
–	Standard rotary knob	
DM2	Rotary knob pressure gauge, large	5

Security		
–	None	6
AS	Rotary knob with detent, can be locked using accessories	7

Pressure output	
–	No angled outlet block
BD	Angled outlet block QS-8
BE	Angled outlet block QS-10

Alternative flow direction	
–	Pressure output to the rear
Z	Pressure output to the front

1 Must be selected if alternative flow direction Z is selected without pressure output BD, BE.
2 Not in combination with alternative flow direction Z.
3 Measuring range max. 10 bar.
4 In combination with alternative flow direction Z only with pressure output BD, BE.
5 Only with pressure gauge alternatives VS, A4, AD1, AD3, AD7 or AD9.
6 Only with rotary knob alternative DM2.
7 Not with rotary knob alternative DM2.

Order example:

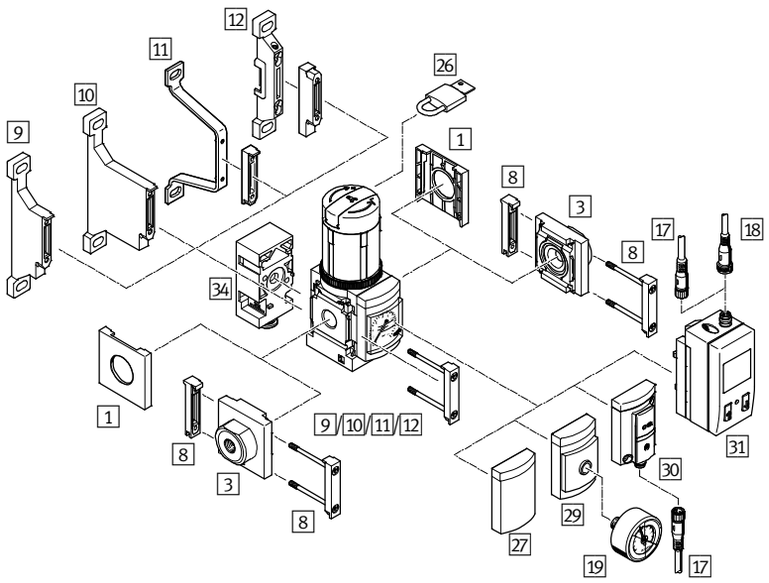
MS6-LRB-1/2-D6-AD9-AS-BD

Standard service unit, grid dimension 62 mm - pressure regulator - female thread G½ - pressure regulation range 0.3 ... 7 bar, manually operated - with pressure sensor with operational status indicator, plug M8, window comparator, PNP, N/O - standard rotary knob - rotary knob with detent, can be locked using accessories - angled outlet block QS-8 - pressure output to the rear

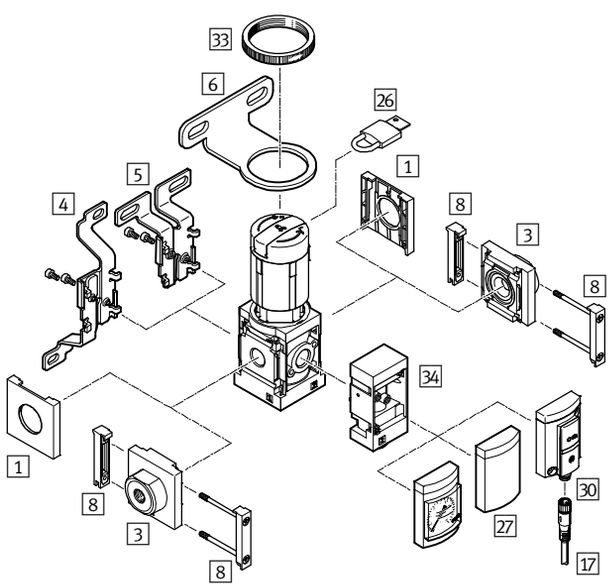
Pressure regulators MS-LRB, for manifold assembly

Accessories – MS4/MS6

Pressure output to the rear



Pressure output to the front (alternative flow direction Z)



Accessories		➔ Page/online
1	Cover cap MS4/6-END	1406
3	Connecting plate kit MS4/6-AG...	1406
4	Mounting bracket MS4/6-WB[1)]	1406
5	Mounting bracket MS4-WBM[1)]	1406
6	Mounting bracket MS4/6-WR[1)]	1406
8	Module connector MS4/6-MV	1406
9	Mounting bracket MS4/6-WP[2)4)]	1406
10	Mounting bracket MS4/6-WPB[3)4)]	1406
11	Mounting bracket MS4/6-WPE[3)4)]	1406
12	Mounting bracket MS4/6-WPM[4)]	1406
17	Connecting cable NEBU-M8...-LE3	1407
18	Connecting cable NEBU-M12...-LE4	1407
19	Pressure gauge MA	1408
26	Padlock LRVS-D	1409

Accessories		➔ Page/online
27	Cover plate VS	1338
29	Adapter A8/A4 for EN pressure gauge 1⁄8/1⁄4	1338
30	Pressure sensor with operational status indicator AD7/AD9	1338
31	Pressure sensor with LCD display AD1/AD3	1338
33	Knurled nut MS-LR (included in the scope of delivery)	–
34	Angled outlet block B...	1338
–	Mounting plate MS4/6-AEND	1406
–	Module connector MS4/6-RMV	1409
–	Module connector MS4-6-AMV	1409
–	Module connector MS6-9-AMV	1409
–	Module connector MS6-9-ARMV	1409
–	Power supply module MS4/6-E-IPM	**ms*-e-ipm***
–	Branching module MS4/6-A-IPM	**ms*-a*ipm***

1) Mounting component for individual device.
2) Only with alternative flow direction Z and/or only with pressure output BC, BD, BE.
3) Not in combination with alternative flow direction Z and pressure output BC, BD, BE.
4) Mounting component and connector for a combination of devices or individual devices with connecting plate kit MS4/6-AG... 3/with mounting plate MS4/6-AEND.

For precision pressure levels

+ Excellent pressure control characteristics
+ High secondary exhausting

Precision pressure regulators

MS-LRP

MS series

Precision pressure regulators

MS-LRP

Overview, configuration and ordering
➔ **www.festo.com/catalogue/ms-lrp**

Additional information, support and user documentation
➔ **www.festo.com/sp/ms-lrp**

Selected types in accordance with the ATEX Directive for explosive atmospheres
➔ **www.festo.com/catalogue/ex**

+ Good regulation characteristics with minimal hysteresis and primary pressure compensation
+ Actuator lock to protect set values against adjustment
+ Optionally with pressure sensor with display
+ Size 6
+ Grid dimension 62 mm

Precision pressure regulators MS-LRP

Product range overview

Size	Pneumatic connection	Product options											
		D2	D4	D5	D7	PO	VS	A8	A8M	A4	AD...	AS	Z
6	¼, ⅜, ½	■	■	■	■	■	■	■	■	■	■	■	■

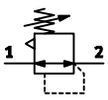
Product options

¼ Female thread G¼
⅜ Female thread G⅜
½ Female thread G½
AGB Connecting plate G¼
AGC Connecting plate G⅜
AGD Connecting plate G½
AGE Connecting plate G¾
AQN Connecting plate NPT¼
AQP Connecting plate NPT3/8
AQR Connecting plate NPT½
AQS Connecting plate NPT¾
D2 Pressure regulation range 0.05 ... 0.7 bar, manually operated
D4 Pressure regulation range 0.05 ... 2.5 bar, manually operated
D5 Pressure regulation range 0.1 ... 4 bar, manually operated
D7 Pressure regulation range 0.1 ... 12 bar, manually operated
PO Pressure regulation range 0.1 ... 12 bar, pneumatically actuated
VS Cover plate
A8 Adapter for EN pressure gauge ⅛, without pressure gauge
A8M Adapter for EN pressure gauge ⅛, with precision pressure gauge
A4 Adapter for EN pressure gauge ¼, without pressure gauge
AD1 Pressure sensor with LCD display, plug M8, 1 switching output PNP, 3-pin
AD2 Pressure sensor with LCD display, plug M8, 1 switching output NPN, 3-pin
AD3 Pressure sensor with LCD display, plug M12, 1 switching output PNP, 4-pin, analogue output 4 ... 20 mA
AD4 Pressure sensor with LCD display, plug M12, 1 switching output NPN, 4-pin, analogue output 4 ... 20 mA
AD7 Pressure sensor with operational status indicator, plug M8, threshold value comparator, PNP, N/O
AD8 Pressure sensor with operational status indicator, plug M8, threshold value comparator, PNP, N/C
AD9 Pressure sensor with operational status indicator, plug M8, window comparator, PNP, N/O
AD10 Pressure sensor with operational status indicator, plug M8, window comparator, PNP, N/C
LD Long rotary knob
KD Rotary knob underneath
AS Rotary knob with detent, can be locked using accessories
E11 Rotary knob with integrated lock
WR Mounting bracket with knurled nut for regulator head
WP Mounting bracket standard design
WPM Mounting bracket for hooking in service units
WB Mounting bracket centrally at rear (wall mounting top and bottom), connecting plates not required
EX4 EU certification (II 2GD to EU Explosion Protection Directive (ATEX))
UL1 UL certification (cULus, ordinary locations for Canada and USA)
Z Direction of flow from right to left

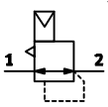
Precision pressure regulators MS-LRP

Data sheet

Manually operated D2/D4/D5/D7



Pneumatically actuated PO



Technical data Download CAD data ➔ **www.festo.com**

Size			MS6		
Pneumatic connection 1, 2			G¼	G⅜	G½
Pneumatic connection 3			G¼		
Pilot air connection 12 with pressure regulation range PO			G⅛		
Design			Piloted precision diaphragm regulator		
Regulating function			With secondary exhausting		
Type of mounting			Via accessories		
			In-line installation		
			Front panel mounting		
Mounting position			Optional		
Actuator lock			Rotary knob with detent, can be locked using accessories		
Pressure regulation range/operation [bar]		D2[1]	0.05 ... 0.7, manually operated		
		D4[1]	0.05 ... 2.5, manually operated		
		D5[1]	0.1 ... 4, manually operated		
		D7[1]	0.1 ... 12, manually operated (0.1 ... 10 bar with pressure sensor AD...)		
		PO[2]	0.1 ... 12, pneumatically actuated (0.1 ... 10 bar with pressure sensor AD...)		
Pressure indication		A8M	Via precision pressure gauge for indicating the outlet pressure		
		AD1/AD3	Via pressure sensor with LCD display for indicating the outlet pressure and with electrical output		
		AD7/AD9	Via pressure sensor with operational status indicator for indicating the outlet pressure and with electrical output		
Length [mm]	With cover plate VS		76		
	With adapter A8/A4		79		
	With adapter and precision pressure gauge A8M		116		
	With pressure sensor AD1/AD3		103		
	With pressure sensor AD7/AD9		79		
Width [mm]			62		
Height [mm]	With rotary knob with detent, can be locked using accessories AS		228		
	With pressure regulation range PO		136		

1) Inlet pressure p1 ≥ outlet pressure p2 + 1 bar.
2) Outlet pressure p12 = pilot pressure p2 + max. 0.5 bar.

Standard nominal flow rate q_{nN}

Pneumatic connection 1, 2		G¼	G⅜	G½
Pressure regulation range D2[3]	[l/min]	800	1100	1600
Pressure regulation range D4[4]	[l/min]	1100	1400	2300
Pressure regulation range D5[5]	[l/min]	1400	1700	3000
Pressure regulation range D7/PO[6]	[l/min]	3000	3300	5000

3) Measured at p1 = 10 bar and p2 = 0.5 bar, Δp = 0.1 bar.
4) Measured at p1 = 10 bar and p2 = 1.5 bar, Δp = 0.1 bar.
5) Measured at p1 = 10 bar and p2 = 2.5 bar, Δp = 0.1 bar.
6) Measured at p1 = 10 bar and p2 = 6.0 bar, Δp = 0.1 bar.

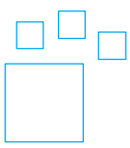
Data sheet

Operating conditions		
Operating medium		Compressed air to ISO 8573-1:2010 [7:4:4]
		Inert gases
Note on the operating/pilot medium		Lubricated operation not possible
Operating pressure	[bar]	1 ... 14
Ambient temperature	[°C]	–10 ... +60 (0 ... +50)[1]

1) Value in brackets applies to MS6-LRP with pressure sensor AD...

Materials	
Housing	Die-cast aluminium
Rotary knob	PA/POM
Seals	NBR

Ordering – Product options



Configurable product

This product and all its options can be ordered using the configurator.

The configurator can be found under Products on the DVD or
➔ **www.festo.com/catalogue/...**

Enter the type code in the search field.

Precision pressure regulators MS-LRP

Order code – MS6

MS	6	–	LRP	–		–		–		–		–

Series	
MS	Standard service unit

Size	
6	Grid dimension 62 mm

Type code	
LRP	Precision pressure regulator

Pneumatic connection	
1/4	Female thread G¼
3/8	Female thread G⅜
1/2	Female thread G½

Pressure regulation range/operation	
D2	0.05 ... 0.7 bar, manually operated
D4	0.05 ... 2.5 bar, manually operated
D5	0.1 ... 4 bar, manually operated
D7	0.1 ... 12 bar, manually operated
PO	0.1 ... 12 bar, pneumatically actuated

Pressure gauge alternatives	
VS	Cover plate
A8	Adapter for EN pressure gauge ⅛, without pressure gauge
A8M	Adapter for EN pressure gauge ⅛, with precision pressure gauge
A4	Adapter for EN pressure gauge ¼, without pressure gauge
AD1	Pressure sensor with LCD display, plug M8, 1 switching output PNP, 3-pin [1]
AD3	Pressure sensor with LCD display, plug M12, 1 switching output PNP, 4-pin, analogue output 4 ... 20 mA [1]
AD7	Pressure sensor with operational status indicator, plug M8, threshold value comparator, PNP, N/O [2]
AD9	Pressure sensor with operational status indicator, plug M8, window comparator, PNP, N/O [2]

Security	
Pressure regulation range/operation PO	
–	None
Pressure regulation range/operation D2/D4/D5/D7	
AS	Rotary knob with detent, can be locked using accessories

Flow direction	
–	From left to right
Z	From right to left

[1] Measuring range max. 10 bar.
Not with pressure regulation range/operation D2, D4

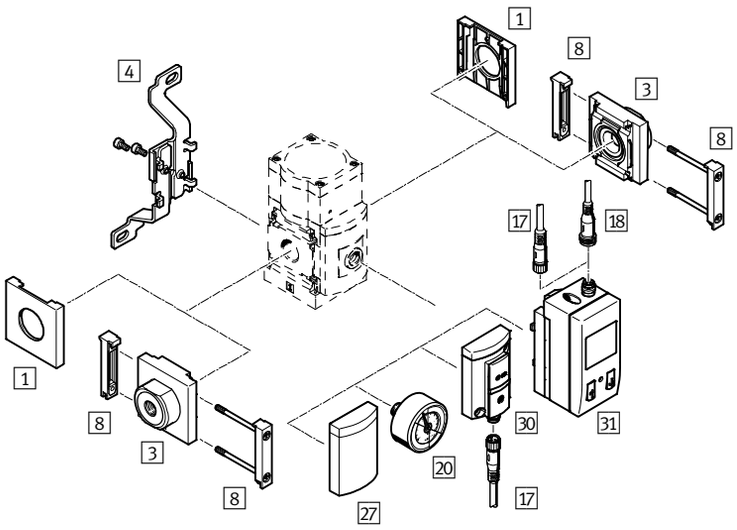
[2] Measuring range max. 10 bar.
Not with pressure regulation range/operation D2

Order example:

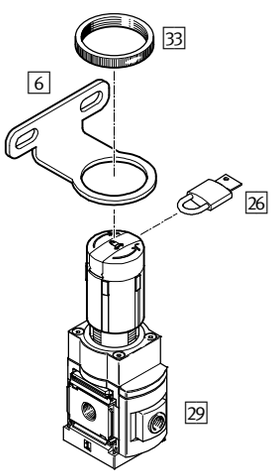
MS6-LRP-1/2-D5-A8M-AS

Standard service unit, grid dimension 62 mm - precision pressure regulator - female thread G½ - pressure regulation range 0.1 ... 4 bar, manually operated - with adapter for EN pressure gauge ⅛, with precision pressure gauge - rotary knob with detent, can be locked using accessories - flow direction from left to right

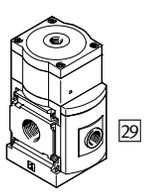
Accessories – MS6



Manually operated D2/D4/D5/D7



Pneumatically actuated PO



Accessories		➔ Page/online
1	Cover cap MS6-END	1406
3	Connecting plate kit MS6-AG...	1406
4	Mounting bracket MS6-WB[1]	1406
6	Mounting bracket MS6-WR[1]	1406
8	Module connector MS6-MV	1406
17	Connecting cable NEBU-M8...-LE3	1407
18	Connecting cable NEBU-M12...-LE4	1407
20	Precision pressure gauge A8M/MAP	1346, 1408
26	Padlock LRVS-D	1409
27	Cover plate VS	1346
29	Adapter A8/A4 for EN pressure gauge ⅛/¼	1346
30	Pressure sensor with operational status indicator AD7/AD9	1346
31	Pressure sensor with LCD display AD1/AD3	1346

1) Mounting component for individual device.

Accessories		➔ Page/online
33	Knurled nut MS-LR (included in the scope of delivery)	–
–	Mounting plate MS6-AEND	1406
–	Mounting bracket MS6-WP[2]	1406
–	Mounting bracket MS6-WPB[2]	1406
–	Mounting bracket MS6-WPE[2]	1406
–	Mounting bracket MS6-WPM[2]	1406
–	Module connector MS6-RMV	1409
–	Module connector MS4-6-AMV	1409
–	Module connector MS6-9-AMV	1409
–	Module connector MS6-9-ARMV	1409
–	Power supply module MS4/6-E-IPM	**ms*-e-ipm***
–	Branching module MS4/6-A-IPM	**ms*-a*ipm***

2) Mounting component and connector for a combination of devices or individual devices with connecting plate kit MS6-AG... 3/with mounting plate MS6-AEND.

For exhausting systems quickly and safely

+ 1 or 2-channel exhausting up to Performance Level e to EN ISO 13849-1
+ Variable pressure build-up prevents critical movements
+ Optional: integrated monitoring and testing

On-off valves and soft-start valves › MS series ›

Soft-start/quick exhaust valves

MS-SV★

MS series

Soft-start/quick exhaust valves

MS-SV★

Overview, configuration and ordering
➔ **www.festo.com/catalogue/ms-sv** ✓

Additional information, support and user documentation
➔ **www.festo.com/sp/ms-sv** ✓

★ Quick ordering of basic designs
➔ page 1355 ✓

+ Performance Level c, d or e to EN ISO 13849-1
+ For reducing pressure quickly and reliably and for building up pressure gradually
+ Switching time delay adjustable via a flow control valve for gradual pressure build-up
+ Supply voltage 24 V DC
+ Sizes 6, 9
+ Grid dimension 62, 90 mm

Product range overview

Size	Pneumatic connection	Product options											
		C	V24	10V24	S	VS	AG	A4	AD...	BAR	MH	MK	Z
6	½	■	–	■	■	–[1]	■	■	■	–	–	■	■
9	¾, 1, G	■	■	–	■	■	■	■	■	■	■	■	■

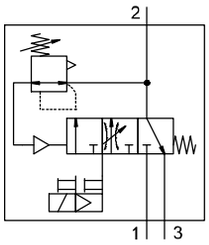
1) Cover plate included in the basic configuration by default.

Product options

½ Female thread G½
¾ Female thread G¾
1 Female thread G1
AGB Connecting plate G¼
AGC Connecting plate G⅜
AGD Connecting plate G½
AGE Connecting plate G¾
AGF Connecting plate G1
AGG Connecting plate G1¼
AGH Connecting plate G1½
N¾ Female thread NPT¾
N1 Female thread NPT1
AQN Connecting plate NPT¼
AQP Connecting plate NPT⅜
AQR Connecting plate NPT½
AQS Connecting plate NPT¾
AQT Connecting plate NPT1
AQU Connecting plate NPT1¼
AQV Connecting plate NPT1½
G Module without connecting thread, without connecting plate
NG Module without connecting thread, without connecting plate (inch)
C Performance Level "c"
V24 Supply voltage 24 V DC (pin allocation to EN 175301), 3.5 ... 16 bar, manual override
– at the soft-start/quick exhaust valve: detenting, self-resetting
– at the pilot solenoid valve: non-detenting
10V24 Supply voltage 24 V DC (pin allocation to EN 175301), 3 ... 10 bar, manual override
– at the soft-start/quick exhaust valve: detenting, self-resetting
– at the pilot solenoid valve: non-detenting
10V24C Supply voltage 24 V DC (pin allocation to EN 175301), 3 ... 10 bar, no manual override
10V24D Supply voltage 24 V DC, M12x1 to ISO 20401 compliant with EN 61076-2-101, 3 ... 10 bar, no manual override
10V24E Supply voltage 24 V DC, M12x1 to ISO 20401 compliant with EN 61076-2-101, 3 ... 10 bar, manual override
– at the soft-start/quick exhaust valve: detenting, self-resetting
– at the pilot solenoid valve: none
10V24F Supply voltage 24 V DC, M12x1 to ISO 20401 compliant with EN 61076-2-101, 3 ... 10 bar, manual override
– at the soft-start/quick exhaust valve: detenting, self-resetting
– at the pilot solenoid valve: non-detenting
10V24P Supply voltage 24 V DC, M12x1 to ISO 20401 compliant with EN 61076-2-101, 3 ... 10 bar, manual override
– at the soft-start/quick exhaust valve: detenting, self-resetting
– at the pilot solenoid valve: non-detenting/detenting
V110 Supply voltage 110 V AC (pin allocation to EN 175301), 3.5 ... 16 bar, manual override
– at the soft-start/quick exhaust valve: detenting, self-resetting
– at the pilot solenoid valve: non-detenting
V230 Supply voltage 230 V AC (pin allocation to EN 175301), 3.5 ... 16 bar, manual override
– at the soft-start/quick exhaust valve: detenting, self-resetting
– at the pilot solenoid valve: non-detenting
S Silencer
VS Cover plate
AG MS pressure gauge
A4 Adapter for EN pressure gauge ¼, without pressure gauge
RG Integrated pressure gauge, red/green scale
AD1 Pressure sensor with LCD display, plug M8, 1 switching output PNP, 3-pin
AD2 Pressure sensor with LCD display, plug M8, 1 switching output NPN, 3-pin
AD3 Pressure sensor with LCD display, plug M12, 1 switching output PNP, 4-pin, analogue output 4 ... 20 mA
AD4 Pressure sensor with LCD display, plug M12, 1 switching output NPN, 4-pin, analogue output 4 ... 20 mA
AD7 Pressure sensor with operational status indicator, plug M8, threshold value comparator, PNP, N/O
AD8 Pressure sensor with operational status indicator, plug M8, threshold value comparator, PNP, N/C
AD9 Pressure sensor with operational status indicator, plug M8, window comparator, PNP, N/O
AD10 Pressure sensor with operational status indicator, plug M8, window comparator, PNP, N/C
BAR Pressure gauge scale in bar
PSI Pressure gauge scale in psi
MPA Pressure gauge scale in MPa
WP Mounting bracket standard design
WPM Mounting bracket for hooking in service units
WPB Mounting bracket for large wall gap
WB Mounting bracket centrally at rear (wall mounting top and bottom), connecting plates not required
MH Tamper protection, cover for manual override only
MK Tamper protection, full cover for manual override and adjusting screws
Z Flow direction from right to left

Soft-start/quick exhaust valves MS-SV-C ★

Data sheet



Electropneumatic soft-start/quick exhaust valve for gradual pressurisation and quick exhausting of system components (single channel). The main flow control valve in the end cap permits a slower build-up of outlet pressure p2. Once the outlet pressure p2 has reached the set pressure switchover point (switching pressure), the valve opens and the full operating pressure p1 is present at the output.

Safety data		
Size	MS6	MS9
Conforms to standard	EN ISO 13849-1	
Safety function	Exhausting	
	Avoidance of unexpected start-up (pressurisation)	
Performance Level (PL)	Exhausting: up to category 1, PL c	
	Avoidance of unexpected start-up (pressurisation): up to category 1, PL c	
Note on forced switch on/off	Switching frequency min. 1/month	
CE marking (see declaration of conformity)[1)]	To the EU Machinery Directive	
Shock resistance	Shock test with severity level 2 according to FN 942017-5 and EN 60068-2-27	Shock test with severity level 1 according to FN 942017-5 and EN 60068-2-27
Vibration resistance	Transport application test with severity class 2 according to FN 942017-4 and EN 60068-2-6	Transport application test with severity class 1 according to FN 942017-4 and EN 60068-2-6

1) Additional information www.festo.com/sp ➔ Certificates.

Note on forced switch on/off: switching frequency min. 1/month

The mechanical system is not tested in the controlled (i.e. pressurised) state. If the process-related switching frequency (safe exhausting) is less than once a month, the machine's operator has to carry out a forced switch off.

13

Compressed air preparation

Technical data					Download CAD data ➔ **www.festo.com**
Size		MS6	MS9		
Pneumatic connection 1, 2		G1/2	G3/4	G1	–[2)]
Pneumatic connection 3		G3/4	G1		
Design		Piston spool			
Type of mounting		Via accessories			
		In-line installation			
Mounting position		Any			
Valve function		3/2-way valve, closed, bistable			
		Soft-start function			
Exhaust air function		No flow control			
Manual override	At the pilot solenoid valve	Non-detenting			
	At the soft-start/quick exhaust valve	Detenting, self-resetting			
Reset method		Mechanical spring			
Type of control		Piloted			
Pressure indication	AG	Via pressure gauge for indicating the outlet pressure			
	AD1/AD3	Via pressure sensor with LCD display for indicating the outlet pressure and with electrical output	–		
	AD7/AD9	Via pressure sensor with operational status indicator for indicating the outlet pressure and with electrical output			

2) Module without connecting thread/without connecting plate. The connecting plate must be ordered separately as an accessory ➔ page 1406.

Data sheet

Technical data Download CAD data ➔ **www.festo.com**

Size		MS6	MS9		
Pneumatic connection 1, 2		G½	G¾	G1	–[1]
Length [mm]	With cover plate VS	76	109		
	With MS pressure gauge AG	77	109		
	With adapter A4	79	110		
	With pressure sensor AD1/AD3	103	–		
	With pressure sensor AD7/AD9	79	112		
Width [mm]		62	104		90
Height [mm]	Without silencer	177	271		
	With silencer	305	437		

1) Module without connecting thread/without connecting plate. The connecting plate must be ordered separately as an accessory ➔ page 1406.

Flow rate characteristics

Size		MS6	MS9		
Pneumatic connection 1, 2		G½	G¾	G1	–[2]
Standard nominal flow rate					
In main flow direction $q_{nN1\rightarrow2}$[3]	[l/min]	5700	14,150	16,460	8300 ... 16,550
Standard flow rate					
In exhaust direction $q_{n2\rightarrow3}$[4]	[l/min]	7600	21,450	20,870	19,730 ... 21,720

2) Dependent on the connecting plate selected, must be ordered separately as an accessory ➔ page 1406.
3) Measured at p1 = 6 bar and p2 = 5 bar, Δp = 1 bar.
4) p2 = 6 bar, measured with respect to atmosphere with silencer S.

Electrical data

Size		MS6	MS9
Supply voltage		10V24	V24
Coil characteristics		24 V DC: 1.8 W	24 V DC: 8.4 W
Electrical connection		Plug, 2-pin, to EN 175301-803, type C	Plug, square design to EN 175301-803, type A
Degree of protection		IP65 with plug socket	
Duty cycle	[%]	100	

Operating conditions

Size		MS6	MS9
Supply voltage		10V24	V24
Operating medium		Compressed air to ISO 8573-1:2010 [7:4:4]	
Note on operating/pilot medium		Lubricated operation possible (in which case lubricated operation will always be required)	
Operating pressure	[bar]	3 ... 10	3.5 ... 16 (3.5 ... 10)[5]
Ambient temperature	[°C]	0 ... +60 (0 ... +50)[5]	
Noise level	[dB (A)]	–	93

5) Value in brackets applies to MS6/MS9-SV-C with pressure sensor AD...

Materials

Size	MS6	MS9
Housing	Die-cast aluminium	
Piston spool	High-alloy stainless steel	Brass
Seals	NBR	

Soft-start/quick exhaust valves MS-SV-C ★

Order code – MS6

MS	6	–	SV	–	1/2	–	C	–	10V24	–		–		–	

Series

MS	Standard service unit

Size

6	Grid dimension 62 mm

Type

SV	Soft-start/quick exhaust valve

Pneumatic connection

1/2	Female thread G½

Performance Level

C	Category 1, 1-channel, to EN ISO 13849-1

Supply voltage

10V24	24 V DC (pin allocation to EN 175301), 3 ... 10 bar

Silencer

–	None
S	Silencer

Pressure gauge/pressure gauge alternatives

–	Cover plate
AG	MS pressure gauge, bar
A4	Adapter for EN pressure gauge ¼
AD1	Pressure sensor with LCD display, plug M8, 1 switching output PNP, 3-pin [1]
AD3	Pressure sensor with LCD display, plug M12, 1 switching output PNP, 4-pin, analogue output 4 ... 20 mA [1]
AD7	Pressure sensor with operational status indicator, plug M8, threshold value comparator, PNP, N/O [1]
AD9	Pressure sensor with operational status indicator, plug M8, window comparator, PNP, N/O [1]

Tamper protection

–	No tamper protection
MK	Full cover

Flow direction

–	From left to right
Z	From right to left

[1] Measuring range max. 10 bar.

Order example:

MS6-SV-1/2-C-10V24-S-AG-MK

Standard service unit, grid dimension 62 mm - soft-start/quick exhaust valve - female thread G½ - Performance Level "c"/category 1, 1 channel, to EN ISO 13849-1 - supply voltage 24 V DC, operating pressure 3 ... 10 bar - with silencer - with MS pressure gauge, bar - with tamper protection, full cover - flow direction from left to right

Ordering – Product options

Configurable product

This product and all its options can be ordered using the configurator.

The configurator can be found under Products on the DVD or
➔ **www.festo.com/catalogue/...**

Enter the type code in the search field.

Order code – MS9

MS	9	–	SV	–		–	C	–	V24	–	S	–		–		–	

Series

MS	Standard service unit

Size

9	Grid dimension 90 mm

Type

SV	Soft-start/quick exhaust valve

Pneumatic connection

3/4	Female thread G¾
1	Female thread G1
G	Module without connecting thread, without connecting plate Connecting plates ➔ page 1406

Performance Level

C	Category 1, 1-channel, to EN ISO 13849-1

Supply voltage

V24	24 V DC (pin allocation to EN 175301), 16 bar

Silencer

S	Silencer

Pressure gauge/pressure gauge alternatives

VS	Cover plate	
AG	MS pressure gauge	
A4	Adapter for EN pressure gauge ¼	
AD7	Pressure sensor with operational status indicator, plug M8, threshold value comparator, PNP, N/O	1
AD9	Pressure sensor with operational status indicator, plug M8, window comparator, PNP, N/O	1

Alternative pressure gauge scale

–	No pressure gauge scale	2
BAR	Bar	3

Tamper protection

–	No tamper protection
MH	Cover for manual override only
MK	Full cover

Flow direction

–	From left to right
Z	From right to left

1 Measuring range max. 10 bar.
2 Not with MS pressure gauge AG.
3 Only with MS pressure gauge AG.

Order example:

MS9-SV-G-C-V24-S-VS-MK

Standard service unit, grid dimension 90 mm - soft-start/quick exhaust valve - module without connecting thread, without connecting plate - Performance Level "c"/category 1, 1 channel, to EN ISO 13849-1 - supply voltage 24 V DC, operating pressure 3.5 ... 16 bar - with silencer - with cover plate - with tamper protection, full cover - flow direction from left to right

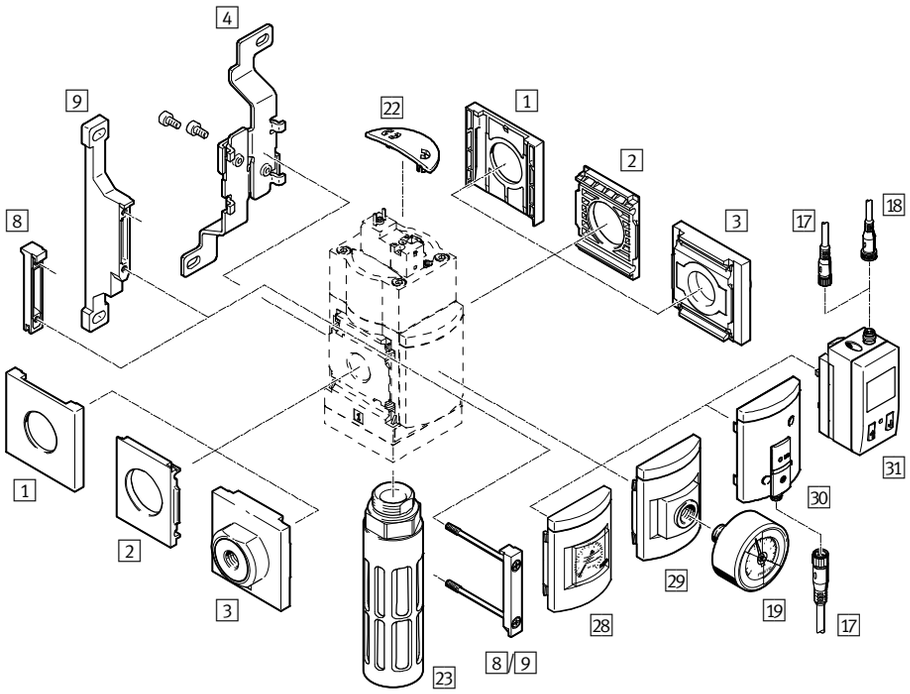
★ Quick ordering [1)]

Part no.	Type
MS6	
8001469	**MS6-SV-1/2-C-10V24-S**

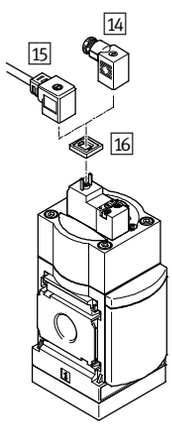
1) All products in this table are easy to select and quick to order.

Soft-start/quick exhaust valves MS-SV-C ★

Accessories – MS6



Supply voltage 10V24



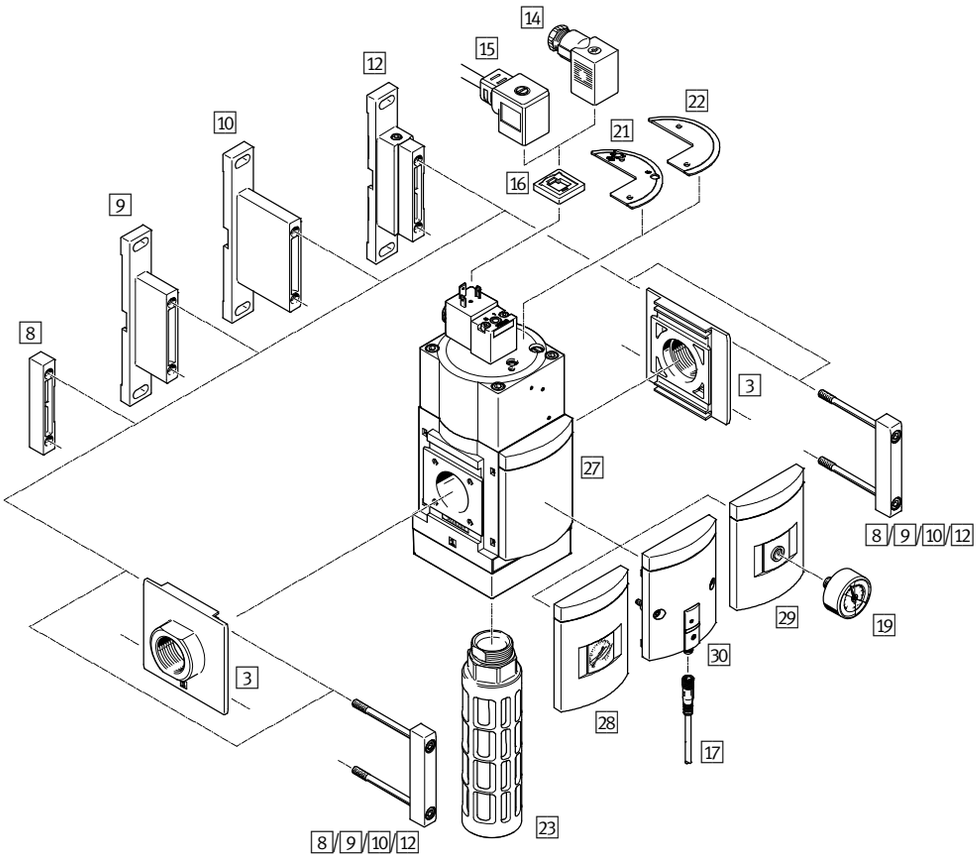
Accessories		➔ Page/online
1	Cover cap MS6-END	1406
2	Mounting plate MS6-AEND	1406
3	Connecting plate kit MS6-AG...	1406
4	Mounting bracket MS6-WB[1)]	1406
8	Module connector MS6-MV	1406
9	Mounting bracket MS6-WP[2)]	1406
14	Plug socket MSSD-EB	1407
15	Plug socket with cable KMEB	1407
16	Illuminating seal MEB-LD	1407
17	Connecting cable NEBU-M8...-LE3	1407
18	Connecting cable NEBU-M12...-LE4	1407
19	Pressure gauge MA	1408
22	Cover MS6-SV-C-MK	1408
23	Silencer U	1409

Accessories		➔ Page/online
28	MS pressure gauge AG	1354
29	Adapter A4 for EN pressure gauge ¼	1354
30	Pressure sensor with operational status indicator AD7/AD9	1354
31	Pressure sensor with LCD display AD1/AD3	1354
–	Mounting bracket MS6-WPB[2)]	1406
–	Mounting bracket MS6-WPE[2)]	1406
–	Mounting bracket MS6-WPM[2)]	1406
–	Module connector MS6-RMV	1409
–	Module connector MS4-6-AMV	1409
–	Module connector MS6-9-AMV	1409
–	Module connector MS6-9-ARMV	1409
–	Power supply module MS6-E-IPM	**ms*-e-ipm***
–	Branching module MS6-A-IPM	**ms*-a*ipm***

1) Mounting component for individual device.

2) Mounting component and connector for a combination of devices or individual devices with connecting plate kit MS6-AG... 3/with mounting plate MS6-AEND 2.

Accessories – MS9



Accessories		➔ Page/online
3	Connecting plate kit MS9-AG...[1]	1406
8	Module connector MS9-MV[1]	1406
9	Mounting bracket MS9-WP	1406
10	Mounting bracket MS9-WPB	1406
12	Mounting bracket MS9-WPM[1]	1406
14	Plug socket MSSD-C	1407
15	Connecting cable KMC	1407
16	Illuminating seal MC-LD	1407
17	Connecting cable NEBU-M8...-LE3	1407
19	Pressure gauge MA	1408

Accessories		➔ Page/online
21	Cover MS9-SV-MH	1408
22	Cover MS9-SV-MK	1408
23	Silencer U	1409
27	Cover plate VS	1355
28	MS pressure gauge AG	1355
29	Adapter A4 for EN pressure gauge ¼	1355
30	Pressure sensor with operational status indicator AD7/AD9	1355
–	Module connector MS9-RMV	1409
–	Module connector MS6-9-AMV	1409
–	Module connector MS6-9-ARMV	1409

1) Not suitable for individual devices with connecting thread G¾ or G1.

Soft-start/quick exhaust valves MS-SV-D

Product range overview

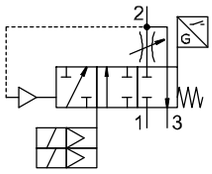
Size	Pneumatic connection	Product options										
		D	10V24	2M8	2M12	2OE	S3	SO	AG	A4	AD...	Z
6	½	■	■	■	■	■	■	■	■	■	■	■

Product options

½ Female thread G½
AGB Connecting plate G¼
AGC Connecting plate G⅜
AGD Connecting plate G½
AGE Connecting plate G¾
AQN Connecting plate NPT¼
AQP Connecting plate NPT⅜
AQR Connecting plate NPT½
AQS Connecting plate NPT¾
D Performance Level “d
10V24 Supply voltage 24 V DC (pin allocation to EN 175301), 3.5 ... 10 bar
10V24P Supply voltage 24 V DC, M12x1 to ISO 20401 compliant with EN 61076-2-101, 3.5 ... 10 bar
2M8 2 proximity sensors SMT with cable (plug M8x1, 3-pin, rotatable thread, cable length 0.3 m)
2M12 2 proximity sensors SMT with cable (plug M12x1, 3-pin, rotatable thread, cable length 0.3 m)
2OE 2 proximity sensors SMT with cable (open end, 3-wire, cable length 5 m)
S3 Additional proximity sensor SMT; required to achieve Performance Level "e"; connection depends on connection technology chosen
SO Silencer open
AG MS pressure gauge
A4 Adapter for EN pressure gauge ¼, without pressure gauge
RG Integrated pressure gauge, red/green scale
AD1 Pressure sensor with LCD display, plug M8, 1 switching output PNP, 3-pin
AD2 Pressure sensor with LCD display, plug M8, 1 switching output NPN, 3-pin
AD3 Pressure sensor with LCD display, plug M12, 1 switching output PNP, 4-pin, analogue output 4 ... 20 mA
AD4 Pressure sensor with LCD display, plug M12, 1 switching output NPN, 4-pin, analogue output 4 ... 20 mA
PSI Pressure gauge scale in psi
MPA Pressure gauge scale in MPa
WP Mounting bracket standard design
WPM Mounting bracket for hooking in service units
WPB Mounting bracket for large wall gap
WB Mounting bracket centrally at rear (wall mounting top and bottom), connecting plates not required
UL1 UL certification (cULus, ordinary locations for Canada and USA)
Z Flow direction from right to left

Soft-start/quick exhaust valves MS-SV-D

Data sheet



The electropneumatic soft-start/quick exhaust valve is used to reduce pressure quickly and safely and to build up pressure gradually in industrial pneumatic piping systems and terminal equipment.
The MS6-SV-D has two safety functions:
– Safe exhausting
– Protection against unexpected start-up
The MS6-SV-D has a 2-channel structure, i.e. it has two internal 2-way valves which can be controlled separately by pilot valves (V1 and V2) situated on the cover.

These valves are actuated when both coils are energised simultaneously; this changes the MS6-SV-D from the normal position to the switching position.
The outlet pressure p2 rises slowly in accordance with the throttle setting.
The main seat opens when the switch-through pressure is reached. The normal position is achieved by switching off both coils.
Two proximity sensors (S1 and S2) secured on the housing monitor the directional control valves. A further proximity sensor (S3) can optionally be added to monitor the soft-start valve.
The MS6-SV-D can achieve various categories and safety levels to EN ISO 13849-1 depending on whether the directional control valves are monitored.
Where there is appropriate integration into the control chain as well as appropriate linking of the signals for initial position sensing with the signals for activation (plausibility checking):
– Performance Level d/category 3 to EN ISO 13849-1 and EN ISO 13849-2 can be achieved when using sensors S1 and S2
– Performance Level e/category 4 to EN ISO 13849-1 and EN ISO 13849-2 can be achieved when using sensors S1, S2 and S3

Note
To avoid back pressures, it is recommended that the device be operated together with the silencer UOS-1.
The silencer can be ordered via the order code (SO ➔ page 1361) or as an accessory (UOS-1 ➔ page 1409).

Note
Only devices that do not impair the pneumatic protective measure – safe exhausting – may be placed downstream of the MS6-SV-...-D.
The MS6-SV-...-D is not permitted for use as a press safety valve.

- Conforms to standard IEC 61508
- Switching time delay adjustable via a flow control valve for gradual pressure build-up; main seat opens at approx. 50% of operating pressure
- Optional pressure sensor

Safety data

Size		MS6
Conforms to standard		EN ISO 13849-1 and EN ISO 13849-2
Safety function		Exhausting
		Avoidance of unexpected start-up (pressurisation)
Performance Level (PL)	With sensing by S1 and S2	Exhausting: category 3, PL d or category 3, PL e[1)]
		Avoidance of unexpected start-up (pressurisation): category 3, PL d or category 3, PL e[1)]
	With sensing by S1, S2 and S3	Exhausting: category 4, PL e
		Avoidance of unexpected start-up (pressurisation): category 4, PL e
Safety integrity level (SIL)		Exhausting: SIL 3
		Avoidance of unexpected start-up (pressurisation): SIL 3
Note on forced switch on/off		Switching frequency min. 1/month
CE marking (see declaration of conformity)[2)]		To the EU Machinery Directive
Shock resistance		Shock test with severity level 2 according to FN 942017-5 and EN 60068-2-27
Vibration resistance		Transport application test with severity class 2 according to FN 942017-4 and EN 60068-2-6

1) Dependent on the average number of annual actuations (n_{op}).
2) Additional information www.festo.com/sp ➔ Certificates.

Note on forced switch on/off: switching frequency min. 1/month
The mechanical system is not tested in the controlled (i.e. pressurised) state. If the process-related switching frequency (safe exhausting) is less than once a month, the machine's operator has to carry out a forced switch off.

Soft-start/quick exhaust valves MS-SV-D

Data sheet

Technical data			Download CAD data ➔ **www.festo.com**
Size			MS6
Pneumatic connection 1, 2			G½
Pneumatic connection 3			G1
Design			Piston seat
Type of mounting			Via accessories
			In-line installation
Mounting position			Any
Valve function			3/2-way valve, closed, bistable
			Soft-start function
Exhaust air function			No flow control
Manual override			None
Reset method			Mechanical spring
Type of control			Piloted
Pressure indication		AG	Via pressure gauge for indicating the outlet pressure
		AD1/AD3	Via pressure sensor with LCD display for indicating the outlet pressure and with electrical output
Length [mm]	With cover plate VS		90
	With MS pressure gauge AG		90
	With adapter A4		92
	With pressure sensor AD1/AD3		116
Width [mm]			62
Height [mm]	Without silencer		257
	With silencer		404

Flow rate characteristics		
Size		MS6
Pneumatic connection 1, 2		G½
Standard nominal flow rate		
In main flow direction $q_{nN1 \rightarrow 2}$ [1)]	[l/min]	4300
Standard flow rate		
In exhaust direction $q_{n2 \rightarrow 3}$ [2)]	[l/min]	9000

1) Measured at p1 = 6 bar and p2 = 5 bar, Δp = 1 bar.
2) p2 = 6 bar, measured with respect to atmosphere with silencer UOS-1.

Electrical data		
Size		MS6
Supply voltage		10V24
Coil characteristics		24 V DC: 1.8 W
Electrical connection		2x plug, 2-pin, to EN 175301-803, type C
Degree of protection		IP65 with plug socket
Duty cycle	[%]	100

Operating conditions		
Size		MS6
Operating medium		Compressed air to ISO 8573-1:2010 [7:4:4]
Note on operating/pilot medium		Lubricated operation possible (in which case lubricated operation will always be required)
Operating pressure	[bar]	3.5 ... 10
Ambient temperature	[°C]	–10 ... +50 (0 ... +50) [3)]
Noise level	[dB (A)]	75 (with silencer UOS-1)

3) Value in brackets applies to MS6-SV-D with pressure sensor AD...

Materials	
Size	MS6
Housing	Die-cast aluminium
Piston rod	High-alloy stainless steel
Seals	NBR

Order code – MS6

MS | 6 | – | SV | – | 1/2 | – | D | – | 10V24 | – | | – | | – | | –

Series

MS	Standard service unit

Size

6	Grid dimension 62 mm

Type

SV	Soft-start/quick exhaust valve

Pneumatic connection

1/2	Female thread G½

Performance Level

D	Category 3, 2-channel to EN ISO 13849-1

Supply voltage

10V24	24 V DC (pin allocation to EN 175301)

Connection technology

2M8	2 proximity sensors SMT with cable (plug M8x1, 3-pin, rotatable thread, cable length 0.3 m)
2M12	2 proximity sensors SMT with cable (plug M12x1, 3-pin, rotatable thread, cable length 0.3 m)
2OE	2 proximity sensors SMT with cable (open end, 3-wire, cable length 5 m)

Extended sensing

–	None
S3	Additional proximity sensor SMT; required to achieve Performance Level e; connection depends on connection technology chosen

Silencer

–	None
SO	Silencer open

Pressure gauge/pressure gauge alternatives

–	Cover plate
AG	MS pressure gauge, bar
A4	Adapter for EN pressure gauge ¼
AD1	Pressure sensor with LCD display, plug M8, 1 switching output PNP, 3-pin [1]
AD3	Pressure sensor with LCD display, plug M12, 1 switching output PNP, 4-pin, analogue output 4 ... 20 mA [1]

Flow direction

–	From left to right
Z	From right to left

[1] Measuring range max. 10 bar.

Ordering – Product options

Configurable product

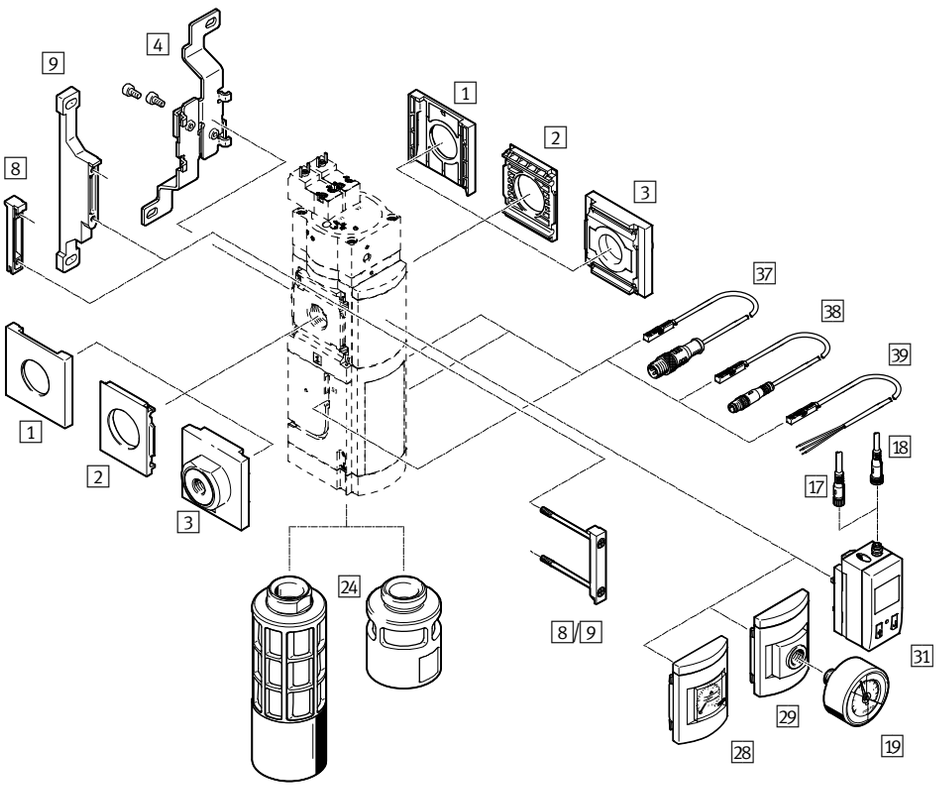
This product and all its options can be ordered using the configurator.

The configurator can be found under Products on the DVD or
➔ **www.festo.com/catalogue/...**

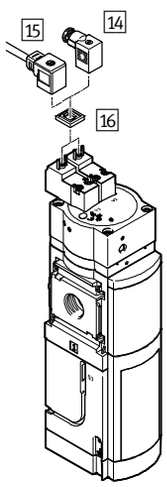
Enter the type code in the search field.

Soft-start/quick exhaust valves MS-SV-D

Accessories – MS6



Supply voltage 10V24



Accessories		→ Page/online
1	Cover cap MS6-END	1406
2	Mounting plate MS6-AEND	1406
3	Connecting plate kit MS6-AG...	1406
4	Mounting bracket MS6-WB[1)]	1406
8	Module connector MS6-MV	1406
9	Mounting bracket MS6-WP[2)]	1406
14	Plug socket MSSD-EB	1407
15	Plug socket with cable KMEB	1407
16	Illuminating seal MEB-LD	1407
17	Connecting cable NEBU-M8...-LE3	1407
18	Connecting cable NEBU-M12...-LE4	1407
19	Pressure gauge MA	1408
24	Silencer UOS	1409
28	MS pressure gauge AG	1361

Accessories		→ Page/online
29	Adapter A4 for EN pressure gauge ¼	1361
31	Pressure sensor with LCD display AD1/AD3	1361
37	Proximity sensor 2M12	1361
38	Proximity sensor 2M8	1361
39	Proximity sensor 2OE	1361
–	Mounting bracket MS6-WPB[2)]	1406
–	Mounting bracket MS6-WPE[2)]	1406
–	Mounting bracket MS6-WPM[2)]	1406
–	Module connector MS6-RMV	1409
–	Module connector MS4-6-AMV	1409
–	Module connector MS6-9-AMV	1409
–	Module connector MS6-9-ARMV	1409
–	Power supply module MS6-E-IPM	**ms*-e-ipm***
–	Branching module MS6-A-IPM	**ms*-a*ipm***

1) Mounting component for individual device.

2) Mounting component and connector for a combination of devices or individual devices with connecting plate kit MS6-AG... 3/with mounting plate MS6-AEND 2.

For pressurising and exhausting systems manually

+ High flow rate
+ Lockable exhaust position

Manually operated on-off valves

MS-EM★

MS series

Manually operated on-off valves

MS-EM★

Overview, configuration and ordering
➔ **www.festo.com/catalogue/ms-em** ✓

Additional information, support and user documentation
➔ **www.festo.com/sp/ms-em** ✓

Quick ordering of basic designs
➔ page 1368 ✓

Selected types in accordance with the ATEX Directive for explosive atmospheres
➔ **www.festo.com/catalogue/ex** ✓

+ Manually operated
+ A silencer can be attached or the exhaust air can be ducted at port 3
+ Optionally with pressure gauge and pressure sensor with display
+ Sizes 4, 6, 9, 12
+ Grid dimension 40, 62, 90, 124 mm

On-off valves MS-EM ★ manually operated

Product range overview

Size	Pneumatic connection	Product options								
		S	VS	AG	A8	A4	AD...	BAR	2	Z
4	1/8, 1/4	■	–[1]	■	■	■	■	–	–	■
6	1/4, 3/8, 1/2	■	–[1]	■	–	■	■	–	–	■
9	3/4, 1, G	■	■	■	–	■	–	■	■	■
12	G	■	–[1]	■	–	■	–	–	–	■

1) Cover plate included in the basic configuration by default.

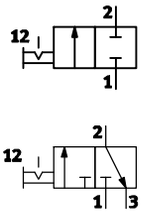
Product options

1/8 Female thread G1/8
1/4 Female thread G1/4
3/8 Female thread G3/8
1/2 Female thread G1/2
3/4 Female thread G3/4
1 Female thread G1
AGA Connecting plate G1/8
AGB Connecting plate G1/4
AGC Connecting plate G3/8
AGD Connecting plate G1/2
AGE Connecting plate G3/4
AGF Connecting plate G1
AGG Connecting plate G1 1/4
AGH Connecting plate G1 1/2
AGI Connecting plate G2
N3/4 Female thread NPT3/4
N1 Female thread NPT1
AQK Connecting plate NPT1/8
AQN Connecting plate NPT1/4
AQP Connecting plate NPT3/8
AQR Connecting plate NPT1/2
AQS Connecting plate NPT3/4
AQT Connecting plate NPT1
AQU Connecting plate NPT1 1/4
AQV Connecting plate NPT1 1/2

G Module without connecting thread, without connecting plate
NG Module without connecting thread, without connecting plate (inch)
S Silencer
VS Cover plate
AG MS pressure gauge
A8 Adapter for EN pressure gauge 1/8, without pressure gauge
A4 Adapter for EN pressure gauge 1/4, without pressure gauge
RG Integrated pressure gauge, red/green scale
AD1 Pressure sensor with LCD display, plug M8, 1 switching output PNP, 3-pin
AD2 Pressure sensor with LCD display, plug M8, 1 switching output NPN, 3-pin
AD3 Pressure sensor with LCD display, plug M12, 1 switching output PNP, 4-pin, analogue output 4 ... 20 mA
AD4 Pressure sensor with LCD display, plug M12, 1 switching output NPN, 4-pin, analogue output 4 ... 20 mA
AD7 Pressure sensor with operational status indicator, plug M8, threshold value comparator, PNP, N/O
AD8 Pressure sensor with operational status indicator, plug M8, threshold value comparator, PNP, N/C
AD9 Pressure sensor with operational status indicator, plug M8, window comparator, PNP, N/O
AD10 Pressure sensor with operational status indicator, plug M8, window comparator, PNP, N/C
BAR Pressure gauge scale in bar
PSI Pressure gauge scale in psi
MPA Pressure gauge scale in MPa
2 2/2-way valve
WP Mounting bracket standard design
WPM Mounting bracket for hooking in service units
WPB Mounting bracket for large wall gap
WB Mounting bracket centrally at rear (wall mounting top and bottom), connecting plates not required
WBM Mounting bracket centrally at rear (wall mounting top), connecting plates not required
EX4 EU certification (II 2GD to EU Explosion Protection Directive (ATEX))
UL1 UL certification (cULus, ordinary locations for Canada and USA)
Z Flow direction from right to left

On-off valves MS-EM ★ manually operated

Data sheet



Technical data Download CAD data ➔ **www.festo.com**

Size			MS4		MS6			MS9		
Pneumatic connection 1, 2			G⅛	G¼	G¼	G⅜	G½	G¾	G1	–[1]
Pneumatic connection 3			G¼		G½			G1		
Design			Rotary slide					Piston spool		
Type of mounting			Via accessories							
			In-line installation							
Mounting position			Any							
Type of actuation			Manual							
Valve function			–					2/2-way valve, bistable		
			3/2-way valve, bistable							
Exhaust air function			No flow control							
Type of control			Direct							
Flow direction			Non-reversible							
Pressure indication		AG	Via pressure gauge for indicating the outlet pressure							
		AD1/AD3	Via pressure sensor with LCD display for indicating the outlet pressure and with electrical output					–		
		AD7/AD9	Via pressure sensor with operational status indicator for indicating the outlet pressure and with electrical output					–		
Length [mm]	With cover plate		54		76			109		
	With MS pressure gauge AG		57		77			109		
	With adapter A8/A4		59		79			110		
	With pressure sensor AD1/AD3		83		103			–		
	With pressure sensor AD7/AD9		59		79			–		
Width [mm]			40		62			104		90
Height [mm]	Without silencer		104		151			272		
	With silencer		153		260			431		

1) Module without connecting thread/without connecting plate. The connecting plate must be ordered separately as an accessory ➔ page 1406.

Standard nominal flow rate q_{nN}[2)]

Size		MS4		MS6			MS9		
Pneumatic connection 1, 2		G⅛	G¼	G¼	G⅜	G½	G¾	G1	–[3]
In main flow direction $q_{nN1\rightarrow2}$	[l/min]	1200	2200	3000	5500	8700	14,500	18,000	8000 ... 18,000
In relief direction $q_{nN2\rightarrow3}$	[l/min]	1900	1700	6800	6600	6200	14,900	14,100	13,200 ... 16,500

2) Measured at p1 = 6 bar and p2 = 5 bar, Δp = 1 bar.
3) Dependent on the connecting plate selected, must be ordered separately as an accessory ➔ page 1406.

Operating conditions

Size		MS4	MS6	MS9
Operating medium		Compressed air to ISO 8573-1:2010 [7:4:4]		
		Inert gases		–
Note on operating/pilot medium		Lubricated operation possible (in which case lubricated operation will always be required)		
Operating pressure	[bar]	0 ... 14 (0 ... 10)[4]	0 ... 18 (0 ... 10)[4]	0 ... 20
Ambient temperature	[°C]	–10 ... +60 (0 ... +50)[4]	–10 ... +60 (0 ... +50)[4]	–10 ... +60

4) Value in brackets applies to MS4/MS6-EM1 with pressure sensor AD...

On-off valves MS-EM ★ manually operated

Data sheet

Materials	
Housing	Die-cast aluminium
Seals	NBR

Order code – MS4/MS6

MS | | – | EM1 | – | | – | | – | | –

Series	
MS	Standard service unit

Size	
4	Grid dimension 40 mm
6	Grid dimension 62 mm

Type	
EM1	Manually operated on-off valve

Pneumatic connection	
MS4	
1/8	Female thread G⅛
1/4	Female thread G¼
MS6	
1/4	Female thread G¼
3/8	Female thread G⅜
1/2	Female thread G½

Silencer	
–	Without silencer
S	Silencer

Pressure gauge/pressure gauge alternatives	
–	Cover plate
AG	MS pressure gauge, bar
A8	Adapter for EN pressure gauge 1/8 (MS4 only)
A4	Adapter for EN pressure gauge ¼
AD1	Pressure sensor with LCD display, plug M8, 1 switching output PNP, 3-pin [1]
AD3	Pressure sensor with LCD display, plug M12, 1 switching output PNP, 4-pin, analogue output 4 ... 20 mA [1]
AD7	Pressure sensor with operational status indicator, plug M8, threshold value comparator, PNP, N/O [1]
AD9	Pressure sensor with operational status indicator, plug M8, window comparator, PNP, N/O [1]

Flow direction	
–	From left to right
Z	From right to left

[1] Measuring range max. 10 bar.

Order example:

MS6-EM1-1/2-S-AD1

Standard service unit, grid dimension 62 mm - manually operated on-off valve - female thread G½ - with silencer - with pressure sensor with LCD display, plug M8, 1 switching output PNP, 3-pin - flow direction from left to right

On-off valves MS-EM ★ manually operated

Order code – MS9

MS | 9 | – | EM | – | | – | | – | | – | | –

Series

MS	Standard service unit

Size

9	Grid dimension 90 mm

Type

EM	Manually operated on-off valve

Pneumatic connection

3/4	Female thread G¾
1	Female thread G1
G	Module without connecting thread, without connecting plate Connecting plates ➔ page 1406

Silencer

–	Without silencer	1
S	Silencer	

Pressure gauge/pressure gauge alternatives

VS	Cover plate
AG	MS pressure gauge
A4	Adapter for EN pressure gauge ¼

Alternative pressure gauge scale

–	No pressure gauge scale	2
BAR	Bar	3

Valve function

–	3/2-way valve	
2	2/2-way valve	4

Flow direction

–	From left to right
Z	From right to left

1 Only with 2/2-way valve function.
2 Not with MS pressure gauge AG.
3 Only with MS pressure gauge AG.
4 Not with silencer S.

Order example:
MS9-EM-1-S-AG-BAR
Standard service unit, grid dimension 90 mm - manually operated on-off valve - female thread G1 - with silencer - with MS pressure gauge - pressure gauge scale in bar - 3/2-way valve - flow direction from left to right

Ordering – Product options

Configurable product

This product and all its options can be ordered using the configurator.

The configurator can be found under Products on the DVD or
➔ **www.festo.com/catalogue/...**

Enter the type code in the search field.

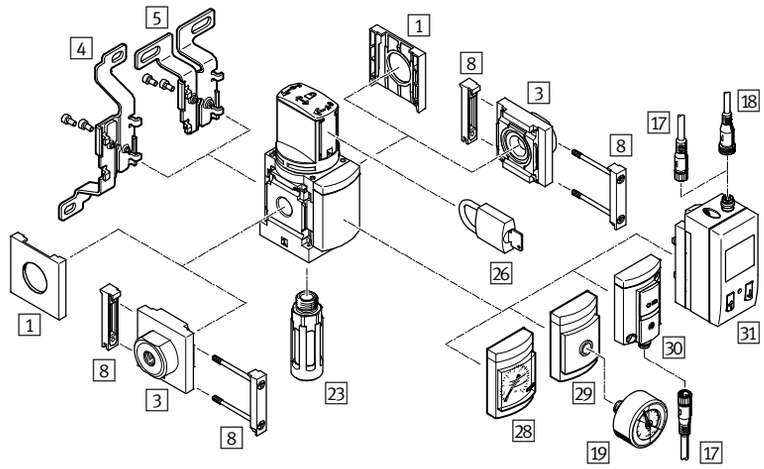
★ Quick ordering [1)]

Part no.	Type
MS4	
541258	**MS4-EM1-1/4**
541259	**MS4-EM1-1/4-S**

Part no.	Type
MS6	
541267	**MS6-EM1-1/2**
541268	**MS6-EM1-1/2-S**

1) All products in this table are easy to select and quick to order.

Accessories – MS4/MS6



Accessories		➔ Page/online
1	Cover cap MS4/6-END	1406
3	Connecting plate kit MS4/6-AG...	1406
4	Mounting bracket MS4/6-WB[1]	1406
5	Mounting bracket MS4-WBM[1]	1406
8	Module connector MS4/6-MV	1406
17	Connecting cable NEBU-M8...-LE3	1407
18	Connecting cable NEBU-M12...-LE4	1407
19	Pressure gauge MA	1408
23	Silencer U	1409
26	Padlock LRVS-D	1409
28	MS pressure gauge AG	1367
29	Adapter A8/A4 for EN pressure gauge 1⁄8/1⁄4	1367
30	Pressure sensor with operational status indicator AD7/AD9	1367

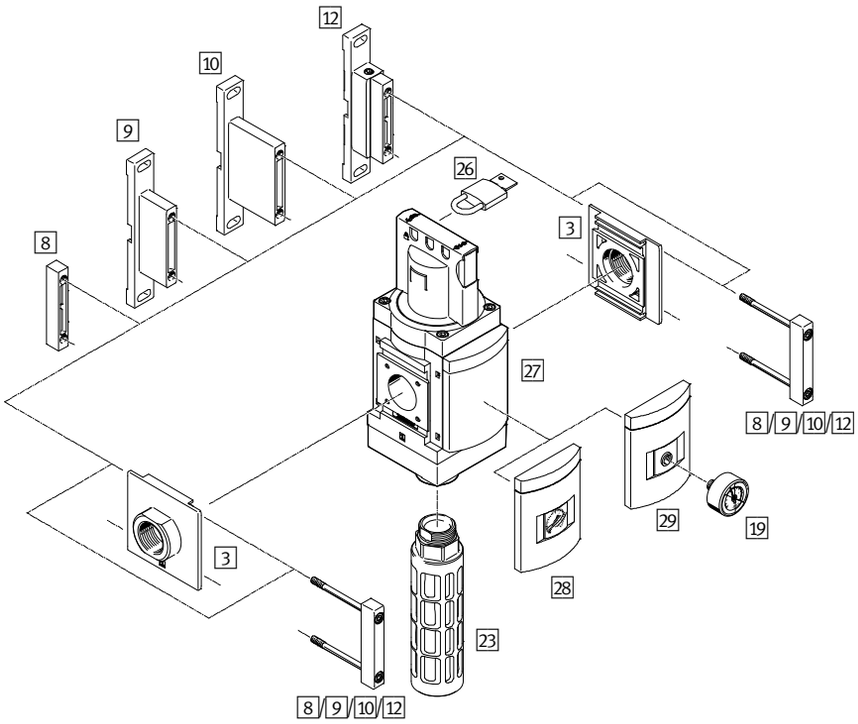
1) Mounting component for individual device.

Accessories		➔ Page/online
31	Pressure sensor with LCD display AD1/AD3	1367
–	Mounting plate MS4/6-AEND	1406
–	Mounting bracket MS4/6-WP[2]	1406
–	Mounting bracket MS4/6-WPB[2]	1406
–	Mounting bracket MS4/6-WPE[2]	1406
–	Mounting bracket MS4/6-WPM[2]	1406
–	Module connector MS4/6-RMV	1409
–	Module connector MS4-6-AMV	1409
–	Module connector MS6-9-AMV	1409
–	Module connector MS6-9-ARMV	1409
–	Power supply module MS4/6-E-IPM	**ms*-e-ipm***
–	Branching module MS4/6-A-IPM	**ms*-a*ipm***

2) Mounting component and connector for a combination of devices or individual devices with connecting plate kit MS4/6-AG... 3/with mounting plate MS4/6-AEND.

On-off valves MS-EM ★ manually operated

Accessories – MS9



Accessories		➔ Page/online
3	Connecting plate kit MS9-AG...[1]	1406
8	Module connector MS9-MV[1]	1406
9	Mounting bracket MS9-WP	1406
10	Mounting bracket MS9-WPB	1406
12	Mounting bracket MS9-WPM[1]	1406
19	Pressure gauge MA	1408
23	Silencer U	1409

Accessories		➔ Page/online
26	Padlock LRVS-D	1409
27	Cover plate VS	1368
28	MS pressure gauge AG	1368
29	Adapter A4 for EN pressure gauge ¼	1368
–	Module connector MS9-RMV	1409
–	Module connector MS6-9-AMV	1409
–	Module connector MS6-9-ARMV	1409

1) Not suitable for individual devices with connecting thread G¾ or G1.

For the easy control of system pressurisation and exhausting

+ High flow rate
+ Optionally with silencer

Solenoid actuated on-off valves

MS-EE★

MS series

Solenoid actuated on-off valves

MS-EE★

Overview, configuration and ordering
➔ **www.festo.com/catalogue/ms-ee** ✓

Additional information, support and user documentation
➔ **www.festo.com/sp/ms-ee** ✓

Quick ordering of basic designs
➔ page 1378 ✓

Selected types in accordance with the ATEX Directive for explosive atmospheres
➔ **www.festo.com/catalogue/ex** ✓

+ Solenoid actuated
+ Supply voltage 24 V DC, 110, 230 V AC
+ Optionally with pressure sensor with display
+ With solenoid coil, without plug socket
+ Sizes 4, 6, 9, 12
+ Grid dimension 40, 62, 90, 124 mm

On-off valves MS-EE ★ solenoid actuated

Product range overview

Size	Pneumatic connection	Product options										
		V24	10V24	S	VS	AG	A8	A4	AD...	BAR	2	Z
4	1/8, 1/4	■	■	■	–[1]	■	■	■	■	–	–	■
6	1/4, 3/8, 1/2	■	■	■	–[1]	■	–	■	■	–	–	■
9	3/4, 1, G	■	–	■	■	■	–	■	■	■	■	■
12	G	■	–	■	–[1]	■	–	■	–	–	–	■

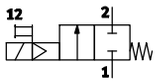
1) Cover plate included in the basic configuration by default.

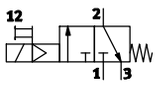
Product options

1/8 Female thread G1/8
1/4 Female thread G1/4
3/8 Female thread G3/8
1/2 Female thread G1/2
3/4 Female thread G3/4
1 Female thread G1
AGA Connecting plate G1/8
AGB Connecting plate G1/4
AGC Connecting plate G3/8
AGD Connecting plate G1/2
AGE Connecting plate G3/4
AGF Connecting plate G1
AGG Connecting plate G1 1/4
AGH Connecting plate G1 1/2
AGI Connecting plate G2
N3/4 Female thread NPT3/4
N1 Female thread NPT1
AQK Connecting plate NPT1/8
AQN Connecting plate NPT1/4
AQP Connecting plate NPT3/8
AQR Connecting plate NPT1/2
AQS Connecting plate NPT3/4
AQT Connecting plate NPT1
AQU Connecting plate NPT1 1/4
AQV Connecting plate NPT1 1/2
G Module without connecting thread, without connecting plate
NG Module without connecting thread, without connecting plate (inch)
V24 Supply voltage 24 V DC (pin allocation to EN 175301), 3 ... 18 bar, non-detenting/detenting manual override
V24P Supply voltage 24 V DC (pin allocation for plug M12 to DESINA), 3 ... 16 bar, non-detenting/detenting manual override
10V24 Supply voltage 24 V DC (pin allocation to EN 175301), 4 ... 10 bar, non-detenting manual override
10V24C Supply voltage 24 V DC (pin allocation to EN 175301), 4 ... 10 bar, no manual override
10V24D Supply voltage 24 V DC, M12x1 to ISO 20401 compliant with EN 61076-2-101, 4 ... 10 bar, no manual override
10V24F Supply voltage 24 V DC, M12x1 to ISO 20401 compliant with EN 61076-2-101, 4 ... 10 bar, non-detenting manual override
10V24P Supply voltage 24 V DC, M12x1 to ISO 20401 compliant with EN 61076-2-101, 4 ... 10 bar, non-detenting/detenting manual override
V110 Supply voltage 110 V AC (pin allocation to EN 175301), 3 ... 18 bar, non-detenting/detenting manual override
V230 Supply voltage 230 V AC (pin allocation to EN 175301), 3 ... 18 bar, non-detenting/detenting manual override
S Silencer
VS Cover plate
AG MS pressure gauge
A8 Adapter for EN pressure gauge 1/8, without pressure gauge
A4 Adapter for EN pressure gauge 1/4, without pressure gauge
RG Integrated pressure gauge, red/green scale
AD1 Pressure sensor with LCD display, plug M8, 1 switching output PNP, 3-pin
AD2 Pressure sensor with LCD display, plug M8, 1 switching output NPN, 3-pin
AD3 Pressure sensor with LCD display, plug M12, 1 switching output PNP, 4-pin, analogue output 4 ... 20 mA
AD4 Pressure sensor with LCD display, plug M12, 1 switching output NPN, 4-pin, analogue output 4 ... 20 mA
AD7 Pressure sensor with operational status indicator, plug M8, threshold value comparator, PNP, N/O
AD8 Pressure sensor with operational status indicator, plug M8, threshold value comparator, PNP, N/C
AD9 Pressure sensor with operational status indicator, plug M8, window comparator, PNP, N/O
AD10 Pressure sensor with operational status indicator, plug M8, window comparator, PNP, N/C
BAR Pressure gauge scale in bar
PSI Pressure gauge scale in psi
MPA Pressure gauge scale in MPa
2 2/2-way valve
WP Mounting bracket standard design
WPM Mounting bracket for hooking in service units
WPB Mounting bracket for large wall gap
WB Mounting bracket centrally at rear (wall mounting top and bottom), connecting plates not required
WBM Mounting bracket centrally at rear (wall mounting top), connecting plates not required
EX2 EU certification (II 3GD to EU Explosion Protection Directive (ATEX))
UL1 UL certification (cULus, ordinary locations for Canada and USA)
Z Flow direction from right to left

On-off valves MS-EE ★ solenoid actuated

Data sheet





Technical data Download CAD data ➔ **www.festo.com**

Size			MS4		MS6			MS9		
Pneumatic connection 1, 2			G1⁄8	G1⁄4	G1⁄4	G3⁄8	G1⁄2	G3⁄4	G1	–[1]
Pneumatic connection 3			G1⁄4		G1⁄2			G1		
Design			Piston spool							
Type of mounting			Via accessories							
			In-line installation							
Mounting position			Any							
Type of actuation			Electric							
Valve function			–					2/2-way valve, closed, single solenoid		
			3/2-way valve, closed, single solenoid							
Exhaust air function			No flow control							
Manual override			Non-detenting/detenting (supply voltage V24)							
			Non-detenting (supply voltage 10V24)					–		
Reset method			Mechanical spring							
Switching position indication			Via accessories							
Type of control			Piloted							
Pilot air supply			Internal							
Flow direction			Non-reversible							
Pressure indication		AG	Via pressure gauge for indicating the outlet pressure							
		AD1/AD3	Via pressure sensor with LCD display for indicating the outlet pressure and with electrical output					–		
		AD7/AD9	Via pressure sensor with operational status indicator for indicating the outlet pressure and with electrical output							
Length [mm]	With cover plate		75 (63)[2]		97 (83)[2]			109		
	With MS pressure gauge AG		86 (65)[2]		98 (83)[2]			109		
	With adapter A8/A4		80 (63)[2]		100 (83)[2]			110		
	With pressure sensor AD1/AD3		104		124			–		
	With pressure sensor AD7/AD9		80		100			112		
Width [mm]			40		62			104		90
Height [mm]	Without silencer		143		186			239		
	With silencer		192		294			398		

1) Module without connecting thread/without connecting plate. The connecting plate must be ordered separately as an accessory ➔ page 1406.
2) Value in brackets with repositioned solenoid actuator (180°), i.e. solenoid points to the front.

Standard nominal flow rate q_{nN}[3]

Size		MS4		MS6			MS9		
Pneumatic connection 1, 2		G1⁄8	G1⁄4	G1⁄4	G3⁄8	G1⁄2	G3⁄4	G1	–[4]
In main flow direction $q_{nN1\rightarrow2}$	[l/min]	1000	2000	2600	5500	7000	14,500	18,000	8000 ... 18,000
In relief direction $q_{nN2\rightarrow3}$	[l/min]	1600	1600	7000	6200	5500	14,900	14,100	13,200 ... 16,500

3) Measured at p1 = 6 bar and p2 = 5 bar, Δp = 1 bar.
4) Dependent on the connecting plate selected, must be ordered separately as an accessory ➔ page 1406.

Data sheet

Electrical data						
Size		MS4		MS6		MS9
Supply voltage		V24	10V24	V24	10V24	V24
Coil characteristics		24 V DC: 1.5 W	24 V DC: 1.8 W	24 V DC: 1.5 W	24 V DC: 1.8 W	24 V DC: 4.5 W
Electrical connection		Plug, square design to EN 175301-803, type C				Plug, square design to EN 175301-803, type A
Degree of protection for solenoid coil		IP65				
Duty cycle	[%]	100				

Operating conditions						
Size		MS4		MS6		MS9
Supply voltage		V24	10V24	V24	10V24	V24
Operating medium		Compressed air to ISO 8573-1:2010 [7:4:4]				
		Inert gases				–
Note on operating/pilot medium		Lubricated operation possible (in which case lubricated operation will always be required)				
Operating pressure	[bar]	4 ... 14 (4 ... 10)[1)]	4 ... 10	4 ... 18 (4 ... 10)[1)]	4 ... 10	3.5 ... 16
Ambient temperature	[°C]	–10 ... +60 (0 ... +50)[1)]	–10 ... +50 (0 ... +50)[1)]	–10 ... +60 (0 ... +50)[1)]	–10 ... +50 (0 ... +50)[1)]	–10 ... +60

1) Value in brackets applies to MS4/MS6-EE with pressure sensor AD...

Materials	
Housing	Die-cast aluminium
Seals	NBR

On-off valves MS-EE ★ solenoid actuated

Order code – MS4/MS6

MS [ ] – EE – [ ] – [ ] – [ ] – [ ] – [ ]

Series	
MS	Standard service unit

Size	
4	Grid dimension 40 mm
6	Grid dimension 62 mm

Type	
EE	Solenoid actuated on-off valve

Pneumatic connection	
MS4	
1/8	Female thread G⅛
1/4	Female thread G¼
MS6	
1/4	Female thread G¼
3/8	Female thread G⅜
1/2	Female thread G½

Supply voltage	
V24	24 V DC (pin allocation to EN 175301), max. 18 bar
10V24	24 V DC (pin allocation to EN 175301), max. 10 bar

Silencer	
–	Without silencer
S	Silencer

Pressure gauge/pressure gauge alternatives	
–	Cover plate
AG	MS pressure gauge, bar
A8	Adapter for EN pressure gauge 1/8 (MS4 only)
A4	Adapter for EN pressure gauge ¼
AD1	Pressure sensor with LCD display, plug M8, 1 switching output PNP, 3-pin [1]
AD3	Pressure sensor with LCD display, plug M12, 1 switching output PNP, 4-pin, analogue output 4 ... 20 mA [1]
AD7	Pressure sensor with operational status indicator, plug M8, threshold value comparator, PNP, N/O [1]
AD9	Pressure sensor with operational status indicator, plug M8, window comparator, PNP, N/O [1]

Flow direction	
–	From left to right
Z	From right to left

[1] Measuring range max. 10 bar.

Order example:

MS4-EE-1/8-10V24-S

Standard service unit, grid dimension 40 mm - solenoid actuated on-off valve - female thread G⅛ - supply voltage 24 V DC, operating pressure 4 ... 10 bar - with silencer - with cover plate - flow direction from left to right

Order code – MS9

MS | 9 | – | EE | – | | – | V24 | – | | – | | – | | –

Series

MS	Standard service unit

Size

9	Grid dimension 90 mm

Type

EE	Solenoid actuated on-off valve

Pneumatic connection

3/4	Female thread G¾
1	Female thread G1
G	Module without connecting thread, without connecting plate Connecting plates ➔ page 1406

Supply voltage

V24	24 V DC (pin allocation to EN 175301), max. 16 bar

Silencer

–	Without silencer
S	Silencer

Pressure gauge/pressure gauge alternatives

VS	Cover plate	
AG	MS pressure gauge	
A4	Adapter for EN pressure gauge ¼	
AD7	Pressure sensor with operational status indicator, plug M8, threshold value comparator, PNP, N/O	[1]

Alternative pressure gauge scale

–	No pressure gauge scale	[2]
BAR	Bar	[3]

Valve function

–	3/2-way valve	
2	2/2-way valve	[4]

Flow direction

–	From left to right
Z	From right to left

[1] Measuring range max. 10 bar.
[2] Not with MS pressure gauge AG.
[3] Only with MS pressure gauge AG.
[4] Not with silencer S.

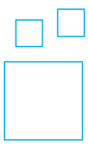
Order example:

MS9-EE-G-V24-S

Standard service unit, grid dimension 90 mm - solenoid actuated on-off valve - module without connecting thread, without connecting plate - supply voltage 24 V DC, operating pressure 3.5 ... 16 bar - with silencer - with cover plate - no pressure gauge scale - 3/2-way valve - flow direction from left to right

On-off valves MS-EE ★ solenoid actuated

Ordering – Product options



Configurable product

This product and all its options can be ordered using the configurator.

The configurator can be found under Products on the DVD or
➔ **www.festo.com/catalogue/...**

Enter the type code in the search field.

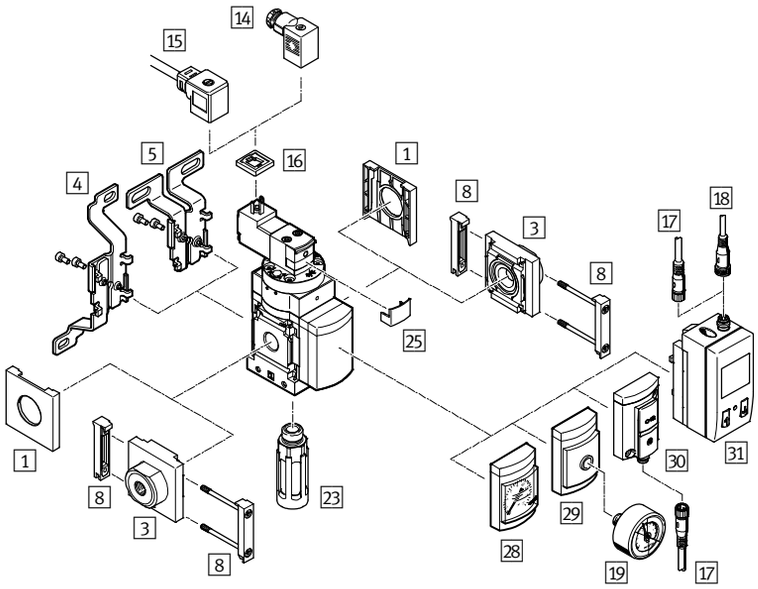
★ Quick ordering [1)]

Part no.	Type
MS4	
542578	**MS4-EE-1/4-10V24**
542598	**MS4-EE-1/4-10V24-S**

Part no.	Type
MS6	
542582	**MS6-EE-1/2-10V24**
542602	**MS6-EE-1/2-10V24-S**

1) All products in this table are easy to select and quick to order.

Accessories – MS4/MS6



Accessories		➔ Page/online
1	Cover cap MS4/6-END	1406
3	Connecting plate kit MS4/6-AG...	1406
4	Mounting bracket MS4/6-WB[1)]	1406
5	Mounting bracket MS4-WBM[1)]	1406
8	Module connector MS4/6-MV	1406
14	Plug socket MSSD-EB	1407
15	Plug socket with cable KMEB	1407
16	Illuminating seal MEB-LD	1407
17	Connecting cable NEBU-M8...-LE3	1407
18	Connecting cable NEBU-M12...-LE4	1407
19	Pressure gauge MA	1408
23	Silencer U	1409
25	Locking clip CPV18-HV	1409
28	MS pressure gauge AG	1376

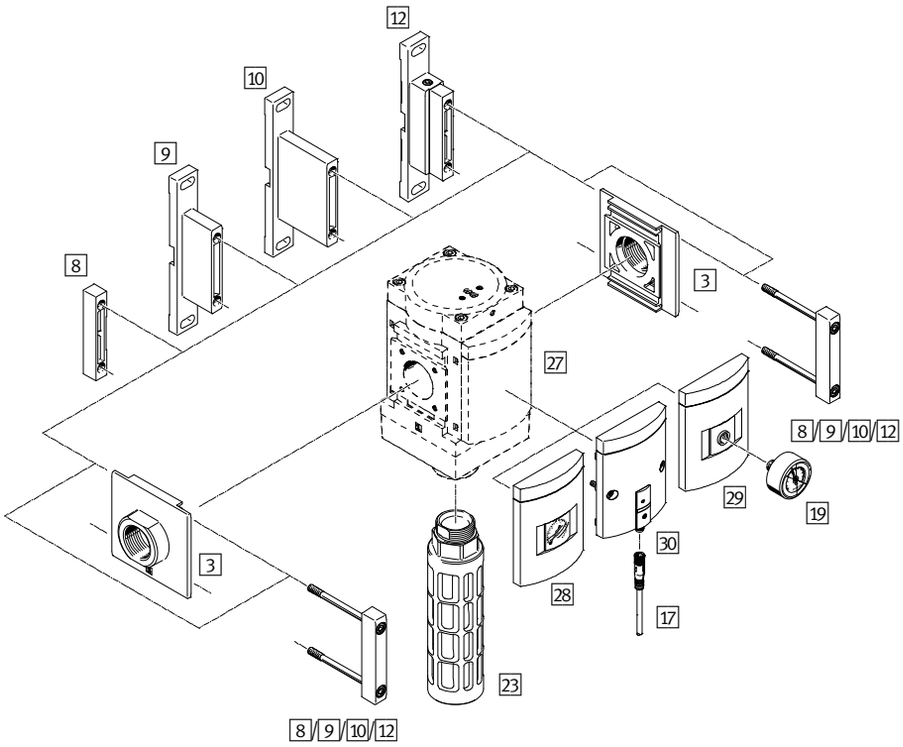
1) Mounting component for individual device.

Accessories		➔ Page/online
29	Adapter A8/A4 for EN pressure gauge 1⁄8/1⁄4	1376
30	Pressure sensor with operational status indicator AD7/AD9	1376
31	Pressure sensor with LCD display AD1/AD3	1376
–	Mounting plate MS4/6-AEND	1406
–	Mounting bracket MS4/6-WP[2)]	1406
–	Mounting bracket MS4/6-WPB[2)]	1406
–	Mounting bracket MS4/6-WPE[2)]	1406
–	Mounting bracket MS4/6-WPM[2)]	1406
–	Module connector MS4/6-RMV	1409
–	Module connector MS4-6-AMV	1409
–	Module connector MS6-9-AMV	1409
–	Module connector MS6-9-ARMV	1409
–	Power supply module MS4/6-E-IPM	**ms*-e-ipm***
–	Branching module MS4/6-A-IPM	**ms*-a*ipm***

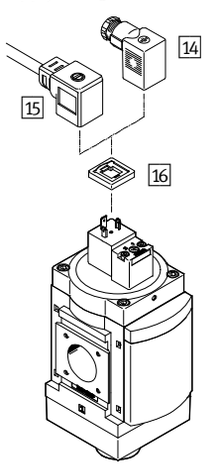
2) Mounting component and connector for a combination of devices or individual devices with connecting plate kit MS4/6-AG... 3 /with mounting plate MS4/6-AEND.

On-off valves MS-EE ★ solenoid actuated

Accessories – MS9



Supply voltage V24



Accessories		➔ Page/online
3	Connecting plate kit MS9-AG...[1]	1406
8	Module connector MS9-MV[1]	1406
9	Mounting bracket MS9-WP	1406
10	Mounting bracket MS9-WPB	1406
12	Mounting bracket MS9-WPM[1]	1406
14	Plug socket MSSD-C	1407
15	Connecting cable KMC	1407
16	Illuminating seal MC-LD	1407
17	Connecting cable NEBU-M8...-LE3	1407

Accessories		➔ Page/online
19	Pressure gauge MA	1408
23	Silencer U	1409
27	Cover plate VS	1377
28	MS pressure gauge AG	1377
29	Adapter A4 for EN pressure gauge ¼	1377
30	Pressure sensor with operational status indicator AD7	1377
–	Module connector MS9-RMV	1409
–	Module connector MS6-9-AMV	1409
–	Module connector MS6-9-ARMV	1409

1) Not suitable for individual devices with connecting thread G¾ or G1.

For targeted system pressurisation

+ Variable pressure build-up prevents critical movements
+ Easily combined with on-off valves

Pneumatically actuated soft-start valves

MS-DL★

MS series

Pneumatically actuated soft-start valves

MS-DL★

Overview, configuration and ordering
➔ **www.festo.com/catalogue/ms-dl** ✓

Additional information, support and user documentation
➔ **www.festo.com/sp/ms-dl** ✓

Quick ordering of basic designs
➔ page 1385 ✓

Selected types in accordance with the ATEX Directive for explosive atmospheres
➔ **www.festo.com/catalogue/ex** ✓

+ For slowly pressurising pneumatic systems (for use with on-off valves EM1 and EE)
+ For advancing the drives slowly and reliably into the initial position
+ For avoiding sudden and unexpected movements
+ Adjustable switching time delay
+ Sizes 4, 6, 12
+ Grid dimension 40, 62, 124 mm

Product range overview

Size	Pneumatic connection	Product options				
		AG	A8	A4	AD...	Z
4	1/8, 1/4	■	■	■	■	■
6	1/4, 3/8, 1/2	■	–	■	■	■
12	G	■	–	■	–	■

Product options

1/8 Female thread G1/8
1/4 Female thread G1/4
3/8 Female thread G3/8
1/2 Female thread G1/2
AGA Connecting plate G1/8
AGB Connecting plate G1/4
AGC Connecting plate G3/8
AGD Connecting plate G1/2
AGE Connecting plate G3/4
AGF Connecting plate G1
AGG Connecting plate G1 1/4
AGH Connecting plate G1 1/2
AGI Connecting plate G2
AQK Connecting plate NPT1/8
AQN Connecting plate NPT1/4
AQP Connecting plate NPT3/8
AQR Connecting plate NPT1/2
AQS Connecting plate NPT3/4
G Module without connecting thread, without connecting plate

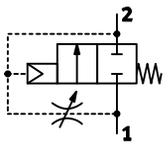
AG MS pressure gauge
A8 Adapter for EN pressure gauge 1/8, without pressure gauge
A4 Adapter for EN pressure gauge 1/4, without pressure gauge
RG Integrated pressure gauge, red/green scale
AD1 Pressure sensor with LCD display, plug M8, 1 switching output PNP, 3-pin
AD2 Pressure sensor with LCD display, plug M8, 1 switching output NPN, 3-pin
AD3 Pressure sensor with LCD display, plug M12, 1 switching output PNP, 4-pin, analogue output 4 ... 20 mA
AD4 Pressure sensor with LCD display, plug M12, 1 switching output NPN, 4-pin, analogue output 4 ... 20 mA

AD7 Pressure sensor with operational status indicator, plug M8, threshold value comparator, PNP, N/O
AD8 Pressure sensor with operational status indicator, plug M8, threshold value comparator, PNP, N/C
AD9 Pressure sensor with operational status indicator, plug M8, window comparator, PNP, N/O
AD10 Pressure sensor with operational status indicator, plug M8, window comparator, PNP, N/C
PSI Pressure gauge scale in psi
MPA Pressure gauge scale in MPa
WP Mounting bracket standard design
WPM Mounting bracket for hooking in service units

WB Mounting bracket centrally at rear (wall mounting top and bottom), connecting plates not required
WBM Mounting bracket centrally at rear (wall mounting top), connecting plates not required
EX4 EU certification (II 2GD to EU Explosion Protection Directive (ATEX))
UL1 UL certification (cULus, ordinary locations for Canada and USA)
Z Flow direction from right to left

Soft-start valves MS-DL ★ pneumatically actuated

Data sheet



Technical data Download CAD data ➔ **www.festo.com**

Size			MS4		MS6		
Pneumatic connection 1, 2			G1⁄8	G1⁄4	G1⁄4	G3⁄8	G1⁄2
Design			Piston seat				
Type of mounting			Via accessories				
			In-line installation				
Mounting position			Any				
Type of actuation			Pneumatic				
Valve function			2/2-way valve				
Exhaust air function			With flow control option				
Reset method			Mechanical spring				
Type of control			Direct				
Pilot air supply			External				
Flow direction			Non-reversible				
Pressure indication		AG	Via pressure gauge for indicating the outlet pressure				
		AD1/AD3	Via pressure sensor with LCD display for indicating the outlet pressure and with electrical output				
		AD7/AD9	Via pressure sensor with operational status indicator for indicating the outlet pressure and with electrical output				
Length [mm]	With cover plate		54		76		
	With MS pressure gauge AG		57		77		
	With adapter A8/A4		59		79		
	With pressure sensor AD1/AD3		83		103		
	With pressure sensor AD7/AD9		59		79		
Width [mm]			40		62		
Height [mm]			83		108		

Standard nominal flow rate q_{nN} 1)

Size		MS4		MS6		
Pneumatic connection 1, 2		G1⁄8	G1⁄4	G1⁄4	G3⁄8	G1⁄2
In main flow direction $q_{nN1 \rightarrow 2}$	[l/min]	1000	2000	2800	5050	6450
In relief direction $q_{nN2 \rightarrow 1}$	[l/min]	1000	2000	2800	5050	6400

1) Measured at p1 = 6 bar and p2 = 5 bar, Δp = 1 bar.

Operating conditions

Size		MS4	MS6
Operating medium		Compressed air to ISO 8573-1:2010 [7:4:4]	
		Inert gases	
Note on operating/pilot medium		Lubricated operation possible (in which case lubricated operation will always be required)	
Operating pressure	[bar]	4 ... 14 (4 ... 10)2)	4 ... 18 (4 ... 10)2)
Ambient temperature	[°C]	–10 ... +60 (0 ... +50)2)	–10 ... +60 (0 ... +50)2)

2) Value in brackets applies to MS4/MS6-DL with pressure sensor AD...

Materials

Housing	Die-cast aluminium
Seals	NBR

Order code – MS4/MS6

MS | | – | DL | – | | – | | –

Series	
MS	Standard service unit

Size	
4	Grid dimension 40 mm
6	Grid dimension 62 mm

Type	
DL	Pneumatically actuated soft-start valve

Pneumatic connection	
MS4	
1/8	Female thread G⅛
1/4	Female thread G¼
MS6	
1/4	Female thread G¼
3/8	Female thread G⅜
1/2	Female thread G½

Pressure gauge/pressure gauge alternatives	
–	Cover plate
AG	MS pressure gauge, bar
A8	Adapter for EN pressure gauge 1/8 (MS4 only)
A4	Adapter for EN pressure gauge ¼
AD1	Pressure sensor with LCD display, plug M8, 1 switching output PNP, 3-pin [1]
AD3	Pressure sensor with LCD display, plug M12, 1 switching output PNP, 4-pin, analogue output 4 ... 20 mA [1]
AD7	Pressure sensor with operational status indicator, plug M8, threshold value comparator, PNP, N/O [1]
AD9	Pressure sensor with operational status indicator, plug M8, window comparator, PNP, N/O [1]

Flow direction	
–	From left to right
Z	From right to left

[1] Measuring range max. 10 bar.

Order example:
MS6-DL-3/8-A4
Standard service unit, grid dimension 62 mm - pneumatically actuated soft-start valve - female thread G⅜ - with adapter for EN pressure gauge ¼ - flow direction from left to right

Ordering – Product options

Configurable product

This product and all its options can be ordered using the configurator.

The configurator can be found under Products on the DVD or
➔ **www.festo.com/catalogue/...**

Enter the type code in the search field.

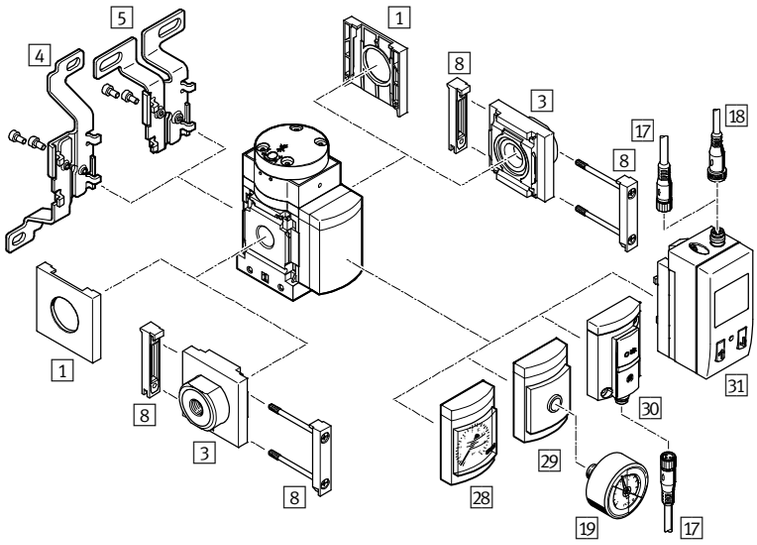
★ Quick ordering [1)]

Part no.	Type
MS4	
529531	**MS4-DL-1/4**

Part no.	Type
MS6	
529817	**MS6-DL-1/2**

1) All products in this table are easy to select and quick to order.

Accessories – MS4/MS6



Accessories		➔ Page/online
1	Cover cap MS4/6-END	1406
3	Connecting plate kit MS4/6-AG...	1406
4	Mounting bracket MS4/6-WB[1]	1406
5	Mounting bracket MS4-WBM[1]	1406
8	Module connector MS4/6-MV	1406
17	Connecting cable NEBU-M8...-LE3	1407
18	Connecting cable NEBU-M12...-LE4	1407
19	Pressure gauge MA	1408
28	MS pressure gauge AG	1385
29	Adapter A8/A4 for EN pressure gauge ⅛/¼	1385
30	Pressure sensor with operational status indicator AD7/AD9	1385
31	Pressure sensor with LCD display AD1/AD3	1385

1) Mounting component for individual device.

Accessories		➔ Page/online
–	Mounting plate MS4/6-AEND	1406
–	Mounting bracket MS4/6-WP[2]	1406
–	Mounting bracket MS4/6-WPB[2]	1406
–	Mounting bracket MS4/6-WPE[2]	1406
–	Mounting bracket MS4/6-WPM[2]	1406
–	Module connector MS4/6-RMV	1409
–	Module connector MS4-6-AMV	1409
–	Module connector MS6-9-AMV	1409
–	Module connector MS6-9-ARMV	1409
–	Power supply module MS4/6-E-IPM	**ms*-e-ipm***
–	Branching module MS4/6-A-IPM	**ms*-a*ipm***

2) Mounting component and connector for a combination of devices or individual devices with connecting plate kit MS4/6-AG... 3 /with mounting plate MS4/6-AEND.

For the easy implementation of additional connection options

+ As an intermediate distributor for varying air qualities
+ Optional non-return valve prevents return of lubricated compressed air

Compressed air distributors › MS series ›

Branching modules

MS-FRM ★

MS series

Branching modules

MS-FRM ★

Overview, configuration and ordering
➔ **www.festo.com/catalogue/ms-frm** ✓

Additional information, support and user documentation
➔ **www.festo.com/sp/ms-frm** ✓

★ Quick ordering of basic designs
➔ page 1392 ✓

Selected types in accordance with the ATEX Directive for explosive atmospheres
➔ **www.festo.com/catalogue/ex** ✓

+ Designs with integrated non-return function, with pressure switch
+ Pneumatic distributor with 4 connections
+ Can be used as an intermediate distributor for varying air qualities
+ Outlet at top and bottom
+ Optionally with pressure sensor with display
+ Sizes 4, 6, 9, 12
+ Grid dimension 40, 62, 90, 124 mm

Product range overview

Size	Pneumatic connection	Product options									
		VS	AG	A8	A4	AD...	BAR	X	Y	M12	Z
4	⅛, ¼	–[1]	■	■	■	■	–	■	■	■	■
6	¼, ⅜, ½	–[1]	■	–	■	■	–	■	■	■	■
9	¾, 1, G	■	■	–	■	■	■	■	■	■	■
12	G	–[1]	–	–	–	–	–	–	–	–	–

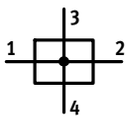
1) Cover plate included in the basic configuration by default.

Product options

⅛	Female thread G⅛
¼	Female thread G¼
⅜	Female thread G⅜
½	Female thread G½
¾	Female thread G¾
1	Female thread G1
AGA	Connecting plate G⅛
AGB	Connecting plate G¼
AGC	Connecting plate G⅜
AGD	Connecting plate G½
AGE	Connecting plate G¾
AGF	Connecting plate G1
AGG	Connecting plate G1¼
AGH	Connecting plate G1½
AGI	Connecting plate G2
N¾	Female thread NPT¾
N1	Female thread NPT1
AQR	Connecting plate NPT½
AQS	Connecting plate NPT¾
AQT	Connecting plate NPT1
AQU	Connecting plate NPT1¼
AQV	Connecting plate NPT1½
G	Module without connecting thread, without connecting plate
NG	Module without connecting thread, without connecting plate (inch)
I	Integrated non-return function
VS	Cover plate
AG	MS pressure gauge
A8	Adapter for EN pressure gauge ⅛, without pressure gauge
A4	Adapter for EN pressure gauge ¼, without pressure gauge
RG	Integrated pressure gauge, red/green scale
AD1	Pressure sensor with LCD display, plug M8, 1 switching output PNP, 3-pin
AD2	Pressure sensor with LCD display, plug M8, 1 switching output NPN, 3-pin
AD3	Pressure sensor with LCD display, plug M12, 1 switching output PNP, 4-pin, analogue output 4 ... 20 mA
AD4	Pressure sensor with LCD display, plug M12, 1 switching output NPN, 4-pin, analogue output 4 ... 20 mA
AD7	Pressure sensor with operational status indicator, plug M8, threshold value comparator, PNP, N/O
AD8	Pressure sensor with operational status indicator, plug M8, threshold value comparator, PNP, N/C
AD9	Pressure sensor with operational status indicator, plug M8, window comparator, PNP, N/O
AD10	Pressure sensor with operational status indicator, plug M8, window comparator, PNP, N/C
BAR	Pressure gauge scale in bar
PSI	Pressure gauge scale in psi
MPA	Pressure gauge scale in MPa
X	Pressure switch with display, plug socket, EN 175301, type A, square
Y	Pressure switch without display, plug socket, EN 175301, type A, square
M12	Pressure switch without display, plug socket, round, M12, 4-pin
WP	Mounting bracket standard design
WPM	Mounting bracket for hooking in service units
WPB	Mounting bracket for large wall gap
WB	Mounting bracket centrally at rear (wall mounting top and bottom), connecting plates not required
WBM	Mounting bracket centrally at rear (wall mounting top), connecting plates not required
EX4	EU certification (II 2GD to EU Explosion Protection Directive (ATEX))
UL1	UL certification (cULus, ordinary locations for Canada and USA)
Z	Direction of flow from right to left

Branching modules MS-FRM ★

Data sheet



Technical data Download CAD data ➔ **www.festo.com**

Size			MS4		MS6			MS9		
Pneumatic connection 1, 2			G⅛	G¼	G¼	G⅜	G½	G¾	G1	–[1]
Pneumatic connection 3			G¼		G½			G1		
Pneumatic connection 4			G¼		G½			G1		
Design			Branching module							
Type of mounting			Via accessories							
			In-line installation							
Mounting position			Any							
Pressure indication		AG	Via pressure gauge for indicating the outlet pressure							
		AD1/AD3	Via pressure sensor with LCD display for indicating the outlet pressure and with electrical output					–		
		AD7/AD9	Via pressure sensor with operational status indicator for indicating the outlet pressure and with electrical output							
Length [mm]	Standard		54		76			109		
	With MS pressure gauge AG		65		77			109		
	With adapter A8/A4		59		79			110		
	With pressure sensor AD1/AD3		83		103			–		
	With pressure sensor AD7/AD9		59		79			112		
	With pressure switch X/Y		63		76			109		
	With pressure switch M12		61		76			109		
Width [mm]			40		62			104		90
Height [mm]	Standard		60		87			122		
	With pressure switch X/Y/M12		153		186			227		

1) Module without connecting thread/without connecting plate. The connecting plate must be ordered separately as an accessory ➔ page 1406.

Standard nominal flow rate q_{nN}[2)]

Size		MS4		MS6			MS9		
Pneumatic connection 1, 2		G⅛	G¼	G¼	G⅜	G½	G¾	G1	–[3]
In main flow direction $q_{nN1\rightarrow2}$	[l/min]	1800	4600	4200	9200	14700	25000	45000	10000 … 50000
Outlet at top $q_{nN1\rightarrow3}$	[l/min]	1600	1500	6000	4700	4400	13000		
Outlet at bottom $q_{nN1\rightarrow4}$	[l/min]	1700	1500	6400	4800	4600	13000		

2) Measured at p1 = 6 bar and p2 = 5 bar, Δp = 1 bar.
3) Dependent on the connecting plate selected, must be ordered separately as an accessory ➔ page 1406.

Operating conditions

Size		MS4		MS6		MS9	
Pressure switch		–	X/Y/M12	–	X/Y/M12	–	X/Y/M12
Operating medium		Compressed air to ISO 8573-1:2010 [7:4:4]					
		Inert gases				–	
Note on the operating/pilot medium		Lubricated operation possible (in which case lubricated operation will always be required)					
Operating pressure	[bar]	0 … 14 (0 … 10)[4]	0 … 12 (0 … 10)[4]	0 … 20 (0 … 10)[4]	0 … 12 (0 … 10)[4]	0 … 20 (0 … 10)[4]	0 … 12 (0 … 10)[4]
Ambient temperature	[°C]	–10 … +60 (0 … +50)[4]					

4) Value in brackets applies to MS4/MS6/MS9-FRM with pressure sensor AD...

Data sheet

Materials	
Housing	Die-cast aluminium
Seals	NBR

Order code – MS4/MS6

MS [ ] – FRM – [ ] – [ ] – [ ] – [ ]

Series	
MS	Standard service unit

Size	
4	Grid dimension 40 mm
6	Grid dimension 62 mm

Type	
FRM	Branching module

Pneumatic connection	
MS4	
1/8	Female thread G⅛
1/4	Female thread G¼
MS6	
1/4	Female thread G¼
3/8	Female thread G3/8
1/2	Female thread G½

Pressure gauge/pressure gauge alternatives	
–	Cover plate
AG	MS pressure gauge, bar
A8	Adapter for EN pressure gauge ⅛ (MS4 only)
A4	Adapter for EN pressure gauge ¼
AD1	Pressure sensor with LCD display, plug M8, 1 switching output PNP, 3-pin [1]
AD3	Pressure sensor with LCD display, plug M12, 1 switching output PNP, 4-pin, analogue output 4 ... 20 mA [1]
AD7	Pressure sensor with operational status indicator, plug M8, threshold value comparator, PNP, N/O [1]
AD9	Pressure sensor with operational status indicator, plug M8, window comparator, PNP, N/O [1]

Pressure switch	
–	Without pressure switch
X	Pressure switch with display, plug socket, EN 175301, type A, square [2]
Y	Pressure switch without display, plug socket, EN 175301, type A, square [2]
M12	Pressure switch without display, plug socket, round, M12, 4-pin [2]

Direction of flow	
–	From left to right
Z	From right to left

[1] Measuring range max. 10 bar.

[2] Max. permissible operating pressure p1 = 12 bar.

Order example:

MS6-FRM-1/2

Standard service unit, grid dimension 62 mm - branching module - female thread G½ - with cover plate - without pressure switch PEV - direction of flow from left to right

Branching modules MS-FRM ★

Order code – MS9

MS	9	–	FRM	–		–		–		–

Series	
MS	Standard service unit

Size	
9	Grid dimension 90 mm

Type	
FRM	Branching module

Pneumatic connection	
3/4	Female thread G¾
1	Female thread G1
G	Module without connecting thread, without connecting plate Connecting plates ➔ page 1406

Pressure gauge/pressure gauge alternatives		
VS	Cover plate	
AG	MS pressure gauge	
A4	Adapter for EN pressure gauge ¼	
AD7	Pressure sensor with operational status indicator, plug M8, threshold value comparator, PNP, N/O	1
AD9	Pressure sensor with operational status indicator, plug M8, window comparator, PNP, N/O	1

Alternative pressure gauge scale		
–	No pressure gauge scale	2
BAR	Bar	3

Pressure switch		
–	Without pressure switch	
X	Pressure switch with display, plug socket, EN 175301, type A, square	4
Y	Pressure switch without display, plug socket, EN 175301, type A, square	4
M12	Pressure switch without display, plug socket, round, M12, 4-pin	4

Direction of flow	
–	From left to right
Z	From right to left

1 Measuring range max. 10 bar.
2 Not with MS pressure gauge AG.
3 Only with MS pressure gauge AG.
4 Max. permissible operating pressure p1 = 12 bar.

Ordering – Product options

Configurable product

This product and all its options can be ordered using the configurator.

The configurator can be found under Products on the DVD or
➔ **www.festo.com/catalogue/...**

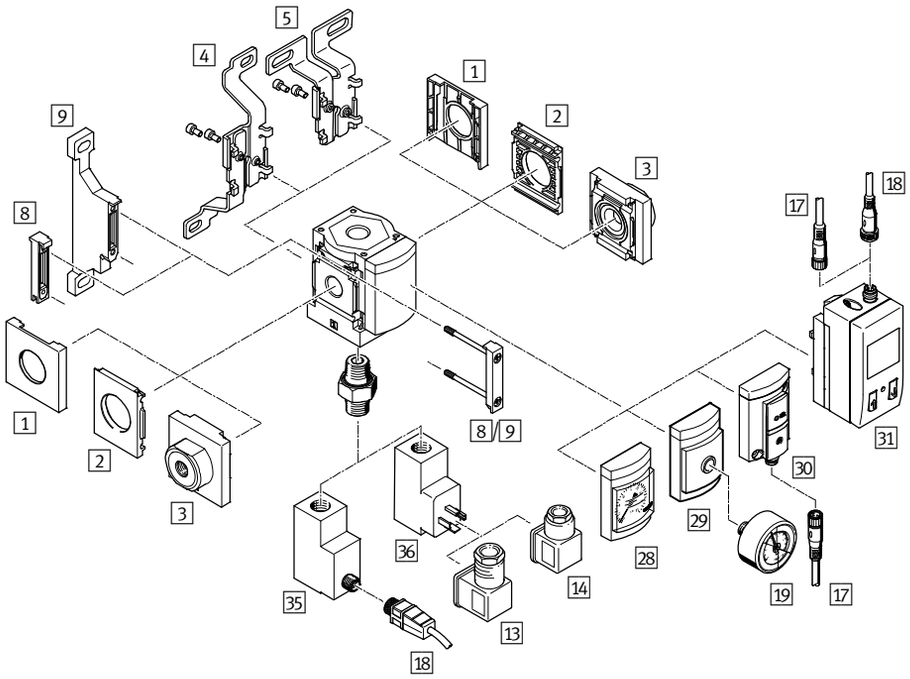
Enter the type code in the search field.

★ Quick ordering [1)]

Part no.	Type
MS6	
529857	**MS6-FRM-1/4**
529853	**MS6-FRM-1/2**

1) All products in this table are easy to select and quick to order.

Accessories – MS4/MS6



Accessories		➔ Page/online
1	Cover cap MS4/6-END	1406
2	Mounting plate MS4/6-AEND	1406
3	Connecting plate kit MS4/6-AG...	1406
4	Mounting bracket MS4/6-WB[1]	1406
5	Mounting bracket MS4-WBM[1]	1406
8	Module connector MS4/6-MV	1406
9	Mounting bracket MS4/6-WP[2]	1406
13	Angled plug socket PEV-1/4-WD-LED	1407
14	Plug socket MSSD-C-4P	1407
17	Connecting cable NEBU-M8...-LE3	1407
18	Connecting cable NEBU-M12...-LE4	1407
19	Pressure gauge MA	1408
28	MS pressure gauge AG	1391
29	Adapter A8/A4 for EN pressure gauge 1/8/1/4	1391

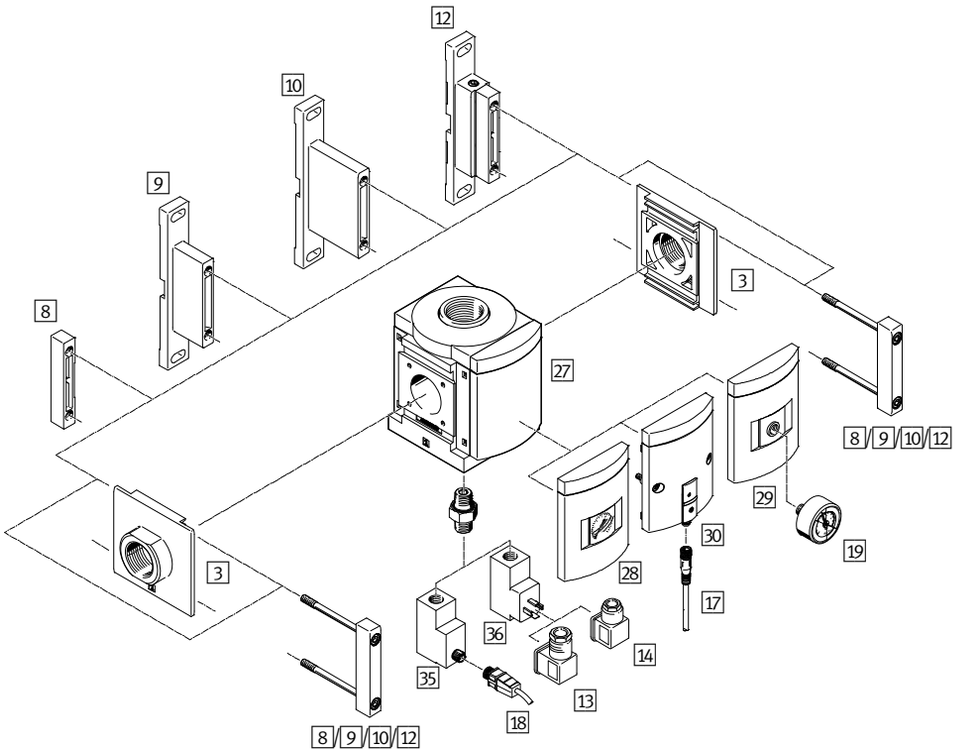
1) Mounting component for individual device.

Accessories		➔ Page/online
30	Pressure sensor without display AD7/AD9	1391
31	Pressure sensor with display AD1/AD3	1391
35	Pressure switch M12	1391
36	Pressure switch X/Y	1391
–	Mounting bracket MS4/6-WPB[2]	1406
–	Mounting bracket MS4/6-WPE[2]	1406
–	Mounting bracket MS4/6-WPM[2]	1406
–	Module connector MS4/6-RMV	1409
–	Module connector MS4-6-AMV	1409
–	Module connector MS6-9-AMV	1409
–	Module connector MS6-9-ARMV	1409
–	Power supply module MS4/6-E-IPM	**ms*-e-ipm***
–	Branching module MS4/6-A-IPM	**ms*-a*ipm***

2) Mounting component and connector for a combination of devices or individual devices with connecting plate kit MS4/6-AG... 3 /with mounting plate MS4/6-AEND 2.

Branching modules MS-FRM ★

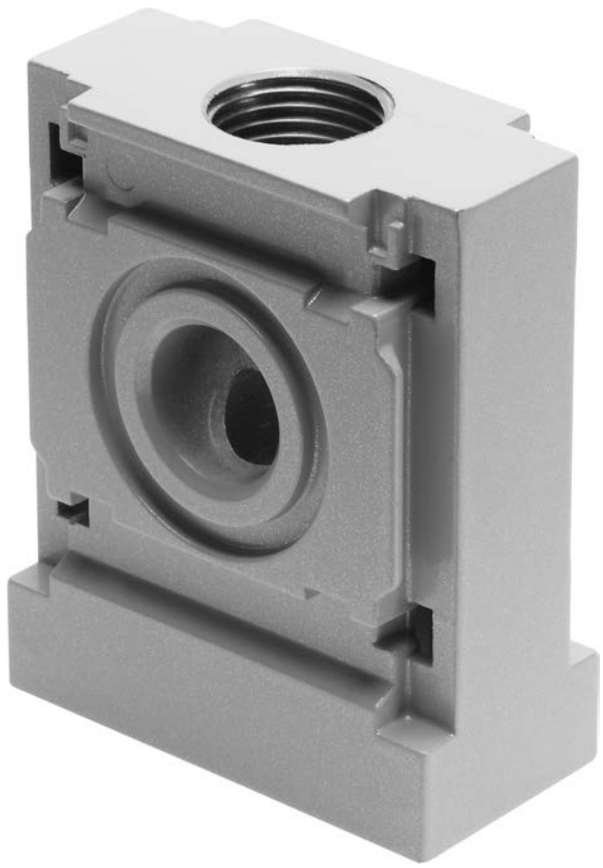
Accessories – MS9



Accessories		→ Page/online
3	Connecting plate kit MS9-AG...[1]	1406
8	Module connector MS9-MV[1]	1406
9	Mounting bracket MS9-WP	1406
10	Mounting bracket MS9-WPB	1406
12	Mounting bracket MS9-WPM[1]	1406
13	Angled plug socket PEV-1/4-WD-LED	1407
14	Plug socket MSSD-C-4P	1407
17	Connecting cable NEBU-M8...-LE3	1407
18	Connecting cable NEBU-M12...-LE4	1407
19	Pressure gauge MA	1408

Accessories		→ Page/online
27	Cover plate VS	1392
28	MS pressure gauge AG	1392
29	Adapter A4 for EN pressure gauge ¼	1392
30	Pressure sensor without display AD7/AD9	1392
35	Pressure switch M12	1392
36	Pressure switch X/Y	1392
–	Module connector MS9-RMV	1409
–	Module connector MS6-9-AMV	1409
–	Module connector MS6-9-ARMV	1409

1) Not suitable for individual devices with connecting thread G¾ or G1.



Compact compressed air distributor

+ As a compact intermediate distributor for varying air qualities

Distributor blocks

MS-FRM-FRZ ★

MS series

Distributor blocks

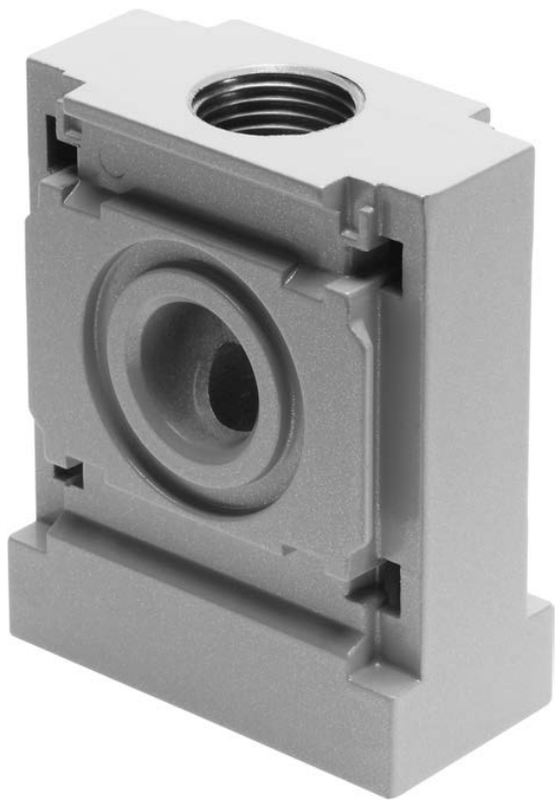
MS-FRM-FRZ ★

Overview, configuration and ordering
➔ **www.festo.com/catalogue/**ms-frm-frz ✓

Additional information, support and user documentation
➔ **www.festo.com/sp/**ms-frm-frz ✓

★ Quick ordering of basic designs
➔ page 1397 ✓

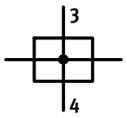
Selected types in accordance with the ATEX Directive for explosive atmospheres
➔ **www.festo.com/catalogue/**ex ✓



+ Sizes 4, 6
+ Connection G1/4, G1/2
+ Pressure 0 ... 20 bar
+ Flow rate 4050 ... 14,600 l/min

Distributor blocks MS-FRM-FRZ ★

Data sheet



Technical data Download CAD data ➔ **www.festo.com**

Size		MS4	MS6
Pneumatic connection 3, 4		G¼	G½
Design		Branching module	
Type of mounting		Via accessories	
		In-line installation	
Mounting position		Any	
Length	[mm]	42	62
Width	[mm]	20	31
Height	[mm]	53	77

Standard nominal flow rate q_{nN} 1)

Size		MS4	MS6
In main flow direction $q_{nN1\rightarrow2}$	[l/min]	4050	14600
Outlet at top $q_{nN1\rightarrow3}$	[l/min]	3250	10400
Outlet at bottom $q_{nN1\rightarrow4}$	[l/min]	2900	9850

1) Measured at p1 = 6 bar and p2 = 5 bar, Δp = 1 bar.

Operating conditions

Size		MS4	MS6
Operating medium		Compressed air to ISO 8573-1:2010 [7:4:4]	
		Inert gases	
Note on operating/pilot medium		Lubricated operation possible (in which case lubricated operation will always be required)	
Operating pressure	[bar]	0 ... 14	0 ... 20
Ambient temperature	[°C]	–10 ... +60	

Materials

Housing	Die-cast aluminium

★ Quick ordering 2)

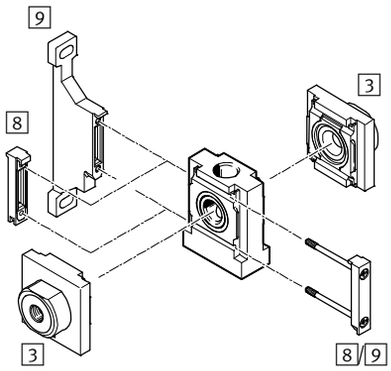
Part no.	Type
MS4	
549336	**MS4-FRM-FRZ**

Part no.	Type
MS6	
549337	**MS6-FRM-FRZ**

2) All products in this table are easy to select and quick to order.

Distributor blocks MS-FRM-FRZ ★

Accessories – MS4/MS6



Accessories		➔ Page/online
3	Connecting plate kit MS4/6-AG...	1406
8	Module connector MS4/6-MV	1406
9	Mounting bracket MS4/6-WP[1)]	1406
–	Mounting bracket MS4/6-WPB[1)]	1406
–	Mounting bracket MS4/6-WPE[1)]	1406
–	Mounting bracket MS4/6-WPM[1)]	1406

Accessories		➔ Page/online
–	Module connector MS4/6-RMV	1409
–	Module connector MS4-6-AMV	1409
–	Module connector MS6-9-AMV	1409
–	Module connector MS6-9-ARMV	1409
–	Power supply module MS4/6-E-IPM	**ms*-e-ipm***
–	Branching module MS4/6-A-IPM	**ms*-a*ipm***

1) Mounting component and connector for a combination of devices or individual devices with connecting plate kit MS4/6-AG... 3.

Remove unwanted condensed water from the compressed air

+ Constantly high condensate separation (99%)
+ Eliminates problems due to condensed water

Condensate drain › MS series ›

Water separators

MS-LWS

MS series

Water separators

MS-LWS

Overview, configuration and ordering
➔ **www.festo.com/catalogue/ms-lws**

Additional information, support and user documentation
➔ **www.festo.com/sp/ms-lws**

Selected types in accordance with the ATEX Directive for explosive atmospheres
➔ **www.festo.com/catalogue/ex**

+ Size 6 and 9
+ Connection G1/4, G3/8, G1/2, G3/4
+ Pressure 0.8 ... 16 bar
+ Fully automatic condensate drain

Product range overview

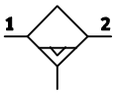
Size	Pneumatic connection	Product options		
		U	V	Z
6	¼, ⅜, ½	■	■	■
9	¾, 1, G	■	■	■
12	G	■	■	■

Product options

¼	Female thread G¼
⅜	Female thread G⅜
½	Female thread G½
¾	Female thread G¾
1	Female thread G1
AGB	Connecting plate G¼
AGC	Connecting plate G⅜
AGD	Connecting plate G½
AGE	Connecting plate G¾
AGF	Connecting plate G1
AGG	Connecting plate G1¼
AGH	Connecting plate G1½
AGI	Connecting plate G2
N¾	Female thread NPT¾
N1	Female thread NPT1
AQN	Connecting plate NPT¼
AQP	Connecting plate NPT⅜
AQR	Connecting plate NPT½
AQS	Connecting plate NPT¾
AQT	Connecting plate NPT1
AQU	Connecting plate NPT1¼
AQV	Connecting plate NPT1½
G	Module without connecting thread, without connecting plate
U	Metal bowl guard
V	Fully automatic condensate drain
E2	External condensate drain, fully automatic, electric, 110 V AC, terminals
E3	External condensate drain, fully automatic, electric, 230 V AC, terminals
E4	External condensate drain, fully automatic, electric, 24 V DC, terminals
WP	Mounting bracket standard design
WPM	Mounting bracket for hooking in service units
WPB	Mounting bracket for large wall gap
WB	Mounting bracket centrally at rear (wall mounting top and bottom), connecting plates not required
EX4	EU certification (II 2GD to EU Explosion Protection Directive (ATEX))
UL1	UL certification (cULus, ordinary locations for Canada and USA)
Z	Direction of flow from right to left

Water separators MS-LWS

Data sheet



Technical data Download CAD data ➔ **www.festo.com**

Size		MS6			MS9		
Pneumatic connection 1, 2		G¼	G⅜	G½	G¾	G1	–[1]
Design		Centrifugal separator					
Type of mounting		Via accessories					
		In-line installation					
Mounting position		Vertical ±5°					
Air purity class at the output		Compressed air to ISO 8573-1:2010 [7:7:4]			Compressed air to ISO 8573-1:2010 [–:7:4]		
Bowl guard		Integrated as metal bowl guard					
Condensate drain		Fully automatic					
Degree of condensate separation	[%]	99					
Max. condensate volume	[ml]	38			220		
Length [mm]		76			109		
Width [mm]		62			104		90
Height [mm]		220 + 64[2]			346 + 50[2]		

1) Module without connecting thread/without connecting plate. The connecting plate must be ordered separately as an accessory ➔ page 1406.
2) Installation dimension for removing the filter bowl.

Standard nominal flow rate q_{nN}[3]

Size		MS6			MS9		
Pneumatic connection 1, 2		G¼	G⅜	G½	G¾	G1	–[4]
q_{nN}	[l/min]	2400	3500	3800	12000 ±15%	15000 ±15%	

3) Measured at p1 = 6 bar and Δp = 1 bar.
4) Dependent on the connecting plate selected, must be ordered separately as an accessory ➔ page 1406.

Operating conditions

Condensate drain		Fully automatic	
Size		MS6	MS9
Operating medium		Compressed air to ISO 8573-1:2010 [7:–:–]	Compressed air to ISO 8573-1:2010 [–:–:–]
		Inert gases	–
Operating pressure	[bar]	2 ... 12	
Ambient temperature	[°C]	+5 ... +60	

Materials

Housing	Die-cast aluminium
Bowl	Wrought aluminium alloy
Inspection window	PA
Seals	NBR

Order code – MS6/MS9

MS – [ ] – LWS – [ ] – U – V – [ ]

Series	
MS	Standard service unit

Size	
6	Grid dimension 62 mm
9	Grid dimension 90 mm

Type	
LWS	Water separator

Pneumatic connection	
MS6	
1/4	Female thread G¼
3/8	Female thread G⅜
1/2	Female thread G½
MS9	
3/4	Female thread G¾
1	Female thread G1
G	Module without connecting thread, without connecting plate Connecting plates ➔ page 1406

Bowl guard	
U	Integrated as metal bowl guard

Condensate drain	
V	Fully automatic

Direction of flow	
–	From left to right
Z	From right to left

Order example:

MS6-LWS-1/2-U-V

Standard service unit, grid dimension 62 mm - water separator - female thread G½ - metal bowl guard - fully automatic condensate drain - flow direction from left to right

Ordering – Product options

Configurable product

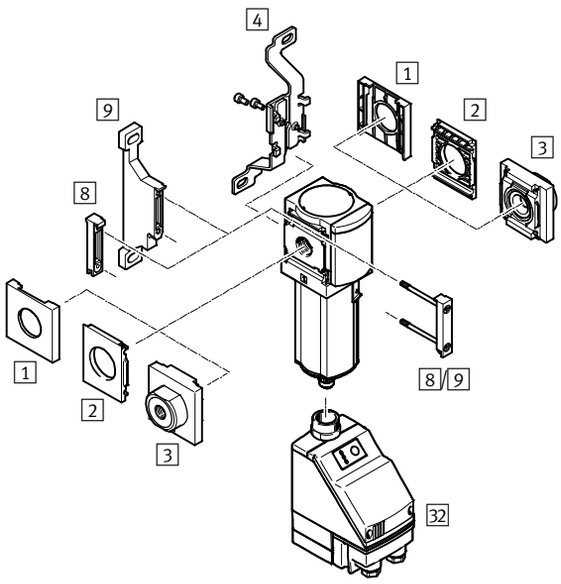
This product and all its options can be ordered using the configurator.

The configurator can be found under Products on the DVD or
➔ **www.festo.com/catalogue/...**

Enter the type code in the search field.

Water separators MS-LWS

Accessories – MS6



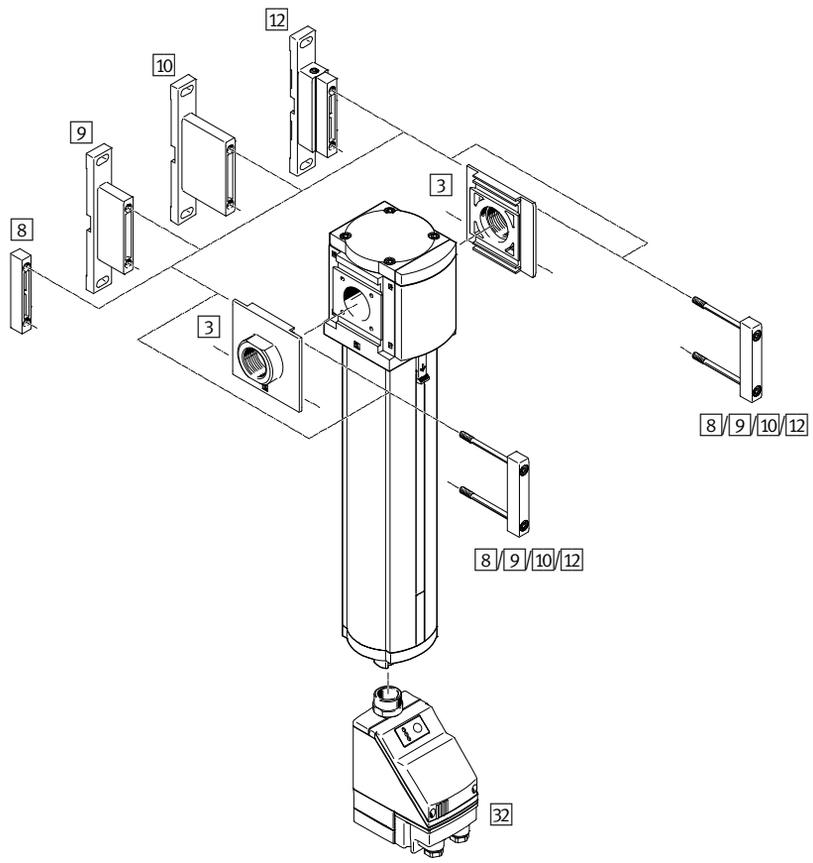
Accessories		➔ Page/online
1	Cover cap MS6-END	1406
2	Mounting plate MS6-AEND	1406
3	Connecting plate kit MS6-AG...	1406
4	Mounting bracket MS6-WB[1)]	1406
8	Module connector MS6-MV	1406
9	Mounting bracket MS6-WP[2)]	1406
32	Fully automatic condensate drain, electrically actuated	**ms6-lws**
–	Mounting bracket MS6-WPB[2)]	1406

1) Mounting component for individual device.

Accessories		➔ Page/online
–	Mounting bracket MS6-WPE[2)]	1406
–	Mounting bracket MS6-WPM[2)]	1406
–	Module connector MS4/6-RMV	1409
–	Module connector MS4-6-AMV	1409
–	Module connector MS6-9-AMV	1409
–	Module connector MS6-9-ARMV	1409
–	Power supply module MS4/6-E-IPM	**ms*-e-ipm***
–	Branching module MS4/6-A-IPM	**ms*-a*ipm***

2) Mounting component and connector for a combination of devices or individual devices with connecting plate kit MS6-AG... 3/with mounting plate MS6-AEND 2.

Accessories – MS9

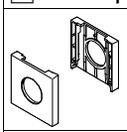
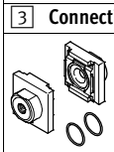
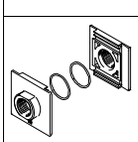


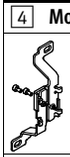
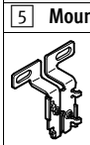
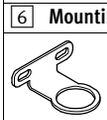
Accessories		➔ Page/online
3	Connecting plate kit MS9-AG...[1]	1406
8	Module connector MS9-MV[1]	1406
9	Mounting bracket MS9-WP	1406
10	Mounting bracket MS9-WPB	1406
12	Mounting bracket MS9-WPM[1]	1406

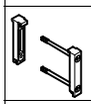
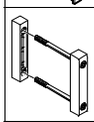
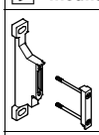
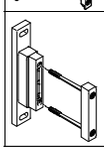
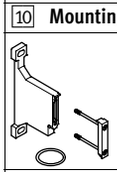
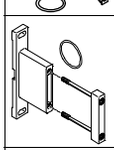
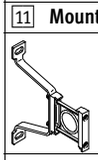
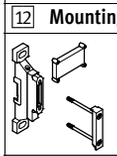
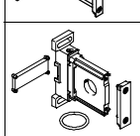
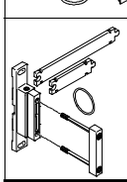
Accessories		➔ Page/online
32	Fully automatic condensate drain, electrically actuated	**ms9-lws**
–	Module connector MS9-RMV	1409
–	Module connector MS6-9-AMV	1409
–	Module connector MS6-9-ARMV	1409

1) Not suitable for individual devices with connecting thread G¾ or G1.

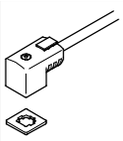
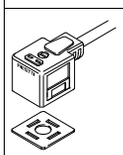
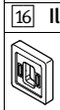
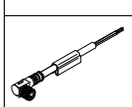
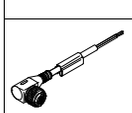
Accessories – Ordering data

	Size			Part no.	Type
1	**Cover cap MS-END**			**Dimensions** online: ➔ **ms*-end**	
	MS4			**538779**	**MS4-END**
	MS6			**538780**	**MS6-END**
2	**Mounting plate MS-AEND**			**Dimensions** online: ➔ **ms*-aend**	
	MS4			**542966**	**MS4-AEND**
	MS6			**535408**	**MS6-AEND**
3	**Connecting plate kit MS-AG**			**Dimensions** online: ➔ **ms*-ag***	
	MS4	G1⁄8		**526068**	**MS4-AGA**
		G1⁄4	★	**526069**	**MS4-AGB**
		G3⁄8	★	**526070**	**MS4-AGC**
	MS6	G1⁄4		**526080**	**MS6-AGB**
		G3⁄8		**526081**	**MS6-AGC**
		G1⁄2	★	**526082**	**MS6-AGD**
		G3⁄4	★	**526083**	**MS6-AGE**
	MS9	G1⁄2		**552954**	**MS9-AGD**
		G3⁄4		**552955**	**MS9-AGE**
		G1		**552956**	**MS9-AGF**
		G1 1⁄4		**552957**	**MS9-AGG**
		G1 1⁄2		**552958**	**MS9-AGH**

	Size		Part no.	Type
4	**Mounting bracket MS-WB**		**Dimensions** online: ➔ **ms*-wb**	
	MS4	★	**532185**	**MS4-WB**
	MS6	★	**532196**	**MS6-WB**
5	**Mounting bracket MS-WBM**		**Dimensions** online: ➔ **ms*-wbm**	
	MS4		**526062**	**MS4-WBM**
6	**Mounting bracket MS-WR**		**Dimensions** online: ➔ **ms*-wr**	
	MS4	★	**526064**	**MS4-WR**
	MS6	★	**526075**	**MS6-WR**
7	**Hex nut MS-WRS**			
	MS4		**532187**	**MS4-WRS**
	MS6		**532188**	**MS6-WRS**

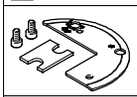
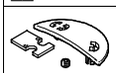
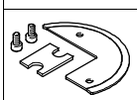
	Size			Part no.	Type
8	**Module connector MS-MV**				
For connecting modules					
	MS4		★	**532798**	**MS4-MV**
	MS6		★	**532799**	**MS6-MV**
	MS9			**552950**	**MS9-MV**
Module connector MS-MVM					
For connecting the modules with rotary knob downwards					
	MS4		★	**532800**	**MS4-MVM**
	MS6		★	**532801**	**MS6-MVM**
9	**Mounting bracket MS-WP**			**Dimensions** online: ➔ **ms*-wp**	
	MS4		★	**532184**	**MS4-WP**
	MS6		★	**532195**	**MS6-WP**
	MS9			**552947**	**MS9-WP**
10	**Mounting bracket MS-WPB**			**Dimensions** online: ➔ **ms*-wpb**	
	MS4	For large wall gap	★	**526063**	**MS4-WPB**
	MS6	For large wall gap	★	**526074**	**MS6-WPB**
	MS9	For large wall gap		**552949**	**MS9-WPB**
11	**Mounting bracket MS-WPE**			**Dimensions** online: ➔ **ms*-wpe**	
	MS4	For large wall gap		**558869**	**MS4-WPE**
	MS6	For large wall gap		**1025936**	**MS6-WPE**
12	**Mounting bracket MS-WPM**			**Dimensions** online: ➔ **ms*-wpm**	
	MS4	For clearance 40 mm	★	**526060**	**MS4-WPM-D**
		For clearance 80 mm		**526061**	**MS4-WPM-2D**
	MS6	For clearance 62 mm	★	**526073**	**MS6-WPM-D**
		For clearance 124 mm		**532186**	**MS6-WPM-2D**
	MS9	For clearance 90 mm or 180 mm		**552948**	**MS9-WPM**

Accessories – Ordering data

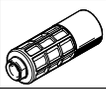
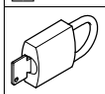
	Description				Part no.	Type
13 Angled plug socket PEV-1/4-WD-LED						**Data sheets** online: → **pev**
	For pressure switch PEV	4-pin, 15 .... 30 V DC	Yellow LED		**164274**	**PEV-1/4-WD-LED-24**
		4-pin, ≤ 230 V AC ≤ 180 V DC	Yellow LED		**164275**	**PEV-1/4-WD-LED-230**
14 Plug socket MSSD						**Data sheets** online: → **mssd**
	For pressure switch PEV				**171157**	**MSSD-C-4P**
	For MS4/6-EE and MS6-SV-C	3-pin	Screw terminal	★	**151687**	**MSSD-EB**
		4-pin	Insulation displacement connector		**192745**	**MSSD-EB-S-M14**
	For MS9-EE and MS9-SV-C	3-pin	Screw terminal		**34583**	**MSSD-C**
		4-pin	Insulation displacement connector		**192748**	**MSSD-C-S-M16**
15 Plug socket with cable KMEB/connecting cable KMC						**Data sheets** online: → **km**
	For MS4/6-EE and MS6-SV-C	2-pin, 24 V DC	LED	2.5 m	**547268**	**KMEB-3-24-2,5-LED**
				5 m	**547269**	**KMEB-3-24-5-LED**
			–	2.5 m	**547270**	**KMEB-3-24-2,5**
				5 m	**547271**	**KMEB-3-24-5**
		3-pin, 24 V DC	LED	2.5 m	★ **151688**	**KMEB-1-24-2,5-LED**
				5 m	**151689**	**KMEB-1-24-5-LED**
				10 m	**193457**	**KMEB-1-24-10-LED**
		3-pin, 230 V AC	–	2.5 m	**151690**	**KMEB-1-230AC-2,5**
				5 m	**151691**	**KMEB-1-230AC-5**
	For MS9-EE and MS9-SV-C	3-pin, 24 V DC	LED	2.5 m	**30931**	**KMC-1-24DC-2,5-LED**
				5 m	**30933**	**KMC-1-24DC-5-LED**
				10 m	**193459**	**KMC-1-24-10-LED**
		3-pin, 230 V AC	–	2.5 m	**30932**	**KMC-1-230AC-2,5**
				5 m	**30934**	**KMC-1-230AC-5**
16 Illuminating seal MEB-LD/MC-LD						**Data sheets** online: → **meb**
	For plug socket with cable KMEB and plug socket MSSD-EB	12 ... 24 V DC			**151717**	**MEB-LD-12-24DC**
		230 V DC/AC ±10%			**151718**	**MEB-LD-230AC**
	For connecting cable KMC and plug socket MSSD-C	12 ... 24 V DC			**19145**	**MC-LD-12-24DC**
		230 V DC/AC ±10%			**19146**	**MC-LD-230AC**
17 Connecting cable NEBU-M8						**Data sheets** → **Page 1544**
	M8x1, 3-pin	2.5 m		★	**541333**	**NEBU-M8G3-K-2.5-LE3**
		5 m		★	**541334**	**NEBU-M8G3-K-5-LE3**
	M8x1, 4-pin	2.5 m			**541342**	**NEBU-M8G4-K-2.5-LE4**
		5 m			**541343**	**NEBU-M8G4-K-5-LE4**
	M8x1, 3-pin	2.5 m		★	**541338**	**NEBU-M8W3-K-2.5-LE3**
		5 m		★	**541341**	**NEBU-M8W3-K-5-LE3**
	M8x1, 4-pin	2.5 m			**541344**	**NEBU-M8W4-K-2.5-LE4**
		5 m			**541345**	**NEBU-M8W4-K-5-LE4**
18 Connecting cable NEBU-M12						**Data sheets** → **Page 1544**
	M12x1, 3-pin	2.5 m		★	**541363**	**NEBU-M12G5-K-2.5-LE3**
		5 m		★	**541364**	**NEBU-M12G5-K-5-LE3**
	M12x1, 4-pin	2.5 m		★	**550326**	**NEBU-M12G5-K-2.5-LE4**
		5 m		★	**541328**	**NEBU-M12G5-K-5-LE4**
	M12x1, 3-pin	2.5 m			**541367**	**NEBU-M12W5-K-2.5-LE3**
		5 m			**541370**	**NEBU-M12W5-K-5-LE3**
	M12x1, 4-pin	2.5 m			**550325**	**NEBU-M12W5-K-2.5-LE4**
		5 m			**541329**	**NEBU-M12W5-K-5-LE4**

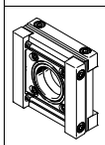
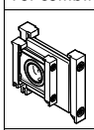
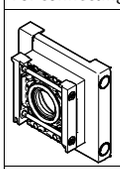
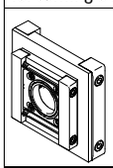
Accessories – Ordering data

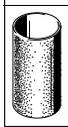
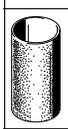
	Connection	Indicating range	Part no.	Type
19 **Pressure gauge MA**				**Data sheets** online: ➔ **ma**
EN 837-1				
	R⅛	0 ... 25 bar	**526167**	**MA-40-25-1/8-EN**
	R¼	0 ... 16 bar	**187080**	**MA-40-16-R1/4-EN**
	G¼	0 ... 16 bar	**183901**	**MA-40-16-G1/4-EN**
EN 837-1, with red/green range				
	R⅛	0 ... 16 bar	**525726**	**MA-40-16-R1/8-E-RG**
	R¼	0 ... 16 bar	**525729**	**MA-50-16-R1/4-E-RG**
20 **Precision pressure gauge MAP**				**Data sheets** online: ➔ **map**
EN 837-1				
	R⅛	0 ... 1 bar	**161126**	**MAP-40-1-1/8-EN**
		0 ... 4 bar	**162842**	**MAP-40-4-1/8-EN**
		0 ... 6 bar	**161127**	**MAP-40-6-1/8-EN**
		0 ... 16 bar	**161128**	**MAP-40-16-1/8-EN**

	Size	Description	Part no.	Type
21 **Cover MS-SV-MH**				
	For MS9-SV-C	Tamper protection for manual override at the soft-start/ quick exhaust valve and manual override at the pilot solenoid valve	**1457670**	**MS9-SV-MH**
22 **Cover MS-SV-MK**				
	For MS6-SV-C	Tamper protection for manual override at the soft-start/ quick exhaust valve, flow control screw, adjusting screw for pressure switchover point and manual override at the pilot solenoid valve (MS6-SV-...-C-10V24 only)	**8001479**	**MS6-SV-C-MK**
	For MS9-SV-C	Tamper protection for manual override at the soft-start/ quick exhaust valve, flow control screw, adjusting screw for pressure switchover point and manual override at the pilot solenoid valve	**1457669**	**MS9-SV-MK**

Accessories – Ordering data

	Description		Part no.	Type
23 **Silencer U**			**Data sheets ➔ Page 1662**	
	G¼	★	**6842**	**U-1/4-B**
	G½	★	**6844**	**U-1/2-B**
	G¾		**6845**	**U-3/4-B**
	G1		**151990**	**U-1-B**
24 **Silencer UOS**				
	G1, for high exhaust rate		**552252**	**UOS-1**
	G1, for low exhaust rate		**1901207**	**UOS-1-LF**
25 **Locking clip CPV18-HV**				
	For MS4/6-EE-...-V24		**530056**	**CPV18-HV**
26 **Padlock LRVS-D**				
	–		**193786**	**LRVS-D**
Special oil OFSW				
	Packaging unit 1 litre		**152811**	**OFSW-32**

	Size	Part no.	Type
Module connector MS-RMV		**Dimensions** online: ➔ **ms*-rmv**	
For connecting service units turned 90° to the connection axis			
	MS4	**543490**	**MS4-RMV**
	MS6	**543491**	**MS6-RMV**
	MS9	**552952**	**MS9-RMV**
Module connector MS-AMV		**Dimensions** online: ➔ **ms*-amv**	
For combining MS4 and MS6 service units into one unit			
	MS4/MS6	**543489**	**MS4-6-AMV**
For connecting MS6 and MS9 service units into one unit			
	MS6/MS9	**3426895**	**MS6-9-AMV**
Module connector MS-ARMV		**Dimensions** online: ➔ **ms*-armv**	
For combining MS6 and MS9 into one unit, for turning a service unit 90° to the connection axis as an option			
	MS6/MS9	**552951**	**MS6-9-ARMV**

	Size		Part no.	Type
Filter cartridge MS-LFP-C, grade of filtration 5 µm				
	MS4	Colour: blue	**534501**	**MS4-LFP-C**
	MS6	Colour: blue	**534499**	**MS6-LFP-C**
	MS9		**570309**	**MS9-LFP-C**
Filter cartridge MS-LFP-E, grade of filtration 40 µm				
	MS4	Colour: white	**534502**	**MS4-LFP-E**
	MS6	Colour: white	**534500**	**MS6-LFP-E**
	MS9		**570310**	**MS9-LFP-E**

For precision pressure levels

+ Very good pressure control characteristics
+ Compact individual device

Regulators › Individual devices ›

Precision pressure regulators

LRP★

LRPS

with integrated lock

Precision pressure regulators

LRP★ / LRPS

Overview, configuration and ordering
➔ **www.festo.com/catalogue/lrp** ✓

Additional information, support and user documentation
➔ **www.festo.com/sp/lrp** ✓

Quick ordering of basic designs
➔ page 1414 ✓

Selected types in accordance with the ATEX Directive for explosive atmospheres
➔ **www.festo.com/catalogue/ex** ✓

+ Lockable design
+ Precision pressure adjustment possible both in static and dynamic applications
+ Good response characteristics during rapid modification of input pressure and flow rate
+ Input pressure fluctuations are almost entirely compensated

Precision pressure regulators LRP/LRPS ★

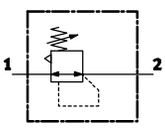
Product range overview

Type	Size	Pneumatic connection	Standard nominal flow rate [l/min]	Pressure regulation range [bar]	Operating pressure [bar]	Max. pressure hysteresis [bar]	Product options EX4	➔ Page/ online
Rotary knob with detent								
LRP	40	G⅛	240 ... 300	0.1 ... 6	1 ... 8	0.02	–	1413
	50	G¼	800 ... 2300	0.05 ... 10	1 ... 12	0.02	■	1415
Rotary knob with integrated lock								
LRPS	50	G¼	800 ... 2300	0.05 ... 10	1 ... 12	0.02	–	1415

Product options

EX4 II 2GD to EU Explosion Protection Directive (ATEX)

Data sheet – Size 40



Note
A manifold block MRS is required to connect the precision pressure regulator LRP-7.0-6 to the compressed air supply. The mounting kit with screws and sealing rings is included with the device.

LRP-⅛-6

LRP-7.0-6

Technical data Download CAD data ➔ **www.festo.com**

Type		LRP-⅛-6	LRP-7.0-6
Pneumatic connection 1, 2		G⅛	For connecting plate ∅ 7 mm
Design		Piloted precision diaphragm regulator	
Regulating function		Outlet pressure constant, with secondary exhausting	
Type of mounting		Via accessories	
		In-line installation	
		Front panel mounting	
Mounting position		Any	
Actuator lock		Rotary knob with detent	
Pressure regulation range	[bar]	0.1 ... 6	
Pressure indication		G⅛ prepared	
Length/width/height	[mm]	40/40/92	

Standard nominal flow rate q_{nN}

Type		LRP-⅛-6	LRP-7.0-6
q_{nN} 2)	[l/min]	300 1)	240 2)

1) Measured at p1 = 8 bar and p2 = 6 bar, Δp2 = 100 mbar
2) Measured on manifold block MRS-4 at p1 = 8 bar and p2 = 6 bar, Δp2 = 100 mbar

Operating conditions

Operating medium		Compressed air to ISO 8573-1:2010 [7:4:4]
		Inert gases
Note on the operating/pilot medium		Lubricated operation not possible
Operating pressure	[bar]	1 ... 8
Ambient temperature	[°C]	–10 ... +60

Precision pressure regulators LRP/LRPS ★

Data sheet – Size 40

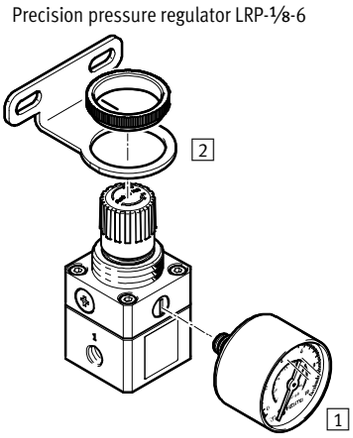
Materials	
Housing	Aluminium
Rotary knob	PA
Knurled nut	Aluminium
Seals	NBR

Ordering data – Size 40

Pressure regulation range [bar]	Pneumatic connection 1, 2		Part no.	Type
0.1 ... 6	G1/8	★	**2416371**	**LRP-1/8-6**
	For connecting plate ∅ 7 mm		**2418761**	**LRP-7.0-6**

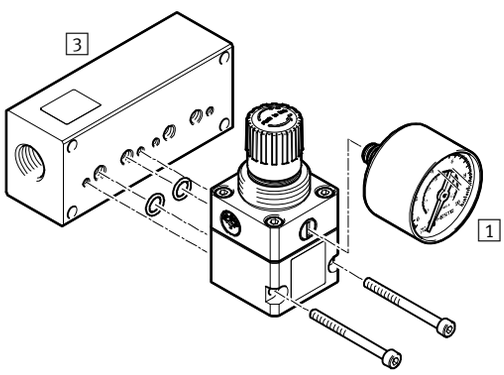
Accessories – Size 40

Precision pressure regulator LRP-1/8-6



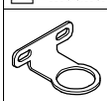
Accessories		➔ Page/online
1	Precision pressure gauge PAGN	1414
2	Mounting bracket MS-WR	1414

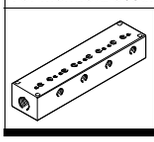
Precision pressure regulator LRP-7.0-6



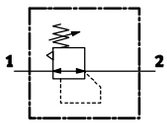
Accessories		➔ Page/online
3	Manifold block MRS, for manifold assembly of 2 or 4 valves	1414

Accessories – Ordering data

		Indicating range		Part no.	Type
1	**Precision pressure gauge PAGN**			**Data sheets** online: ➔ **pagn**	
		0 ... 10 bar		**2849914**	**PAGN-40-10-R18-1.6**
		0 ... 1 MPa		**2849916**	**PAGN-40-1M-R18-1.6**
2	**Mounting bracket MS-WR**			**Dimensions** online: ➔ **ms*-wr**	
		–	★	**526064**	**MS4-WR**

		Pneumatic connection		Part no.	Type
3	**Manifold block MRS**			**Dimensions** online: ➔ **mrs**	
For manifold assembly of 2 valves					
		G3/8		**2844247**	**MRS-2**
For manifold assembly of 4 valves					
		G3/8		**2844348**	**MRS-4**

Data sheet – Size 50



Technical data

Download CAD data ➔ **www.festo.com**

Type		LRP	LRPS
Pneumatic connection 1, 2		G¼	
Design		Piloted precision diaphragm regulator	
Regulating function		Outlet pressure constant, with secondary exhausting	
Type of mounting		Via accessories	
		In-line installation	
		Front panel mounting	
Mounting position		Any	
Actuator lock		Rotary knob with detent	Rotary knob with integrated lock
Pressure regulation range	[bar]	0.05 ... 0.7	
		0.05 ... 2.5	
		0.05 ... 4	
		0.1 ... 10	
Pressure indication		G⅛ prepared	
Length/width/height	[mm]	50/50/108	50/50/138 + min. 60[1]

1) Clearance for removing the key.

Standard nominal flow rate q_{nN}

Pressure regulation range	[bar]	0.05 ... 0.7	0.05 ... 2.5	0.05 ... 4	0.1 ... 10
q_{nN}[2]	[l/min]	800	1800	2000	2300

2) Measured at p1 = 12 bar and Δp2 = 100 mbar.

Operating conditions

Operating medium		Compressed air to ISO 8573-1:2010 [7:4:4]
		Inert gases
Note on operating/pilot medium		Lubricated operation not possible
Operating pressure	[bar]	1 ... 12
Ambient temperature	[°C]	–10 ... +60

Materials

Housing	Die-cast aluminium
Rotary knob	PA
Knurled nut	Aluminium
Seals	NBR

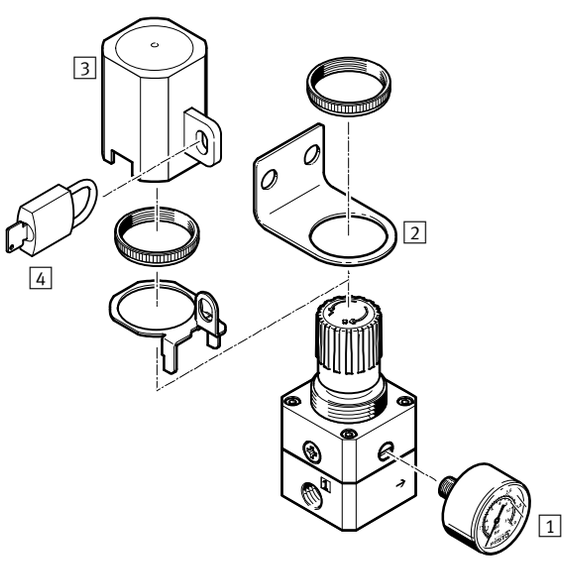
Precision pressure regulators LRP/LRPS ★

Ordering data – Size 50

Pressure regulation range [bar]	Pneumatic connection 1, 2		Part no.	Type
Rotary knob with detent				
0.05 ... 0.7	Female thread G1/4	★	**159500**	**LRP-1/4-0,7**
0.05 ... 2.5	Female thread G1/4	★	**162834**	**LRP-1/4-2,5**
0.05 ... 4	Female thread G1/4	★	**159501**	**LRP-1/4-4**
0.1 ... 10	Female thread G1/4	★	**159502**	**LRP-1/4-10**
Rotary knob with integrated lock				
0.05 ... 0.7	Female thread G1/4		**194690**	**LRPS-1/4-0,7**
0.05 ... 2.5	Female thread G1/4		**194691**	**LRPS-1/4-2,5**
0.05 ... 4	Female thread G1/4		**194692**	**LRPS-1/4-4**
0.1 ... 10	Female thread G1/4		**194693**	**LRPS-1/4-10**

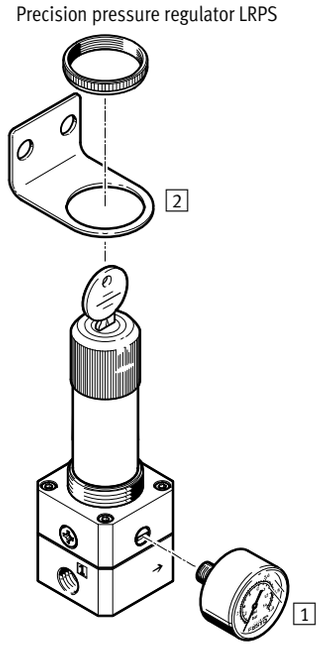
Accessories – Size 50

Precision pressure regulator LRP



Accessories	➔ Page/online
1 Precision pressure gauge MAP	1416
2 Mounting bracket HR	1416

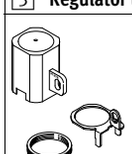
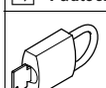
Precision pressure regulator LRPS



Accessories	➔ Page/online
3 Regulator lock LRVS	1416
4 Padlock LRVS-D	1416

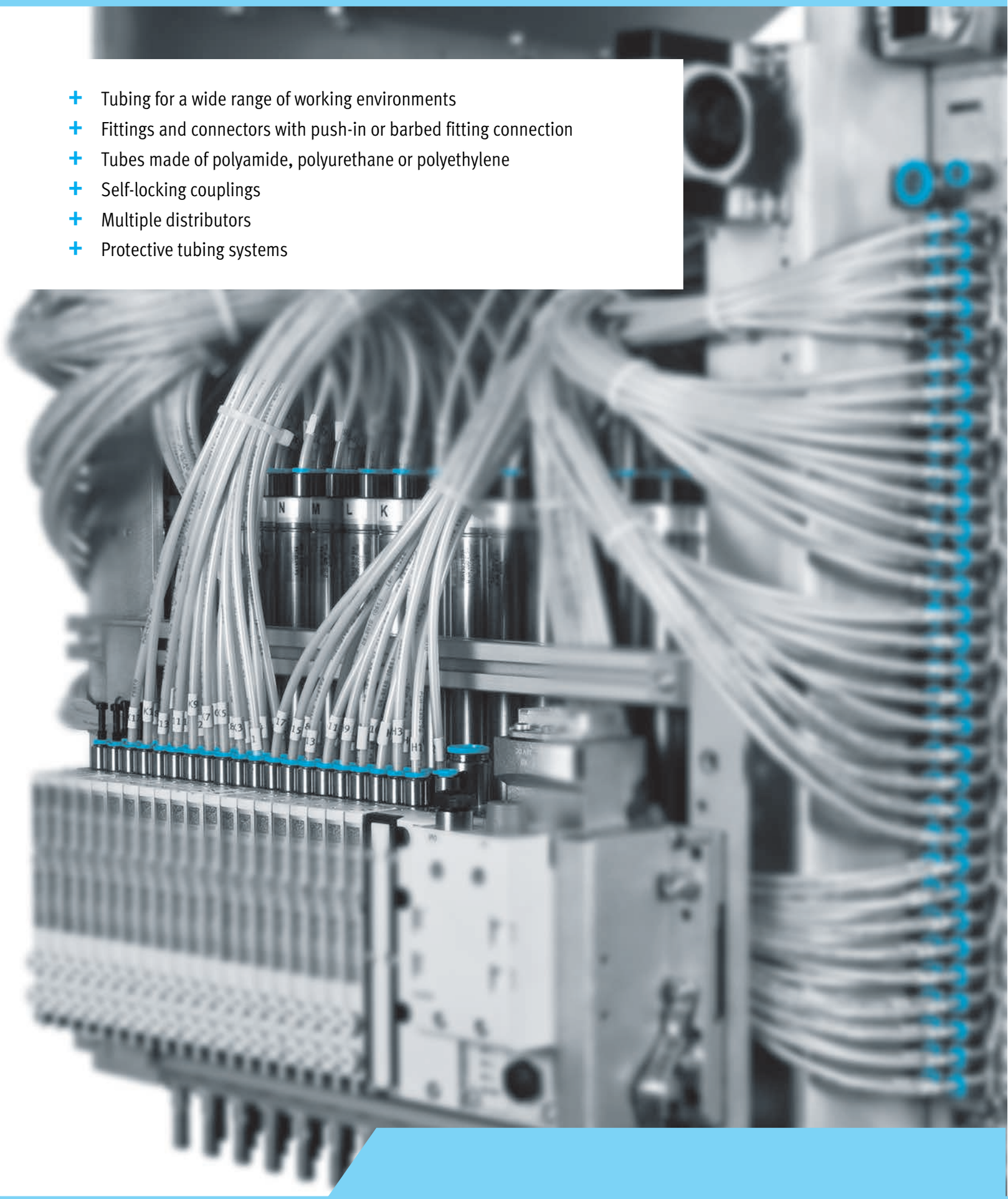
Accessories – Ordering data

	Indicating range	Part no.	Type
1 **Precision pressure gauge MAP**			**Data sheets** online: ➔ **map**
	0 ... 1 bar	**161126**	**MAP-40-1-1/8-EN**
	0 ... 4 bar	**162842**	**MAP-40-4-1/8-EN**
	0 ... 6 bar	**161127**	**MAP-40-6-1/8-EN**
	0 ... 16 bar	**161128**	**MAP-40-16-1/8-EN**
2 **Mounting bracket HR**			
	–	**159503**	**HR-1/4-P**

		Part no.	Type
3 **Regulator lock LRVS**			
		**193785**	**LRVS-LRP-1/4**
4 **Padlock LRVS-D**			
		**193786**	**LRVS-D**

14 Pneumatic fittings system

- Tubing for a wide range of working environments
- Fittings and connectors with push-in or barbed fitting connection
- Tubes made of polyamide, polyurethane or polyethylene
- Self-locking couplings
- Multiple distributors
- Protective tubing systems



PUN★
PUN-H★

Plastic tubing

+ PUN: large selection of variants and highly resistant to stress cracks
+ PUN-H: high resistance to microbes and hydrolysis and approved for use in the food industry

➔ page 1431

NPQH

Push-in fittings

+ All-metal push-in fittings made of chemically nickel-plated brass
+ High corrosion and chemical resistance

➔ page 1477

QS★
QSM★

Push-in fittings

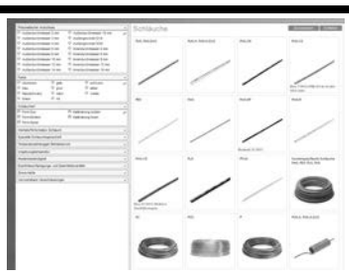
+ QS: standard series for maximum flexibility in standard applications
+ QSM: mini series for maximum component density in confined installation spaces

➔ page 1441

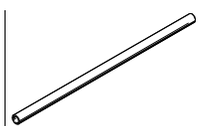
Contents

Product overview 1420
Standard O.D. plastic tubing PEN, PUN, PUN-H, PUN-DUO 1431
Push-in fittings QS, QSM 1441
Push-in fittings NPQH, metal 1467
Push-in fittings NPQM, metal 1477
Push-in fittings CRQS, stainless steel 1485
Self-sealing/rotary push-in fittings QSK/QSR 1491
Quick connectors NPCK 1497
Threaded fittings NPFC, blanking plugs B 1501
Quick coupling sockets/plugs NPHS 1511
Quick coupling sockets/plugs KD, KS 1511
Multiple distributors QSLV, QSQ 1519
Accessories 1525

Software tool

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 • on the Internet at www.festo.com/catalogue by clicking on the blue "Product Finder" button • or on the DVD under "Product Finder"
Festo Design Tool 3D		The Festo Design Tool 3D is a 3D product configurator for generating specific CAD product combinations from Festo. The configurator makes your search for the right accessory easier, more reliable and faster. You can then order the module that has been created 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, EST, FI, FR, GB, GR, HU, IE, IT, NL, NO, PL, PT, RU, SE, SI, SK, TR, ZA. This tool can be found • via the address: www.festo.com/fdt-3d-online in the above listed countries

Standard O.D. tubing

Type	 **Plastic tubing, DUO plastic tubing PUN, PUN-DUO** ★	 **Plastic tubing, DUO plastic tubing PUN-H, PUN-H-DUO** ★	 **Plastic tubing PTFEN**	 **Plastic tubing PUN-CM**
O.D.	3 ... 16 mm	2 ... 16 mm	4 ... 16 mm	4 ... 12 mm
I.D.	2.1 ... 11 mm	1.2 ... 11 mm	2.9 ... 11 mm	2.5 ... 8 mm
Temperature-dependent operating pressure	-0.95 ... 10 bar	-0.95 ... 10 bar	-0.95 ... 15 bar	-0.95 ... 10 bar
Ambient temperature	-35 ... 60°C	-35 ... 60°C	-20 ... 150°C	-35 ... 60°C
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 • For use with food see www.festo.com/sp/pun-h › tab "Certificates" • Suitable for energy chains • Also available as DUO plastic tubing • Operating media compressed air, vacuum, water	• Polytetrafluoroethylene • For use with food see www.festo.com/sp/ptfen › tab "Certificates" • High resistance to chemicals • High temperature resistance • Operating media compressed air, vacuum	• Polyurethane • Plastic tubing, antistatic, electrically conductive • Suitable for energy chains • Operating media compressed air, vacuum
➔ Page/online	**1431**	**1431**	**ptfen**	**pun-cm**

Standard O.D. tubing

Type	Plastic tubing PUN-V0	Plastic tubing PEN	Plastic tubing PAN
O.D.	4 ... 16 mm	4 ... 16 mm	4 ... 16 mm
I.D.	2 ... 11.8 mm	2.7 ... 10.8 mm	2.5 ... 12 mm
Temperature-dependent operating pressure	-0.95 ... 30 bar	-0.95 ... 10 bar	-0.95 ... 19 bar
Ambient temperature	-35 ... 60°C	-30 ... 60°C	-30 ... 80°C
Description	• 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 media compressed air, vacuum, water	• 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
➔ Page/online	pun-v0	1431	pan

Standard O.D. tubing

Type	Plastic tubing PAN-MF	Heavy-duty tubing PAN-R	Plastic tubing PAN-V0
O.D.	4 ... 16 mm	4 ... 28 mm	6 ... 14 mm
I.D.	2.5 ... 12 mm	2.5 ... 23 mm	2.5 ... 9 mm
Temperature-dependent operating pressure	-0.95 ... 31 bar	-0.95 ... 35 bar	-0.95 ... 12 bar
Ambient temperature	-60 ... 100°C	-30 ... 80°C	-30 ... 90°C
Description	• 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 media compressed air, vacuum	• PVC, polyamide • Flame retardant to UL 94 V0 • High resistance to microbes and UV radiation • Double-sheath tubing • Operating media compressed air, vacuum, water, mineral oil • Resistant to welding spatter
➔ Page/online	pan	pan-r	pan-v0

Standard O.D. tubing

Type	Plastic tubing PLN	Plastic tubing PFAN	Customised tubing PAN, PEN, PLN, PUN
O.D.	4 ... 16 mm	3 ... 12 mm	3 ... 16 mm
I.D.	2.9 ... 12 mm	2.3 ... 8.4 mm	2.1 ... 12 mm
Temperature-dependent operating pressure	-0.95 ... 14 bar	-0.95 ... 16 bar	-0.95 ... 16 bar
Ambient temperature	-30 ... 80°C	-20 ... 150°C	-35 ... 80°C
Description	• Polyethylene • High resistance to chemicals, microbes and hydrolysis • For use with food see www.festo.com/sp/pln › tab "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 • For use with food see www.festo.com/sp/pfan › tab "Certificates" • High resistance to chemicals, microbes, UV radiation, hydrolysis and stress cracks • Operating media compressed air, vacuum, water	• Individual lengths: delivered in units of 25, 50, 100, 200 ... 500 m • Minimum quantity: 3000 m • Individual design: labelled with your company name and/or your part number • Easy to recognise and handle: individual colour selection • Choose from 9 basic colours; further colours available on request • Simple to order with the configurator
➔ Page/online	pln	pfan	tubing

Standard I.D. tubing

Type	Plastic tubing PU
O.D.	11.6 ... 17,6 mm
I.D.	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)
➔ Page/online	pu

Spiral tubing

Type	Spiral plastic tubing, DUO spiral plastic tubing PUN-S, PUN-S-DUO	Spiral plastic tubing PUN-SG	Spiral plastic tubing PPS
O.D.	4 ... 12 mm	9.5 ... 11.7 mm	6.3 ... 7.8 mm
I.D.	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 • High resistance to UV radiation and stress cracks	• Polyurethane, nickel-plated brass, polyacetal • Pre-assembled with captive rotatable fittings • High resistance to microbes and hydrolysis • Operating media compressed air, vacuum	• Polyamide, brass, galvanised steel • Pre-assembled with 2 rotatable connectors and captive sealing rings OL • High resistance to microbes • Operating media compressed air, vacuum
➔ Page/online	spiral	spiral	pps

Push-in fittings

Type	**Push-in fittings, mini series QSM, QSMC, QSMF, QSML, QSMS, QSML, QSMP, QSMS, QSMT, QSMX, QSMY** ★	**Push-in fittings, standard series QS, QSF, QSS, QSC, QSH, QSL, QST, QSW, QSX, QSY** ★	**Push-in fittings NPQH**	**Push-in fittings/connectors, metal, standard series NPQM**
Pneumatic connection 1	Male thread G1/8, M3, M5, M6, M6x0.75, M7, M8x0.75, R1/8, M8x1.25, female thread M3, M5, push-in sleeve QS-3, QS-4, QS-6, for tubing O.D. 2, 3, 4, 6 mm	Male thread G1/8, G1/4, G3/8, G1/2, G3/4, M5, R1/8, R1/4, R3/8, R1/2, female thread G1/8, G1/4, G3/8, G1/2, push-in sleeve QS-4, QS-6, QS-8, QS-10, QS-12, QS-16, for tubing O.D. 4, 6, 8, 10, 12, 16 mm	Male thread M5, M7, G1/8, G1/4, G3/8, G1/2, for tubing O.D. 4 mm, 6 mm, 8 mm, 10 mm, 12 mm, 14 mm, female thread G1/8, G1/4, push-in sleeve QS-10, QS-12, QS-14, QS-4, QS-6, QS-8	G1/8, G1/4, G3/8, G1/2, M5, M7, push-in sleeve QS-4, QS-6, QS-8, QS-10, QS-12, for tubing O.D. 4, 6, 8, 10, 12 mm
Pneumatic connection 2	For tubing O.D. 2, 3, 4, 6 mm	Female thread G1/8, G1/4, G3/8, G1/2, for tubing O.D. 4, 6, 8, 10, 12, 16 mm	For tubing O.D. 4 mm, 6 mm, 8 mm, 10 mm, 12 mm, 14 mm, push-in sleeve QS-10, QS-12, QS-14, QS-4, QS-6, QS-8	For tubing O.D. 3, 4, 6, 8, 10, 12 mm
Temperature-dependent operating pressure	-0.95 ... 14 bar	-0.95 ... 14 bar		
Operating pressure for entire temperature range	-0.95 ... 6 bar	-0.95 ... 6 bar	-0.95 ... 20 bar	-0.95 ... 16 bar
Ambient temperature	-10 ... 80°C	-10 ... 80°C	0 ... 150°C	-20 ... 70°C
Description	• Mini series • Compact for maximum component density in confined spaces • PBT and nickel-plated brass • Operating media compressed air, vacuum	• 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)	• All-metal brass, chemically nickel-plated • High corrosion and chemical resistance • High resistance to temperatures and pressure • For use with food see www.festo.com/sp/npqh › tab "Certificates" • Operating media compressed air, vacuum, water	• All-metal brass, nickel-plated • Attractively priced metal push-in fitting • Sturdy • Operating media compressed air, vacuum
➔ Page/online	**1441**	**1441**	**1467**	**1477**

Push-in fittings

Type	Push-in fittings/connectors, resistant to media NPQP	Cartridges, polymer, black QSPK, QSPLK	Cartridges, polymer, grey QSPKG, QSPLKG	Push-in fittings, stainless steel CRQS, CRQSL, CRQSS, CRQST, CRQSY
Pneumatic connection 1	Male thread R1/8, R1/4, R3/8, R1/2, push-in sleeve QS-4, QS-6, QS-8, QS-10, QS-12, for tubing O.D. 4, 6, 8, 10, 12 mm	Cartridge 10 mm, 18 mm	Cartridge 10 mm, 14 mm, 18 mm, 20 mm	Male thread M5, R1/8, R1/4, R3/8, R1/2, for tubing O.D. 4, 6, 8, 10, 12, 16 mm
Pneumatic connection 2	For tubing O.D. 4, 6, 8, 10, 12 mm	For tubing O.D. 3, 4, 6, 8, 10 mm	For tubing O.D. 3, 4, 6, 8, 10, 12 mm	For tubing O.D. 4, 6, 8, 10, 12, 16 mm
Temperature-dependent operating pressure	-0.95 ... 10 bar			
Operating pressure for entire temperature range		-0.95 ... 10 bar	-0.95 ... 10 bar	-0.95 ... 10 bar
Ambient temperature	-20 ... 60°C	-5 ... 60°C	-5 ... 60°C	-15 ... 120°C
Description	• Polypropylene • Low-cost alternative to stainless steel: resistant to most cleaning agents in combination with tubing PLN • For use with extreme media influences • For use with food see www.festo.com/sp/npqp › tab "Certificates" • Operating media compressed air, vacuum	• Compact fitting space • Threadless assembly	• Compact fitting space • Threadless assembly	• Maximum corrosion resistance (corrosion resistance class 4 to Festo standard 940 070) and chemical resistance • For use with food see www.festo.com/sp/crqs › tab "Certificates" • Operating media compressed air, vacuum, (water) • Stainless steel
➔ Page/online	npqp	qsp	qsp	1485

Push-in fittings

Type	Push-in fittings, resistant to welding spatter QS-V0, QSL-V0, QST-V0	Self-sealing push-in fittings and connectors QSK, QSSK, QSKL	Rotary push-in fittings QSR, QSRL	Fluid separators CQA
Pneumatic connection 1	G1/8, G1/4, G3/8, G1/2, R1/8, R1/4, R3/8, R1/2, for tubing O.D. 4, 6, 8, 10, 12 mm	Male thread M5, G1/8, G1/4, G3/8, G1/2, R1/8, R1/4, R3/8, R1/2, for tubing O.D. 4, 6, 8, 10, 12 mm	Male thread M5, G1/8, G1/4, G3/8, G1/2, R1/8, R1/4, R3/8, R1/2	Push-in sleeve CQ-28, for pipe/tubing O.D. 22 mm
Pneumatic connection 2	For tubing O.D. 4, 6, 8, 10, 12 mm	For tubing O.D. 4, 6, 8, 10, 12 mm	For tubing O.D. 4, 6, 8, 10, 12 mm	Push-in sleeve CQ-28, for pipe/tubing O.D. 22 mm
Temperature-dependent operating pressure		-0.95 ... 14 bar	-0.95 ... 14 bar	-0.95 ... 15 bar
Operating pressure for entire temperature range	-0.95 ... 10 bar	-0.95 ... 6 bar	-0.95 ... 6 bar	-0.95 ... 7 bar
Ambient temperature	0 ... 60°C	-10 ... 80°C	0 ... 60°C	-25 ... 70°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 media 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 • Operating media compressed air, vacuum	• Rotatable push-in fitting with swivel connection: rotatable by 360° with max. 500 rpm • Compact fitting space	• Assembly and disassembly without tools • Sturdy and leakproof connection
➔ Page/online	qs-v0	1491	1491	cqa

Barbed fittings

Type	Fittings NPCK	Barbed fittings CN, CRCN, FCN, L-PK, LCN, N, RTU, SCN, LCNH, T-PK, TCN, Y-PK	Barbed hose fittings C-P, N-P, N-MS	Quick connectors ACK, CK, QCK, SCK, CV-PK, GCK-KU, LCK, TCK, FCK-KU, MCK
Nominal width	2 ... 6.2 mm	1.3 ... 5.3 mm	4 ... 16.5 mm	2 ... 11.7 mm
Pneumatic connection 1	Male thread M5, G1/8, G1/4, G3/8	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 with union nut, 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. 6 mm, 9 mm, 19 mm, 13 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 with union nut, 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 ... 80°C
Description	• Stainless steel design • For use with food see www.festo.-com/sp/npck › tab "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	• Female hose connector 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
➔ Page/online	**1497**	**n_070302f**	**n_cnp**	**ck**

Threaded fittings

Type	Threaded fittings NPFC	Blanking plugs B ★	Adapters NPFV
Pneumatic connection 1	G1/8, G1/4, G3/8, G1/2, G3/4, G1, M5, M7, R1/8, R1/4, R3/8, R1/2, R3/4, R1	Male thread G1, G1/2, G1/4, G1/8, G3/4, G3/8, M3, M5, M7	G1/4, NPT1/4-18
Pneumatic connection 2	G1/8, G1/4, G3/8, G1/2, G3/4, M5, R1/8, R1/4, R3/8, R1/2, R3/4, R1		G1/4, NPT1/4-18
Operating pressure	-0.95 ... 50 bar		2 ... 8 bar
Operating pressure for entire temperature range			
Ambient temperature	-20 ... 150°C		
Nominal width			6 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, stainless steel • With sealing ring	• Aluminium • Adapter with filter • From G1/4 to NPT1/4 or G1/4 • Operating media compressed air, vacuum
➔ Page/online	**1501**	**1501**	**npfv**

Threaded fittings

Type	Reducers, sleeves, double nipples D, ESK, FR, G, LJK, QM, QSP10, TJK	Ring pieces, hollow bolts LK, TK, VT
Pneumatic connection 1	G1/8, G1/4, G3/8, G1/2, G3/4, G1, M3, M5, M7, R1/8, R1/4, R3/8, R1/2	Male thread G1/4, G1/8, G3/8, M5
Pneumatic connection 2	G1/8, G1/4, G3/8, G1/2, G3/4, G1, M3, M5, M7, R1/8, R1/4, R3/8, R1/2	For barbed connector I.D. 3 mm with union nut, 4 mm with union nut, 6 mm with union nut
Operating pressure		
Operating pressure for entire temperature range		0 ... 10 bar
Nominal width		
Ambient temperature	2.6 ... 10.7 mm	
Description	• Brass or aluminium • Reducing nipple • Double nipple • Distributor block • Sleeve • Operating media compressed air, vacuum	• 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
➔ Page/online	esk	lk

Click fittings

Type	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 • For use with food see www.festo.com/sp/npka -› tab "Certificates" • Operating media compressed air, vacuum, water • Free from copper, fluorine and silicone • Cleanroom-compatible • Easy-to-clean design with few corners and edges
➔ Page/online	npka

Pipes

Type	Plastic pipes PQ-PA	Pipes PQ-AL	Plastic-coated metal tubes PM
O.D.	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 media compressed air, vacuum
➔ Page/online	**pq-pa**	**pq-al**	**pm**

Push-in fittings for piping PQ

Type	Push-in fittings CQ, CQC, CQH, CQL, CQT
Pneumatic connection 1	Male thread G3/8, G1/2, G3/4, G1, female thread G1/2, push-in sleeve CQ-12, CQ-15, CQ-18, CQ-22, CQ-28, push-in sleeve QS-16, for pipe/tube O.D. 12, 15, 18, 22, 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 ... 75°C
Description	• For pipes PQ-PA, PQ-AL and tubing PAN and PUN • Operating media compressed air, vacuum, liquid media • POM
➔ Page/online	**cq**

Product overview

Couplings

Type	Quick coupling sockets, quick coupling plugs NPHS-D6, NPHS-S6 ★	Quick coupling sockets, quick coupling plugs KD1, KD2, KD3, KD4, KS1, KS2, KS3, KS4 ★	Multiple connectors KSV, KDVF, KDV	Multi-tube connectors KM
Pneumatic connection			PK-2, PK-3, PK-4, PK-6, for tubing O.D. 3 mm, 4 mm, 6 mm	PK-2, PK-3, PK-4
Pneumatic connection 1	Male thread G1/2, G1/4, G3/8, female thread G1/2, G1/4, G3/8, for plug-in nipple I.D. 9 mm	Male thread M3, M5, G1/8, G1/4, G1/2, G3/8, female thread G1/4, G3/8, G1/2, CK-3, CK-4, CK-6, CK-9, CK13, N6, N-9		
Standard nominal flow rate	875 ... 2083 l/min	44 ... 1350 l/min		
Operating pressure			-0.95 ... 16 bar	-0.95 ... 8 bar
Ambient temperature	-20 ... 80°C	-10 ... 80°C	-10 ... 60°C	-10 ... 60°C
Description	• Safety coupling • Shut-off on one side • Metal or plastic releasing sleeve • Exhausting of the air on the plug side without having to undo the coupling • Combination of coupling and hand slide valve • Can be used as an on-off valve	• 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 outlets • Operating media compressed air, vacuum
➔ Page/online	**1511**	**1511**	**ksv**	**km**

Distributors

Type	Multiple distributors QSLV, QSQ, QST3	Multiple distributors QSYTF	Distributor blocks FR
Pneumatic connection 1	Male thread G1/8, G1/4, G3/8, G1/2, R1/8, R1/4, R3/8, R1/2, for tubing O.D. 6, 8, 10 mm	Male thread G1/8, G1/4, G3/8, G1/2, R1/8, R1/4, R3/8, R1/2	Female thread G1/4, G3/8, G1/2, G3/4
Pneumatic connection 2	For tubing O.D. 4, 6, 8, 10, 12 mm	Female thread G1/8, G1/4, G3/8, G1/2, for tubing O.D. 6, 8, 10, 12 mm	Female thread M3, M5, G1/8, G3/8, G1/2, for tubing O.D. 4 mm, 6 mm
No. of supply lines	1	1	1
No. of outlets	2, 3, 4, 6	3	3, 8, 9, 12
Max. rotational speed			
Description	• PBT and nickel-plated brass • L-shape, T-shape • Rotatable 360º • Reducing design • Operating media compressed air, vacuum, (water)	• PBT and nickel-plated brass • Y-shape • Rotatable 360º • Operating media compressed air, vacuum, (water)	• Aluminium • 4, 8, 9 or 12 connections • Operating media compressed air, vacuum
➔ Page/online	**1519, qst3**	**qsytf**	**fr**

Distributors

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

Protective conduit systems

Type	Protective conduits MK, MKG, MKR, MKV	Protective conduit fittings HMZAS, HMZV, MKA, MKGV, MKM, MKRL, MKRS, MKRT, MKRV, MKVM, MKVV, MKY
I.D.	7.5 ... 48 mm	
O.D.	10 ... 56 mm	
Connecting thread		Pg 9, Pg 11, Pg 13.5, Pg 16, Pg 21, Pg 29, Pg 36, Pg 48
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 • Reducing connector • Protective conduit fitting • Lock nut • Protective conduit connector • Y-distributor • Polymer, polyamide, nickel-plated brass
➔ Page/online	mkg	mka

Accessories

Type	Sealing material CRO, GWB, O, OK, OL	Pipe and tubing cutters PAN-VOS, ZDS, ZMS, ZR, ZRS	Pipe clamps PQ	Tubing accessories KK, NPAW, PB, PKB, PKS, QSO, SK
Description	• Sealing ring • Sealing ring assortment • Thread sealing tape	• Tubing cutter • Disconnecting pliers • Connecting pliers • Pipe cutter • Pipe and tubing cutter	• For pipes with an O.D. of 12 ... 28 mm	• Tubing strap • Spiral wrap for tubing • Tubing support • Multi-tube holder
➔ Page/online	1525	Zds, 1525	pq	npaw

Use our reliable and economical tubing series

+ High resistance and long service life
+ Highly flexible and easy to install
+ Colour selection for easier recognition

Standard O.D. plastic tubing

PEN
PUN★, PUN-H★
PUN-DUO

Standard O.D. plastic tubing

PEN/PUN★ / PUN-H★

Overview, configuration and ordering
➔ **www.festo.com/catalogue/pun** ✓

Additional information, support and user documentation
➔ **www.festo.com/sp/pun** ✓

★ Quick ordering of basic designs
➔ page 1436, 1438 ✓

+ PUN: extremely flexible polyurethane tubing
+ High resistance to stress cracks
+ RoHS-compliant
+ Operating media: compressed air, vacuum
+ Suitable for energy chains

+ PUN-H: extremely flexible polyurethane tubing
+ Suitable for use with food and FDA compliant
+ High resistance to microbes and hydrolysis
+ Operating media: compressed air, vacuum, water
+ Suitable for energy chains

Plastic tubing

Key features

PUN-DUO/PUN-H-DUO:
Two lengths of plastic tubing are fused together into a tubing pair. To fit it, the paired tubing is separated as required at both ends.

Type	O.D. [mm]	Material	Food-safe	Halogen free	Suitable for energy chains	Approved by the German Technical Control Board (TÜV)	Resistance				Flexibility	Shore hardness
							Hydrolysis	Chemicals	Microbes	UV radiation		
PEN	4, 6, 8, 10, 12, 14, 16	PE	–	■	+++	■	+++	++	++	++[1)]	++	D 52 ±3
PUN	3, 4, 6, 8, 10, 12, 14, 16	TPE-U(PU)	–	■	++	■	+	–	–	++[1)]	+++	D 52 ±3
PUN-DUO	4, 6, 8, 10	TPE-U(PU)	–	■	++	■	+	–	–	+	++	D 52 ±3
PUN-H	2	TPE-U(PU)	–	■	++	–	++	+	++	++[1)]	+++	D 52 ±3
	3, 4, 6, 8, 10, 12, 14, 16	TPE-U(PU)	■	■	++	■	++	+	++	++[1)]	+++	D 52 ±3
PUN-H-DUO	4, 6, 8, 10	TPE-U(PU)	■	■	++	■	++	+	++	+	++	D 52 ±3

+++ Highly suitable
++ Suitable
+ Limited suitability (on request)
– Not suitable

1) Applies to the colour black.

Product range overview

Type	O.D. [mm]	Packaging unit [m]	Product options																	➔ Page/ online
			Colour																	
			SI	TBL	BL	TSW	SW	TGE	GE	TGN	GN	TRT	RT	BR	WS	NT	BS	TXT	CB	HA
PEN	4, 6, 8, 10, 12, 14, 16	50, 100, 200, 300, 400, 500	■	–	■	–	■	–	■	–	■	–	■	■	■	■	–	■	■	■	1434
PUN	3, 4, 6, 8, 10, 12, 14, 16	50, 100, 200, 300, 400, 500	■	–	■	–	■	–	■	–	■	–	■	■	■	–	–	■	■	■	1435
PUN-DUO	4, 6, 8, 10	50	■	–	–	–	–	–	–	–	–	–	–	–	–	–	■	–	–	–	1439
PUN-H	2	50	–	–	–	–	■	–	–	–	–	–	■	–	–	■	–	–	–	–	1437
	3, 4, 6, 8, 10, 12, 14, 16	50, 100, 200, 300, 400, 500	■	■	■	■	■	■	■	■	■	■	■	■	■	■	–	■	■	■	
PUN-H-DUO	4, 6, 8, 10	50	–	–	–	–	–	–	–	–	–	–	–	–	–	–	■	–	–	–	1439

Product options

SI	Silver	TGE	Translucent yellow	RT	Red	TXT	Customer-specific tubing inscription (on request)
TBL	Translucent blue	GE	Yellow	BR	Brown		
BL	Blue	TGN	Translucent green	WS	White	25	Packaging unit 25 m
TSW	Translucent black	GN	Green	NT	Natural	CB	Cardboard box
SW	Black	TRT	Translucent red	BS	Blue/black	HA	Reel

Plastic tubing PEN

Data sheet

Technical data — Download CAD data ➔ **www.festo.com**

O.D.	[mm]	4	6	8	10	12	14	16
I.D.	[mm]	2.7	4	5.7	7	8.4	9.5	10.8
Min. bending radius	[mm]	10	13.5	22.5	23.5	33	45	57.5
Bending radius relevant for flow rate	[mm]	20	26	35	40	58	80	122

Operating conditions

Operating medium		Compressed air to ISO 8573-1:2010 [7:–:–]
		Water as per manufacturer's declaration[1)]
Temperature-dependent operating pressure	[bar]	–0.95 ... +10
Ambient temperature	[°C]	–30 ... +60

1) Additional information www.festo.com/sp ➔ Certificates.

Order code

PEN – [ ] x [ ] – [ ] –

Type

PEN	Plastic tubing

O.D. [mm]

	Wall thickness [mm]
4	0.75
6	1
8	1.25
10	1.5
12	1.75
14	2
16	2.5

Colour

SI	Silver	1
BL	Blue	1
SW	Black	
GE	Yellow	1
GN	Green	1
RT	Red	1
NT	Natural	

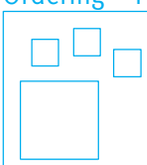
Packaging unit [m]

–	50	
100	100	2
200	200	3
300	300	4
400	400	5
500	500	6

1 Not with O.D. 14
2 Only with O.D. 16 and colours SI, BL, SW
3 Only with O.D. 12 and colours SI, BL, SW
4 Only with O.D. 10 and colours SI, BL, SW
5 Only with O.D. 8 and colours SI, BL, SW
6 Only with O.D. 4, 6 and colours SI, BL, SW

Order example:
PEN-8x1,25-BL-400
Plastic tubing PEN - O.D. 8 mm - wall thickness 1.25 mm - colour blue - packaging unit 400 m

Ordering – Product options



Configurable product

This product and all its options can be ordered using the configurator.

The configurator can be found under Products on the DVD or
➔ **www.festo.com/catalogue/...**

Enter the type code in the search field.

Plastic tubing PUN ★

Data sheet

Technical data Download CAD data ➔ **www.festo.com**

O.D.	[mm]	3	4	6	8	10	12	14	16
I.D.	[mm]	2.1	2.6	4	5.7	7	8	9.8	11
Min. bending radius	[mm]	9	8	16	24	28	33	45	45
Bending radius relevant for flow rate	[mm]	12	17	26.5	37	54	62	84	88

Operating conditions

Operating medium		Compressed air to ISO 8573-1:2010 [7:–:–]
Temperature-dependent operating pressure	[bar]	–0.95 ... +10
Ambient temperature	[°C]	–35 ... +60

Order code

PUN – [ ] x [ ] – [ ] –

Type	
PUN	Plastic tubing

O.D. [mm]	**Wall thickness [mm]**
3	0.5
4	0.75
6	1
8	1.25
10	1.5
12	2
14	2
16	2.5

Colour		
SI	Silver	
BL	Blue	
SW	Black	
GE	Yellow	1
GN	Green	1
RT	Red	1

Packaging unit [m]		
–	50	
100	100	2
200	200	3
300	300	4
400	400	5
500	500	6

1 Not with O.D. 14
2 Only with O.D. 16 and colours SI, BL, SW
3 Only with O.D. 12 and colours SI, BL, SW
4 Only with O.D. 10 and colours SI, BL, SW
5 Only with O.D. 8 and colours SI, BL, SW
6 Only with O.D. 3, 4, 6 and colours SI, BL, SW

Order example:
PUN-14X2-SI
Plastic tubing PUN - O.D. 14 mm - wall thickness 2 mm - colour silver - packaging unit 50 m

Ordering – Product options

Configurable product

This product and all its options can be ordered using the configurator.

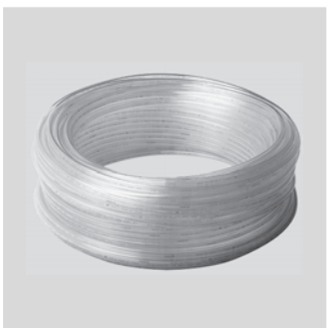
The configurator can be found under Products on the DVD or
➔ **www.festo.com/catalogue/...**

Enter the type code in the search field.

Plastic tubing PUN ★

★ Quick ordering [1)]

PUN



O.D. [mm]	I.D. [mm]	Min. bending radius [mm]	Bending radius relevant for flow rate [mm]	Colour	Part no.	Type	PU[2)]
3	2.1	9	21	Silver	**152583**	**PUN-3x0,5-SI**	**50**
				Blue	**159660**	**PUN-3x0,5-BL**	**50**
				Black	**159661**	**PUN-3x0,5-SW**	**50**
4	2.6	8	17	Silver	**152584**	**PUN-4x0,75-SI**	**50**
				Blue	**159662**	**PUN-4x0,75-BL**	**50**
				Black	**159663**	**PUN-4x0,75-SW**	**50**
6	4	16	26.5	Silver	**152586**	**PUN-6x1-SI**	**50**
				Blue	**159664**	**PUN-6x1-BL**	**50**
				Black	**159665**	**PUN-6x1-SW**	**50**
8	5.7	24	37	Silver	**152587**	**PUN-8x1,25-SI**	**50**
				Blue	**159666**	**PUN-8x1,25-BL**	**50**
				Black	**159667**	**PUN-8x1,25-SW**	**50**
10	7	28	54	Silver	**152588**	**PUN-10x1,5-SI**	**50**
				Blue	**159668**	**PUN-10x1,5-BL**	**50**
				Black	**159669**	**PUN-10x1,5-SW**	**50**
12	8	33	62	Silver	**152589**	**PUN-12x2-SI**	**50**
				Blue	**159670**	**PUN-12x2-BL**	**50**
				Black	**159671**	**PUN-12x2-SW**	**50**
14	9.8	45	84	Silver	**570389**	**PUN-14x2-SI**	**50**
				Blue	**570390**	**PUN-14x2-BL**	**50**
				Black	**570391**	**PUN-14x2-SW**	**50**
16	11	45	88	Silver	**152590**	**PUN-16x2,5-SI**	**50**
				Blue	**159672**	**PUN-16x2,5-BL**	**50**
				Black	**159673**	**PUN-16x2,5-SW**	**50**

1) All products in this table are easy to select and quick to order.

2) Packaging unit in metres

Data sheet

Technical data										Download CAD data ➔ www.festo.com
O.D.	[mm]	2	3	4	6	8	10	12	14	16
I.D.	[mm]	1.2	2.1	2.6	4	5.7	7	8	9.8	11
Min. bending radius	[mm]	5	6	8	10	21	28	33	38	38
Bending radius relevant for flow rate	[mm]	8	12	16	26	37	52	62	78	88

Operating conditions										
O.D.	[mm]	2	3	4	6	8	10	12	14	16
Operating medium		Compressed air to ISO 8573-1:2010 [7:–:–]								
		–	Water as per manufacturer's declaration[1)]							
Temperature-dependent operating pressure	[bar]	–0.95 ... +10								
Ambient temperature	[°C]	–35 ... +60								
Food-safe[1)]		–	See supplementary material information							

1) Additional information www.festo.com/sp ➔ Certificates.

Order code

PUN – H – [ ] x [ ] – [ ] –

Type	
PUN	Plastic tubing

Alternative material properties	
H	Hydrolysis-resistant

O.D. [mm]	Wall thickness [mm]
2	0.4
3	0.5
4	0.75
6	1
8	1.25
10	1.5
12	2
14	2
16	2.5

Colour		
SI	Silver	1 2
TBL	Translucent blue	3
BL	Blue	1
TSW	Translucent black	3
SW	Black	
TGE	Translucent yellow	3
GE	Yellow	1 2
TGN	Translucent green	3
GN	Green	1 2
TRT	Translucent red	3
RT	Red	2
NT	Natural	

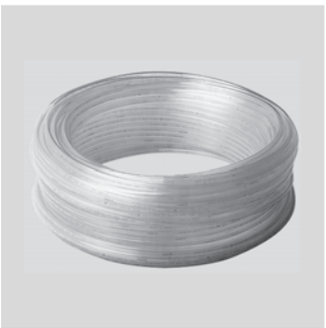
Packaging unit [m]		
–	50	
100	100	4
200	200	5
300	300	6
400	400	7
500	500	8

1 Not with O.D. 2
2 Not with O.D. 14
3 Not with O.D. 2, 3, 14, 16
4 Only with O.D. 16 and colours SI, BL, SW, NT
5 Only with O.D. 12 and colours SI, TBL, BL, TSW, SW, TGE, TGN, TRT, NT
6 Only with O.D. 10 and colours SI, TBL, BL, TSW, SW, TGE, TGN, TRT, NT
7 Only with O.D. 8 and colours SI, TBL, BL, TSW, SW, TGE, TGN, TRT, NT
8 Only with O.D. 3, 4, 6 and colours SI, TBL, BL, TSW, SW, TGE, TGN, TRT, NT

Plastic tubing PUN-H ★

★ Quick ordering [1)]

PUN-H



O.D. [mm]	I.D. [mm]	Min. bending radius [mm]	Bending radius relevant for flow rate [mm]	Colour	Part no.	Type	PU[2)]
2	1.2	5	8	Natural	**133038**	**PUN-H-2x0,4-NT**	**50**
				Black	**133039**	**PUN-H-2x0,4-SW**	**50**
3	2.1	6	12	Natural	**197375**	**PUN-H-3x0,5-NT**	**50**
				Blue	**197382**	**PUN-H-3x0,5-BL**	**50**
				Black	**197389**	**PUN-H-3x0,5-SW**	**50**
				Silver	**558277**	**PUN-H-3x0,5-SI**	**50**
4	2.6	8	16	Natural	**197376**	**PUN-H-4x0,75-NT**	**50**
				Translucent blue	**8048671**	**PUN-H-4x0,75-TBL**	**50**
				Blue	**197383**	**PUN-H-4x0,75-BL**	**50**
				Black	**197390**	**PUN-H-4x0,75-SW**	**50**
				Silver	**558278**	**PUN-H-4x0,75-SI**	**50**
6	4	10	26	Natural	**197377**	**PUN-H-6x1-NT**	**50**
				Translucent blue	**8048681**	**PUN-H-6x1-TBL**	**50**
				Blue	**197384**	**PUN-H-6x1-BL**	**50**
				Black	**197391**	**PUN-H-6x1-SW**	**50**
				Silver	**558279**	**PUN-H-6x1-SI**	**50**
8	5.7	21	37	Natural	**197378**	**PUN-H-8x1,25-NT**	**50**
				Translucent blue	**8048691**	**PUN-H-8x1,25-TBL**	**50**
				Blue	**197385**	**PUN-H-8x1,25-BL**	**50**
				Black	**197392**	**PUN-H-8x1,25-SW**	**50**
				Silver	**558280**	**PUN-H-8x1,25-SI**	**50**
10	7	28	52	Natural	**197379**	**PUN-H-10x1,5-NT**	**50**
				Translucent blue	**8048701**	**PUN-H-10x1,5-TBL**	**50**
				Blue	**197386**	**PUN-H-10x1,5-BL**	**50**
				Black	**197393**	**PUN-H-10x1,5-SW**	**50**
				Silver	**558281**	**PUN-H-10x1,5-SI**	**50**
12	8	33	62	Natural	**197380**	**PUN-H-12x2-NT**	**50**
				Translucent blue	**8048711**	**PUN-H-12x2-TBL**	**50**
				Blue	**197387**	**PUN-H-12x2-BL**	**50**
				Black	**197394**	**PUN-H-12x2-SW**	**50**
				Silver	**558282**	**PUN-H-12x2-SI**	**50**
14	9.8	38	78	Blue	**570386**	**PUN-H-14x2-BL**	**50**
				Black	**570387**	**PUN-H-14x2-SW**	**50**
16	11	38	88	Natural	**197381**	**PUN-H-16x2,5-NT**	**50**
				Blue	**197388**	**PUN-H-16x2,5-BL**	**50**
				Black	**197395**	**PUN-H-16x2,5-SW**	**50**
				Silver	**558283**	**PUN-H-16x2,5-SI**	**50**

1) All products in this table are easy to select and quick to order.

2) Packaging unit in metres

Data sheet

Technical data Download CAD data ➔ **www.festo.com**

Type		PUN-DUO				PUN-H-DUO			
O.D.	[mm]	4	6	8	10	4	6	8	10
I.D.	[mm]	2.6	4	5.7	7	2.6	4	5.7	7
Min. bending radius	[mm]	8	16	24	28	8	10	21	28
Bending radius relevant for flow rate	[mm]	17	26.5	37	54	16	26	37	52

Operating conditions

Type		PUN-DUO	PUN-H-DUO
Operating medium		Compressed air to ISO 8573-1:2010 [7:–:–]	
		–	Water as per manufacturer's declaration[1)]
Temperature-dependent operating pressure	[bar]	–0.95 ... +10	
Ambient temperature	[°C]	–35 ... +60	
Food-safe[1)]		–	See supplementary material information

1) Additional information www.festo.com/sp ➔ Certificates.

Order code

PUN – – [ ] x [ ] – DUO –

Type	
PUN	Plastic tubing

Alternative material properties	
–	Standard
H	Hydrolysis-resistant

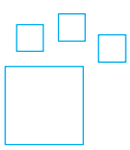
O.D. [mm]	**Wall thickness [mm]**
4	0.75
6	1
8	1.25
10	1.5

Tubing type	
DUO	DUO tubing

Colour	
PUN	
SI	Silver
BS	Blue/black
PUN-H	
–	Blue/black

Order example:
PUN-H-6x1-DUO
Plastic tubing PUN, hydrolysis-resistant - O.D. 6 mm - wall thickness 1 mm - duo tubing - colour blue/black

Ordering – Product options



Configurable product

This product and all its options can be ordered using the configurator.

The configurator can be found under Products on the DVD or
➔ **www.festo.com/catalogue/...**

Enter the type code in the search field.

QSM, mini

QS, standard

The versatile standard fitting for maximum flexibility

+ Extremely easy assembly
+ Extremely wide choice of variants
+ Minimum leakage

Fittings › Push-in fittings ›

Push-in fittings

QS★ / QSM★

QS, standard
QSM, mini

Push-in fittings

QS★ / QSM★

Overview, configuration and ordering
➔ **www.festo.com/catalogue/qs**

Additional information, support and user documentation
➔ **www.festo.com/sp/qs**

Quick ordering of basic designs
➔ page QSM: 1445 ff., QS: 1452 ff.

+ QSM, mini: compact for maximum component density in confined spaces
+ QS, standard: wide selection for maximum flexibility in standard applications
+ Male or female thread with external or internal hex
+ Resistant to pressure: economical for pneumatic installations up to 14 bar
+ Suitable for use with water as an operating medium

Key features

QSM, mini series

Miniature push-in fittings for maximum component density in confined spaces. Tubing O.D. of 2, 3, 4 and 6 mm with connecting threads M3, M5, M6, M7, R⅛ and G⅛.

QS, standard series

Wide selection of push-in fittings. Tubing O.D. of 4, 6, 8, 10, 12, 16 and 22 mm with connecting threads R⅛ ... R½ and G⅛ ... G¾.

Product range overview

Type	Version	Design	Pneumatic connection 1					Pneumatic connection 2	➔ Page/ online
			M thread	R thread	G thread	Tubing O.D.	Push-in sleeve	Tubing O.D.	
QSM, mini series									
QSM	Push-in fitting	Straight	■	■	■	–	–	■	1445
	Push-in connector		–	–	–	■	■	■	1446
QSMS	Push-in bulkhead connector		–	–	–	■	–	■	
QSMF	Push-in fitting		■	–	–	–	–	■	1447
QSMP	Push-in fitting		■	–	–	–	–	■	**qsmp**
QSMC	Push-in cap		–	–	–	■	–	–	1447
	Blanking plug		–	–	–	–	■	–	
QSML	Push-in fitting	L-shape	■	■	■	–	–	■	1448
	Push-in connector		–	–	–	■	■	■	1449
QSMLV	Push-in fitting		■	–	–	–	–	■	
QSMT	Push-in fitting	T-shape	■	■	■	–	–	■	1450
	Push-in connector		–	–	–	■	–	■	
QSMTL	Push-in fitting		■	■	■	–	–	■	
QSMX	Push-in connector	X-shape	–	–	–	■	–	■	**qsmx**
QSMY	Push-in connector	Y-shape	–	–	–	■	–	■	1451
QS, standard series									
QS	Push-in fitting	Straight	–	■	■	–	–	■	1452
	Push-in connector		–	–	–	■	–	■	1453
	Push-in connector		–	–	–	–	■	■	1454
QSS	Push-in bulkhead connector		–	–	–	■	–	■	
QSF	Push-in fitting		–	–	■	–	–	■	1455
QSSF	Push-in bulkhead fitting		–	–	■	–	–	■	**qssf**
QSC	Push-in cap		–	–	–	■	–	–	1455
	Blanking plug		–	–	–	–	■	–	
QSH	Push-in sleeve		–	–	–	–	■	–	**qsh**
QSL	Push-in fitting	L-shape	–	■	■	–	–	■	1456
	Push-in connector		–	–	–	■	■	■	1458
QSLF	Push-in fitting		–	–	■	–	–	■	
QSLV	Push-in fitting		■	■	■	–	–	■	1459
QST	Push-in fitting	T-shape	–	■	■	–	–	■	1461
	Push-in connector		–	–	–	■	–	■	1462
QSTF	Push-in fitting		–	■	■	–	–	■	
QSTL	Push-in fitting		–	■	■	–	–	■	1463
QSW	Push-in fitting	W-shape	–	■	–	–	–	■	
	Push-in connector		–	–	–	–	■	■	1464
QSX	Push-in connector	X-shape	–	–	–	■	–	■	**qsx**
QSY	Push-in fitting	Y-shape	■	■	■	–	–	■	1464
	Push-in connector		–	–	–	■	■	■	1465
QSYL	Push-in fitting	Y-shape	–	■	■	–	–	■	1466
QSYLV	Push-in fitting		–	■	■	–	–	■	**qsylv**

Push-in fittings QS ★

Data sheet

Operating conditions			
Type		QSM	QS
Operating medium		Compressed air to ISO 8573-1:2010 [7:–:–]	
		–	Water as per manufacturer's declaration[1)]
Note on operating/pilot medium		Operation with lubricated medium possible	
Operating pressure for entire temperature range	[bar]	–0.95 ... +6	
Temperature-dependent operating pressure	[bar]	–0.95 ... +14	
Ambient temperature	[°C]	–10 ... +80	

1) Additional information www.festo.com/sp ➔ Certificates.

Materials			
Type	QSM	QSM...-M3	QS
Housing	Nickel-plated brass		
	PBT		
Threaded coupling	Nickel-plated brass	Nickel-plated steel	Nickel-plated brass
Releasing ring	POM		
Tube retaining claw	High-alloy stainless steel		
Tubing seal	NBR		

Ordering data

Push-in fitting QSM

Male thread with external hex

M thread

R thread

G thread

Pneumatic connection		Nominal width		Part no.	Type	PU[1]
1 Male thread	2 Tubing O.D. [mm]	[mm]				
Metric thread with sealing ring						
M3	2	0.9		133027	QSM-M3-2	10
	3	0.9	★	153301	QSM-M3-3	10
	4	1.1	★	153303	QSM-M3-4	10
M5	2	1.1		133028	QSM-M5-2	10
	3	2	★	153302	QSM-M5-3	10
	4	2.2	★	153304	QSM-M5-4	10
	6	2.1	★	153306	QSM-M5-6	10
M6	6	2.8	★	132600	QSM-M6-6	10
R thread						
R⅛	4	2.9	★	153305	QSM-1/8-4	10
	6	4.5	★	153307	QSM-1/8-6	10
G thread with sealing ring						
G⅛	4	2.9	★	186264	QSM-G1/8-4	10
	6	2.8	★	186265	QSM-G1/8-6	10

Push-in fitting QSM-...-I

Male thread with internal hex

M thread

R thread

G thread

Pneumatic connection		Nominal width		Part no.	Type	PU[1]
1 Male thread	2 Tubing O.D. [mm]	[mm]				
Metric thread with sealing ring						
M3	2	1.1		133026	QSM-M3-2-I	10
	3	1.6	★	153312	QSM-M3-3-I	10
	4	1.5	★	153314	QSM-M3-4-I	10
M5	3	1.9	★	153313	QSM-M5-3-I	10
	4	2.5	★	153315	QSM-M5-4-I	10
	6	2.6	★	153317	QSM-M5-6-I	10
M7	4	3.1	★	153319	QSM-M7-4-I	10
	6	4.1	★	153321	QSM-M7-6-I	10
R thread						
R⅛	4	3.1	★	153316	QSM-1/8-4-I	10
	6	4.1	★	153318	QSM-1/8-6-I	10
G thread with sealing ring						
G⅛	4	3.1	★	186266	QSM-G1/8-4-I	10
	6	4.1	★	186267	QSM-G1/8-6-I	10

1) Packaging unit per part

Push-in fittings QSM ★ mini series

Ordering data

Push-in connector QSM

Pneumatic connection 1 Tubing O.D. [mm]	Pneumatic connection 2 Tubing O.D. [mm]	Nominal width [mm]		Part no.	Type	PU[1]
3	3	1.9	★	**153323**	**QSM-3**	**10**
4	4	2.6	★	**153324**	**QSM-4**	**10**
6	6	3.7	★	**153325**	**QSM-6**	**10**
Reducing						
3	2	1.1		**133029**	**QSM-3-2**	**10**
4	3	1.7	★	**153326**	**QSM-4-3**	**10**
6	4	2.7	★	**153327**	**QSM-6-4**	**10**

Push-in connector QSM-...H

with push-in sleeve

Pneumatic connection 1 Push-in sleeve	Pneumatic connection 2 Tubing O.D. [mm]	Nominal width [mm]		Part no.	Type	PU[1]
QS-3	2	1.1		**133035**	**QSM-3H-2**	**10**
QS-4	3	1.7	★	**153328**	**QSM-4H-3**	**10**
QS-6	4	2.6	★	**153329**	**QSM-6H-4**	**10**

Push-in bulkhead connector QSMS

Pneumatic connection 1 Tubing O.D. [mm]	Pneumatic connection 2 Tubing O.D. [mm]	Nominal width [mm]		Part no.	Type	PU[1]
3	3	1.7	★	**153375**	**QSMS-3**	**10**
4	4	2.2	★	**153376**	**QSMS-4**	**10**
6	6	3.7	★	**153377**	**QSMS-6**	**10**

1) Packaging unit per part

Ordering data

Push-in fitting QSMF

Female thread with external hex

Pneumatic connection		Nominal width [mm]	Part no.	Type	PU[1]
1 Female thread	2 Tubing O.D. [mm]				
M3	3	1.3	**153308**	**QSMF-M3-3**	**10**
	4	2.1	**153310**	**QSMF-M3-4**	**10**
M5	3	1.9	**153309**	**QSMF-M5-3**	**10**
	4	1.8	**153311**	**QSMF-M5-4**	**10**

Push-in cap QSMC

Pneumatic connection	Part no.	Type	PU[1]
1 Tubing O.D. [mm]			
3	**153381**	**QSMC-3**	**10**

Blanking plug QSMC-...H

Pneumatic connection	Part no.	Type	PU[1]
1 Push-in sleeve			
QS-2	**133036**	**QSMC-2H**	**10**
QS-3	**153382**	**QSMC-3H**	**10**

1) Packaging unit per part

Push-in fittings QSM ★ mini series

Ordering data

Push-in L-fitting QSML

Male thread with external hex, rotatable

M thread

R thread

G thread

Pneumatic connection		Nominal width		Part no.	Type	PU[1]
1 Male thread	2 Tubing O.D. [mm]	[mm]				
Metric thread with sealing ring						
M3	2	0.8		133030	QSML-M3-2	10
	3	0.8	★	153330	QSML-M3-3	10
	4	1.3	★	153332	QSML-M3-4	10
M5	2	0.9		133031	QSML-M5-2	10
	3	1.5	★	153331	QSML-M5-3	10
	4	1.7	★	153333	QSML-M5-4	10
	6	2.1	★	153335	QSML-M5-6	10
M7	4	2	★	186352	QSML-M7-4	10
	6	2.4	★	186353	QSML-M7-6	10
R thread						
R⅛	4	2.5	★	153334	QSML-1/8-4	10
	6	3.3	★	153336	QSML-1/8-6	10
G thread with sealing ring						
G⅛	4	2.5	★	186268	QSML-G1/8-4	10
	6	3.3	★	186269	QSML-G1/8-6	10

Push-in L-fitting, long QSMLL

Male thread with external hex, rotatable

M thread

R thread

G thread

Pneumatic connection		Nominal width		Part no.	Type	PU[1]
1 Male thread	2 Tubing O.D. [mm]	[mm]				
Metric thread with sealing ring						
M3	2	0.8		133032	QSMLL-M3-2	10
	3	0.9		153337	QSMLL-M3-3	10
	4	1.1		153338	QSMLL-M3-4	10
M5	2	0.9		133033	QSMLL-M5-2	10
	3	1.5		130838	QSMLL-M5-3	10
	4	2		153339	QSMLL-M5-4	10
	6	2		153341	QSMLL-M5-6	10
M7	4	2		186354	QSMLL-M7-4	10
	6	2.4		186355	QSMLL-M7-6	10
R thread						
R⅛	4	2.3		153340	QSMLL-1/8-4	10
	6	3.1		153342	QSMLL-1/8-6	10
G thread with sealing ring						
G⅛	4	2.3		186270	QSMLL-G1/8-4	10
	6	3.1		186271	QSMLL-G1/8-6	10

1) Packaging unit per part

Ordering data

Push-in L-connector QSML

Pneumatic connection		Nominal width		Part no.	Type	PU[1]
1 Tubing O.D. [mm]	2 Tubing O.D. [mm]	[mm]				
3	3	1.7	★	**153343**	**QSML-3**	**10**
4	4	2.5	★	**153344**	**QSML-4**	**10**
6	6	3.4	★	**153345**	**QSML-6**	**10**

Push-in L-connector QSML-...H

with push-in sleeve

Pneumatic connection		Nominal width		Part no.	Type	PU[1]
1 Push-in sleeve	2 Tubing O.D. [mm]	[mm]				
QS-3	3	1.2	★	**153346**	**QSML-3H**	**10**
QS-4	4	1.9	★	**153347**	**QSML-4H**	**10**
QS-6	6	3.2	★	**153348**	**QSML-6H**	**10**
Reducing						
QS-4	3	1.7	★	**153349**	**QSML-4H-3**	**10**
QS-6	4	1.9	★	**153350**	**QSML-6H-4**	**10**

Push-in L-fitting QSMLV-...-I

Male thread with internal hex, rotatable

Pneumatic connection		Nominal width		Part no.	Type	PU[1]
1 Male thread	2 Tubing O.D. [mm]	[mm]				
Metric thread with sealing ring						
M5	3	1.7		**130830**	**QSMLV-M5-3-I**	**10**
	4	1.8		**130831**	**QSMLV-M5-4-I**	**10**
M7	4	1.9		**130832**	**QSMLV-M7-4-I**	**10**
	6	1.8		**130833**	**QSMLV-M7-6-I**	**10**

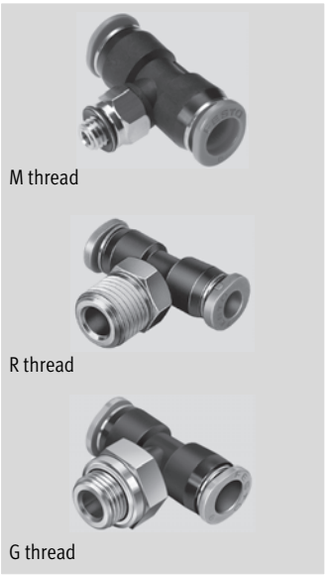
1) Packaging unit per part

Push-in fittings QSM ★ mini series

Ordering data

Push-in T-fitting QSMT

Male thread with external hex, rotatable



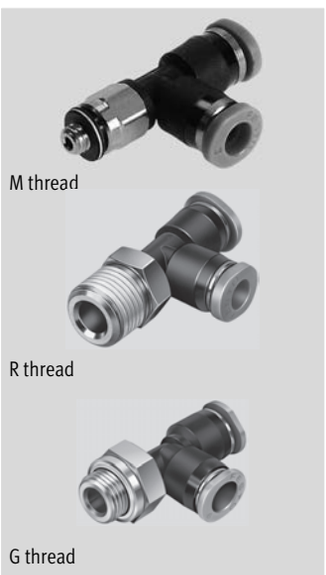
Pneumatic connection		Nominal width	Part no.	Type	PU[1]
1 Male thread	2 Tubing O.D. [mm]	[mm]			
Metric thread with sealing ring					
M3	3	0.9	**153351**	**QSMT-M3-3**	**10**
	4	1.3	**153353**	**QSMT-M3-4**	**10**
M5	3	1.6	**153352**	**QSMT-M5-3**	**10**
	4	2.2	**153354**	**QSMT-M5-4**	**10**
	6	2.1	**153356**	**QSMT-M5-6**	**10**
R thread					
R1/8	4	2.4	**153355**	**QSMT-1/8-4**	**10**
	6	3.3	**153357**	**QSMT-1/8-6**	**10**
G thread with sealing ring					
G1/8	4	2.4	**186272**	**QSMT-G1/8-4**	**10**
	6	3.3	**186273**	**QSMT-G1/8-6**	**10**

Push-in T-connector QSMT

Pneumatic connection		Nominal width		Part no.	Type	PU[1]
1 Tubing O.D. [mm]	2 Tubing O.D. [mm]	[mm]				
2	2	0.9		**133034**	**QSMT-2**	**10**
3	3	1.6	★	**153365**	**QSMT-3**	**10**
4	4	2.4	★	**153366**	**QSMT-4**	**10**
6	6	3.4	★	**153367**	**QSMT-6**	**10**
Reducing						
4	3	1.7	★	**153368**	**QSMT-4-3**	**10**
6	4	2.6	★	**153369**	**QSMT-6-4**	**10**

Push-in T-fitting QSMTL

Male thread with external hex, rotatable



Pneumatic connection		Nominal width	Part no.	Type	PU[1]
1 Male thread	2 Tubing O.D. [mm]	[mm]			
Metric thread with sealing ring					
M3	3	0.9	**153358**	**QSMTL-M3-3**	**10**
	4	1.1	**153360**	**QSMTL-M3-4**	**10**
M5	3	1.7	**153359**	**QSMTL-M5-3**	**10**
	4	1.6	**153361**	**QSMTL-M5-4**	**10**
	6	1.7	**153363**	**QSMTL-M5-6**	**10**
R thread					
R1/8	4	2.4	**153362**	**QSMTL-1/8-4**	**10**
	6	3.3	**153364**	**QSMTL-1/8-6**	**10**
G thread with sealing ring					
G1/8	4	2.4	**186274**	**QSMTL-G1/8-4**	**10**
	6	3.3	**186275**	**QSMTL-G1/8-6**	**10**

1) Packaging unit per part

Ordering data

Push-in Y-connector QSMY

Pneumatic connection		Nominal width [mm]		Part no.	Type	PU[1]
1 Tubing O.D. [mm]	2 Tubing O.D. [mm]					
2	2	0.9		**133037**	**QSMY-2**	**10**
3	3	1.6	★	**153370**	**QSMY-3**	**10**
4	4	1.7	★	**153371**	**QSMY-4**	**10**
6	6	2.9	★	**153372**	**QSMY-6**	**10**
2 reducing outlets						
4	3	1.6	★	**153373**	**QSMY-4-3**	**10**
6	4	2.3	★	**153374**	**QSMY-6-4**	**10**

1) Packaging unit per part

Push-in fittings QS ★ standard series

Ordering data

Push-in fitting QS

Male thread with external hex

R thread

G thread

Pneumatic connection		Nominal width [mm]		Part no.	Type	PU[1]
1 Male thread	2 Tubing O.D. [mm]					
R thread						
R1/8	4	3	★	153001	QS-1/8-4	10
	6	5	★	153002	QS-1/8-6	10
	8	6	★	153004	QS-1/8-8	10
	10	6	★	190643	QS-1/8-10	10
R1/4	4	3	★	190644	QS-1/4-4	10
	6	5	★	153003	QS-1/4-6	10
	8	7	★	153005	QS-1/4-8	10
	10	8.5	★	153007	QS-1/4-10	10
	12	8.5	★	164980	QS-1/4-12	10
R3/8	6	5	★	190645	QS-3/8-6	10
	8	7	★	153006	QS-3/8-8	10
	10	9	★	153008	QS-3/8-10	10
	12	11	★	153009	QS-3/8-12	10
	16	11	★	164957	QS-3/8-16	1
R1/2	10	9	★	190646	QS-1/2-10	1
	12	11	★	153010	QS-1/2-12	1
	16	13	★	153011	QS-1/2-16	1
G thread with sealing ring						
G1/8	4	3	★	186095	QS-G1/8-4	10
	6	5	★	186096	QS-G1/8-6	10
	8	6	★	186098	QS-G1/8-8	10
G1/4	6	5	★	186097	QS-G1/4-6	10
	8	7	★	186099	QS-G1/4-8	10
	10	8.5	★	186101	QS-G1/4-10	10
	12	8.5	★	186350	QS-G1/4-12	10
G3/8	8	7	★	186100	QS-G3/8-8	10
	10	9	★	186102	QS-G3/8-10	10
	12	11	★	186103	QS-G3/8-12	10
	16	11	★	186347	QS-G3/8-16	1
G1/2	12	11	★	186104	QS-G1/2-12	1
	16	13	★	186105	QS-G1/2-16	1

1) Packaging unit per part

Ordering data

Push-in fitting QS-...-I

Male thread with internal hex

Pneumatic connection		Nominal width		Part no.	Type	PU[1]
1 Male thread	2 Tubing O.D. [mm]	[mm]				
R thread						
R⅛	4	2.6	★	153012	QS-1/8-4-I	10
	6	4.2	★	153013	QS-1/8-6-I	10
	8	5.3	★	153015	QS-1/8-8-I	10
	10	5.3	★	190647	QS-1/8-10-I	10
R¼	6	4.2	★	153014	QS-1/4-6-I	10
	8	6.3	★	153016	QS-1/4-8-I	10
	10	6.3	★	153018	QS-1/4-10-I	10
	12	6.3	★	190649	QS-1/4-12-I	10
R⅜	8	6.3	★	153017	QS-3/8-8-I	10
	10	6.3	★	153019	QS-3/8-10-I	10
	12	8.4	★	153020	QS-3/8-12-I	10
R½	10	6.3	★	190648	QS-1/2-10-I	1
	12	8.4	★	153021	QS-1/2-12-I	1
G thread with sealing ring						
G⅛	4	2.6	★	186106	QS-G1/8-4-I	10
	6	4.2	★	186107	QS-G1/8-6-I	10
	8	5.3	★	186109	QS-G1/8-8-I	10
	10	5.3	★	132999	QS-G1/8-10-I	10
G¼	6	4.2	★	186108	QS-G1/4-6-I	10
	8	6.3	★	186110	QS-G1/4-8-I	10
	10	7.3	★	186112	QS-G1/4-10-I	10
G⅜	8	6.3	★	186111	QS-G3/8-8-I	10
	10	7.3	★	186113	QS-G3/8-10-I	10
	12	8.4	★	186114	QS-G3/8-12-I	10
G½	12	8.4	★	186115	QS-G1/2-12-I	1

Push-in connector QS

Pneumatic connection		Nominal width		Part no.	Type	PU[1]
1 Tubing O.D. [mm]	2 Tubing O.D. [mm]	[mm]				
4	4	2.6	★	153031	QS-4	10
6	6	4	★	153032	QS-6	10
8	8	5	★	153033	QS-8	10
10	10	6.7	★	153034	QS-10	10
12	12	8.7	★	153035	QS-12	10
16	16	13.7	★	153036	QS-16	1
Reducing						
6	4	2.6	★	153037	QS-6-4	10
8	4	2.3	★	130606	QS-8-4	10
	6	4	★	153038	QS-8-6	10
10	6	3.7	★	130607	QS-10-6	10
	8	5	★	153039	QS-10-8	10
12	8	5.2	★	130608	QS-12-8	10
	10	6.7	★	153040	QS-12-10	10

1) Packaging unit per part

Push-in fittings QS ★ standard series

Ordering data

Push-in connector QS-...H

with push-in sleeve

Pneumatic connection		Nominal width [mm]		Part no.	Type	PU[1]
1 Push-in sleeve	2 Tubing O.D. [mm]					
QS-6	4	2.5	★	**153041**	**QS-6H-4**	**10**
QS-8	4	2.4	★	**130622**	**QS-8H-4**	**10**
	6	3.8	★	**153042**	**QS-8H-6**	**10**
QS-10	6	3.8	★	**130623**	**QS-10H-6**	**10**
	8	5.4	★	**153043**	**QS-10H-8**	**10**
QS-12	6	3.8	★	**132981**	**QS-12H-6**	**10**
	8	5.4	★	**130624**	**QS-12H-8**	**10**
	10	6.3	★	**153044**	**QS-12H-10**	**10**

Push-in bulkhead connector QSS

With fixed collar

Pneumatic connection		Nominal width [mm]		Part no.	Type	PU[1]
1 Tubing O.D. [mm]	2 Tubing O.D. [mm]					
4	4	3	★	**153157**	**QSS-4**	**10**
6	6	5	★	**153158**	**QSS-6**	**10**
8	8	7	★	**153159**	**QSS-8**	**10**
10	10	9	★	**153160**	**QSS-10**	**10**
12	12	11	★	**153161**	**QSS-12**	**10**
With fixed collar						
4	4	2.6		**193950**	**QSS-4-F**	**10**
6	6	4		**193951**	**QSS-6-F**	**10**
8	8	5.5	★	**130642**	**QSS-8-F**	**10**
10	10	6.5	★	**130643**	**QSS-10-F**	**10**
12	12	7.5	★	**130644**	**QSS-12-F**	**10**

1) Packaging unit per part

Ordering data

Push-in fitting QSF

Female thread with external hex

Pneumatic connection		Nominal width		Part no.	Type	PU[1]
1 Female thread	2 Tubing O.D. [mm]	[mm]				
G1/8	4	3	★	153022	QSF-1/8-4-B	10
	6	5	★	153023	QSF-1/8-6-B	10
	8	7	★	153025	QSF-1/8-8-B	10
G1/4	4	3	★	190650	QSF-1/4-4-B	10
	6	5	★	153024	QSF-1/4-6-B	10
	8	7	★	153026	QSF-1/4-8-B	10
	10	9	★	153028	QSF-1/4-10-B	10
	12	11	★	190651	QSF-1/4-12-B	10
G3/8	6	5	★	190652	QSF-3/8-6-B	10
	8	7	★	153027	QSF-3/8-8-B	10
	10	9	★	153029	QSF-3/8-10-B	10
	12	11	★	153030	QSF-3/8-12-B	10
G1/2	12	11	★	190653	QSF-1/2-12-B	1
	16	15	★	190654	QSF-1/2-16-B	1

Push-in cap QSC

Pneumatic connection		Part no.	Type	PU[1]
1 Tubing O.D. [mm]				
4	★	153262	QSC-4	10
6	★	153263	QSC-6	10
8	★	153264	QSC-8	10
10	★	153265	QSC-10	10
12	★	153266	QSC-12	10

Blanking plug QSC-...H

Pneumatic connection		Part no.	Type	PU[1]
1 Push-in sleeve				
QS-4	★	153267	QSC-4H	10
QS-6	★	153268	QSC-6H	10
QS-8	★	153269	QSC-8H	10
QS-10	★	153270	QSC-10H	10
QS-12	★	153271	QSC-12H	10
QS-16	★	153272	QSC-16H	1

1) Packaging unit per part

Push-in fittings QS ★ standard series

Ordering data

Push-in L-fitting QSL

Male thread with external hex, rotatable

R thread

G thread

Pneumatic connection		Nominal width		Part no.	Type	PU[1]
1 Male thread	2 Tubing O.D. [mm]	[mm]				
R thread						
R⅛	4	2.8	★	**153045**	**QSL-1/8-4**	**10**
	6	4.2	★	**153046**	**QSL-1/8-6**	**10**
	8	6	★	**153048**	**QSL-1/8-8**	**10**
	10	6	★	**190658**	**QSL-1/8-10**	**10**
R¼	4	2.8	★	**190659**	**QSL-1/4-4**	**10**
	6	4.3	★	**153047**	**QSL-1/4-6**	**10**
	8	6.7	★	**153049**	**QSL-1/4-8**	**10**
	10	8	★	**153051**	**QSL-1/4-10**	**10**
	12	8	★	**164981**	**QSL-1/4-12**	**10**
R⅜	6	4.3	★	**190660**	**QSL-3/8-6**	**10**
	8	6.7	★	**153050**	**QSL-3/8-8**	**10**
	10	8.3	★	**153052**	**QSL-3/8-10**	**10**
	12	10	★	**153053**	**QSL-3/8-12**	**10**
	16	11	★	**164958**	**QSL-3/8-16**	**1**
R½	10	8.3	★	**190661**	**QSL-1/2-10**	**1**
	12	10.3	★	**153054**	**QSL-1/2-12**	**1**
	16	13	★	**153055**	**QSL-1/2-16**	**1**
G thread with sealing ring						
G⅛	4	2.8	★	**186116**	**QSL-G1/8-4**	**10**
	6	4.2	★	**186117**	**QSL-G1/8-6**	**10**
	8	6	★	**186119**	**QSL-G1/8-8**	**10**
G¼	6	4.3	★	**186118**	**QSL-G1/4-6**	**10**
	8	6.7	★	**186120**	**QSL-G1/4-8**	**10**
	10	8	★	**186122**	**QSL-G1/4-10**	**10**
	12	8	★	**186351**	**QSL-G1/4-12**	**10**
G⅜	8	6.7	★	**186121**	**QSL-G3/8-8**	**10**
	10	8.3	★	**186123**	**QSL-G3/8-10**	**10**
	12	10	★	**186124**	**QSL-G3/8-12**	**10**
	16	11	★	**186348**	**QSL-G3/8-16**	**1**
G½	12	10.3	★	**186125**	**QSL-G1/2-12**	**1**
	16	13	★	**186126**	**QSL-G1/2-16**	**1**

1) Packaging unit per part

Ordering data

Push-in L-fitting, long QSLL

Male thread with external hex, rotatable

R thread

Pneumatic connection		Nominal width [mm]		Part no.	Type	PU[1]
1 Male thread	2 Tubing O.D. [mm]					
R thread						
R⅛	4	2.8	★	**153076**	**QSLL-1/8-4**	**10**
	6	4.3	★	**153077**	**QSLL-1/8-6**	**10**
	8	6	★	**153079**	**QSLL-1/8-8**	**10**
R¼	4	2.8	★	**190662**	**QSLL-1/4-4**	**10**
	6	4.3	★	**153078**	**QSLL-1/4-6**	**10**
	8	6.7	★	**153080**	**QSLL-1/4-8**	**10**
	10	8	★	**153082**	**QSLL-1/4-10**	**10**
R⅜	6	4.3	★	**190663**	**QSLL-3/8-6**	**10**
	8	6.7	★	**153081**	**QSLL-3/8-8**	**10**
	10	8.3	★	**153083**	**QSLL-3/8-10**	**10**
	12	10	★	**153084**	**QSLL-3/8-12**	**10**
R½	10	8.3	★	**190664**	**QSLL-1/2-10**	**1**
	12	10.3	★	**153085**	**QSLL-1/2-12**	**1**
G thread with sealing ring						
G⅛	4	2.8		**186127**	**QSLL-G1/8-4**	**10**
	6	4.3		**186128**	**QSLL-G1/8-6**	**10**
	8	6		**186130**	**QSLL-G1/8-8**	**10**
G¼	6	4.3		**186129**	**QSLL-G1/4-6**	**10**
	8	6.7		**186131**	**QSLL-G1/4-8**	**10**
	10	8		**186133**	**QSLL-G1/4-10**	**10**
	12	8		**132596**	**QSLL-G1/4-12**	**1**
G⅜	8	6.7		**186132**	**QSLL-G3/8-8**	**10**
	10	8.3		**186134**	**QSLL-G3/8-10**	**10**
	12	10		**186135**	**QSLL-G3/8-12**	**10**
G½	12	10.3		**186136**	**QSLL-G1/2-12**	**1**
	16	13		**190665**	**QSLL-G1/2-16**	**1**

1) Packaging unit per part

Push-in fittings QS ★ standard series

Ordering data

Push-in L-connector QSL

Pneumatic connection 1 Tubing O.D. [mm]	Pneumatic connection 2 Tubing O.D. [mm]	Nominal width [mm]		Part no.	Type	PU[1]
4	4	2.3	★	153070	QSL-4	10
6	6	3.6	★	153071	QSL-6	10
8	8	4.6	★	153072	QSL-8	10
10	10	6.2	★	153073	QSL-10	10
12	12	7.7	★	153074	QSL-12	10
16	16	10.8	★	153075	QSL-16	1

Push-in L-connector QSL-...H

with push-in sleeve

Long push-in sleeve

Pneumatic connection 1 Push-in sleeve	Pneumatic connection 2 Tubing O.D. [mm]	Nominal width [mm]		Part no.	Type	PU[1]
QS-4	4	2	★	153056	QSL-4H	10
QS-6	6	3.2	★	153057	QSL-6H	10
QS-8	8	4.7	★	153058	QSL-8H	10
QS-10	10	5.7	★	153059	QSL-10H	10
QS-12	12	6.8	★	153060	QSL-12H	10
Reducing						
QS-6	4	2.4	★	153061	QSL-6H-4	10
QS-8	6	3.5	★	153062	QSL-8H-6	10
QS-10	8	4.9	★	153063	QSL-10H-8	10
QS-12	10	6.1	★	153064	QSL-12H-10	10
Long push-in sleeve						
QS-4	4	2	★	153065	QSL-4HL	10
QS-6	6	3.1	★	153066	QSL-6HL	10
QS-8	8	4.5	★	153067	QSL-8HL	10
QS-10	10	5.6	★	153068	QSL-10HL	10
QS-12	12	6.7	★	153069	QSL-12HL	10

Push-in L-fitting QSLF

Female thread with external hex

Pneumatic connection 1 Female thread	Pneumatic connection 2 Tubing O.D. [mm]	Nominal width [mm]		Part no.	Type	PU[1]
G thread						
G1⁄8	4	2.8	★	153273	QSLF-1/8-4-B	10
	6	4.2	★	153274	QSLF-1/8-6-B	10
	8	6	★	153276	QSLF-1/8-8-B	10
G1⁄4	6	4.3	★	153275	QSLF-1/4-6-B	10
	8	6.7	★	153277	QSLF-1/4-8-B	10
	10	8	★	153279	QSLF-1/4-10-B	10
G3⁄8	8	6.7	★	153278	QSLF-3/8-8-B	10
	10	8.3	★	153280	QSLF-3/8-10-B	10

1) Packaging unit per part

Ordering data

Push-in L-fitting QSLV

Male thread with external hex, rotatable

M thread

R thread

G thread

Pneumatic connection		Nominal width		Part no.	Type	PU[1]
1 Male thread	2 Tubing O.D. [mm]	[mm]				
Metric thread with sealing ring						
M5	6	1.6	★	**190666**	**QSLV-M5-6**	**10**
R thread						
R⅛	4	2.4	★	**153086**	**QSLV-1/8-4**	**10**
	6	3.7	★	**153087**	**QSLV-1/8-6**	**10**
	8	4.4	★	**153089**	**QSLV-1/8-8**	**10**
R¼	6	3.8	★	**153088**	**QSLV-1/4-6**	**10**
	8	5	★	**153090**	**QSLV-1/4-8**	**10**
	10	5.4	★	**153092**	**QSLV-1/4-10**	**10**
R⅜	8	5.2	★	**153091**	**QSLV-3/8-8**	**10**
	10	6.3	★	**153093**	**QSLV-3/8-10**	**10**
	12	7.1	★	**153094**	**QSLV-3/8-12**	**10**
R½	12	8	★	**153095**	**QSLV-1/2-12**	**1**
	16	8.9	★	**153096**	**QSLV-1/2-16**	**1**
G thread with sealing ring						
G⅛	4	2.3	★	**186137**	**QSLV-G1/8-4**	**10**
	6	3.5	★	**186138**	**QSLV-G1/8-6**	**10**
	8	4	★	**186140**	**QSLV-G1/8-8**	**10**
G¼	6	3.7	★	**186139**	**QSLV-G1/4-6**	**10**
	8	4.9	★	**186141**	**QSLV-G1/4-8**	**10**
	10	5.3	★	**186143**	**QSLV-G1/4-10**	**10**
G⅜	8	5.4	★	**186142**	**QSLV-G3/8-8**	**10**
	10	6.4	★	**186144**	**QSLV-G3/8-10**	**10**
	12	6.4	★	**186145**	**QSLV-G3/8-12**	**10**
G½	12	7	★	**186146**	**QSLV-G1/2-12**	**1**
	16	8.1	★	**186147**	**QSLV-G1/2-16**	**1**

1) Packaging unit per part

Push-in fittings QS ★ standard series

Ordering data

Push-in L-fitting QSLV-...-I

Male thread with internal hex, rotatable

Pneumatic connection		Nominal width [mm]	Part no.	Type	PU[1]
1 Male thread	2 Tubing O.D. [mm]				
R thread					
R1/8	6	3	**153097**	**QSLV-1/8-6-I**	**10**
	8	4.2	**153099**	**QSLV-1/8-8-I**	**10**
R1/4	6	3.1	**153098**	**QSLV-1/4-6-I**	**10**
	8	4	**153100**	**QSLV-1/4-8-I**	**10**
	10	5.4	**153102**	**QSLV-1/4-10-I**	**10**
R3/8	8	4.2	**153101**	**QSLV-3/8-8-I**	**10**
	10	5.4	**153103**	**QSLV-3/8-10-I**	**10**
	12	6.9	**153104**	**QSLV-3/8-12-I**	**10**
R1/2	12	6.4	**153105**	**QSLV-1/2-12-I**	**1**
G thread with sealing ring					
G1/8	6	3	**186148**	**QSLV-G1/8-6-I**	**10**
	8	4.2	**186150**	**QSLV-G1/8-8-I**	**10**
G1/4	6	3.1	**186149**	**QSLV-G1/4-6-I**	**10**
	8	4	**186151**	**QSLV-G1/4-8-I**	**10**
	10	5.4	**186153**	**QSLV-G1/4-10-I**	**10**
G3/8	8	4.2	**186152**	**QSLV-G3/8-8-I**	**10**
	10	5.4	**186154**	**QSLV-G3/8-10-I**	**10**
	12	6.9	**186155**	**QSLV-G3/8-12-I**	**10**
G1/2	12	6.4	**186156**	**QSLV-G1/2-12-I**	**1**

1) Packaging unit per part

Ordering data

Push-in T-fitting QST

Male thread with external hex, rotatable

R thread

G thread

Pneumatic connection		Nominal width		Part no.	Type	PU[1]
1 Male thread	2 Tubing O.D. [mm]	[mm]				
R thread						
R1/8	4	2.8	★	**153106**	**QST-1/8-4**	**10**
	6	4.2	★	**153107**	**QST-1/8-6**	**10**
	8	6	★	**153109**	**QST-1/8-8**	**10**
	10	6	★	**190667**	**QST-1/8-10**	**10**
R1/4	4	2.8	★	**190668**	**QST-1/4-4**	**10**
	6	4.3	★	**153108**	**QST-1/4-6**	**10**
	8	6.7	★	**153110**	**QST-1/4-8**	**10**
	10	8	★	**153112**	**QST-1/4-10**	**10**
	12	8	★	**190669**	**QST-1/4-12**	**10**
R3/8	6	4.3	★	**190670**	**QST-3/8-6**	**10**
	8	6.7	★	**153111**	**QST-3/8-8**	**10**
	10	8.3	★	**153113**	**QST-3/8-10**	**10**
	12	10	★	**153114**	**QST-3/8-12**	**10**
	16	11	★	**164959**	**QST-3/8-16**	**1**
R1/2	10	8.3	★	**190672**	**QST-1/2-10**	**1**
	12	10.3	★	**153115**	**QST-1/2-12**	**1**
	16	13	★	**153116**	**QST-1/2-16**	**1**
G thread with sealing ring						
G1/8	4	2.8		**186157**	**QST-G1/8-4**	**10**
	6	4.2		**186158**	**QST-G1/8-6**	**10**
	8	6		**186160**	**QST-G1/8-8**	**10**
G1/4	6	4.3		**186159**	**QST-G1/4-6**	**10**
	8	6.7		**186161**	**QST-G1/4-8**	**10**
	10	8		**186163**	**QST-G1/4-10**	**10**
	12	8		**132597**	**QST-G1/4-12**	**1**
G3/8	8	6.7		**186162**	**QST-G3/8-8**	**10**
	10	8.3		**186164**	**QST-G3/8-10**	**10**
	12	10		**186165**	**QST-G3/8-12**	**10**
	16	11		**186349**	**QST-G3/8-16**	**1**
G1/2	12	10.3		**186166**	**QST-G1/2-12**	**1**
	16	13		**186167**	**QST-G1/2-16**	**1**

1) Packaging unit per part

Push-in fittings QS ★ standard series

Ordering data

Push-in T-connector QST

Pneumatic connection 1 Tubing O.D. [mm]	Pneumatic connection 2 Tubing O.D. [mm]	Nominal width [mm]		Part no.	Type	PU[1]
4	4	2.6	★	**153128**	**QST-4**	**10**
6	6	4	★	**153129**	**QST-6**	**10**
8	8	5	★	**153130**	**QST-8**	**10**
10	10	6.7	★	**153131**	**QST-10**	**10**
12	12	8.7	★	**153132**	**QST-12**	**10**
16	16	10.7	★	**153133**	**QST-16**	**1**
Reducing						
6	4	2.3	★	**153134**	**QST-6-4**	**10**
8	4	2.3	★	**130613**	**QST-8-4**	**10**
8	6	3.5	★	**153135**	**QST-8-6**	**10**
10	6	3.7	★	**130614**	**QST-10-6**	**10**
10	8	4.9	★	**153136**	**QST-10-8**	**10**
12	8	5.1	★	**130615**	**QST-12-8**	**10**
12	10	6.1	★	**153137**	**QST-12-10**	**10**
16	12	7.6	★	**130616**	**QST-16-12**	**1**

Push-in T-fitting QSTF

Female and male thread with external hex, rotatable

R thread

G thread

Pneumatic connection 1 Male thread	Pneumatic connection 2 Female thread	Tubing O.D. [mm]	Nominal width [mm]	Part no.	Type	PU[1]
R thread						
R⅛	G⅛	4	2.5	**153182**	**QSTF-1/8-4-B**	**1**
		6	3.3	**153183**	**QSTF-1/8-6-B**	**1**
		8	3.6	**153185**	**QSTF-1/8-8-B**	**1**
R¼	G¼	6	3.6	**153184**	**QSTF-1/4-6-B**	**1**
		8	4.4	**153186**	**QSTF-1/4-8-B**	**1**
		10	4.4	**153188**	**QSTF-1/4-10-B**	**1**
R⅜	G⅜	8	4.9	**153187**	**QSTF-3/8-8-B**	**1**
		10	5.6	**153189**	**QSTF-3/8-10-B**	**1**
		12	6	**153190**	**QSTF-3/8-12-B**	**1**
R½	G½	12	7.4	**153191**	**QSTF-1/2-12-B**	**1**
G thread with sealing ring						
G⅛	G⅛	4	2.4	**186199**	**QSTF-G1/8-4**	**1**
		6	3.2	**186200**	**QSTF-G1/8-6**	**1**
		8	3.7	**186202**	**QSTF-G1/8-8**	**1**
G¼	G¼	6	3.7	**186201**	**QSTF-G1/4-6**	**1**
		8	4.4	**186203**	**QSTF-G1/4-8**	**1**
		10	4.9	**186205**	**QSTF-G1/4-10**	**1**
G⅜	G⅜	8	4.9	**186204**	**QSTF-G3/8-8**	**1**
		10	5.8	**186206**	**QSTF-G3/8-10**	**1**
		12	6	**186207**	**QSTF-G3/8-12**	**1**
G½	G½	12	7	**186208**	**QSTF-G1/2-12**	**1**

1) Packaging unit per part

Ordering data

Push-in T-fitting QSTL

Male thread with external hex, rotatable

Pneumatic connection		Nominal width		Part no.	Type	PU[1]
1 Male thread	2 Tubing O.D. [mm]	[mm]				
R thread						
R⅛	4	2.8	★	153117	QSTL-1/8-4	10
	6	4.3	★	153118	QSTL-1/8-6	10
	8	6	★	153120	QSTL-1/8-8	10
R¼	6	4.3	★	153119	QSTL-1/4-6	10
	8	6.7	★	153121	QSTL-1/4-8	10
	10	8	★	153123	QSTL-1/4-10	10
R⅜	8	6.7	★	153122	QSTL-3/8-8	10
	10	8.3	★	153124	QSTL-3/8-10	10
	12	10	★	153125	QSTL-3/8-12	10
R½	12	10.3	★	153126	QSTL-1/2-12	1
	16	13	★	153127	QSTL-1/2-16	1
G thread with sealing ring						
G⅛	4	2.8		186168	QSTL-G1/8-4	10
	6	4.3		186169	QSTL-G1/8-6	10
	8	6		186171	QSTL-G1/8-8	10
G¼	6	4.3		186170	QSTL-G1/4-6	10
	8	6.7		186172	QSTL-G1/4-8	10
	10	8		186174	QSTL-G1/4-10	10
G⅜	8	6.7		186173	QSTL-G3/8-8	10
	10	8.3		186175	QSTL-G3/8-10	10
	12	10		186176	QSTL-G3/8-12	10
G½	12	10.3		186177	QSTL-G1/2-12	1
	16	13		186178	QSTL-G1/2-16	1

Push-in fitting QSW

Male thread with external hex, rotatable

Pneumatic connection		Nominal width	Part no.	Type	PU[1]
1 Male thread	2 Tubing O.D. [mm]	[mm]			
R thread					
R⅛	4	2.5	130596	QSW-1/8-4	10
	6	3.3	130597	QSW-1/8-6	10
	8	6	130598	QSW-1/8-8	10
R¼	6	3.3	130599	QSW-1/4-6	10
	8	6.7	130600	QSW-1/4-8	10
	10	8	130601	QSW-1/4-10	10
R⅜	10	8.3	130602	QSW-3/8-10	10
	12	9.5	130603	QSW-3/8-12	10
R½	12	10.3	130604	QSW-1/2-12	1
	16	13	130605	QSW-1/2-16	1

1) Packaging unit per part

Push-in fittings QS ★ standard series

Ordering data

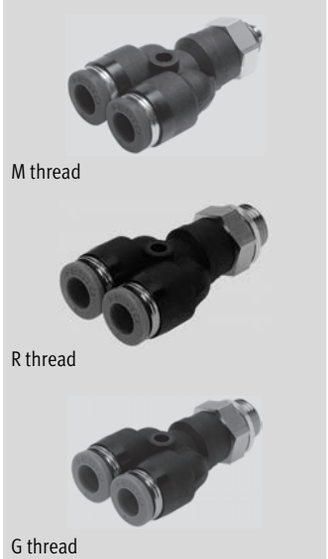
Push-in connector QSW-...HL

with push-in sleeve

Pneumatic connection		Nominal width [mm]		Part no.	Type	PU[1]
1 Push-in sleeve	2 Tubing O.D. [mm]					
QS-4	4	2		**130617**	**QSW-4HL**	**10**
QS-6	6	2.7		**130618**	**QSW-6HL**	**10**
QS-8	8	5		**130619**	**QSW-8HL**	**10**
QS-10	10	6.3		**130620**	**QSW-10HL**	**10**
QS-12	12	6.9		**130621**	**QSW-12HL**	**10**

Push-in Y-fitting QSY

Male thread with external hex, rotatable



M thread

R thread

G thread

Pneumatic connection		Nominal width [mm]		Part no.	Type	PU[1]
1 Male thread	2 Tubing O.D. [mm]					
Metric thread with sealing ring						
M5	4	2.4	★	**190673**	**QSY-M5-4**	**10**
	6	2.4	★	**190674**	**QSY-M5-6**	**10**
R thread						
R1/8	4	3.1	★	**153138**	**QSY-1/8-4**	**10**
	6	4.2	★	**153139**	**QSY-1/8-6**	**10**
	8	5.9	★	**153141**	**QSY-1/8-8**	**10**
R1/4	4	3.3	★	**190675**	**QSY-1/4-4**	**10**
	6	4.8	★	**153140**	**QSY-1/4-6**	**10**
	8	6.2	★	**153142**	**QSY-1/4-8**	**10**
	10	7.2	★	**153144**	**QSY-1/4-10**	**10**
R3/8	8	6.6	★	**153143**	**QSY-3/8-8**	**10**
	10	7.4	★	**153145**	**QSY-3/8-10**	**10**
	12	8.4	★	**153146**	**QSY-3/8-12**	**10**
R1/2	10	7.8		**133196**	**QSY-1/2-10**	**1**
	12	8.3	★	**153147**	**QSY-1/2-12**	**1**
G thread with sealing ring						
G1/8	4	3.1		**186179**	**QSY-G1/8-4**	**10**
	6	4.2		**186180**	**QSY-G1/8-6**	**10**
	8	5.9		**186182**	**QSY-G1/8-8**	**10**
G1/4	6	4.8		**186181**	**QSY-G1/4-6**	**10**
	8	6.2		**186183**	**QSY-G1/4-8**	**10**
	10	7.2		**186185**	**QSY-G1/4-10**	**10**
G3/8	8	6.6		**186184**	**QSY-G3/8-8**	**10**
	10	7.4		**186186**	**QSY-G3/8-10**	**10**
	12	8.4		**186187**	**QSY-G3/8-12**	**10**
G1/2	12	8.3		**186188**	**QSY-G1/2-12**	**1**

1) Packaging unit per part

Ordering data

Push-in Y-connector QSY

Reducing

Pneumatic connection 1 Tubing O.D. [mm]	Pneumatic connection 2 Tubing O.D. [mm]	Nominal width [mm]		Part no.	Type	PU[1]
4	4	2.3	★	**153148**	**QSY-4**	**10**
6	6	3.6	★	**153149**	**QSY-6**	**10**
8	8	4.6	★	**153150**	**QSY-8**	**10**
10	10	5.9	★	**153151**	**QSY-10**	**10**
12	12	7	★	**153152**	**QSY-12**	**10**
16	16	8.5	★	**130609**	**QSY-16**	**1**
2 reducing outlets						
6	4	2.3	★	**153153**	**QSY-6-4**	**10**
8	4	1.7	★	**130610**	**QSY-8-4**	**10**
8	6	3.2	★	**153154**	**QSY-8-6**	**10**
10	6	3.3	★	**130611**	**QSY-10-6**	**10**
10	8	4.5	★	**153155**	**QSY-10-8**	**10**
12	8	4.5	★	**130612**	**QSY-12-8**	**10**
12	10	5.8	★	**153156**	**QSY-12-10**	**10**
16	12	7	★	**190708**	**QSY-16-12**	**1**

Push-in Y-connector QSY-...H

with push-in sleeve

Pneumatic connection 1 Push-in sleeve	Pneumatic connection 2 Tubing O.D. [mm]	Nominal width [mm]	Part no.	Type	PU[1]
QS-4	4	1.6	**130628**	**QSY-4H**	**10**
QS-6	6	3.1	**133145**	**QSY-6H-B**	**10**
QS-8	8	4.6	**133146**	**QSY-8H-B**	**10**
QS-10	10	5.9	**133148**	**QSY-10H-B**	**10**
QS-12	12	7.3	**133150**	**QSY-12H-B**	**10**
Reducing					
QS-6	4	2.3	**130633**	**QSY-6H-4**	**10**
QS-8	6	3.6	**133147**	**QSY-8H-6-B**	**10**
QS-10	8	4.6	**133149**	**QSY-10H-8-B**	**10**
QS-12	10	5.9	**133151**	**QSY-12H-10-B**	**10**

1) Packaging unit per part

Push-in fittings QS ★ standard series

Ordering data

Push-in Y-fitting QSYL

Male thread with external hex, rotatable

R thread

G thread

Pneumatic connection		Nominal width [mm]		Part no.	Type	PU[1]
1 Male thread	2 Tubing O.D. [mm]					
R thread						
R1/8	4	3.9	★	**153172**	**QSYL-1/8-4**	**1**
	6	4.2	★	**153173**	**QSYL-1/8-6**	**1**
	8	5.7	★	**153175**	**QSYL-1/8-8**	**1**
R1/4	6	5.3	★	**153174**	**QSYL-1/4-6**	**1**
	8	7.3	★	**153176**	**QSYL-1/4-8**	**1**
	10	8	★	**153178**	**QSYL-1/4-10**	**1**
R3/8	8	7.3	★	**153177**	**QSYL-3/8-8**	**1**
	10	9.2	★	**153179**	**QSYL-3/8-10**	**1**
	12	9.7	★	**153180**	**QSYL-3/8-12**	**1**
R1/2	12	10.6	★	**153181**	**QSYL-1/2-12**	**1**
G thread with sealing ring						
G1/8	4	3.9		**186189**	**QSYL-G1/8-4**	**1**
	6	4.2		**186190**	**QSYL-G1/8-6**	**1**
	8	5.7		**186192**	**QSYL-G1/8-8**	**1**
G1/4	6	5.3		**186191**	**QSYL-G1/4-6**	**1**
	8	7.3		**186193**	**QSYL-G1/4-8**	**1**
	10	8		**186195**	**QSYL-G1/4-10**	**1**
G3/8	8	7.3		**186194**	**QSYL-G3/8-8**	**1**
	10	9.2		**186196**	**QSYL-G3/8-10**	**1**
	12	9.7		**186197**	**QSYL-G3/8-12**	**1**
G1/2	12	10.6		**186198**	**QSYL-G1/2-12**	**1**

1) Packaging unit per part

The multi-talented robust metal fitting

+ High temperature resistance
+ Suitable for use with food and FDA compliant
+ Resistance to cleaning agents makes hygiene easier

Push-in fittings

NPQH

Push-in fittings

NPQH

Overview, configuration and ordering
➔ **www.festo.com/catalogue/npqh**

Additional information, support and user documentation
➔ **www.festo.com/sp/npqh**

+ All metal push-in fitting made of chemically nickel-plated brass
+ High corrosion and chemical resistance
+ FDA compliant for the food and packaging industry
+ For pneumatic applications with a temperature range up to 150°C and a pressure range up to 20 bar

Product range overview

Type	Version	Design	Pneumatic connection 1				Pneumatic connection 2		➔ Page/ online
			M thread	G thread	Tubing O.D.	Push-in sleeve	Tubing O.D.	Push-in sleeve	
NPQH-D	Push-in fitting	Straight	■	■	–	–	■	–	1470
	Push-in fitting		■	■	–	–	–	■	1471
	Push-in connector		–	–	■	–	■	–	
	Push-in connector		–	–	■	–	–	■	
	Push-in sleeve		–	–	–	■	–	■	1472
NPQH-DK	Push-in fitting		■	■	–	–	■	–	
NPQH-H	Push-in bulkhead fitting		–	■	–	–	■	–	1473
	Push-in bulkhead connector		–	–	■	–	■	–	
NPQH-P	Blanking plug		–	–	–	■	–	–	
NPQH-BK	Plug screw		■	■	–	–	–	–	
NPQH-L	Push-in fitting	L-shape	■	■	–	–	■	–	1474
	Push-in connector		–	–	■	–	■	–	
NPQH-T	Push-in fitting	T-shape	■	■	–	–	■	–	1475
	Push-in connector		–	–	■	–	■	–	
NPQH-Y	Push-in connector	Y-shape	–	–	■	–	■	–	

Note

When using a push-in sleeve as a quick coupling plug, the only way to guarantee an optimal and secure connection is by using products from the same series.

In other words, a push-in sleeve NPQH may only be used with a push-in connector NPQH. The groove of the push-in sleeve must engage securely in the counterpart.

Data sheet

Operating conditions		
Operating medium		Compressed air to ISO 8573-1:2010 [7:–:–]
		Water as per manufacturer's declaration[1)]
Note on operating/pilot medium		Operation with lubricated medium possible
Operating pressure for entire temperature range	[bar]	–0.95 ... +20
Ambient temperature	[°C]	0 ... +150
Food-safe[1)]		See supplementary material information

1) Additional information www.festo.com/sp ➔ Certificates.

Materials	
Housing	Nickel-plated brass
Releasing ring	Nickel-plated brass
Tube retaining claw	High-alloy stainless steel
Nut	Nickel-plated brass
Tubing seal	FPM
Threaded seal	FPM

Push-in fittings NPQH

Ordering data

Push-in fitting NPQH-D

Male thread with internal/external hex

Pneumatic connection		Nominal width [mm]	Part no.	Type	PU[1]
1 Male thread	2 Tubing O.D. [mm]				
Metric thread with sealing ring					
M5	4	2.5	**578334**	**NPQH-D-M5-Q4-P10**	**10**
	6	2.5	**578335**	**NPQH-D-M5-Q6-P10**	**10**
M7	4	3	**578336**	**NPQH-D-M7-Q4-P10**	**10**
	6	3	**578337**	**NPQH-D-M7-Q6-P10**	**10**
G thread with sealing ring					
G1/8	4	3	**578338**	**NPQH-D-G18-Q4-P10**	**10**
	6	4	**578339**	**NPQH-D-G18-Q6-P10**	**10**
	8	6	**578340**	**NPQH-D-G18-Q8-P10**	**10**
G1/4	6	4	**578341**	**NPQH-D-G14-Q6-P10**	**10**
	8	6	**578342**	**NPQH-D-G14-Q8-P10**	**10**
	10	8	**578343**	**NPQH-D-G14-Q10-P10**	**10**
	12	8	**578344**	**NPQH-D-G14-Q12-P10**	**10**
G3/8	8	6	**578345**	**NPQH-D-G38-Q8-P10**	**10**
	10	8	**578346**	**NPQH-D-G38-Q10-P10**	**10**
	12	10	**578347**	**NPQH-D-G38-Q12-P10**	**10**
	14	10	**578348**	**NPQH-D-G38-Q14-P10**	**10**
G1/2	10	8	**578349**	**NPQH-D-G12-Q10**	**1**
	12	10	**578350**	**NPQH-D-G12-Q12**	**1**
	14	12	**578351**	**NPQH-D-G12-Q14**	**1**

Push-in fitting NPQH-D

Female thread with external hex

Pneumatic connection		Nominal width [mm]	Part no.	Type	PU[1]
1 Female thread	2 Tubing O.D. [mm]				
G1/8	4	3	**578352**	**NPQH-D-G18F-Q4-P10**	**10**
	6	5	**578353**	**NPQH-D-G18F-Q6-P10**	**10**
	8	7	**578354**	**NPQH-D-G18F-Q8-P10**	**10**
G1/4	4	3	**578355**	**NPQH-D-G14F-Q4-P10**	**10**
	6	5	**578356**	**NPQH-D-G14F-Q6-P10**	**10**
	8	7	**578357**	**NPQH-D-G14F-Q8-P10**	**10**

1) Packaging unit per part

Ordering data

Push-in fitting NPQH-D

with push-in sleeve

Pneumatic connection		Nominal width [mm]	Part no.	Type	PU[1]
1 Male thread	2 Push-in sleeve				
Metric thread with sealing ring					
M5	QS-4	2.5	**578358**	**NPQH-D-M5-S4-P10**	**10**
	QS-6	2.5	**578359**	**NPQH-D-M5-S6-P10**	**10**
G thread with sealing ring					
G1/8	QS-4	2.5	**578360**	**NPQH-D-G18-S4-P10**	**10**
	QS-6	4	**578361**	**NPQH-D-G18-S6-P10**	**10**
	QS-8	6	**578362**	**NPQH-D-G18-S8-P10**	**10**
G1/4	QS-6	4	**578363**	**NPQH-D-G14-S6-P10**	**10**
	QS-8	6	**578364**	**NPQH-D-G14-S8-P10**	**10**
	QS-10	8	**578365**	**NPQH-D-G14-S10-P10**	**10**
	QS-12	8.5	**578366**	**NPQH-D-G14-S12-P10**	**10**
G3/8	QS-10	8	**578367**	**NPQH-D-G38-S10-P10**	**10**
	QS-12	10	**578368**	**NPQH-D-G38-S12-P10**	**10**
G1/2	QS-12	10	**578369**	**NPQH-D-G12-S12**	**1**

Push-in connector NPQH-D

Pneumatic connection		Nominal width [mm]	Part no.	Type	PU[1]
1 Tubing O.D. [mm]	2 Tubing O.D. [mm]				
4	4	3	**578323**	**NPQH-D-Q4-E-P10**	**10**
6	6	5	**578324**	**NPQH-D-Q6-E-P10**	**10**
8	8	7	**578325**	**NPQH-D-Q8-E-P10**	**10**
10	10	9	**578326**	**NPQH-D-Q10-E-P10**	**10**
12	12	11	**578327**	**NPQH-D-Q12-E-P10**	**10**
14	14	13	**578328**	**NPQH-D-Q14-E-P10**	**10**
Reducing					
6	4	3	**578329**	**NPQH-D-Q6-Q4-P10**	**10**
8	6	5	**578330**	**NPQH-D-Q8-Q6-P10**	**10**
12	8	7	**578331**	**NPQH-D-Q12-Q8-P10**	**10**
14	10	9	**578332**	**NPQH-D-Q14-Q10-P10**	**10**
14	12	11	**578333**	**NPQH-D-Q14-Q12-P10**	**10**

Push-in connector NPQH-D

with push-in sleeve

Pneumatic connection		Nominal width [mm]	Part no.	Type	PU[1]
1 Tubing O.D. [mm]	2 Push-in sleeve				
4	QS-6	3	**578304**	**NPQH-D-S6-Q4-P10**	**10**
	QS-8	3.5	**578305**	**NPQH-D-S8-Q4-P10**	**10**
	QS-10	3.5	**578307**	**NPQH-D-S10-Q4-P10**	**10**
6	QS-8	5	**578306**	**NPQH-D-S8-Q6-P10**	**10**
	QS-10	5.5	**578308**	**NPQH-D-S10-Q6-P10**	**10**
	QS-12	5.5	**578310**	**NPQH-D-S12-Q6-P10**	**10**
	QS-14	5	**578313**	**NPQH-D-S14-Q6-P10**	**10**
8	QS-10	7	**578309**	**NPQH-D-S10-Q8-P10**	**10**
	QS-12	7	**578311**	**NPQH-D-S12-Q8-P10**	**10**
	QS-14	7	**578314**	**NPQH-D-S14-Q8-P10**	**10**
10	QS-12	9	**578312**	**NPQH-D-S12-Q10-P10**	**10**
	QS-14	9	**578315**	**NPQH-D-S14-Q10-P10**	**10**
12	QS-14	11	**578316**	**NPQH-D-S14-Q12-P10**	**10**

1) Packaging unit per part

Push-in fittings NPQH

Ordering data

Push-in sleeve NPQH-D

Pneumatic connection 1 Push-in sleeve	Nominal width [mm]	Part no.	Type	PU[1]
QS-4	2	**578317**	**NPQH-D-S4-E-P10**	**10**
QS-6	4	**578318**	**NPQH-D-S6-E-P10**	**10**
QS-8	6	**578319**	**NPQH-D-S8-E-P10**	**10**
QS-10	8	**578320**	**NPQH-D-S10-E-P10**	**10**
QS-12	10	**578321**	**NPQH-D-S12-E-P10**	**10**
QS-14	12	**578322**	**NPQH-D-S14-E-P10**	**10**

Push-in fitting NPQH-DK

Male thread with internal hex

Pneumatic connection 1 Male thread	2 Tubing O.D. [mm]	Nominal width [mm]	Part no.	Type	PU[1]
Metric thread with sealing ring					
M5	4	2.5	**578370**	**NPQH-DK-M5-Q4-P10**	**10**
	6	2.5	**578371**	**NPQH-DK-M5-Q6-P10**	**10**
M7	4	3	**578372**	**NPQH-DK-M7-Q4-P10**	**10**
	6	3	**578373**	**NPQH-DK-M7-Q6-P10**	**10**
G thread with sealing ring					
G1/8	4	3	**578374**	**NPQH-DK-G18-Q4-P10**	**10**
	6	4	**578375**	**NPQH-DK-G18-Q6-P10**	**10**
	8	6	**578376**	**NPQH-DK-G18-Q8-P10**	**10**
G1/4	8	6	**578377**	**NPQH-DK-G14-Q8-P10**	**10**
	10	8.2	**578378**	**NPQH-DK-G14-Q10-P10**	**10**
G3/8	12	10.2	**578379**	**NPQH-DK-G38-Q12-P10**	**10**

1) Packaging unit per part

Ordering data

Push-in bulkhead fitting NPQH-H

Female thread with external hex

Pneumatic connection		Nominal width	Part no.	Type	PU[1]
1 Female thread	2 Tubing O.D. [mm]	[mm]			
G thread with sealing ring					
G1⁄8	4	3	**578294**	**NPQH-H-G18F-Q4-P10**	**10**
	6	5	**578295**	**NPQH-H-G18F-Q6-P10**	**10**
	8	7	**578296**	**NPQH-H-G18F-Q8-P10**	**10**
G1⁄4	6	5	**578297**	**NPQH-H-G14F-Q6-P10**	**10**
	8	7	**578298**	**NPQH-H-G14F-Q8-P10**	**10**

Push-in bulkhead connector NPQH-H

Pneumatic connection		Nominal width	Part no.	Type	PU[1]
1 Tubing O.D. [mm]	2 Tubing O.D. [mm]	[mm]			
4	4	3	**578299**	**NPQH-H-Q4-E-P10**	**10**
6	6	5	**578300**	**NPQH-H-Q6-E-P10**	**10**
8	8	7	**578301**	**NPQH-H-Q8-E-P10**	**10**
10	10	9	**578302**	**NPQH-H-Q10-E-P10**	**10**
12	12	11	**578303**	**NPQH-H-Q12-E-P10**	**10**

Blanking plug NPQH-P

Pneumatic connection	Part no.	Type	PU[1]
1 Push-in sleeve			
QS-4	**578257**	**NPQH-P-S4-P10**	**10**
QS-6	**578258**	**NPQH-P-S6-P10**	**10**
QS-8	**578259**	**NPQH-P-S8-P10**	**10**
QS-10	**578260**	**NPQH-P-S10-P10**	**10**
QS-12	**578261**	**NPQH-P-S12-P10**	**10**
QS-14	**578262**	**NPQH-P-S14-P10**	**10**

Plug screw NPQH-BK

Pneumatic connection	Part no.	Type	PU[1]
1			
Metric thread with sealing ring			
M5	**578404**	**NPQH-BK-M5-P10**	**10**
M7	**578405**	**NPQH-BK-M7-P10**	**10**
G thread with sealing ring			
G1⁄8	**578406**	**NPQH-BK-G18-P10**	**10**
G1⁄4	**578407**	**NPQH-BK-G14-P10**	**10**
G3⁄8	**578408**	**NPQH-BK-G38-P10**	**10**
G1⁄2	**578409**	**NPQH-BK-G12**	**1**

1) Packaging unit per part

Push-in fittings NPQH

Ordering data

Push-in L-fitting NPQH-L

Male thread with external hex, rotatable

Pneumatic connection		Nominal width	Part no.	Type	PU[1]
1 Male thread	2 Tubing O.D. [mm]	[mm]			
Metric thread with sealing ring					
M5	4	3	**578276**	**NPQH-L-M5-Q4-P10**	**10**
	6	3.5	**578277**	**NPQH-L-M5-Q6-P10**	**10**
M7	4	3	**578278**	**NPQH-L-M7-Q4-P10**	**10**
	6	4	**578279**	**NPQH-L-M7-Q6-P10**	**10**
G thread with sealing ring					
G1⁄8	4	3	**578280**	**NPQH-L-G18-Q4-P10**	**10**
	6	5	**578281**	**NPQH-L-G18-Q6-P10**	**10**
	8	5.5	**578282**	**NPQH-L-G18-Q8-P10**	**10**
G1⁄4	6	5	**578283**	**NPQH-L-G14-Q6-P10**	**10**
	8	5.5	**578284**	**NPQH-L-G14-Q8-P10**	**10**
	10	8.5	**578285**	**NPQH-L-G14-Q10-P10**	**10**
	12	11	**578286**	**NPQH-L-G14-Q12-P10**	**10**
G3⁄8	8	6	**578287**	**NPQH-L-G38-Q8-P10**	**10**
	10	8.5	**578288**	**NPQH-L-G38-Q10-P10**	**10**
	12	11	**578289**	**NPQH-L-G38-Q12-P10**	**10**
	14	12	**578290**	**NPQH-L-G38-Q14-P10**	**10**
G1⁄2	10	8.5	**578291**	**NPQH-L-G12-Q10**	**1**
	12	11	**578292**	**NPQH-L-G12-Q12**	**1**
	14	12	**578293**	**NPQH-L-G12-Q14**	**1**

Push-in L-fitting, long NPQH-LL

Male thread with external hex, rotatable

Pneumatic connection		Nominal width	Part no.	Type	PU[1]
1 Male thread	2 Tubing O.D. [mm]	[mm]			
G thread with sealing ring					
G1⁄8	4	3	**578263**	**NPQH-LL-G18-Q4-P10**	**10**
	6	5	**578264**	**NPQH-LL-G18-Q6-P10**	**10**
	8	6	**578265**	**NPQH-LL-G18-Q8-P10**	**10**
G1⁄4	6	5	**578266**	**NPQH-LL-G14-Q6-P10**	**10**
	8	6	**578267**	**NPQH-LL-G14-Q8-P10**	**10**
	10	8.5	**578268**	**NPQH-LL-G14-Q10-P10**	**10**
G3⁄8	10	8.5	**578269**	**NPQH-LL-G38-Q10-P10**	**10**

Push-in L-connector NPQH-L

Pneumatic connection		Nominal width	Part no.	Type	PU[1]
1 Tubing O.D. [mm]	2 Tubing O.D. [mm]	[mm]			
4	4	3	**578270**	**NPQH-L-Q4-E-P10**	**10**
6	6	5	**578271**	**NPQH-L-Q6-E-P10**	**10**
8	8	7	**578272**	**NPQH-L-Q8-E-P10**	**10**
10	10	9	**578273**	**NPQH-L-Q10-E-P10**	**10**
12	12	11	**578274**	**NPQH-L-Q12-E-P10**	**10**
14	14	12	**578275**	**NPQH-L-Q14-E-P10**	**10**

1) Packaging unit per part

Ordering data

Push-in T-fitting NPQH-T

Male thread with external hex, rotatable

Pneumatic connection		Nominal width [mm]	Part no.	Type	PU[1]
1 Male thread	2 Tubing O.D. [mm]				
Metric thread with sealing ring					
M5	4	3	**578390**	**NPQH-T-M5-Q4-P10**	**10**
	6	3	**578391**	**NPQH-T-M5-Q6-P10**	**10**
G thread with sealing ring					
G⅛	4	3	**578392**	**NPQH-T-G18-Q4-P10**	**10**
	6	5	**578393**	**NPQH-T-G18-Q6-P10**	**10**
	8	5.5	**578394**	**NPQH-T-G18-Q8-P10**	**10**
G¼	6	5	**578395**	**NPQH-T-G14-Q6-P10**	**10**
	8	5.5	**578396**	**NPQH-T-G14-Q8-P10**	**10**
	10	8.5	**578397**	**NPQH-T-G14-Q10-P10**	**10**
	12	11	**578398**	**NPQH-T-G14-Q12-P10**	**10**
G⅜	8	6	**578399**	**NPQH-T-G38-Q8-P10**	**10**
	10	8.5	**578400**	**NPQH-T-G38-Q10-P10**	**10**
	12	11	**578401**	**NPQH-T-G38-Q12-P10**	**10**
G½	10	8.5	**578402**	**NPQH-T-G12-Q10**	**1**
	12	11	**578403**	**NPQH-T-G12-Q12**	**1**

Push-in T-connector NPQH-T

Pneumatic connection		Nominal width [mm]	Part no.	Type	PU[1]
1 Tubing O.D. [mm]	2 Tubing O.D. [mm]				
4	4	3	**578380**	**NPQH-T-Q4-E-P10**	**10**
6	6	5	**578381**	**NPQH-T-Q6-E-P10**	**10**
8	8	7	**578382**	**NPQH-T-Q8-E-P10**	**10**
10	10	9	**578383**	**NPQH-T-Q10-E-P10**	**10**
12	12	11	**578384**	**NPQH-T-Q12-E-P10**	**10**
14	14	12	**578385**	**NPQH-T-Q14-E-P10**	**10**
Reducing					
6	4	3	**578386**	**NPQH-T-Q6-Q4-P10**	**10**
8	6	5	**578387**	**NPQH-T-Q8-Q6-P10**	**10**
10	8	7	**578388**	**NPQH-T-Q10-Q8-P10**	**10**
12	10	9	**578389**	**NPQH-T-Q12-Q10-P10**	**10**

Push-in Y-connector NPQH-Y

Pneumatic connection		Nominal width [mm]	Part no.	Type	PU[1]
1 Tubing O.D. [mm]	2 Tubing O.D. [mm]				
6	6	5.5	**578410**	**NPQH-Y-Q6-E-P10**	**10**
8	8	7.5	**578411**	**NPQH-Y-Q8-E-P10**	**10**
10	10	9.5	**578412**	**NPQH-Y-Q10-E-P10**	**10**
Reducing					
6	4	3.5	**578413**	**NPQH-Y-Q6-Q4-P10**	**10**
8	6	5.5	**578414**	**NPQH-Y-Q8-Q6-P10**	**10**
10	8	7.5	**578415**	**NPQH-Y-Q10-Q8-P10**	**10**

1) Packaging unit per part

The sturdy and inexpensive metal fitting

+ Sturdy and flame retardant
+ Suitable for low temperatures
+ Antistatic means no electrostatic problems

Push-in fittings, metal

NPQM

Push-in fittings, metal

NPQM

Overview, configuration and ordering
➔ **www.festo.com/catalogue/npqm**

Additional information, support and user documentation
➔ **www.festo.com/sp/npqm**

+ Standard series
+ Attractively priced metal push-in fitting
+ Male or female thread with external or internal hex
+ Resistant to welding spatter
+ Antistatic means no electrostatic problems

Push-in fittings NPQM, metal, standard

Product range overview

Type	Version	Design	Pneumatic connection 1				Pneumatic connection 2		➔ Page/ online
			M thread	G thread	Tubing O.D.	Push-in sleeve	Tubing O.D.	Push-in sleeve	
NPQM-D	Push-in fitting	Straight	–	■	–	–	■	–	1480
	Push-in connector		–	–	■	–	■	–	
	Push-in connector		–	–	■	–	–	■	1481
	Push-in sleeve		–	–	–	■	–	■	
NPQM-DK	Push-in fitting		■	–	–	–	■	–	
NPQM-H	Push-in bulkhead connector		–	–	■	–	■	–	
NPQM-L	Push-in fitting	L-shape	■	■	–	–	■	–	1482
	Push-in connector		–	–	■	–	■	–	
	Push-in connector		–	–	■	–	–	■	
NPQM-LH	Push-in fitting		■	■	–	–	■	–	1483
NPQM-LK	Push-in fitting		■	■	–	–	■	–	
NPQM-LFK	Multiple distributor	F-shape	–	■	–	–	■	–	
NPQM-T	Push-in fitting	T-shape	–	■	–	–	■	–	1484
	Push-in connector		–	–	■	–	■	–	
	Push-in connector		–	–	■	–	–	■	
NPQM-Y	Push-in connector	Y-shape	–	–	■	–	■	–	

Note

When using a push-in sleeve as a quick coupling plug, the only way to guarantee an optimal and secure connection is by using products from the same series.

In other words, a push-in sleeve NPQM may only be used with a push-in connector NPQM. The groove of the push-in sleeve must engage securely in the counterpart.

Data sheet

Operating conditions	
Operating medium	Compressed air to ISO 8573-1:2010 [7:–:–]
Note on operating/pilot medium	Operation with lubricated medium possible
Operating pressure for entire temperature range [bar]	–0.95 ... +16
Ambient temperature [°C]	–20 ... +70

Materials	
Housing	Nickel-plated brass
Nut	Nickel-plated brass
Hollow bolt	Nickel-plated brass
Tubing seal	NBR

Push-in fittings NPQM, metal, standard

Ordering data

Push-in fitting NPQM-D

Male thread with internal/external hex

Pneumatic connection		Nominal width [mm]	Part no.	Type	PU[1]
1 Male thread	2 Tubing O.D. [mm]				
G thread with sealing ring					
G1/8	4	3	**558661**	**NPQM-D-G18-Q4-P10**	**10**
	6	4	**558662**	**NPQM-D-G18-Q6-P10**	**10**
	8	6	**558663**	**NPQM-D-G18-Q8-P10**	**10**
G1/4	6	4	**558664**	**NPQM-D-G14-Q6-P10**	**10**
	8	6	**558665**	**NPQM-D-G14-Q8-P10**	**10**
	10	8	**558666**	**NPQM-D-G14-Q10-P10**	**10**
	12	8	**558667**	**NPQM-D-G14-Q12-P10**	**10**
G3/8	8	6	**558668**	**NPQM-D-G38-Q8-P10**	**10**
	10	8	**558669**	**NPQM-D-G38-Q10-P10**	**10**
	12	10	**558670**	**NPQM-D-G38-Q12-P10**	**10**
	14	10	**570450**	**NPQM-D-G38-Q14-P10**	**1**
G1/2	10	8	**558671**	**NPQM-D-G12-Q10-P10**	**10**
	12	10	**558672**	**NPQM-D-G12-Q12-P10**	**10**
	14	12	**570451**	**NPQM-D-G12-Q14-P10**	**1**

Push-in fitting NPQM-D

Female thread with external hex

Pneumatic connection		Nominal width [mm]	Part no.	Type	PU[1]
1 Female thread	2 Tubing O.D. [mm]				
G1/8	4	3	**558674**	**NPQM-D-G18F-Q4-P10**	**10**
	6	5	**558675**	**NPQM-D-G18F-Q6-P10**	**10**
	8	7	**558676**	**NPQM-D-G18F-Q8-P10**	**10**
G1/4	6	5	**558678**	**NPQM-D-G14F-Q6-P10**	**10**
	8	7	**558679**	**NPQM-D-G14F-Q8-P10**	**10**
	10	9	**558680**	**NPQM-D-G14F-Q10-P10**	**10**

Push-in connector NPQM-D

Pneumatic connection		Nominal width [mm]	Part no.	Type	PU[1]
1 Tubing O.D. [mm]	2 Tubing O.D. [mm]				
4	4	3	**558760**	**NPQM-D-Q4-E-P10**	**10**
6	6	5	**558761**	**NPQM-D-Q6-E-P10**	**10**
8	8	7	**558762**	**NPQM-D-Q8-E-P10**	**10**
10	10	9	**558763**	**NPQM-D-Q10-E-P10**	**10**
12	12	11	**558764**	**NPQM-D-Q12-E-P10**	**10**
14	14	13	**570452**	**NPQM-D-Q14-E-P10**	**1**

1) Packaging unit per part

Ordering data

Push-in connector NPQM-D

with push-in sleeve

Pneumatic connection		Nominal width	Part no.	Type	PU[1]
1 Tubing O.D. [mm]	2 Push-in sleeve	[mm]			
4	QS-6	3	**558765**	**NPQM-D-Q4-S6-P10**	**10**
	QS-8	3.5	**558766**	**NPQM-D-Q4-S8-P10**	**10**
6	QS-4	2.5	**558767**	**NPQM-D-Q6-S4-P10**	**10**
	QS-8	5	**558768**	**NPQM-D-Q6-S8-P10**	**10**
	QS-10	5.5	**558769**	**NPQM-D-Q6-S10-P10**	**10**
	QS-12	5.5	**558770**	**NPQM-D-Q6-S12-P10**	**10**
	QS-14	5	**570457**	**NPQM-D-Q6-S14-P10**	**1**
8	QS-6	4	**558771**	**NPQM-D-Q8-S6-P10**	**10**
	QS-10	7	**558772**	**NPQM-D-Q8-S10-P10**	**10**
	QS-12	7	**558773**	**NPQM-D-Q8-S12-P10**	**10**
	QS-14	7	**570458**	**NPQM-D-Q8-S14-P10**	**1**
10	QS-12	9	**558774**	**NPQM-D-Q10-S12-P10**	**10**
	QS-14	9	**570456**	**NPQM-D-Q10-S14-P10**	**1**
12	QS-14	11	**570459**	**NPQM-D-Q12-S14-P10**	**1**

Push-in sleeve NPQM-D

Pneumatic connection	Nominal width	Part no.	Type	PU[1]
1 Push-in sleeve	[mm]			
QS-4	2	**558811**	**NPQM-D-S4-E-P10**	**10**
QS-6	4	**558812**	**NPQM-D-S6-E-P10**	**10**
QS-8	6	**558813**	**NPQM-D-S8-E-P10**	**10**
QS-10	8	**558814**	**NPQM-D-S10-E-P10**	**10**
QS-12	10	**558815**	**NPQM-D-S12-E-P10**	**10**
QS-14	12	**570455**	**NPQM-D-S14-E-P10**	**1**

Push-in fitting NPQM-DK

Male thread with internal hex

Pneumatic connection		Nominal width	Part no.	Type	PU[1]
1 Male thread	2 Tubing O.D. [mm]	[mm]			
Metric thread with sealing ring					
M5	4	2.5	**558657**	**NPQM-DK-M5-Q4-P10**	**10**
	6	2.5	**558658**	**NPQM-DK-M5-Q6-P10**	**10**
M7	4	3	**558659**	**NPQM-DK-M7-Q4-P10**	**10**
	6	3	**558660**	**NPQM-DK-M7-Q6-P10**	**10**

Push-in bulkhead connector NPQM-H

Pneumatic connection		Nominal width	Part no.	Type	PU[1]
1 Tubing O.D. [mm]	2 Tubing O.D. [mm]	[mm]			
4	4	3	**558806**	**NPQM-H-Q4-E-P10**	**10**
6	6	5	**558807**	**NPQM-H-Q6-E-P10**	**10**
8	8	7	**558808**	**NPQM-H-Q8-E-P10**	**10**
10	10	9	**558809**	**NPQM-H-Q10-E-P10**	**10**
12	12	11	**558810**	**NPQM-H-Q12-E-P10**	**10**

1) Packaging unit per part

Push-in fittings NPQM, metal, standard

Ordering data

Push-in L-fitting NPQM-L

Male thread with external hex, rotatable

Pneumatic connection		Nominal width [mm]	Part no.	Type	PU[1]
1 Male thread	2 Tubing O.D. [mm]				
Metric thread with sealing ring					
M5	4	3	**558704**	**NPQM-L-M5-Q4-P10**	**10**
	6	3.5	**558705**	**NPQM-L-M5-Q6-P10**	**10**
G thread with sealing ring					
G1/8	4	3	**558708**	**NPQM-L-G18-Q4-P10**	**10**
	6	5	**558709**	**NPQM-L-G18-Q6-P10**	**10**
	8	5.5	**558710**	**NPQM-L-G18-Q8-P10**	**10**
G1/4	6	5	**558711**	**NPQM-L-G14-Q6-P10**	**10**
	8	5.5	**558712**	**NPQM-L-G14-Q8-P10**	**10**
	10	8.5	**558713**	**NPQM-L-G14-Q10-P10**	**10**
	12	11	**558714**	**NPQM-L-G14-Q12-P10**	**10**
G3/8	8	6	**558715**	**NPQM-L-G38-Q8-P10**	**10**
	10	8.5	**558716**	**NPQM-L-G38-Q10-P10**	**10**
	12	11	**558717**	**NPQM-L-G38-Q12-P10**	**10**
	14	12	**570460**	**NPQM-L-G38-Q14-P10**	**1**
G1/2	10	8.5	**558718**	**NPQM-L-G12-Q10-P10**	**10**
	12	11	**558719**	**NPQM-L-G12-Q12-P10**	**10**
	14	12	**570461**	**NPQM-L-G12-Q14-P10**	**1**

Push-in L-connector NPQM-L

Pneumatic connection		Nominal width [mm]	Part no.	Type	PU[1]
1 Tubing O.D. [mm]	2 Tubing O.D. [mm]				
4	4	3	**558776**	**NPQM-L-Q4-E-P10**	**10**
6	6	5	**558777**	**NPQM-L-Q6-E-P10**	**10**
8	8	7	**558778**	**NPQM-L-Q8-E-P10**	**10**
10	10	9	**558779**	**NPQM-L-Q10-E-P10**	**10**
12	12	11	**558780**	**NPQM-L-Q12-E-P10**	**10**
14	14	12	**570453**	**NPQM-L-Q14-E-P10**	**1**

Push-in L-connector NPQM-L

with push-in sleeve

Pneumatic connection		Nominal width [mm]	Part no.	Type	PU[1]
1 Tubing O.D. [mm]	2 Push-in sleeve				
4	QS-4	3	**558781**	**NPQM-L-Q4-S4-P10**	**10**
6	QS-6	5	**558782**	**NPQM-L-Q6-S6-P10**	**10**
8	QS-8	5.5	**558783**	**NPQM-L-Q8-S8-P10**	**10**
10	QS-10	8.5	**558784**	**NPQM-L-Q10-S10-P10**	**10**

1) Packaging unit per part

Ordering data

Push-in L-fitting NPQM-LH

Male thread with external hex, rotatable

Pneumatic connection		Nominal width [mm]	Part no.	Type	PU[1]
1 Male thread	2 Tubing O.D. [mm]				
Metric thread with sealing ring					
M5	4	3	**558827**	**NPQM-LH-M5-Q4-P10**	**10**
	6	3.5	**558828**	**NPQM-LH-M5-Q6-P10**	**10**
G thread with sealing ring					
G1⁄8	4	3	**558829**	**NPQM-LH-G18-Q4-P10**	**10**
	6	5	**558830**	**NPQM-LH-G18-Q6-P10**	**10**
	8	6.5	**558831**	**NPQM-LH-G18-Q8-P10**	**10**
G1⁄4	6	5	**558832**	**NPQM-LH-G14-Q6-P10**	**10**
	8	6.5	**558833**	**NPQM-LH-G14-Q8-P10**	**10**
G3⁄8	8	7	**558834**	**NPQM-LH-G38-Q8-P10**	**10**
	10	8.5	**558835**	**NPQM-LH-G38-Q10-P10**	**10**
	12	10.5	**558836**	**NPQM-LH-G38-Q12-P10**	**10**

Push-in L-fitting NPQM-LK

Male thread with internal hex, rotatable

Pneumatic connection		Nominal width [mm]	Part no.	Type	PU[1]
1 Male thread	2 Tubing O.D. [mm]				
Metric thread with sealing ring					
M5	3	2	**558816**	**NPQM-LK-M5-Q3-P10**	**10**
	4	2	**558817**	**NPQM-LK-M5-Q4-P10**	**10**
G thread with sealing ring					
G1⁄8	4	4	**558818**	**NPQM-LK-G18-Q4-P10**	**10**
	6	4	**558819**	**NPQM-LK-G18-Q6-P10**	**10**
	8	4	**558820**	**NPQM-LK-G18-Q8-P10**	**10**
G1⁄4	6	5.5	**558821**	**NPQM-LK-G14-Q6-P10**	**10**
	8	5.5	**558822**	**NPQM-LK-G14-Q8-P10**	**10**
	10	5.5	**558823**	**NPQM-LK-G14-Q10-P10**	**10**
G3⁄8	10	7	**558825**	**NPQM-LK-G38-Q10-P10**	**10**

Multiple distributor NPQM-LFK

Male thread with internal hex, rotatable

Pneumatic connection		Nominal width [mm]	Part no.	Type	PU[1]
1 Male thread	2 Tubing O.D. [mm]				
G thread with sealing ring					
G1⁄8	4	4	**558837**	**NPQM-LFK-G18-Q4-P10**	**10**
	6	4	**558838**	**NPQM-LFK-G18-Q6-P10**	**10**
	8	4	**558839**	**NPQM-LFK-G18-Q8-P10**	**10**
G1⁄4	6	5.5	**558840**	**NPQM-LFK-G14-Q6-P10**	**10**
	8	5.5	**558841**	**NPQM-LFK-G14-Q8-P10**	**10**

1) Packaging unit per part

Push-in fittings NPQM, metal, standard

Ordering data

Push-in T-fitting NPQM-T

Male thread with external hex, rotatable

Pneumatic connection		Nominal width	Part no.	Type	PU[1]
1 Male thread	2 Tubing O.D. [mm]	[mm]			
G thread with sealing ring					
G1/8	4	3	**558736**	**NPQM-T-G18-Q4-P10**	**10**
	6	5	**558737**	**NPQM-T-G18-Q6-P10**	**10**
	8	5.5	**558738**	**NPQM-T-G18-Q8-P10**	**10**
G1/4	6	5	**558739**	**NPQM-T-G14-Q6-P10**	**10**
	8	5.5	**558740**	**NPQM-T-G14-Q8-P10**	**10**
	10	8.5	**558741**	**NPQM-T-G14-Q10-P10**	**10**
G3/8	8	6	**558743**	**NPQM-T-G38-Q8-P10**	**10**
	10	8.5	**558744**	**NPQM-T-G38-Q10-P10**	**10**
	12	11	**558745**	**NPQM-T-G38-Q12-P10**	**10**
G1/2	12	11	**558747**	**NPQM-T-G12-Q12-P10**	**10**

Push-in T-connector NPQM-T

Pneumatic connection		Nominal width	Part no.	Type	PU[1]
1 Tubing O.D. [mm]	2 Tubing O.D. [mm]	[mm]			
4	4	3	**558786**	**NPQM-T-Q4-E-P10**	**10**
6	6	5	**558787**	**NPQM-T-Q6-E-P10**	**10**
8	8	7	**558788**	**NPQM-T-Q8-E-P10**	**10**
10	10	9	**558789**	**NPQM-T-Q10-E-P10**	**10**
12	12	11	**558790**	**NPQM-T-Q12-E-P10**	**10**
14	14	12	**570454**	**NPQM-T-Q14-E-P10**	**1**

Push-in T-connector NPQM-T

with push-in sleeve

Pneumatic connection		Nominal width	Part no.	Type	PU[1]
1 Tubing O.D. [mm]	2 Push-in sleeve	[mm]			
4	QS-4	3	**558791**	**NPQM-T-Q4-S4-P10**	**10**
6	QS-6	5	**558792**	**NPQM-T-Q6-S6-P10**	**10**
8	QS-8	5.5	**558793**	**NPQM-T-Q8-S8-P10**	**10**
10	QS-10	8.5	**558794**	**NPQM-T-Q10-S10-P10**	**10**

Push-in Y-connector NPQM-Y

Pneumatic connection		Nominal width	Part no.	Type	PU[1]
1 Tubing O.D. [mm]	2 Tubing O.D. [mm]	[mm]			
4	4	3.5	**558798**	**NPQM-Y-Q4-E-P10**	**10**
6	6	5.5	**558799**	**NPQM-Y-Q6-E-P10**	**10**
8	8	7.5	**558800**	**NPQM-Y-Q8-E-P10**	**10**
10	10	9.5	**558801**	**NPQM-Y-Q10-E-P10**	**10**
12	12	11.5	**558802**	**NPQM-Y-Q12-E-P10**	**10**
Reducing					
6	4	3.5	**558803**	**NPQM-Y-Q6-Q4-P10**	**10**
8	6	5.5	**558804**	**NPQM-Y-Q8-Q6-P10**	**10**
10	8	7.5	**558805**	**NPQM-Y-Q10-Q8-P10**	**10**

1) Packaging unit per part

The sturdy stainless steel fitting with maximum chemical resistance

+ Unlimited use in the food industry
+ Suitable for aggressive acids and alkalis
+ High temperature resistance

Fittings › Push-in fittings ›

Push-in fittings, stainless steel

CRQS

Push-in fittings, stainless steel

CRQS

Overview, configuration and ordering
➔ **www.festo.com/catalogue/crqs**

Additional information, support and user documentation
➔ **www.festo.com/sp/crqs**

+ Stainless steel fitting
+ Connection M5, R1/8, R1/4, R3/8, R1/2
+ For tubing O.D. 4, 6, 8, 10, 12, 16 mm
+ Suitable for vacuum
+ Push-in fittings, push-in connectors, push-in bulkhead connectors
+ High resistance to chemicals and corrosion
+ High temperature resistance

Push-in fittings CRQS, stainless steel

Product range overview

Type	Version	Design	Pneumatic connection 1			Pneumatic connection 2	➔ Page/ online
			M thread	R thread	Tubing O.D.	Tubing O.D.	
CRQS	Push-in fitting	Straight	■	■	–	■	1488
	Push-in connector		–	–	■	■	
CRQSS	Push-in bulkhead connector		–	–	■	■	1489
CRQSL	Push-in fitting	L-shape	■	■	–	■	
	Push-in connector		–	–	■	■	
CRQST	Push-in fitting	T-shape	■	■	–	■	1490
	Push-in connector		–	–	■	■	
CRQSY	Push-in connector	Y-shape	–	–	■	■	

Data sheet

Operating conditions	
Operating medium	Compressed air to ISO 8573-1:2010 [7:–:–]
	Water as per manufacturer's declaration[1)]
Note on operating/pilot medium	Operation with lubricated medium possible
Operating pressure for entire temperature range [bar]	–0.95 ... +10
Ambient temperature [°C]	–15 ... +120
Food-safe[1)]	See supplementary material information

1) Additional information www.festo.com/sp ➔ Certificates.

Materials	
Housing	High-alloy stainless steel
Releasing ring	High-alloy stainless steel
Tube retaining claw	High-alloy stainless steel
Threaded coupling	High-alloy stainless steel
Nut	High-alloy stainless steel
Tubing seal	FPM

Push-in fittings CRQS, stainless steel

Ordering data

Push-in fitting CRQS

Male thread with external hex

M thread

R thread

Pneumatic connection		Nominal width [mm]	Part no.	Type	PU[1]
1 Male thread	2 Tubing O.D. [mm]				
Metric thread with sealing ring					
M5	4	2	**162860**	**CRQS-M5-4**	**1**
	6	2	**162861**	**CRQS-M5-6**	**1**
R thread					
R1/8	4	2.5	**132643**	**CRQS-1/8-4**	**1**
	6	4.1	**162862**	**CRQS-1/8-6**	**1**
	8	5.1	**162863**	**CRQS-1/8-8**	**1**
R1/4	6	4.2	**132644**	**CRQS-1/4-6**	**1**
	8	5.8	**162864**	**CRQS-1/4-8**	**1**
	10	5.9	**162865**	**CRQS-1/4-10**	**1**
R3/8	10	6	**162866**	**CRQS-3/8-10**	**1**
	12	7.6	**162867**	**CRQS-3/8-12**	**1**
R1/2	12	8.1	**162868**	**CRQS-1/2-12**	**1**
	16	10.1	**162869**	**CRQS-1/2-16**	**1**

Push-in fitting CRQS-...-I

Male thread with internal hex

Pneumatic connection		Nominal width [mm]	Part no.	Type	PU[1]
1 Male thread	2 Tubing O.D. [mm]				
Metric thread with sealing ring					
M5	4	2	**132328**	**CRQS-M5-4-I**	**1**
	6	2	**132329**	**CRQS-M5-6-I**	**1**
R thread					
R1/8	6	4.1	**132330**	**CRQS-1/8-6-I**	**1**
	8	5.1	**132331**	**CRQS-1/8-8-I**	**1**
R1/4	8	5.8	**132332**	**CRQS-1/4-8-I**	**1**
	10	5.9	**132333**	**CRQS-1/4-10-I**	**1**
R3/8	10	6	**132334**	**CRQS-3/8-10-I**	**1**
	12	7.6	**132335**	**CRQS-3/8-12-I**	**1**
R1/2	12	8.1	**132336**	**CRQS-1/2-12-I**	**1**
	16	10.1	**132337**	**CRQS-1/2-16-I**	**1**

Push-in connector CRQS

Pneumatic connection		Nominal width [mm]	Part no.	Type	PU[1]
1 Tubing O.D. [mm]	2 Tubing O.D. [mm]				
4	4	2.4	**130645**	**CRQS-4**	**1**
6	6	3.7	**130646**	**CRQS-6**	**1**
8	8	5.8	**130647**	**CRQS-8**	**1**
10	10	6.6	**130648**	**CRQS-10**	**1**
12	12	7.9	**130649**	**CRQS-12**	**1**
16	16	10.5	**130650**	**CRQS-16**	**1**
Reducing					
6	4	2.4	**130651**	**CRQS-6-4**	**1**
8	6	3.7	**130652**	**CRQS-8-6**	**1**
10	8	5.8	**130653**	**CRQS-10-8**	**1**
12	10	6.6	**130654**	**CRQS-12-10**	**1**
16	12	7.9	**130655**	**CRQS-16-12**	**1**

1) Packaging unit per part

Ordering data

Push-in bulkhead connector CRQSS

Pneumatic connection		Nominal width	Part no.	Type	PU[1]
1 Tubing O.D. [mm]	2 Tubing O.D. [mm]	[mm]			
4	4	2.4	**164210**	**CRQSS-4**	**1**
6	6	3.7	**164211**	**CRQSS-6**	**1**
8	8	5.7	**164213**	**CRQSS-8**	**1**
10	10	6.7	**164215**	**CRQSS-10**	**1**
12	12	7.9	**164217**	**CRQSS-12**	**1**
16	16	10.4	**164219**	**CRQSS-16**	**1**

Push-in L-fitting CRQSL

Male thread with external hex, rotatable

M thread

R thread

Pneumatic connection		Nominal width	Part no.	Type	PU[1]
1 Male thread	2 Tubing O.D. [mm]	[mm]			
Metric thread with sealing ring					
M5	4	2	**162870**	**CRQSL-M5-4**	**1**
	6	2	**162871**	**CRQSL-M5-6**	**1**
R thread					
R1/8	4	2.2	**132598**	**CRQSL-1/8-4**	**1**
	6	3.9	**162872**	**CRQSL-1/8-6**	**1**
	8	5.2	**162873**	**CRQSL-1/8-8**	**1**
R1/4	6	3.6	**132599**	**CRQSL-1/4-6**	**1**
	8	5.1	**162874**	**CRQSL-1/4-8**	**1**
	10	6	**162875**	**CRQSL-1/4-10**	**1**
R3/8	10	6	**162876**	**CRQSL-3/8-10**	**1**
	12	8.1	**162877**	**CRQSL-3/8-12**	**1**
R1/2	12	7.9	**162878**	**CRQSL-1/2-12**	**1**
	16	9.4	**162879**	**CRQSL-1/2-16**	**1**

Push-in L-connector CRQSL

Pneumatic connection		Nominal width	Part no.	Type	PU[1]
1 Tubing O.D. [mm]	2 Tubing O.D. [mm]	[mm]			
4	4	2.1	**130662**	**CRQSL-4**	**1**
6	6	3.5	**130663**	**CRQSL-6**	**1**
8	8	5.1	**130664**	**CRQSL-8**	**1**
10	10	6.1	**130665**	**CRQSL-10**	**1**
12	12	7.8	**130666**	**CRQSL-12**	**1**
16	16	9.4	**130667**	**CRQSL-16**	**1**

1) Packaging unit per part

Push-in fittings CRQS, stainless steel

Ordering data

Push-in T-fitting CRQST

Male thread with external hex, rotatable

Pneumatic connection		Nominal width [mm]	Part no.	Type	PU[1]
1 Male thread	2 Tubing O.D. [mm]				
Metric thread with sealing ring					
M5	4	2	**164200**	**CRQST-M5-4**	**1**
	6	2	**164201**	**CRQST-M5-6**	**1**
R thread					
R1/8	6	3.7	**164202**	**CRQST-1/8-6**	**1**
	8	5	**164203**	**CRQST-1/8-8**	**1**
R1/4	8	5	**164204**	**CRQST-1/4-8**	**1**
	10	5.9	**164205**	**CRQST-1/4-10**	**1**
R3/8	10	5.9	**164206**	**CRQST-3/8-10**	**1**
	12	8.1	**164207**	**CRQST-3/8-12**	**1**
R1/2	12	8.1	**164208**	**CRQST-1/2-12**	**1**
	16	9.5	**164209**	**CRQST-1/2-16**	**1**

Push-in T-connector CRQST

Pneumatic connection		Nominal width [mm]	Part no.	Type	PU[1]
1 Tubing O.D. [mm]	2 Tubing O.D. [mm]				
4	4	2.1	**130668**	**CRQST-4**	**1**
6	6	3.5	**130669**	**CRQST-6**	**1**
8	8	5	**130670**	**CRQST-8**	**1**
10	10	6.1	**130671**	**CRQST-10**	**1**
12	12	8	**130672**	**CRQST-12**	**1**
16	16	9.7	**130673**	**CRQST-16**	**1**

Push-in Y-connector CRQSY

Pneumatic connection		Nominal width [mm]	Part no.	Type	PU[1]
1 Tubing O.D. [mm]	2 Tubing O.D. [mm]				
4	4	2	**130656**	**CRQSY-4**	**1**
6	6	3.3	**130657**	**CRQSY-6**	**1**
8	8	4.9	**130658**	**CRQSY-8**	**1**
10	10	5.6	**130659**	**CRQSY-10**	**1**
12	12	7	**130660**	**CRQSY-12**	**1**
16	16	8.2	**130661**	**CRQSY-16**	**1**

1) Packaging unit per part

QSR

QSK

Push-in fittings with additional functions

QSK:

+ Shut-off function after the tubing is disconnected

QSR:

+ Simple and secure compressed air through-feed for rotary movements
+ Speed-resistant rotary fitting

Fittings › Push-in fittings ›

Self-sealing/rotary push-in fittings

QSK

QSSK
QSKL

QSR

QSRL

Self-sealing/rotary push-in fittings

QSK/QSR

Overview, configuration and ordering
➔ **www.festo.com/catalogue/qsk**

Additional information, support and user documentation
➔ **www.festo.com/sp/qsk**

+ Standard series
+ Male thread with external hex

QSK:

+ Push-in fitting blocks the air flow after the tubing is disconnected

QSR:

+ Rotatable 360°, with ball bearing
+ Male thread with external hex
+ For speeds up to max. 500 rpm

Self-sealing/rotary push-in fittings QSK/QSR

Key features

Rotatable

The fitting can be aligned after it has been assembled.

Rotatable 360°, with ball bearing

Permits rotary movement of up to 500 rpm during use.

Product range overview

Type	Version	Design	Pneumatic connection 1				Pneumatic connection 2	➔ Page/ online
			M thread	R thread	G thread	Tubing O.D.	Tubing O.D.	
Self-sealing push-in fitting QSK								
QSK	Push-in fitting	Straight	■	■	■	–	■	1494
	Push-in connector		–	–	–	■	■	
QSSK	Push-in bulkhead connector		–	–	–	■	■	
QSKL	Push-in fitting	L-shape	■	■	■	–	■	1495
Rotary push-in fitting QSR								
QSR	Push-in fitting	Straight	■	■	■	–	■	1496
QSRL	Push-in fitting	L-shape	■	■	■	–	■	

Data sheet

Operating conditions			
Type		Self-sealing push-in fitting QSK	Rotary push-in fitting QSR
Operating medium		Compressed air to ISO 8573-1:2010 [7:–:–]	
		Water as per manufacturer's declaration[1)]	–
Note on operating/pilot medium		Operation with lubricated medium possible	
Operating pressure for entire temperature range	[bar]	–0.95 ... +6	
Temperature-dependent operating pressure	[bar]	–0.95 ... +14	
Ambient temperature	[°C]	–10 ... +80	0 ... +60

1) Push-in bulkhead connector QSSK only.
Additional information www.festo.com/sp ➔ Certificates.

Materials	
Housing	PBT, nickel-plated brass
Tube retaining claw	High-alloy stainless steel
Releasing ring	POM
Tubing seal	NBR

Self-sealing push-in fittings QSK

Ordering data

Self-sealing push-in fitting QSK

Male thread with external hex

M thread

R thread

G thread

Pneumatic connection		Nominal width	Part no.	Type	PU[1]
1 Male thread	2 Tubing O.D. [mm]	[mm]			
Metric thread with sealing ring					
M5	4	1.4	**153291**	**QSK-M5-4**	**1**
	6	1.7	**153292**	**QSK-M5-6**	**1**
R thread					
R1/8	4	1.6	**153419**	**QSK-1/8-4**	**1**
	6	3	**153420**	**QSK-1/8-6**	**1**
	8	3.4	**153422**	**QSK-1/8-8**	**1**
R1/4	6	3	**153421**	**QSK-1/4-6**	**1**
	8	4.3	**153423**	**QSK-1/4-8**	**1**
	10	4.8	**153425**	**QSK-1/4-10**	**1**
R3/8	8	4.5	**153424**	**QSK-3/8-8**	**1**
	10	5.6	**153426**	**QSK-3/8-10**	**1**
	12	6.1	**153427**	**QSK-3/8-12**	**1**
R1/2	12	6.4	**153428**	**QSK-1/2-12**	**1**
G thread with sealing ring					
G1/8	4	1.6	**186294**	**QSK-G1/8-4**	**1**
	6	3	**186295**	**QSK-G1/8-6**	**1**
	8	3.4	**186297**	**QSK-G1/8-8**	**1**
G1/4	6	3	**186296**	**QSK-G1/4-6**	**1**
	8	4.3	**186298**	**QSK-G1/4-8**	**1**
	10	4.8	**186300**	**QSK-G1/4-10**	**1**
G3/8	8	4.5	**186299**	**QSK-G3/8-8**	**1**
	10	5.6	**186301**	**QSK-G3/8-10**	**1**
	12	6.1	**186302**	**QSK-G3/8-12**	**1**
G1/2	12	6.4	**186303**	**QSK-G1/2-12**	**1**

Self-sealing push-in connector QSK

Pneumatic connection		Nominal width	Part no.	Type	PU[1]
1 Tubing O.D. [mm]	2 Tubing O.D. [mm]	[mm]			
4	4	1.6	**153439**	**QSK-4**	**1**
6	6	3	**153440**	**QSK-6**	**1**
8	8	4.4	**153441**	**QSK-8**	**1**
10	10	5.3	**153442**	**QSK-10**	**1**
12	12	6.2	**153443**	**QSK-12**	**1**

Push-in bulkhead connector QSSK

Pneumatic connection		Nominal width	Part no.	Type	PU[1]
1 Tubing O.D. [mm]	2 Tubing O.D. [mm]	[mm]			
4	4	1.5	**130637**	**QSSK-4**	**1**
6	6	3	**130638**	**QSSK-6**	**1**
8	8	4.3	**130639**	**QSSK-8**	**1**
10	10	5.4	**130640**	**QSSK-10**	**1**
12	12	6.3	**130641**	**QSSK-12**	**1**

1) Packaging unit per part

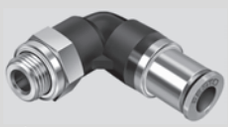
Ordering data

Self-sealing push-in L-fitting QSKL

Male thread with external hex, rotatable

M thread

R thread



G thread

Pneumatic connection		Nominal width	Part no.	Type	PU[1]
1 Male thread	2 Tubing O.D. [mm]	[mm]			
Metric thread with sealing ring					
M5	4	1.4	**153294**	**QSKL-M5-4**	**1**
	6	1.7	**153295**	**QSKL-M5-6**	**1**
R thread					
R1/8	4	1.5	**153429**	**QSKL-1/8-4**	**1**
	6	3	**153430**	**QSKL-1/8-6**	**1**
	8	4.2	**153432**	**QSKL-1/8-8**	**1**
R1/4	6	3.2	**153431**	**QSKL-1/4-6**	**1**
	8	4.1	**153433**	**QSKL-1/4-8**	**1**
	10	5.2	**153435**	**QSKL-1/4-10**	**1**
R3/8	8	4.3	**153434**	**QSKL-3/8-8**	**1**
	10	5.3	**153436**	**QSKL-3/8-10**	**1**
	12	6.2	**153437**	**QSKL-3/8-12**	**1**
R1/2	12	6.2	**153438**	**QSKL-1/2-12**	**1**
G thread with sealing ring					
G1/8	4	1.5	**186304**	**QSKL-G1/8-4**	**1**
	6	2.9	**186305**	**QSKL-G1/8-6**	**1**
	8	4.2	**186307**	**QSKL-G1/8-8**	**1**
G1/4	6	3.2	**186306**	**QSKL-G1/4-6**	**1**
	8	4.1	**186308**	**QSKL-G1/4-8**	**1**
	10	5.2	**186310**	**QSKL-G1/4-10**	**1**
G3/8	8	4.3	**186309**	**QSKL-G3/8-8**	**1**
	10	5.3	**186311**	**QSKL-G3/8-10**	**1**
	12	6.2	**186312**	**QSKL-G3/8-12**	**1**
G1/2	12	6.2	**186313**	**QSKL-G1/2-12**	**1**

1) Packaging unit per part

Rotatable push-in fittings QSR

Ordering data

Rotatable push-in fitting QSR

Male thread with external hex, rotatable 360°, with ball bearing

M thread

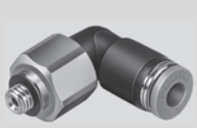
R thread

G thread

Pneumatic connection		Nominal width	Part no.	Type	PU[1]
1 Male thread	2 Tubing O.D. [mm]	[mm]			
Metric thread with sealing ring					
M5	4	1.6	**153526**	**QSR-M5-4**	**1**
	6	1.6	**153527**	**QSR-M5-6**	**1**
R thread					
R1/8	4	2.1	**153401**	**QSR-1/8-4**	**1**
	6	3.4	**153402**	**QSR-1/8-6**	**1**
	8	5	**153404**	**QSR-1/8-8**	**1**
R1/4	6	3.4	**153403**	**QSR-1/4-6**	**1**
	8	5	**153405**	**QSR-1/4-8**	**1**
R3/8	8	5	**153406**	**QSR-3/8-8**	**1**
	10	6.7	**153407**	**QSR-3/8-10**	**1**
	12	8	**153408**	**QSR-3/8-12**	**1**
R1/2	12	8	**153409**	**QSR-1/2-12**	**1**
G thread with sealing ring					
G1/8	4	2.1	**186276**	**QSR-G1/8-4**	**1**
	6	3.4	**186277**	**QSR-G1/8-6**	**1**
	8	5	**186279**	**QSR-G1/8-8**	**1**
G1/4	6	3.4	**186278**	**QSR-G1/4-6**	**1**
	8	5	**186280**	**QSR-G1/4-8**	**1**
G3/8	8	5	**186281**	**QSR-G3/8-8**	**1**
	10	6.7	**186282**	**QSR-G3/8-10**	**1**
	12	8	**186283**	**QSR-G3/8-12**	**1**
G1/2	12	8	**186284**	**QSR-G1/2-12**	**1**

Rotatable push-in L-fitting QSRL

Male thread with external hex, rotatable 360°, with ball bearing



M thread

R thread

G thread

Pneumatic connection		Nominal width	Part no.	Type	PU[1]
1 Male thread	2 Tubing O.D. [mm]	[mm]			
Metric thread with sealing ring					
M5	4	1.4	**153529**	**QSRL-M5-4**	**1**
	6	1.6	**153530**	**QSRL-M5-6**	**1**
R thread					
R1/8	4	1.8	**153410**	**QSRL-1/8-4**	**1**
	6	3.1	**153411**	**QSRL-1/8-6**	**1**
	8	4.6	**153413**	**QSRL-1/8-8**	**1**
R1/4	6	3.1	**153412**	**QSRL-1/4-6**	**1**
	8	4.6	**153414**	**QSRL-1/4-8**	**1**
R3/8	8	4.6	**153415**	**QSRL-3/8-8**	**1**
	10	6.2	**153416**	**QSRL-3/8-10**	**1**
	12	7.4	**153417**	**QSRL-3/8-12**	**1**
R1/2	12	7.4	**153418**	**QSRL-1/2-12**	**1**
G thread with sealing ring					
G1/8	4	1.9	**186285**	**QSRL-G1/8-4**	**1**
	6	3.1	**186286**	**QSRL-G1/8-6**	**1**
	8	4.6	**186288**	**QSRL-G1/8-8**	**1**
G1/4	6	3.1	**186287**	**QSRL-G1/4-6**	**1**
	8	4.6	**186289**	**QSRL-G1/4-8**	**1**
G3/8	8	4.6	**186290**	**QSRL-G3/8-8**	**1**
	10	6.2	**186291**	**QSRL-G3/8-10**	**1**
	12	7.4	**186292**	**QSRL-G3/8-12**	**1**
G1/2	12	7.4	**186293**	**QSRL-G1/2-12**	**1**

1) Packaging unit per part

The Clean Design stainless steel fitting

+ Suitable for use in the food industry
+ Design free of any edges where dirt would accumulate
+ For cleaning intensive areas

Fittings › Barbed fittings ›

Quick connectors

NPCK

Quick connectors

NPCK

Overview, configuration and ordering
➔ **www.festo.com/catalogue/npck**

Additional information, support and user documentation
➔ **www.festo.com/sp/npck**

+ Stainless steel fitting for use in areas subject to intensive cleaning
+ Highly resistant to corrosion
+ For pneumatic applications with a temperature range up to 120°C and a pressure range up to 12 bar

Data sheet

Technical data						
Pneumatic connection 1	Male thread					
	M5	G1/8		G1/4		G3/8
Pneumatic connection 2	For tubing O.D. 4 mm	For tubing O.D. 6 mm	For tubing O.D. 8 mm	For tubing O.D. 8 mm	For tubing O.D. 10 mm	For tubing O.D. 10 mm
Type of seal on threaded plug	O-ring	Sealing ring				

Operating conditions		
Operating medium		Compressed air to ISO 8573-1:2010 [7:–:–]
		Water as per manufacturer's declaration[1]
Note on operating/pilot medium		Operation with lubricated medium possible
Operating pressure for entire temperature range	[bar]	–0.95 ... +12
Ambient temperature	[°C]	–20 ... +120[2]
Food-safe[1]		See supplementary material information

1) Additional information www.festo.com/sp ➔ Certificates.
2) Other possibilities: The fitting can be used in the temperature range from –40 ... +60°C when suitable tubing is used. The maximum permissible operating pressure of the tubing must not be exceeded.

Materials				
Pneumatic connection	M5	G1/8	G1/4	G3/8
Housing	High-alloy stainless steel			
Threaded plug	High-alloy stainless steel			
Sealing ring	EPDM	PEEK		

Ordering data

Fitting NPCK-C-D

Male thread with external hex

Pneumatic connection		Nominal width [mm]	Part no.	Type	PU[3]
1 Male thread	2 Tubing O.D. [mm]				
Metric thread with O-ring					
M5	4	2	**1857681**	**NPCK-C-D-M5-K4**	**1**
G thread with sealing ring					
G1/8	6	2.9	**1366257**	**NPCK-C-D-G18-K6**	**1**
	8	4.9	**1490383**	**NPCK-C-D-G18-K8**	**1**
G1/4	8	4.9	**1691701**	**NPCK-C-D-G14-K8**	**1**
	10	6.1	**1489336**	**NPCK-C-D-G14-K10**	**1**
G3/8	10	6.2	**1489614**	**NPCK-C-D-G38-K10**	**1**

Accessories – Ordering data

	Pneumatic connection	Part no.	Type	PU[3]
Sealing ring NPAS				**Data sheets** online: ➔ **npas**
	For male thread G1/8	**2652516**	**NPAS-C1-R-G18-P-FD-P10**	**10**
	For male thread G1/4	**2652517**	**NPAS-C1-R-G14-P-FD-P10**	**10**
	For male thread G3/8	**2652519**	**NPAS-C1-R-G38-P-FD-P10**	**10**

3) Packaging unit quantity

The simple and sturdy threaded fitting

+ For high pressures and temperatures
+ Sturdy and corrosion resistant

Threaded fittings, blanking plugs

NPFC
B★

Threaded fittings, blanking plugs

NPFC/B★

Overview, configuration and ordering
➔ **www.festo.com/catalogue/npfc** ✓

Additional information, support and user documentation
➔ **www.festo.com/sp/npfc** ✓

★ Quick ordering of basic designs
➔ page 1510 ✓

+ Nickel-plated brass
+ Blanking plug
+ Sleeve
+ Reducing sleeve
+ Extension
+ Double nipple
+ Reducing nipple
+ L-, T-, Y- or X-fitting

Threaded fittings NPFC

Product range overview

Type	Version	Design	Pneumatic connection 1			Pneumatic connection 2			➔ Page/ online
			M thread	G thread	R thread[1)]	M thread	G thread	R thread[1)]	
NPFC-S	Sleeve	Straight	■	■	–	■	■	–	1504
NPFC-R	Reducing sleeve		–	■	–	■	■	–	
NPFC-E	Extension		■	■	–	■	■	–	
NPFC-D	Double nipple		■	■	■	■	■	■	1505
NPFC-R	Reducing nipple		■	■	–	■	■	–	
NPFC-H	Bulkhead fitting		■	■	–	■	■	–	1506
NPFC-L	Elbow fitting	L-shape	■	■	■	■	■	■	
NPFC-T	T-fitting	T-shape	■	■	■	■	■	■	1507
NPFC-Y	Y-fitting	Y-shape	–	■	■	–	■	–	1509
NPFC-X	X-fitting	X-shape	–	■	■	–	■	–	

1) Sealing with thread sealing tape GWB-Q1 (➔ page 1527) is recommended.

Data sheet

Operating conditions		
Operating medium		Compressed air to ISO 8573-1:2010 [-:-:-]
		Gases on request
		Liquids on request
Operating pressure	[bar]	–0.95 ... +50
Ambient temperature	[°C]	–20 ... +150

Materials	
Threaded fitting	Nickel-plated brass

Threaded fittings NPFC

Ordering data

Sleeve NPFC-S

Pneumatic connection	Part no.	Type	PU[1]
1 Female thread			
Metric thread			
M5	**8030290**	**NPFC-S-2M5-F**	**10**
G thread			
G1⁄8	**8030291**	**NPFC-S-2G18-F**	**10**
G1⁄4	**8030292**	**NPFC-S-2G14-F**	**10**
G3⁄8	**8030293**	**NPFC-S-2G38-F**	**10**
G1⁄2	**8030294**	**NPFC-S-2G12-F**	**10**
G3⁄4	**8030295**	**NPFC-S-2G34-F**	**10**

Reducing sleeve NPFC-R

Pneumatic connection		Part no.	Type	PU[1]
1 Female thread	2 Female thread			
G thread				
G1⁄8	M5	**8069219**	**NPFC-R-G18-M5-F**	**10**
G1⁄4	G1⁄8	**8069220**	**NPFC-R-G14-G18-F**	**10**
G3⁄8	G1⁄8	**8030296**	**NPFC-R-G38-G18-F**	**10**
	G1⁄4	**8069221**	**NPFC-R-G38-G14-F**	**10**
G1⁄2	G1⁄8	**8069222**	**NPFC-R-G12-G18-F**	**10**
	G1⁄4	**8069223**	**NPFC-R-G12-G14-F**	**10**
	G3⁄8	**8069224**	**NPFC-R-G12-G38-F**	**10**
G3⁄4	G1⁄2	**8030297**	**NPFC-R-G34-G12-F**	**10**
G1	G1⁄2	**8069225**	**NPFC-R-G1-G12-F**	**10**
	G3⁄4	**8069226**	**NPFC-R-G1-G34-F**	**10**

Extension NPFC-E

Pneumatic connection		Length	Part no.	Type	PU[1]
1 Female thread	2 Male thread	[mm]			
Metric thread, extension E1					
M5	M5	18.5	**8069218**	**NPFC-E1-2M5-FM**	**10**
G thread, extension E1					
G1⁄8	G1⁄8	22	**8030298**	**NPFC-E1-2G18-FM**	**10**
G1⁄4	G1⁄4	28	**8030299**	**NPFC-E1-2G14-FM**	**10**
G3⁄8	G3⁄8	32	**8030300**	**NPFC-E1-2G38-FM**	**10**
G1⁄2	G1⁄2	35	**8030301**	**NPFC-E1-2G12-FM**	**10**
G thread, extension E2					
G1⁄8	G1⁄8	32	**8030302**	**NPFC-E2-2G18-FM**	**10**
G1⁄4	G1⁄4	35	**8030303**	**NPFC-E2-2G14-FM**	**10**
G thread, extension E3					
G1⁄8	G1⁄8	42	**8030304**	**NPFC-E3-2G18-FM**	**10**
G1⁄4	G1⁄4	51	**8030305**	**NPFC-E3-2G14-FM**	**10**
G thread, extension E4					
G1⁄8	G1⁄8	51	**8030306**	**NPFC-E4-2G18-FM**	**10**

1) Packaging unit per part

Ordering data

Double nipple NPFC-D

Pneumatic connection		Part no.	Type	PU[1]
1 Male thread	2 Male thread			
Metric thread				
M3	M3	**8069210**	**NPFC-D-2M3-M**	**10**
M5	M5	**8030267**	**NPFC-D-2M5-M**	**10**
	G1⁄8	**8069211**	**NPFC-D-M5-G18-M**	**10**
M7	G1⁄8	**8030268**	**NPFC-D-M7-G18-M**	**10**
G thread				
G1⁄8	G1⁄8	**8030269**	**NPFC-D-2G18-M**	**10**
	G1⁄4	**8030270**	**NPFC-D-G18-G14-M**	**10**
	G3⁄8	**8030271**	**NPFC-D-G18-G38-M**	**10**
G1⁄4	G1⁄4	**8030272**	**NPFC-D-2G14-M**	**10**
	G3⁄8	**8030273**	**NPFC-D-G14-G38-M**	**10**
	G1⁄2	**8030274**	**NPFC-D-G14-G12-M**	**10**
G3⁄8	G3⁄8	**8030275**	**NPFC-D-2G38-M**	**10**
	G1⁄2	**8030276**	**NPFC-D-G38-G12-M**	**10**
G1⁄2	G1⁄2	**8030277**	**NPFC-D-2G12-M**	**10**
	G3⁄4	**8069216**	**NPFC-D-G12-G34-M**	**10**
G3⁄4	G3⁄4	**8069217**	**NPFC-D-2G34-M**	**10**
R thread				
R1⁄8	R1⁄8	**8030278**	**NPFC-D-2R18-M**	**10**
	R1⁄4	**8030279**	**NPFC-D-R18-R14-M**	**10**
	R3⁄8	**8030280**	**NPFC-D-R18-R38-M**	**10**
R1⁄4	R1⁄4	**8030281**	**NPFC-D-2R14-M**	**10**
	R3⁄8	**8030282**	**NPFC-D-R14-R38-M**	**10**
	R1⁄2	**8030283**	**NPFC-D-R14-R12-M**	**10**
R3⁄8	R3⁄8	**8030284**	**NPFC-D-2R38-M**	**10**
	R1⁄2	**8030285**	**NPFC-D-R38-R12-M**	**10**
R1⁄2	R1⁄2	**8030286**	**NPFC-D-2R12-M**	**10**
	R3⁄4	**8030287**	**NPFC-D-R12-R34-M**	**10**
R3⁄4	R3⁄4	**8030288**	**NPFC-D-2R34-M**	**10**
R1	R1	**8030289**	**NPFC-D-2R1-M**	**10**

Reducing nipple NPFC-R

Pneumatic connection		Part no.	Type	PU[1]
1 Female thread	2 Male thread			
G thread				
G1⁄8	M5	**8030314**	**NPFC-R-G18-M5-FM**	**10**
G1⁄4	G1⁄8	**8030315**	**NPFC-R-G14-G18-FM**	**10**
G3⁄8	G1⁄8	**8030316**	**NPFC-R-G38-G18-FM**	**10**
	G1⁄4	**8030317**	**NPFC-R-G38-G14-FM**	**10**
G1⁄2	G3⁄8	**8030318**	**NPFC-R-G12-G38-FM**	**10**

1) Packaging unit per part

Threaded fittings NPFC

Ordering data

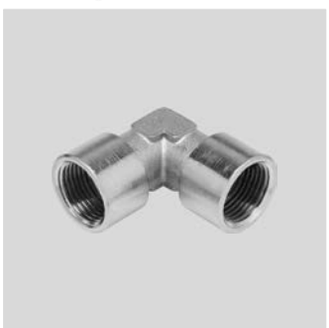
Reducing nipple NPFC-R

Pneumatic connection		Part no.	Type	PU[1]
1 Male thread	2 Female thread			
Metric thread				
M5	M3	**8069227**	**NPFC-R-M5-M3-MF**	**10**
M7	M5	**8069228**	**NPFC-R-M7-M5-MF**	**10**
G thread				
G1⁄8	M5	**8030307**	**NPFC-R-G18-M5-MF**	**10**
G1⁄4	M5	**8069229**	**NPFC-R-G14-M5-MF**	**10**
	G1⁄8	**8030308**	**NPFC-R-G14-G18-MF**	**10**
G3⁄8	G1⁄8	**8030309**	**NPFC-R-G38-G18-MF**	**10**
	G1⁄4	**8030310**	**NPFC-R-G38-G14-MF**	**10**
G1⁄2	G1⁄4	**8030311**	**NPFC-R-G12-G14-MF**	**10**
	G3⁄8	**8030312**	**NPFC-R-G12-G38-MF**	**10**
G3⁄4	G1⁄4	**8069234**	**NPFC-R-G34-G14-MF**	**10**
	G3⁄8	**8069235**	**NPFC-R-G34-G38-MF**	**10**
	G1⁄2	**8030313**	**NPFC-R-G34-G12-MF**	**10**
G1	G1⁄2	**8069237**	**NPFC-R-G1-G12-MF**	**10**
	G3⁄4	**8069238**	**NPFC-R-G1-G34-MF**	**10**

Bulkhead fitting NPFC-H

Pneumatic connection	Part no.	Type	PU[1]
1 Female thread			
Metric thread			
M5	**8069239**	**NPFC-H-M5-F**	**10**
G thread			
G1⁄8	**8069240**	**NPFC-H-G18-F**	**10**
G1⁄4	**8069241**	**NPFC-H-G14-F**	**10**
G3⁄8	**8069242**	**NPFC-H-G38-F**	**10**
G1⁄2	**8069243**	**NPFC-H-G12-F**	**10**

Elbow fitting NPFC-L



Pneumatic connection	Part no.	Type	PU[1]
1 Female thread			
Metric thread			
M5	**8030208**	**NPFC-L-2M5-F**	**10**
G thread			
G1⁄8	**8030209**	**NPFC-L-2G18-F**	**10**
G1⁄4	**8030210**	**NPFC-L-2G14-F**	**10**
G3⁄8	**8030211**	**NPFC-L-2G38-F**	**10**
G1⁄2	**8030212**	**NPFC-L-2G12-F**	**10**
G3⁄4	**8030213**	**NPFC-L-2G34-F**	**10**
G1	**8030214**	**NPFC-L-2G1-F**	**10**

1) Packaging unit per part

Ordering data

Elbow fitting NPFC-L

Pneumatic connection		Part no.	Type	PU[1]
1 Male thread	2 Female thread			
Metric thread				
M5	M5	**8030215**	**NPFC-L-2M5-MF**	**10**
R thread/G thread				
R1/8	G1/8	**8030216**	**NPFC-L-R18-G18-MF**	**10**
R1/4	G1/4	**8030217**	**NPFC-L-R14-G14-MF**	**10**
R3/8	G3/8	**8030218**	**NPFC-L-R38-G38-MF**	**10**
R1/2	G1/2	**8030219**	**NPFC-L-R12-G12-MF**	**10**
R3/4	G3/4	**8030220**	**NPFC-L-R34-G34-MF**	**10**
R1	G1	**8030221**	**NPFC-L-R1-G1-MF**	**10**

Elbow fitting NPFC-L

Pneumatic connection	Part no.	Type	PU[1]
1 Male thread			
Metric thread			
M5	**8030222**	**NPFC-L-2M5-M**	**10**
R thread			
R1/8	**8030223**	**NPFC-L-2R18-M**	**10**
R1/4	**8030224**	**NPFC-L-2R14-M**	**10**
R3/8	**8030225**	**NPFC-L-2R38-M**	**10**
R1/2	**8030226**	**NPFC-L-2R12-M**	**10**
R3/4	**8030227**	**NPFC-L-2R34-M**	**10**

T-fitting NPFC-T

Pneumatic connection	Part no.	Type	PU[1]
1 Female thread			
G thread			
G1/8	**8030235**	**NPFC-T-3G18-F**	**10**
G1/4	**8030236**	**NPFC-T-3G14-F**	**10**
G3/8	**8030237**	**NPFC-T-3G38-F**	**10**
G1/2	**8030238**	**NPFC-T-3G12-F**	**10**
G3/4	**8030239**	**NPFC-T-3G34-F**	**10**
G1	**8030240**	**NPFC-T-3G1-F**	**10**

T-fitting NPFC-T

Pneumatic connection		Part no.	Type	PU[1]
1 Female thread	2 Male thread			
Metric thread				
M5	M5	**8030245**	**NPFC-T-3M5-FMF**	**10**
G thread/R thread				
G1/8	R1/8	**8030246**	**NPFC-T-2G18-R18-FMF**	**10**
G1/4	R1/4	**8030247**	**NPFC-T-2G14-R14-FMF**	**10**
G3/8	R3/8	**8030248**	**NPFC-T-2G38-R38-FMF**	**10**
G1/2	R1/2	**8030249**	**NPFC-T-2G12-R12-FMF**	**10**
G3/4	R3/4	**8030250**	**NPFC-T-2G34-R34-FMF**	**10**
G1	R1	**8030251**	**NPFC-T-2G1-R1-FMF**	**10**

1) Packaging unit per part

Threaded fittings NPFC

Ordering data

T-fitting NPFC-T

Pneumatic connection		Part no.	Type	PU[1]
1 Female thread	2 Male thread			
G thread/R thread				
G1/8	R1/8	**8030255**	**NPFC-T-G18-2R18-FMM**	**10**
G1/4	R1/4	**8030256**	**NPFC-T-G14-2R14-FMM**	**10**
G3/8	R3/8	**8030257**	**NPFC-T-G38-2R38-FMM**	**10**
G1/2	R1/2	**8030258**	**NPFC-T-G12-2R12-FMM**	**10**

T-fitting NPFC-T

Pneumatic connection	Part no.	Type	PU[1]
1 Male thread			
R thread			
R1/4	**8030252**	**NPFC-T-3R14-M**	**10**
R3/8	**8030253**	**NPFC-T-3R38-M**	**10**
R1/2	**8030254**	**NPFC-T-3R12-M**	**10**

T-fitting NPFC-T

Pneumatic connection		Part no.	Type	PU[1]
1 Male thread	2 Female thread			
R thread/G thread				
R1/8	G1/8	**8030259**	**NPFC-T-2R18-G18-MMF**	**10**
R1/4	G1/4	**8030260**	**NPFC-T-2R14-G14-MMF**	**10**
R1/2	G1/2	**8030261**	**NPFC-T-2R12-G12-MMF**	**10**

T-fitting NPFC-T

Pneumatic connection		Part no.	Type	PU[1]
1 Male thread	2 Female thread			
Metric thread				
M5	M5	**8069244**	**NPFC-T-M5-MFF**	**10**
R thread/G thread				
R1/8	G1/8	**8030241**	**NPFC-T-R18-2G18-MFF**	**10**
R1/4	G1/4	**8030242**	**NPFC-T-R14-2G14-MFF**	**10**
R3/8	G3/8	**8030243**	**NPFC-T-R38-2G38-MFF**	**10**
R1/2	G1/2	**8030244**	**NPFC-T-R12-2G12-MFF**	**10**

1) Packaging unit per part

Ordering data

Y-fitting NPFC-Y

Pneumatic connection	Part no.	Type	PU[1]
1 Female thread			
G thread			
G¼	**8030228**	**NPFC-Y-3G14-F**	**10**
G⅜	**8030229**	**NPFC-Y-3G38-F**	**10**
G½	**8030230**	**NPFC-Y-3G12-F**	**10**

Y-fitting NPFC-Y

Pneumatic connection		Part no.	Type	PU[1]
1 Male thread	2 Female thread			
R thread/G thread				
R⅛	G⅛	**8030231**	**NPFC-Y-R18-2G18-MFF**	**10**
R¼	G¼	**8030232**	**NPFC-Y-R14-2G14-MFF**	**10**
R⅜	G⅜	**8030233**	**NPFC-Y-R38-2G38-MFF**	**10**
R½	G½	**8030234**	**NPFC-Y-R12-2G12-MFF**	**10**

X-fitting NPFC-X

Pneumatic connection	Part no.	Type	PU[1]
1 Female thread			
G thread			
G¼	**8030262**	**NPFC-X-4G14-F**	**10**
G⅜	**8030263**	**NPFC-X-4G38-F**	**10**
G½	**8030264**	**NPFC-X-4G12-F**	**10**

X-fitting NPFC-X

Pneumatic connection		Part no.	Type	PU[1]
1 Male thread	2 Female thread			
R thread/G thread				
R¼	G¼	**8030265**	**NPFC-X-R14-3G14-MFFF**	**10**
R½	G½	**8030266**	**NPFC-X-R12-3G12-MFFF**	**10**

1) Packaging unit per part

Blanking plugs B ★

Data sheet

Materials			
Type	B-M3-S9	B-M5	B-M5-B, B-M7, B with G thread
Blanking plug	High-alloy stainless steel	Galvanised steel	Galvanised steel

★ Quick ordering [1)]

Blanking plug B

Pneumatic connection		Part no.	Type	PU[2)]
1 Male thread				
Metric thread with sealing ring				
M3	With external hex	**30979**	**B-M3-S9**	**10**
M5	With external hex	**3843**	**B-M5**	**10**
	With internal hex	**174308**	**B-M5-B**	**10**
M7	With internal hex	**174309**	**B-M7**	**10**
G thread with sealing ring				
G⅛	With internal hex	**3568**	**B-1/8**	**10**
G¼	With internal hex	**3569**	**B-1/4**	**10**
G⅜	With internal hex	**3570**	**B-3/8**	**10**
G½	With internal hex	**3571**	**B-1/2**	**10**
G¾	With internal hex	**3572**	**B-3/4**	**1**
G1	With internal hex	**5763**	**B-1**	**1**

1) All products in this table are easy to select and quick to order.

2) Packaging unit per part

The fast and economical coupling system

+ Energy-efficient connection with minimal pressure drop
+ Shut off at one or both ends

Couplings ›

Quick coupling sockets/plugs

NPHS ★
KD/KS ★

Couplings ›

Quick coupling sockets/plugs

NPHS★, KD / KS★

Overview, configuration and ordering
➔ **www.festo.com/catalogue/couplings** ✓

Additional information, support and user documentation
➔ **www.festo.com/sp/couplings** ✓

★ Quick ordering of basic designs
➔ page 1516, 1518 ✓

- \+ NPHS: certified by IFA (German Institute for Occupational Health and Safety)
- \+ Quick connection coupling for standard applications without safety function
- \+ With male or female thread or with barbed fitting or quick connector
- \+ Shut off at one or both ends

Product range overview

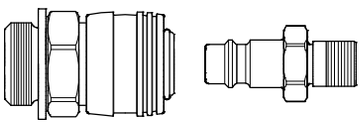
Quick coupling socket/plug	Pneumatic connection 1				Standard nominal flow rate [l/min]	➔ Page/ online
	Male thread	Female thread	Quick connector with union nut	Barbed fitting		
Plug-in coupling, shut off at one end						
KD1/KS1	■/–	–	–	–/■	44	1514
KD2/KS2	■/■	■/■	■/■	–	68 ... 135	
KD3/KS3	■/■	■/■	■/■	–	158 ... 666	
KD4/KS4	■/■	■/■	■/■	■/■	252 ... 1350	
Plug-in coupling, shut-off at both ends						
KD3/KS3	■/■	–	–	–	563	1514
KD4/KS4	■/■	–	–	–	765	
Safety coupling, shut-off at one end						
NPHS-D6/ NPHS-S6	■/■	■/■	–	■/■	875 ... 2100	1517

Quick coupling sockets/plugs KD/KS ★

Key features

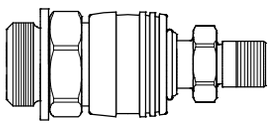
Mode of operation

Coupling



To lock the coupling, push the plug into the socket. The plug automatically engages with an audible click when in a specific position.

Decoupling



To unlock, push the releasing sleeve.

When removing the quick coupling plug, it is important to hold it until it is fully exhausted.

Note
The maximum pressure that should be applied when mating and releasing the couplings is 10 bar.

Note
Quick coupling sockets and plugs with the same function and size are compatible.

Data sheet

Operating conditions		
Operating medium		Compressed air to ISO 8573-1:2010 [7:–:–]
Note on operating/pilot medium		Operation with lubricated medium possible
Operating pressure for entire temperature range	[bar]	–0.95 ... +12
Ambient temperature	[°C]	–10 ... +60

Materials				
Quick coupling socket/plug	Plug-in coupling, shut-off at one end			
	KD1/KS1	KD2/KS2	KD3/KS3	KD4/KS4
Quick coupling socket housing	Nickel-plated brass	Nickel-plated brass	Nickel-plated brass	Nickel-plated brass
Quick coupling plug housing	Nickel-plated brass	Nickel-plated brass	Nickel-plated brass	Nickel-plated brass
Releasing sleeve	Nickel-plated brass	Nickel-plated brass	Nickel-plated brass	PP

Quick coupling socket/plug	Plug-in coupling, shut-off at both ends	
	KD3/KS3	KD4/KS4
Quick coupling socket housing	Brass	Brass
Quick coupling plug housing	Brass	Brass
Releasing sleeve	Nickel-plated brass	PP

Coupling/tubing combination options								
Pneumatic connection 1			CN-2	CK-3	CK-4	CK-6, N-6	CK-9, N-9	➔ Page/ online
For tubing O.D.	[mm]	PAN	–	4	6	8	–	pan
	[mm]	PUN	3	4	6	8	–	1433
For tubing I.D.	[mm]	PU	–	–	–	–	9	pu

Ordering data – Plug-in coupling, shut-off at one end

Quick coupling socket/plug KD1/KS1

Pneumatic connection 1	Quick coupling socket			Quick coupling plug		
	Nominal width [mm]	Part no.	Type	Nominal width [mm]	Part no.	Type
Male thread						
M3	1.5	**151995**	**KD1-M3-A**	–	**–**	**–**
Barbed fitting						
CN-2	–	**–**	**–**	1.5	**151996**	**KS1-CN-2**

Quick coupling socket/plug KD2/KS2

Pneumatic connection 1	Quick coupling socket			Quick coupling plug		
	Nominal width [mm]	Part no.	Type	Nominal width [mm]	Part no.	Type
Male thread						
M5	2.4	**4087**	**KD2-M5-A**	2.4	**531658**	**KS2-M5-A**
Female thread						
M5	2.7	**531620**	**KD2-M5-I**	2.7	**531660**	**KS2-M5-I**
Quick connector with union nut						
CK-3	2	**531621**	**KD2-CK-3**	2	**4091**	**KS2-CK-3**
CK-4	2.9	**531622**	**KD2-CK-4**	2.7	**4090**	**KS2-CK-4**

Quick coupling socket/plug KD3/KS3

Pneumatic connection 1	Quick coupling socket			Quick coupling plug		
	Nominal width [mm]	Part no.	Type	Nominal width [mm]	Part no.	Type
Male thread						
G⅛	4.95	**2142**	**KD3-1/8-A**	4.95	**3492**	**KS3-1/8-A**
G¼	5	**531626**	**KD3-1/4-A**	4.95	**531666**	**KS3-1/4-A**
Female thread						
G⅛	5	**531627**	**KD3-1/8-I**	4.95	**531668**	**KS3-1/8-I**
G¼	5	**531628**	**KD3-1/4-I**	4.95	**531669**	**KS3-1/4-I**
Quick connector with union nut						
CK-4	2.9	**531629**	**KD3-CK-4**	2.9	**3326**	**KS3-CK-4**
CK-6	4.9	**531630**	**KD3-CK-6**	4.9	**3478**	**KS3-CK-6**

Quick coupling sockets/plugs KD/KS ★

Ordering data – Plug-in coupling, shut-off at one end

Quick coupling socket/plug KD4/KS4

Pneumatic connection 1	Quick coupling socket				Quick coupling plug		
	Nominal width [mm]		Part no.	Type	Nominal width [mm]	Part no.	Type
Male thread							
G¼	8	★	**2143**	**KD4-1/4-A**	7.85	**2154**	**KS4-1/4-A**
G⅜	10	★	**2144**	**KD4-3/8-A**	7.85	**2155**	**KS4-3/8-A**
G½	10	★	**2145**	**KD4-1/2-A**	7.85	**531676**	**KS4-1/2-A**
Female thread							
G¼	7.2		**531636**	**KD4-1/4-I**	7.85	**531678**	**KS4-1/4-I**
G⅜	7.2		**531637**	**KD4-3/8-I**	7.85	**531679**	**KS4-3/8-I**
G½	7.2		**531638**	**KD4-1/2-I**	7.85	**531680**	**KS4-1/2-I**
Quick connector with union nut							
CK-4	–		**–**	**–**	2.9	**2150**	**KS4-CK-4**
CK-6	4.9		**531639**	**KD4-CK-6**	4.9	**2151**	**KS4-CK-6**
CK-9	7.4		**531640**	**KD4-CK-9**	7.4	**531683**	**KS4-CK-9**
Barbed fitting							
N-6	–		**–**	**–**	4.5	**2152**	**KS4-N-6**
N-9	7.4		**531641**	**KD4-N-9**	7	**2153**	**KS4-N-9**

Ordering data – Plug-in coupling, shut-off at both ends

Quick coupling socket/plug KD3/KS3

Pneumatic connection 1	Quick coupling socket			Quick coupling plug		
	Nominal width [mm]	Part no.	Type	Nominal width [mm]	Part no.	Type
Male thread						
G⅛	5	**531659**	**KD3-1/8-A-R**	4.2	**531667**	**KS3-1/8-A-R**

Quick coupling socket/plug KD4/KS4

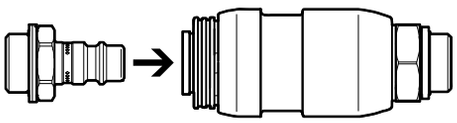
Pneumatic connection 1	Quick coupling socket			Quick coupling plug		
	Nominal width [mm]	Part no.	Type	Nominal width [mm]	Part no.	Type
Male thread						
G¼	8	**531694**	**KD4-1/4-A-R**	8	**531677**	**KS4-1/4-A-R**

Key features

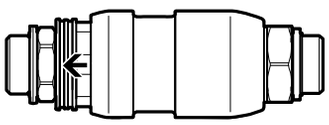
Mode of operation

Quick coupling socket NPHS-D6-M and quick coupling plug NPHS-S6

Coupling

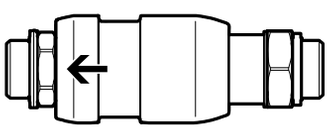


To lock the coupling, push the plug into the socket. The plug automatically engages with an audible click when in a specific position.



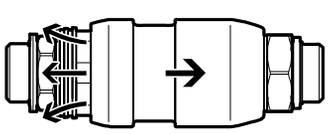
When the plug is engaged, the releasing sleeve shifts one position in the direction of the plug. This releases the locking mechanism between the releasing sleeve and the sliding sleeve. The sliding sleeve can now be actuated.

Pressurising



To pressurise, push the sliding sleeve in the direction of the plug.

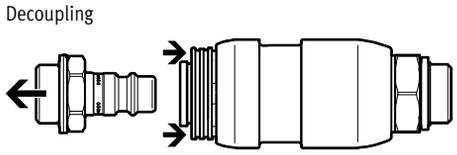
Exhausting



To exhaust, push the sliding sleeve in the direction of the thread on the quick coupling socket. The air from the plug and the components connected to it can escape. The air on the coupling side is shut off. The releasing sleeve can now be accessed.

Special features:
To repressurise the plug, the sliding sleeve must be pushed in the direction of the plug once more. It is not necessary to release the plug from the socket completely before doing this. This safety coupling can thus be used as an on-off valve, for example.

Decoupling

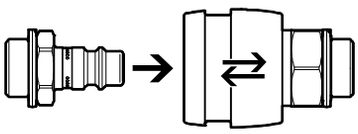


Unlock the plug fully by pushing the releasing sleeve. The plug should only be removed after all the air has been exhausted. With the plug removed, the two sleeves cannot slide or be pushed.

Note
Pressurise or exhaust the coupling to a maximum of 10 bar only. Hearing protection is recommended, especially at higher operating pressures.

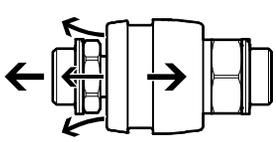
Quick coupling socket NPHS-D6-P and quick coupling plug NPHS-S6

Coupling



To lock the coupling, push the plug into the socket. The plug automatically engages with an audible click when in a specific position. In the process, the releasing sleeve moves briefly backwards and then forwards again.

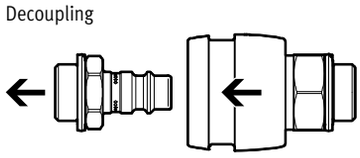
Exhausting



To exhaust, first push the releasing sleeve in the direction of the thread on the quick coupling socket. This releases the pin locking mechanism of the coupling. The plug moves approx. 5 mm out of the coupling and is held in this position by the ball locking mechanism of the coupling. The air from the plug and the components connected to it can escape. The air on the coupling side is shut off.

Special features:
To repressurise the plug, it must be pushed into the socket once more. It is not necessary to release the plug from the socket completely before doing this.

Decoupling



Next release the plug from the ball locking mechanism by pulling the releasing sleeve. This releases the plug completely so that it can be removed from the socket. The plug should only be removed after all the air has been exhausted.

Quick coupling sockets/plugs NPHS ★

Data sheet

Operating conditions

	Quick coupling socket		Quick coupling plug
	Plastic releasing sleeve	Metal releasing sleeve	
Operating medium	Compressed air to ISO 8573-1:2010 [7:–:–]		
Note on operating/pilot medium	Operation with lubricated medium possible		
Operating pressure for entire temperature range [bar]	–0.95 … +10	–0.95 … +20[1)]	–0.95 … +10 (–0.95 … +20)[2)]
Ambient temperature [°C]	–10 … +60	–20 … +80	–10 … +60 (–20 … +100)[2)]

1) Pressurise or exhaust the coupling to a maximum of 10 bar only. Hearing protection is recommended, especially at higher operating pressures. 20 bar is the maximum static operating pressure (without pulsation).
2) Using a suitable sealing ring (e.g. sealing ring OL), it is possible to achieve a static operating pressure (without pulsation) of up to 20 bar in a temperature range of –20°C to +100°C.

Materials

	Quick coupling socket		Quick coupling plug
	Plastic releasing sleeve	Metal releasing sleeve	
Housing	Nickel-plated brass	Nickel-plated brass	Hardened galvanised steel
Releasing sleeve	PP	Nickel-plated brass	–
Sliding sleeve	–	Colourless anodised aluminium	–

Note

All types of quick coupling socket NPHS-D6 are compatible with all plugs NPHS-S6.

In addition, the quick coupling sockets NPHS-D6-M and all quick coupling plugs NPHS-S6 can be combined with quick coupling sockets/plugs KD4/KS4 made of brass.

In contrast, the quick coupling sockets NPHS-D6-P may only be used with the hardened quick coupling plugs NPHS-S6.

No safety function when combining quick coupling socket KD4 with quick coupling plug NPHS-S6. In this combination, the plug is released directly in one step.

Ordering data – Safety coupling, shut-off at one end

Quick coupling socket NPHS-D6

NPHS-D6-P

NPHS-D6-M

Pneumatic connection 1	Plastic releasing sleeve: Nominal width [mm]		Part no.	Type	Metal releasing sleeve: Nominal width [mm]	Part no.	Type
Male thread							
G1/8	5		**8059266**	**NPHS-D6-P-G18**	–	**–**	**–**
G1/4	7.8	★	**8059267**	**NPHS-D6-P-G14**	8.2	**8059275**	**NPHS-D6-M-G14**
G3/8	10.2	★	**8059268**	**NPHS-D6-P-G38**	10	**8059276**	**NPHS-D6-M-G38**
G1/2	11	★	**8059269**	**NPHS-D6-P-G12**	10	**8059277**	**NPHS-D6-M-G12**
Female thread							
G1/4	–		**8059271**	**NPHS-D6-P-G14F**	–	**–**	**–**
G3/8	–		**8059272**	**NPHS-D6-P-G38F**	–	**–**	**–**
G1/2	–		**8059273**	**NPHS-D6-P-G12F**	–	**–**	**–**
For plug-in nipple							
N-9	7		**8059274**	**NPHS-D6-P-BC9**	–	**–**	**–**

Quick coupling plug NPHS-S6

Pneumatic connection 1	Nominal width [mm]		Part no.	Type
Male thread				
G1/8	5.5	★	**8059257**	**NPHS-S6-M-G18**
G1/4	7.85	★	**8059258**	**NPHS-S6-M-G14**
G3/8	7.85	★	**8059259**	**NPHS-S6-M-G38**
G1/2	7.85	★	**8059260**	**NPHS-S6-M-G12**
Female thread				
G1/4	7.85	★	**8059262**	**NPHS-S6-M-G14F**
G3/8	7.85	★	**8059263**	**NPHS-S6-M-G38F**
G1/2	7.85	★	**8059264**	**NPHS-S6-M-G12F**
For plug-in nipple				
N-9	7		**8059265**	**NPHS-S6-M-BC9**

QSLV

QSQ

Distribution of compressed air with maximum power density

+ Compact design
+ High flow rates

Distributors ›

Multiple distributors

QSLV
QSQ

Multiple distributors

QSLV/QSQ

Overview, configuration and ordering
➔ **www.festo.com/catalogue/**qslv

Additional information, support and user documentation
➔ **www.festo.com/sp/**qslv

- + Standard series
- + Temperature range up to 80°C
- + L-shape, T-shape
- + Rotatable 360°
- + Connection via threaded or push-in connector
- + Reducing design
- + Suitable for use with water as an operating medium

Key features

The fitting can be aligned after assembly.

Product range overview

Type	Version	Design	Pneumatic connection 1			Pneumatic connection 2	➔ Page/ online
			R thread	G thread	Tubing O.D.	Tubing O.D.	
QSQ	Multiple distributor, 4 outlets	Straight	■	■	■	■	1522
QSLV2	Multiple distributor, 2 outlets	L-shape	■	■	–	■	1523
QSLV3	Multiple distributor, 3 outlets		■	■	–	■	
QSLV4	Multiple distributor, 4 outlets		■	■	–	■	1524
QSLV6	Multiple distributor, 6 outlets		■	■	–	■	
QST3	Multiple distributor, 4 outlets		■	■	■	■	qst3
QSYTF	Multiple distributor, 3 outlets		■	■	–	■	qsytf

Data sheet

Operating conditions		
Operating medium		Compressed air to ISO 8573-1:2010 [7:–:–]
		Water as per manufacturer's declaration[1)]
Note on operating/pilot medium		Operation with lubricated medium possible
Operating pressure for entire temperature range	[bar]	–0.95 ... +6
Temperature-dependent operating pressure	[bar]	–0.95 ... +14
Ambient temperature	[°C]	–10 ... +80

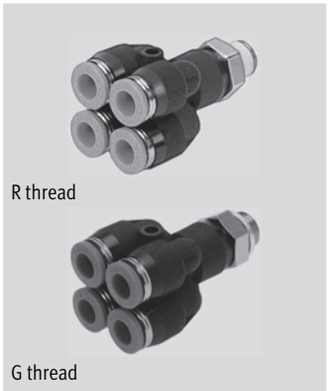
1) Additional information www.festo.com/sp ➔ Certificates.

Materials	
Housing	PBT
Releasing ring	POM
Tube retaining claw	High-alloy stainless steel
Tubing seal	NBR

Ordering data

Multiple distributor QSQ

4 outlets, rotatable



R thread

G thread

Pneumatic connection		Nominal width [mm]	Part no.	Type	PU[1]
1 Male thread	2 Tubing O.D. [mm]				
R thread					
R⅛	4	2.6	**153206**	**QSQ-1/8-4**	**1**
	6	5.2	**153208**	**QSQ-1/8-6**	**1**
R¼	4	2.6	**153207**	**QSQ-1/4-4**	**1**
	6	5.2	**153288**	**QSQ-1/4-6**	**1**
G thread with sealing ring					
G⅛	4	2.6	**186220**	**QSQ-G1/8-4**	**1**
	6	5.2	**186222**	**QSQ-G1/8-6**	**1**
G¼	4	2.6	**186221**	**QSQ-G1/4-4**	**1**
	6	5.2	**186263**	**QSQ-G1/4-6**	**1**

Pneumatic connection		Nominal width [mm]	Part no.	Type	PU[1]
1 Tubing O.D. [mm]	2 Tubing O.D. [mm]				
Push-in connector, reducing					
6	4	1.4	**153209**	**QSQ-6-4**	**1**
8	6	3.2	**153210**	**QSQ-8-6**	**1**

1) Packaging unit per part

Ordering data

Multiple distributor QSLV2

2 outlets, rotatable

R thread

G thread

Pneumatic connection		Nominal width [mm]	Part no.	Type	PU[1]
1 Male thread	2 Tubing O.D. [mm]				
R thread					
R1/8	4	2.4	**153211**	**QSLV2-1/8-4**	**1**
	6	3.2	**153212**	**QSLV2-1/8-6**	**1**
	8	4.2	**153214**	**QSLV2-1/8-8**	**1**
R1/4	6	3.2	**153213**	**QSLV2-1/4-6**	**1**
	8	4.3	**153215**	**QSLV2-1/4-8**	**1**
	10	5.2	**153217**	**QSLV2-1/4-10**	**1**
R3/8	8	4.3	**153216**	**QSLV2-3/8-8**	**1**
	10	5.3	**153218**	**QSLV2-3/8-10**	**1**
	12	6.3	**153219**	**QSLV2-3/8-12**	**1**
R1/2	12	6.4	**153220**	**QSLV2-1/2-12**	**1**
G thread with sealing ring					
G1/8	4	2.4	**186223**	**QSLV2-G1/8-4**	**1**
	6	3.2	**186224**	**QSLV2-G1/8-6**	**1**
	8	4.2	**186226**	**QSLV2-G1/8-8**	**1**
G1/4	6	3.2	**186225**	**QSLV2-G1/4-6**	**1**
	8	4.3	**186227**	**QSLV2-G1/4-8**	**1**
	10	5.2	**186229**	**QSLV2-G1/4-10**	**1**
G3/8	8	4.3	**186228**	**QSLV2-G3/8-8**	**1**
	10	5.3	**186230**	**QSLV2-G3/8-10**	**1**
	12	6.3	**186231**	**QSLV2-G3/8-12**	**1**
G1/2	12	6.4	**186232**	**QSLV2-G1/2-12**	**1**

Multiple distributor QSLV3

3 outlets, rotatable

R thread

G thread

Pneumatic connection		Nominal width [mm]	Part no.	Type	PU[1]
1 Male thread	2 Tubing O.D. [mm]				
R thread					
R1/8	4	2.4	**153221**	**QSLV3-1/8-4**	**1**
	6	3.2	**153222**	**QSLV3-1/8-6**	**1**
	8	4.3	**153224**	**QSLV3-1/8-8**	**1**
R1/4	6	3.2	**153223**	**QSLV3-1/4-6**	**1**
	8	4.2	**153225**	**QSLV3-1/4-8**	**1**
	10	5.2	**153227**	**QSLV3-1/4-10**	**1**
R3/8	8	4.3	**153226**	**QSLV3-3/8-8**	**1**
	10	5.3	**153228**	**QSLV3-3/8-10**	**1**
	12	6.4	**153229**	**QSLV3-3/8-12**	**1**
R1/2	12	6.5	**153230**	**QSLV3-1/2-12**	**1**
G thread with sealing ring					
G1/8	4	2.4	**186233**	**QSLV3-G1/8-4**	**1**
	6	3.2	**186234**	**QSLV3-G1/8-6**	**1**
	8	4.3	**186236**	**QSLV3-G1/8-8**	**1**
G1/4	6	3.2	**186235**	**QSLV3-G1/4-6**	**1**
	8	4.2	**186237**	**QSLV3-G1/4-8**	**1**
	10	5.2	**186239**	**QSLV3-G1/4-10**	**1**
G3/8	8	4.3	**186238**	**QSLV3-G3/8-8**	**1**
	10	5.3	**186240**	**QSLV3-G3/8-10**	**1**
	12	6.4	**186241**	**QSLV3-G3/8-12**	**1**
G1/2	12	6.5	**186242**	**QSLV3-G1/2-12**	**1**

1) Packaging unit per part

Ordering data

Multiple distributor QSLV4

4 outlets, rotatable

R thread

G thread

Pneumatic connection		Nominal width	Part no.	Type	PU[1]
1 Male thread	2 Tubing O.D. [mm]	[mm]			
R thread					
R1/8	4	2.3	**153231**	**QSLV4-1/8-4**	**1**
	6	2.9	**153232**	**QSLV4-1/8-6**	**1**
	8	4	**153234**	**QSLV4-1/8-8**	**1**
R1/4	6	2.9	**153233**	**QSLV4-1/4-6**	**1**
	8	4.1	**153235**	**QSLV4-1/4-8**	**1**
	10	5	**153237**	**QSLV4-1/4-10**	**1**
R3/8	8	4.1	**153236**	**QSLV4-3/8-8**	**1**
	10	5.1	**153238**	**QSLV4-3/8-10**	**1**
	12	6	**153239**	**QSLV4-3/8-12**	**1**
R1/2	12	6.2	**153240**	**QSLV4-1/2-12**	**1**
G thread with sealing ring					
G1/8	4	2.3	**186243**	**QSLV4-G1/8-4**	**1**
	6	2.9	**186244**	**QSLV4-G1/8-6**	**1**
	8	4	**186246**	**QSLV4-G1/8-8**	**1**
G1/4	6	2.9	**186245**	**QSLV4-G1/4-6**	**1**
	8	4.1	**186247**	**QSLV4-G1/4-8**	**1**
	10	5	**186249**	**QSLV4-G1/4-10**	**1**
G3/8	8	4.1	**186248**	**QSLV4-G3/8-8**	**1**
	10	5.1	**186250**	**QSLV4-G3/8-10**	**1**
	12	6	**186251**	**QSLV4-G3/8-12**	**1**
G1/2	12	6.2	**186252**	**QSLV4-G1/2-12**	**1**

Multiple distributor QSLV6

6 outlets, rotatable

R thread

G thread

Pneumatic connection		Nominal width	Part no.	Type	PU[1]
1 Male thread	2 Tubing O.D. [mm]	[mm]			
R thread					
R1/8	4	2.3	**153241**	**QSLV6-1/8-4**	**1**
	6	2.9	**153242**	**QSLV6-1/8-6**	**1**
	8	4	**153244**	**QSLV6-1/8-8**	**1**
R1/4	6	2.9	**153243**	**QSLV6-1/4-6**	**1**
	8	4	**153245**	**QSLV6-1/4-8**	**1**
	10	5.2	**153247**	**QSLV6-1/4-10**	**1**
R3/8	8	4.1	**153246**	**QSLV6-3/8-8**	**1**
	10	5.2	**153248**	**QSLV6-3/8-10**	**1**
	12	6.3	**153249**	**QSLV6-3/8-12**	**1**
R1/2	12	6.3	**153250**	**QSLV6-1/2-12**	**1**
G thread with sealing ring					
G1/8	4	2.3	**186253**	**QSLV6-G1/8-4**	**1**
	6	2.9	**186254**	**QSLV6-G1/8-6**	**1**
	8	4	**186256**	**QSLV6-G1/8-8**	**1**
G1/4	6	2.9	**186255**	**QSLV6-G1/4-6**	**1**
	8	4	**186257**	**QSLV6-G1/4-8**	**1**
	10	5.2	**186259**	**QSLV6-G1/4-10**	**1**
G3/8	8	4.1	**186258**	**QSLV6-G3/8-8**	**1**
	10	5.2	**186260**	**QSLV6-G3/8-10**	**1**
	12	6.3	**186261**	**QSLV6-G3/8-12**	**1**
G1/2	12	6.3	**186262**	**QSLV6-G1/2-12**	**1**

1) Packaging unit per part

Prevent leakages simply and reliably

+ Two-component sealing rings ensure zero leakage
+ Thread sealing tape for flexible sealing

Accessories for pneumatic connection technology ›

Sealing materials

GWB

Thread sealing tape

O

Sealing rings

ZRS

Pipe and tubing cutters

Sealing materials

GWB/O

Overview, configuration and ordering
➔ **www.festo.com/catalogue/**pn_acc

Additional information, support and user documentation
➔ **www.festo.com/sp/**pn_acc

+ Sealing materials
+ Pipe and tubing cutters
+ Tubing accessories
+ Pipe accessories

Product range overview

Type	Function	M3	M5	M7	G1⁄8	G1⁄4	G3⁄8	G1⁄2	G3⁄4	G1	➔ Page/ online
Sealing material											
GWB	Thread sealing tape	–									1527
O	Sealing ring	■	■	–	■	■	■	■	■	■	
CRO	Sealing ring	–	■	–	■	■	■	■	■	■	
OL	Sealing ring, sealing ring assortment	–	■	–	■	■	■	■	■	–	1528
OK	Sealing ring, sealing ring assortment	■	■	■	■	■	■	■	■	–	
NPAS	Sealing ring	–	–	–	■	■	■	–	–	–	1499

Ordering data

Thread sealing tape GWB-0,1

Width [mm]	Thickness [mm]	Length [m]	Part no.	Type
10	0.1	12.5	**9076**	**GWB-0,1**

Sealing ring O/CRO

For thread	Part no.	Type	PU[1)]
PA			
M3	**30290**	**O-M3-B**	**1**
PVC			
M5	**3565**	**O-M5**	**1**
	534226	**O-M5-500**	**500**
G1⁄8	**2223**	**O-1/8**	**1**
	534227	**O-1/8-500**	**500**
G1⁄4	**2224**	**O-1/4**	**1**
	534228	**O-1/4-200**	**200**
G3⁄8	**2225**	**O-3/8**	**1**
	534229	**O-3/8-200**	**200**
G1⁄2	**2226**	**O-1/2**	**1**
	534230	**O-1/2-100**	**100**
G3⁄4	**2227**	**O-3/4**	**1**
G1	**210893**	**O-1**	**1**
PVDF			
M5	**165191**	**CRO-M5**	**1**
G1⁄8	**575895**	**CRO-1/8**	**1**
G1⁄4	**165193**	**CRO-1/4**	**1**
G3⁄8	**165194**	**CRO-3/8**	**1**
G1⁄2	**165195**	**CRO-1/2**	**1**
G3⁄4	**165196**	**CRO-3/4**	**1**
G1	**165197**	**CRO-1**	**1**

1) Packaging unit per part

Ordering data

Sealing ring OL

with metal body, based on standard ISO 16030

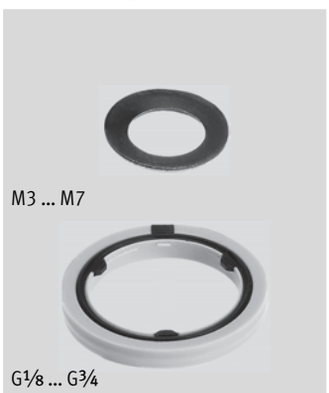
For thread	Part no.	Type	PU[1]
Stainless steel, NBR			
M5	**34634**	**OL-M5**	**1**
	534231	**OL-M5-500**	**500**
G1⁄8	**33840**	**OL-1/8**	**1**
	534232	**OL-1/8-500**	**500**
G1⁄4	**34635**	**OL-1/4**	**1**
	534233	**OL-1/4-200**	**200**
Aluminium, NBR			
G3⁄8	**34636**	**OL-3/8**	**1**
	534234	**OL-3/8-200**	**200**
G1⁄2	**34637**	**OL-1/2**	**1**
	534235	**OL-1/2-100**	**100**
G3⁄4	**34638**	**OL-3/4**	**1**

Sealing ring assortment OL-S1

Contents	Quantity	Part no.	Type
OL-M5	50	**161355**	**OL-S1**
OL-1/8	100		
OL-1/4	100		
OL-3/8	40		
OL-1/2	30		
OL-3/4	10		

Sealing ring OK

with support ring, based on standard ISO 16030



M3 ... M7

G1⁄8 ... G3⁄4

For thread	Part no.	Type	PU[1]
Stainless steel, NBR			
M3	**130849**	**OK-M3**	**1**
M5	**130850**	**OK-M5**	**1**
M7	**130851**	**OK-M7**	**1**
PA, TPE-U(PU)			
G1⁄8	**531771**	**OK-1/8**	**1**
G1⁄4	**531772**	**OK-1/4**	**1**
G3⁄8	**531773**	**OK-3/8**	**1**
G1⁄2	**531774**	**OK-1/2**	**1**
G3⁄4	**531775**	**OK-3/4**	**1**

Sealing ring assortment OK-S1

Contents	Quantity	Part no.	Type
OK-M3	50	**570465**	**OK-S1**
OK-M5	100		
OK-M7	50		
OK-1/8	100		
OK-1/4	100		
OK-3/8	40		
OK-1/2	30		
OK-3/4	10		

1) Packaging unit per part

Product range overview

Type	Function		➔ Page/ online
Tools			
ZRS	Pipe and tubing cutter	For cutting plastic and nitrile rubber tubing with outside diameters of up to 20 mm, with or without textile insert. It is not suitable for tubing with metal casing.	1529
PAN-V0S	Tubing cutter	For flame-retardant PAN-V0 tubing	zds
ZDS	Disconnecting pliers	For removing plastic tubing from barbed fittings	
ZMS	Connecting pliers	For connecting plastic tubing to barbed fittings	
ZR	Pipe cutter	For cutting plastic pipes PQ-PA with outside diameters of up to 28 mm	

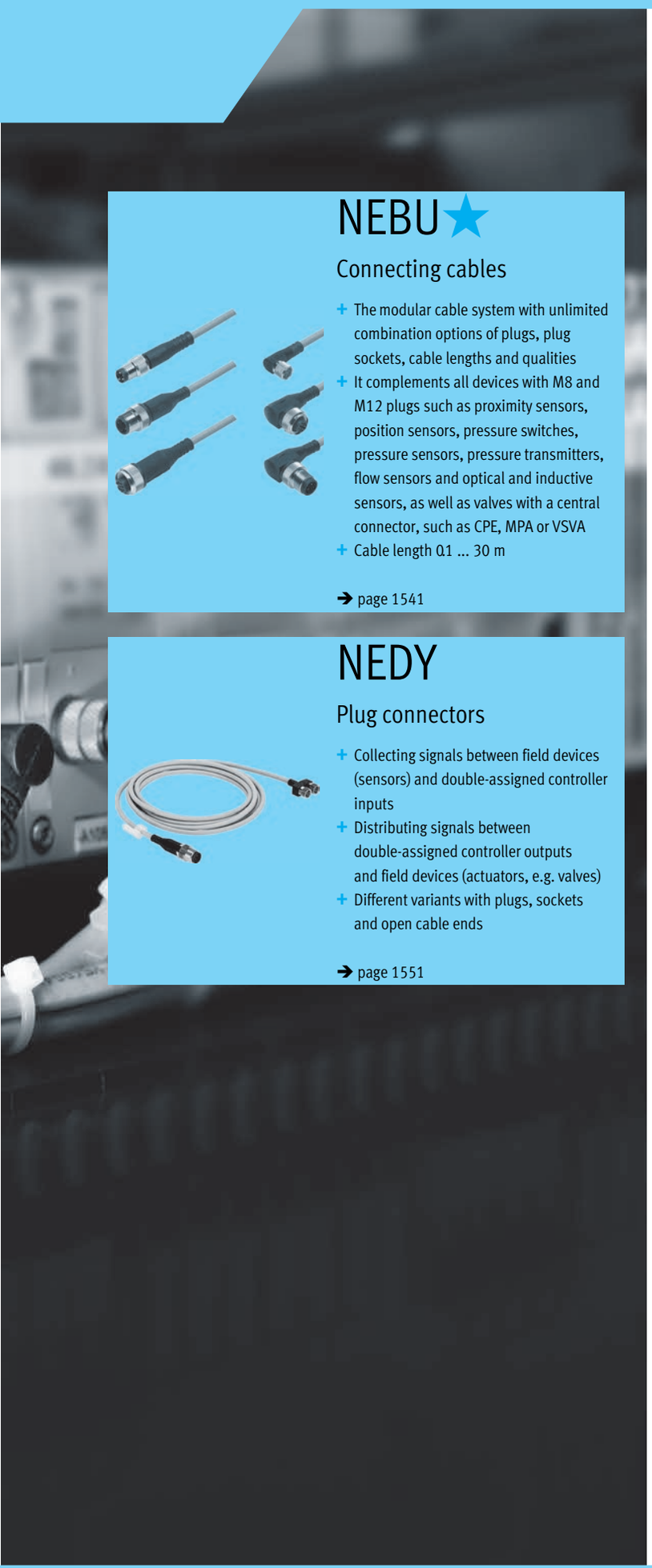
Ordering data

Pipe and tubing cutter ZRS

	Part no.	Type
Pipe and tubing cutter with 2 spare blades	**7658**	**ZRS**
10 spare blades for pipe and tubing cutter	**218606**	**ZRS 10PACK.**

15 Electrical connector technology

- Universal connecting cables
- Connecting cables for controllers, sensors, valves and valve terminals
- Universal plug connectors
- Plug connectors for controllers, sensors, valves and valve terminals
- Accessories for electrical connector technology



NEBU ★

Connecting cables

+ The modular cable system with unlimited combination options of plugs, plug sockets, cable lengths and qualities
+ It complements all devices with M8 and M12 plugs such as proximity sensors, position sensors, pressure switches, pressure sensors, pressure transmitters, flow sensors and optical and inductive sensors, as well as valves with a central connector, such as CPE, MPA or VSVA
+ Cable length 0.1 ... 30 m

➔ page 1541

NEDY

Plug connectors

+ Collecting signals between field devices (sensors) and double-assigned controller inputs
+ Distributing signals between double-assigned controller outputs and field devices (actuators, e.g. valves)
+ Different variants with plugs, sockets and open cable ends

➔ page 1551

Contents

Product overview 1532
Motor, encoder, resolver cables NEBM 1533
NEW Additional versions

Connecting cables NEBB 1536
NEW New series

Connecting cables NEBU 1541
T-distributors NEDY 1551

Software tool

Configurator		Design a product with numerous features reliably and quickly with the help of the configurator. Select all the relevant 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.

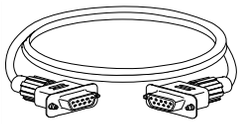
Connecting cables, universal

Type	**Connecting cables NEBU** ★	**Connecting cables/plug sockets with cable SIM**	**Connecting cables KM12**
Electrical connection	Socket: straight, angled, rotatable, plug: straight, angled, M8x1, M12x1, 3-pin, 4-pin, 5-pin, 8-pin, rotatable thread, open end	Straight, angled socket, angled socket/open end, straight socket/open end, M12x1, M8x1, clip-on, 3-pin, 4-pin, 5--pin, 3-wire, 4-wire, 5-wire,	8--pin/8-pin, M12x1/M12x1, plug: straight/socket: straight
Cable length	0.1 ... 30 m	2 ... 10 m	2 m
Description	• Designs for static, standard, energy chain and robot applications • Designs with switching status indication • Designs for connecting sensors and actuators	• Pre-assembled at both ends	• For connecting inputs and outputs • Type of mounting: union nut, threaded connector
➔ Page/online	**1541**	**sim**	**km12**

Connecting cables for controllers

Type	**Connecting cables NEBC**	**Connecting cables NEBP**	**Connecting cables, diagnostic cables SBOA**	**Cables FEC-KBG**	
Electrical connection	Straight plug, socket, M12.x, Sub-D, 5-pin, 9-pin, 25-pin, square design/ angled, Sub-D/Sub-D	Angled socket, M16x0.75, 6-pin; angled plug, M9x0.5, 5-pin	Straight plug/straight socket/straight socket	Open end, for RS232 interface	
Cable length	0.25 ... 20 m	2 m	2 m	2.5 ... 5 m	
Description	• For I/O interface • For connecting motor controller CMMS-ST to any controllers	• Connection between displacement encoder MME and measuring module CPX-CMIX	• 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 to control block CPX-FEC • Connection between displacement encoder MME and measuring module CPX-CMIX	
➔ Page/online	**nebc**	**nebp**	**sboa**	**fec-kbg**	

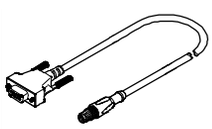
Connecting cables for control systems

Type	Control cables KES	Programming cables KDI	Programming cables PS1-ZK11	Connecting cables KV-M12
				
Electrical connection	15-pin, straight socket, Sub-D, cable, open end, 15-pin, 18-pin	4-pin, 9-pin, straight socket, straight plug, M8x1, Sub-D	Sub-D, 9-pin	Socket, plug, straight, round, M12x1 A-coded to EN 61076-2-101
Cable length	2.5 ... 10 m	3 m	2 m	1.5 ... 3.5 m
Description	• For I/O interface for connecting motor controller SFC-DC to any controller	• Pre-assembled at both ends • For diagnostic interface	• The null modem cable ZK11 is intended exclusively as a programming cable for direct connection to a PC • Among other things 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
→ Page/online	kes	kdi	cmms-st	kv-m12

Connecting cables for motors

Type	Motor, encoder, resolver cables NEBM	Control cables KES	Motor cables KMTR
	NEW		
Electrical connection	Socket, cable, plug, straight, angled, connection pattern L4, connection pattern L5, RJ45, ITT M3, Sub-D, M12x1 A-coded to EN 61076-2-101, M16x0.75, open end, M23x1, M40x1.5	15-pin, straight socket, Sub-D, cable, open end, 15-pin, 18-pin	11-pin, 12-pin, straight socket, M12x1, A-coded to EN 61076-2-101, 11-pin, 15-pin, straight plug, Sub-D
Cable length	1 ... 25 m	2.5 ... 10 m	2.5 ... 10 m
NEW	• Additional versions		
Description	• For servo motor EMMS-AS and stepper motor EMMS-ST • Suitable for energy chains	• For I/O interface for connecting motor controller SFC-DC to any controller	• For motor controller SFC-DC
→ Page/online	nebm	kes	kmtr

Connecting cables for motors

Type	Power supply cables KPWR	Fieldbus adapters fba
		
Electrical connection	6-pin, 7-pin, straight socket, Sub-D mixed, 6-pin, cable, open end	9-pin Sub-D plug to 5-pin round plug/socket M12, plus round plug M12 for logic voltage supply
Cable length	2.5 ... 10 m	0.1 m
Description	• For motor controller SFC-DC for connecting load and logic supply	• 9-pin Sub-D plug to 5-pin round plug/socket M12
→ Page/online	kpwr	fba

Connecting cables for valves

Type	Connecting cables NEBV ★	Plug sockets with cable KMEB-1, KMEB-2, KMEB-3 ★	Plug sockets with cable KMF ★	Connecting cables NEDV
Electrical connection	M8x1, socket, straight socket, M12, 8-pin, straight plug, M12, 4-pin, 2-pin, angled socket/straight plug, angled socket/cable, straight socket/straight plug, M8x1/M8x1, M12x1/M12x1, 4-pin/3-pin, 8-pin/4-pin, 4-pin/2-wire, socket/plug/plug, M12x1/M12x1/M12x1, 8-pin/4-pin/4-pin	2-pin, 3-pin, 4-pin, 5-pin, angled socket, type C, to DIN EN 175301-803	Socket	M12, 3-pin, 2x angled socket, 1x angled plug, M8, 4-pin
Cable length	0.2 ... 30 m	0.5 ... 10 m	2.5 ... 10 m	0.2 m
Description	• For valves with ZC solenoid coil • Pre-assembled at both ends	• For valves with EB solenoid coil • Mounting via central screw • Polyvinyl chloride cable • Ambient temperature -20 ... +80 °C	• For valves with F solenoid coil • Mounting via central screw • Polyvinyl chloride cable • Temperature range –20 ... +80 °C	• For proportional valves VPWP • For connecting to sub-base VAPV-S3 • Pre-assembled
→ Page/online	nebv	kmeb-1	kmf	nedv

Connecting cables for valves

Type	Plug sockets with cable KMYZ-2, KMYZ-4	Plug sockets with cable KME	Plug sockets with cable KMC
Electrical connection	Angled socket/straight plug, angled socket/cable, square design/M8x1, square design/open end, 2-pin/3-pin, 2-pin/2-wire Cable, angled socket, square design MSZB/MSZC	Angled socket, square design, 3-pin, type C	Socket, type A
Cable length	0.5 ... 10 m	2.5 ... 10 m	2.5 ... 10 m
Description	• For valves with ZB solenoid coil • For valves with ZC solenoid coil • Mounting via central screw	• For valves with E solenoid coil • Mounting via central screw • Polyvinyl chloride cable • Ambient temperature –20 ... +80 °C	• For valves with D solenoid coil • For valves with N1 solenoid coil • Polyvinyl chloride cable • Mounting via central screw • Ambient temperature –20 ... +80 °C
→ Page/online	kmyz-2	kme	kmc

Connecting cables for valves

Type	Plug sockets with cable KMV	Connecting cables KRP	Electrical plug-in bases MHAP-PI
Electrical connection	Socket, type B	2-pin, angled socket	2-pin, 3-pin, socket
Cable length	2.5 ... 10 m	2.5 ... 5 m	0.5 ... 1 m
Description	• For valves with V solenoid coil • Mounting via central screw M3 • 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	• Plug base with cable for connecting individual valves • Pre-assembled • Mounting via clip
→ Page/online	kmv	krp	mhap

Connecting cables for valves

Type	Plug sockets with cable KMPPE	Connecting cables KMPYE-AIF, KMPYE-5, KMPYE-...	Connecting cables MHJ9-KMH
Electrical connection	8-pin		2-pin/2-pin/4-wire, straight socket/straight socket/ cable
Cable length	2.5 ... 5 m	0.3 ... 5 m	0.5 ... 2.5 m
Description	• For proportional pressure regulators MPPE and MPPES • Mounting via union nut M16x0.75 • Polyvinyl chloride cable • Ambient temperature –30 ... +80 °C	• Plug socket with cable, screened, for proportional directional control valves MPYE	• For valves MHJ9 • With plug sockets KMH • With control electronics for two valves
➔ Page/online	**kmppe**	**kmpye**	**mhj9-kmh**

Connecting cables for valve terminals

Type	Connecting cables/plug sockets with cable NEBV-S1W37	Flat cables KASI	Addressing cables KASI-ADR
Electrical connection	Socket, cable, Sub-D, open end	2-pin, open cable end	4-pin/4-pin/2-pin, straight socket/angled plug/ straight socket
Cable length	2.5 ... 10 m	100 m	2.5 m
Description	• For multi-pin plug connection to valve terminal VTSA and VTSA-F • Pre-assembled at one end	• For AS-Interface® • Reverse polarity protected • Contact using insulation displacement technology • No need to strip cable and wire insulation • Two different colours: yellow (preferred for the AS-Interface® network) and black (for auxiliary power supply)	• For AS-Interface® • For any slaves such as individual valve interface, valve terminal with AS-Interface® connection • Reverse polarity protected
➔ Page/online	**nebv**	**kasi**	**kasi-adr**

Connecting cables for valve terminals

Type	Connecting cables KMP3, KMP4, KMP6	Connecting cables KV-M12	Plug sockets with cable KMPV
Electrical connection	15-pin, 25-pin, 26-pin, 9-pin, socket, Sub-D	Straight socket, M12, 5-pin, A-coded, straight plug, M12x1, 5-pin, A-coded	Cable with socket, Sub-D, 15-pin
Cable length	2.5 ... 10 m	1.5 ... 3.5 m	5 m ... 10 m
Description	• Plug socket with cable for multi-pin plug connection • Pre-assembled • Mounting via union nut, with 2 screws	• 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	• Connecting cable for multi-pin plug connection • Pre-assembled
➔ Page/online	**kmp**	**kv-m12**	**nebv**

Connecting cables for valve terminals

Type	Connecting cables KVI	Connecting cables KVIA	Connecting cables VMPA-KMS1, VMPA-KMS2, VMPAL-KM, VMPAL-KMSK
Electrical connection	M9, plug, socket, 5-pin, straight socket/straight plug	Straight plug, straight plug/straight socket, straight plug/angled socket	Cable with plug
Cable length	0.25 ... 8 m	5 ... 10 m	2.5 ... 10 m
Description	• 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 to side • Pre-assembled at one end • Polyvinyl chloride or polyurethane cable
➔ Page/online	kvi	kvia	vmpa-kms

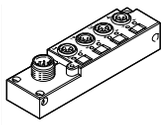
Connecting cables for sensors

Type	NEW Connecting cables NEBB	Connecting cables NEBS
Electrical connection	Straight socket, angled socket, M8x1 A-coded to EN 61076-2-104, M12x1 A-coded to EN 61076-2-101, cable, open end	Straight socket, M12x1, 12-pin, A-coded, straight socket, M12x1, 5-pin, A-coded, socket, square design L1, 4-pin, open end, 12-wire, open end, 4-wire, open end, 5-wire
Cable length	2.5 ... 10 m	0.3 ... 10 m
NEW	• New series	
Description	• Degree of protection IP65, IP68, IP69K, in mounted condition	• Degree of protection IP40
➔ Page/online	nebs	nebs

Universal plug connectors

Type	Sensor/actuator distributors NEDY	Cable sockets NEFU
Electrical connection	Controller side: plug M8x1, A-coded, EN 61076-2-104, plug M12x1, A-coded, EN 61076-2-101, open end Field device side: socket M8x1, A-coded, EN 61076-2-104, socket type A, EN 175301-803, socket type B, EN 175301-803, socket type B, industry standard 11 mm, socket type C, EN 175301-803, socket type C, industry standard 9.4 mm, socket connection pattern H, socket connection pattern ZB, self-tapping screw, socket connection pattern ZC, self-tapping screw, socket connection pattern ZC, metric screw, open end	Angled socket, RJ45, 4-pin, straight socket, M12x1, 4-pin, D-coded
Connection cross section		
Degree of protection	IP65, IP67, IP68, IP69K	IP20, IP65, IP67, in mounted condition, to IEC 60529
Description	• Collecting signals between field devices (sensors) and double-assigned controller inputs • Distributing signals between double-assigned controller outputs and field devices (actuators, e.g. valves)	• Cable socket for branching the AS-Interface® network at any required point • Reconnecting AS-Interface® flat cable to 5-pin M12 socket • Reverse polarity protected
➔ Page/online	1551	nefu

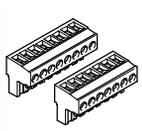
Universal plug connectors

Type	Plugs NECU, NECU-HX	Push-in T-connectors NEDU	 Multi-pin plug distributors NEDU
Electrical connection	3-pin, 4-pin, 5-pin, 8-pin, 9-pin, Sub-D, straight socket, straight plug, spring-loaded terminal, screw terminal, insulation displacement connector, 7/8", AIDA push-pull, M8x1, M12x1, for self-assembly, can be screened, square design	Socket/socket/plug, M12x1/M12x1/M12x1, 4-pin/4-pin/4-pin, A-coded/A-coded/A-coded	Straight socket, M8, 3-pin, Straight plug, M12x1, 8-pin
Connection cross section	0.08 ... 2.5 mm²		
Degree of protection	IP20, IP40, IP65, IP67	IP65, IP67	IP68
Description	• Power supply socket for fieldbus connection • Plug and socket for power supply • Can be assembled with any cable lengths • NECU-HX: reconnectable M8 and M12 round plug connectors with Harax® quick connection technology for low-voltage applications	• For fieldbus connection • Branch line for connecting and disconnecting fieldbus components	• Particularly compact
→ Page/online	necu	nedu	nedu

Universal plug connectors

Type	Plugs SEA	Cable distributors ASI-KVT	Cable sockets ASI-SD
Electrical connection	3-pin, 4-pin, 5-pin, angled socket, straight plug, screw terminal, insulation displacement connector, solder connection, type A, M8x1, M12x1, M12x1 round plug connector	Insulation displacement technology	2-pin, 4-pin, straight socket, screw terminal
Connection cross section	0.08 ... 0.75 mm²	1.5 mm²	0.75 ... 1.5 mm²
Degree of protection	IP65, IP67	IP65	IP65, IP67
Description	• 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
→ Page/online	sea	asi-kvt	asi-sd

Plug connectors for controllers

Type	 Plug assortments NEKM	Plugs NECC
Electrical connection	2 ... 9-pin, screw connector	11-pin, 9-pin/9-pin, plug, Sub-D/screw terminal
Connection cross section	0.2 ... 2.5 mm²	0.2 ... 2.5 mm²
Degree of protection		IP40
Description	• For motor controller CMMS-ST, CMMO-ST, CMMP-AS	• Encoder plug for motor controller CMMS-ST • Plug for multi-axis controller CMXR for interface housing CAMI-C, 11-pin • Plug for multi-axis controller CMXR and for modular controller CECX for peripheral modules • 2-pin, 4-pin, 6-pin, 8-pin, 11-pin, 18-pin
→ Page/online	nekm	necc

Plug connectors for control systems

Type	Plugs PS1-SAC, PS1-ZC	Plugs FBS-SUB-9-WS	Plugs FBS-RJ45
Electrical connection	10-pin/10-pin/10-pin, 30-pin, socket/terminal strip	5-pin, type A, M12x1, straight plug/screw terminal	5-pin, type A, M12x1, straight plug/screw terminal
Connection cross section	0.08 ... 0.75 mm²	0.75 mm²	0.75 mm²
Degree of protection		IP40	IP65, IP67, to IEC 60529
Description	• 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	• Ethernet plug with 8-pin RJ45 connection • High transmission quality • Detachable connection
→ Page/online	ps1	fbs-sub-9-ws	fbs-rj

Plug connectors for valves

Type	Plug sockets MSSD ★	Adapters NEFV	Soldering bases PCBC	Multi-pin plug sockets NECA
Electrical connection	3-pin, 4-pin, angled socket, type A, type B, type C, to DIN EN 175301-803, to DIN EN 61984, square design	Socket, round, angled, M12x1, A-coded to EN 61076-2-101, 8-pin	2-pin	Socket, Sub-D, 9-pin
Connection cross section	0.25 ... 1.5 mm²			0.34 ... 1 mm²
Degree of protection	IP50, IP65, IP67, in mounted state, to IEC 60529	IP65, IP67	IP40	IP65, to IEC 60529
Description	• For valves with F, D, N1, V, E, EB, N2, Y, Z, ZB, ZC, MD-2 and MH-2 solenoid coils • For connecting individual valves • Cable connection using clamping screws, insulation displacement technology or push-in connector • Optionally with LED display	• Adapter for connecting a proportional valve to the controller	• 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
→ Page/online	mssd	nefv	pcbc	ms6-sv

Plug connectors for valves

Type	Angled plug sockets MPPE-3-B	Time delay adapters MFZ	Illuminating seals MF-LD, MC-LD, MV-LD, ME-LD, MEB-LD	Indicating inserts MCL, MCLZ, MFL, MFLZ
Electrical connection	8-pin, angled socket, solderable	For connector socket or device plug, type F	Type A, B, C, to DIN EN 175301-803, square design, MSC/MSE/MSEB/MSF/MSV	Plug, to DIN 43650
Connection cross section	0.75 mm²			
Degree of protection	IP67	IP64	IP65	IP65
Description	• For proportional pressure regulators MPPE and MPPES • Mounting via union nut	• Electronic timer with adjustable time delay of between 0 ... 10 s • For mounting between the solenoid coil and connector socket and plug	• The seal is illuminated yellow when the power is switched on • For mounting between the plug socket and solenoid coil • For F, D, N1, V, E and EB solenoid coils	• Variant with integrated protective circuit • For mounting between the solenoid coil and plug connection • With yellow LED display
→ Page/online	mppe-3-b	mfz	mc-ld	mcl

Plug connectors for valve terminals

Type	Plug sockets FBSD-GD, FBSD-WD	Plug sockets NTSD-GD, NTSD-WD	T-adapters FB-TA
Electrical connection	4--pin, 5--pin, socket: straight, angled, screw terminal, type A, M12x1	4-pin, 5-pin, socket: straight, angled, plug: straight, screw terminal	Plug/socket, M12x1/M12x1, 5-pin/5-pin
Connection cross section	0.75 mm²	0.75 ... 2.5 mm²	
Degree of protection	IP20, IP67	IP67	IP67
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	• Branch line for connecting and disconnecting fieldbus components
➔ Page/online	fbs	ntsd	fb-ta

Plug connectors for valve terminals

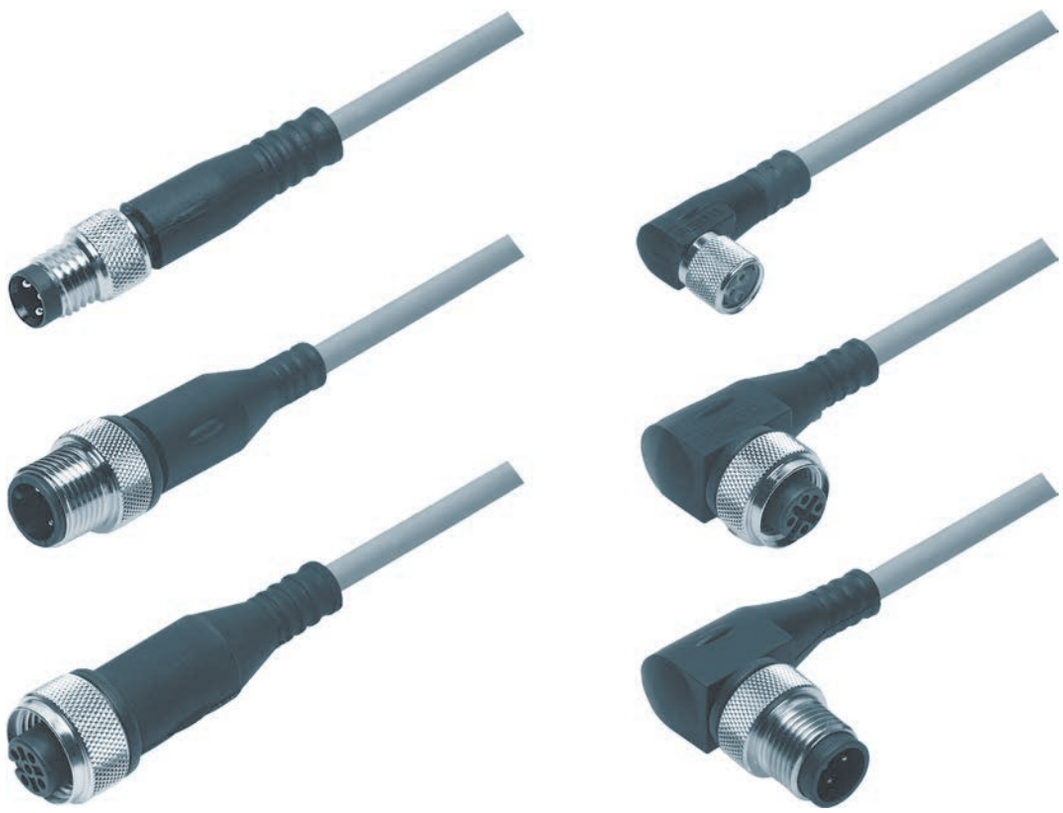
Type	Bus connections FBA-1, FBA-2	Plugs FBS-SUB, FBS-SCRJ, FBS-M12	Sensor sockets SIE-GD, SIE-WD
Electrical connection	9-pin/5-pin, straight socket/straight plug, straight socket/plug and socket, Sub-D/-, Sub-D/M12x1	5-pin, type A, M12x1, straight plug/screw terminal	4-pin, straight socket, angled socket, M12x1
Connection cross section		0.75 mm²	0.25 ... 0.75 mm²
Degree of protection	IP40, IP65, to IEC 60529	IP65, IP67, in mounted condition, to IEC 60529	IP67
Description	• Can be assembled with any cable lengths	• 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 fabrication of cables • Pin adapter for fieldbus connection • With screw terminals • Straight or angled design
➔ Page/online	fba-1	fbs-sub	sie-gd

Plug connectors for valve terminals

Type	Cover caps ISK	Plug sockets, plugs SD-SUB	Bus connections FBSD-KL
Electrical connection		25-pin, plug, Sub-D	Angled socket, screw terminal
Connection cross section			0.2 ... 2.5 mm²
Degree of protection	IP65	IP65	IP20
Description	• For sealing unused ports/openings • Thread M8, M12	• 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
➔ Page/online	isk	sd-sub	fbsd-kl

Plug connectors for sensors

Type	Angled plug sockets PEV-WD	Plug sockets SD-4-WD
Electrical connection	4-pin, angled socket	4-pin, plug, Sub-D
Connection cross section		
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
➔ Page/online	**pev*wd**	**sd-4-wd**



Select the right connecting cable quickly and easily

+ Plugs, sockets and cables can be configured individually
+ Choose from different cable qualities
+ Ready to install standard designs

Connecting cables

NEBU★

Connecting cables

NEBU ★

Overview, configuration and ordering
➔ **www.festo.com/catalogue/nebu** ✓

Additional information, support and user documentation
➔ **www.festo.com/sp/nebu** ✓

★ Quick ordering of basic designs
➔ page 1549 ✓

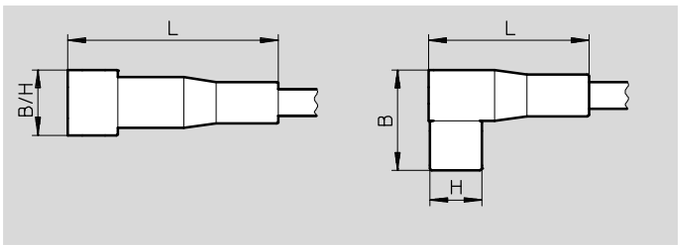
+ Designs for static, standard, energy chain and robot applications
+ Design with switching status indication
+ Designs for connecting sensors and actuators

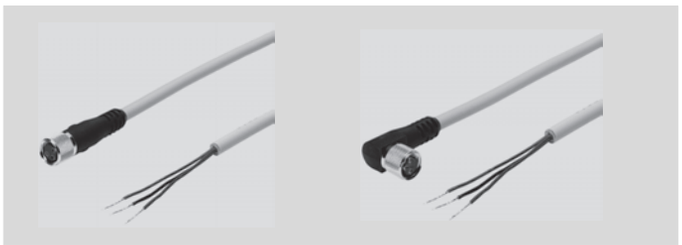
Product range overview

Type	Electrical connection Left	Cable characteristic	Electrical connection Right	Number of wires	Cable length [m]	➔ Page/ online
NEBU-LE	Open end	Basic	Plug M8x1	3, 4, 5	0.1 ... 30	1544
			Plug M12x1			
		Standard	Plug M8x1	3, 4, 5	0.1 ... 30	1544
			Plug M12x1			
NEBU-M8	Socket M8x1	Basic	Open end	2, 3, 4	0.1 ... 30	1544
			Plug M8x1			
			Plug M12x1			
		Standard	Open end	2, 3, 4	0.1 ... 30	1544
			Plug M8x1			
			Plug M12x1			
		Suitable for use with energy chains	Open end	3, 4	0.1 ... 30	1544
			Plug M8x1			
			Plug M12x1			
		Suitable for robot applications	Open end	3, 4	0.1 ... 30	1544
			Plug M8x1			
			Plug M12x1			
		With switching status indication	Open end	3	0.1 ... 30	1544
			Plug M8x1			
			Plug M12x1			
NEBU-M12	Socket M12x1	Basic	Open end	3, 4, 5	0.1 ... 30	1544
			Plug M8x1			
			Plug M12x1			
		Standard	Open end	3, 4, 5	0.1 ... 30	1544
				8	2, 5, 10, 15	**nebu**
			Plug M8x1	3, 4, 5	0.1 ... 30	1544
			Plug M12x1			
		Suitable for use with energy chains	Open end	3, 4, 5	0.1 ... 30	1544
			Plug M8x1			
			Plug M12x1			
		Suitable for robot applications	Open end	3, 4, 5	0.1 ... 30	1544
			Plug M8x1			
			Plug M12x1			
		With switching status indication	Open end	3	0.1 ... 30	1544
			Plug M8x1			
			Plug M12x1			
NEBU-G78	Socket 7/8"	Standard	Open end	5	2	**nebu-g78**

Connecting cables NEBU

Data sheet





Technical data

Type		NEBU-LE	NEBU-M8	NEBU-M12
Conforms to standard		EN 61076-2-101	–	EN 61076-2-101
		EN 61076-2-104	EN 61076-2-104	–
		EN 61984		
Cable characteristic	NEBU-...-P	Basic		
	NEBU-...-K	Standard		
	NEBU-...-E	Suitable for energy chains, cables halogen-free and oil-resistant		
	NEBU-...-R	Suitable for robot applications, cables halogen-free and oil-resistant		

Electrical connection		Socket M8x1		Plug M8x1		Socket M12x1		Plug M12x1	
		Straight	Angled	Straight	Angled	Straight	Angled	Straight	Angled
Cable composition		2 x 0.25 mm²				–			
		3 x 0.25 mm²				3 x 0.25 mm²			
		4 x 0.25 mm²				4 x 0.25 mm²			
		–				5 x 0.25 mm²			
		–				5 x 1.00 mm²			
Conductor nominal cross section	[mm²]	0.25				0.25			
	[mm²]	–				1	–	1	–
Cable diameter	[mm]	4.5				4.5			
Cable length	[m]	0.1 ... 30				0.1 ... 30			
Plug coding		–				A			
Length L/width W/height H	[mm]	35/9/9	27/17/9	42/10/10	27/24/10	48/15/15	38/26/15	55/15/15	38/33/15

Type	NEBU-...P	NEBU-...N	NEBU-...L	NEBU-...P2
Indicator	LED, PNP	LED, NPN	LED, DC	2x LED, PNP
Ready status indication	Green LED	Green LED	–	Green LED
Switching status indication	Yellow LED	Yellow LED	Yellow LED	Yellow LED
	–	–	–	Blue LED

Electrical data

Type		NEBU-M8				
Cable composition		2 x 0.25 mm²	3 x 0.25 mm²		4 x 0.25 mm²	
Indicator		L	–	P, N	–	P, N
Operating voltage range[1]	[V AC]	–	0 ... 60	–	0 ... 30	–
	[V DC]	21.6 ... 30	0 ... 60	10 ... 30	0 ... 30	10 ... 30
Surge capacity[1]	[kV]	0.8	1.5	0.8	0.8	0.8
Acceptable current load at 40 °C[1]	[A]	3				
Contamination level		3				

1) When different connection technologies are combined, the lower value applies.

Data sheet

Type		NEBU-M12					
Cable composition		3 x 0.25 mm²		4 x 0.25 mm²		5 x 0.25 mm²	5 x 1.00 mm²
Indicator		–	P, N	–	P2	–	–
Operating voltage range[1]	[V AC]	0 … 250	–	0 … 250	–	0 … 60	0 … 60
	[V DC]	0 … 250	10 … 30	0 … 250	10 … 30	0 … 60	0 … 60
Surge capacity[1]	[kV]	2.5[2]	0.8	2.5	0.8	1.5	1.5
Acceptable current load at 40 °C[1]	[A]	4					
Contamination level		3					

1) When different connection technologies are combined, the lower value applies.
2) 0.8 kV applies for alternative number of wires = 3.

Materials

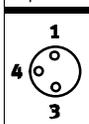
Type	NEBU-…-P	NEBU-…-K	NEBU-…-E	NEBU-…-R
Cable characteristic	Basic	Standard	Suitable for energy chains	Suitable for robot applications
Housing	PUR	PUR	PUR	PUR
Union nut	Nickel-plated brass	Nickel-plated brass	Nickel-plated brass	Nickel-plated brass
Cable sheath	PVC	PUR	PUR	PUR
Pin contacts	Gold-plated brass	Gold-plated brass	Gold-plated brass	Gold-plated brass
Insulating sheath	PVC	PVC	TPE-E	TPE-E

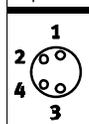
Operating conditions

Type		NEBU-…-P	NEBU-…-K	NEBU-…-E	NEBU-…-R
Cable characteristic		Basic	Standard	Suitable for energy chains	Suitable for robot applications
Ambient temperature	[°C]	–25 … +70	–25 … +70	–25 … +80	–25 … +80
Ambient temperature with flexible cable installation	[°C]	–5 … +80	–5 … +70	–5 … +80	–5 … +80
Degree of protection		IP65, IP68			

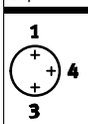
Pin allocation to EN 60947-5-2

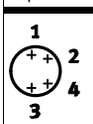
Socket M8x1

3-pin	Pin	Wire colour
	1	Brown
	3	Blue
	4	Black

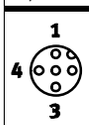
4-pin	Pin	Wire colour
	1	Brown
	2	White
	3	Blue
	4	Black

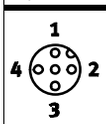
Plug M8x1

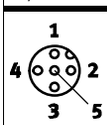
3-pin	Pin	Wire colour
	1	Brown
	3	Blue
	4	Black

4-pin	Pin	Wire colour
	1	Brown
	2	White
	3	Blue
	4	Black

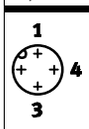
Socket M12x1

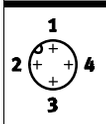
3-pin	Pin	Wire colour
	1	Brown
	3	Blue
	4	Black

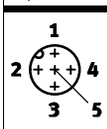
4-pin	Pin	Wire colour
	1	Brown
	2	White
	3	Blue
	4	Black

5-pin	Pin	Wire colour
	1	Brown
	2	White
	3	Blue
	4	Black
	5	Grey

Plug M12x1

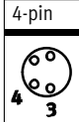
3-pin	Pin	Wire colour
	1	Brown
	3	Blue
	4	Black

4-pin	Pin	Wire colour
	1	Brown
	2	White
	3	Blue
	4	Black

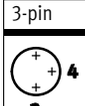
5-pin	Pin	Wire colour
	1	Brown
	2	White
	3	Blue
	4	Black
	5	Grey

Pin allocation – Indicator L

Socket M8x1

4-pin	Pin	Wire colour
	3	Black
	4	Black

Plug M8x1

3-pin	Pin
	3
	4

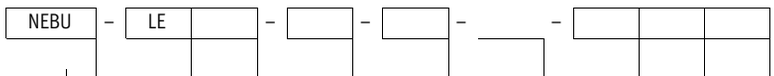
4-pin	Pin
	3
	4

Plug M12x1

2-pin	Pin
	3
	4

Connecting cables NEBU-LE

Order code



Function	
NEBU	Connecting cable

Connection technology, on the left	
LE	Open end

Number of pins/wires (on the left)		
3	3-pin (suitable for open end, plug M8)	1
4	4-pin (suitable for open end, plug M8)	1
5	5-pin (suitable for 3, 4 and 5-pin plug M12)	1

Cable characteristic	
P	Basic
K	Standard
E	Suitable for energy chains
R	Suitable for robot applications

Cable length	
0.1 ... 30	0.1 ... 30 m (0.1 ... 2.5 m in 0.1 m increments, 2.5 ... 30 m in 0.5 m increments)

Cable designation	
–	With inscription label holder (standard)
N	Without inscription label holder

Connection technology, on the right	
M8	Plug with connecting thread M8
M12	Plug with connecting thread M12, A-coded

Plug design	
G	Straight
W	Angled

Number of pins/wires (on the right)		
3	3-pin (suitable for socket M8/M12)	2
4	4-pin (suitable for socket M8/M12)	2
5	5-pin (suitable for socket M12)	2

1 With connection technology LE on the left, the number of wires selected must be equal to the number of pins (on the right).

2 With connection technology LE on the left, the number of wires (on the left) must be copied over.

Order example:

NEBU-LE5-K-1-N-M12G5

Connecting cable NEBU – open end, 5-pin – standard – cable length 1 m – without inscription label holder – plug M12x1, A-coded, straight, 5-pin

Order code

NEBU – M8 [ ][ ] – [ ] – [ ] – [ ] – [ ]

Function	
NEBU	Connecting cable

Connection technology, on the left	
M8	Socket with connecting thread M8

Socket design	
G	Straight
W	Angled

Number of pins/wires (on the left)	
3	3-pin (suitable for open end, plug M8)
4	4-pin (suitable for open end, plug M8)

Indicator		
–	Without LED, DC (standard)	
P	LED, PNP	1
N	LED, NPN	1
L	LED, DC	2

Cable characteristic	
P	Basic
K	Standard
E	Suitable for energy chains
R	Suitable for robot applications

Cable length	
0.1 ... 30	0.1 ... 30 m (0.1 ... 2.5 m in 0.1 m increments, 2.5 ... 30 m in 0.5 m increments)

Cable designation	
–	With inscription label holder (standard)
N	Without inscription label holder

Connection technology, on the right	
LE	Open end
M8	Plug with connecting thread M8
M12	Plug with connecting thread M12, A-coded

Plug design		
–	Open end	3
G	Straight	4
W	Angled	4

Number of pins/wires (on the right)		
2	2-pin	5
3	3-pin (suitable for socket M8/M12)	
4	4-pin (suitable for socket M8/M12)	

1 Can only be combined with socket design W and 3 pins/wires (on the left).
2 Can only be combined with 4 pins/wires (on the left), M8 connection technology on the right with 3, 4 pins/wires (on the right) or with connection technology LE on the right, M12 with 2 pins/wires (on the right) (always a 2-wire cable), cable characteristics K.
3 Must be selected with connection technology LE on the right.
4 Must be selected with M8, M12 connection technology on the right.
5 Can only be combined with connection technology LE on the right. Cannot be combined with cable characteristics P, E, R.

Order example:
NEBU-M8G4-K-5-LE4
Connecting cable NEBU – socket M8x1, straight, 4-pin, without LED, DC – standard – cable length 5 m – with inscription label holder – open end, 4-pin

Connecting cables NEBU-M12

Order code

NEBU – M12 [ ] 5 – [ ] – [ ] – – – [ ] [ ]

Function

NEBU	Connecting cable

Connection technology, on the left

M12	Socket with connecting thread M12, A-coded

Socket design

G	Straight
W	Angled

Number of pins/wires (on the left)

5	5-pin

Indicator

–	Without LED, DC (standard)	
P	LED, PNP	1
N	LED, NPN	1
P2	2x LED, PNP	2

Cable characteristic

P	Basic
K	Standard
E	Suitable for energy chains
R	Suitable for robot applications

Cable length

0.1 ... 30	0.1 ... 30 m (0.1 ... 2.5 m in 0.1 m increments, 2.5 ... 30 m in 0.5 m increments)

Cable designation

–	With inscription label holder (standard)
N	Without inscription label holder

Wire cross section

–	0.25 mm² (standard)	
Q8N	1 mm²	3

Connection technology, on the right

LE	Open end
M8	Plug with connecting thread
M12	Plug with connecting thread, A-coded

Plug design

–	Open end	4
G	Straight	5
W	Angled	5

Number of pins/wires (on the right)

3	3-pin (suitable for socket M8/M12)	6
4	4-pin (suitable for socket M8/M12)	6
5	5-pin (suitable for socket M12)	6

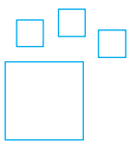
1 Can only be combined with socket design W and 5 pins/wires (on the left) and 3 pins/wires (on the right).
2 Can only be combined with socket design W and 4 pins/wires (on the right).
3 Can only be combined with M12 connection technology on the left and socket design G with 5 pins/wires, M12 connection technology on the right and socket design G with 5 pins/wires, cable characteristics E.
4 Must be selected with connection technology LE on the right.
5 Must be selected with M8, M12 connection technology on the right.
6 With LE open end on the right, the number of pins/wires must be less than or equal to the number of pins on the opposite side.

Order example:

NEBU-M12W5P-E-3.5-N-M8G3

Connecting cable NEBU – socket M12x1, A-coded, angled, 5-pin, LED indicator, PNP – suitable for use with energy chains – cable length 3.5 m – without inscription label holder – plug M8x1, straight, 3-pin

Ordering – Product options



Configurable product

This product and all its options can be ordered using the configurator.

The configurator can be found under Products on the DVD or
➔ **www.festo.com/catalogue/...**

Enter the type code in the search field.

★ Quick ordering[1)]

	Cable length [m]	Part no.	Type
Straight socket, 3-pin, M8			
Open cable end, 3-wire	2.5	**541333**	**NEBU-M8G3-K-2.5-LE3**
	5	**541334**	**NEBU-M8G3-K-5-LE3**
	10	**541332**	**NEBU-M8G3-K-10-LE3**
Straight plug, 3-pin, M8	0.5	**541346**	**NEBU-M8G3-K-0.5-M8G3**
	1	**541347**	**NEBU-M8G3-K-1-M8G3**
	2.5	**541348**	**NEBU-M8G3-K-2.5-M8G3**
	5	**541349**	**NEBU-M8G3-K-5-M8G3**
Angled socket, 3-pin, M8			
Open cable end	2.5	**541338**	**NEBU-M8W3-K-2.5-LE3**
	5	**541341**	**NEBU-M8W3-K-5-LE3**
	10	**541335**	**NEBU-M8W3-K-10-LE3**

	Cable length [m]	Part no.	Type
Straight socket, 5-pin, M12			
Open cable end, 3-wire	2.5	**541363**	**NEBU-M12G5-K-2.5-LE3**
	5	**541364**	**NEBU-M12G5-K-5-LE3**
Open cable end, 4-wire	2.5	**550326**	**NEBU-M12G5-K-2.5-LE4**
	5	**541328**	**NEBU-M12G5-K-5-LE4**

1) All products in this table are easy to select and quick to order.

Collect or distribute system signals easily and save space

+ Collect signals between sensors and double-assigned controller inputs
+ Distribute between double-assigned controller outputs and valves

Universal plug connectors ›

Sensor/actuator distributors

NEDY

Universal plug connectors ›

Sensor/actuator distributors

NEDY

Overview, configuration and ordering
➔ **www.festo.com/catalogue/nedy** ✓

Additional information, support and user documentation
➔ **www.festo.com/sp/nedy** ✓

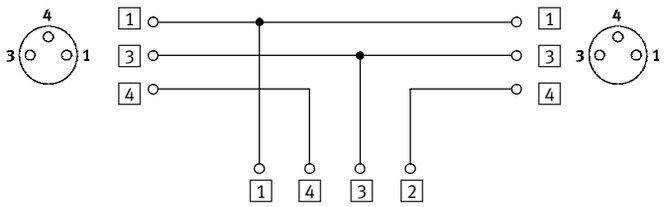
\+ Different variants with plugs, sockets and open cable end

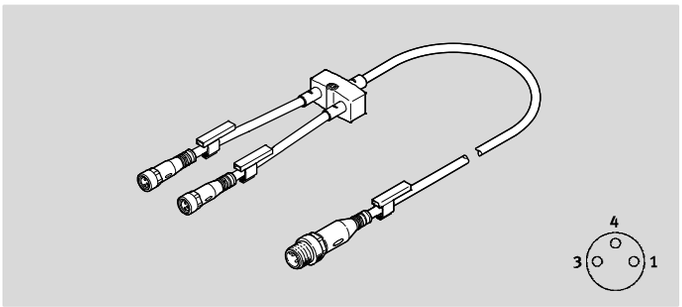
Product range overview

Type	Design	Connection technology on the right, controller side				➔ Page/ online
		Plug M8x1	Plug M12x1	Open cable end		
		4-pin	4-pin	3-wire	4-wire	
2x socket M8x1, A-coded, EN 61076-2-104, 3-pin						
NEDY-L2R1-V1-M8	Sensor/actuator distributor without cable	■	■	–	–	1554
	Sensor/actuator distributor with cable on field device side	■	■	–	–	1554
	Sensor/actuator distributor with cable on controller side	■	■	■	■	1554
	Sensor/actuator distributor with cables on both sides	■	■	■	■	1554
2x socket M8x1, A-coded, EN 61076-2-104, 4-pin						
NEDY-L2R1-V1-M8	Sensor/actuator distributor with cable on field device side	■	■	–	–	nedy
	Sensor/actuator distributor with cables on both sides	■	■	■	■	nedy
2x socket M12x1, A-coded, EN 61076-2-101, 5-pin						
NEDY-L2R1-V1-M12	Sensor/actuator distributor without cable	–	■	–	–	1554
	Sensor/actuator distributor with cable on field device side	■	■	–	–	1554
	Sensor/actuator distributor with cable on controller side	■	■	–	■	1554
	Sensor/actuator distributor with cables on both sides	■	■	–	■	1554
2x socket, type A, EN 175301-803, 4-pin						
NEDY-L2R1-V1-A1W4L	Sensor/actuator distributor with cable on field device side	■	■	–	–	1555
	Sensor/actuator distributor with cables on both sides	■	■	■	–	1555
2x socket, type B, EN 175301-803, 3-pin						
NEDY-L2R1-V1-B1W3L	Sensor/actuator distributor with cable on field device side	■	■	–	–	nedy
	Sensor/actuator distributor with cables on both sides	■	■	■	–	nedy
2x socket, type B, industry standard 11 mm, 3-pin						
NEDY-L2R1-V1-B2W3L	Sensor/actuator distributor with cable on field device side	■	■	–	–	1555
	Sensor/actuator distributor with cables on both sides	■	■	■	–	1555
2x socket, type C, EN 175301-803, 4-pin						
NEDY-L2R1-V1-C1W4L	Sensor/actuator distributor with cable on field device side	■	■	–	–	1556
	Sensor/actuator distributor with cables on both sides	■	■	■	–	1556
2x socket, type C, industry standard 9.4 mm, 4-pin						
NEDY-L2R1-V1-E1W4L	Sensor/actuator distributor with cable on field device side	■	■	–	–	nedy
	Sensor/actuator distributor with cables on both sides	■	■	■	–	nedy
2x socket, connection pattern H, 3-pin						
NEDY-L2R1-V1-H1G3	Sensor/actuator distributor with cable on field device side	■	■	–	–	nedy
	Sensor/actuator distributor with cables on both sides	■	■	■	–	nedy
2x socket, connection pattern ZB, self-tapping screw, 2-pin						
NEDY-L2R1-V1-Z1W2L	Sensor/actuator distributor with cable on field device side	■	■	–	–	nedy
	Sensor/actuator distributor with cables on both sides	■	■	■	–	nedy
2x socket, connection pattern ZC, self-tapping screw, 2-pin						
NEDY-L2R1-V1-Z3W2Z	Sensor/actuator distributor with cable on field device side	■	■	–	–	nedy
	Sensor/actuator distributor with cables on both sides	■	■	■	–	nedy
2x socket, connection pattern ZC, metric screw, 2-pin						
NEDY-L2R1-V1-Z4W2	Sensor/actuator distributor with cable on field device side	■	■	–	–	1556
	Sensor/actuator distributor with cables on both sides	■	■	■	–	1556
2x open cable end, 3-wire						
NEDY-L2R1-V1-LE3	Sensor/actuator distributor with cable on field device side	■	■	–	–	nedy
	Sensor/actuator distributor with cables on both sides	■	■	–	■	nedy

1) The solenoid coil must be ordered separately.

Data sheet – Y-distributor, socket M8x1, EN 61076-2-104, 3-pin

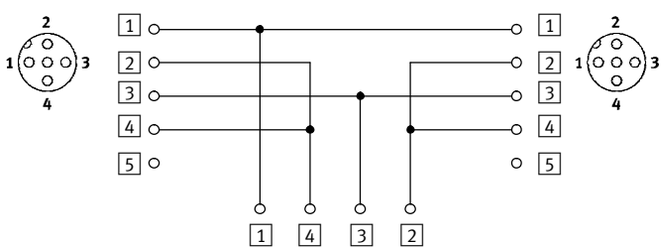


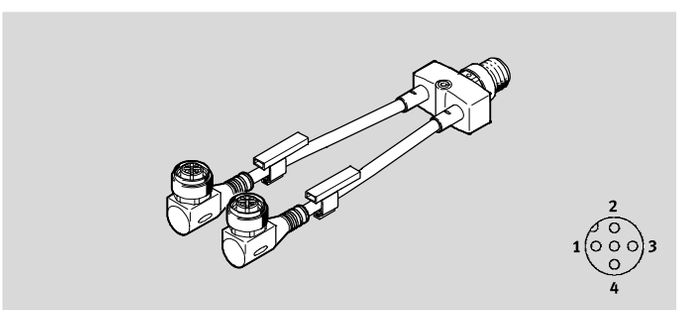


Technical data			Download CAD data ➔ www.festo.com
Connection technology			M8x1, A-coded to EN 61076-2-104
Indicator			None
			Green LED and yellow LED, ready and switching status
Operating voltage range	No indicator	[V DC]	0 ... 30
	Indicator P	[V DC]	10 ... 30
Cable characteristic			Suitable for use with energy chains/robot applications
Ambient temperature with flexible cable installation		[°C]	–20 ... +80
Degree of protection			IP65/IP68, IP69K

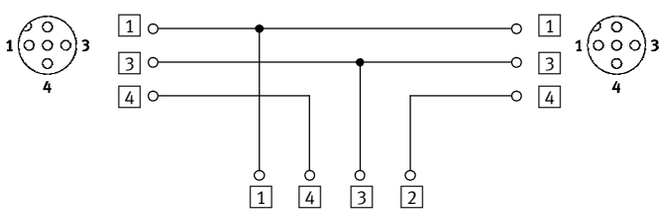
Data sheet – Y-distributor, socket M12x1, EN 61076-2-104, 5-pin

No indicator



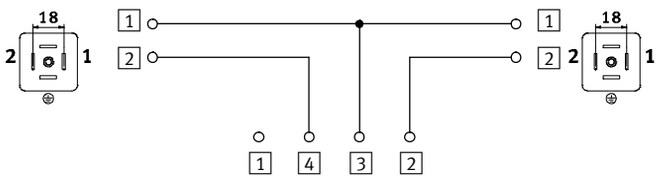


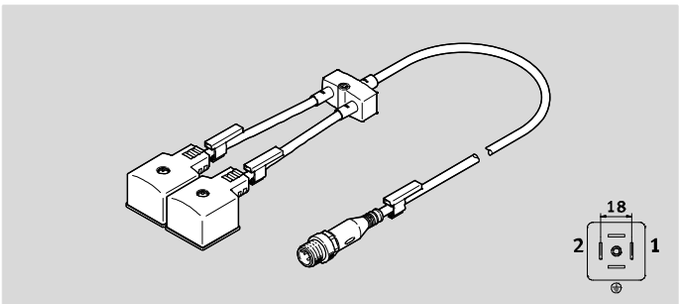
With yellow LED indicator, ready status and switching status



Technical data			Download CAD data ➔ www.festo.com
Connection technology			M12x1, A-coded to EN 61076-2-101
Indicator			None
			Yellow LED, ready and switching status
Operating voltage range	No indicator	[V DC]	0 ... 30
	Indicator P	[V DC]	10 ... 30
Cable characteristic			Suitable for use with energy chains/robot applications
Ambient temperature with flexible cable installation		[°C]	–20 ... +80
Degree of protection			IP65/IP68, IP69K

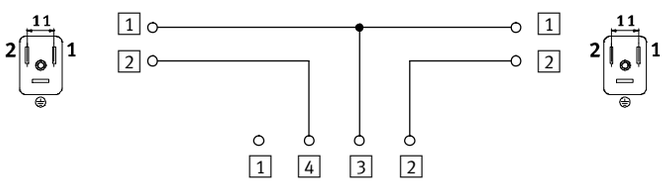
Data sheet – Y-distributor, socket type A, EN 175301-803

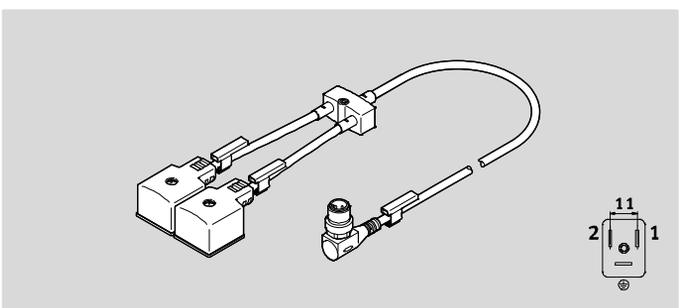




Technical data		Download CAD data ➔ www.festo.com
Connection technology		Connection pattern type A to EN 175301-803
Indicator		Yellow LED, signal status
Operating voltage range	[V DC]	20.4 ... 27.6
Cable characteristic		Suitable for use with energy chains/robot applications
Ambient temperature with flexible cable installation	[°C]	–20 ... +80
Degree of protection		IP65/IP67

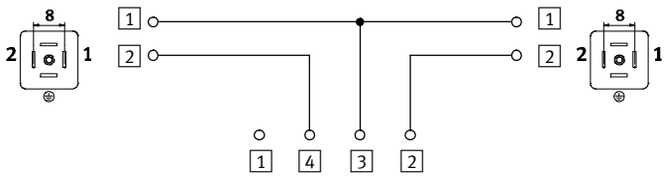
Data sheet – Y-distributor, socket type B, industry standard 11 mm

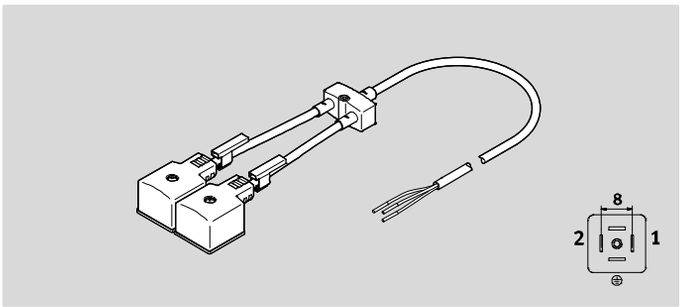




Technical data		Download CAD data ➔ www.festo.com
Connection technology		Connection pattern type B to industry standard 11 mm
Indicator		Yellow LED, signal status
Operating voltage range	[V DC]	20.4 ... 27.6
Cable characteristic		Suitable for use with energy chains/robot applications
Ambient temperature with flexible cable installation	[°C]	–20 ... +80
Degree of protection		IP65/IP67

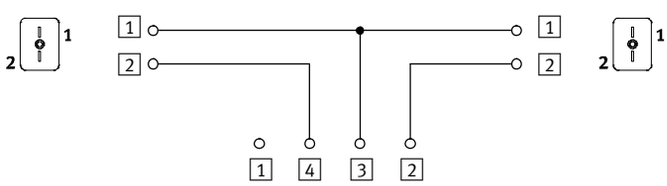
Data sheet – Y-distributor, socket type C, EN 175301-803

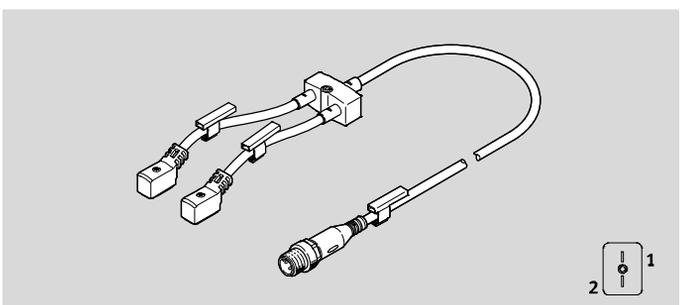




Technical data		Download CAD data ➔ www.festo.com
Connection technology		Connection pattern type C to EN 175301 803
Indicator		Yellow LED, signal status
Operating voltage range	[V DC]	20.4 ... 27.6
Cable characteristic		Suitable for use with energy chains/robot applications
Ambient temperature with flexible cable installation	[°C]	–20 ... +80
Degree of protection		IP65/IP67

Data sheet – Y-distributor, socket connection pattern ZC, metric screw





Technical data			Download CAD data ➔ www.festo.com
Connection technology			Connection pattern ZC, metric screw
Indicator			Yellow LED, signal status
Additional function			Holding current reduction
Operating voltage range		[V DC]	20.4 ... 26.4
Cable characteristic	Field device side		Standard
	Controller side		Suitable for use with energy chains/robot applications
Ambient temperature with flexible cable installation		[°C]	–5 ... +50
Degree of protection			IP65

Order code – Y-distributor, socket M8x1, EN 61076-2-104, 3-pin

NEDY	–	L2R1	–	V1	–	M8	G3	–		–		–		–		G4	–

Function

NEDY	Distributor

Distributor type

L2R1	Y type

Circuitry

V1	Standard variant

Connection technology on the left, field device side

M8	Socket M8x1, A-coded, EN 61076-2-104

Cable outlet on the left

G3	Straight, 3-pin

Cable characteristic

–	Without cable
U	Suitable for use with energy chains/ robot applications

Cable length on the left

–	Without cable
0.3L	0.3 m [1]

Cable identification

–	With inscription label holder
N	Without inscription label holder [2]

Connection technology on the right, controller side

M8	Plug M8x1, A-coded, EN 61076-2-104
M12	Plug M12x1, A-coded, EN 61076-2-101

Cable outlet on the right

G4	Straight, 4-pin

Cable length on the right

–	None
2.5R	2.5 m
5R	5 m

[1] Only with cable length on the right 2.5R or 5R.

[2] Not with cable length on the right 2.5R or 5R.

Order example:

NEDY-L2R1-V1-M8G3-N-M8G4

Distributor - Y type - standard variant - socket M8x1, A-coded, EN 61076-2-104, straight, 3-pin - without inscription label holder - plug M8x1, A-coded, EN 61076-2-104, straight, 4-pin

Order code – Y-distributor, socket M12x1, EN 61076-2-104, 5-pin

NEDY	–	L2R1	–	V1	–	M12	G5	–		–		–		–		G4	–

Function

NEDY	Distributor

Distributor type

L2R1	Y type

Circuitry

V1	Standard variant

Connection technology on the left, field device side

M12	Socket M12x1, A-coded, EN 61076-2-101

Cable outlet on the left

G5	Straight, 5-pin

Cable characteristic

–	Without cable
U	Suitable for use with energy chains/ robot applications

Cable length on the left

–	Without cable
0.3L	0.3 m [1]

Cable identification

–	With inscription label holder
N	Without inscription label holder [2]

Connection technology on the right, controller side

M8	Plug M8x1, A-coded, EN 61076-2-104
M12	Plug M12x1, A-coded, EN 61076-2-101

Cable outlet on the right

G4	Straight, 4-pin

Cable length on the right

–	None [3]
2.5R	2.5 m
5R	5 m

[1] Only with cable length on the right 2.5R or 5R.

[2] Not with cable length on the right 2.5R or 5R.

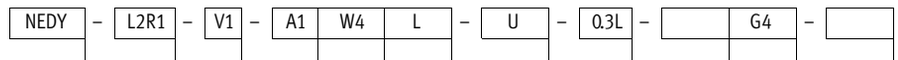
[3] Only with connection technology on the right, controller side M12.

Order example:

NEDY-L2R1-V1-M12G5-U-M8G4-5R

Distributor - Y type - standard variant - socket M12x1, A-coded, EN 61076-2-101, straight, 5-pin - cable characteristic: suitable for use with energy chains/robot applications - with inscription label holder - plug M8x1, A-coded, EN 61076-2-104, straight, 4-pin - cable length, right 5 m

Order code – Y-distributor, socket type A, EN 175301-803, 4-pin



Function	
NEDY	Distributor

Distributor type	
L2R1	Y type

Circuitry	
V1	Standard variant

Connection technology on the left, field device side	
A1	Socket type A, EN 175301-803

Cable outlet on the left	
W4	Angled, 4-pin

Indicator	
L	Signal status LED (only for valves)

Cable characteristic	
U	Suitable for use with energy chains/ robot applications

Cable length on the left	
0.3L	0.3 m

Connection technology on the right, controller side	
M8	Plug M8x1, A-coded, EN 61076-2-104
M12	Plug M12x1, A-coded, EN 61076-2-101

Cable outlet on the right	
G4	Straight, 4-pin

Cable length on the right	
2.5R	2.5 m
5R	5 m

Order example:

NEDY-L2R1-V1-A1W4L-U-0.3L-M8G4-2.5R

Distributor - Y type - standard variant - socket type A, EN 175301-803, angled, 4-pin - cable characteristic: suitable for use with energy chains/robot applications - cable length, left 0.3 m - with inscription label holder - plug M8x1, A-coded, EN 61076-2-104, straight, 4-pin - cable length, right 2.5 m

Order code – Y-distributor, socket type B, industry standard 11 mm

NEDY	–	L2R1	–	V1	–	B2	W3	L	–	U	–	0.3L	–		G4	–	

Function

NEDY	Distributor

Distributor type

L2R1	Y type

Circuitry

V1	Standard variant

Connection technology on the left, field device side

B2	Socket type B, industry standard 11 mm

Cable outlet on the left

W3	Angled, 3-pin

Indicator

L	Signal status LED (only for valves)

Cable characteristic

U	Suitable for use with energy chains/ robot applications

Cable length on the left

0.3L	0.3 m

Connection technology on the right, controller side

M8	Plug M8x1, A-coded, EN 61076-2-104
M12	Plug M12x1, A-coded, EN 61076-2-101

Cable outlet on the right

G4	Straight, 4-pin

Cable length on the right

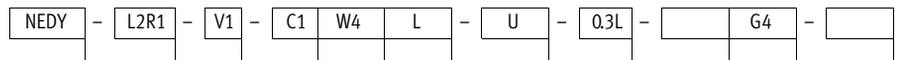
2.5R	2.5 m
5R	5 m

Order example:

NEDY-L2R1-V1-B2W3L-U-0.3L-M12G4-2.5R

Distributor - Y type - standard variant - socket type B, industry standard 11 mm, angled, 3-pin, signal status LED (only for valves) - cable characteristic: suitable for use with energy chains/robot applications - cable length, left 0.3 m - with inscription label holder - plug M12x1, A-coded, EN 61076-2-101, straight, 4-pin - cable length, right 2.5 m

Order code – Y-distributor, socket type C, EN 175301-803



Function	
NEDY	Distributor

Distributor type	
L2R1	Y type

Circuitry	
V1	Standard variant

Connection technology on the left, field device side	
C1	Socket type C, EN 175301-803

Cable outlet on the left	
W4	Angled, 4-pin

Indicator	
L	Signal status LED (only for valves)

Cable characteristic	
U	Suitable for use with energy chains/ robot applications

Cable length on the left	
0.3L	0.3 m

Connection technology on the right, controller side	
M8	Plug M8x1, A-coded, EN 61076-2-104
M12	Plug M12x1, A-coded, EN 61076-2-101

Cable outlet on the right	
G4	Straight, 4-pin

Cable length on the right	
2.5R	2.5 m
5R	5 m

Order example:

NEDY-L2R1-V1-C1W4L-U-0.3L-M12G4-2.5R

Distributor - Y type - standard variant - socket type C, EN 175301-803, angled, 4-pin, signal status LED (only for valves) - cable characteristic: suitable for use with energy chains/ robot applications - cable length on the left 0.3 m - with inscription label holder - plug M12x1, A-coded, EN 61076-2-101, straight, 4-pin - cable length, right 2.5 m

Order code – Y-distributor, socket connection pattern ZC, metric screw

NEDY	–	L2R1	–	V1	–	Z4	W2	Z	–	U	–	0.3L	–		G4	–	

Function

NEDY	Distributor

Distributor type

L2R1	Y type

Circuitry

V1	Standard variant

Connection technology on the left, field device side

Z4	Socket connection pattern ZC, metric screw

Cable outlet on the left

W2	Angled, 2-pin

Indicator

Z	LED signal status, holding current reduction (only for valves without holding current reduction)

Cable characteristic

U	Suitable for use with energy chains/ robot applications

Cable length on the left

0.3L	0.3 m

Connection technology on the right, controller side

M8	Plug M8x1, A-coded, EN 61076-2-104
M12	Plug M12x1, A-coded, EN 61076-2-101

Cable outlet on the right

G4	Straight, 4-pin

Cable length on the right

2.5R	2.5 m
5R	5 m

Order example:

NEDY-L2R1-V1-Z4W2Z-U-0.3L-M12G4-5R

Distributor - Y type - standard variant - socket connection pattern ZC, metric screw, angled, 2-pin, signal status LED indicator, holding current reduction (only for valves without holding current reduction) - cable characteristic: suitable for use with energy chains/robot applications - cable length, left 0.3 m - with inscription label holder - plug M12x1, A-coded, EN 61076-2-101, straight, 4-pin - cable length, right 5 m

Ordering – Product options

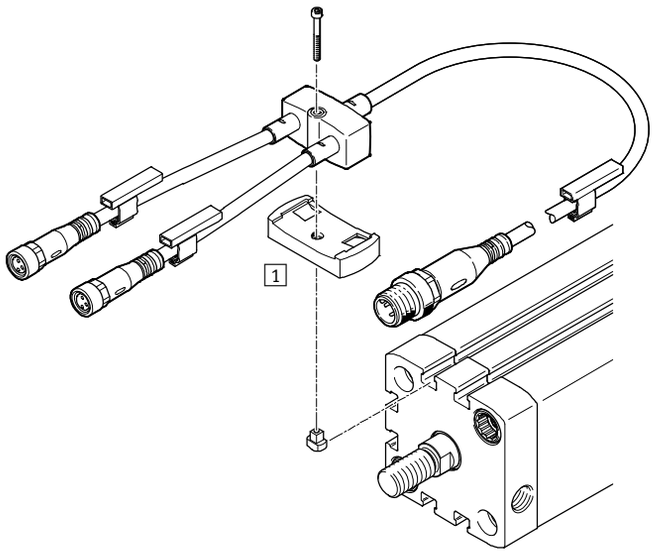
Configurable product

This product and all its options can be ordered using the configurator.

The configurator can be found under Products on the DVD or
➔ **www.festo.com/catalogue/...**

Enter the type code in the search field.

Accessories



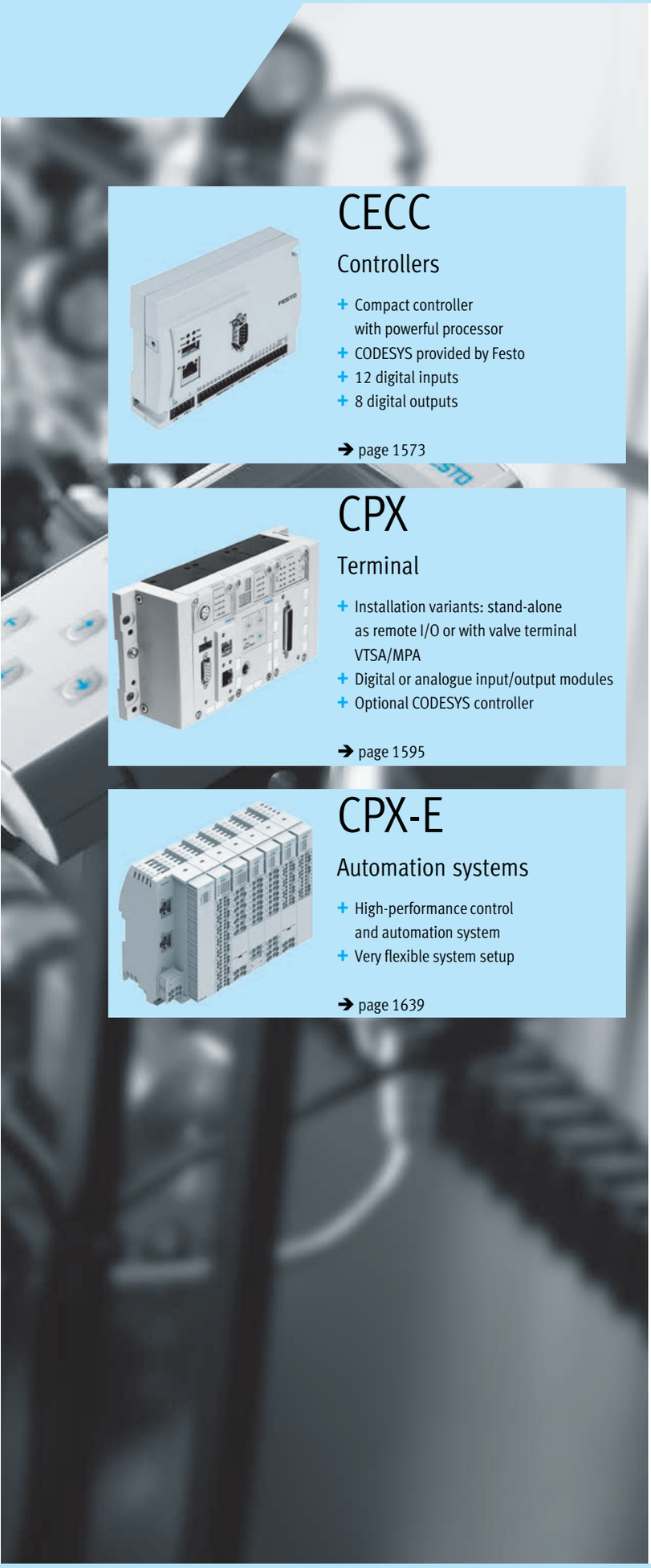
Variants and accessories	➔ Page/online
1 Mounting for T-slot NEAU	1563

Accessories – Ordering data

	Description	Part no.	Type
1 **Mounting for T-slot**			
	• For Y-distributor without cable with plug M8x1 and socket M8x1 • For Y-distributor with cable on field device side and plug M8x1 • For Y-distributor with cable on controller side and socket M8x1	**8032868**	**NEAU-A-N8-1**
	• For Y-distributor without cable with plug M12x1 • For Y-distributor with cable on field device side and plug M12x1 • For Y-distributor with cable on controller side and socket M12x1 • For Y-distributor with cables on both sides	**8032869**	**NEAU-A-N8-2**

16 Control technology and software

- Pneumatic and electropneumatic controllers
- Electronic controllers with serial and Ethernet interfaces
- Electrical peripherals: electrical components for valve terminals and AS-Interface components
- Display and operating units for controllers and electrical terminals
- Software



CECC

Controllers

+ Compact controller with powerful processor
+ CODESYS provided by Festo
+ 12 digital inputs
+ 8 digital outputs

➔ page 1573

CPX

Terminal

+ Installation variants: stand-alone as remote I/O or with valve terminal VTSA/MPA
+ Digital or analogue input/output modules
+ Optional CODESYS controller

➔ page 1595

CPX-E

Automation systems

+ High-performance control and automation system
+ Very flexible system setup

➔ page 1639

Contents

Product overview 1566
EPLAN projects GDDE 1570
NEW New software

Software packages GSAY 1571
NEW New software

Controllers CECC 1573
Fieldbus modules CTEU 1581
Terminal CPX 1595
Terminal CPX-E 1639
NEW New series

Product overview

Pneumatic and electropneumatic controllers

Type	Pulse generators TAA, TAB	Memory modules SBA-2N	Pulse generators VLG
Pneumatic connection	Barbed connector for 3 mm I.D. plastic tubing	Barbed connector for 3 mm I.D. plastic tubing	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
➔ Page/online	taa	sba	vlg

Software tool

CODESYS		CODESYS for standardised programming of embedded devices 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 • Convenient IEC function element extension • Re-use of existing application parts The parameterisation software can be found in the support portal at www.festo.com/sp › enter search term "CODESYS" › start "Search" › select "Software" tab.

Electronic controllers

Type	**Controllers CECC-D, CECC-LK, CECC-S**	Controllers CECX-X-M1, CECX-X-C1	Input/output modules CECX-D-E8A, CECX-A-4E4A	Input modules CECX-D-16E, CECX-A-4E-V, CECX-E-E-T-P
Operating voltage	19.2 ... 30 V DC, 20.4 ... 30 V DC	19.2 ... 30 V DC	19.2 ... 30 V DC	19.2 ... 30 V DC
CPU data	400 MHz processor	64 MB DRAM, 400 MHz processor	64 MB DRAM, 400 MHz processor	64 MB DRAM, 400 MHz processor
Fieldbus interface, type	CAN bus	CAN bus		
Ethernet, connector plug	RJ45	8-pin, socket, RJ45		
Description	• Compact programmable logic controller • Programming with CODESYS to IEC 61131-3 • 12 digital inputs, 8 digital outputs, additionally two high-speed counters up to 250 kHz • Ethernet 10/100 Mbps • 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
➔ Page/online	1573	cecx-x-m1	cecx	cecx

Electronic controllers

Type	Output modules CECX-D-14A-2, CECX-A-4A-V	Encoder interfaces CECX-C-2G	Bus interfaces CECX-F-PB-S-V, CECX-F-PB-V1, CECX-B-CO
Operating voltage	24 V DC +25%/-15%	19.2 ... 30 V DC	19.2 ... 30 V DC
CPU data			
Fieldbus interface, type			CAN bus, PROFIBUS master DP-V1, PROFIBUS slave DP-V0, PROFIBUS slave DP-V1
Ethernet, connector plug		9-pin, socket, RJ45	8-pin, socket, 9-pin, plug connector
Description	• Digital modules: 14 digital outputs • Analogue modules: 4 analogue voltage outputs	• Displacement measurement function • Pulse counter • Speed measurement function • Shaft encoder monitoring function • Counter reading latch function • Sensor break monitoring • Status display function	• Connection via CAN bus to the modular controller • For connecting decentralised peripheral modules in series
➔ Page/online	cecx	cecx	cecx

Electronic controllers

Type	Electrical interfaces CECX-C-2S1	AS-Interface® modules CESA
Operating voltage	9.2 ... 30 V DC	AS-Interface® voltage 30 V DC
CPU data		
Fieldbus interface, type		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
➔ Page/online	cecx	cesa

Product overview

Electrical peripherals

Type	Terminal CPX	NEW Automation systems CPX-E	Terminal CPX-P	Electrical interfaces CPX-CTEL
Max. no. of inputs	Digital 512, analogue 32	Digital 512, analogue 32	512	256
Max. no. of outputs	Digital 512, analogue 18	Digital 512, analogue 32	512	256
No. of module positions	Max. 9 electric input/output modules	10	10	Max. 4 modules with I-Port interface
Electric actuation	Fieldbus, integrated controller	Fieldbus, integrated controller	Fieldbus, integrated controller	I-Port
NEW		• New series		
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 • Analogue inputs and outputs, 2-way/4-way, optionally with HART protocol	• Modern control system with high performance • Fieldbus master interfaces, EtherCAT® master, fieldbus slave interfaces, PROFINET, EtherNet/IP, PROFIBUS, EtherCAT® • Digital input modules (16DI), digital output modules (8DO/0.5 A) • Analogue input modules (current, voltage), analogue output modules (current, voltage) • Modern programming system CODESYS V3 to IEC 61131-3 • Integration of motion functions (SoftMotion) • High I/O component density • Easy mounting of the control system on an H-rail	• 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 • Analogue inputs and outputs with HART protocol	• CPX-CTEL master module with 4 I-Port connections • Decentralised point-to-point connection to input modules and/or valve terminals possible • Standardised M12 connections
➔ Page/online	**1595**	**1639**	cpx-p	cpx-ctel

Electrical peripherals

Type	Measuring modules CPX-CMIX	Input modules CTSL	CPI installation system CTEC
Max. no. of inputs	6x8	16	128
Max. no. of outputs	6x8		128
No. of module positions	9		
Electric actuation	Via fieldbus	IO-Link®, I-Port	Fieldbus, integrated controller
Description	• Pneumatics and electrics – movement and measurement on one platform • Innovative measurement technology – piston rod drives, rodless drives, rotary drives • Actuation via fieldbus • Remote maintenance, remote diagnostics, web server, SMS and e-mail alert are all possible via TCP/IP • Modules can be quickly exchanged and expanded without altering the wiring	• For installation system CTEL • For recording sensor input signals • Display of the input status for each input signal via an assigned LED • Diagnostic LED for short circuit/overload of sensor supply	• 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
➔ Page/online	cpc-cmix	**1581**	ctec

Electrical peripherals

Type	Fieldbus modules CTEU	AS-Interface® components ASI, CACC
Max. no. of inputs	128	4, 8
Max. no. of outputs	128	8
No. of module positions	32	
Electric actuation	CANopen, DeviceNet, AS-Interface®, CC-Link, PROFIBUS, EtherCAT, Ethernet/IP, PROFINET, CPI-B, I-Port	AS-Interface®
Description	• For valve terminals VTUB-12, VTUG, MPA-L, CPV, VTOC • Can be expanded into installation system CTEL • Fieldbus-typical LEDs, interfaces and switching elements available • Isolated power supply for electronics and valves	• 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)
➔ Page/online	**1581**	**as-interface**

Operator units

Type	Operator units, with touchscreen CDPX	Simulators CDSM
Display	Colour TFT	
Display size	4.3", 7", 10.4", 13.3"	
Recipe memory	32 KB	
Display resolution	480x272 pixels, SVGA, 800x600 pixels, WVGA, 800x480 pixels, WXGA, 1280x800 pixels	
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 • With touchscreen	• 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
➔ Page/online	**cdpx**	**cdsm**

Documentation

Type	Manuals GDCW, GDCP, GDCC, GSIB, P.BE, P.BP
Description	• For software • For control blocks • For motors and controllers • For valve terminals and electrical peripherals • For vision systems
➔ Page/online	**documentation**

Product overview

Learning systems

Type	**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
➔ Page/online	edutrainer

Software

Type	**Operator packages GSIB**	**Operator packages P.BP**	**Software GSPF**	**Software and manuals P.SW**
Description	• Information software and documentation for motor controllers CMMD-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 • 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 the motor controller	• 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
➔ Page/online	gsib	software	gspf	software

Software

			NEW
Type	**Software licenses GSLO**	**FluidDraw® software GSWF**	**EPLAN projects GDDE**
NEW			• New software
Description	• 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	• The EPLAN documentation for a complex Festo product can be created within a few minutes • Automated generation to IEC 61355, IEC 81346 and ISO 1219 • Available at any time via the web service
➔ Page/online	gslo	gswf	gdde

Software

Type	Motion Apps GAMM	Software packages GSAY
NEW		• New software
Description	• A new dimension in flexibility thanks to Motion Apps – one valve, numerous functions • Accelerated engineering processes • Short response times without adjusting the hardware • Reduced system complexity • Shorter market launch times for your application • Control programs for VEVM valves	• Modular operating software for the servo press kit YJKP, which is already pre-installed on the press controller and thus immediately ready for use once system integration is complete • No programming knowledge required • Thanks to the integrated sequencer, press-fitting operations are quick to configure and easy to implement • Configurator for the joining process: feed/joining path, possible wait times, threading functionality, etc. • Recording process data for quality assurance • Recorded force/displacement graph exported as *.csv file • Analysis functions for the force/displacement graph • Definition of windows • Envelopes • Through points • Advanced licensed software package available to purchase via Festo AppWorld
→ Page/online	gamm	gsay

Software

Type	App World	Smartenance GASM
NEW	• A Festo portal for selling apps, cloud-based digital products and other software libraries	• Mobile and digital maintenance management
Description	• As a customer, you can use this portal to buy directly online and, with your type code, see the apps that are relevant for your system. • Simply log in via the link provided • Order and receive your digital product immediately • View your App World order history - it's quick, convenient and transparent	• Digital maintenance manager for production managers and system operators • Maintenance management is finally paperless • Clear schedule and evaluation for your system maintenance • Fast and easy transition to digital maintenance • Clear structures • Easy to use • 2 parts: 1 dashboard for production managers to manage and document and 1 mobile maintenance app for the shop floor • Transform the maintenance tasks for every system directly into a digital solution and offer customers added value for the system
→ Page/online	www.festo.com/appworld	www.festo.com/smartenance

Compact and connective

+ Compact CODESYS controllers in IP20 with OPC UA server for Industry 4.0 integration
+ Numerous predefined interfaces to a higher-order control system

Electronic controllers ›

Controllers

CECC

Controllers

CECC

Overview, configuration and ordering
➔ **www.festo.com/catalogue/cecc**

Additional information, support and user documentation
➔ **www.festo.com/sp/cecc**

- \+ Modern, compact and versatile controller
- \+ Programming with CODESYS to IEC 61131-3
- \+ 12 digital inputs, 8 digital outputs, additionally 2 high-speed counter inputs up to 250 kHz
- \+ Ethernet 10/100 Mbps
- \+ USB interface for data transfer
- \+ CECC-LK with CANopen, IO-Link®, I-Port and Modbus TCP protocol

Application

Controller

The controllers CECC are modern, compact and versatile controllers that enable programming with CODESYS to IEC 61131-3.

State-of-the-art programming

CODESYS V3 pbF offers a user-friendly interface with the following new functions:

- Object-oriented programming
- Modern editors for simplified input
- Simplified configuration for fieldbus
- New configurator for IO-Link masters

IO-Link

- Multiple controllers in one project
- Improved troubleshooting function
- Simplified project navigation

Basic functions of the CECC-D

The controllers CECC (CECC-D) offer the following basic functions:

- 12 digital inputs, 8 digital outputs, additionally 2 high-speed counters up to 180 kHz
- Ethernet 10/100 Mbps, Modbus TCP client/server, EasyIP, TCP/IP, OPC server available
- CANopen master: connection of the electric drives
- USB interface for data transfer
- Can be connected directly with modern HMI devices: CDPX

Additional functions of the CECC-LK

- This variant of the CECC offers four IO-Link masters and one IO-Link device interface
- The integrated IO-Link interface of the CECC-LK enables quick and easy connection of Festo valve terminals and sensors to a controller
- All modern, compact valve terminals from the CTEU series can be connected to IO-Link masters: VTUB, VTUG, MPA, CPV, VTOC and upcoming devices, as well as the input box CTSL

Additional functions of the CECC-S

- 2 RS232 interfaces
- 1 RS422/RS485 interface, allows freely configurable communication with different devices
- The RS422 interface can optionally be used as an encoder interface. For this operating mode, there are numerous setting options on the encoder type, comparison functions and referencing
- In addition, the CECC offers an IO-Link master and an IO-Link device interface

Fieldbus interfaces

The CECC-LK and CECC-S can be connected to a combination of CTEU nodes and CAPC on various fieldbuses via the IO-Link device interface:

- PROFIBUS
- EtherCAT
- DeviceNet
- CANopen
- AS-Interface

PROFIBUS
EtherCAT
DeviceNet
CANopen
AS-Interface

System configuration

The CECC can communicate with all electric drive controllers from Festo and actuate all valve terminals via CANopen. The CECC communicates via Ethernet with other controllers and operator units from Festo, such as the modern, new HMI device series CDPX and the camera SBOx-Q for image evaluation.

Controllers CECC

Data sheet

Technical data	
CPU data	400 MHz processor
Degree of protection	IP20
Status displays	LED
Electrical connection technology for I/O	Socket strip, grid 3.5 mm

Digital inputs		
Number		12
Switching logic		Positive logic (PNP)
High-speed clock pulse inputs		2, each with max. 180 kHz
Input signal delay	[ms]	Typically 3
Input voltage	[V DC]	24
Permissible connecting cable length	[m]	30

Digital outputs		
Number		8
Switching logic		Positive logic (PNP)
Contact		Transistor
Output voltage	[V DC]	24
Output current	[mA]	500
Switching frequency	[kHz]	Max. 1
Protection against short circuit		Yes

Serial interfaces		CECC-LK	CECC-D	CECC-S
USB interface		USB 1.1		
Ethernet interface		RJ45		
IO-Link interface		Cage Clamp, master 5-pin	–	Cage Clamp, master 5-pin
Fieldbus interface				
Programming software		CODESYS V3		
Type of fieldbus interface		CAN bus		
Connection technology		Sub-D plug, 9-pin		
Transmission rate	[kbps]	125, 250, 500, 800, 1000		
		Can be set using software		

Operating and environmental conditions		CECC-LK	CECC-D	CECC-S
Operating voltage	[V DC]	19.2 ... 30		20.4 ... 30
Current consumption at 24 V DC	[mA]	100		
Ambient temperature	[°C]	0 ... +55		

Order code

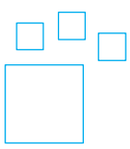
CECC – [ ]

Type	
CECC	

Function module	
LK	With 14 digital inputs and 8 digital outputs, Ethernet, USB, CANopen, 4 IO-Link masters, 1 IO-Link device
D	With 14 digital inputs and 8 digital outputs, Ethernet, USB, CANopen
S	With 14 digital inputs and 8 digital outputs, Ethernet, USB, CANopen, 2 RS232, 1 RS485/RS422/encoder, 1 IO-Link master, 1 IO-Link device

Order example:
CECC-LK
Function module CECC-LK, with 14 digital inputs and 8 digital outputs, Ethernet, USB, CANopen, 4 IO-Link masters, 1 IO-Link device

Ordering – Product options



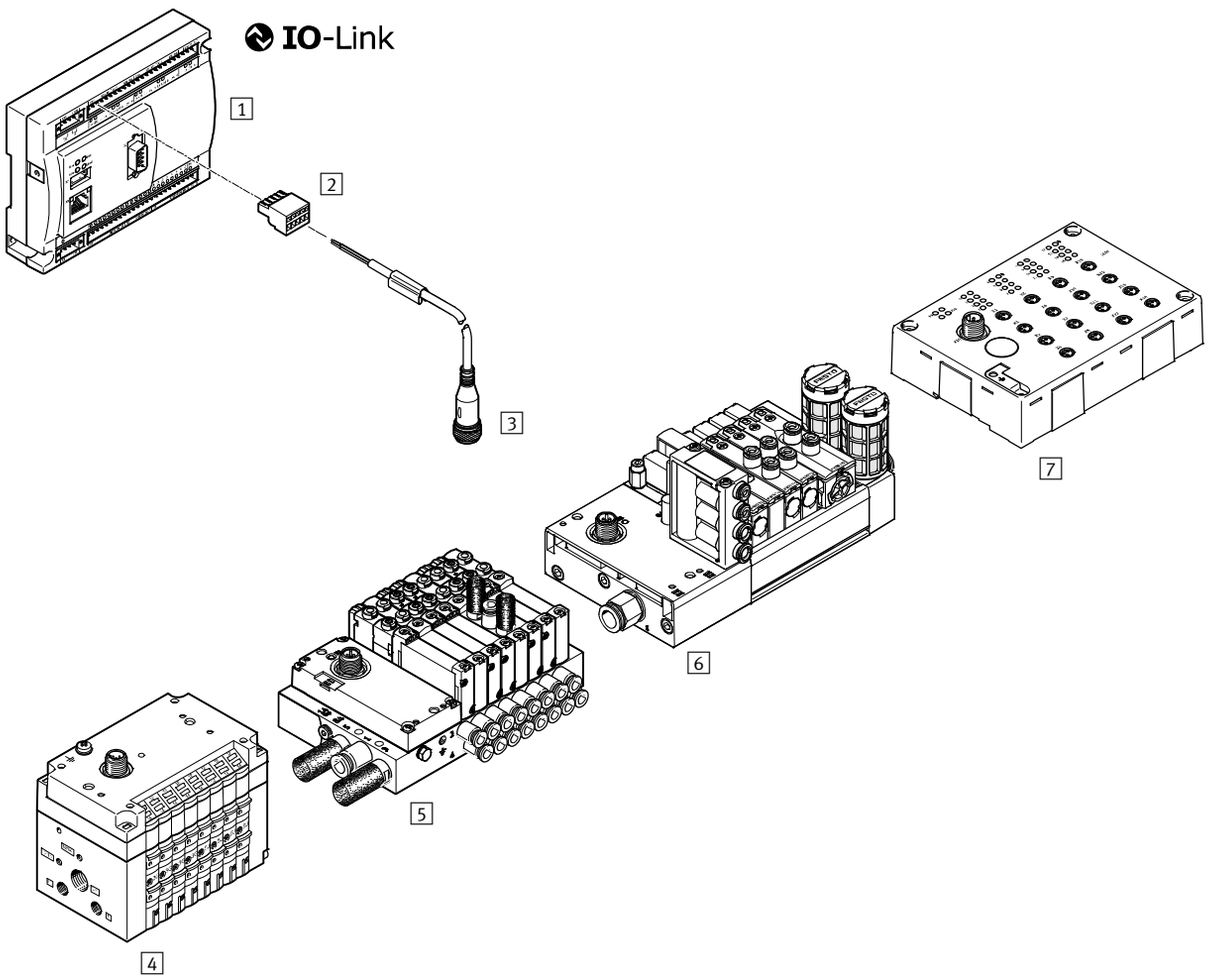
Configurable product

This product and all its options can be ordered using the configurator.

The configurator can be found under Products on the DVD or
➔ **www.festo.com/catalogue/...**

Enter the type code in the search field.

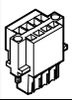
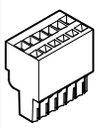
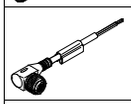
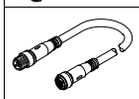
Accessories



		➔ Page/ online
1	Controller CECC	1576
2	Plug NECC	1579
3	Connecting cable NEBU	1579
4	Valve terminal CPV	**cpv**

		➔ Page/ online
5	Valve terminal VTUG	**vtug**
6	Valve terminal VTUB	**vtub**
7	Input module CTSL	**ctsl**
–	CODESYS V3 software	1579

Accessories – Ordering data

	Description		Part no.	Type
2 **Plugs**				
	–		**575303**	**NECC-L2G4-C1-M**
	2-pin		**575302**	**NECC-L2G2-C1**
	4-pin		**8024782**	**NECC-L2G4-C1**
	5-pin		**575304**	**NECC-L2G5-C1**
	6-pin		**575305**	**NECC-L2G6-C1**
	8-pin		**575306**	**NECC-L2G8-C1**
	24-pin		**575307**	**NECC-L2G24-C1**
	9-pin		**576031**	**NECC-S1G9-C2-M**
3 **Connecting cables**				**Data sheets ➔ 1543**
	Straight socket, 5-pin, cable length 2.5 m	★	**541330**	**NEBU-M12G5-K-2,5-LE5**
	Angled socket, 5-pin, cable length 2.5 m	★	**567843**	**NEBU-M12W5-K-2,5-LE5**
	Up to 20 m can be used[1)]	★	**574321**	**NEBU-M12G5-E-5-Q8-M12G5**
		★	**574322**	**NEBU-M12G5-E-7,5-Q8-M12G5**
		★	**574323**	**NEBU-M12G5-E-10-Q8-M12G5**
Programming software				
	–		**542000**	**GSPF-CDS-3**

1) Modular product, additional information ➔ Internet: nebu

Cost-sensitive and simple communication

+ Universal connection to controllers
+ All key communication standards available
+ Plug and work functionality

Electrical peripherals ›

Fieldbus modules

CTEU

Electrical peripherals ›

Fieldbus modules

CTEU

Overview, configuration and ordering
➔ **www.festo.com/catalogue/cteu**

Additional information, support and user documentation
➔ **www.festo.com/sp/cteu**

+ Fieldbus module for valve modules VTOC, VTUB-12, VTUG, MPA-L and CPV
+ Bus protocols: CANopen, PROFIBUS, DeviceNet®, AS-Interface, CC-LINK®, EtherCAT®, EtherNet/IP, PROFINET, CPI-B
+ Optional: 2 I-Port interfaces via adapter CAPC for installation system CTEL

Product range overview

Type	Designation	Address space		➔ Page/ online
		Inputs	Outputs	
CTEU-AS	Bus node for AS-Interface	2 bytes	2 bytes	cteu
CTEU-CC	Bus node for CC-LINK	16 bytes	16 bytes	1586
CTEU-CO	Bus node for CANopen	8 bytes	8 bytes	1586
CTEU-CP	Interface for CP installation system	4 bytes	4 bytes	cteu
CTEU-DN	Bus node for DeviceNet	8 bytes	8 bytes	1587
CTEU-EC	Bus node for EtherCAT	16 bytes	16 bytes	1587
CTEU-EP	Bus node for EtherNet/IP	64 bytes	64 bytes	1588
CTEU-PB	Bus node for PROFIBUS	16 bytes	16 bytes	1588
CTEU-PN	Bus node for PROFINET	64 bytes	64 bytes	cteu
CPX-CTEL	I-Port interface for CPX	32 bytes	32 bytes	1589
CPX-CTEL-2	IO-Link interface for CPX	32 bytes	32 bytes	cteu
VMPAL-EPL	I-Port interface for valve terminal MPA-L	–	4 bytes	1590
VAEM-L1-S	I-Port interface for valve terminal VTUG	–	6 bytes	1590
CPV-GE-PT	I-Port interface for valve terminal CPV	–	2 bytes	cteu
VABM-C8	I-Port interface for valve terminal VTUB-12	–	4 bytes	cteu
CTSL-D-16E	Input module	2 bytes	–	1591
CAPC-F1	Decentralised adapter for connecting I-Port devices	Dependent on connected I-Port devices		1591

Note
CTEU is ordered using an ident. code. A configurator is available to help you select a suitable valve terminal.
The convenient product configurator can be found at:

➔ **www.festo.com/catalogue/cteu**

Key features

The system

- Bus nodes CTEU for valve terminals
- Festo-specific interface (I-Port)
- Input modules CTSL for recording sensor signals
- Cost savings for valve terminals with a large number of valves on the fieldbus thanks to the reduction of hardware
- Direct and easy networking of valve terminals and other devices via a bus connection
- Versatility thanks to high protection class IP65/67
- Universal connection technology (Sub-D, M12, terminal strip)
- Optional decentralised installation of bus node for connecting two valve terminals
- Basic diagnostics: undervoltage, short circuit

CTEU for universal use of valve terminals. The Festo-specific, standardised interface (I-Port) enables the bus modules to be used for different valve terminal types.

The following protocols are currently supported:

- CC-LINK
- CANopen
- DeviceNet
- EtherCAT
- EtherNet/IP
- PROFIBUS

Fieldbus systems

CC-LINK
"Control and Communications Link" (CC-LINK) was developed by Mitsubishi Electric and has been available as an open fieldbus network since 1999.

CANopen
CANopen was originally developed for the automotive industry by a joint venture led by Bosch. It has been maintained by the organisation CiA (CAN in Automation) since 1995, and at the end of 2002 it was standardised as European standard EN 50325-4.

DeviceNet
DeviceNet is an open fieldbus standard that was developed by Rockwell Automation on the basis of the CAN protocol. DeviceNet is standardised in European standard EN 50325.

EtherCAT
EtherCAT is a bus with real-time capability; it was developed by Beckhoff and the EtherCAT Technology Group (ETG). EtherCAT is an open technology and has been standardised in international standards IEC 61158 and IEC 61784 and in ISO 15745-4.

EtherNet/IP
EtherNet/IP was developed by Allen-Bradley (Rockwell Automation) and the ODVA (Open DeviceNet Vendor Association). EtherNet/IP is an open standard (technology based on Ethernet TCP/IT and UDP/IP) for industrial networks and is standardised in the IEC 61158 series of international standards.

PROFIBUS
Process Fieldbus (PROFIBUS) is a fieldbus that was developed by Siemens and has been standardised in the IEC 61158 series of international standards. It enables communication between devices without the need for any specific adaptations to the interface.

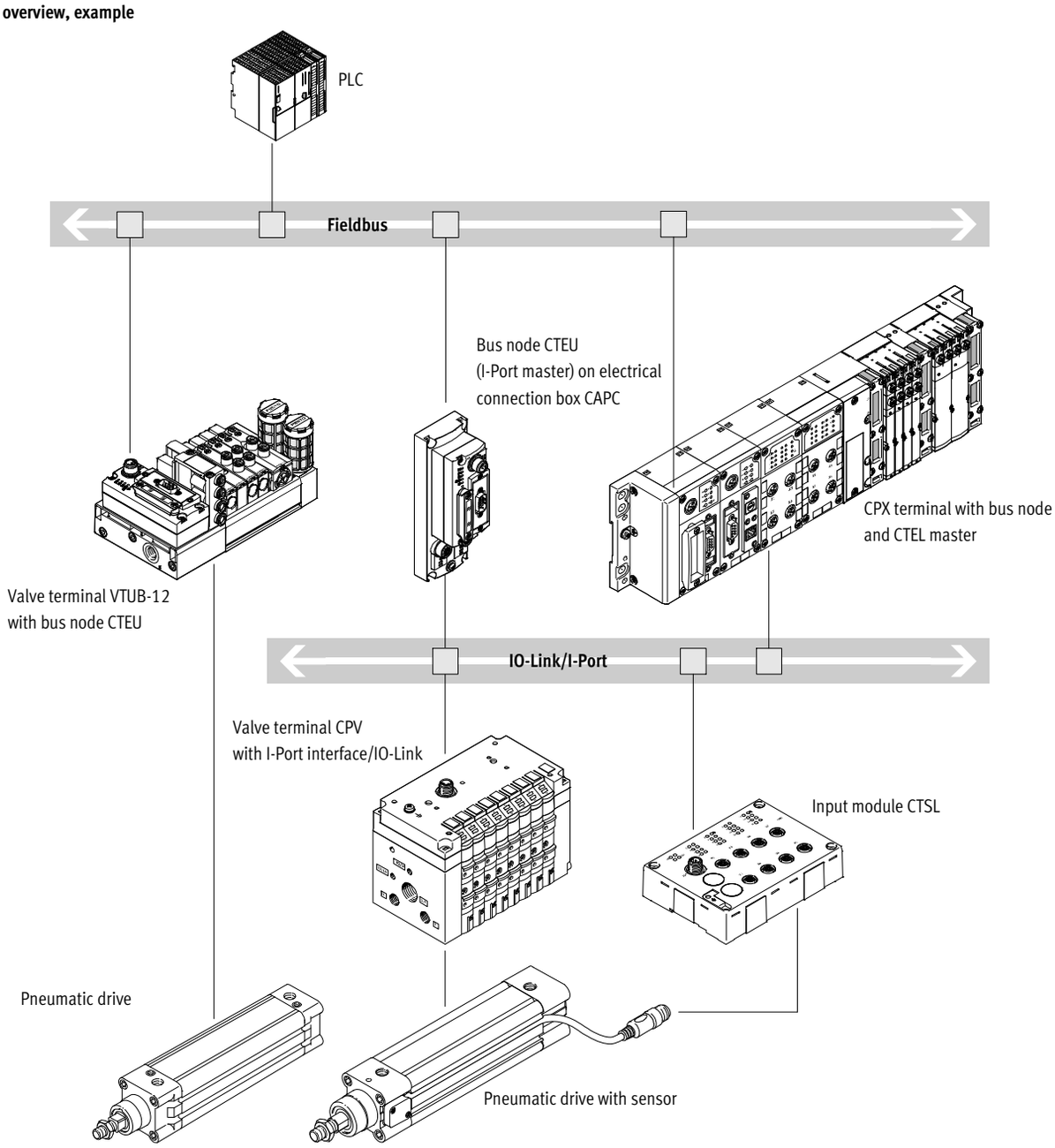
Key features

Different bus nodes are used for integration in the control systems of various manufacturers.

The following protocols are supported with the compatible bus node CTEU:
- CC-LINK
- CANopen
- DeviceNet
- EtherCAT
- EtherNet/IP
- PROFIBUS

A second valve terminal can be connected via an electrical connection box (decentralised adapter). (➔ Page 1591)

System overview, example



- Communication with the higher-order controller via fieldbus
- Use a bus node CTEU compatible with the fieldbus protocol
- Up to 64 inputs/outputs (solenoid coils), depending on the valve terminal

Data sheet – CTEU-CC

CC-Link

Materials
Housing: PC, PA reinforced

Technical data Type		CTEU-CC
Fieldbus interface		• Sub-D socket, 9-pin • Sub-D plug for self-assembly • Screw terminal strip, IP20
Baud rate	[kbps]	156 ... 10000
Intrinsic current consumption at nominal operating voltage	[mA]	Typically 70
Parameterisation		• Activating diagnostics • Failsafe and idle response
Max. address capacity, inputs	[byte]	16
Max. address capacity, outputs	[byte]	16
Additional functions		System status can be displayed using process data
Dimensions W x L x H	[mm]	40 x 91 x 50

Data sheet – CTEU-CO

CANopen

Materials
Housing: PC, PA reinforced

Technical data Type		CTEU-CO
Fieldbus interface		• Sub-D socket, 9-pin • Sub-D plug for self-assembly • 2x M12x1, 5-pin • Terminal strip, 5-pin
Baud rate	[kbps]	125, 250, 500 and 1000
Intrinsic current consumption at nominal operating voltage	[mA]	Typically 65
Parameterisation		• Diagnostic behaviour • Fail state
Max. address capacity, inputs	[byte]	8
Max. address capacity, outputs	[byte]	8
Additional functions		• Emergency message • Acyclic data access via "SDO"
Dimensions W x L x H	[mm]	40 x 91 x 50

Data sheet – CTEU-DN

Materials
Housing: PC, PA reinforced

Technical data

Type		CTEU-DN
Fieldbus interface		• Sub-D socket, 9-pin • Sub-D plug for self-assembly • 2x M12x1, 5-pin • Terminal strip, 5-pin
Baud rate	[kbps]	125; 250; 500
Intrinsic current consumption at nominal operating voltage	[mA]	Typically 65
Parameterisation		• Diagnostic behaviour • Failsafe and idle response
Max. address capacity, inputs	[byte]	8
Max. address capacity, outputs	[byte]	8
Additional functions		• Acyclic data access via "Explicit Message" • QuickConnect • System status can be displayed using process data
Dimensions W x L x H	[mm]	40 x 91 x 50

Data sheet – CTEU-EC

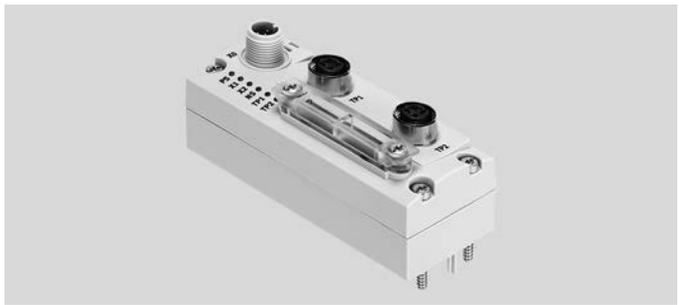
Materials
Housing: PC, PA reinforced

Technical data

Type		CTEU-EC
Fieldbus interface		2x socket M12, D-coded, 4-pin
Baud rate	[Mbps]	100
Intrinsic current consumption at nominal operating voltage	[mA]	Typically 60
Parameterisation		• Diagnostic behaviour • Failsafe response
Max. address capacity, inputs	[byte]	16
Max. address capacity, outputs	[byte]	16
Additional functions		• Diagnostic object • Acyclic data access via "SDO" • Emergency message • Modular Device Profile (MDP)
Dimensions W x L x H	[mm]	40 x 91 x 50

Data sheet – CTEU-EP

Materials
Housing: PA reinforced



Technical data

Type		CTEU-EP
Fieldbus interface		2x socket, M12x1, 4-pin, D-coded
Baud rate	[Mbps]	10/100
Intrinsic current consumption at nominal operating voltage	[mA]	Typically 65
Parameterisation		• Failsafe and idle response • Diagnostic behaviour
Max. address capacity, inputs	[byte]	64
Max. address capacity, outputs	[byte]	64
Additional functions		• AddressConflictDetection (ACD) • Acyclic data access via "Explicit Message" • EtherNet/IP QuickConnect • IP addressing via DHCP, DIL switch, fieldbus or FFT • Integrated switch • Ring topology (DLR) • SNMP • Start-up parameterisation in plain text via fieldbus • System status can be displayed using process data • Web server
Dimensions W x L x H	[mm]	40 x 91 x 50

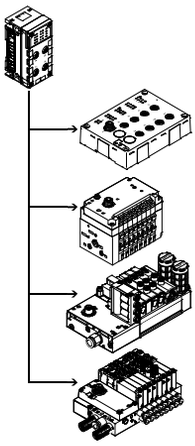
Data sheet – CTEU-PB

Materials
Housing: PC, PA reinforced

Technical data

Type		CTEU-PB
Fieldbus interface		• Sub-D socket, 9-pin • Sub-D plug for self-assembly • 2x M12x1, 5-pin, B-coded
Baud rate	[kbps]	9.6; 19.2; 93.75; 187.5; 500
	[Mbps]	1.5, 12
Intrinsic current consumption at nominal operating voltage	[mA]	Typically 100
Parameterisation		• Diagnostic behaviour • Failsafe response
Max. address capacity, inputs	[byte]	16
Max. address capacity, outputs	[byte]	16
Additional functions		• System status via diagnostics program • Emergency message
Dimensions W x L x H	[mm]	40 x 91 x 50

Data sheet – CPX-CTEL



Materials
Housing: PC, PA reinforced

Technical data

Type		CPX-CTEL-4-M12-5POL
I-Port connection		4x socket M12, 5-pin, A-coded
Protocol		I-Port
Intrinsic current consumption at nominal operating voltage	[mA]	Typically 65
Parameterisation		• Diagnostic behaviour • Failsafe per channel • Forcing per channel • Idle mode per channel • Module parameters • Tool change mode
Max. address capacity, inputs	[byte]	32
Max. address capacity, outputs	[byte]	32
Additional functions		Tool change mode
Dimensions (incl. interlinking block) W x L x H	[mm]	50 x 107 x 55

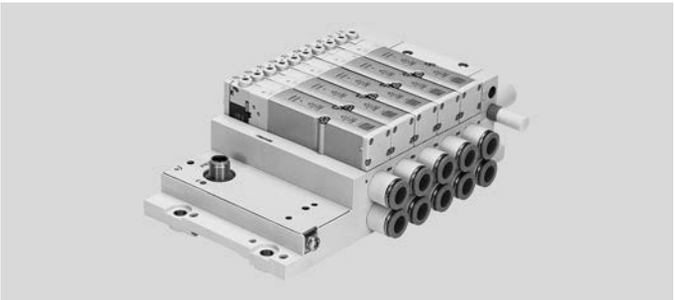
Data sheet –MPA-L

Flow rate
VMPA1: up to 360 l/min
VMPA14: up to 670 l/min
VMPA2: up to 700 l/min

Valve width
VMPA1: 10 mm
VMPA14: 14 mm
VMPA2: 20 mm

I-Port interface for communication between a valve terminal MPA-L and an I-Port master. It activates a valve terminal MPA-L with up to 32 solenoid coils on max. 32 valve positions.

Materials
End plate: PPA reinforced

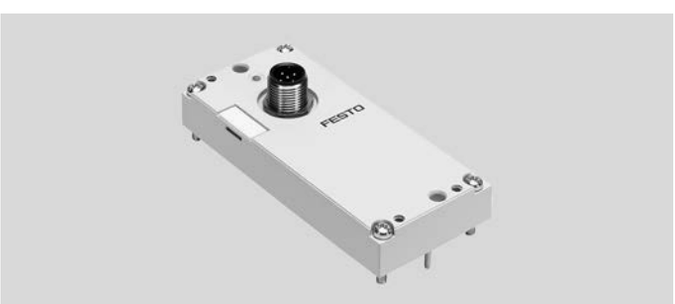


Technical data

Type			VMPAL-EPL-IPO32
Protocol			IO-Link/I-Port
IO-Link	Connection technology		5-pin
	Protocol		V 1.0
	Communication mode		COM2 (38.4 kBaud), COM3 (230 kBaud)
	Port type		B
	Number of ports		1
	Process data width OUT	[bit]	8 ... 32
Baud rate		[kbps]	38.4; 230.4
Intrinsic current consumption	Operating voltage	[mA]	30
	Load voltage	[mA]	30

Data sheet – I-Port interface/IO-Link for valve terminal VTUG

Versions:
- I-Port interface for bus nodes (CTEU)
- IO-Link mode for direct connection to a higher-level IO-Link master



Technical data

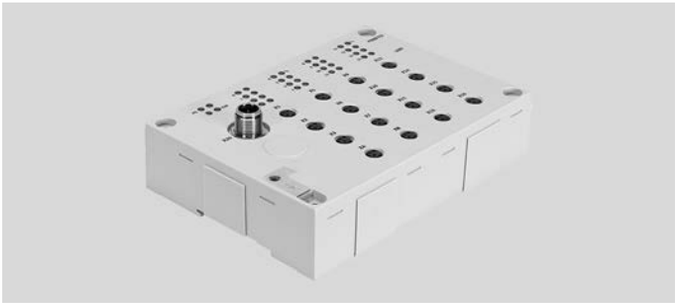
Type			VAEM-L1-S
Communication types			IO-Link
Electrical connection			• M12 plug, 5-pin • A-coded • Metal thread for screening
Baud rate	COM3	[kbps]	230.4
	COM2	[kbps]	38.4
Intrinsic current consumption	Logic supply PS	[mA]	30
	Valve supply PL	[mA]	30
Max. number of solenoid coils	VAEM-L1-S-8-PT		16
	VAEM-L1-S-16-PT		32
	VAEM-L1-S-24-PT		48
Max. no. of valve positions	VAEM-L1-S-8-PT		8
	VAEM-L1-S-16-PT		16
	VAEM-L1-S-24-PT		24
Ambient temperature		[°C]	–5 ... +50

Data sheet – CTSL

Function

Digital input modules facilitate the connection of proximity sensors or other 24 V DC sensors (inductive, capacitive, etc.).

Materials: PA reinforced



Technical data

Type			CTSL-D-16E-M8-3	CTSL-D-16E-M12-5
Electrical connection			16x socket, M8, 3-pin	8x socket, M12, 5-pin
Protocol			IO-Link/I-Port	
IO-Link	Connection technology		5-pin	
	Protocol		V 1.0	
	Communication mode		COM2 (38.4 kBaud), COM3 (230 kBaud)	
	Port type		B	
	Number of ports		1	
	Process data width OUT	[bit]	16	
	Minimum cycle time	[ms]	3.2	
	Device ID		0x 700410	
Current consumption at nominal operating voltage of logic circuit		[mA]	Max. 35	
Baud rate		[kbps]	38.4; 230.4	
Max. number of inputs			16	

Data sheet – Electrical connection box CAPC

Function

The electrical connection box CAPC enables the decentralised installation of bus nodes CTEU on a valve terminal or input modules with I-Port interface.

Area of application

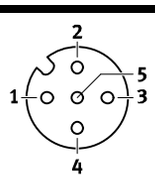
- M12 connection technology (two interfaces)
- Enables the installation of valve terminals or other devices over a distance of 20 metres
- Accessory CAFM enables the connection box to be installed on an H-rail

Housing: PA reinforced

Technical data

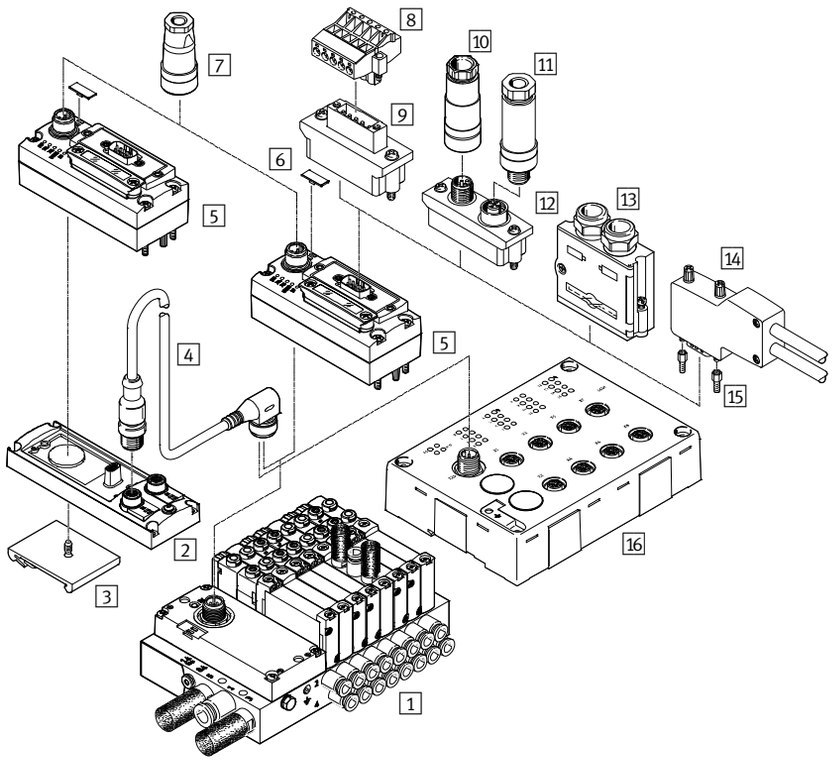
Type		CAPC-F1-E-M12
Fieldbus interface		2x socket M12, 5-pin, A-coded
Operating voltage range	[V DC]	18 ... 30
Max. power supply	[A]	2
Nominal operating voltage	[V DC]	24
Dimensions W x L x H	[mm]	50 x 148 x 28

Pin allocation – I-Port interface/IO-Link



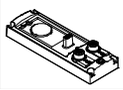
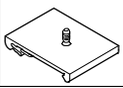
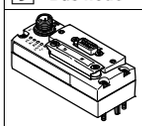
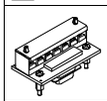
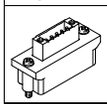
Pin	Allocation	Description
1	$24V_{EL/SEN}$	Operating voltage supply (electronics, sensors/inputs)
2	$24V_{VAL/OUT}$	Load voltage supply (valves/outputs)
3	$0V_{EL/SEN}$	Operating voltage supply (electronics, sensors/inputs)
4	C/Q	Data communication
5	$0V_{VAL/OUT}$	Load voltage supply (valves/outputs)
Housing, FE		Functional earth

Peripherals overview – CTEU with valve terminal VTUG



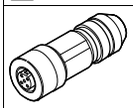
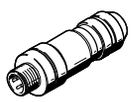
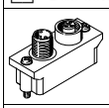
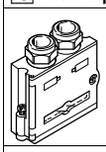
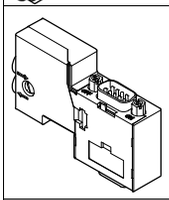
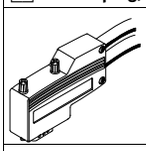
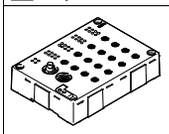
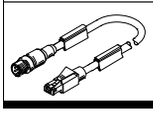
Accessories		➔ Page/online
1	Manifold rail VABM, with I-Port interface, for connecting max. 35 valves	vtug
2	Electrical connection box CAPC, for connecting a further terminal (2x I-Port interface)	1593
3	H-rail adapter CAFM, for adapter CAPC	1593
4	Connecting cable NEBU, for IO-Link	1593
5	Bus node CTEU	1593
6	Inscription label ASLR, for bus node	1593
7	Power supply socket NTSD/FBSD, for power supply	1593
8	Terminal strip FBSD-KL, for open style connection	1593
9	Bus connection FBA-1, open style for 5-pin terminal strip	1593
10	Socket FBSD-GD, NECU, for micro style connection, M12, 5-pin	1594
11	Plug FBS, NECU, for micro style connection, M12, 5-pin	1594
12	Bus connection FBA-2, micro style, 2xM12, 5-pin	1594
13	Plug FBS-SUB-9-BU, Sub-D	1594
14	Plug FBS-SUB-9-WS, Sub-D, angled	1594
15	Threaded sleeve UNC, Sub-D mounting bolt	1594
16	Input module CTSL-D-16E	1594
–	Connecting cable NEBC for EtherCAT and EtherNet/IP	1594

Accessories – Ordering data

	Code[1]	Description		Part no.	Type
2 Electrical connection box					
	–	For connecting two devices with I-Port interface to a bus node		**570042**	**CAPC-F1-E-M12**
3 H-rail mounting					
	–	For electrical connection box CAPC-F1-E-M12		**570043**	**CAFM-F1-H**
4 Connecting cable					**Data sheets ➔ Page 1543**
	–	Connecting cable, M12, 5-pin, straight plug-straight socket	5 m	**574321**	**NEBU-M12G5-E-5-Q8N-M12G5**
	–		7.5 m	**574322**	**NEBU-M12G5-E-7.5-Q8N-M12G5**
	–		10 m	**574323**	**NEBU-M12G5-E-10-Q8N-M12G5**
5 Bus node					
	CC	CC-Link bus node		**1544198**	**CTEU-CC**
	CO	CANopen bus node		**570038**	**CTEU-CO**
	DN	DeviceNet bus node		**570039**	**CTEU-DN**
	EC	EtherCAT bus node		**572556**	**CTEU-EC**
	EP	EtherNet/IP bus node		**2798071**	**CTEU-EP**
	PB	PROFIBUS bus node		**570040**	**CTEU-PB**
6 Inscription label					
	–	40 pieces in frame		**565306**	**ASLR-C-E4**
7 Power supply socket					**Data sheets** online: ➔ **ntsd**
	–	M12 socket, 5-pin	For DeviceNet, CANopen	**538999**	**NTSD-GD-9-M12-5POL-RK**
			For CC-Link, PROFIBUS, EtherCAT, EtherNet/IP	**18324**	**FBSD-GD-9-5POL**
8 Terminal strip for open style connection					**Data sheets** online: ➔ **fbsd**
	–	Terminal strip for open style connection, 5-pin	Compatible with FBA-1-SL-5POL	**525635**	**FBSD-KL-2x5POL**
9 Bus connection					**Data sheets** online: ➔ **fba**
	–	Screw terminal bus connection	For CC-Link	**197962**	**FBA-1-KL-5POL**
	–	Open style bus connection	For DeviceNet, CANopen	**525634**	**FBA-1-SL-5POL**

1) Code letter within the order code for a valve terminal configuration.

Accessories – Ordering data

	Code[1]	Description		Part no.	Type
9 Socket for micro style connection					**Data sheets** online: ➔ **fbsd/necu**
	–	Socket for micro style connection, M12x1, 5-pin	Compatible with FBA-2-M12-5POL	**18324**	**FBSD-GD-9-5POL**
			Compatible with FBA-2-M12-5POL-RK	**1067905**	**NECU-M-B12G5-C2-PB**
11 Plug for micro style connection, M12, 5-pin					**Data sheets** online: ➔ **fbs/necu**
	–	Plug for micro style connection, M12x1, 5-pin	Compatible with FBA-2-M12-5POL	**175380**	**FBS-M12-5GS-PG9**
			Compatible with FBA-2-M12-5POL-RK	**1066354**	**NECU-M-S-B12G5-C2-PB**
12 Bus connection M12 adapter					
	–	Micro style bus connection, 2xM12, 5-pin	For DeviceNet, CANopen	**525632**	**FBA-2-M12-5POL**
			For PROFIBUS	**533118**	**FBA-2-M12-5POL-RK**
13 Sub-D plug, straight					**Data sheets** online: ➔ **fbs**
	–	Plug connector to fabricate a connecting cable	For DeviceNet, CANopen	**532219**	**FBS-SUB-9-BU-2x5POL-B**
			For CC-Link	**532220**	**FBS-SUB-9-GS-2x4POL-B**
	–	Plug connector with terminating resistor and programming interface, to fabricate a connecting cable	For CANopen	**574588**	**NECU-S1W9-C2-ACO**
			For PROFIBUS	**574589**	**NECU-S1W9-C2-APB**
14 Sub-D plug, angled					**Data sheets** online: ➔ **fbs**
	–	Plug connector to fabricate a connecting cable	For CANopen	**533783**	**FBS-SUB-9-WS-CO-K**
			For PROFIBUS	**533780**	**FBS-SUB-9-WS-PB-K**
15 Threaded sleeve					
	–	Threaded sleeve for Sub-D		**533000**	**UNC4-40/M3X8**
16 Input module					
	–	16 sensor connections M8, 3-pin, single allocation		**1387363**	**CTSL-D-16E-M8-3**
	–	8 sensor connections M12, 5-pin, double allocation		**1387359**	**CTSL-D-16E-M12-5**
Connecting cable					**Data sheets** online: ➔ **nebc**
	–	Straight plug, M12x1, 4-pin, D-coded, straight plug, RJ45, 8-pin	1 m	**8040451**	**NEBC-D12G4-ES-1-S-R3G4-ET**
			3 m	**8040452**	**NEBC-D12G4-ES-3-S-R3G4-ET**
			5 m	**8040453**	**NEBC-D12G4-ES-5-S-R3G4-ET**

1) Code letter within the order code for a valve terminal configuration.

The automation platform

+ Universal connection to controllers
+ Integration of electric and pneumatic functions on one platform
+ Safety on board

Electrical peripherals ›

Terminal

CPX

Electrical peripherals ›

Terminal

CPX

Overview, configuration and ordering
➔ **www.festo.com/catalogue/cpx**

Additional information, support and user documentation
➔ **www.festo.com/sp/cpx**

+ Centralised, decentralised, hybrid installation system with maximum modularity and flexibility
+ IP65, IP67 or IP20
+ Choice of polymer or metal housing with individual linking
+ Open to all leading fieldbus protocols/Industrial EtherNet with integrated IT services such as SMS/e-mail alert, web monitor
+ Comprehensive integrated diagnostic and service function
+ Operating modes: stand-alone as remote I/O or with valve terminals MPA, VTSA/VTSA-F

Product range overview

Type	Designation	Code[1]	Address space		Version		➔ Page/ online
			Inputs	Outputs	Polymer	Metal	
CPX-CEC	CoDeSys embedded controller	T06, T07	512 bit	512 bit	■	–	cpx
CPX-CEC-V3	CODESYS V3 embedded controller	T32, T33, T34	512 bit	512 bit	■	–	1608
CPX-FB6	Bus node for INTERBUS	F06	96 bit	96 bit	■	–	1609
CPX-FB11	Bus node for DeviceNet	F11	512 bit	512 bit	■	–	1609
CPX-FB13	Bus node for PROFIBUS DP	F13	512 bit	512 bit	■	–	1610
CPX-FB14	Bus node for CANopen	F14	256 bit	256 bit	■	–	1610
CPX-M-FB21	Bus node for INTERBUS, fibre-optic connection	F21	96 bit	96 bit	–	■	cpx
CPX-FB23-24	Bus node for CC-Link	F23	256 bit	256 bit	■	–	1611
		F24	512 bit	512 bit	■	–	1611
CPX-FB33	Bus node for PROFINET RT, 2x M12	F33	512 bit	512 bit	–	■	1612
CPX-M-FB34	Bus node for PROFINET RT, 2x RJ45	F34	512 bit	512 bit	–	■	1612
CPX-M-FB35	Bus node for PROFINET RT, 2x SCRJ push-pull, AIDA	F35	512 bit	512 bit	–	■	1613
CPX-FB36	Bus node for EtherNet/IP, 2x M12	F36	512 bit	512 bit	■	–	1614
CPX-FB37	Bus node for EtherCAT	F37	512 bit	512 bit	■	–	cpx
CPX-FB39	Bus node for Sercos III	F39	512 bit	512 bit	■	–	cpx
CPX-FB40	Bus node for POWERLINK	F40	512 bit	512 bit	■	–	cpx
CPX-M-FB41	Bus node for PROFINET RT, 2x SCRJ push-pull, AIDA	F41	512 bit	512 bit	–	■	cpx
CPX-CP-4-FB	CP interface	T11 ... T18	16 ... 128 bit	16 ... 128 bit	■	–	1615
CPX-CTEL-4-M12-5POL	CPX CTEL master	T40 ... T44	0 ... 256 bit	0 ... 256 bit	■	–	1615
CPX-CTEL-2-M12-5POL-LK	CPX CTEL master, IO-Link	T45 ... T48	0 ... 192 bit	0 ... 192 bit	■	–	cmpx
CPX-CMPX	End-position controller CMPX	T20	48 bit	48 bit	■	–	cmpx
CPX-CMAX	Axis controller CMAX	T21	64 bit	64 bit	■	–	cmax
CPX-CMIX	Measuring module CMIX	T23	48 bit	48 bit	■	–	cpx
CPX-CM-HPP	FHPP gateway	T31	256 bit	256 bit	■	–	1616

1) Code letter within the order code for a valve terminal configuration.

Note
The electrical terminal can be ordered quickly and easily online.
The convenient product configurator can be found at:

➔ **www.festo.com/catalogue/cpx**

Note
The bus node and control block provide the aforementioned address space.

Product range overview

Type	Designation	Code[1]	Address space		Version		➔ Page/ online
			Inputs	Outputs	Polymer	Metal	
CPX-4DE	Input module, 4 digital inputs	F	4/8 bit[2]	–	■	–	cpx
CPX-8DE	Input module, 8 digital inputs	E	8 bit	–	■	–	1616
CPX-8DE-D	Input module, 8 digital inputs (channel diagnostics)	D	8 bit	–	■	–	cpx
CPX-8NDE	Input module, 8 digital inputs (NPN)	O	8 bit	–	■	–	1616
CPX-P-8DE-N	Input module, 8 digital inputs, NAMUR	BR	16 bit	8 bit	–	■	cpx
	Input module, 16 digital inputs, NAMUR (inputs configured as counters)	BR	80 bit	16 bit	–	■	cpx
CPX-16DE	Input module, 16 digital inputs	M	16 bit	–	■	–	1617
CPX-M-16DE-D	Input module, 16 digital inputs (channel diagnostics)	NM	16 bit	–	■	–	1617
CPX-L-16DE-16-KL-3POL	Input module, 16 digital inputs (spring-loaded terminal)	NB	16 bit	–	■	–	cpx
CPX-F8DE-P	PROFIsafe input module, 8 digital inputs for reliable detection and evaluation of input statuses	ND	48 bit	56 bit	■	–	cpx
CPX-4DA	Output module, 4 digital outputs	A	–	4/8 bit[2]	■	–	1617
CPX-8DA	Output module, 8 digital outputs	L	–	8 bit	■	–	cpx
CPX-8DA-H	Output module, 8 digital outputs (high current)	NL	–	8 bit	■	–	1618
CPX-8DE-8DA	Input/output module, 16-way, 8 digital inputs/outputs each	Y	8 bit	8 bit	■	–	1619
CPX-L-8DE-8DA-16-KL-3POL	Input module, 8 digital inputs/outputs (spring-loaded terminal)	NC	8 bit	8 bit	■	–	cpx
CPX-2ZE2DA	Counter module, 2 digital inputs, 2 digital outputs	T25	96 bit	96 bit	■	–	cpx
CPX-4AE-4AA-H	HART input/output module, 4 analogue inputs/outputs with HART protocol	H01 ... H10	0 ... 192 bit	0 ... 64 bit	■	■	cpx
CPX-2AE-U-I	Input module, 2 analogue inputs	U	32 bit	–	■	–	1620
CPX-4AE-U-I	Input module, 4 analogue inputs	NI	64 bit	–	■	–	cpx
CPX-4AE-I	Input module, 4 analogue inputs (current)	I	64 bit	–	■	–	1621
CPX-4AE-T	Input module, 4 analogue inputs (temperature)	T	64 bit	–	■	–	1622
CPX-4AE-TC	Input module, 4 analogue inputs (temperature, thermocouples)	NT	64 bit	–	■	–	1623
CPX-4AE-P	Input module, 4 analogue inputs (pressure)	NY, NV	64 bit	–	■	–	1624
CPX-2AA-U-I	Output module, 2 analogue outputs	P	–	32 bit	■	–	1625
CPX-FVDA-P2	PROFIsafe shut-off module	NG	48 bit	48 bit	–	■	1626
VMPA-FB-EPL	Pneumatic interface to MPA-S	–D	16 ... 512 bit	4 ... 512 bit	■	■	cpx
VMPAL-EPL-CPX	Pneumatic interface to MPA-L	–L	–	4 ... 32 bit	■	–	1629
VABA-S6-1-X	Pneumatic interface to VTSA and VTSA-F	–S, –T,	–	8 ... 32 bit	■	■	1629

1) Code letter within the order code for a valve terminal configuration.
2) Number of occupied bits is dependent on the upstream bus node/control block.

Note
The electrical terminal can be ordered quickly and easily online.
The convenient product configurator can be found at:

➔ **www.festo.com/catalogue/cpx**

Note
Input/output modules, etc. use the specified address space.

Key features

Installation concept

- Choice of several valve terminal types for different applications:
  - MPA-L
  - VTSA/VTSA-F
- Economical from the smallest configuration up to the maximum number of modules
- Up to 9 electrical input/output modules plus bus nodes and pneumatic interface/electronics modules for valves
- Extensive range of functions and connection options for the electrical modules
- Choice of connection technology for technically and economically optimised connections
- Can be used as a dedicated remote I/O module

Electrics

- High operating voltage tolerance (±25%)
- Choice of M18, 7/8" or AIDA push-pull connection for power supply
- Open to all fieldbus protocols and Ethernet
- Optional function and technology modules for pre-processing
- IT services and TCP/IP such as remote maintenance, remote diagnostics, SMS and e-mail alert
- Digital inputs and outputs, 4-way/8-way/16-way, optionally available with individual channel diagnostics
- Analogue inputs and outputs, 2-way/4-way
- Supply ports
- Temperature inputs
- Controllers for pneumatic and electric axes
- IP65 and IP67 or IP20

Mounting

- Wall or H-rail mounting, also on mobile units
- Conversions/extensions are possible at any time, individual linking with CPX metal design
- Modular system offering a range of configuration options
- Fully assembled and tested unit
- Lower selection, ordering, assembly and commissioning costs thanks to the central CPX terminal
- Choice of pneumatic components for optimised control chain system design
- Decentralised, subordinate CPI installation system improves cycle times by up to 30%
- Safe and convenient earthing thanks to earthing plate

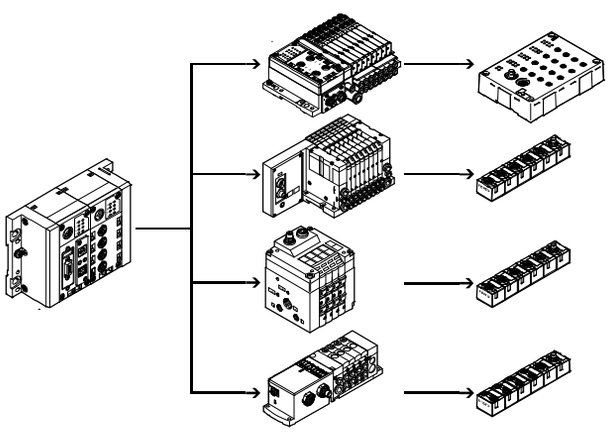
Operation

- Fast troubleshooting thanks to an extensive selection of LEDs (some of which are multi-coloured) on the bus node and on all I/O modules
- Supports module and channel-oriented diagnostics
- Fieldbus/Ethernet remote diagnostics
- Innovative diagnostic support with maintenance tool with USB adapter for PC
- Optimised commissioning thanks to parameterisable functions
- Reliable servicing with connection blocks and modules that are quick to replace without changing the wiring

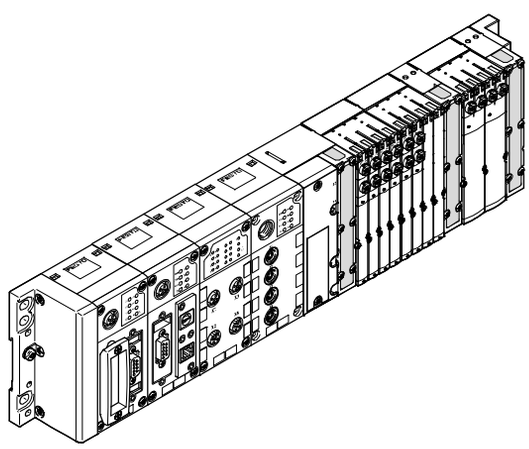
Pneumatic variants of the CPX terminal

The electrical CPX terminal is a modular peripheral system for valve terminals. The system is specifically designed so that the valve terminal can be adapted to suit different applications. The modular system design lets you configure the number of valves, inputs and additional outputs to suit the application.

With valve terminal – decentralised

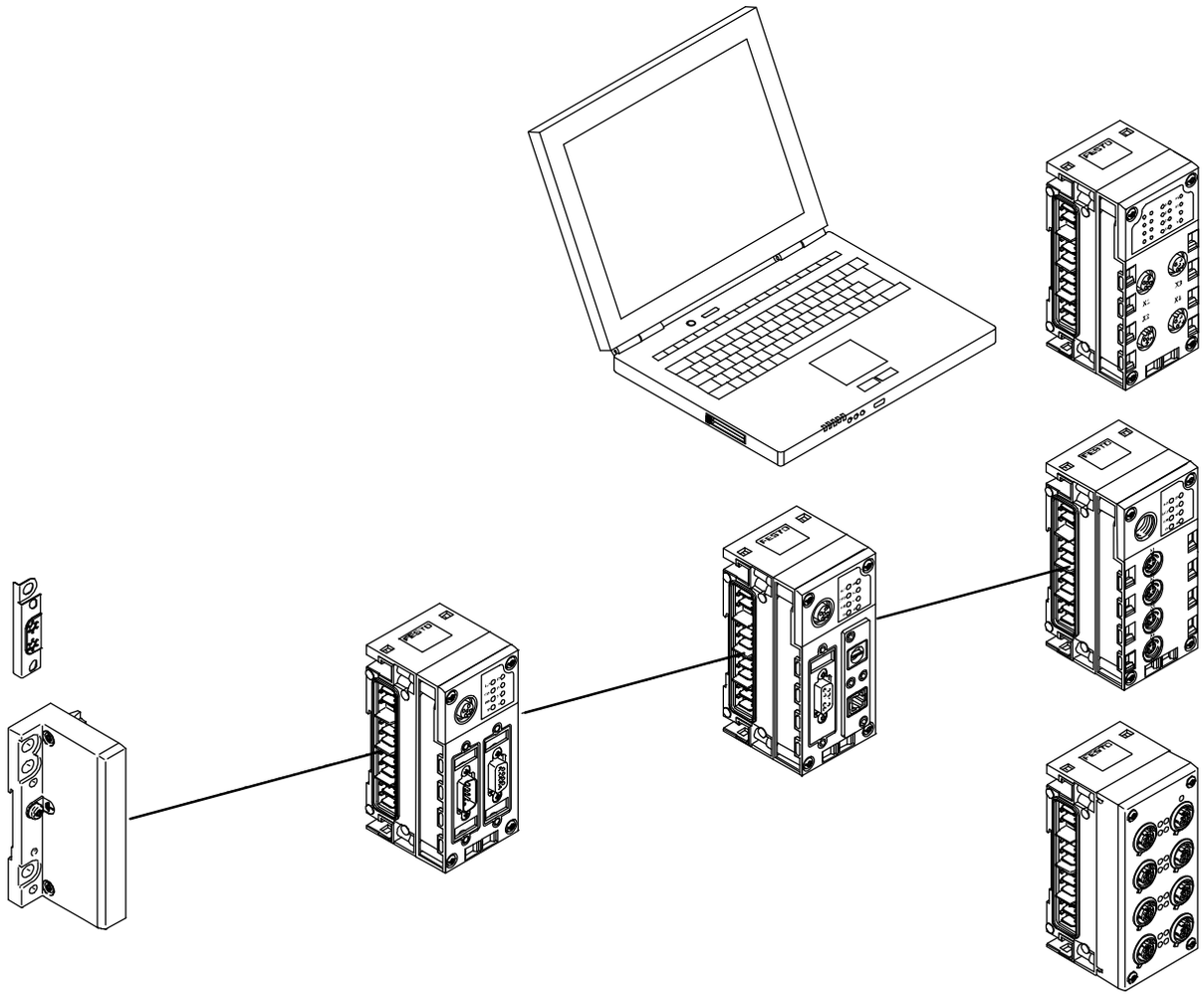


With valve terminal MPA-S – centralised



Variants

Complete overview of modules



End plate

- Mounting holes for wall mounting
- Functional earth connection
- Special earthing plate for safe and easy connection to the machine bed or H-rail

Bus node

- Fieldbus/Industrial EtherNet connection using various types of connection technology
- Setting fieldbus parameters via DIL switch
- Display of fieldbus and peripheral equipment status via LED
- PROFINET to AIDA standard in metal housing, fast start-up

Control block

- Pre-processing, stand-alone controller or remote unit
- Connection via EtherNet TCP/IP or Sub-D programming interface
- Setting operating modes via DIL switch and program selection via rotary switch
- CPX-CMX products for controlling axes

CP interface/CTEL interface

- Interfaces for decentralised installation systems, thus optimising the pneumatic control chains (short tubes/short cycle times)
- Actuation for I/O modules and valve terminals
- Power supply and bus interface via the same cable

Web monitor

- Website integrated in the CPX terminal
- Dynamic status display
- Online diagnostics
- SMS/e-mail alert

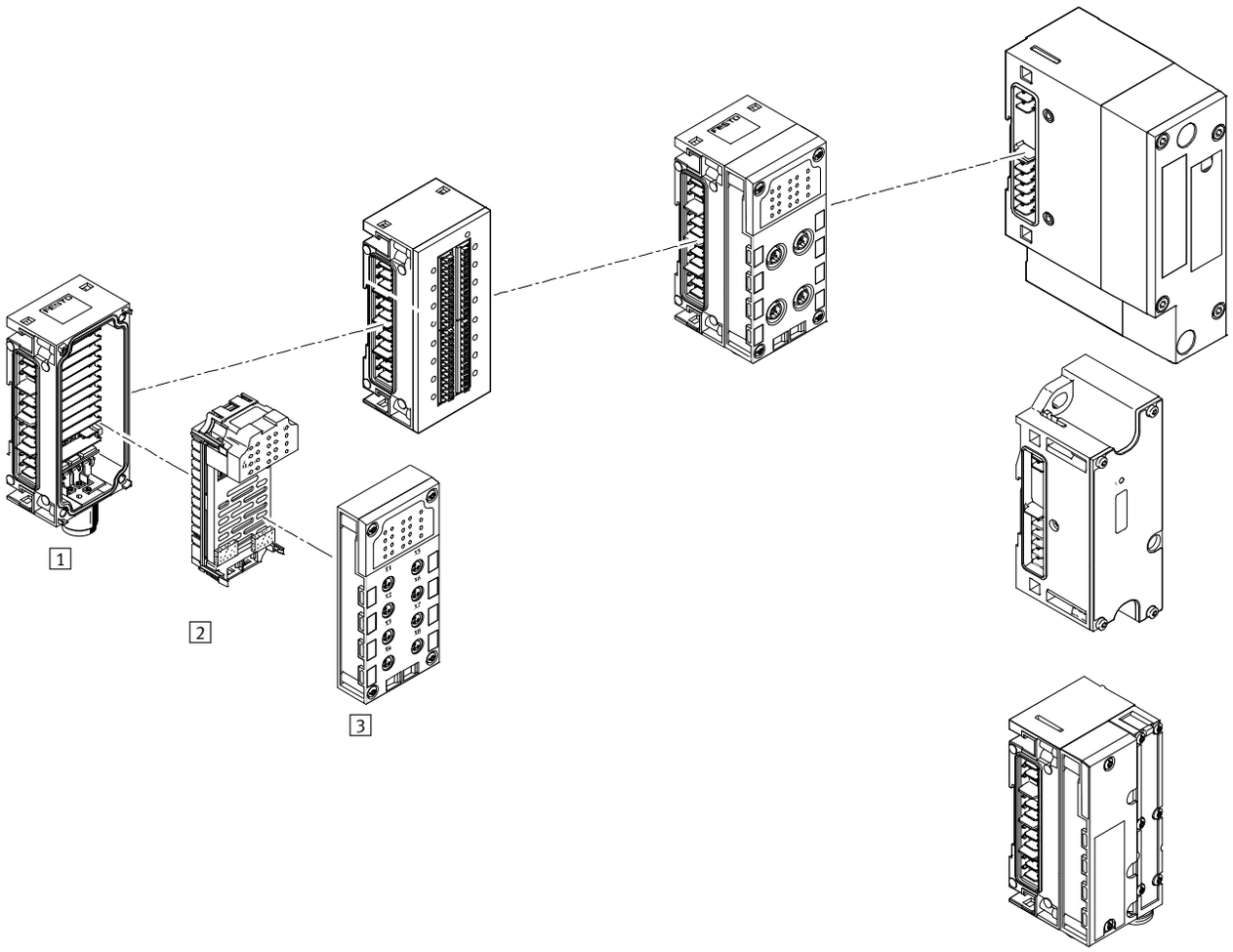
Input/output modules

Combination of

- Interlinking block
- Electronics module
- Connection block

Variants

Complete overview of modules



Input/output modules

1 Interlinking block

- Internal linking of the power supply and serial communication
- External power supply for the entire system
- Additional power supply for outputs or valves
- Connection accessories for M18, 7/8" or AIDA push-pull
- Polymer design: linking with tie rods
- Metal design: individual linking with M6 screws, individually expandable

2 Electronics module

- Digital inputs for connecting the sensors
- Digital outputs for activating additional actuators
- Analogue inputs
- Temperature inputs (analogue)
- Analogue outputs
- PROFIsafe shut-off module with two digital outputs for shutting off the supply voltage for valves

3 Connection block

- Choice of 8 connection technology variants
- Degree of protection IP65/IP67 or IP20
- Can be combined with the electronics modules
- M8/M12/Sub-D/quick connection
- M8/M12/Sub-D, etc. connecting cables
- Modular system for M8/M12 connecting cables
- M12 connection technology for the metal design

Pneumatic interface

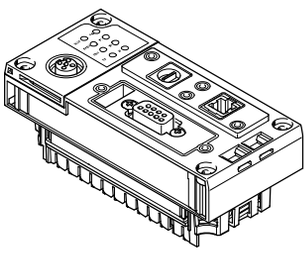
- MPA-L
- VTSA/VTSA-F

Variants

Individual overview of modules

Control block

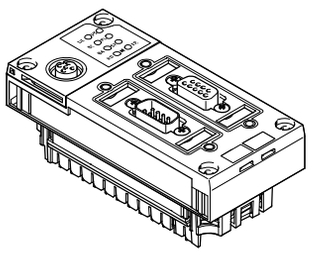
Data sheets ➔ Page 1608



CPX-CEC
- Programming with CODESYS
- Ethernet interface
- Modbus/TCP
- EasyIP
- CANopen master

Bus node

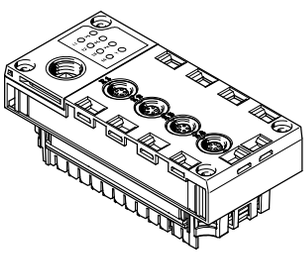
Data sheets ➔ Page 1614 and following



Bus node for
- INTERBUS
- DeviceNet
- PROFIBUS DP
- CANopen
- CC-LINK
- EtherNet/IP
- PROFINET
- EtherCAT

CP interface

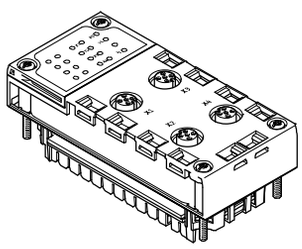
Data sheets ➔ Page 1615



CP interface
- 4 CP strings
- Max. 4 modules per string
- 32 inputs/32 outputs per string
- CPI functionality

CTEL interface

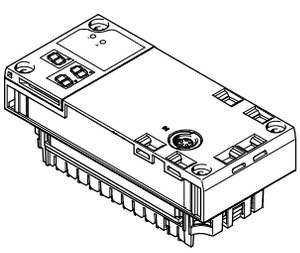
Data sheets ➔ Page 1615



CPX-CTEL interface
- CTEL master
- Max. 4 devices with individual electronic fuse protection
- Max. 64 inputs/64 outputs per I-Port interface
- The maximum length of a string is 20 m

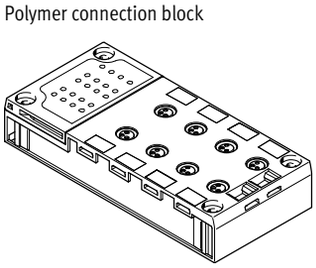
Modules for actuating electric drive units

Data sheets ➔ Page 1616



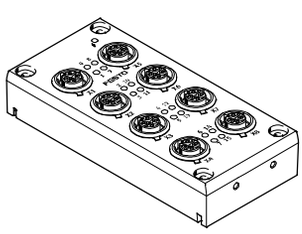
CPX-CM-HPP
- Axis interface
- CAN bus for up to 4 individual electric axes

Polymer connection block



Direct machine mounting
(degree of protection IP65/IP67)
- M8 3-pin or 4-pin
- M12 5-pin, 5-pin with quick lock/ metal thread screened, 8-pin, optional screening plate
- Sub-D
- Quick connection
- Spring-loaded terminal with protection to IP20 or with cover

Metal connection block



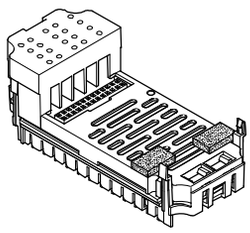
Direct machine mounting
(degree of protection IP65/IP67)
- M12 5-pin

Variants

Individual overview of modules

Digital electronics module

Data sheets ➔ Page 1616 and following

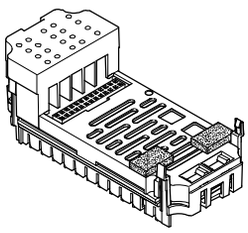


Digital inputs and outputs
- 8 digital inputs NPN
- 8 digital inputs PNP
- 16 digital inputs
- 16 digital inputs with channel diagnostics
- 4 digital outputs (1 A per channel, individual channel diagnostics)
- 8 digital outputs (2.1 A/50 W lamp load per channel pair, individual channel diagnostics)

Multi I/O modules
- 8 digital inputs and 8 digital outputs

Analogue electronics module

Data sheets ➔ Page 1620 and following



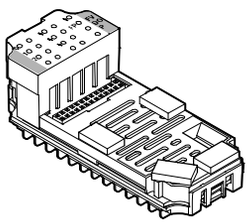
Analogue inputs
- 2 analogue inputs (0 ... 10 V DC, 0 ... 20 mA, 4 ... 20 mA)
- 4 analogue inputs (0 ... 20 mA, 4 ... 20 mA)

Analogue temperature inputs
- 4 analogue inputs for temperature measurement (Pt100, Pt200, Pt500, Pt1000, Ni100, Ni120, Ni500, Ni1000)
- 4 analogue inputs for temperature measurement (thermocoupler and PT1000 sensor for cold-junction compensation)

Analogue outputs
- 2 analogue outputs (0 ... 10 V DC, 0 ... 20 mA, 4 ... 20 mA)

PROFIsafe shut-off module

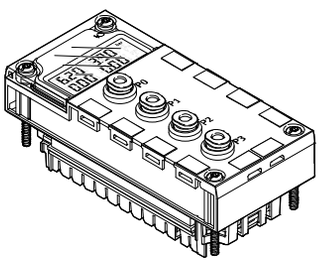
Data sheets ➔ Page 1626



Digital outputs
- 2 digital outputs
- Supply voltage for valves can be shut off

Electronics module for supply ports

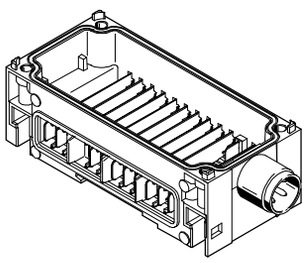
Data sheets ➔ Page 1624



Analogue inputs
- 4 analogue supply ports (0 ... 10 bar, –1 ... +1 bar)

Polymer interlinking block – Interlinking using tie rods

Data sheets ➔ Page 1627 and following



System linking
- Different voltages for supplying the modules
- Serial communication between the modules

System supply
- M18 4-pin
- 7/8" 4-pin or 5-pin

In addition to system linking, power supply for the
- electronics plus sensors (16 A)
- valves plus actuators (16 A)

Additional power supply
In addition to system linking, power supply for the
- actuators (16 A per supply)

Power supply for the
- valves (16 A per supply)

Expandability
- Can be expanded using an interlinking block with tie rod CPX-ZA-1-E

Note
The 7/8" supply is subject to the following restrictions due to the available accessories:
- 5-pin 8 A
- 4-pin 10 A

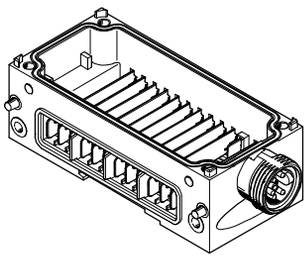
Note
Polymer interlinking blocks (tie rods) and metal interlinking blocks (individual linking) cannot be combined due to their different interlinking systems.

Variants

Individual overview of modules

Metal interlinking block – Individual linking

Data sheets ➔ Page 1627 and following



System linking
- Different voltages for supplying the modules
- Serial communication between the modules

System supply
- 7/8" 5-pin
- AIDA push-pull

In addition to system linking, power supply for the
- electronics plus sensors (16 A)
- valves plus actuators (16 A)

Additional power supply
In addition to system linking, power supply for the
- actuators (16 A per supply)

Power supply for the
- valves (16 A per supply)

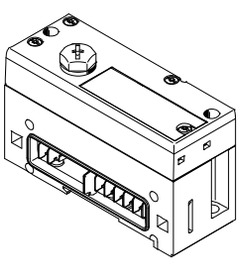
Expandability
- Can be expanded as required by up to 10 interlinking blocks

Note
The 7/8" supply is subject to the following restrictions due to the available accessories:
- 5-pin 8 A
- 4-pin 10 A

Note
Polymer interlinking blocks (tie rods) and metal interlinking blocks (individual linking) cannot be combined due to their different interlinking systems.

Pneumatic interface MPA-L

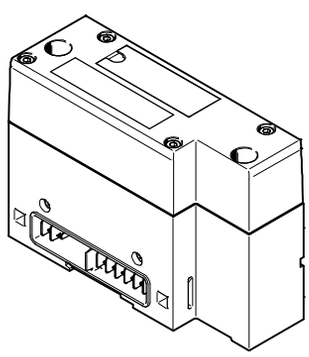
Data sheets ➔ Page 1629



Valve terminal
- MPAL1 (360 l/min)
- MPAL14 (670 l/min)
- MPAL2 (870 l/min)
- Up to 32 solenoid coils
- For CPX polymer design

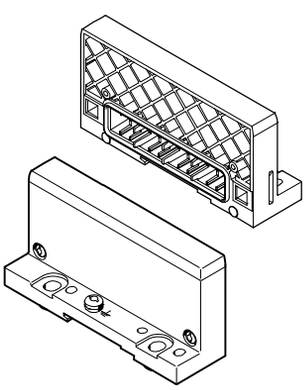
Pneumatic interface VTSA/VTSA-F

Data sheets ➔ Page 1629



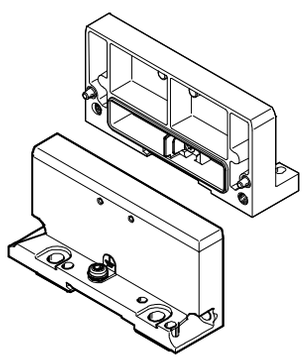
Valve terminal (valve flow rate according to width)
- 18 mm (700 l/min)
- 26 mm (1350 l/min)
- 42 mm (1300 l/min)
- 52 mm (2900 l/min)
- 65 mm (4000 l/min)
- Max. 32 valve positions/ max. 32 solenoid coils
- For CPX polymer design
- For CPX metal design

Polymer end plate



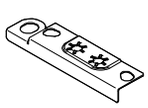
End plate
- Left
- Right (for use without valves)

Metal end plate



End plate
- Left
- Right (for use without valves)

Earthing plate (for polymer end plate)



Earthing plate
- For safe and easy connection to the machine bed or H-rail, suitable for right-hand and left-hand end plate
- Assembly and earthing in a single processing step, which means:
  - 50% time saving
  - No additional material required

Data sheet

General basic data and guidelines

- Max. 11 modules in total:
- One bus node and/or one control block, freely positionable
- Up to 9 additional input/output modules, freely positionable
- An additional pneumatic interface, always positioned as the last module on the right-hand side
- With VTSA, VTSA-F and MPA-L: fixed operating range, set using switch at the pneumatic interface
- Address capacity max. 512 inputs and 512 outputs, depending on the bus node or control block
- The maximum system configuration can be limited in individual cases by exceeding the address space
- One interlinking block with system supply, freely positionable
- Multiple interlinking blocks with additional power supply, always positioned to the right of the interlinking block with system supply
- The connection blocks can, with just a few exceptions, be freely combined with the electronics modules for inputs/outputs, either in metal or polymer (➔ table below)
- All electronics modules for inputs/outputs can be combined with any interlinking block
- Polymer interlinking blocks (tie rods) and metal interlinking blocks (individual linking) cannot be combined due to their different interlinking systems.

Combinations of connection blocks and digital electronics modules for inputs/outputs

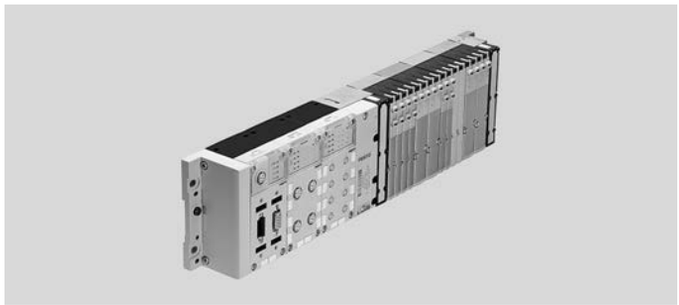
Connection blocks	Digital electronics modules							
	CPX-8DE	CPX-8NDE	CPX-16DE	CPX-M-16DE-D	CPX-4DA	CPX-8DA-H	CPX-8DE-8DA	CPX-FVDA-P2
Polymer version with mounting screws for mounting on polymer interlinking blocks								
CPX-AB-8-M8-3POL	■	■	–	–	■	–	–	–
CPX-AB-8-M8X2-4POL	–	–	■	–	■	■	–	–
CPX-AB-4-M12x2-5POL	■	■	–	–	■	–	–	–
CPX-AB-4-M12x2-5POL-R	■	■	–	–	■	■	–	–
CPX-AB-8-KL-4POL	■	■	■	–	■	■	■	■
CPX-AB-1-SUB-BU-25POL	■	■	■	–	■	■	■	–
CPX-AB-4-HAR-4POL	■	■	–	–	■	–	–	–
Polymer design with mounting screws for assembly on metal plates								
CPX-AB-8-M8x2-4P-M3	–	–	■	–	■	■	–	–
CPX-AB-4-M12-8P-M3	–	–	–	–	–	–	■	–
CPX-AB-4-M12x2-5P-R-M3	■	■	–	–	■	■	–	–
Metal version with mounting screws for mounting on metal and polymer interlinking blocks								
CPX-M-AB-4-M12x2-5POL	■	■	–	–	■	■	–	■
CPX-M-AB-8-M12x2-5POL	–	–	–	■	–	–	–	–

Combinations of connection blocks and analogue electronics modules for inputs/outputs

Connection blocks	Analogue electronics modules					
	CPX-2AE-U-I	CPX-4AE-I	CPX-4AE-P	CPX-4AE-T	CPX-4AE-TC	CPX-2AA-U-I
Polymer version with mounting screws for mounting on polymer interlinking blocks						
CPX-AB-4-M12x2-5POL	■	■	–	■	■	■
CPX-AB-4-M12x2-5POL-R	■	■	–	■	■	■
CPX-AB-8-KL-4POL	■	■	–	■	■	■
CPX-AB-1-SUB-BU-25POL	■	■	–	–	–	■
CPX-AB-4-HAR-4POL	–	–	–	■	–	–
Polymer design with mounting screws for assembly on metal plates						
CPX-AB-4-M12x2-5P-R-M3	■	■	–	■	■	■
Metal version with mounting screws for mounting on metal and polymer interlinking blocks						
CPX-M-AB-4-M12x2-5POL	■	■	–	■	■	■

Data sheet – Electrical terminal CPX

Module width
50 mm



General technical data			
Max. number of modules[1]	Control block		1
	Bus node		1
	I/O modules/CP interface/CTEL interface/ electrical interface CPX-CTEL-2/multi-axis interface		9
	Pneumatic interface		1
Max. address capacity	Inputs	[byte]	64
	Outputs	[byte]	64
Configuration support			Fieldbus-specific
LED displays	Bus node/control block		Up to 4 LEDs, bus-specific 4 LEDs, CPX-specific PS = Power system PL = Power load SF = System fault M = Modify parameter/forcing active
	I/O modules		Min. one centralised diagnostic LED Channel-oriented status and diagnostic LED, depending on the module
	Pneumatic interface		One centralised diagnostic LED Valve status LED on valve
Diagnostics			Channel and module-oriented diagnostics for inputs/outputs and valves
			Detection of module undervoltage for the different potential values
			Storage of the last 40 errors with timestamp (acyclic access)
Parameterisation, module-specific and entire system, for example			Diagnostic behaviour
			Condition monitoring
			Profile of inputs
			Fail-safe response of outputs and valves
Commissioning support			Forcing of inputs and outputs
Degree of protection to EN 60529			IP65/IP67
Tests	Vibration test to DIN IEC 68		With wall mounting: severity level 2
			With H-rail mounting: severity level 1
	Shock test to DIN IEC 68		With wall mounting: severity level 2
			With H-rail mounting: severity level 1
Resistance to interference			EN 61000-6-2 (industry)
Emitted interference			EN 61000-6-4 (industry)
Grid dimension		[mm]	50

1) A maximum of 11 modules in total can be combined
(e.g. 1 control block + 9 I/O modules + 1 pneumatic interface, or 1 control block + 1 bus node + 8 I/O modules + 1 pneumatic interface)

Data sheet – Electrical terminal CPX

Electrical data			Download CAD data ➔ **www.festo.com**
Power supply	Interlinking block		
	with system supply		
	Electronics plus sensors	[V DC]	24, max. 16 A (8 A/10 A with 7/8" supply, 5-pin/4-pin)
	Actuators plus valves	[V DC]	24, max. 16 A (8 A/10 A with 7/8" supply, 5-pin/4-pin)
	Additional power supply		
	Actuators	[V DC]	24, max. 16 A per supply (8 A/10 A with 7/8" supply, 5-pin/4-pin)
	Additional power supply		
	Valves	[V DC]	24, max. 16 A per supply (10 A with 7/8" supply, 4-pin)
Current consumption			Depending on system configuration
Power failure bridging (bus electronics only)		[ms]	10
Power supply connection			M18 4-pin
			7/8" 5-pin
			7/8" 4-pin
			AIDA push-pull, 5-pin
Fuse concept			Per module with electronic fuses
Isolation test for galvanically isolated circuits to IEC 1131 Part 2		[V DC]	500
Galvanic isolation of electrical voltages		[V DC]	80
Protection against direct and indirect contact			PELV

Operating conditions			
Temperature range, electronics	Operation	[°C]	–5 ... +50
	Storage/transport	[°C]	–20 ... +70
Temperature range, electronics plus pneumatic components	Operation	[°C]	–5 ... +50
	Storage/transport	[°C]	–20 ... +40

Materials	
Housing	Die-cast aluminium, PA reinforced, PC

Data sheet – Control block CPX-CEC

Technical data

Download CAD data ➔ **www.festo.com**

Type		CPX-CEC-C1-V3	CPX-CEC-M1-V3
Ethernet interface		RJ45 (socket, 8-pin)	
Data transmission speed	[Mbps]	10/100	
Supported protocols		TCP/IP, EasyIP, Modbus TCP	
Fieldbus interface		CAN bus (plug, Sub-D, 9-pin)	
Transmission rate	[kbps]	125, 250, 500, 800, 1000	
		Can be set using software	
Flags		28 kB remanent memory	
		CODESYS variable concept	
IP address setting		DHCP via CODESYS	
Program memory		16 MB user program	
Programming software		CODESYS provided by Festo	
Programming language		SFC, IL, FCH, LDR and ST to IEC 61131-3	
		Also CFC	
Parameterisation		CODESYS V3	
Configuration support		CODESYS V3	
Control elements		DIL switch for CAN termination	
		Rotary switch for RUN/STOP	
Function elements		CPX diagnostic status, copy CPX diagnostic trace, read CPX module diagnostics	
		And others	
Additional functions		Diagnostic functions	
		Motion functions for electric drives	SoftMotion functions for electric drives
Total number of axes		127	31
Intrinsic current consumption at nominal operating voltage	[mA]	Typically 85	
Length/width/height (incl. interlinking block)	[mm]	50/107/55	

Data sheet – Bus node CPX-FB6

Technical data Download CAD data ➔ **www.festo.com**

Fieldbus interface			Socket and plug, Sub-D, 9-pin
Baud rates		[Mbps]	0.5 and 2
Max. number of process data bits	Inputs/outputs	[bit]	96/96
Parameterisation			Start-up parameterisation via user functions (CMD)
			Via PCP communication
Additional functions			Storage of the last 40 errors with timestamp (access via PCP)
			8-bit system status in image table for inputs
			2-byte inputs and 2-byte outputs, system diagnostics in image table
Current consumption		[mA]	Typically 200
Length/width/height (incl. interlinking block)		[mm]	107/50/55

Data sheet – Bus node CPX-FB11

Technical data Download CAD data ➔ **www.festo.com**

Fieldbus interface	Either		Micro style bus connection: 2x M12 with protection to IP65/IP67
			Open style bus connection: 5-pin terminal strip, IP20
Baud rates		[kbps]	125, 250, 500
Addressing range			0 ... 63, set using DIL switch
Communication types			Polled I/O, change of state/cyclic, strobed I/O and explicit messaging
Max. address capacity	Inputs/outputs	[byte]	64/64
Parameterisation			Module and system parameterisation via configuration interface in plain text (EDS)
			Online in run or program mode
Additional functions			Storage of the last 40 errors with timestamp (access via EDS)
			8-bit system status in image table for inputs
			2-byte inputs and 2-byte outputs, system diagnostics in image table
Current consumption		[mA]	Typically 200
Length/width/height (incl. interlinking block)		[mm]	107/50/50

Data sheet – Bus node CPX-FB13

Technical data			Download CAD data ➔ www.festo.com
Fieldbus interface			Sub-D socket, 9-pin (EN 50170), galvanically isolated 5 V
Baud rates		[Mbps]	0.0096 ... 12
Addressing range			1 ... 125, set using DIL switch
Communication types	DPV0		Cyclic communication
	DPV1		Acyclic communication
Max. address capacity	Inputs/outputs	[byte]	64/64
Parameterisation			Start-up via configuration interface in plain text (GSD)
			Acyclic parameterisation via DPV1
Additional functions			Storage of the last 40 errors with timestamp (access via DPV1)
			8-bit system status in image table for inputs
			2-byte inputs and 2-byte outputs, system diagnostics in image table
Current consumption		[mA]	Max. 200
Length/width/height (incl. interlinking block)		[mm]	107/50/50

Data sheet – Bus node CPX-FB14

Technical data			Download CAD data ➔ www.festo.com
Fieldbus interface			Sub-D plug, 9-pin (to DS 102), galvanically isolated via optocoupler, 24 V supply for CAN interface via bus
Baud rates		[kbps]	125, 250, 500 and 1000 can be set via DIL switch
Communication profile			DS 301, V4.01
Max. address capacity	Inputs/outputs	[byte]	16 digital, 16 analogue channels/16 digital, 16 analogue channels
Parameterisation			Via SDO
Additional functions			Storage of the last 40 errors with timestamp (access via SDO)
			8-bit system status via transmit PDO 4 (default)
			2-byte inputs and 2-byte outputs, system diagnostics via PDO 4
			Minimum boot-up
			Variable PDO mapping
			Emergency message
			Node guarding
			Heart beat
Current consumption		[mA]	Max. 200
Length/width/height (incl. interlinking block)		[mm]	107/50/50

Data sheet – Bus node CPX-FB23-24

Technical data Download CAD data ➔ **www.festo.com**

Fieldbus interface, either				Sub-D socket, 9-pin
				Screw terminal strip, IP20
Baud rates			[kbps]	156 ... 10,000
Number of stations per slave				1, 2, 3 or 4 stations, set using DIL switch
Communication types				Cyclic communication
Max. address capacity, inputs	FB23	RWr	[byte]	32
		Rx	[byte]	14
	FB24	RWr	[byte]	64
		Rx	[byte]	64
Max. address capacity, outputs	FB23	RWw	[byte]	32
		Ry	[byte]	14
	FB24	RWw	[byte]	64
		Ry	[byte]	64
Parameterisation				Hold/clear via DIL switch
Additional functions				Storage of the last 40 errors with timestamp (access via system diagnostics)
Current consumption			[mA]	Typically 200
Length/width/height (incl. interlinking block)			[mm]	107/50/50

Data sheet – Bus node CPX-FB33

Technical data			Download CAD data ➔ www.festo.com
Fieldbus interface			2x M12 socket, 4-pin, D-coded
Baud rates		[Mbps]	100
Max. address capacity	Inputs/outputs	[byte]	64/64
Parameterisation			System parameters
			Diagnostic behaviour
			Signal setup
			Fail-safe response
			Forcing of channels
Additional functions			Start-up parameterisation in plain text via fieldbus
			Fast start-up (FSU)
			Channel-oriented diagnostics via fieldbus
			Acyclic data access via fieldbus
			System status can be displayed using process data
			Additional diagnostic interface for operator units
			Acyclic data access via Ethernet
Current consumption		[mA]	Typically 120
Length/width/height (incl. interlinking block)		[mm]	107/50/50

Data sheet – Bus node CPX-M-FB34

Technical data			Download CAD data ➔ www.festo.com
Fieldbus interface			2x RJ45 push-pull socket, AIDA
Baud rates		[Mbps]	100
Max. address capacity	Inputs/outputs	[byte]	64/64
Parameterisation			System parameters
			Diagnostic behaviour
			Signal setup
			Fail-safe response
			Forcing of channels
Additional functions			Start-up parameterisation in plain text via fieldbus
			Fast start-up (FSU)
			Channel-oriented diagnostics via fieldbus
			Acyclic data access via fieldbus
			System status can be displayed using process data
			Additional diagnostic interface for operator units
			Acyclic data access via Ethernet
Current consumption		[mA]	Typically 120
Length/width/height (incl. interlinking block)		[mm]	107/50/80

Data sheet – Bus node CPX-M-FB35

Technical data			Download CAD data ➔ www.festo.com
Fieldbus interface			2x SCRJ push-pull socket, AIDA
Baud rates		[Mbps]	100
Max. address capacity	Inputs/outputs	[byte]	64/64
Parameterisation			System parameters
			Diagnostic behaviour
			Signal setup
			Fail-safe response
			Forcing of channels
Additional functions			Start-up parameterisation in plain text via fieldbus
			Fast start-up (FSU)
			Channel-oriented diagnostics via fieldbus
			Acyclic data access via fieldbus
			System status can be displayed using process data
			Additional diagnostic interface for operator units
			Acyclic data access via Ethernet
Current consumption		[mA]	Typically 150
Length/width/height (incl. interlinking block)		[mm]	107/50/80

Data sheet – Bus node CPX-FB36

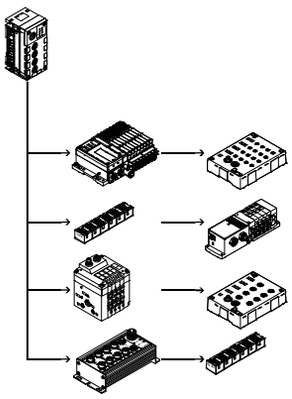
Industrial EtherNet
EtherNet/IP

IT services:

Web

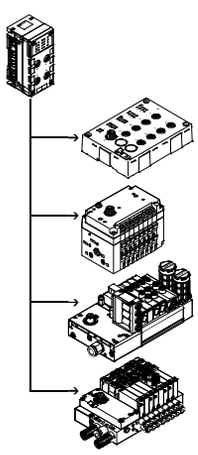
Technical data			Download CAD data ➔ **www.festo.com**
Fieldbus interface			2x M12x1 socket, 4-pin, D-coded
Baud rates		[Mbps]	10/100
Max. address capacity	Inputs/outputs	[byte]	64/64
Parameterisation			Diagnostic behaviour
			Fail-safe response
			Forcing of channels
			Idle mode characteristics
			Signal setup
			System parameters
Additional functions			EtherNet/IP Quickconnect
			Ring topology (DLR)
			Acyclic data access via "Explicit Message" and Ethernet
			Integrated switch
			IP addressing via DHCP, DIL switch
			Channel-oriented diagnostics via fieldbus
			Start-up parameterisation in plain text via fieldbus
			System status can be displayed using process data
			Additional diagnostic interface for operator units
Current consumption		[mA]	Typically 100
Length/width/height (incl. interlinking block)		[mm]	107 x 50 x 50

Data sheet – Interface CPX-CP-4-FB



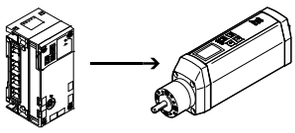
Technical data			Download CAD data ➔ www.festo.com
CP connection			Socket M9, 5-pin
Max. number of	CP strings		4
	CP modules per string		4
	Outputs per string		32
	Inputs per string		32
Baud rate		[kbps]	1000
Sensor supply voltage		[V DC]	24 ±25% coming from bus node
Actuator load voltage		[V DC]	24 ±10% coming from bus node
Current consumption	Without CP modules	[A]	Max. 0.2
	Per CP string	[A]	Max. 1.6
Length/width/height (incl. interlinking block)		[mm]	107/50/45

Data sheet – Interface CPX-CTEL-4-M12-5POL



Technical data			Download CAD data ➔ www.festo.com
I-Port connection			4x socket M12, 5-pin, A-coded
Max. address capacity	Inputs/outputs	[bit]	256/256
Number of I-Port interfaces			4
Max. cable length		[m]	20
Internal cycle time		[ms]	1 per 8 bits of user data
Additional functions			Tool change mode
Max. power supply per channel		[A]	4x 1.6
Max. residual current of outputs per channel		[A]	4x 1.6
Intrinsic current consumption at nominal operating voltage		[mA]	Typically 65
Length/width/height (incl. interlinking block)		[mm]	107/50/55

Data sheet – Control block CPX-CM-HPP



Technical data			Download CAD data ➔ www.festo.com
Fieldbus interface			1x socket M9, 5-pin
Control interface			CAN bus
Baud rate		[Mbps]	1
Protocol			FHPP
Max. address capacity	Inputs/outputs	[byte]	32/32
Parameterisation			Forcing of channels
			System parameters
Total number of axes			4
Intrinsic current consumption at nominal operating voltage		[mA]	Typically 80
Length/width/height (incl. interlinking block)		[mm]	107/50/55

Data sheet – Digital input module with 8 inputs, CPX-8DE, CPX-8NDE

Possible connection blocks:

- CPX-AB-8-M8-3POL
- CPX-AB-4-M12X2-5POL
- CPX-AB-4-M12X2-5POL-R
- CPX-AB-8-KL-4POL
- CPX-AB-1-SUB-BU-25POL
- CPX-AB-4-HAR-4POL
- CPX-M-AB-4-M12X2-5POL
- CPX-M-AB-8-M12X2-5POL

Technical data			Download CAD data ➔ www.festo.com	
Type			CPX-8DE	CPX-8NDE
Number of inputs			8	
Max. residual current of inputs per module		[A]	1	0.7
Internal electronic fuse			Per module	Per module
Intrinsic current consumption at operating voltage		[mA]	Typically 15	Typically 15
Sensor supply voltage		[V DC]	24 ±25%	24 ±25%
Electrical isolation	Channel – channel		No	No
	Channel – internal bus		No	No
Switching level	Signal 0	[V DC]	≤ 5	≥ 11
	Signal 1	[V DC]	≥ 11	≤ 5
Input characteristic			IEC 1131-T2	
Switching logic			Positive logic (PNP)	Negative logic (NPN)
Parameterisation			Module monitoring	
			Behaviour after short circuit	
			Input debounce time	
			Signal extension time	

Data sheet – Digital input module with 16 inputs, CPX-16DE, CPX-M-16DE-D

Possible connection blocks
CPX-16DE:
- CPX-AB-8-M8X2-4POL
- CPX-AB-8-M8X2-4P-M3
- CPX-AB-8-KL-4POL
- CPX-AB-1-SUB-BU-25POL

Possible connection blocks
CPX-M-16DE-D:
- CPX-M-AB-8-M12X2-5POL

Technical data

Download CAD data ➔ **www.festo.com**

Type			CPX-16DE	CPX-M-16DE-D
Number of inputs			16	
Max. residual current of inputs per module		[A]	1.8	
Internal electronic fuse			Per module	Per channel pair
Intrinsic current consumption at operating voltage		[mA]	Typically 15	Typically 34
Sensor supply voltage		[V DC]	24 ±25%	
Electrical isolation	Channel – channel		No	
	Channel – internal bus		No	
Switching level	Signal 0	[V DC]	≤ 5	
	Signal 1	[V DC]	≥ 11	
Input characteristic			IEC 1131-2	
Switching logic			Positive logic (PNP)	
Parameterisation			Module monitoring	
			Behaviour after short circuit	
			Input debounce time	
			Signal extension time	

Data sheet – Digital output module with 4 outputs, CPX-4DA

Possible connection blocks:
- CPX-AB-8-M8-3POL
- CPX-AB-8-M8X2-4POL
- CPX-AB-8-M8X2-4P-M3
- CPX-AB-4-M12X2-5POL
- CPX-AB-4-M12X2-5POL-R
- CPX-AB-8-KL-4POL
- CPX-AB-1-SUB-BU-25POL
- CPX-AB-4-HAR-4POL
- CPX-AB-4-M12X2-5P-R-M3
- CPX-M-AB-4-M12X2-5POL

Technical data

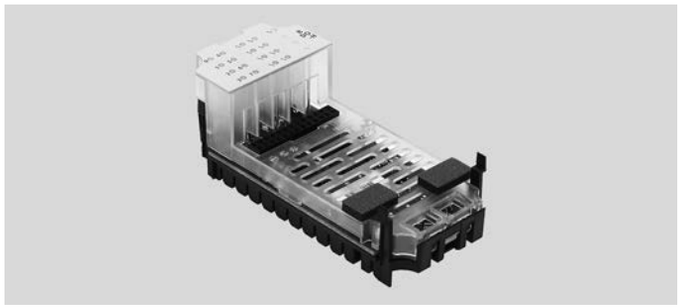
Download CAD data ➔ **www.festo.com**

Type			CPX-4DA
Number of outputs			4
Max. power supply	Per module	[A]	4
	Per channel	[A]	1 (24 W lamp load, 4 channels can be connected in parallel)
Fuse protection (short circuit)			Internal electronic fuse per channel
Module current consumption (voltage supply for electronics)		[mA]	Typically 16
Supply voltage		[V DC]	24 ±25%
Electrical isolation	Channel – channel		No
	Channel – internal bus		Yes, with intermediate supply
Output characteristic			Based on IEC 1131-2
Switching logic			Positive logic (PNP)
Parameterisation			Module monitoring
			Behaviour after short circuit
			Fail-safe channel x
			Forcing channel x
			Idle mode channel x

Data sheet – Digital output module with 8 high-current outputs, CPX-8DA-H

Possible connection blocks:

- CPX-AB-8-M8X2-4POL
- CPX-AB-8-M8X2-4P-M3
- CPX-AB-4-M12X2-5POL-R
- CPX-AB-8-KL-4POL
- CPX-AB-1-SUB-BU-25POL
- CPX-AB-4-M12X2-5P-R-M3
- CPX-M-AB-4-M12X2-5POL



Technical data

Download CAD data ➔ **www.festo.com**

Type			CPX-8DA-H
Number of outputs			8
Max. power supply	Per module	[A]	8.4
	Per channel	[A]	2.1 (50 W lamp load) per channel pair
Fuse protection (short circuit)			Internal electronic fuse per channel
Module current consumption (voltage supply for electronics)		[mA]	Typically 34
Supply voltage		[V DC]	24 ±25%
Electrical isolation	Channel – channel		No
	Channel – internal bus		Yes, with intermediate supply
Output characteristic			Based on IEC 1131-2
Switching logic			Positive logic (PNP)
Parameterisation			Module monitoring
			Behaviour after short circuit
			Fail-safe channel x
			Forcing channel x
			Idle mode channel x

Data sheet – Digital input/output module with 8 inputs and 8 outputs, CPX-8DE-8DA

Possible connection blocks:
- CPX-AB-4-M12-8POL
- CPX-AB-4-M12-8P-M3
- CPX-AB-8-KL-4POL
- CPX-AB-1-SUB-BU-25POL

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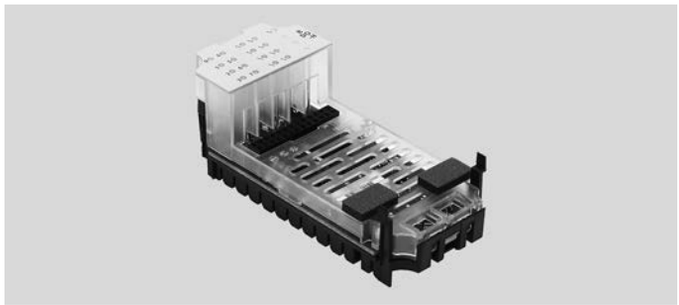
Type			CPX-8DE-8DA
Number	Inputs/outputs		8/8
Max. power supply	Sensor supply	[A]	0.7
Per module	Outputs	[A]	4
Max. power supply per channel		[A]	0.5 (12 W lamp load, channels A0 ... A03 can be connected in parallel to A4 ... A7)
Fuse protection	Sensor supply		Internal electronic fuse for sensor supply
	Outputs		Internal electronic fuse per channel
Current consumption of internal electronics	Inputs/outputs	[mA]	Typically 22/typically 34
	Sensors/outputs	[V DC]	24 ±25% / 24 ±25%
Electrical isolation, inputs	Channel – channel		No
	Channel – internal bus		No
Electrical isolation, outputs	Channel – channel		No
	Channel – internal bus		Yes, with intermediate supply
Characteristic	Inputs/outputs		IEC 1131-2/IEC 1131-2
Switching logic			Positive logic (PNP)
Parameterisation	Inputs		Module monitoring
			Behaviour after short circuit, sensor supply
			Input debounce time
			Signal stretching time, inputs
	Outputs		Behaviour after short circuit
			Fail-safe channel x
			Forcing channel x
			Idle mode channel x

Data sheet – Analogue input module with 2 inputs, CPX-2AE-U-I

Possible connection blocks:

- CPX-AB-4-M12X2-5POL
- CPX-AB-4-M12X2-5POL-R
- CPX-AB-8-KL-4POL
- CPX-AB-1-SUB-BU-25POL
- CPX-AB-4-M12X2-5P-R-M3
- CPX-M-AB-4-M12X2-5POL



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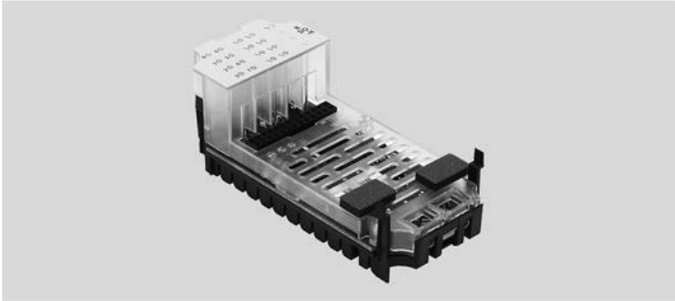
Type			CPX-2AE-U-I	
			Voltage input	Current input
Number of inputs			2	2
Max. power supply per module		[A]	0.7	0.7
Fuse protection			Internal electronic fuse for sensor supply	
Current consumption from 24 V sensor supply (quiescent current)		[mA]	Typically 50	Typically 50
Current consumption from 24 V sensor supply (at full load)		[A]	Max. 0.7	Max. 0.7
Sensor supply voltage		[V DC]	24 ±25%	24 ±25%
Signal range (parameterisable for each channel via DIL switch or software)			0 ... 10 V DC	0 ... 20 mA 4 ... 20 mA
Resolution		[bit]	12	
Absolute accuracy		[%]	±0.5	±0.6
Input resistance			100 kΩ	≤ 100 Ω
Max. permissible input voltage		[V DC]	30	–
Max. permissible input current		[mA]	–	40
Data format			Prefix + 15 bits, linear scaling Prefix + 15 bits left-aligned, S7 compatible Prefix + 12 bits left-aligned + diagnostics, S5 compatible	
Cable length			Max. 30 m (screened)	
Electrical isolation	Channel – channel		No	
	Channel – internal bus		Yes, with external sensor supply	
	Channel – sensor supply		Yes, with external sensor supply	
Parameterisation			Short circuit monitoring, sensor supply	
			Behaviour after short circuit, sensor supply	
			Data format	
			Lower limit value/full-scale value	
			Upper limit value/full-scale value	
			Monitoring value falling below nominal range/full-scale value	
			Monitoring value exceeding nominal range/full-scale value	
			Monitoring wire break (measuring range 4 ... 20 mA)	
			Signal range	
			Measured value smoothing	

Data sheet – Analogue input module with 2 or 4 inputs, CPX-4AE-I

Possible connection blocks:

- CPX-AB-4-M12X2-5POL
- CPX-AB-4-M12X2-5POL-R
- CPX-AB-8-KL-4POL
- CPX-AB-1-SUB-BU-25POL
- CPX-AB-4-M12X2-5P-R-M3
- CPX-M-AB-4-M12X2-5POL



Technical data

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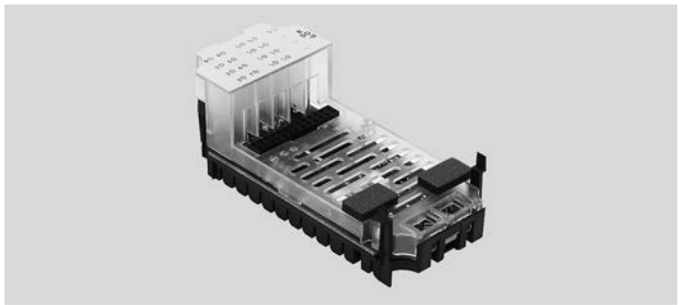
Type			CPX-4AE-I
			Current input
Number of inputs			4
Max. power supply per module		[A]	0.7
Fuse protection			Internal electronic fuse for sensor supply
Current consumption from 24 V sensor supply (quiescent current)		[mA]	Typically 50
Current consumption from 24 V sensor supply (at full load)		[A]	Max. 0.7
Sensor supply voltage		[V DC]	24 ±25%
Signal range (parameterisable for each channel via DIL switch or software)		[mA]	0 ... 20
		[mA]	4 ... 20
Resolution		[bit]	12
Absolute accuracy		[%]	±0.6
Input resistance		[Ω]	≤ 100
Max. permissible input voltage		[V DC]	–
Max. permissible input current		[mA]	40
Data format			Prefix + 15 bits, linear scaling
			Prefix + 15 bits left-aligned, S7 compatible
			Prefix + 12 bits left-aligned + diagnostics, S5 compatible
Cable length		[m]	Max. 30 (screened)
Electrical isolation	Channel – channel		No
	Channel – internal bus		Yes, with external sensor supply
	Channel – sensor supply		Yes, with external sensor supply
Parameterisation			Short circuit monitoring, sensor supply
			Behaviour after short circuit, sensor supply
			Data format
			Lower limit value/full-scale value
			Upper limit value/full-scale value
			Monitoring value falling below nominal range/full-scale value
			Monitoring value exceeding nominal range/full-scale value
			Monitoring wire break (measuring range 4 ... 20 mA)
			Signal range
			Measured value smoothing

Data sheet – Analogue input module with 2 or 4 inputs for temperature sensors, CPX-4AE-T

Possible connection blocks:

- CPX-AB-4-M12X2-5POL
- CPX-AB-4-M12X2-5POL-R
- CPX-AB-8-KL-4POL
- CPX-AB-4-HAR-4POL
- CPX-AB-4-M12X2-5P-R-M3
- CPX-M-AB-4-M12X2-5POL



Technical data

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Type			CPX-4AE-T
Number of inputs			2 or 4
Max. power supply per module		[A]	0.7
Fuse protection			Internal electronic fuse for sensor supply
Current consumption from 24 V sensor supply (quiescent current)		[mA]	Typically 50
Sensor supply voltage		[V DC]	24 ±25%
Sensor type (parameterisable for each channel via DIL switch)			PT100, PT200, PT500, PT1000 Ni100, Ni120, Ni500, Ni1000
Temperature range	Pt standard	[°C]	–200 ... +850
	Pt climate	[°C]	–120 ... +130
	Ni	[°C]	–60 ... +180
Sensor connection technology			2-wire, 3-wire and 4-wire technology
Resolution		[bit]	15 + prefix
Operating error limit relative to input range		[%]	±0.06
Basic error limit (25 °C)	Standard	[K]	±0.6
	Pt climate	[K]	±0.2
Temperature error relative to input range		[%]	±0.001
Linearity error (no software scaling)		[%]	±0.02
Repetition accuracy (at 25 °C)		[%]	±0.05
Max. line resistance per conductor		[Ω]	10
Max. permissible input voltage		[V DC]	±30
Data format		[bit]	15 + prefix, complement of two, binary notation in tenths of a degree
Cable length		[m]	Max. 200 (screened)
Electrical isolation	Channel – channel		No
	Channel – internal bus		Yes
Parameterisation			Unit of measurement and interference frequency suppression
			Diagnostic message in the event of a wire break or short circuit
			Limit monitoring per channel
			Sensor connection technology
			Sensor type/temperature coefficient, temperature range
			Limit value per channel
			Measured value smoothing

Data sheet – Analogue input module with 4 inputs for thermocoupler, CPX-4AE-TC

Possible connection blocks:

- CPX-AB-4-M12X2-5POL
- CPX-AB-4-M12X2-5POL-R
- CPX-AB-8-KL-4POL
- CPX-AB-4-M12X2-5P-R-M3
- CPX-M-AB-4-M12X2-5POL

Technical data

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Type			CPX-4AE-TC
Number of inputs			4
Fuse protection			Internal electronic fuse per channel
Sensor supply voltage		[V DC]	24 ±25%
Sensor type (parameterisable for each channel via software)			• Type B +400 ... +1820 °C, 8 µV/°C • Type E –270 ... +900 °C, 60 µV/°C • Type J –200 ... +1200 °C, 51 µV/°C • Type K –200 ... +1370 °C, 40 µV/°C • Type N –200 ... +1300 °C, 38 µV/°C • Type R 0 ... +1760 °C, 12 µV/°C • Type S 0 ... +1760 °C, 11 µV/°C • Type T –200 ... +400 °C, 40 µV/°C
Sensor connection technology			2-wire technology
Operating error limit relative to ambient temperature		[%]	Max. ±0.6
Basic error limit (at 25 °C)		[%]	Max. ±0.4
Repetition accuracy (at 25 °C)		[%]	±0.05
Max. line resistance per conductor		[Ω]	10
Max. residual current per module		[mA]	30
Max. permissible input voltage		[V]	±30
Internal cycle time (module)		[ms]	250
Data format		[bit]	15 + prefix, complement of two, binary notation in tenths of a degree
Cable length		[m]	Max. 50 (screened)
Electrical isolation	Channel – channel		No
	Channel – internal bus		Yes
Diagnostics			Parameterisation error
			Wire break per channel
			Limit value violation per channel
Parameterisation			Monitoring wire break per channel
			Unit of measurement
			Cold-junction compensation
			Sensor type per channel
			Limit value monitoring per channel
			Measured value smoothing

Data sheet – Analogue input module with pressure sensors, CPX-4AE-P

Tubing connections:

- 4x QS4

Technical data

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Type			CPX-4AE-P-B2	CPX-4AE-P-D10
Number of analogue inputs			4	
Nominal operating voltage		[V DC]	24 ±25%	
Intrinsic current consumption		[mA]	Typically 50	
Measured variable			4x relative or 2x differential pressure measurement	
Displayable units			kPa	
			mbar	
			psi	
Pressure measuring range	Start value	[bar]	–1	0
	End value	[bar]	1	10
Data format			15 bits + prefix	
			Binary notation in mbar, kPa, psi	
LED displays			Group diagnostics	
Diagnostics			Limit value violation per channel	
			Parameterisation error	
			Sensor limit per channel	
Parameterisation			Diagnostic delay per channel	
			Hysteresis per module	
			Unit of measurement	
			Measured value smoothing per channel	
			Limit value monitoring per channel	
			Sensor limit per channel	
			Measurement of relative/differential pressure	
Operating medium			Compressed air to ISO 8573-1:2010 [7:4:4]	
Note on the operating/pilot medium			Lubricated operation possible (in which case lubricated operation will always be required)	
Temperature of medium		[°C]	0 ... +50	
Length/width/height (incl. interlinking block)		[mm]	107/50/55	

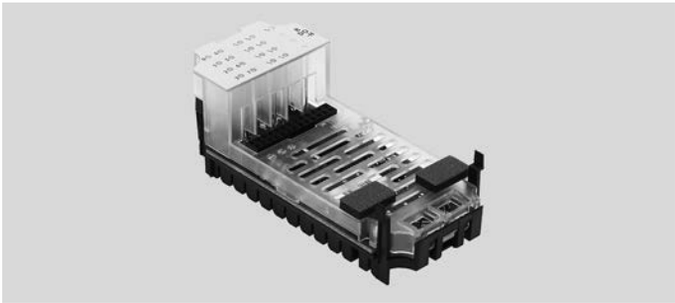
Note

Extreme pneumatic conditions, e.g. high cycle rates with high pressure amplitudes, can damage the sensors.

Data sheet – Analogue output module with 2 inputs, CPX-2AA-U-I

Possible connection blocks:

- CPX-AB-4-M12X2-5POL
- CPX-AB-4-M12X2-5POL-R
- CPX-AB-8-KL-4POL
- CPX-AB-1-SUB-BU-25POL
- CPX-AB-4-M12X2-5P-R-M3
- CPX-M-AB-4-M12X2-5POL



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Type			CPX-2AA-U-I	
			Voltage output	Current output
Number of outputs			2	2
Max. actuator supply per module		[A]	2.8	2.8
Fuse protection			Internal electronic fuse for actuator supply	
Current consumption from 24 V sensor supply (at full load)		[mA]	Max. 150	Max. 150
Current consumption from 24 V actuator supply (at full load)		[A]	4 ... 10	4 ... 10
Supply voltage for actuators		[V DC]	24 ±25%	24 ±25%
Signal range (parameterisable for each channel via DIL switch or software)			0 ... 10 V DC	0 ... 20 mA 4 ... 20 mA
Resolution			12 bit	12 bit
Absolute accuracy		[%]	±0.6	±0.6
Encoder selection	Load resistance for ohmic load	[kΩ]	Min. 1	Max. 0.5
	Load resistance for capacitive load	[µF]	Max. 1	–
	Load resistance for inductive load	[mH]	–	Max. 1
	Short circuit protection for analogue output		Yes	–
	Short circuit current of analogue output	[mA]	Approx. 20	–
	Open circuit voltage	[V DC]	–	18
	Destruction limit against externally applied voltage	[V DC]	15	15
	Actuator connection		2 wires	2 wires
Response time	For ohmic load	[ms]	0.1	0.1
	For capacitive load	[ms]	0.7	–
	For inductive load	[ms]	–	0.5
Data format			15 bits + prefix, linear scaling 12 bits left-aligned, S7 compatible 12 bits left-aligned, S5 compatible	
Cable length		[m]	Max. 30 (screened)	
Parameterisation			Short circuit monitoring, actuator supply	
			Short circuit monitoring, analogue output	
			Behaviour after short circuit, actuator supply	
			Data format	
			Lower limit value/full-scale value	
			Upper limit value/full-scale value	
			Monitoring value falling below nominal range/full-scale value	
			Monitoring value exceeding nominal range/full-scale value	
			Monitoring wire break	
			Signal range	

Data sheet – PROFIsafe shut-off module, CPX-FVDA-P2

CPX-FVDA-P2

Possible connection blocks:
- CPX-M-AB-4-M12x2-5POL
- CPX-AB-8-KL-4POL

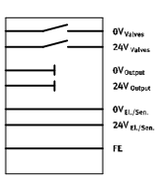
Possible interlinking blocks:
- CPX-M-GE-EV-FVO

Possible bus nodes:
- CPX-FB6
- CPX-FB33
- CPX-M-FB34
- CPX-M-FB35

Technical data Download CAD data ➔ **www.festo.com**

Type			CPX-FVDA-P2
Number of outputs			2
Note on outputs			1 internal channel for shutting off the supply voltage for valves
			2 external outputs
Max. power supply	Per module	[A]	5
	Per channel	[A]	1.5
Fuse protection (short circuit)			Internal electronic fuse per channel
Current consumption of module		[mA]	Typically 65 (power supply for valves)
		[mA]	Typically 25 (power supply for electronics)
Voltage drop per channel		[V]	0.6
Residual ripple		[Vpp]	2 within voltage range
Load capacity to FE		[nF]	400
Max. response time to shut-off command		[ms]	23
Electrical isolation	Channel – channel		No
	Channel – internal bus		Yes, with intermediate supply
Switching logic	Outputs		P-M switching
Safety integrity level			Safe Switch Off, SIL3
Performance Level			Safe Switch Off/category 3, Performance Level e
Diagnostics			Short circuit/overload per channel
			Undervoltage at valves
			Cross circuit
			Wire break per channel
Parameterisation			Monitoring wire break per channel
			Diagnostic behaviour
Length/width/height (incl. interlinking block and connection block)		[mm]	107 x 50 x 55

Data sheet – Interlinking block without supply, CPX-M-GE-EV-FVO



Possible modules:
- CPX-FVDA-P2

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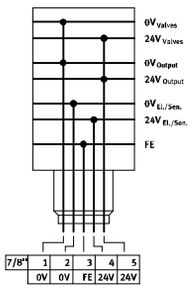
Type		CPX-M-GE-EV-FVO
Acceptable current load (per contact/contact rail)	[A]	16
Type of mounting		Angled fitting
Length/width/height	[mm]	107 x 50 x 35

Data sheet – Interlinking block with system supply, CPX-GE-EV-S, CPX-M-GE-EV-S



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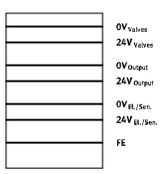
Type			CPX-GE-EV-S	CPX-GE-EV-S-7/8-4POL	CPX-GE-EV-S-7/8-5POL	CPX-M-GE-EV-S-7/8-5POL	CPX-M-GE-EV-S-PP-5POL
Electrical connection			M18	7/8", 4-pin	7/8", 5-pin	7/8", 5-pin	AIDA push-pull, 5-pin
Nominal operating voltage		[V DC]	24				
Current supply	Sensors and electronics	[A]	Max. 16		Max. 12	Max. 8	Max. 16
	Valves and outputs	[A]	Max. 16		Max. 12	Max. 8	Max. 16
Degree of protection to EN 60529			Depending on connection block				
Ambient temperature		[°C]	–5 ... +50				
Type of mounting			Tie rod			Angled fitting	
Length/width/height		[mm]	107/50/35				

Data sheet – Interlinking block without supply, CPX-GE-EV, CPX-M-GE-EV



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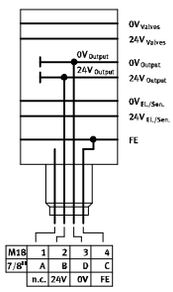
Type		CPX-GE-EV	CPX-M-GE-EV
Electrical connection		–	
Nominal operating voltage	[V DC]	24	
Acceptable current load (per contact/contact rail)	[A]	16	
Degree of protection to EN 60529		Depending on connection block	
Ambient temperature	[°C]	–5 ... +50	
Type of mounting		Tie rod	Angled fitting
Length/width/height	[mm]	107/50/35	

Data sheet – Interlinking block with additional power supply for outputs, CPX-GE-EV-Z, CPX-M-GE-EV-Z



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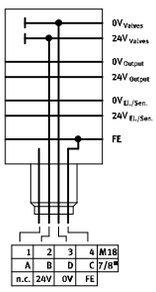
Type			CPX-GE-EV-Z	CPX-GE-EV-Z-7/8-4POL	CPX-GE-EV-Z-7/8-5POL	CPX-M-GE-EV-Z-7/8-5POL	CPX-M-GE-EV-Z-PP-5POL
Electrical connection			M18	7/8", 4-pin	7/8", 5-pin	7/8", 5-pin	AIDA push-pull, 5-pin
Nominal operating voltage		[V DC]	24				
Current supply	Outputs	[A]	Max. 16		Max. 12	Max. 8	Max. 16
Degree of protection to EN 60529			Depending on connection block				
Ambient temperature		[°C]	–5 ... +50				
Type of mounting			Tie rod			Angled fitting	
Length/width/height		[mm]	107/50/35				

Data sheet – Interlinking block with additional power supply for valves, CPX-GE-EV-V



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Type		CPX-GE-EV-V	CPX-GE-EV-V-7/8-4POL
Electrical connection		M18	7/8", 4-pin
Nominal operating voltage	[V DC]	24	
Acceptable current load (per contact/contact rail)	[A]	16	
Degree of protection to EN 60529		Depending on connection block	
Ambient temperature	[°C]	–5 ... +50	
Type of mounting		Tie rod	
Length/width/height	[mm]	107/50/35	

Data sheet – Pneumatic interface for valve terminal MPA-L, VMPAL-EPL-CPX

Operating voltage
24 V DC

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Type			VMPAL-EPL-CPX
Type of mounting			Tie rod
Number of solenoid coils			32
Operating pressure		[bar]	–0.9 ... 10
Intrinsic current consumption of valve terminal (internal electronics, without valves)	At 24 V $U_{EL/SEN}$ [1]	[mA]	Typically 13
	At 24 V Uval [2]	[mA]	Typically 35
Diagnostic message on undervoltage U_{OFF} Load voltage outside function range		[V]	17.7 ... 17.8
Nominal pick-up current/duration per solenoid coil at nominal voltage		[mA]	50/20 ms
Nominal current per solenoid coil at nominal voltage with current reduction		[mA]	10 after 20 ms
Length/width/height		[mm]	107/40/70

1) Power supply for electronics and sensors.
2) Load voltage supply for valves.

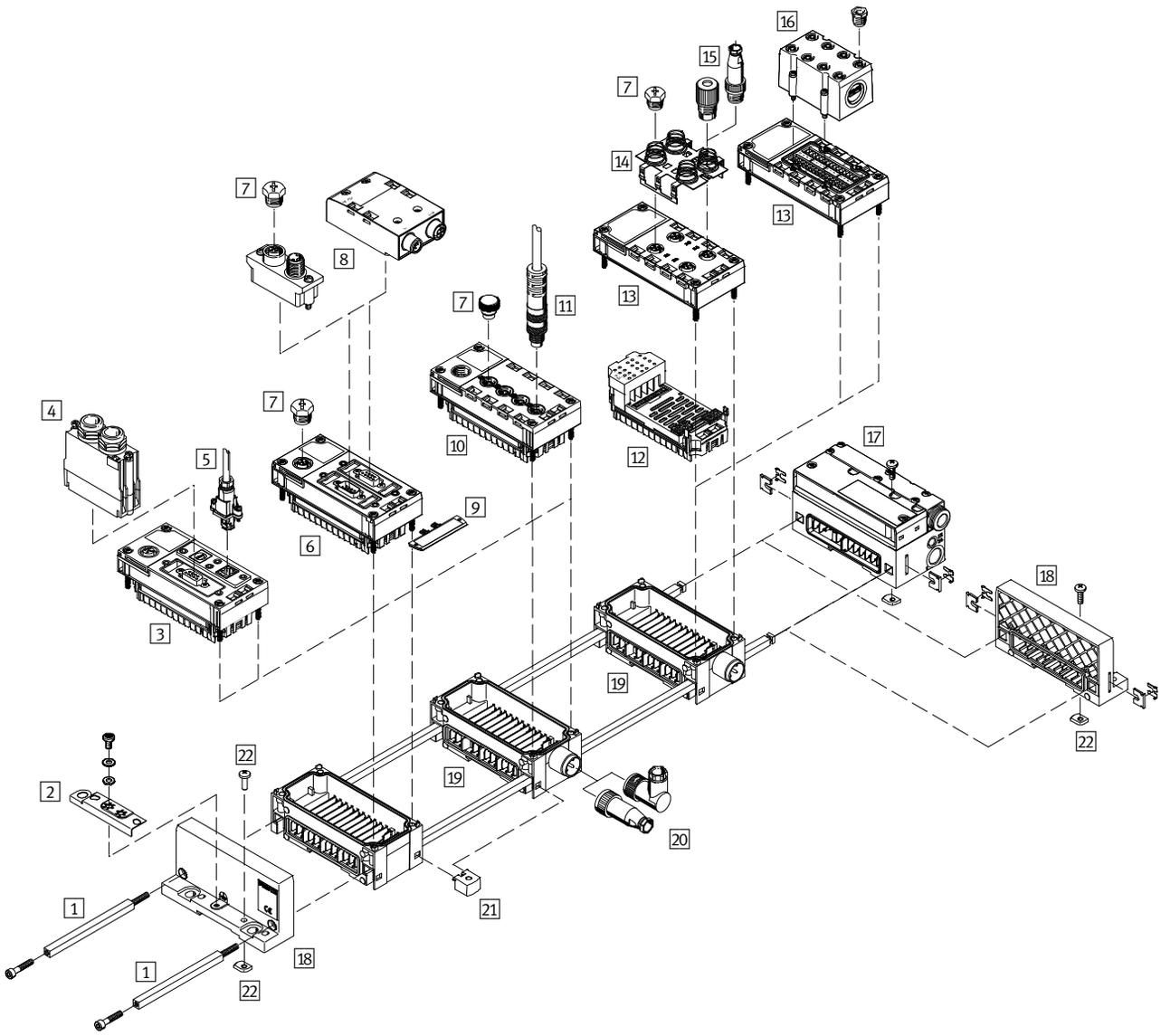
Data sheet – Pneumatic interface for valve terminal VTSA/VTSA-F, VABA-S6-1-X

Operating voltage
24 V DC

Technical data Download CAD data ➔ **www.festo.com**

Type		VABA-S6-1-X1	VABA-S6-1-X2
Type of mounting		Tie rod	Angled fitting
Number of solenoid coils		32	
Electrical actuation		Fieldbus	
Electrical connection		Via CPX	
Nominal operating voltage	[V DC]	24	
Permissible voltage fluctuations	[%]	10	
Degree of protection to EN 60529		IP65	
Ambient temperature	[°C]	–5 ... +50	

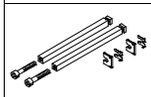
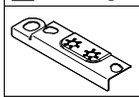
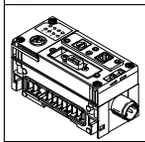
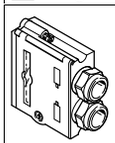
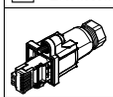
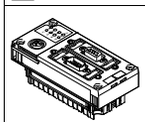
Accessories



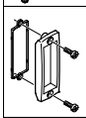
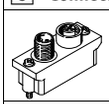
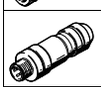
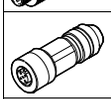
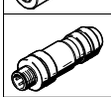
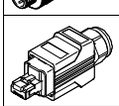
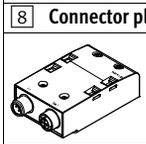
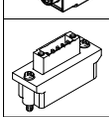
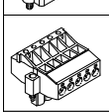
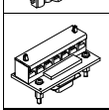
		➔ Page/ online
1	Tie rod/tie-rod extension CPX-ZA	1631
2	Earthing component CPX-EPFE-EV for right-hand/left-hand end plate	1631
3	Control block CPX-CEC	1631
4	Plug FBS-SUB-9 for fieldbus connection (version dependent on bus type)	1631
5	Plug FBS-RJ45 for Ethernet connection	1631
6	CPX bus node CPX-FB	1631
7	Cover cap ISK/CPX-M-AK/AK-SUB (for unused connections)	1632
8	Connector plug FBA/FBS/NECU/FBSD/CPX-AB for fieldbus connection	1632
9	Inscription label IBS/CPX-ST	1633
10	CPX CP interface/CPX CTEL master/axis interface CPX-CP-4-FB/CPX-CTEL-4-M12-5POL/CPX-CM	1633
11	Connecting cable for CP interface/CPX CTEL master KVI-CP-3/NEBU-M12G5	1633
12	CPX module CPX (analogue/digital input/output module)	1633
13	Connection block CPX-AB/CPX-M-AB	1634
14	Screening plate CPX-AB-S	1634

		➔ Page/ online
15	Connector plug/connecting cable for inputs/outputs NEDY/NEBU/KV-M12	1634
16	Cover AK-8KL for CPX-AB-8-KL-4POL (IP65/67)	1634
17	Pneumatic interface VMPAL-EPL-CPX/VABA-S6-1-X	1635
18	End plate CPX-EP	1635
19	Interlinking block CPX-GE/CPX-M-GE (with/without voltage supply)	1635
20	Connector plug NTSD/NECU for voltage supply	1636
21	Mounting components for wall mounting CPX-BG-RW/CPX-M-BG-RW	1636
22	H-rail mounting CPX-CPA-BG-NRH	1636
–	Hood CAFC	1636
–	Screws for mounting the bus node/connection block on an interlinking block	1636
–	Temperature sensor CPX-W-PT1000 for CPX module CPX-4AE-TC for cold-junction compensation	1636
–	Memory card CPX-SK-3 for PROFINET bus node	1636
–	User documentation P.BE-CPX	1637

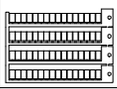
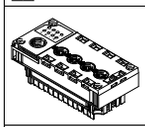
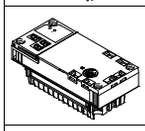
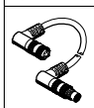
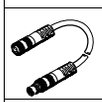
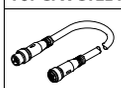
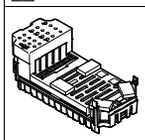
Accessories – Ordering data

	Description	Part no.	Type
1	**Tie rod/tie-rod extension**		
	Extension, 1 module	**525418**	**CPX-ZA-1-E**
	1 module	**195718**	**CPX-ZA-1**
	2 modules	**195720**	**CPX-ZA-2**
	3 modules	**195722**	**CPX-ZA-3**
	4 modules	**195724**	**CPX-ZA-4**
	5 modules	**195726**	**CPX-ZA-5**
	6 modules	**195728**	**CPX-ZA-6**
	7 modules	**195730**	**CPX-ZA-7**
	8 modules	**195732**	**CPX-ZA-8**
	9 modules	**195734**	**CPX-ZA-9**
	10 modules	**195736**	**CPX-ZA-10**
2	**Earthing component for right/left end plate**		
	5 pieces	**538892**	**CPX-EPFE-EV**
3	**Control block**		**Data sheets ➔ Page 1608**
	CODESYS embedded controller, CANopen	**3473128**	**CPX-CEC-C1-V3**
	CODESYS embedded controller, SoftMotion	**3472765**	**CPX-CEC-M1-V3**
4	**Plug for bus connection, Sub-D**		**Data sheets** online: ➔ **fbs**
	For INTERBUS, incoming	**532218**	**FBS-SUB-9-BU-IB-B**
	For INTERBUS, outgoing	**532217**	**FBS-SUB-9-GS-IB-B**
	For DeviceNet/CANopen	**532219**	**FBS-SUB-9-BU-2x5POL-B**
	For PROFIBUS DP	**532216**	**FBS-SUB-9-GS-DP-B**
	For CC-Link	**532220**	**FBS-SUB-9-GS-2x4POL-B**
	For control block	**534497**	**FBS-SUB-9-GS-1x9POL-B**
5	**EtherNet connection**		**Data sheets** online: ➔ **fbs**
	RJ45 plug	**534494**	**FBS-RJ45-8-GS**
6	**CPX bus node**		**Data sheets ➔ Page 1614**
	INTERBUS	**195748**	**CPX-FB6**
	DeviceNet	**526172**	**CPX-FB11**
	PROFIBUS DP	**195740**	**CPX-FB13**
	CANopen	**526174**	**CPX-FB14**
	CC-Link	**526176**	**CPX-FB23-24**
	PROFINET with M12, D-coded, 4-pin	**548755**	**CPX-FB33**
	PROFINET with RJ45 push-pull, AIDA	**548751**	**CPX-M-FB34**
	PROFINET with SCRJ push-pull, AIDA	**548749**	**CPX-M-FB35**
	EtherNet/IP with M12	**1912451**	**CPX-FB36**

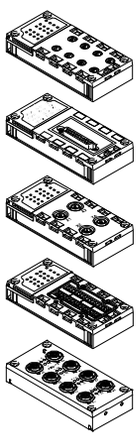
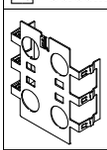
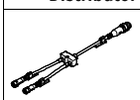
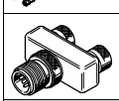
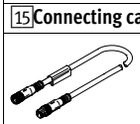
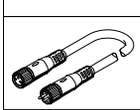
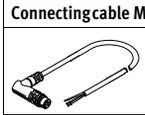
Accessories – Ordering data

	Description	Part no.	Type
7 **Cover cap**			
	For M8 connections (packaging unit 10 pieces)	**177672**	**ISK-M8**
	For M12 connections (packaging unit 10 pieces)	**165592**	**ISK-M12**
	Cover cap for bus connection RJ45 push-pull, AIDA	**2873540**	**CPX-M-AK-D**
	Cover for DIL switch and memory card	**548754**	**CPX-M-AK-M**
	Inspection cover, for DIL switch and bus connection	**533334**	**AK-SUB-9/15-B**
8 **Connector plug for bus connection**			**Data sheets** online: ➔ **necu**
	M12 adapter (B-coded) for PROFIBUS DP	**533118**	**FBA-2-M12-5POL-RK**
	Micro style, 2x M12 for DeviceNet/CANopen	**525632**	**FBA-2-M12-5POL**
	Socket for micro style connection, M12	**18324**	**FBSD-GD-9-5POL**
	Plug for micro style connection, M12	**175380**	**FBS-M12-5GS-PG9**
	Plug M12x1, 4-pin, D-coded, for PROFINET	**543109**	**NECU-M-S-D12G4-C2-ET**
	Socket M12x1, for FBA-2-M12-5POL-RK and CPX-AB-2-M12-RK-DP	**1067905**	**NECU-M-B12G5-C2-PB**
	Plug M12x1, for FBA-2-M12-5POL-RK and CPX-AB-2-M12-RK-DP	**1066354**	**NECU-M-S-B12G5-C2-PB**
	Plug RJ45, 8-pin, push-pull	**552000**	**FBS-RJ45-PP-GS**
	Plug SCRJ, 2-pin, push-pull	**571017**	**FBS-SCRJ-PP-GS**
8 **Connector plug for bus connection**			
	M12 adapter for PROFIBUS DP (B-coded)	**541519**	**CPX-AB-2-M12-RK-DP**
	M12 adapter for INTERBUS (B-coded)	**534505**	**CPX-AB-2-M12-RK-IB**
	Open style for 5-pin terminal strip, for DeviceNet/CANopen	**525634**	**FBA-1-SL-5POL**
	5-pin terminal strip, for DeviceNet/CANopen	**525635**	**FBSD-KL-2x5POL**
	Screw terminal for CC-Link	**197962**	**FBA-1-KL-5POL**

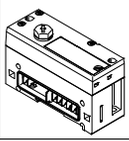
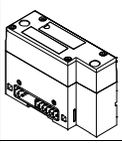
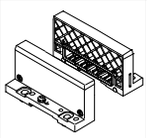
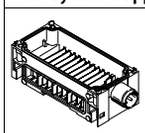
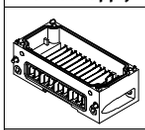
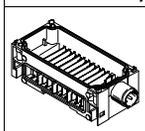
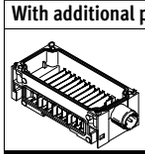
Accessories – Ordering data

	Description		Part no.	Type
9	**Inscription label**			
	Inscription labels 6x10 mm, in frame (64 pieces)		**18576**	**IBS-6x10**
	Inscription label holder for connection block M12		**536593**	**CPX-ST-1**
	Screws for attaching an inscription label holder to the bus node (12 pieces)		**550222**	**CPX-M-M2,5X8-12X**
10	**CPX CP interface/axis interface**			**Data sheets ➔ Page 1615**
	Central node for connecting I/O modules of the CPI system		**526705**	**CPX-CP-4-FB**
	Interface for max. 4 I/O modules and valve terminals with I-Port interface (devices)		**1577012**	**CPX-CTEL-4-M12-5POL**
	For actuating up to 4 electric drives via CAN bus		**562214**	**CPX-CM-HPP**
11	**Connecting cable**			
	for CP interface, M9-M9			**Data sheets** online: ➔kvi
	Angled plug/angled socket	0.25 m	**540327**	**KVI-CP-3-WS-WD-0,25**
		0.5 m	**540328**	**KVI-CP-3-WS-WD-0,5**
		2 m	**540329**	**KVI-CP-3-WS-WD-2**
		5 m	**540330**	**KVI-CP-3-WS-WD-5**
		8 m	**540331**	**KVI-CP-3-WS-WD-8**
	Straight plug/straight socket	2 m	**540332**	**KVI-CP-3-GS-GD-2**
		5 m	**540333**	**KVI-CP-3-GS-GD-5**
		8 m	**540334**	**KVI-CP-3-GS-GD-8**
	For CPX CTEL master, M12-M12			**Data sheets ➔ Page 1543**
	Straight plug/straight socket	5 m	**574321**	**NEBU-M12G5-E-5-Q8N-M12G5**
		7.5 m	**574322**	**NEBU-M12G5-E-7.5-Q8N-M12G5**
		10 m	**574323**	**NEBU-M12G5-E-10-Q8N-M12G5**
12	**CPX module**			**Data sheets ➔ Page 1617**
	8 digital inputs PNP		**195750**	**CPX-8DE**
	8 digital inputs NPN		**543813**	**CPX-8NDE**
	16 digital inputs		**543815**	**CPX-16DE**
	16 digital inputs with channel diagnostics		**550202**	**CPX-M-16DE-D**
	4 digital outputs		**195754**	**CPX-4DA**
	8 digital outputs		**550204**	**CPX-8DA-H**
	8 digital inputs and 8 digital outputs		**526257**	**CPX-8DE-8DA**
	2 analogue inputs		**526168**	**CPX-2AE-U-I**
	4 analogue inputs		**541484**	**CPX-4AE-I**
	4 analogue inputs for temperature measurement		**541486**	**CPX-4AE-T**
	4 analogue inputs for temperature measurement, thermocoupler and PT1000 sensor for cold-junction compensation		**553594**	**CPX-4AE-TC**
	Input module, 4 analogue inputs (pressure), pressure range –1 ... +1 bar		**560361**	**CPX-4AE-P-B2**
	Input module, 4 analogue inputs (pressure), pressure range 0 ... 10 bar		**560362**	**CPX-4AE-P-D10**
	2 analogue outputs		**526170**	**CPX-2AA-U-I**
	PROFIsafe shut-off module	PROFINET, PROFIBUS	**1971599**	**CPX-FVDA-P2**

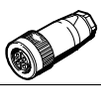
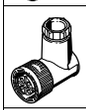
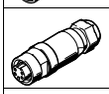
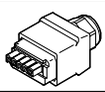
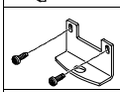
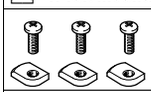
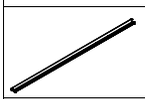
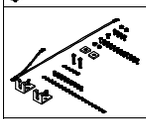
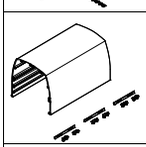
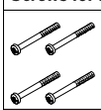
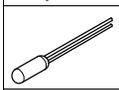
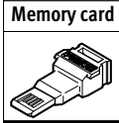
Accessories – Ordering data

	Description		Part no.	Type
13	**Connection block**			
	**Polymer version with mounting screws for mounting on polymer interlinking blocks**			
	8x socket M8, 3-pin		**195706**	**CPX-AB-8-M8-3POL**
	8x socket M8, 4-pin		**541256**	**CPX-AB-8-M8X2-4POL**
	4x socket M12, 5-pin		**195704**	**CPX-AB-4-M12x2-5POL**
	4x socket M12, 5-pin, with quick lock and metal thread		**541254**	**CPX-AB-4-M12x2-5POL-R**
	Spring-loaded terminal, 32-pin		**195708**	**CPX-AB-8-KL-4POL**
	1x socket, Sub-D, 25-pin		**525676**	**CPX-AB-1-SUB-BU-25POL**
	4x socket, quick connector, 4-pin		**525636**	**CPX-AB-4-HAR-4POL**
	Metal version with mounting screws for mounting on metal and polymer interlinking blocks			
	4x socket M12, 5-pin		**549367**	**CPX-M-AB-4-M12x2-5POL**
	8x socket M12, 5-pin		**549335**	**CPX-M-AB-8-M12x2-5POL**
14	**Screening plate**			
	For M12 connections		**526184**	**CPX-AB-S-4-M12**
	Distributor			**Data sheets** online: ➔ **nedy**
	1x plug M12, 4-pin – 2x socket M8, 3-pin		**8005311**	**NEDY-L2R1-V1-M8G3-N-M12G4**
	1x plug M12, 4-pin – 2x socket M12, 5-pin		**8005310**	**NEDY-L2R1-V1-M12G5-N-M12G4**
	1x plug M8, 4-pin – 2x socket M8, 3-pin		**8005312**	**NEDY-L2R1-V1-M8G3-N-M8G4**
	Modular system for any sensor/actuator distributor		–	➔ **internet: nedy**
15	**Connecting cable**			**Data sheets** ➔ **Page 1543**
	M8-M8, straight plug/straight socket	0.5 m	**541346**	**NEBU-M8G3-K-0.5-M8G3**
		1.0 m	**541347**	**NEBU-M8G3-K-1-M8G3**
		2.5 m	**541348**	**NEBU-M8G3-K-2.5-M8G3**
		5.0 m	**541349**	**NEBU-M8G3-K-5-M8G3**
	M12-M12 5-pin/5-pin	1.5 m	**529044**	**KV-M12-M12-1,5**
		3.5 m	**530901**	**KV-M12-M12-3,5**
	Modular system for any connecting cable		–	➔ **internet: nebu**
	Connecting cable M9, 5-pin			**Data sheets** online: ➔ **nebc**
	M9/open end 5-pin/5-wire	2.0 m	**563711**	**NEBC-M9W5-K-2-N-LE3**
		5.0 m	**563712**	**NEBC-M9W5-K-5-N-LE3**
16	**Cover for CPX-AB-8-KL-4POL (IP65/67)**			
	– 8 cable throughfeeds M9 – 1 cable throughfeed for multi-pin plug		**538219**	**AK-8KL**
	Fittings kit for cover AK-8KL		**538220**	**VG-K-M9**

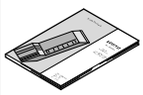
Accessories – Ordering data

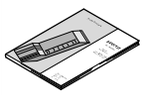
	Description		Part no.	Type
	17 Pneumatic interface, for valve terminal MPA-L			**Data sheets → Page 1629**
	CPX in polymer version		**570783**	**VMPAL-EPL-CPX**
	For valve terminal VTSA/VTSA-F			
	CPX in polymer version		**543416**	**VABA-S6-1-X1**
	CPX in metal version		**550663**	**VABA-S6-1-X2**
	18 End plates			
	Polymer version	Right	**195714**	**CPX-EPR-EV**
		Left	**195716**	**CPX-EPL-EV**
	Metal version	Right	**550214**	**CPX-M-EPR-EV**
		Left	**550212**	**CPX-M-EPL-EV**
	19 Interlinking block, with system supply			**Data sheets → Page 1627**
	Polymer version	M18 connection	**195746**	**CPX-GE-EV-S**
		7/8" connection, 4-pin	**541248**	**CPX-GE-EV-S-7/8-4POL**
		7/8" connection, 5-pin	**541244**	**CPX-GE-EV-S-7/8-5POL**
	Metal version	7/8" connection, 5-pin	**550208**	**CPX-M-GE-EV-S-7/8-5POL**
		Push-pull plug connection (AIDA), 5-pin	**563057**	**CPX-M-GE-EV-S-PP-5POL**
	Without supply			
	Polymer version		**195742**	**CPX-GE-EV**
	Metal version		**550206**	**CPX-M-GE-EV**
	Metal design, for CPX-FVDA-P2		**567806**	**CPX-M-GE-EV-FVO**
	With additional power supply for outputs			
	Polymer version	M18 connection	**195744**	**CPX-GE-EV-Z**
		7/8" connection, 4-pin	**541250**	**CPX-GE-EV-Z-7/8-4POL**
		7/8" connection, 5-pin	**541246**	**CPX-GE-EV-Z-7/8-5POL**
	Metal version	7/8" connection, 5-pin	**550210**	**CPX-M-GE-EV-Z-7/8-5POL**
		Push-pull plug connection (AIDA), 5-pin	**563058**	**CPX-M-GE-EV-Z-PP-5POL**
	With additional power supply for valves			
	Polymer version	M18 connection	**533577**	**CPX-GE-EV-V**
		7/8" connection, 4-pin	**541252**	**CPX-GE-EV-V-7/8-4POL**

Accessories – Ordering data

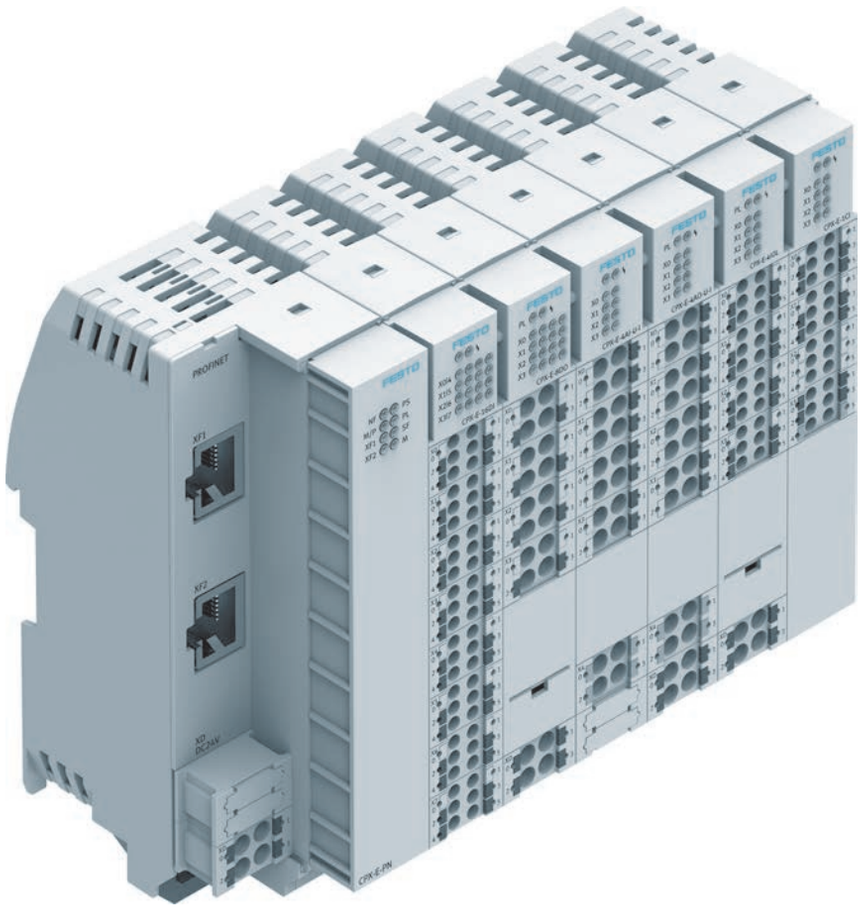
	Description		Part no.	Type
20 Connector plug for power supply				**Data sheets** online: ➔ ntsd
	M18 socket, straight	For 1.5 mm²	**18493**	**NTSD-GD-9**
		For 2.5 mm²	**18526**	**NTSD-GD-13,5**
	M18 socket, angled	For 1.5 mm²	**18527**	**NTSD-WD-9**
		For 2.5 mm²	**533119**	**NTSD-WD-11**
	7/8" connection	5-pin	**543107**	**NECU-G78G5-C2**
		4-pin	**543108**	**NECU-G78G4-C2**
	AIDA push-pull plug socket, spring-loaded terminal	5-pin	**5195383**	**NECU-M-PPG5PP-C1-PN**
21 Attachment for wall mounting				
	For long valve terminals, 10 pieces, for polymer manifold sub-bases		**529040**	**CPX-BG-RW-10x**
	For long valve terminals, 2 mounting brackets and 4 screws, for metal manifold sub-bases		**550217**	**CPX-M-BG-RW-2x**
22 H-rail mounting				
	For mounting a CPX terminal and valve terminal on an H-rail		**526032**	**CPX-CPA-BG-NRH**
Hood				
	Mounting rail for attaching the hood, 1 m		**572256**	**CAFC-X1-S**
	Mounting kit for CPX hood		**572257**	**CAFC-X1-BE**
	Hood section	200 mm	**572258**	**CAFC-X1-GAL-200**
		300 mm	**572259**	**CAFC-X1-GAL-300**
Screws for mounting the bus node/connection block on an interlinking block				
	Metal connection block, polymer interlinking block		**550218**	**CPX-DPT-30X32-S-4X**
	Polymer connection block, metal interlinking block		**550219**	**CPX-M-M3x22-4x**
	Metal connection block, metal interlinking block		**550216**	**CPX-M-M3x22-S-4x**
Temperature sensor				
	PT1000, for cold-junction compensation for CPX module CPX-4AE-TC		**553596**	**CPX-W-PT1000**
Memory card				
	For PROFINET bus node (CPX-FB33, CPX-M-FB34, CPX-M-FB35), 2 MB		**4798288**	**CPX-SK-3**

Accessories – Ordering data

	Description	Part no.	Type
User documentation			
	**Bus node CPX-FB06**		
	German	**526433**	**P.BE-CPX-FB6-DE**
	English	**526434**	**P.BE-CPX-FB6-EN**
	French	**526436**	**P.BE-CPX-FB6-FR**
	Italian	**526437**	**P.BE-CPX-FB6-IT**
	Spanish	**526435**	**P.BE-CPX-FB6-ES**
	Bus node CPX-FB11		
	German	**526421**	**P.BE-CPX-FB11-DE**
	English	**526422**	**P.BE-CPX-FB11-EN**
	French	**526424**	**P.BE-CPX-FB11-FR**
	Italian	**526425**	**P.BE-CPX-FB11-IT**
	Spanish	**526423**	**P.BE-CPX-FB11-ES**
	Bus node CPX-FB13		
	German	**526427**	**P.BE-CPX-FB13-DE**
	English	**526428**	**P.BE-CPX-FB13-EN**
	French	**526430**	**P.BE-CPX-FB13-FR**
	Italian	**526431**	**P.BE-CPX-FB13-IT**
	Spanish	**526429**	**P.BE-CPX-FB13-ES**
	Bus node CPX-FB14		
	German	**526409**	**P.BE-CPX-FB14-DE**
	English	**526410**	**P.BE-CPX-FB14-EN**
	French	**526412**	**P.BE-CPX-FB14-FR**
	Italian	**526413**	**P.BE-CPX-FB14-IT**
	Spanish	**526411**	**P.BE-CPX-FB14-ES**
	Bus node CPX-FB23-24		
	German	**526403**	**P.BE-CPX-FB23-24-DE**
	English	**526404**	**P.BE-CPX-FB23-24-EN**
	Bus node CPX-FB33, CPX-M-FB34, CPX-M-FB35		
	German	**548759**	**P.BE-CPX-PNIO-DE**
	English	**548760**	**P.BE-CPX-PNIO-EN**
	Spanish	**548761**	**P.BE-CPX-PNIO-ES**
	Bus node CPX-FB36		
	German	**8024074**	**CPX-FB36-DE**
	English	**8024075**	**CPX-FB36-EN**
	Spanish	**8024076**	**CPX-FB36-ES**

	Description	Part no.	Type
User documentation			
	**CPX system manual**		
	German	**526445**	**P.BE-CPX-SYS-DE**
	English	**526446**	**P.BE-CPX-SYS-EN**
	Spanish	**526447**	**P.BE-CPX-SYS-ES**
	French	**526448**	**P.BE-CPX-SYS-FR**
	Italian	**526449**	**P.BE-CPX-SYS-IT**
	CPX CP interface		
	German	**539293**	**P.BE-CPX-CP-DE**
	English	**539294**	**P.BE-CPX-CP-EN**
	Spanish	**539295**	**P.BE-CPX-CP-ES**
	CPX CTEL master		
	German	**574600**	**P.BE-CPX-CTEL-DE**
	English	**574601**	**P.BE-CPX-CTEL-EN**
	Spanish	**574602**	**P.BE-CPX-CTEL-ES**
	Control block CPX-CM-HPP		
	German	**568683**	**CPX-CM-HPP-DE**
	English	**568684**	**CPX-CM-HPP-EN**
	PROFIsafe shut-off module		
	German	**8022606**	**P.BE-CPX-FVDA-P2-DE**
	English	**8022607**	**P.BE-CPX-FVDA-P2-EN**
	Spanish	**8022608**	**P.BE-CPX-FVDA-P2-ES**
	French	**8022609**	**P.BE-CPX-FVDA-P2-FR**
	Italian	**8022610**	**P.BE-CPX-FVDA-P2-IT**
	Chinese	**8022611**	**P.BE-CPX-FVDA-P2-ZH**
	Digital input/output modules		
	German	**526439**	**P.BE-CPX-EA-DE**
	English	**526440**	**P.BE-CPX-EA-EN**
	Spanish	**526441**	**P.BE-CPX-EA-ES**
	Analogue input/output modules		
	German	**526415**	**P.BE-CPX-AX-DE**
	English	**526416**	**P.BE-CPX-AX-EN**
	Spanish	**526417**	**P.BE-CPX-AX-ES**

New
New series



Powerful, flexible system

+ Modern control system with high performance
+ Easy mounting of the control system on an H-rail
+ Reduced development work through seamless data management

Electrical peripherals ›
Automation systems

CPX-E

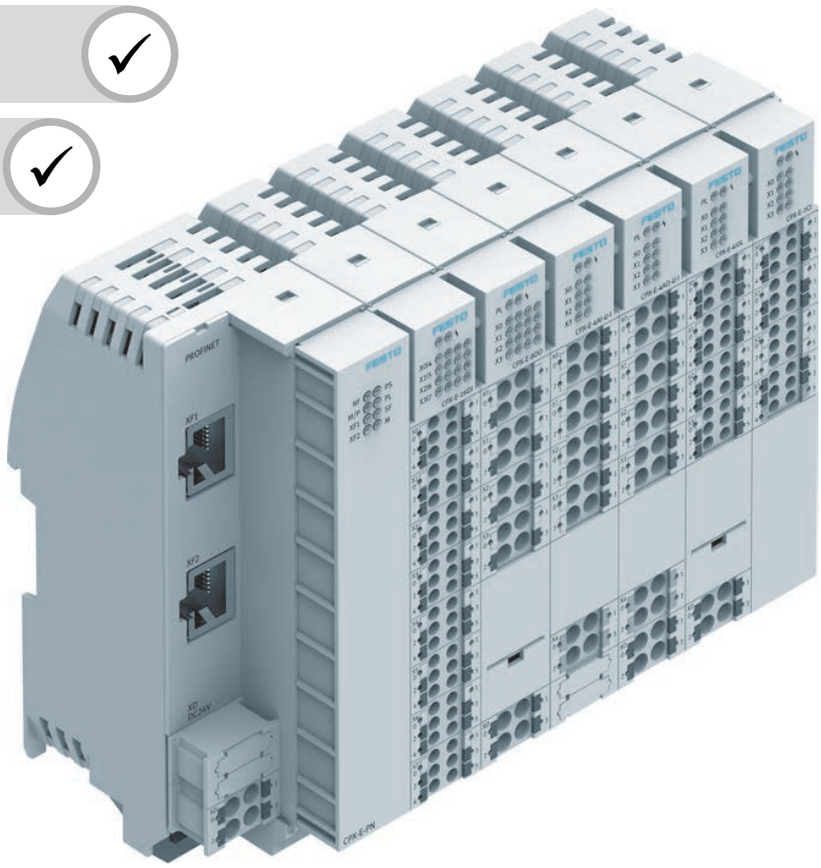
Automation systems

CPX-E

Overview, configuration and ordering
➔ **www.festo.com/catalogue/**cpx-e

Additional information, support and user documentation
➔ **www.festo.com/sp/**cpx-e

Spare parts service



+ Fieldbus master interfaces, EtherCAT® master, fieldbus slave interfaces, PROFINET, EtherNet/IP, PROFIBUS, EtherCAT®
+ Can be designed and used purely as a remote I/O system or as a control system
+ High I/O component density

Product range overview

Type	Designation	Code[1]	Address space		➔ Page/ online
			Inputs	Outputs	
Controllers and bus modules					
CPX-E-CEC-C1-PN	Controller, CODESYS V3	CPN	512 bits	512 bits	1644
CPX-E-CEC-M1-PN	Controller, CODESYS V3 with SoftMotion	MPN	512 bits	512 bits	1644
CPX-E-CEC-C1-EP	Controller, CODESYS V3, EtherNet/IP	CEN	512 bits	512 bits	1644
CPX-E-CEC-M1-EP	Controller, CODESYS V3 with SoftMotion, EtherNet/IP	MEN	512 bits	512 bits	1644
CPX-E-PN	Bus module for PROFINET	PN	512 bits	512 bits	1646
CPX-E-EC	Bus module for EtherCAT®	EC	512 bits	512 bits	1646
CPX-E-EP	Bus module for Ethernet IP	EP	512 bits	512 bits	1647
CPX-E-PB	Bus module for PROFIBUS	PB	512 bits	512 bits	1647
Modules					
CPX-16DI	Input module, 16 digital inputs	M	16 bits	–	1648
CPX-E-1CI	Counter module, digital with 1 input	T53	96 bits	16 bits	1648
CPX-E-8-DO	Output module, 8 digital outputs	L	–	8 bits	1649
CPX-E-4AE-U-I	Input module, 4 analogue inputs	NI	64 bits	–	1649
CPX-E-4AO-U-I	Output module, 4 analogue outputs	NO	–	64 bits	1650
CPX-E-4IOL	Master for IO-Link®, 4 ports	T51	64 ... 256 bits	64 ... 256 bits	1650
Accessories					
CAFC-X3-C	Module cover including label strips	MH	–	–	1652
CAMC-M-MS-G32	32 GB memory card	SK	–	–	1652
CDSB-A1	Display and control unit	AB	–	–	1652

1) Code letter within the order code for a valve terminal configuration.

Note

The automation system CPX-E can be ordered quickly and easily online.

The convenient product configurator can be found at:

➔ **www.festo.com/catalogue/cpx**

Note

- The bus module and controller provide the aforementioned address space.
- Input/output modules, etc. use the specified address space.

Automation system CPX-E

NEW

Key features

The automation system CPX-E is a high-performance control and automation system focusing primarily on motion control functions for handling technology. It comprises individual function modules that allow a very flexible system structure.
Depending on the combination, the automation system CPE-X can be configured and used purely as a remote I/O system or as a control system.
The following modules are available:

- Controller
- Bus modules
- Input/output modules
- Counter modules
- IO-Link® master modules

The controllers for the automation system CPX-E are powerful and have comprehensive PLC functions. They have an integrated EtherCAT® master for communication with other products such as motor controllers.
There is support for SoftMotion, depending on the variant. SoftMotion is a powerful software library for simple and complex motion control applications.
All controllers have an integrated bus interface; an additional bus module for connection to higher-order controllers is not required.

- Standardised CODESYS programming interface
- Reduced development effort thanks to integrated data management
- Extended software functions for seamless integration and simplified control of electric drives
- Standardised, integrated platform combining servo technology and stepper motor technology, enabling mixed operation of the two technologies without problems in the application

Scalable motion control functions:

- Simple movements
- Multi-axis movements (cam discs)
- Contour applications
- Robotics

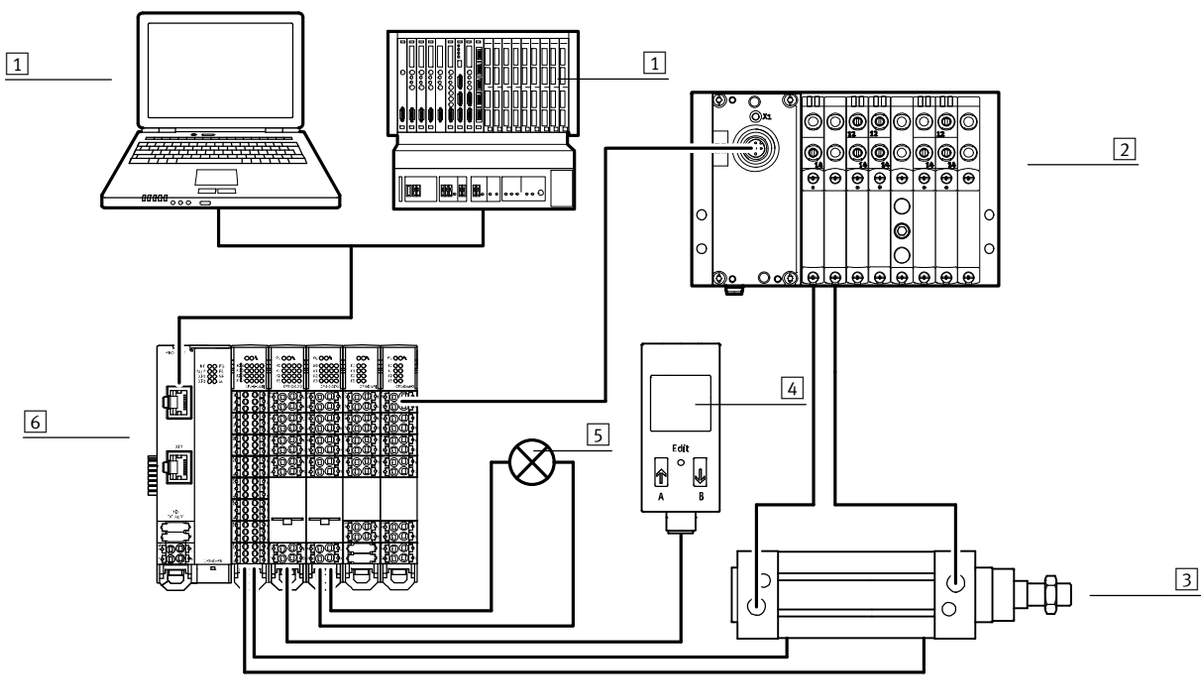
Handling technology using Festo kinematics (planar surface gantry, linear gantry, Cartesian three-dimensional gantries)

- Parts handling
- Assembly systems
- Palletising
- Gluing, dispensing

Complete automation of machines:

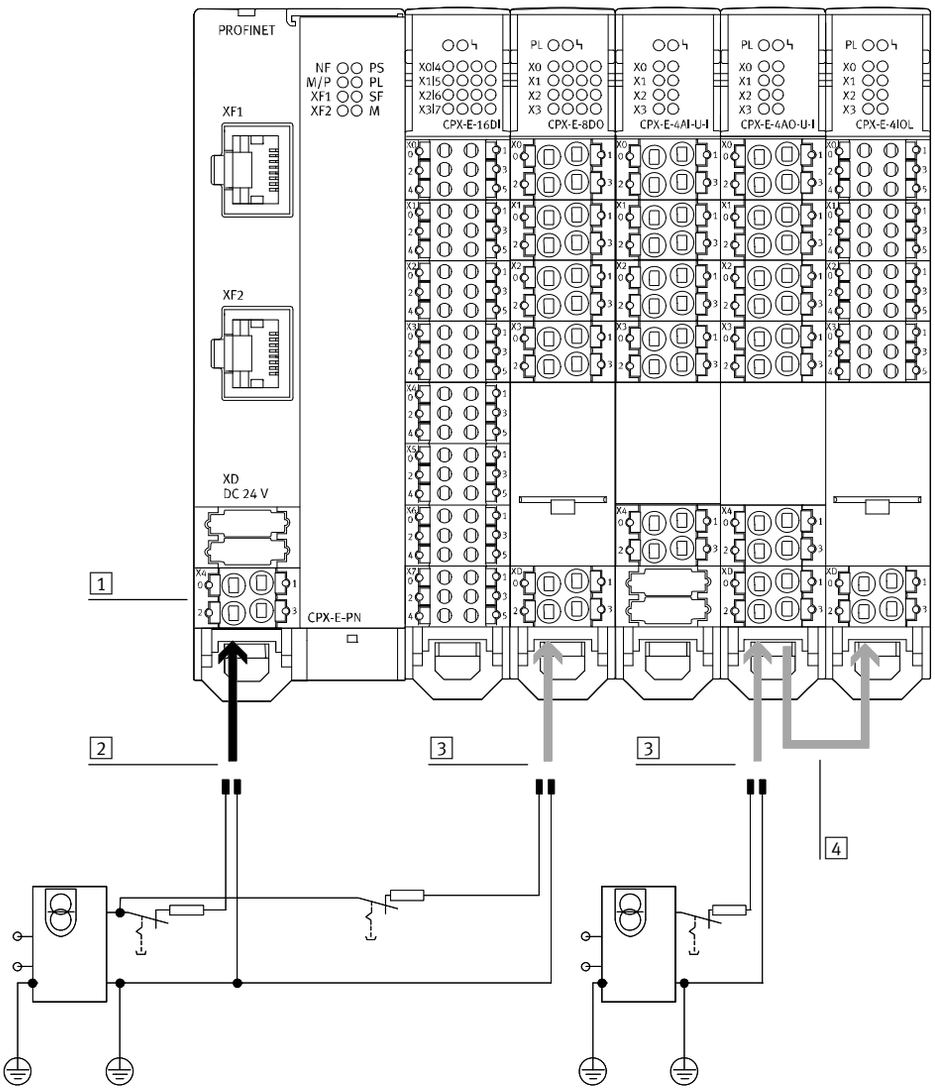
- Packaging machines
- Palletising systems
- Assembly machines
- Handling systems

Overview



1 Higher-order controller
2 Valve terminal with I-Port interface/ device with IO-Link® interface
3 Cylinder with sensors for position sensing
4 Flow sensor
5 Visual indicator
6 Automation system CPX-E

Power supply concept



1 The power supply is provided via a terminal strip with spring-loaded terminals on the module
2 The power supply for the modules themselves and the connected sensors is provided centrally on the bus module/controller
3 The power supply for connected actuators is provided via a terminal strip with spring-loaded terminals on the respective output module/IO-Link® master module
4 The power supply for actuators can be looped through from output module to output module/IO-master module

Interlinking blocks represent the backbone of the automation system CPX-E with all supply lines. They provide the power supply for the modules used on them as well as their bus connections. For segmentation into voltage zones, the power supply for the outputs is fed in separately at the output module. This provides electrically isolated, all-pin disconnectable potential groups/voltage segments.

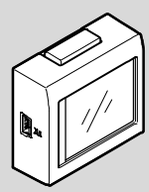
Data sheet – Automation system CPX-E

Technical data		
Nominal operating voltage DC	[V DC]	24
Nominal operating voltage DC for electronics/sensors	[V DC]	24
Permissible voltage fluctuations for electronics/sensors	[%]	±25
Max. power supply	[A]	8
Protection against direct and indirect contact		PELV
Type of mounting		Via H-rail
Ambient temperature	[°C]	–5 ... +50
Electrical connection		
Connection type		Terminal strip
Connection technology		Spring-loaded terminal
Wire cross-section	[mm²]	0.2 ... 1.5
Note on wire cross-section		0.2 ... 2.5 mm² for flexible conductor without wire end sleeve

Data sheet – Display and control unit CDSB-A1

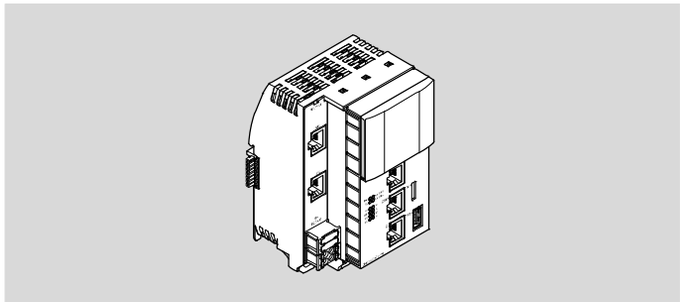
The operator unit CDSB-A1 from Festo is a plug-in display and control unit for the automation system CPX-E.
The built-in colour TFT display with touchscreen allows both operation and simple diagnostics of the connected basic unit. User-friendliness is enhanced through fault diagnostics with plain text error message.

- Display of full text messages (errors, warnings, data)
- Easy data backup of parameters and firmware in the unit (e.g. for series commissioning or device replacement)



Technical data		Download CAD data ➔ www.festo.com
Display component		LCD graphic display with background illumination (128 x 64 pixels)
Control elements		7 buttons: 4 arrow keys and 3 function keys
Data interface		RS 232 interface, 57.6 kBaud, M12 socket, 4-pin
Operating voltage	[V DC]	24, supplied by the connected device
Current consumption	[mA]	50 ... 60
Length/width/height	[mm]	137/81/28

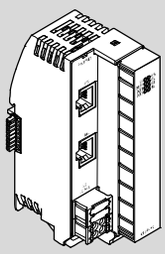
Data sheet – Controller



Data sheet – Controller

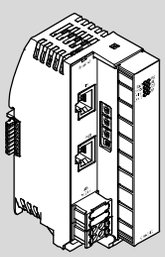
General Technical data			
Type		CPX-E-CEC-...-PN	CPX-E-CEC-...-EP
CPU data		Dual core 766 MHz	
		512 MB RAM	
Programming software		CODESYS provided by Festo	
Program memory		12 MB, user program	
Control elements		DIL switch for RUN/STOP	DIL switch for RUN/STOP
		Optional operator unit CDSB	Optional operator unit CDSB
		–	Rotary switch for address setting
Configuration support		Operator unit CDSB	Operator unit CDSB
		CODESYS V3	CODESYS V3
		GSDML file	–
Maximum number of modules		10	
Intrinsic current consumption at nominal operating voltage for electronics/sensors	[mA]	Typically 150	
Dimensions W x L x H	[mm]	75.9 x 124.3 x 82.5	
Inputs/outputs			
Max. address capacity outputs	[byte]	64	
Max. address capacity inputs	[byte]	64	
Fieldbus interface 1			
Protocol		PROFINET IO	EtherNet/IP
Transmission rate	[Mbps]	100	
Type		Ethernet	
Connection type		2x socket	
Connection technology		RJ45	
Fieldbus interface 2			
Protocol		EtherCAT® master	
Transmission rate	[Mbps]	100	
Type		Ethernet	
Connection type		Socket	
Connection technology		RJ45	
Number of poles/wires		8	
USB interface			
USB interface		USB 2.0	

Data sheet – PROFINET bus module



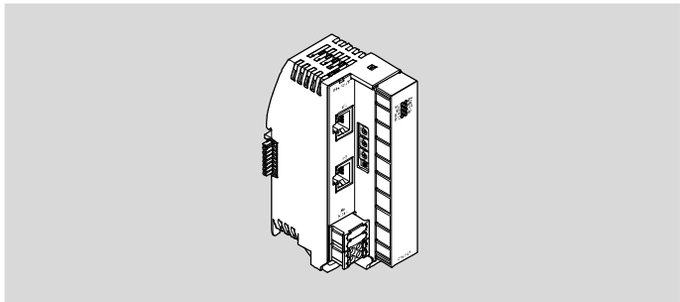
Technical data		Download CAD data ➔ www.festo.com
Fieldbus interface		
Protocol		PROFINET IRT
		PROFINET IRT
Transmission rate	[Mbps]	100
Type		Ethernet
Connection type		2x socket
Connection technology		RJ45
Max. address capacity outputs	[byte]	64
Max. address capacity inputs	[byte]	64
Intrinsic current consumption at nominal operating voltage	[mA]	Typically 75
Dimensions W x L x H	[mm]	42.2 x 125.8 x 76.5

Data sheet – EtherCAT® bus module



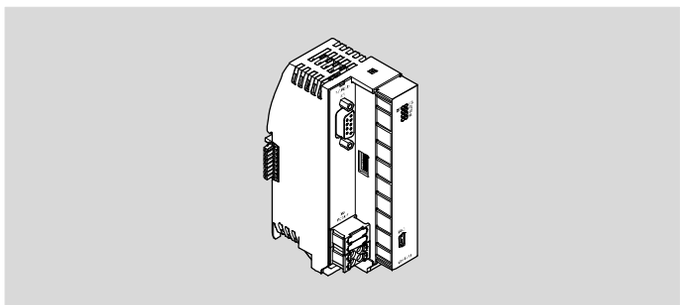
Technical data		Download CAD data ➔ www.festo.com
Fieldbus interface		
Protocol		EtherCAT®
Transmission rate	[Mbps]	100
Type		EtherCAT®
Connection type		2x socket
Connection technology		RJ45
Max. address capacity outputs	[byte]	64
Max. address capacity inputs	[byte]	64
Intrinsic current consumption at nominal operating voltage	[mA]	Typically 64
Dimensions W x L x H	[mm]	42.2 x 125.8 x 76.5

Data sheet – EtherNet/IP bus module



Technical data		Download CAD data ➔ www.festo.com
Fieldbus interface		
Protocol		EtherNet/IP
		Modbus®/TCP
Transmission rate	[Mbps]	100
Type		Ethernet
Connection type		2x socket
Connection technology		RJ45
Max. address capacity outputs	[byte]	64
Max. address capacity inputs	[byte]	64
Intrinsic current consumption at nominal operating voltage	[mA]	Typically 65
Dimensions W x L x H	[mm]	42.2 x 125.8 x 76.5

Data sheet – PROFIBUS bus module

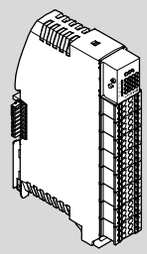


Technical data		Download CAD data ➔ www.festo.com				
Fieldbus interface						
Protocol		PROFIBUS DP				
Transmission rate	[kbps]	9.6	19.2	93.75	187.5	500
	[Mbps]	1.5	3	6	12	
Type		PROFIBUS				
Connection type		Socket				
Connection technology		Sub-D				
Max. address capacity outputs	[byte]	64				
Max. address capacity inputs	[byte]	64				
Intrinsic current consumption at nominal operating voltage	[mA]	Typically 75				
Dimensions W x L x H	[mm]	42.2 x 125.8 x 76.5				

Data sheet – Digital input module

Function

Digital input modules facilitate the connection of proximity sensors or other 24 V DC sensors (inductive, capacitive, etc.).



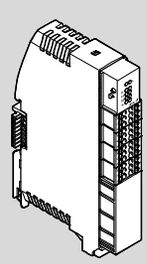
Technical data Download CAD data ➔ **www.festo.com**

Function			Digital input
Number of inputs			16
Max. address capacity inputs		[byte]	2
Max. residual current of inputs per module		[A]	1.8
Internal electronic fuse			Per module
Intrinsic current consumption at nominal operating voltage		[mA]	15
Sensor supply voltage		[V DC]	24 ±25
Electrical isolation	Channel – channel		No
	Channel – internal bus		No
Input switching logic			PNP (positive switching)
			2- and 3-wire sensors to IEC 61131-2
Connection type			8x terminal strip
Connection technology			Spring-loaded terminal
Wire cross-section		[mm^2]	0.2 ... 1.5
Dimensions W x L x H		[mm]	18.9 x 76.6 x 124.3

Data sheet – Digital counter module

Function

Digital counter modules support the connection of sensors for detecting pulses.



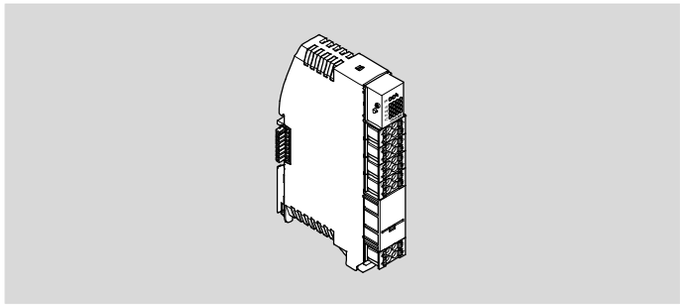
Technical data Download CAD data ➔ **www.festo.com**

Function	Electrical input 1		Digital input
	Electrical input 2		Counter input
Number of inputs			4
Max. address capacity inputs		[byte]	12
Max. residual current of inputs per module		[A]	1.8
Internal electronic fuse			Per module
Intrinsic current consumption at nominal operating voltage		[mA]	Typically 15
Sensor supply voltage		[V DC]	24 ±25
Electrical isolation	Channel – channel		No
	Channel – internal bus		No
Input switching logic			PNP (positive switching)
			2- and 3-wire sensors to IEC 61131-2
Connection type			Terminal strip
Connection technology			Spring-loaded terminal
Wire cross-section		[mm^2]	0.2 ... 1.5
Dimensions W x L x H		[mm]	18.9 x 76.6 x 124.3

Data sheet – Digital output module

Function

Digital output modules make it possible to connect electrical consumers in accordance with IEC 1131-2 type Q5 (valves, contactors or display components) with an operating voltage of 24 V DC.



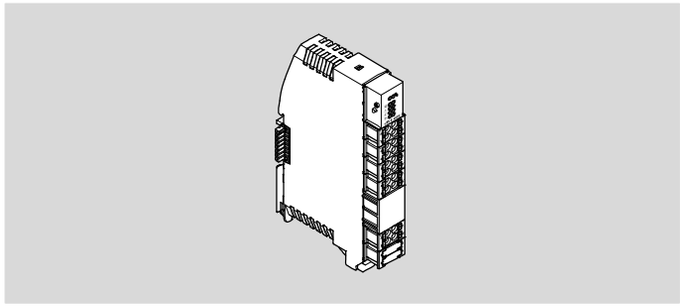
Technical data Download CAD data ➔ **www.festo.com**

Function			Digital output
Number of outputs			8
Max. address capacity outputs		[byte]	1
Max. residual current of outputs per module		[A]	4
Internal electronic fuse			Per channel
Intrinsic current consumption at nominal operating voltage load		[mA]	34
Sensor supply voltage		[V DC]	24 ±25
Electrical isolation	Channel – channel		No
	Channel – internal bus		Yes
Switching logic at outputs			PNP (positive switching)
Connection type			4x terminal strip
Connection technology			Spring-loaded terminal
Wire cross-section		[mm²]	0.2 … 1.5
Dimensions W x L x H		[mm]	18.9 x 76.6 x 124.3

Data sheet – Analogue input module

Function

Analogue input modules make it possible to detect analogue input signals such as current or voltage.



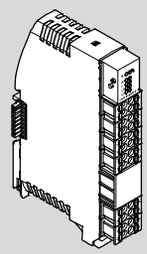
Technical data Download CAD data ➔ **www.festo.com**

Function			Analogue input
Number of inputs			4
Max. address capacity inputs		[byte]	8
Max. residual current of inputs per module		[A]	1.4
Internal electronic fuse			Per module
Intrinsic current consumption at nominal operating voltage		[mA]	70
Sensor supply voltage		[V DC]	24 ±25
Electrical isolation	Channel – channel		No
	Channel – internal bus		Yes
Connection type			4x terminal strip
Connection technology			Spring-loaded terminal
Wire cross-section		[mm²]	0.2 … 1.5
Dimensions W x L x H		[mm]	18.9 x 76.6 x 124.3

Data sheet – Analogue output module

Function

The module converts the value specified by the controller (15-bit value with prefix) and transfers it to a connected actuator as an analogue current or voltage value.



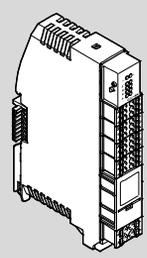
Technical data Download CAD data ➔ **www.festo.com**

Function			Analogue output
Number of outputs			4
Max. address capacity outputs		[byte]	8
Max. residual current of outputs per module		[A]	2
Internal electronic fuse			Per module
Intrinsic current consumption at nominal operating voltage		[mA]	60
Sensor supply voltage		[V DC]	24 ±25
Electrical isolation	Channel – channel		No
	Channel – internal bus		Yes
Connection type			4x terminal strip
Connection technology			Spring-loaded terminal
Wire cross-section		[mm²]	0.2 … 1.5
Dimensions W x L x H		[mm]	18.9 x 76.6 x 124.3

Data sheet – IO-Link® master module

Function

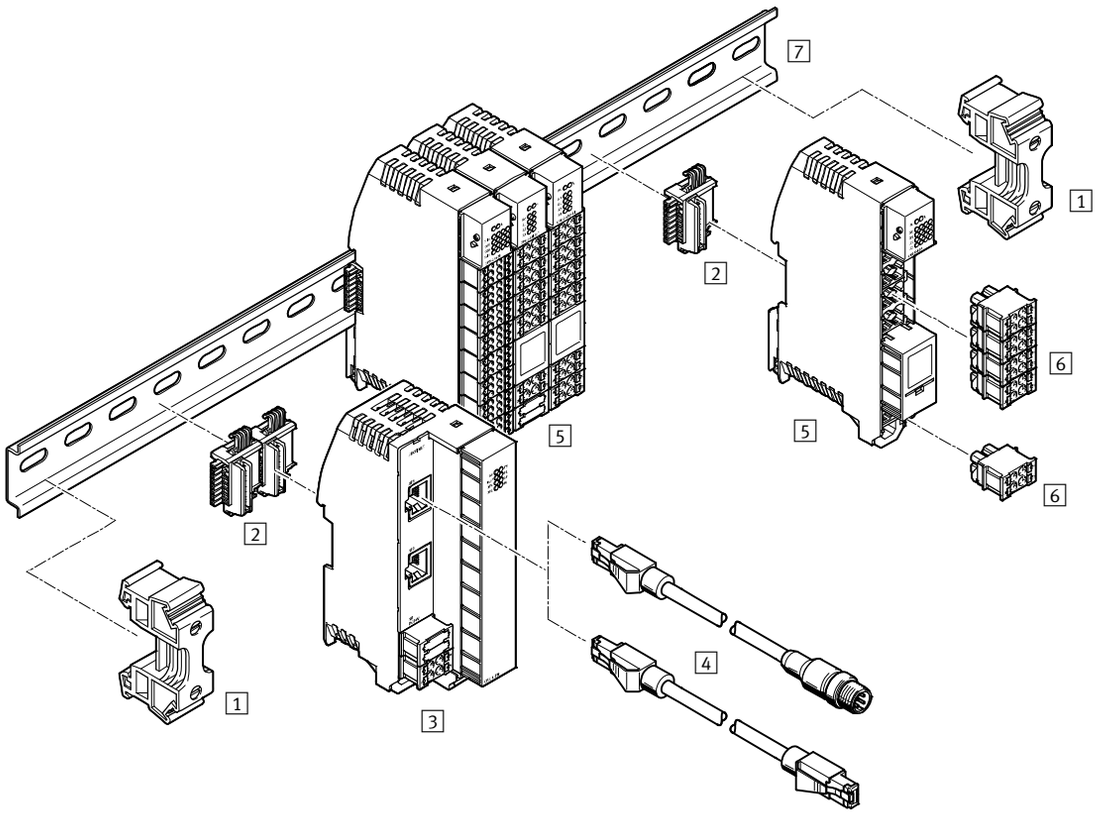
The IO-Link® master module establishes the connection to modules that have an IO-Link® interface (device). The I/O data from the connected devices is transmitted to the connected CPX-E bus module and thus to the higher-order controller via fieldbus.



Technical data Download CAD data ➔ **www.festo.com**

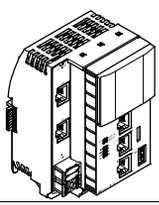
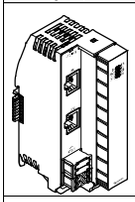
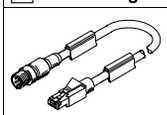
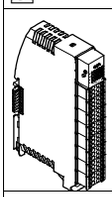
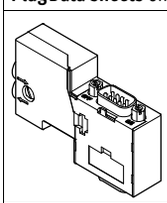
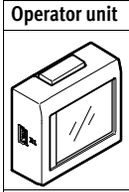
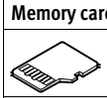
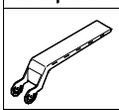
Protocol			I/O-Link®
Number of ports			4
Internal electronic fuse			Per module
			Per channel
Intrinsic current consumption at nominal operating voltage		[mA]	50
Sensor supply voltage		[V DC]	24 ±25
Electrical isolation	Channel – channel		No
	Channel – internal bus		No
Connection type			4x terminal strip
Connection technology			Spring-loaded terminal
Wire cross-section		[mm²]	0.2 … 1.5
Dimensions W x L x H		[mm]	18.9 x 76.6 x 124.3

Accessories



		➔ Page/online
1	Holder CAFM	–
2	Electrical interlinking module VAEA	–
3	Controller/bus module CPX-E	1652
4	Connecting cable NEBC, for controller	1652
5	Module CPX-E	1652
6	Terminal strip NEKC, for input and output modules and IO-Link® master modules	–
7	DIN mounting rail NRH	nrh
–	Plug FBS/NECU, for PROFIBUS	1652
–	Display and control unit CDSB, for controller	1652
–	Memory card CAMC, for controller	1652
–	Inscription label holder CAFC, for input and output modules and IO-Link® master modules	1652

Accessories – Ordering data

	Description			Part no.	Type
3	**Controller/bus module**				**Data sheets** online: ➔ **nebc**
	Controller with PROFINET IO	CODESYS V3		**4252741**	**CPX-E-CEC-C1-PN**
		CODESYS V3 with SoftMotion		**4252743**	**CPX-E-CEC-M1-PN**
	Controller with EtherNet/IP	CODESYS V3		**4252742**	**CPX-E-CEC-C1-EP**
		CODESYS V3 with SoftMotion		**4252744**	**CPX-E-CEC-M1-EP**
	Bus module	PROFINET		**4080497**	**CPX-E-PN**
		EtherCAT		**4080498**	**CPX-E-EC**
		EtherNet/IP		**4080499**	**CPX-E-EP**
		PROFIBUS		**4080496**	**CPX-E-PB**
4	**Connecting cable**				**Data sheets** online: ➔ **nebc**
	Straight plug, RJ45, 8-pin	Straight plug, M12x1, 4-pin, D-coded	1 m	**8040451**	**NEBC-D12G4-ES-1-S-R3G4-ET**
			3 m	**8040452**	**NEBC-D12G4-ES-3-S-R3G4-ET**
			5 m	**8040453**	**NEBC-D12G4-ES-5-S-R3G4-ET**
			10 m	**8040454**	**NEBC-D12G4-ES-10-S-R3G4-ET**
		Straight plug, RJ45, 8-pin	1 m	**8040455**	**NEBC-R3G4-ES-1-S-R3G4-ET**
5	**Module**				**Data sheets** online: ➔ **nebc**
	Digital input module	16 inputs		**4080492**	**CPX-E-16DI**
	Digital counter module	1 input		**4827505**	**CPX-E-1CI**
	Digital output module	8 outputs		**4080491**	**CPX-E-8DO**
	Analogue input module	4 inputs		**4080493**	**CPX-E-4AI-U-I**
	Analogue output module	4 outputs		**4080494**	**CPX-E-4AO-U-I**
	IO-Link master module	4 ports		**4080495**	**CPX-E-4IOL**
	Plug **Data sheets** online: ➔ **necu**				
	Sub-D plug, straight			**532216**	**FBS-SUB-9-GS-DP-B**
	Sub-D plug, straight, with terminating resistor and programming interface			**574589**	**NECU-S1W9-C2-APB**
	Operator unit				**Data sheets** online: ➔ **cdsb**
	Display and control unit			**8070984**	**CDSB-A1**
	Memory card				
	32 GB memory card, for controller			**4553880**	**CAMC-M-MS-G32**
	Inscription label holder				
	5 pieces			**4080500**	**CAFC-X3-C**

17 Other pneumatic devices

+ Pneumatic assembly tools
+ Air reservoirs
+ Silencers
+ Air guns
+ Inscription systems

CRVZS

Air reservoirs

+ Compensation of pressure fluctuations and as accumulators in the event of sudden air consumption
+ Corrosion resistant

➔ page 1665

AMTE★

Silencers

+ Metal design
+ High temperature resistance up to 80°C
+ Slim overall width
+ Wide range of variants
+ Can be used universally

➔ page 1659

U★

Silencers

+ Polymer design
+ Thread connection M5, G1/2, G1/4, G1/8, G3/8, G3/4, G1
+ Barbed fitting connection PK-3, PK-4
+ Noise level 65 ... 84 dB(A)

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Contents

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Silencers AMTE, U 1659
Air reservoirs CRVZS 1665

Silencers

Type	Silencers AMTE ★	Silencers U ★	Silencers AMTC	Silencers UC
Information on materials - silencer insert	Bronze	Bronze, PE	PE	PE
Pneumatic connection	G1/8, G1/4, G3/8, G1/2, G3/4, G1, M3, M5, NPT1/2-14, NPT1/4-18, NPT1/8-27, NPT3/8-18, UNF10-32	G1/8, G1/4, G3/8, G1/2, G3/4, G1, NPT3/4-14, PK-3, PK-4, NPT1-11	Cartridge 10 mm	G1/8, G1/4, G3/8, M5, M7, QS-3, QS-4, QS-6, QS-8, QS-10
Noise level	55 ... 95 dB(A)	70 ... 85 dB(A)	58 dB(A)	58 ... 68 dB(A)
Description	• Long or short design • Metal version • Operating medium compressed air • High temperature resistance up to 80°C • Slim overall width • Wide range of variants • Can be used universally	• 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	• Polymer version • Operating medium compressed air • Threaded connection or push-in sleeve for push-in fitting QS
➔ Page/online	**1659**	**1659**	**1659**	**1659**

Silencers

Type	Silencers UO	Silencers UOS-1, UOS-1-LF	Silencers UOM, UOMS
Information on materials - silencer insert	PE	PE	PU foam
Pneumatic connection	G1/8, G1/4, 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
➔ Page/online	**1659**	**1659**	**1659**

Tools

Type	Clip fix tools AGTC
Valve function	3/2-way, closed, single solenoid
Actuation type	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
➔ Page/online	agtc

Air reservoirs

Type	Air reservoirs CRVZS	Air reservoirs VZS
Volume	0.1 l, 0.4 l, 0.75 l, 2 l, 5 l, 10 l, 20 l	20 l
Information on materials - air reservoirs	High-alloy stainless steel	Powder-coated steel
Conforms to	AD 2000	EN 286-1
Condensate drain connection	G3/8	G3/8
Description	• 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 • Food safe see www.festo.com/sp/crvzs › tab "Certificates" • Designs to EU Pressure Equipment Directive EN 286-1 • Operating media compressed air, vacuum	• Compensation of pressure fluctuations • Provision of large volumes 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
➔ Page/online	**1665**	**1665**

Product overview

Air guns

Type	Low consumption 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, PA6-reinforced	Aluminium, brass, die-cast zinc, chrome-plated, nickel-plated
Description	• Precise, infinitely variable, lever-operated flow metering • Interchangeable nozzles • Operating medium compressed air	• With protective air shield or silencer • Targeted, strong air jet or powerful, focused air jet • Low noise level • Operating medium compressed air
➔ Page/online	lsp	lpz

Pneumatic indicators

Type	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	G1/8, barbed connector PK-3	Barbed connector PK-3, barbed connector PK-4, G1/4
Type of mounting	Front panel mounting in Ø 22.5	Can be snapped onto DIN mounting rail type NRC32
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
➔ Page/online	oh	lt

Inscription systems

Type	Inscription labels ASLR, BZ, HWF, IBS, KM, KMC, MH, SBS, SIEZ-LB	Inscription label holders CPV10-VI-ST, CPV14-VI-ST, CPV18-VI-ST, CPVSC1-ST, CPX-ST, IBT, MN2H-BZT, MVH-BZ, VMPA1-ST
Type of mounting	Inscription clip 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
➔ Page/online	aslr	ascf

Lower the noise level of your system

+ Compact and sturdy metal designs
+ Highly efficient polymer designs

Silencers

AMTE★

AMTC

U★

UC, UOS

Silencers

U...★ /AMT...★

Overview, configuration and ordering
➔ **www.festo.com/catalogue/u** ✓

Additional information, support and user documentation
➔ **www.festo.com/sp/u** ✓

★ Quick ordering of basic designs
➔ page U: 1662, AMTE: 1663 ✓

+ Small designs, polymer or metal version
+ Barbed connector or threaded connection
+ Version with push-in sleeve for push-in fitting QS
+ Mounting by spring clip

Product range overview

Type	Version	Pneumatic connection					➔ Page/ online
		Male thread	Female thread	Barbed connector	Push-in sleeve	Cartridge	
U	Sintered metal	–	–	PK-3, PK-4	–	–	u-pk-*
	Polymer	G1⁄8, G1⁄4, G3⁄8, G1⁄2, G3⁄4, G1	–	–	–	–	1662
		–	G1⁄8	–	–	–	u
	Die-cast metal	G1⁄8, G1⁄4, G3⁄8, G1⁄2, G3⁄4, G1	–	–	–	–	1662
		NPT3⁄4-14, NPT1-11½	–	–	–	–	u
UC	–	–	–	–	QS-3, QS-4, QS-6, QS-8, QS-10	–	1662
		M5, M7, G1⁄8, G1⁄4, G3⁄8	–	–	–	–	1662
AMTC	–	–	–	–	–	10 mm	1663
AMTE	Short	M5, G1⁄8, G1⁄4, G3⁄8, G1⁄2	–	–	–	–	1663
	Long	M3, M5, G1⁄8, G1⁄4, G3⁄8, G1⁄2, G3⁄4, G1	–	–	–	–	
		UNF10-32, NPT1⁄8-27, NPT1⁄4-18, NPT3⁄8-18, NPT1⁄2-14	–	–	–	–	amte
UOS-1	For MS6-SV-D	G1	–	–	–	–	1663
UO	For VN-...-T2/T3	M7, G1⁄8, G1⁄4	–	–	–	–	1664
UOM(S)	For VN-...-T4/T6	G1⁄4, G3⁄8	–	–	–	–	1664

Data sheet

Operating conditions

Type		U/UC	AMTC	AMTE	UOS-1	UO	UOM(S)
Operating medium		Compressed air to ISO 8573-1:2010 [7:–:–]			Compressed air to ISO 8573-1:2010 [–:–:–]	Compressed air to ISO 8573-1:2010 [7:4:4]	Compressed air to ISO 8573-1:2010 [–:–:–]
Note on operating/pilot medium		Lubricated operation possible (in which case lubricated operation will always be required)			–		
Operating pressure	[bar]	0 ... 10				0 ... 8	
Ambient temperature	[°C]	–10 ... +70	–5 ... +60	–40 ... +80	–10 ... +50	–10 ... +60	0 ... +60

Note
Clean silencers with paraffin or benzene (not with trichloroethylene).

Materials

Type	U			UC/AMTC	AMTE	UOS-1	UO	UOM(S)
Version	Sintered metal	Polymer	Die-cast metal					
Threaded plug	Brass	POM	Aluminium	PE	Brass	Wrought aluminium alloy, POM	PE	POM
Silencer insert	Bronze	PE	PE	PE	Bronze	PE	PE	Polyurethane foam

Silencers U ★ /UC

Ordering data

Silencer U

Polymer

Pneumatic connection	Noise level[1] [dB (A)]	Flow rate with respect to atmosphere[2] [l/min]		Part no.	Type	PU[3]
G1⁄8	< 77	2050	★	**2307**	**U-1/8**	**1**
				534222	**U-1/8-50**	**50**
G1⁄4	< 77	3400	★	**2316**	**U-1/4**	**1**
				534223	**U-1/4-20**	**20**
G3⁄8	< 82	5900	★	**2309**	**U-3/8**	**1**
				534224	**U-3/8-20**	**20**
G1⁄2	< 80	10,600	★	**2310**	**U-1/2**	**1**
				534225	**U-1/2-20**	**20**
G3⁄4	< 83	15,000		**2311**	**U-3/4**	**1**
G1	< 84	19,900		**2312**	**U-1**	**1**

Die-cast metal

Pneumatic connection	Noise level[1] [dB (A)]	Flow rate with respect to atmosphere[2] [l/min]		Part no.	Type	PU[3]
G1⁄8	< 74	1340	★	**6841**	**U-1/8-B**	**1**
G1⁄4	< 80	2440	★	**6842**	**U-1/4-B**	**1**
G3⁄8	< 80	5800	★	**6843**	**U-3/8-B**	**1**
G1⁄2	< 80	7500	★	**6844**	**U-1/2-B**	**1**
G3⁄4	< 81	10,000		**6845**	**U-3/4-B**	**1**
G1	< 80	17,500		**151990**	**U-1-B**	**1**

Silencer UC

With push-in sleeve

Pneumatic connection	Noise level[1] [dB (A)]	Flow rate with respect to atmosphere[2] [l/min]	Part no.	Type	PU[3]
QS-3	< 60	170	**165005**	**UC-QS-3H**	**1**
QS-4	< 60	350	**165006**	**UC-QS-4H**	**1**
QS-6	< 60	800	**165007**	**UC-QS-6H**	**1**
QS-8	< 60	1500	**175611**	**UC-QS-8H**	**1**
QS-10	< 68	3100	**526475**	**UC-QS-10H**	**1**

Threaded connection

Pneumatic connection	Noise level[1] [dB (A)]	Flow rate with respect to atmosphere[2] [l/min]	Part no.	Type	PU[3]
M5	< 60	350	**165003**	**UC-M5**	**1**
			534217	**UC-M5-50**	**50**
M7	< 58	800	**161418**	**UC-M7**	**1**
			534218	**UC-M7-50**	**50**
G1⁄8	< 59	1700	**161419**	**UC-1/8**	**1**
			534219	**UC-1/8-50**	**50**
G1⁄4	< 60	3200	**165004**	**UC-1/4**	**1**
			534220	**UC-1/4-20**	**20**
G3⁄8	< 60	5000	**1707427**	**UC-3/8**	**1**
			576759	**UC-3/8-20**	**20**

1) Measured at 6 bar with respect to atmosphere at a distance of 1 m.
2) Measured at p1 = 6 bar.
3) Packaging unit quantity

Ordering data

Silencer AMTC

Pneumatic connection	Noise level[1] [dB (A)]	Flow rate with respect to atmosphere[2] [l/min]		Part no.	Type	PU[3]
Cartridge 10 mm	< 58	800		**1224460**	**AMTC-P-PC10**	**1**

Silencer AMTE

Pneumatic connection	Noise level[1] [dB (A)]	Flow rate with respect to atmosphere[2] [l/min]		Part no.	Type	PU[3]
Short version						
M5	< 71	91		**1206621**	**AMTE-M-H-M5**	**20**
G1⁄8	< 92	615		**1206622**	**AMTE-M-H-G18**	**20**
G1⁄4	< 95	1000		**1206623**	**AMTE-M-H-G14**	**20**
G3⁄8	< 92	1545		**1206624**	**AMTE-M-H-G38**	**10**
G1⁄2	< 92	2745		**1206625**	**AMTE-M-H-G12**	**10**
Long version						
M3	< 55	95		**1231120**	**AMTE-M-LH-M3**	**20**
M5	< 72	255	★	**1205858**	**AMTE-M-LH-M5**	**20**
G1⁄8	< 76	1735	★	**1205860**	**AMTE-M-LH-G18**	**20**
G1⁄4	< 83	3140	★	**1205861**	**AMTE-M-LH-G14**	**20**
G3⁄8	< 82	5430	★	**1205862**	**AMTE-M-LH-G38**	**10**
G1⁄2	< 88	10,500	★	**1205863**	**AMTE-M-LH-G12**	**10**
G3⁄4	< 85	12,400		**1205864**	**AMTE-M-LH-G34**	**10**
G1	< 88	17,235		**1205865**	**AMTE-M-LH-G1**	**10**

Silencer UOS-1

For soft-start/quick exhaust valve MS6-SV-D ➔ Page 1358

Pneumatic connection	Noise level[1] [dB (A)]		Part no.	Type	PU[3]
For high exhaust rate					
G1	< 75		**552252**	**UOS-1**	**1**
For low exhaust rate					
G1	< 75		**1901207**	**UOS-1-LF**	**1**

1) Measured at 6 bar with respect to atmosphere at a distance of 1 m.
2) Measured at p1 = 6 bar.

3) Packaging unit quantity

Silencers UO/UOM

Ordering data

Silencer UO

For vacuum generators VN-...-T2/T3 ➔ Page 883

Pneumatic connection	Part no.	Type	PU[1]
M7	**197582**	**UO-M7**	**1**
G1⁄8	**197583**	**UO-1/8**	**1**
G1⁄4	**197584**	**UO-1/4**	**1**

Silencer UOM/silencer extension UOMS

For vacuum generators VN-...-T4/T6 ➔ Page 883

Pneumatic connection	Part no.	Type	PU[1]
G1⁄4	**538432**	**UOM-1/4**	**1**
G3⁄8	**538433**	**UOM-3/8**	**1**
Silencer extension			
–	**538436**	**UOMS-1/4**	**1**
–	**538437**	**UOMS-3/8**	**1**

1) Packaging unit quantity

Reduce pressure fluctuations

+ Compensation of pressure fluctuations
+ Corrosion-resistant stainless steel
+ Designs in accordance with EU Pressure Equipment Directive

Air reservoirs

CRVZS

Stainless steel

VZS

Air reservoirs

CRVZS

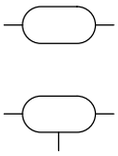
Overview, configuration and ordering
➔ **www.festo.com/catalogue/crvzs**

Additional information, support and user documentation
➔ **www.festo.com/sp/crvzs**

+ Corrosion resistant
+ Volume up to 20 l
+ Optionally with condensate drain
+ 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
+ Designs in accordance with EU Pressure Equipment Directive

Air reservoirs CRVZS

Data sheet



Technical data Download CAD data ➔ **www.festo.com**

Type		CRVZS-0.1	CRVZS-0.4	CRVZS-0.75	CRVZS-2	CRVZS-5	CRVZS-10	CRVZS-20
Pneumatic connection		G⅛	G¼		G½	G1		
Condensate drain connection		–				G⅜		
Type of mounting		Retaining clips			Via through-hole			
Mounting position		Optional				Condensate drain underneath		
Volume	[l]	0.1 ±20%	0.4 ±20%	0.75 ±20%	2 ±10%	5 ±10%	10 ±10%	20 ±10%
Length/width/height	[mm]	132/51/71	240/54/84	248/60/95	300/134/110	330/162/195	558/162/195	740/162/233

Operating conditions

Type		CRVZS-0.1	CRVZS-0.4	CRVZS-0.75	CRVZS-2	CRVZS-5	CRVZS-10	CRVZS-20
Operating medium		Compressed air to ISO 8573-1:2010 [–:–:–]						
		Nitrogen						
Operating pressure	[bar]	–0.95 ... +16						
Ambient temperature	[°C]	–10 ... +100 (observe operating range of tubing and piping)						
CE marking (see declaration of conformity)[1)]		–				In accordance with EU Pressure Equipment Directive		
Suitable for use in the food industry[1)]		See supplementary material information						

1) Additional information www.festo.com/sp ➔ Certificates.

Materials

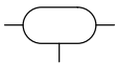
Type	CRVZS-0.1	CRVZS-0.4	CRVZS-0.75	CRVZS-2	CRVZS-5	CRVZS-10	CRVZS-20
Air reservoir	High-alloy stainless steel						
Retaining clips	High-alloy stainless steel			–			

Ordering data

Pneumatic connection	Volume [l]	Part no.	Type
G⅛	0.1 ±20%	**160233**	**CRVZS-0.1**
G¼	0.4 ±20%	**160234**	**CRVZS-0.4**
	0.75 ±20%	**160235**	**CRVZS-0.75**
G½	2 ±10%	**160236**	**CRVZS-2**
G1	5 ±10%	**192159**	**CRVZS-5**
	10 ±10%	**160237**	**CRVZS-10**
	20 ±10%	**534845**	**CRVZS-20**

Air reservoirs VZS

Data sheet



Technical data Download CAD data ➔ **www.festo.com**

Type		VZS-20-B
Pneumatic connection		G1
Condensate drain connection		G⅜
Type of mounting		Via through-hole
Mounting position		Condensate drain underneath
Volume	[l]	20 ±10%
Length/width/height	[mm]	696/206/250

Operating conditions

Type		VZS-20-B
Operating medium		Compressed air to ISO 8573-1:2010 [–:–:–]
		Nitrogen
Operating pressure	[bar]	–0.95 ... +16
Ambient temperature	[°C]	–10 ... +100 (observe operating range of tubing and piping)
CE marking (see declaration of conformity)[1)]		In accordance with EU Directive on Simple Pressure Vessels

1) Additional information www.festo.com/sp ➔ Certificates.

Materials

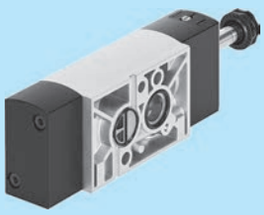
Type	VZS-20-B
Air reservoir	Powder-coated steel

Ordering data

Pneumatic connection	Volume [l]	Part no.	Type
G1	20 ±10%	**192161**	**VZS-20-B**

18 Process automation

- Electronic controllers and remote I/O
- Valve modules with electrical individual, multi-pin or fieldbus connections or integrated control
- Solenoid valves with interface as per NAMUR (VDI/VDE 3845)
- Electropneumatic positioners for quarter turn actuators
- Pneumatic linear actuators with integrated positioner
- Pneumatic quarter turn actuators
- Ball valves with pneumatic actuator
- Pneumatically or solenoid actuated media valves



VSNC ★

Solenoid valves, NAMUR

+ Certified in accordance with established explosion standards
+ Sturdy and capable of high flow rates

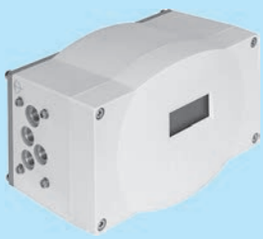
➔ page 1672

SRBC ★

Sensor boxes

+ Weatherproof aluminium housing
+ Cost-optimised, high-performance and reliable series

➔ page 1673



CMSX ★

Positioners

+ Very energy-efficient: no compressed air consumption at standstill
+ Ideally suited to dispensing applications

➔ page 1674

DFPD ★

Quarter turn actuators

+ Flange hole pattern to ISO 5211
+ Connection pattern to NAMUR for solenoid valves and sensor boxes to VDI/VDE 3845

➔ page 1675

VZXA

Angle seat valves

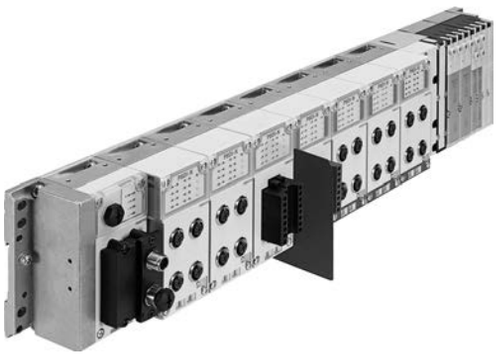
+ Highly flexible, extremely high flow rates
+ Hygienic design, insensitive to dirt

➔ page 1677

Contents

Product overview 1672
Solenoid valves VSNC 1672
Quarter turn actuators DFPD 1675
NEW Additional versions
Ball valves VZBM 1675
NEW Additional versions
Pinch valves VZQA 1679
NEW Additional versions

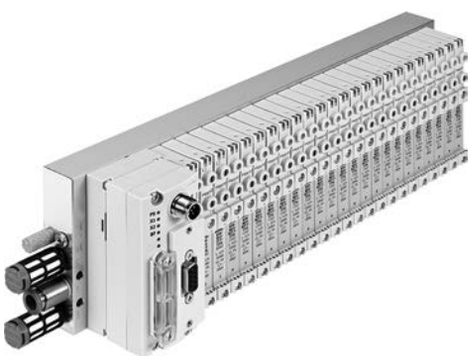
Control technology and remote I/O



- Electronic controllers and remote I/Os including electrical peripherals for standard and potentially explosives 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

Type	**Solenoid valves VSNC** ★	**Solenoid valves, to NAMUR (VDI/VDE 3845) NVF3**	**Solenoid valves VOFC**	**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-way 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, single solenoid, semi-automatic, 3/2-way, closed, single solenoid
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-5/16, QS-6, QS-8, QS-10, QS-1/4, QS-3/8	G1/4	G1/2, G1/4, NPT1/4-18, connection pattern to NAMUR	G1/4, M5, NPT1/4-18, connection pattern to NAMUR
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, EPL Db (IEC-EX), Ex ia IIC T6 Ga, EPL Ga (IEC-EX)	II 2G, II 2D, EPL Db (RU), EPL Dc (RU), EPL Gb (RU), c T6, EPL Gc (RU), c 40°C, c T70°C	II 2G, II 2D, for zone 1, 2, 21, 22, Ex ia IIIC T85°C,T125°C Db, EPL Db (IEC-EX), EPL Db (KR), Ex ia IIC T6, T5 Gb, EPL Gb (IEC-EX), EPL Gb (KR)	For zone 1, 2, 21, 22
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 • All solenoid coils can be used on an armature tube • The variant VSNC-...FN achieves increased energy efficiency thanks to reduced power consumption	• Connection pattern as per NAMUR for solenoid valves to VDI/VDE 3845 • Electrically actuated, piloted • Mechanical spring return • Explosion protection to ATEX	• Suitable for process automation, for applications in the chemical and petrochemical industries • Suitable for outdoor use under harsh ambient conditions • Especially suitable for quarter turn actuators thanks to flange pattern to NAMUR • 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 chemical and petrochemical plants • Suitable for outdoor use under harsh ambient conditions • Especially suitable for quarter turn actuators thanks to flange pattern to NAMUR • Variants with TÜV approval up to SIL4 to IEC 61508
➔ **Page/online**	**967**	**nvf3**	**vofc**	**vofd**

Sensor boxes

Type	Sensor boxes SRBC ★	Sensor boxes SRBG	Sensor boxes SRBE
Information on materials – housing	Die-cast aluminium	PBT	Die-cast aluminium
Operating voltage range AC	0 ... 250 V		0 ... 250 V
Operating voltage range DC	0 ... 175 V	6 ... 60 V	0 ...60 V
Measuring principle	Inductive, magnetic reed, mechanical/electrical, for proximity sensor	Inductive	Inductive, magnetic reed, mechanical/electrical, for proximity sensor
Switching element function	N/C contact, N/O contact, toggle switch, single-pole	N/C contact, N/O contact, N/C contact or N/O contact switchable	N/C contact, N/O contact, toggle switch, single-pole, double-pole
Description	• 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	• Compact housing with M12 plug connection • Direct mounting on quarter turn actuators to VDI/VDE 3845 • AS-Interface® version with extended addressing • Intrinsically safe version to ATEX and SIL 2 to IEC 61508	• 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
➔ Page/online	srbc	srbg	srbee

Sensor boxes

Type	Sensor boxes 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	• Round design • Drive interface to standard VDI/VDE 3845 (NAMUR) • With display
➔ Page/online	srap	dapz

Positioners

Type	Positioners CMSX ★
Standard nominal flow rate	50 ... 130 l/min
Ambient temperature	-5 ... 60 °C
Setpoint value	0 - 20 mA, 4 - 20 mA, 0 - 10 V
Operating voltage range DC	21.6 ... 26.4 V
Operating pressure	3 ... 8 bar
Safety information	Adjustable, opening, closing, holding
Degree of protection	IP65
Type of mounting	On flange ISO 5211, via accessories
Information on materials – housing	PC
Description	• Digital electropneumatic positioner for single-acting or double-acting pneumatic quarter turn actuators and double-acting pneumatic linear actuators • No air consumption in the controlled state
➔ Page/online	cmsx

Linear actuators

Type	Linear actuators with displacement encoder DFPI	Linear actuators with displacement encoder DFPI-NB3P	Linear actuators Copac 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
Stroke	40 ... 990 mm	40 ... 990 mm	40 ... 600 mm
Operating pressure	3 ... 8 bar	3 ... 8 bar	2 ... 8 bar
Ambient temperature	-20 ... 60 °C	-20 ... 80 °C	-20 ... 80 °C
Description	• Mounting interfaces for process valves to DIN 3358 • Integrated air supply • Optionally with integrated displacement encoder or fully integrated positioner • IP65, IP67, IP69K, NEMA4 • ATEX certification	• Mounting interfaces to ISO 15552 • Sturdy tie rod design • Optionally with integrated displacement encoder or fully integrated positioner • IP65, IP67, IP69K, NEMA4 • ATEX certification	• Mounting interfaces for process valves to DIN 3358 • Connection pattern as per NAMUR to VDI/VDE 3845 • Integrated air supply • ATEX certification
➔ Page/online	dfpi	dfpi	dlp

Quarter turn actuators

Type	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, 700, 900, 1200, 2300	0008, 0015, 0030, 0053, 0060, 0090, 0106, 0120, 0180, 0240, 0360, 0480, 0720, 0960, 1440, 1920, 2880, 3840, 4000, 5760, 8000
Flange hole pattern	F03, F04, F05, F14, F0507, F0710, F1012, F1216	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	• Additional versions	
Description	• Uniform torque characteristic across the entire rotation angle range of 90° with double-acting version • Process valve connection to ISO 5211 • Mounting hole pattern to VDI/VDE 3845 • Sturdy, non-slip and easy-to-clean aluminium housing • Long service life, low wear • Increased corrosion protection	• High breakaway 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
➔ Page/online	dfpd	daps

Ball valves and ball valve units

Type	Ball valves VZBD	Ball valves VZBE	Ball valves VZBF	NEW Ball valves VZBM
Design	2-way ball valve	2-way ball valve, 3-way ball valve with L-shaped hole or T-shaped hole	2-way ball valve	2-way ball valve, 3-way ball valve, L-shaped hole, quarter turn actuator, T-shaped hole
Actuation type	Mechanical	Mechanical	Mechanical	Mechanical, pneumatic
Nominal width DN	15, 20, 25, 32, 40, 50, 65, 80, 100	8, 10, 15, 20, 25, 32, 40, 50, 65, 80, 100	15, 20, 25, 32, 40, 50, 65, 80, 100, 150, 200	8, 10, 15, 20, 25, 32, 40, 50
Process valve connection				
Flow rate Kv	3.5 ... 436.3 m³/h	5 ... 435.2 m³/h	8.5 ... 2078.3 m³/h	5.9 ... 243 m³/h
Temperature of medium	–20 ... +200 °C	–20 ... +200 °C	–20 ... +200 °C	–20 ... +130 °C
Process valve nominal pressure	16	63	20	25, 40, 50
NEW				• Additional versions
Description	• Electropolished surfaces SFV4 • PTFE seal with little dead space • The powerful ball valve for the pharmaceutical and cosmetic industries • FDA-compliant seal to FDA 21 CFR 177.1550	• 2-way manual, optionally with lockable hand lever • 3-way, L-shaped or T-shaped hole, optionally with lockable hand lever • Stainless steel design • Pipe thread to ASME B1.20.1	• Flanged connections to ANSI B 16.5. class 150 • Static dissipation guaranteed • API 607 fire safe approval • Easy to maintain	• Brass design • Pipe thread to EN 10226-1
➔ Page/online	vzbd	vzbe	vzbf	vzbm

Ball valves and ball valve units

Type	Ball valves VAPB	Ball valves VZBC	Ball valve actuator units VZBC	Ball valves VZBA
Design	2-way ball valve	2-way ball valve	2-way ball valve, quarter turn actuator	2-way ball valve, 3-way ball valve, L-shaped hole, T-shaped hole
Actuation type	Mechanical	Mechanical	Pneumatic	Mechanical
Nominal width DN	15, 20, 25, 32, 40, 50, 63	15, 20, 25, 32, 40, 50, 65, 80, 100	15, 20, 25, 32, 40, 50, 65, 80, 100	8, 10, 15, 20, 25, 32, 40, 50, 65, 80, 100
Process valve connection	Rp1, Rp1 1/2, Rp1 1/4, Rp1/2, Rp1/4, Rp2, Rp2 1/2, Rp3/4, Rp3/8	Ring housing with threaded flange	Ring housing with threaded flange	Rp1/4, Rp3/8, Rp1/2, Rp3/4, Rp1, Rp1 1/4, Rp1 1/2, Rp2, Rp2 1/2, Rp3, Rp4, weld-on ends/weld-on ends
Flow rate Kv	5.9 ... 535 m³/h	19.4 ... 1414 m³/h	19.4 ... 1414 m³/h	7 ... 1414 m³/h
Temperature of medium	-20 ... 150 °C	-10 ... 200 °C	-10 ... 200 °C	-10 ... 200 °C
Process valve nominal pressure	25, 40	16, 40	16, 40	63
Description	• Automatable 2-way ball valve • Brass design • Blow-out proof shaft • Manual operation possible using hand lever • Connecting thread to EN 10226-1 • Mounting flange to ISO 5211	• Automatable 2-way ball valve with compact flange • Stainless steel design • Short installed length • Blow-out proof shaft • Manual operation possible using hand lever • Flange to DIN 1092-1 • Mounting flange according to ISO 5211 • Use in zone 1, 21, 2, 22	• Ball valve actuator unit with double-acting or single-acting quarter turn actuator • Stainless steel ball valve in compact design • Connection pattern as per NAMUR for solenoid valves/sensor boxes to VDI/VDE 3845 • Flow is fully opened or closed in both directions • Use in zone 1, 21, 2, 22	• Automatable 2-way or 3-way ball valve • Stainless steel design • Blow-out proof shaft • Manual operation possible using hand lever • Connecting thread to EN 10226-1 • Mounting flange to ISO 5211 • Use in zone 1, 21, 2, 22
➔ Page/online	vapb	vzbc	vzbc	vzba

Ball valves and ball valve units

Type	Ball valve actuator units VZBA	Ball valve actuator units VZPR	Ball valves QH
Design	2-way ball valve, 3-way ball valve, L-shaped hole, quarter turn actuator, T-shaped hole	2-way ball valve, quarter turn actuator	Ball valve
Actuation type	Pneumatic	Pneumatic, electric	Manual
Nominal width	8, 10, 15, 20, 25, 32, 40, 50, 65, 80, 100	15, 20, 25, 32, 40, 50, 63	10, 15, 20, 25, 40
Process valve connection	Rp1/4, Rp3/8, Rp1/2, Rp3/4, Rp1, Rp1 1/4, Rp1 1/2, Rp2, Rp2 1/2, Rp3, Rp4, welded ends/welded ends	Rp1/4, Rp3/8, Rp1/2, Rp3/4, Rp1, Rp1 1/4, Rp1 1/2, Rp2, Rp2 1/2	
Flow rate Kv	7 ... 1414 m³/h	5.9 ... 535 m³/h	
Temperature of medium	-10 ... 200 °C	-20 ... 150 °C	
Process valve nominal pressure			
Description	• Ball valve actuator unit with double-acting or single-acting quarter turn actuator • Stainless steel ball valve • Connection pattern as per NAMUR for solenoid valves/sensor boxes to VDI/VDE 3845 • Flow is fully opened or closed in both directions • Use in zone 1, 21, 2, 22	• Ball valve actuator unit with double-acting quarter turn actuator • Brass ball valve • Connection pattern as per NAMUR for solenoid valves/sensor boxes to VDI/VDE 3845 • Flow is fully opened or closed in both directions	• Shut-off valve, manually actuated • In-line installation • Female thread at both ends • With hand lever • Pipe thread to ISO 2281
➔ Page/online	vzba	vzpr	1021

Angle seat valves

Type	Angle seat valves VZXF ★	Angle seat valves VZXA
Actuator size		46 mm, 75 mm, 90 mm
Design	Poppet valve with piston drive	Poppet valve with piston drive, poppet valve with diaphragm actuator
Valve function	2/2-way, closed, monostable	2/2-way
Control function		Closed by reduced spring force, NC, double-acting, opened by spring force, NO, closed by spring force, NC
Actuation type	Pneumatic	Pneumatic
Nominal width DN	15, 20, 25, 32, 40, 50	1/2" ... 2", DN13 ... DN50
Nominal width	12 ... 45 mm	
Process valve connection	G1/2, G3/4, G1, G11/4, G11/2, G2	
Flow rate Kv	3.3 ... 43 m³/h	6 ... 68.5 m³/h
Medium pressure	-0.9 ... 40 bar	0 ... 30 bar
Temperature of medium	-40 ... 200 °C	–10 ... +180 °C
Process valve nominal pressure	16, 40	
Description	• Sturdy design • Stainless steel and gunmetal process valves with stainless steel, brass or aluminium actuators • 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	• Highly flexible, extremely high flow rates • Long service life • Modular design • Hygienic design, insensitive to dirt • Quick and easy maintenance • Simple and sturdy: ideally suited for virtually all media up to a viscosity of 600 mm2/s • High chemical and thermal resistance
➔ Page/online	vzxf	vzxa

Software tool

Configurator		Design a product with numerous features reliably and quickly with the help of the configurator. Select all the relevant 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.

Butterfly valves

Type	Butterfly valves KVZA
Description	• For versatile use in a wide range of industry segments • Butterfly valve with hand lever, with quarter turn actuator or with quarter turn actuator and positioner • Butterfly valve type wafer or lug • Nominal width DN25 ... DN200 • Connection standard DIN EN 1092-1 or ANSI CLASS 150
➔ Page/online	kvza

Solenoid-actuated media valves

Type	Solenoid valves VZWD ★	Solenoid valves VZWF ★	Solenoid valves VZWM-L ★
Design	Directly actuated poppet valve	Diaphragm valve, force pilot operated	Poppet valve with diaphragm seal
Actuation type	Electric	Electric	Electric
Nominal width	1 … 6 mm	13.5 … 50 mm	13 … 50 mm
Process valve connection	G1/8, G1/4, NPT1/8, NPT1/4	G1/4, G3/8, G1/2, G3/4, G1, G1 1/4, G1 1/2, G2 NPT1/4, NPT3/8, NPT1/2, NPT3/4, NPT1, NPT1 1/4, NPT1 1/2, NPT2	G1/4, G3/8, G1/2, G3/4, G1, G1 1/4, G1 1/2, G2
Flow rate Kv	0.06 … 430 l/min	1.8 … 29900 l/min	1.6 … 31000 l/min
Medium pressure	0 … 90 bar	0 … 10 bar	0.5 … 10 bar
Temperature of medium	-10 … 80 °C	-10 … 80 °C	-10 … 60 °C
Description	• Extensive pressure range • Directly actuated poppet valve • No pressure difference required • Can also be used in vacuum technology	• High flow rates • Large nominal widths with relatively small solenoids • No pressure difference required • Can also be used in vacuum technology	• Brass or stainless steel casting design • Electrical connection via solenoid armature tube • Wide range of coils • Coil can be ordered separately
➔ Page/online	vzwd	vzwf	vzwm

Solenoid-actuated media valves

Type	Solenoid valves MN1H-2	Solenoid valves VZWP	Reverse jet pulse valves VZWE-E, VZWE-F
Design	Diaphragm valve	Piloted piston poppet valve	Angled version, straight version with flange, diaphragm valve
Actuation type	Electric	Electric	Electric
Nominal width	13 … 40 mm	13 … 25 mm	20 … 76 mm
Process valve connection	G1/4, G3/8, G1/2, G3/4, G1, G1 1/2	G1/4, G3/8, G1/2, G3/4, G1 NPT1/4, NPT3/8, NPT1/2, NPT3/4, NPT1	Flange diameter 60, 75, 89, G1, G1 1/2, G2, G2 1/2, G3/4
Flow rate Kv	2000 … 30500 l/min	1.5 … 12250 l/min	15 … 210 m3/h
Medium pressure	0.5 … 10 bar	0.5 … 40 bar	0.35 … 8 bar
Temperature of medium	-10 … 60 °C	-10 … 80 °C	-20 … 60 °C
Description	• Pilot operated diaphragm valve • Brass design • Can only be used for gaseous media • Adjustable closing cushioning, in-line mounting or through-hole • Operating voltage 24 V DC, 110/230 V AC (50 … 60 Hz)	• 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 • For mechanically cleaning filters and dust filter systems • Fast opening and closing times • Sturdy pilot system
➔ Page/online	mn1h-2	vzwp	vzwe

Pneumatically actuated media valves

Type	NEW **Pinch valves** **VZQA**	 **Pneumatic valves** **VLX**
Design	Pneumatically actuated pinch valve	Diaphragm valve
Actuation type	Pneumatic	Pneumatic
Nominal size DN	6, 15, 25	
Nominal width		13 ... 25 mm
Process valve connection	G1/4, G1/2, G1, NPT1/4, NPT1/2, clamp to ASME-BPE type A/type B, clamp to DIN 32676 series A	G1/4, G3/8, G1/2, G3/4, G1
Flow rate Kv	0.7 ... 18 m^3/h	
Standard nominal flow rate		2400 ... 14000 l/min
Medium pressure	0 ... 6 bar	1 ... 10 bar
Temperature of medium	-5 ... 150 °C	–10 ... 80 °C
NEW	• Additional versions	
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
➔ Page/online	**vzqa**	**vlx**

Compressed air preparation

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

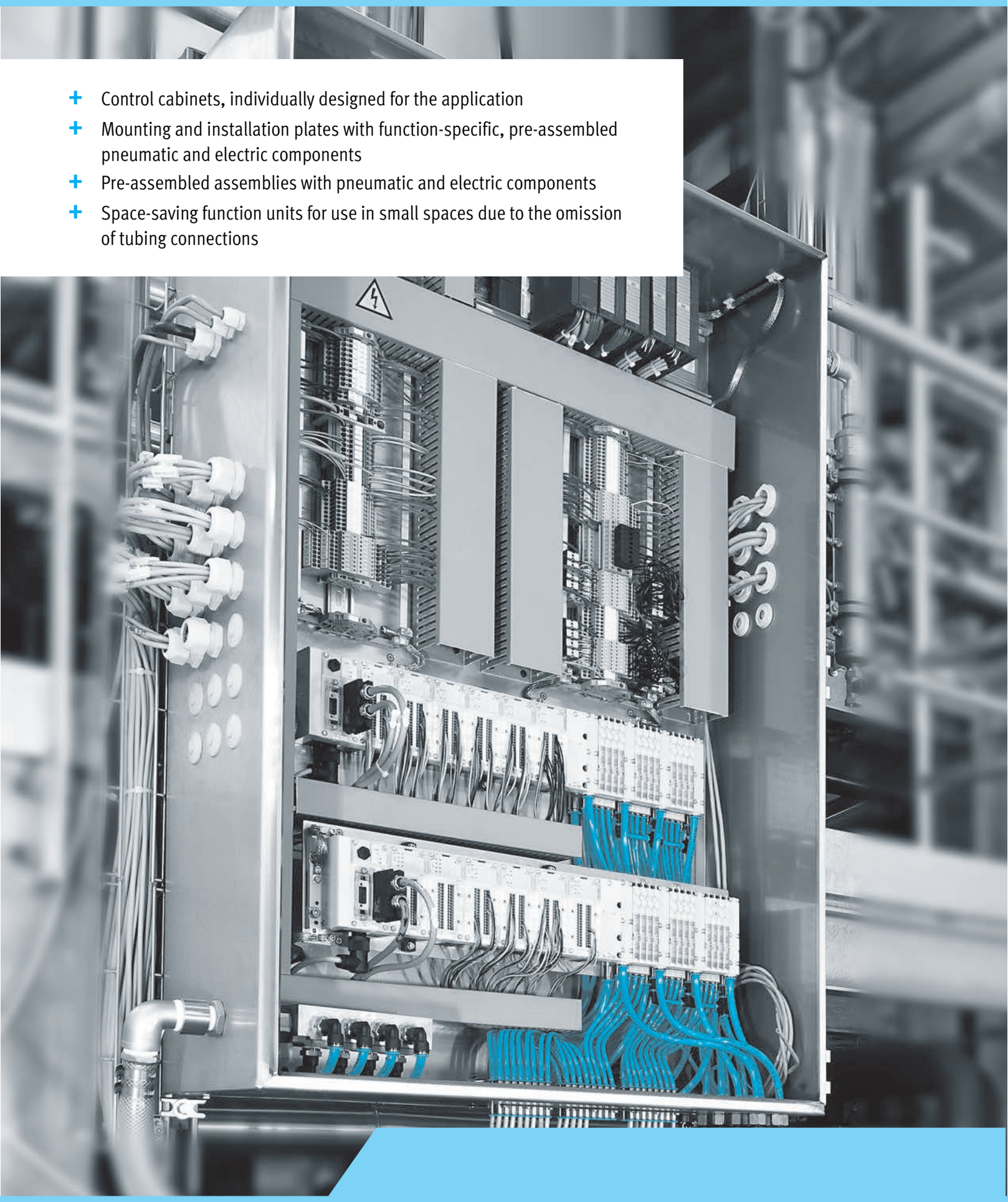
➔ **www.festo.com/pa/airprep**

Pneumatic connection technology

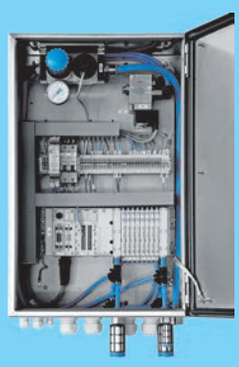
- Pipes
- Tubing
- Plug connectors
- Couplings
- Distributors
- Protective tubing systems
- Accessories

➔ **www.festo.com/pa/fittings**

19 Ready-to-install solutions



- Control cabinets, individually designed for the application
- Mounting and installation plates with function-specific, pre-assembled pneumatic and electric components
- Pre-assembled assemblies with pneumatic and electric components
- Space-saving function units for use in small spaces due to the omission of tubing connections



Control cabinets

+ Factory automation
+ Process automation
+ Control of handling systems

➔ page 1686

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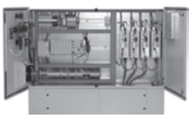
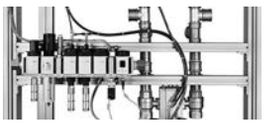
Ready-to-install solutions – the benefits to you 1685
Control cabinets 1686
Mounting and installation plates 1690
Assemblies 1692
Cartridge solutions 1694
Sheet-metal structures and special housings 1696
Function blocks 1698
Profile solutions 1700

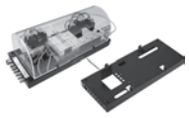
Control cabinets

Type	Factory automation	Process automation	Control cabinets for handling systems
			
Technical data	• Simple to complex control cabinet designs • Application-specific combination of components • Fully tested, with test certificate • Ready to install • Complete documentation • Design conforms to: – EN 60204-1 – ATEX zone 1 and 21 (pneumatic only), ATEX zone 2 and 22 (electric and electro-pneumatic) – UL-508A • Implementation of safety functions • Different bus technologies	• Simple to complex control cabinet designs • Application-specific combination of components • Different operating voltages possible • 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 electro-pneumatic) – UL-508A • Implementation of safety functions • Wide range of bus technologies • Compliance with special cleanliness and hygiene requirements • Special materials • Protected against the ingress of liquids and foreign matter • Heating or cooling elements • Intrinsically safe valve terminal technology • Hot swap inspection window	• Simple to complex control cabinet designs • Control of motion sequences with up to 6 axes • Application-specific combination of components • Use of the latest innovations and technologies • Fully tested, with test certificate • Ready to install • Complete documentation • Design conforms to: – EN 60204-1 – ATEX zone 1 and 21 (pneumatic only), ATEX zone 2 and 22 (electric and electro-pneumatic) – UL-508A • Implementation of safety functions • Wide range of bus technologies • Function modules for motion applications • Host modules for easy connection to the customer's control environment
Description	• Made-to-measure control cabinets • Pneumatic, electric, combined • Individually configured • Adapted to requirements in industrial automation • Design and sizing included	• Made-to-measure control cabinets • Pneumatic, electric, combined • Individually configured • Adapted to requirements in process automation • Design and sizing included	• Made-to-measure control cabinets for handling systems • Software package for third-party devices included • Individually configurable • Adapted to requirements for handling solutions ➔Chapter 6 "Handling systems", page 830
➔ Page/online	**1686**	**1688**	**1689**

Mounting and installation plates

			
Type	**Mounting plates**	**Hall installation plates (HIP) for body assembly**	**Robot installation plates (RIP) for body assembly**
Technical data	• Customised support plate shape • Support plate 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 electro-pneumatic) – UL-508A • Implementation of safety functions	• Media supply for compressed air and cooling water for welding cells • Made to measure: profile as support element, design perfectly adapted to the installation space, for installation within safety barriers • Labelling: customised labelling for safe operation • Fast installation: thanks to assembly according to the customer's specification • Medium water: fittings for liquid media	• Media supply for compressed air and cooling water for welding robots • Protection against ambient conditions through the use of special materials, such as hoses and fittings resistant to welding spatter • Protection against environmental influences to prevent damage to the installation • Made to measure: profile as support element, design perfectly adapted to the installation space • Cooling water suction cylinder for drawing in cooling water when changing welding caps • Water flow sensor: measures flow rate, volume and cooling water temperature – to monitor the welding process • Easy to maintain thanks to removable fittings
Description	• Machine-specific pre-assembly of pneumatic and electric components on support plate • Tubing and wiring included • Defined interfaces for simple installation directly in the system	• Controls and monitors the compressed air and cooling water supply for whole welding cells	• Controls and monitors the compressed air and cooling water supply for individual welding guns
➔ Page/online	**1690**	**www.festo.com/sp/hip**	**www.festo.com/sp/rip**

Assemblies

Type	Assemblies	Cartridge solutions	Sheet-metal structures and special housings
			
Technical data	• Combination of a wide range of pneumatic and/or electric components into one unit • Application-specific combination of components • Accessories mounted on the sub-assemblies • 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 electro-pneumatic) – UL-508A • Implementation of safety functions	• Space saving thanks to extremely compact design • Pneumatic functions integrated in a single compact housing • Housing available in different materials • No tubing required • Minimal cabling required • Significant design freedom • Flexible integration options on and within the machine • Sturdy design • Fully tested • Ready to install • Complete documentation	• Sheet-metal structures – Customised shape and size – Reduced weight and number of assembly parts • Special housing – Customised shape – Customised dimensions – Different materials – Compact, space-saving format – Protection against environmental influences and unauthorised access • In combination – Alternative to conventional control cabinets – Variable integration options on and within the machine – Short tubing and cable lengths – Attractive design
Description	• Pneumatic and electric components pre-assembled to create a function unit • Can be combined from around 30,000 catalogue components • Connections included • For integration in machines	• Integration of various pneumatic functions in one component • No need for individual housings • Ideal for applications that require a highly compact design	• Reduced weight thanks to optimal use of materials with sheet-metal structures • Protection against environmental influences and unauthorised access in the special housing • Ideally combined as a control cabinet directly in the system
➔ Page/online	**1692**	**1694**	**1696**

Assemblies

Type	Function blocks	Profile solutions
Technical data	• No tubing required thanks to drilled ducts • Housing available in different materials • Customised design of the pneumatic interfaces for the system • Ideal for a small number of components and variable connection options • Extremely economical, even for small quantities	• Profiles in customised cross sections and lengths • Integrated ducts for straight-line routing of the compressed air • Common air supply for multiple valves or valve terminals via a single duct • Combination of exhaust air and supply air without tubing, even over long distances • Supply of compressed air at different locations • No tubing required • Significantly reduced cabling • Modular structure easy to achieve • Optional: profile as mechanical mounting element for other components or as a supporting part of the machine frame
Description	• Compressed air supply for pneumatic components via drilled ducts • Ideal for small number of pneumatic components and variable connection options • Compact and easy to service	• Extruded profiles in combination with valves as a valve terminal • For the distribution of compressed air in the machine concept • Customised profile cross sections available
➔ Page/online	**1698**	**1700**

Ready-to-install solutions – the benefits to you at a glance

Modernise
The benefit to you:
- State-of-the-art technology
- Easy to service and clear layout
- Energy efficiency as standard

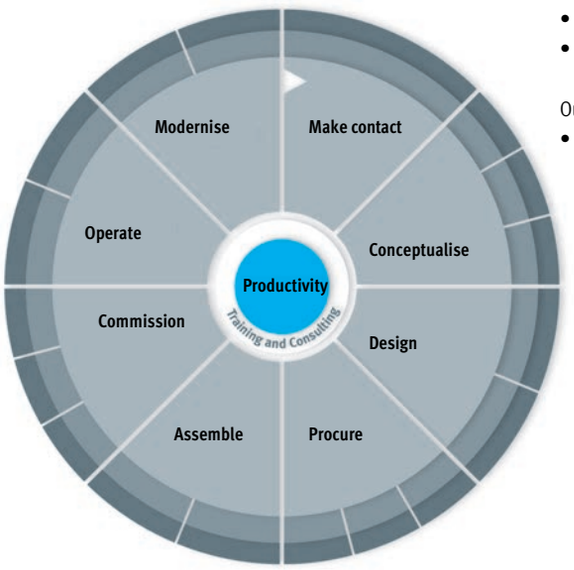
Our service:
- Compressed air cost calculator
- Energy Saving Services

Make contact
The benefit to you:
- Systematic support right from the start
- Expert know-how included

Our service:
- Personal advice in 59 countries
- Pneumatic, servo-pneumatic, electric and mechatronic technologies
- Application- and industry-specific

Operate
The benefit to you:
- Complete documentation, quickly integrated into overall documentation

Our service:
- Detailed system documentation in the end customers' national language
  - Assembly drawing
  - Parts list
  - Circuit diagrams
  - Operating instructions for components



Conceptualise
The benefit to you:
- Consideration of application-specific requirements
- Detailed quotation with engineering concept
- Specific automation expertise for different industry segments

Our service:
- Quotation includes
  - 2D/3D concept
  - Detailed parts list
  - Functional sequence

Commission
The benefit to you:
- Minimal assembly and installation effort with Festo plug and work
  - Straightforward assembly principles
  - Defined interfaces
  - Teach-in or parameterisation functions

Our service:
- Commissioning service

Design
The benefit to you:
- No engineering effort required
- Individually tailored solutions based on application-specific requirements
- Solution based on the latest technological standards

Our service:
- Full engineering
  - Technology and component selection
  - Sizing of solutions
  - CAD design (2D/3D)
  - Circuit diagram creation
  - Simulation
  - Programming

Assemble
The benefit to you:
- Reduced manufacturing involvement as no in-house machining or pre-assembly is required
- Maximum reliability with regard to function and quality
- Expertise on standards and directives included

Our service:
- Application-specific machining
- Assembly of all individual components
- Installation of third-party components possible
- Complete tubing and wiring
- Full functional and leak testing
- Test certificate
- Certifications, e.g. EN60204-1, ATEX, UL-508A

Procure
The benefit to you:
- Reduced costs thanks to single sourcing
- Easy order processing and minimal logistical effort with just one order item for the entire solution
- One delivery date

Our service:
- Procurement of all components and foreign parts
- Delivery of a ready-to-install system

Factory automation

- Control cabinets made to measure
- Individually configured
- Adapted to requirements in industrial automation
- Design and sizing included

Festo made-to-measure control cabinets provide protection for all pneumatic, electric and electronic system components.

The control cabinets are individually designed and built for the application, taking into account specific industry requirements such as those in the food or automotive industries, for example.

The design is also influenced by local conditions such as weather and climate. Along with Festo components, third-party components are integrated into the control cabinets as required.

The operationally tested system is delivered ready to install – directly to where it will be used, if requested.

Technical data

- Simple to complex control cabinet designs
  - Pneumatic
  - Electric
  - Combined
- 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-508A
- Implementation of safety functions

- Different bus technologies:
  - PROFIBUS
  - PROFIBUS DP
  - PROFIBUS PA
  - PROFIBUS FMS
  - PROFINET
  - INTERBUS
  - EtherCAT
  - CANopen
  - MODBUS
  - DeviceNet
  - EtherNet/IP
  - CC-Link
  - AS-Interface

Ready-to-install – the benefits to you

Ordering
Just one order number for the entire control cabinet.

Engineering
Complete engineering solution according to your application-specific requirements by Festo specialists.

Production and assembly
The entire production and assembly process is taken care of for you.

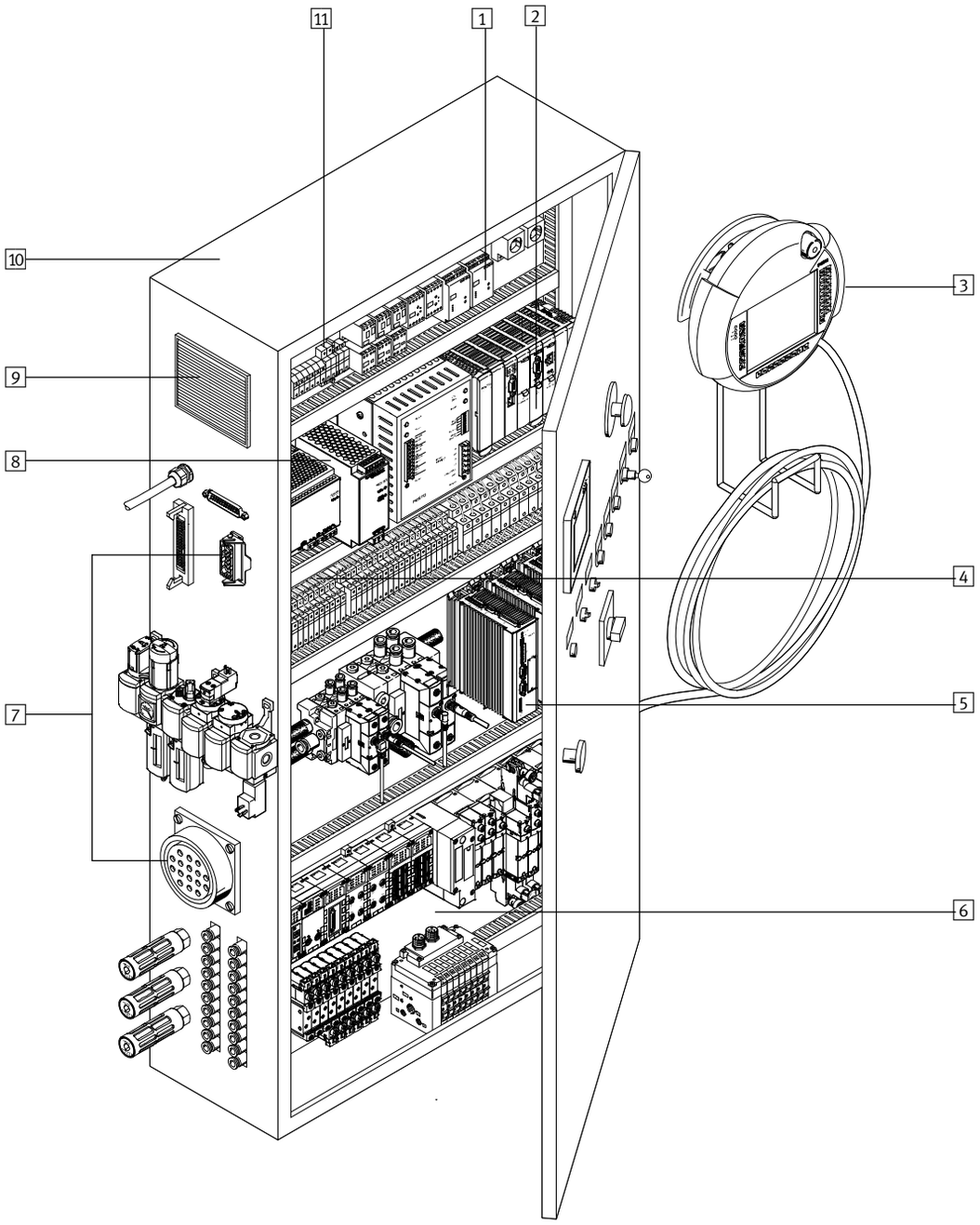
Checking and testing
The control cabinet is fully tested.

Documentation
You receive detailed system documentation, which you can quickly and easily integrate into your overall documentation:
- Assembly drawing
- Parts list
- Circuit diagrams (EPLAN/Promis)
- Operating instructions for components

Interested in control cabinets for factory automation?

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

Or visit your local website at www.festo.com, where you will find further information on ready-to-install solutions.



1 Power supply
- 24 V DC, to 20 A
- 48 V DC
- Single-phase/three-phase
- Plug sockets

2 Control system
- CMXR, CECX, FED, CPX
- Robot control system
- Third-party control systems
- Up to 6 axes
- Safety relay

3 Operator units
- Mobile: MMI, CDSA
- Integration in the control cabinet: emergency off, key actuator, control elements

4 Wiring/tubing
- Number of wires
- Cross section
- Cable harness/individual cables
- Cable inscription
- Tubing diameter
- Tubing colour/material
- Tubing designation

5 Controller
- Servo motor
- Stepper motor
- DC motor

6 Pneumatics
- Valves/valve terminals
- Compressed air preparation
- Pressure regulators
- Sensors
- Servo-pneumatics

7 Outputs
- Pneumatic, electric
- Multi-pin interfaces

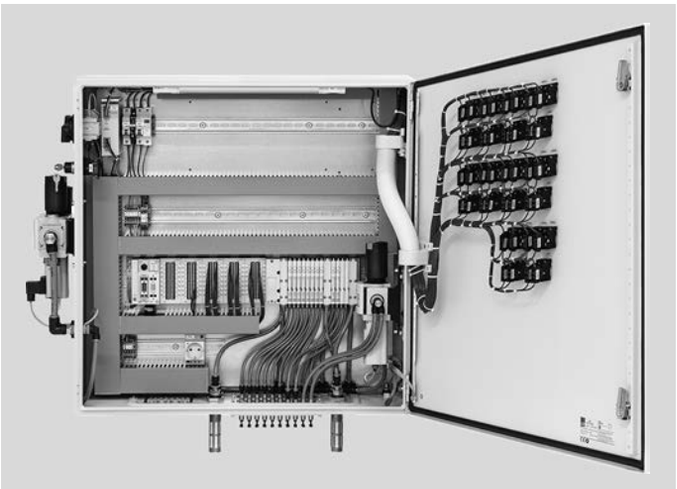
8 Power supply unit
- Converts AC voltage/frequency
- Speed regulation

9 Cooling/heating
- Active
- Passive

10 Housing
- Sheet steel/stainless steel/aluminium/polymer
- Standard sizes
- Special sizes
- Illuminated
- Control cabinet colour RAL 7035 or special colour
- Labels

11 Fuses
- Fuse
- Circuit breaker

Process automation



- Control cabinets made to measure
- Individually configured
- Adapted to requirements in process automation
- Design and sizing included

Festo made-to-measure control cabinets provide protection for all pneumatic, electric and electronic system components.

The control cabinets are individually designed and built for the application, taking into account specific requirements in process automation. The design is also influenced by local conditions such as weather and climate as well as compliance with hygiene criteria or degrees of protection.
Along with Festo components, third-party components are integrated into the control cabinets as required.
The operationally tested system is delivered ready to install – directly to where it will be used, if requested.

Technical data

- Simple to complex control cabinet designs
  - Pneumatic
  - Electric
  - Combined
- Application-specific combination of components
- Different operating voltages possible
- 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-508A
- Implementation of safety functions
- Wide range of bus technologies
- Compliance with special cleanliness and hygiene requirements
- Special materials, e.g. stainless steel, for use in virtually all ambient conditions
- Protected against the ingress of liquids and foreign matter
- Installation of heating or cooling elements
- Intrinsically safe valve terminal technology
- Replacement of individual terminal valves during operation (hot swap)
- Installation of inspection windows
- Control elements on the outside
- Safe thanks to key lock system on the service unit: to switch off, all employees responsible must remove their lock

Ready-to-install – the benefits to you

Ordering
Just one order number for the entire control cabinet.

Engineering
Complete engineering solution according to your application-specific requirements by Festo specialists.

Production and assembly
The entire production and assembly process is taken care of for you.

Checking and testing
The control cabinet is fully tested.

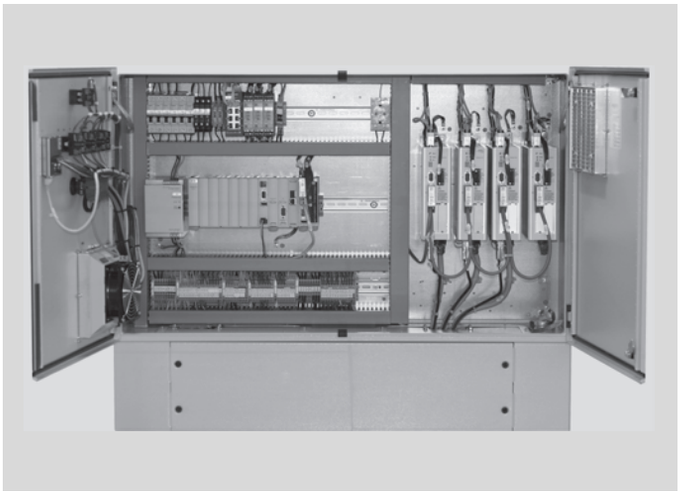
Documentation
You receive detailed system documentation, which you can quickly and easily integrate into your overall documentation:
- Assembly drawing
- Parts list
- Circuit diagrams (EPLAN/Promis)
- Operating instructions for components

Interested in control cabinets for process automation?

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

Or visit your local website at www.festo.com, where you will find further information on ready-to-install solutions.

Control cabinets for handling systems



- Control cabinets made to measure for controlling handling systems
- Software package for third-party devices included
- Individually configurable
- Adapted to requirements for handling solutions
  ➔ Chapter 6 "Handling systems", page 830

Festo made-to-measure control cabinets for controllers provide protection for control components for single-axis and multi-axis systems, from solutions involving simple control tasks to the complex control of highly dynamic movements, such as with the parallel kinematic system.
The control cabinets are individually designed and built for the application, taking into account specific industry requirements such as those in the food or pharmaceuticals industries, for example.
Festo can also integrate third-party components, including software packages, as required. The operationally tested system is delivered ready to install – directly to where it will be used, if requested.

Technical data

- Simple to complex control cabinet designs
- Control of motion sequences with up to 6 axes
- Application-specific combination of components
- Use of the latest innovations and technologies
- Fully tested, with test certificate
- Ready to install
- Complete documentation
- Design conforms to:
  - EN 60204-1
  - ATEX zone 1 and 21 (pneumatic only), ATEX zone 2 and 22 (electric and electropneumatic)
  - UL-508A
- Implementation of safety functions
- Wide range of bus technologies
- Function modules for motion applications
- Host modules for easy connection to the customer's control environment

Ready-to-install – the benefits to you

Everything from a single source
Handling system and control cabinet perfectly co-ordinated.

Ordering
Just one order number for the entire control cabinet.

Engineering
Complete engineering solution according to your application-specific requirements by Festo specialists.

Production and assembly
The entire production and assembly process is taken care of for you.

Checking and testing
The control cabinet is fully tested.

Documentation
You receive detailed system documentation, which you can quickly and easily integrate into your overall documentation:
- Assembly drawing
- Parts list
- Circuit diagrams (EPLAN/Promis)
- Operating instructions for components

Interested in cabinets for control systems?

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

Or visit your local website at www.festo.com, where you will find further information on ready-to-install solutions.

Mounting plates

- Machine-specific pre-assembly of pneumatic and electric components on a support plate
- Tubing and wiring included
- Defined interfaces for simple installation directly in the system

Festo mounting plates are used for the function-specific pre-assembly of pneumatic and electric components. They support the individual components and are integrated directly into the system concept.

Each mounting plate has a customised design based on the respective application and with a customised combination of components. In addition to Festo components, third-party components can be integrated as required.
The mounting plate is supplied ready to install – fully connected and tested. It can be installed directly in the machine. Suitable mounting attachments are already fitted to or integrated into the support plate. The pneumatic and electric connections are also provided. These simply have to be connected to the machine.

Technical data

- Customised support plate shape
- For a wide range of industrial applications
- Support plate available in different materials, e.g. sheet steel, stainless steel, etc.
- Application-specific combination of components
- Fully assembled, connected and wired
- Defined interfaces
- Use of the latest innovations and technologies
- Ready to install:
  all the steps from engineering through to assembly and right up to quality inspection are carried out by Festo specialists
- 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-508A
- Implementation of safety functions

Ready-to-install – the benefits to you

Ordering
Just one order number for the entire solution.

Engineering
Complete engineering solution according to your application-specific requirements by Festo specialists.

Production and assembly
The mounting plate is ready to install. The entire assembly process, including wiring and connection, is thus taken care of for you.

Documentation
You receive detailed system documentation, which you can quickly and easily integrate into your overall documentation:
- Assembly drawing
- Parts list
- Circuit diagrams
- Operating instructions for components

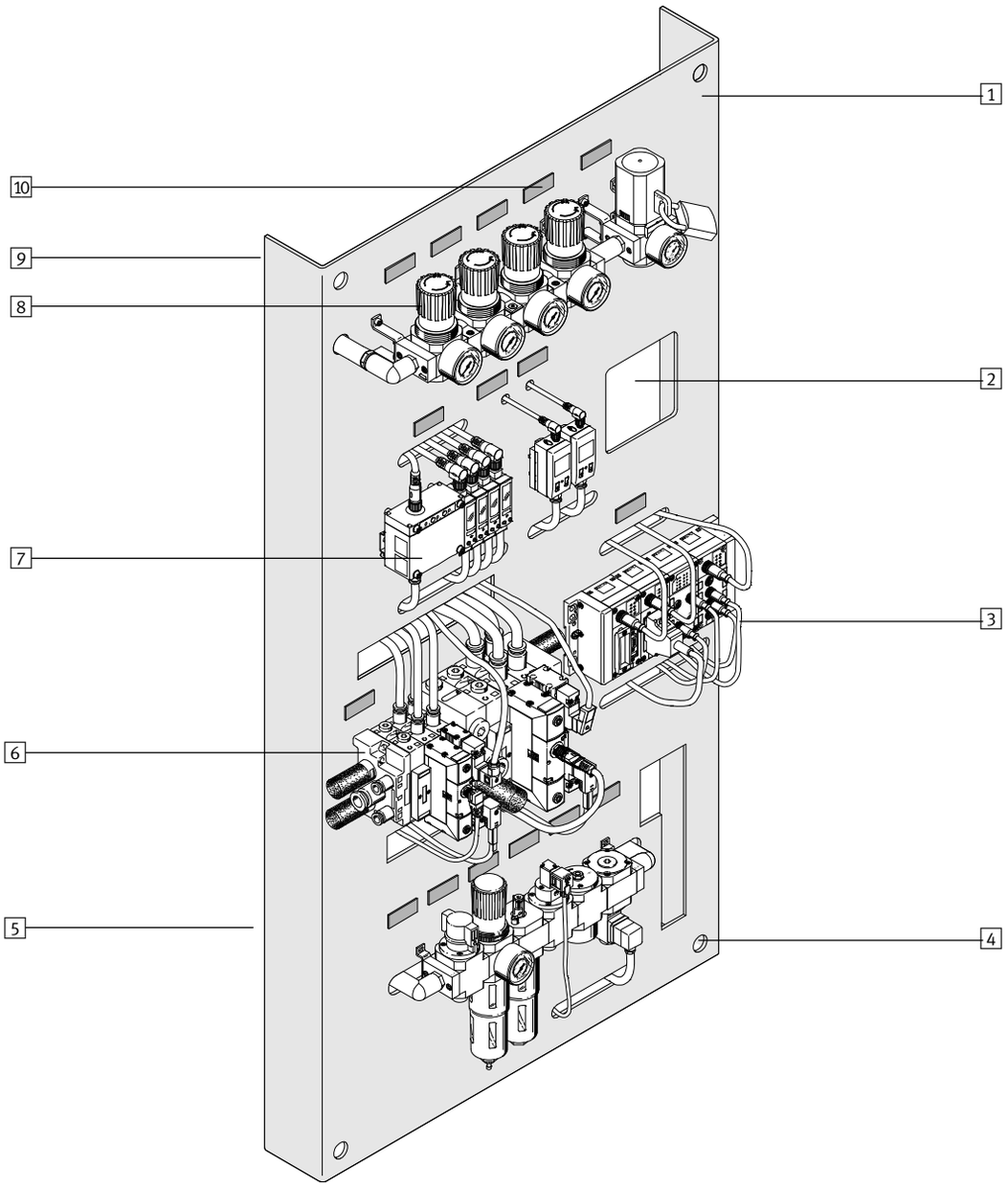
Interested in mounting plates?

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

Or visit your local website at www.festo.com,

where you will find further information on ready-to-install solutions.

Mounting plates



1 Support plate
- Sheet steel/stainless steel/aluminium/polymer
- Individually adapted shape and size
- Plate is integrated directly into the machine concept as a supporting component
- Label

2 Cut-outs
- For tubing
- For connections
- etc.

3 Wiring/tubing
- Number of wires
- Cross section
- Cable harness/individual cables
- Cable inscription

4 Mounting options
- For mounting in the system

5 Electrical installation
- Implementation of electrical circuit diagrams in a solution (not shown)

6 Valves and valve terminals

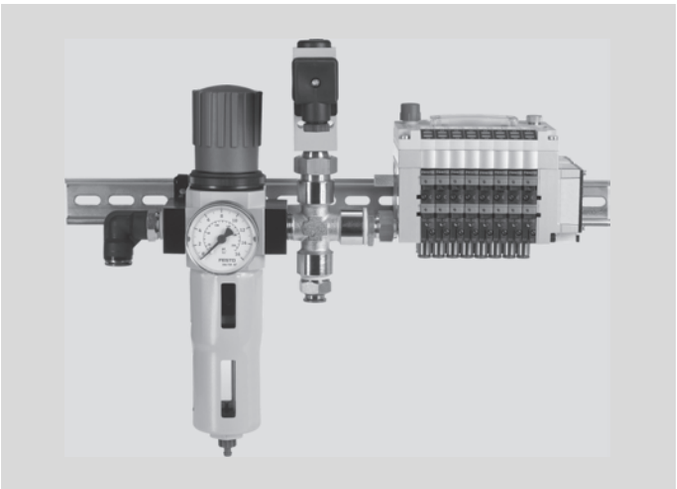
7 Sensors
- Pressure
- Flow rate
- Position

8 Compressed air preparation
- MS series
- D series
- Customised configuration of modules

9 Defined interfaces for the machine
- Tubing/cables in specified length
- Customised coupling
- etc.

10 Customised inscriptions

Assemblies



- Pneumatic and electric components pre-assembled to create a function unit
- Can be combined from around 30,000 catalogue components
- Connections included
- For integration in machines

The product range from Festo comprises about 30,000 individual components, which can be pre-assembled to form a functional module. Accessories such as fittings and connections can also be assembled on the unit. The assembly can thus be installed directly in the system or in the higher-level system as a ready-to-install subsystem.

An assembly can be made up of a wide range of components. Typical combinations include:

- Cylinder/valve combinations
- Components for compressed air preparation combined with valves
- Valve blocks

Third-party components can be integrated and the assembly can be mounted on a plate as required.

A complete functional test of the entire unit is carried out after completion. The assembly is supplied ready to install.

Technical data

- Combination of various pneumatic and/or electric components to create a single unit
- For a wide range of industrial applications
- Application-specific combination of components
- Optional: accessories mounted on sub-assemblies
- Use of the latest innovations and technologies
- Ready to install: all the steps from engineering through to assembly and right up to quality inspection are carried out by Festo specialists
- 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-508A
- Implementation of safety functions

Ready-to-install – the benefits to you

Ordering
Just one order number for the entire solution.

Production and assembly
The entire production and assembly process, including wiring and connection, is taken care of for you. Connections to the system can be pre-installed on the assembly if required.

Checking and testing
The assembly is fully tested.

Documentation
You receive detailed system documentation, which you can quickly and easily integrate into your overall documentation:
- Assembly drawing
- Parts list
- Circuit diagrams
- Operating instructions for components

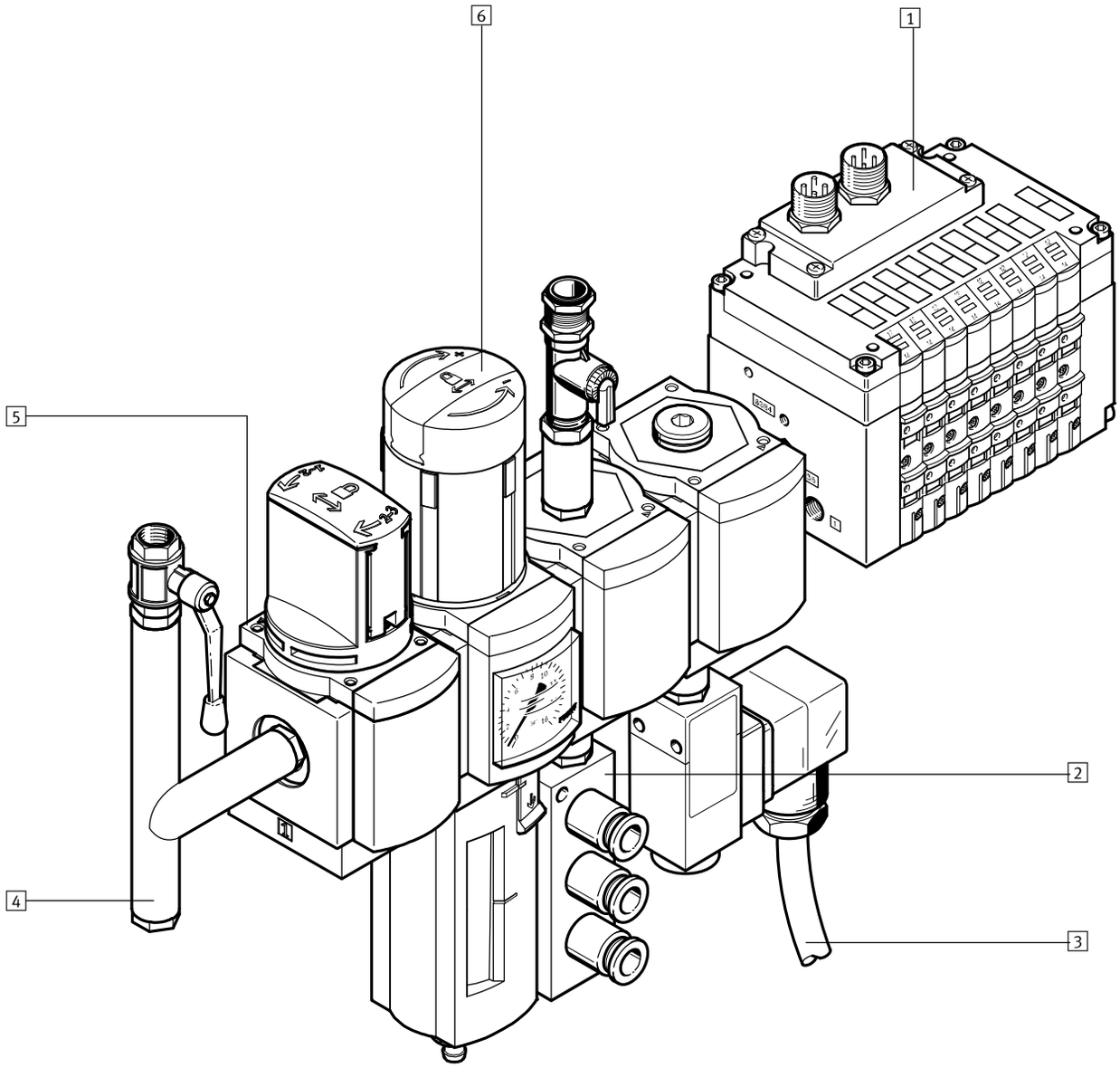
Interested in assemblies?

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

Or visit your local website at www.festo.com,

where you will find further information on ready-to-install solutions.

Assemblies



1 Valves and valve terminals
2 Other pneumatic components
- Cylinders
- Pressure regulators
- Pressure gauges
- Third-party components
- Connections
- Sensors
- Servopneumatics
- etc.

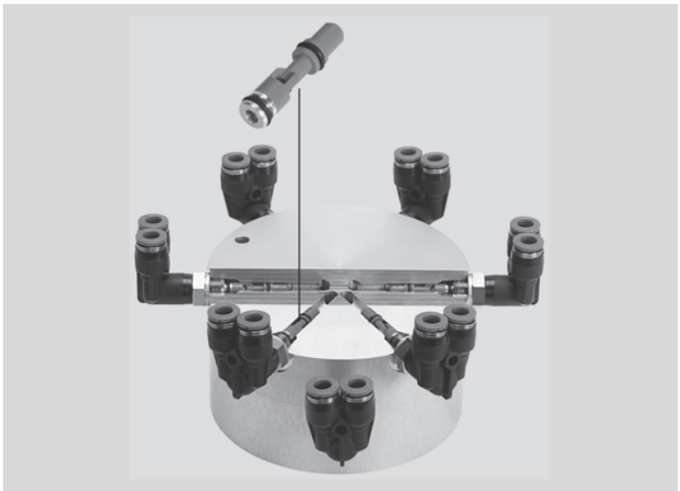
3 Tubing, wiring and piping
- Number of wires
- Cross section
- Cable harness/individual cables
- Cable inscription

4 Outputs
- Pneumatic
- Electric
- Multi-pin interfaces

5 Mounting options
- For mounting in the system

6 Compressed air preparation
- MS series
- D series
- Customised configuration of modules

Cartridge solutions



- Integration of various pneumatic functions in one component
- No need for individual housings
- Ideal for applications that require a highly compact design

Cartridge solutions integrate one or more pneumatic functions in a closed unit. There is no need for individual housings, as the "insides" of the parts are housed in the component itself.
Festo cartridge solutions are used wherever an extremely compact design and component protection are required – with just a small number of pneumatic functions.
Functionality provided by standard technology, such as directional control valves or flow control valves, is fully integrated into the housing, thus reducing the required installation space.
The housing has a customised design based on specific application requirements, which means that the cartridge solution can be attached or installed just about anywhere on the machine.

Technical data

- Space-saving thanks to extremely compact design
- Pneumatic functions integrated in a single compact housing, e.g.
  - Directional control valves
  - Flow control valves
  - Check valves
  - Vacuum generators
  - Pressure regulators
  - Pneumatic logic functions
- Housing available in different materials
- No tubing required
- Minimal cabling required
- Significant design freedom
- Variable integration options on and within the machine
- Sturdy design thanks to protected installed parts and smooth surfaces
- Fully tested
- Ready to install
- Complete documentation

Ready-to-install – the benefits to you

Engineering
Complete engineering solution according to your application-specific requirements by Festo specialists.

Production and assembly
The entire production and assembly process is taken care of for you.

Checking and testing
The solution is fully tested.

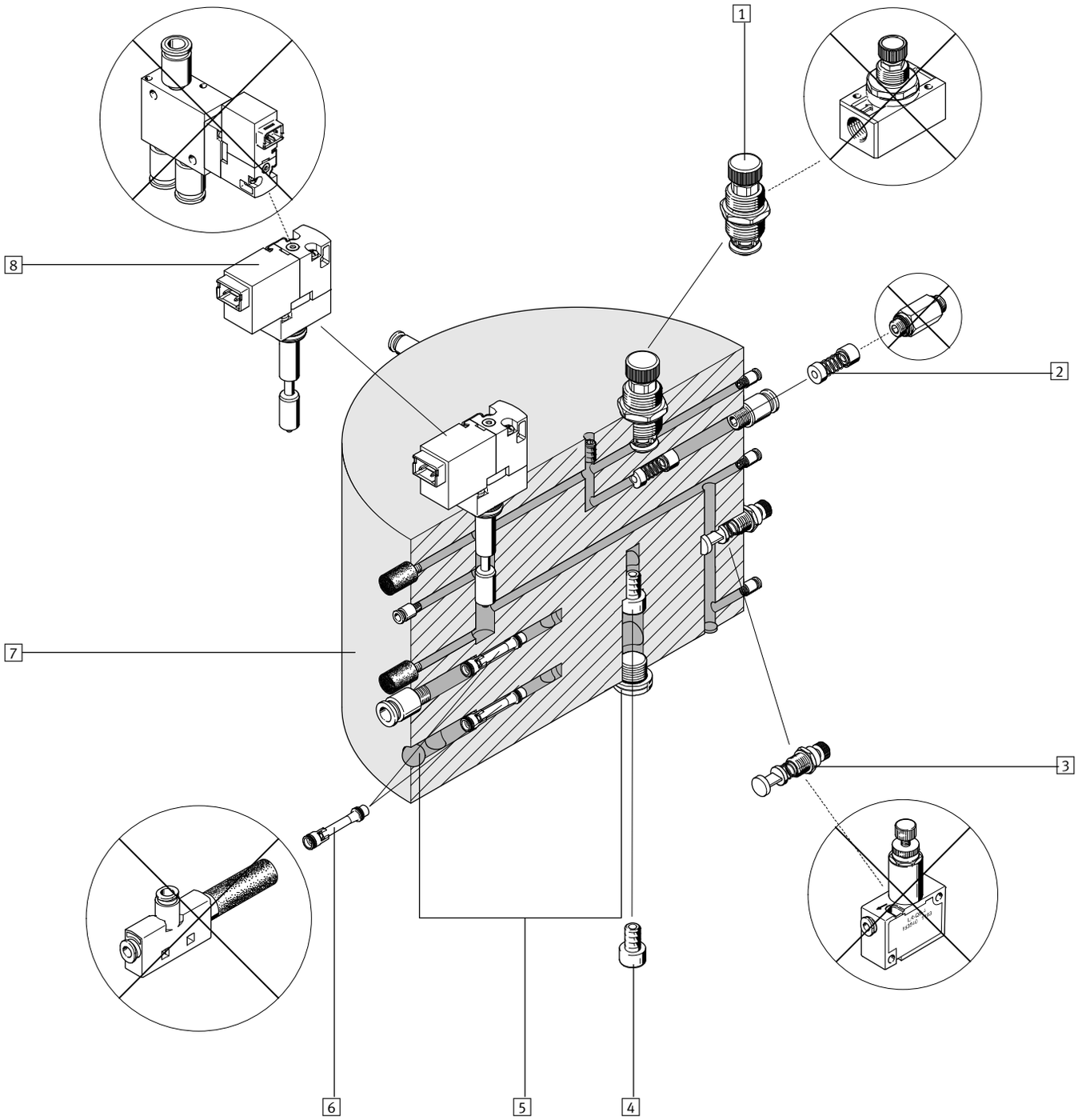
Documentation
You receive detailed system documentation, which you can quickly and easily integrate into your overall documentation.

Interested in cartridge solutions?

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

Or visit your local website at www.festo.com,
where you will find further information on ready-to-install solutions.

Cartridge solutions



1 Flow control valve
- Integrated

2 Check valve
- Integrated

3 Pressure regulator
- Integrated

4 Fixed restrictor
- Screw-in

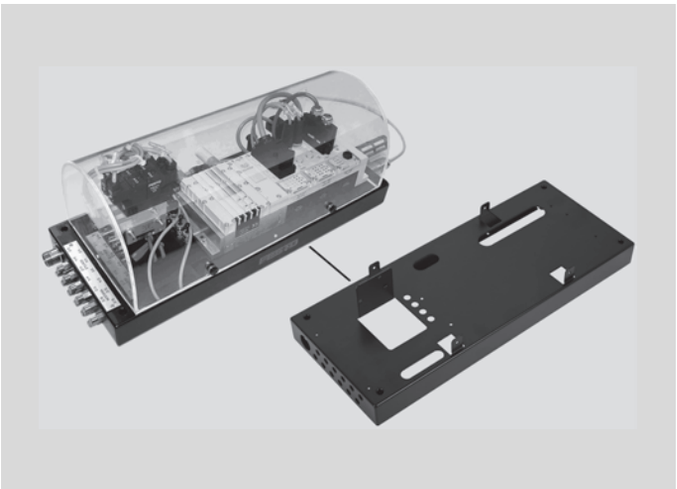
5 Sealing of holes

6 Vacuum generator
- Integrated
- Various sizes

7 Housing
- Aluminium
- Brass
- Steel
- POM
- PEEK
- PA
- etc.

8 Valve
- Integrated

Sheet-metal structures and special housings



- Reduced weight thanks to optimal use of materials with sheet-metal structures
- Protection against environmental influences and unauthorised access
- Ideally combined as a control cabinet directly in the system

A sheet-metal structure acts as a support for pneumatic and electric components. The well thought-out design makes it possible to get the most out of the material used. Upright steel parts perform the function of mounting brackets in this case. This means fewer components and reduced weight, making the entire system into a compact unit.
Special housings protect electric and pneumatic components against environmental influences and unauthorised access. They also lend applications a more attractive appearance. They are developed for specific applications in a space-saving design.
When combined, sheet-metal structures and special housings produce a small control cabinet which can be fitted directly in or on the application. The resulting short tubing and cable lengths significantly shorten the switching times.

Technical data

- Sheet-metal structures
  - Customised shape and size
  - Reduced weight and number of assembly parts
- Special housing
  - Customised shape (flat, curved, rectangular, etc.)
  - Customised dimensions
  - Different materials (metal, aluminium, polymer, etc.)
  - Compact, space-saving format
  - Protection against environmental influences and unauthorised access
- In combination
  - Alternative to conventional control cabinets
  - Variable integration options on and within the machine
  - Short tubing and cable lengths
  - Attractive design

Ready-to-install – the benefits to you

Engineering
Complete engineering solution according to your application-specific requirements by Festo specialists.

Production and assembly
The entire production and assembly process is taken care of for you.

Checking and testing
The solution is fully tested.

Documentation
You receive detailed system documentation, which you can quickly and easily integrate into your overall documentation.

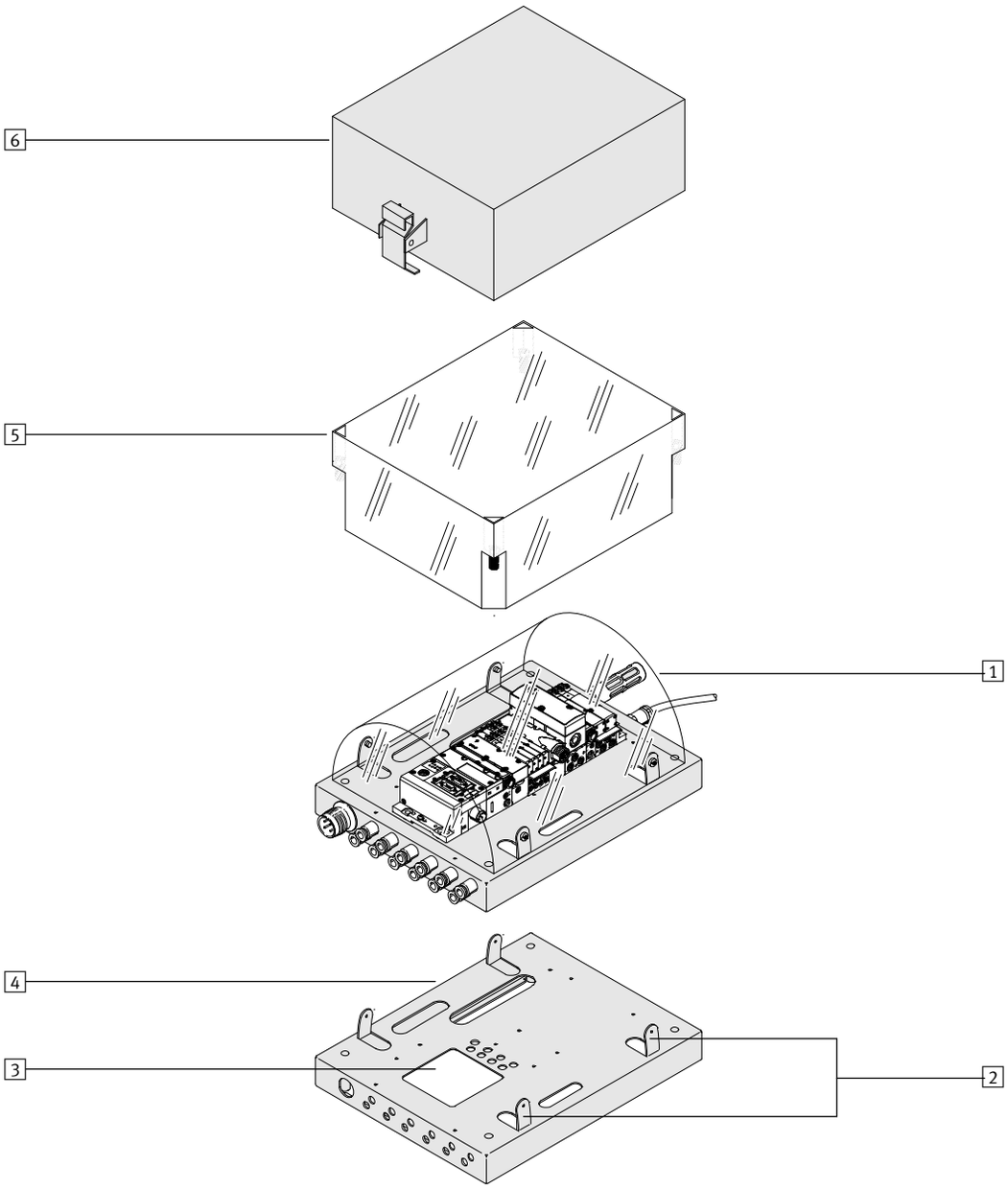
Interested in sheet-metal structures and special housings?

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

Or visit your local website at www.festo.com,

where you will find further information on ready-to-install solutions.

Sheet-metal structures and special housings



1 One basic solution
- Small control cabinet

2 Upright sheet-metal parts
- As mounting brackets

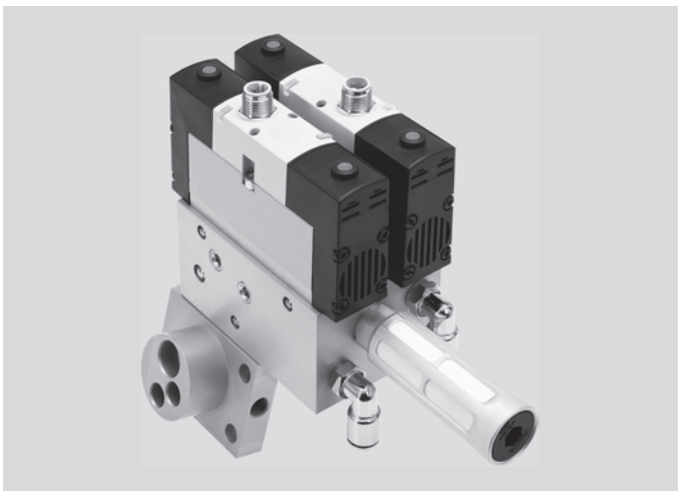
3 Cut-outs
- For tubing
- For connections
- etc.

4 Sheet-metal structure
- Customised dimensions
- Customised shapes

5 Material
- Metal
- Polymer
- etc.

6 Special housing
- Customised dimensions
- Customised shapes (flat, curved, etc.)

Function blocks



- 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

For applications that require the installation of only a small number of pneumatic components in a compact space, Festo function blocks with drilled ducts represent a practical alternative to manifold duct plates. The position of the connections must be variable and not subject to any special requirements.

In the function block, the air supply connections are established using intersecting ducts – individual sub-bases are no longer required. The components are mounted directly on the function block, which means that no tubing is required.

Technical data

- No tubing required thanks to drilled ducts
- Housing available in different materials:
  - Aluminium
  - Brass
  - Steel
  - POM
  - PEEK
  - PA
  - etc.
- 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

Ready-to-install – the benefits to you

Engineering
Complete engineering solution according to your application-specific requirements by Festo specialists.

Production and assembly
The entire production and assembly process is taken care of for you.

Checking and testing
The solution is fully tested.

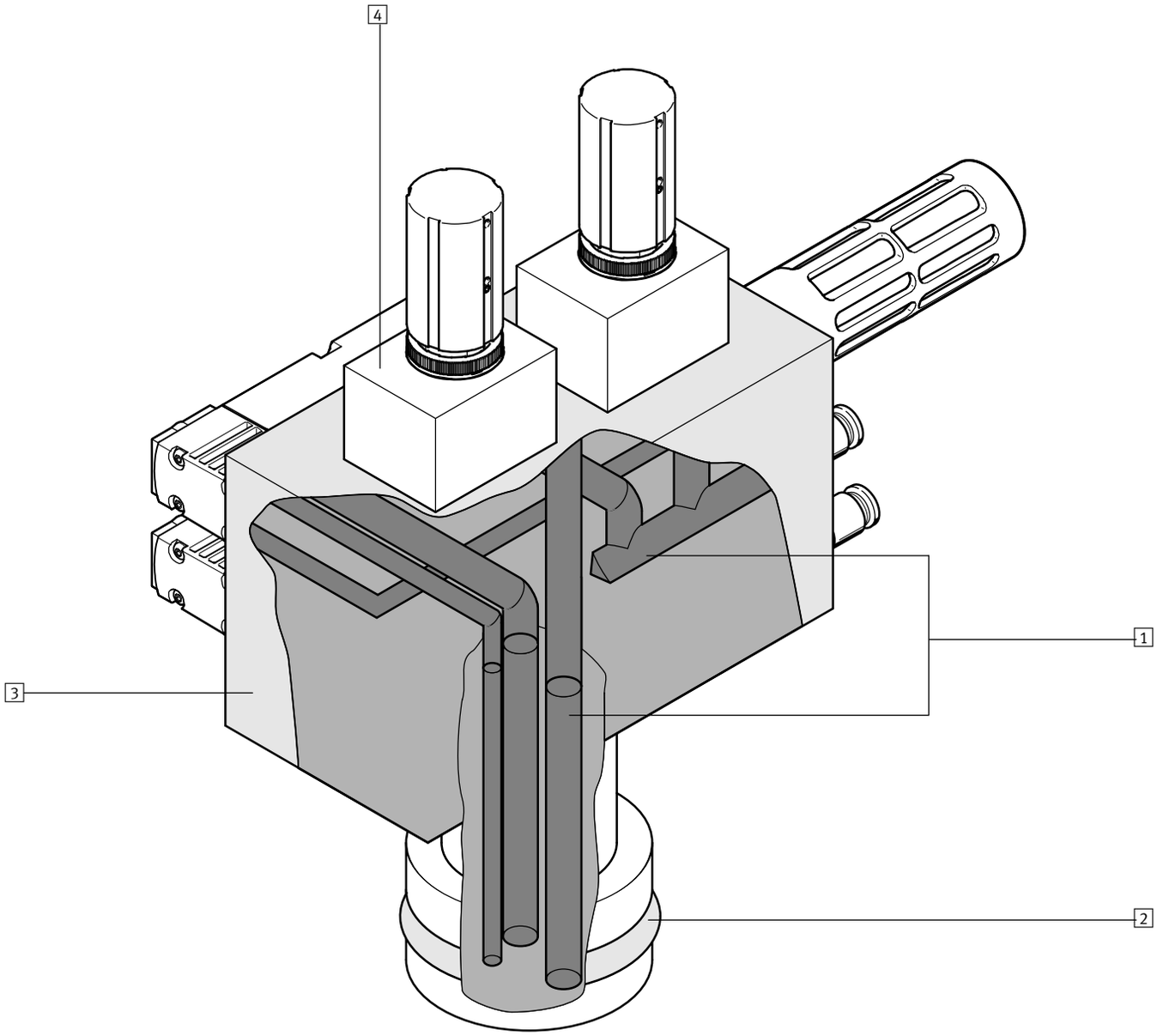
Documentation
You receive detailed system documentation, which you can quickly and easily integrate into your overall documentation.

Interested in function blocks?

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

Or visit your local website at www.festo.com, where you will find further information on ready-to-install solutions.

Function blocks



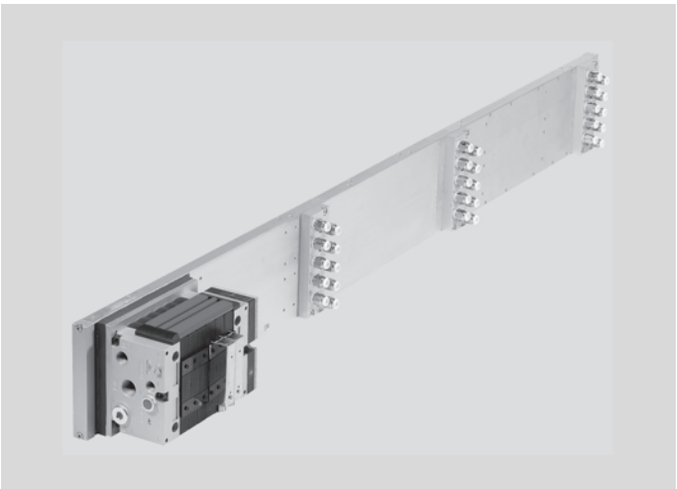
1 Drilled ducts
- For the air supply

2 Pneumatic interfaces for the machine
- Customised

3 Housing
- Aluminium
- Brass
- Steel
- POM
- PEEK
- PA
- etc.

4 Pneumatics
- Compressed air preparation
- Valves
- Valve terminals
- Pressure regulators
- Pressure gauges
- Third-party components
- Connections

Profile solutions



- 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

Profile solutions enable valve terminal concepts to be adapted to the machine design. Space optimisation, high performance in a small space and optimal distribution of compressed air within the system are just some of the main advantages.
The compressed air flows into integrated ducts. Exhaust air and supply air can thus be combined over long distances without any tubing. The compressed air is then provided at different locations according to specific requirements.
Festo profiles have different cross sections and lengths depending on application requirements. The valves and valve terminals can be mounted on the profile in a freely definable grid.

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 structure easy to achieve
- Optional: profile as mechanical mounting element for other components or as a supporting part of the machine frame

Ready-to-install – the benefits to you

Engineering
Complete engineering solution according to your application-specific requirements by Festo specialists.

Production and assembly
The entire production and assembly process is taken care of for you.

Checking and testing
The solution is fully tested.

Documentation
You receive detailed system documentation, which you can quickly and easily integrate into your overall documentation.

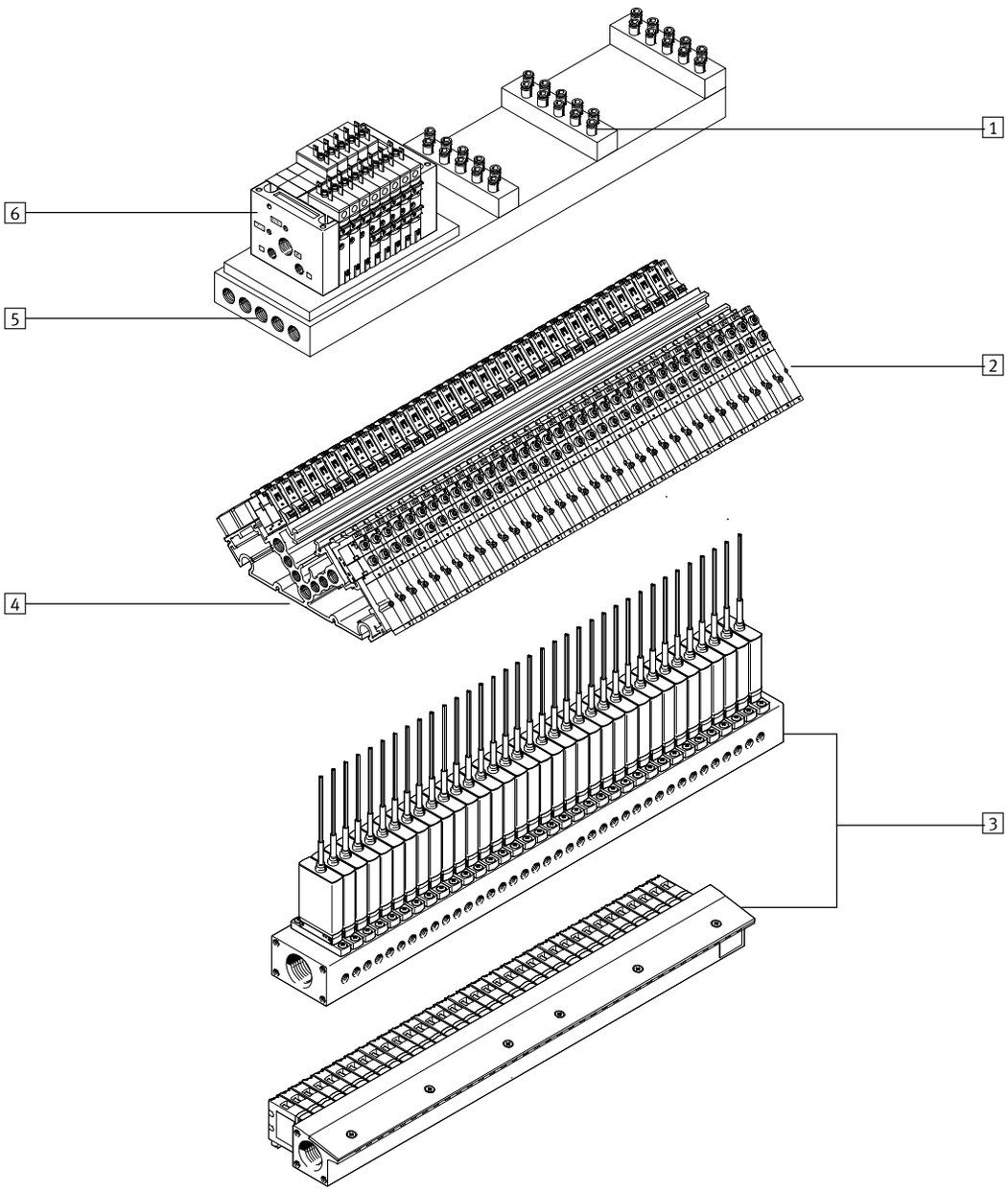
Interested in profile solutions?

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

Or visit your local website at www.festo.-com,

where you will find further information on ready-to-install solutions.

Profile solutions



1 Air ducts
- Supply of compressed air at different locations

2 Valves and valve terminals
- Freely definable grid
- Freely definable number

3 Customised pneumatic connection
- Optimised for the machine concept

4 Aluminium extruded profile
- Customised shape (round, square, trapezoidal, etc.)
- Customised profile cross sections
- Freely definable lengths

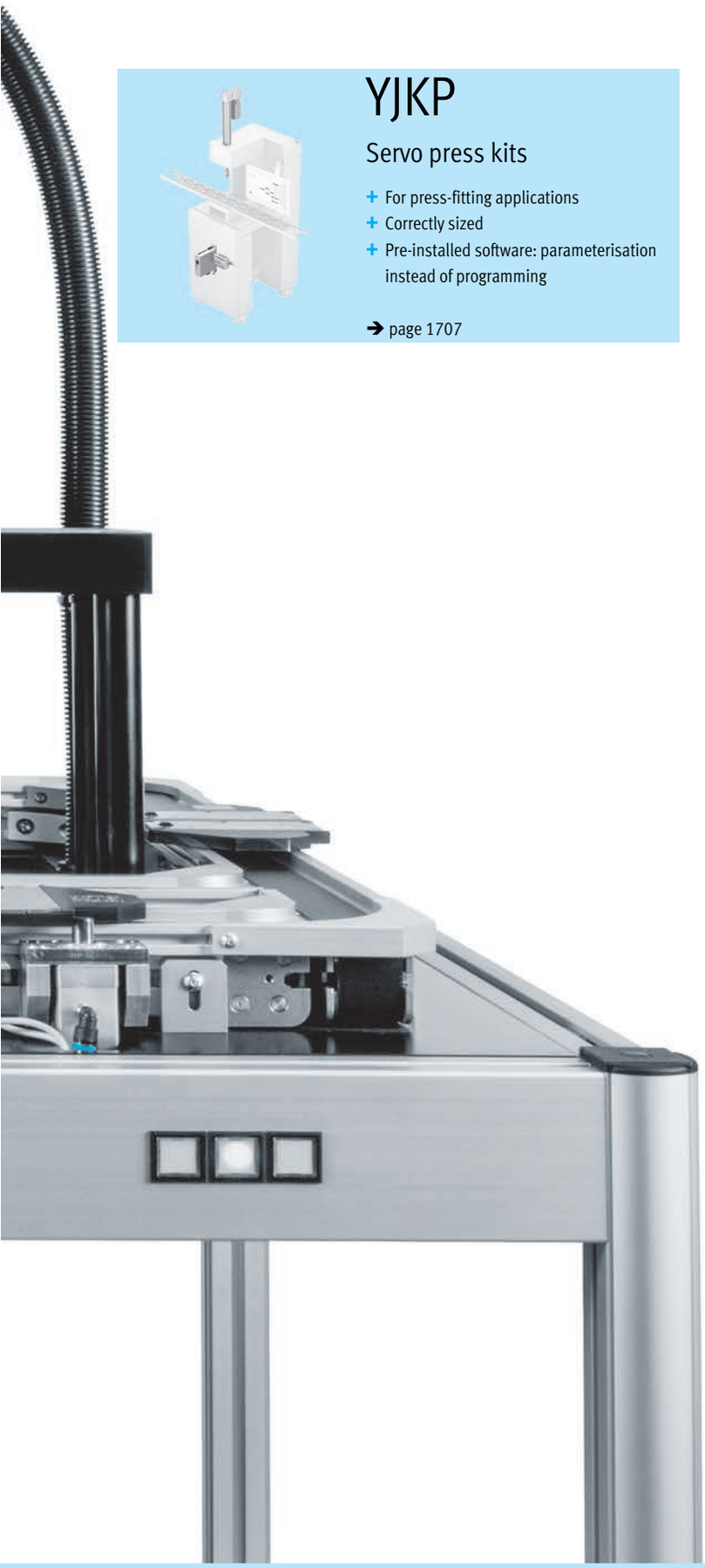
5 Air ducts
- For the distribution of compressed air in the system

6 Valve terminals

20 Function-specific systems

Platform strategies and modularisation for greater productivity

+ Pre-assembled system kit comprising software, controller and kinematics
+ Application-specific software for fast, intuitive commissioning
+ Coordinated components
+ Easy integration into the system concept
+ Lower project and total costs



YJKP

Servo press kits

+ For press-fitting applications
+ Correctly sized
+ Pre-installed software: parameterisation instead of programming

➔ page 1707

Contents

Product overview 1704
Software packages GSAY 1704
NEW New software

Balancer kit YHBP 1705
NEW New series

Servo press kits YJKP 1707

Software tool

Configurator		Design a product with numerous features reliably and quickly with the help of the configurator. Select all the required product features step-by-step. The use of logic checks ensures that only correct configurations are available for selection.	The configurator is part of the electronic catalogue and is not available as a separate software program.

Function-specific systems

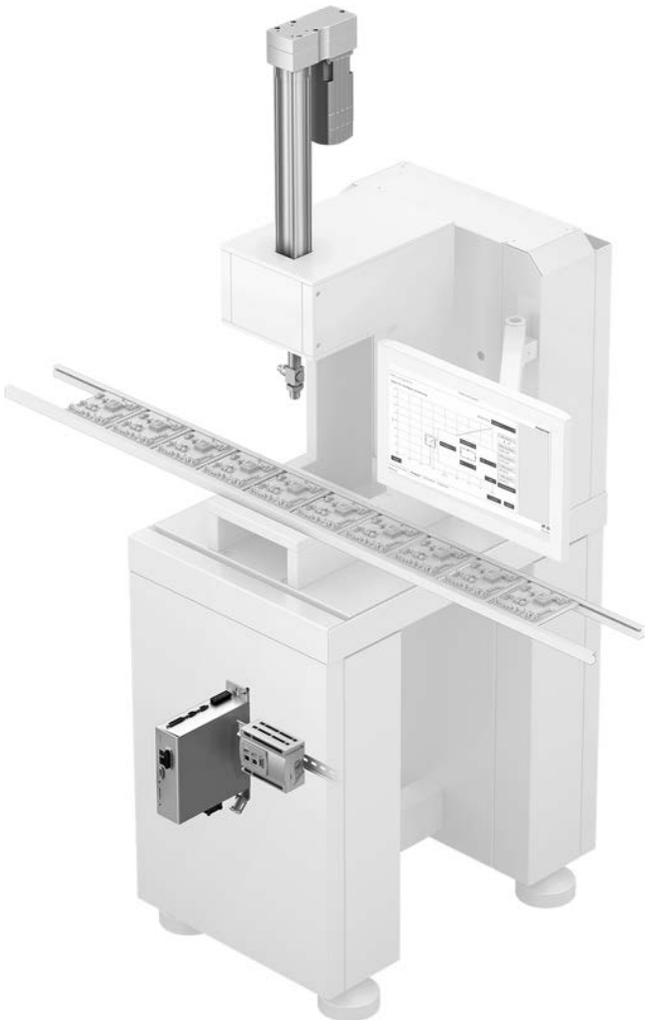
Type	**Servo press kits YJKP**
Function	Press-fitting
Working stroke	100 mm, 200 mm, 300 mm, 400 mm
Pressing force	0.1 ... 17 kN
Feed speed	0 ... 250 mm/s
Accuracy in ± % FS	0.5 %FS
Protocol	EtherNet/IP, Modbus TCP, TCP/IP, PROFINET
NEW	
Description	• Modular system kit comprising operating software 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 • Expanded software package for even greater customisation to your application • 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
➔ Page/online	**1707**

Software

	NEW
Type	**Software packages GSAY**
NEW	• New software
Description	• The modular operating software for the servo press kit YJKP is already installed on the press controller and therefore ready to use as soon as system integration is complete • No programming skills are needed • Thanks to the integrated sequencer, press-fitting operations are quick to configure and easy to implement • Configurator for the joining process: feed/joining path, possible wait times, threading functionality, etc. • Recording process data for quality assurance • Recorded force/displacement graph exported as *.csv file • Analysis functions for the force/displacement graph • Definition of windows • Envelopes • Through points • Extended licensed software package available to purchase via the Festo AppWorld
➔ Page/online	gsay

Handling solutions

Type	NEW Balancer kit YHBP
Stroke range	100 ... 1000 mm
Cylinder diameter	80 ... 200 mm
Max. travel speed	1 m/s
Load	70 ... 999 kg
Operating pressure	4 ... 8 bar
Nominal operating voltage DC	24 V
NEW	• New series
Description	• Very low operating forces of only 10 N • Very fast, automatic weight detection for production processes with large numbers of variants • Safety Performance Level d • For loads from 70 to 999 kg • Suitable for all commercially available kinematic systems
➔ Page/online	yhbp



Low-cost press-fitting

+ Less expensive than conventional press-fitting systems
+ Software and hardware from a single source
+ Pre-installed, modular software
+ Pre-assembled kit
+ Easy integration into your own system concept

Joining technology ›

Servo press kits

YJKP

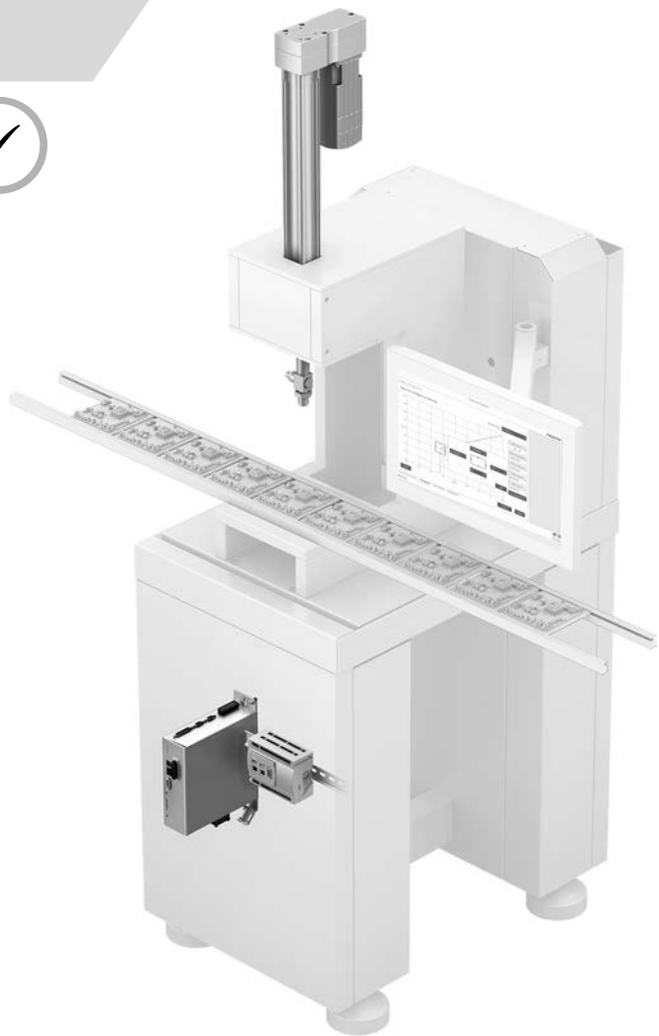
Joining technology ›

Servo press kits

YJKP

Overview, configuration and ordering
➔ **www.festo.com/catalogue/yjkp**

Additional information, support and user documentation
➔ **www.festo.com/sp/yjkp**

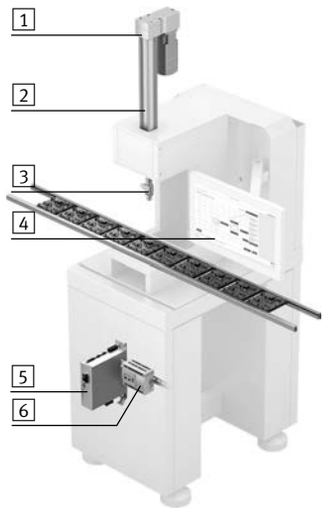


+ Ready-to-use system kit for electrical press-fitting applications
+ Pre-installed, modular software for configuration, operation and visualisation
+ High precision and repetition accuracy
+ Simple, cost-effective and quick to install

At a glance

The servo press kit and its associated software can be used to respond quickly to a range of press processes. It offers the ideal alternative to complex and often oversized presses.
The software can be used to monitor parameters such as the force and displacement of joining and press-fitting processes continuously.

Advantages:
- Pressing forces up to 17 kN (higher force ranges on request)
- Very high positioning and repetition accuracy
- Ideal price/performance ratio
- Easy integration into any application

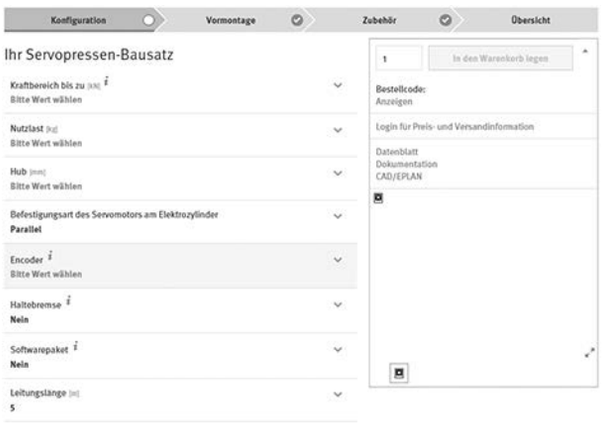


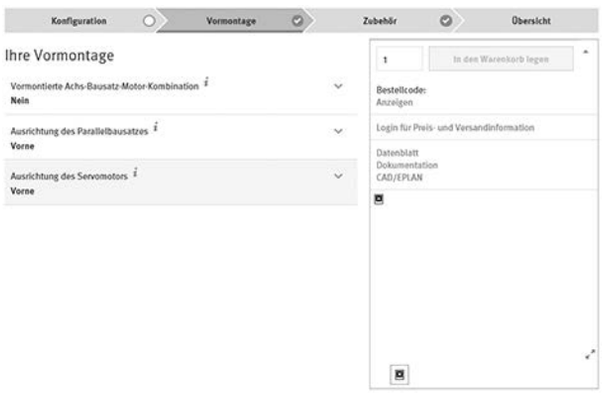
Individual components:
1 Servo motor
2 Electric cylinder
3 Force sensor
(incl. inspection record)
4 Software package
5 Motor controller
6 Controller
(incl. micro SD memory card)

Motor/encoder cables are included in the scope of delivery.

Ordering via configurator

It is very easy to put together and order a wide range of servo press kits using the configurator.
The "Configuration", "Pre-assembly" and "Accessories" tabs are used to select the combinations and display them with the correct configuration.
CAD files and ePLAN macros included.





Ordering – Product options

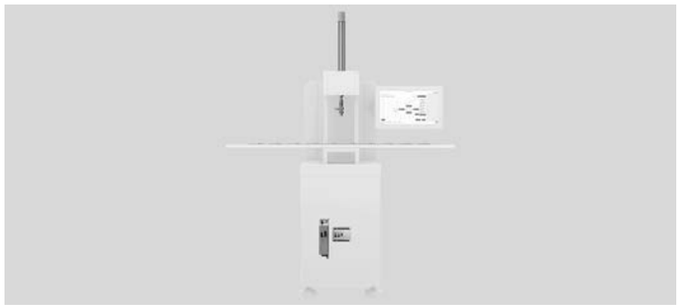
Configurable product	**This product and all its options can be ordered using the configurator.**	The configurator can be found under Products on the DVD or ➔ **www.festo.com/catalogue/...**	Enter the type code in the search field.

Servo press kits YJKP

Data sheet

Fieldbus interfaces

Modbus
EtherNet/IP
PROFINET



Technical data Dimensions ➔ Page 1713

Force range up to	[kN]	0.8	1.5	4	7	12	17
Protection against torsion/guide		With plain-bearing guide					
Working stroke	[mm]	100, 200, 300, 400					
Pressing force	[kN]	0.8	1.5	4	7	12	17
Max. payload[1]	[kg]	19.5	19.5	48	48	95	95
Max. feed speed	[mm/s]	250				160	
Acceleration							
For positioning operation	[m/s²]	2					
For cushioning phase	[m/s²]	2					
Repetition accuracy	[mm]	±0.01			±0.015	±0.01	
Scanning frequency of the force sensor	[Hz]	1000					
Accuracy FS of the force measurement[2]	[%]	±0.25					
Parameterisation interface		Ethernet					
Fieldbus interface		Modbus TCP, EtherNet/IP, EtherNet TCP/IP, PROFINET IO					
Configuration via visualisation system		Force/displacement graphs, default for good/defective parts, visualisation					
Evaluation methods		Threshold value, envelopes, windowing					
Visualisation		At the customer's premises via a web browser					
Mounting position		Any					

1) Caused by tool weight, for example.
2) Related to the calibration range of the force sensor and/or the force measurement range of the software for the complete system. Example for YJKP with a force range of 0.8 kN: 0.25% x 1200 N

Technical data – Force sensor

Force range to	[kN]	0.8	1.5	4	7	12	17
Force measuring range of software	[kN]	–0.2 ... 1	–0.2 ... 2	–0.5 ... 4.5	–0.5 ... 7.5	–1 ... 13	–1 ... 18
Max. overload	[kN]	1.5	3.75	11.25	15	30	37.5
Analogue output	[mA]	4 ... 20					

Note

The accuracy of the force measurement is influenced by the following properties of the force sensor:

- Accuracy
- Calibration range
- Nominal signal range
- Overload range

Lateral forces on the force sensor should be avoided as they may lead to false measurement results or damage the sensor.

MODBUS®, EtherNet/IP®, PROFINET®, is a registered trademark of its respective trademark holder in certain countries.

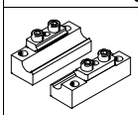
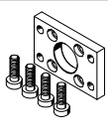
Data sheet

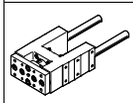
Electrical data							
Force range to	[kN]	0.8	1.5	4	7	12	17
Motor controller							
Input voltage range	[V AC]	100 ... 230 ±10%			3x 230 ... 480 ±10%		
Max. nominal input current	[A]	3		6	5.5		11
Nominal power	[VA]	500		1000	3000		6000
Controller							
Operating voltage	[V DC]	24					
Current consumption	[mA]	200					
Force sensor							
Operating voltage range	[V DC]	10 ... 30					

Safety characteristics of the motor controller	
Safety function to EN 61800-5-2	Safe Torque Off (STO)
Performance Level (PL) to EN ISO 13849-1	Category 4, Performance Level e
Safety Integrity Level (SIL) to EN 61800-5-2, EN 62061, EN 61508	SIL 3
Certificate issuing authority	TÜV 01/205/5262.01/14

Operating conditions		
Ambient temperature	[°C]	0 ... 40
Degree of protection		IP20

Accessories – Ordering data

	For force range to [kN]	Part no.	Type
Profile mounting			**Dimensions** online: ➔ yjkp
	0.8; 1.5	**2838839**	**EAHF-V2-32/40-P**
	4; 7	**1547781**	**EAHF-V2-50/63-P**
	12; 17	**1547780**	**EAHF-V2-80/100-P**
Flange mounting			**Dimensions** online: ➔ yjkp
	0.8	**2827587**	**EAHH-V2-32-R1**
	1.5	**2827588**	**EAHH-V2-40-R1**
	4	**2827589**	**EAHH-V2-50-R1**
	7	**1502305**	**EAHH-V2-63-R1**
	12	**1502306**	**EAHH-V2-80-R1**
	17	**1502307**	**EAHH-V2-100-R1**
Clamping component			**Dimensions** online: ➔ yjkp
	–	**1461069**	**EADT-E-U1-110**

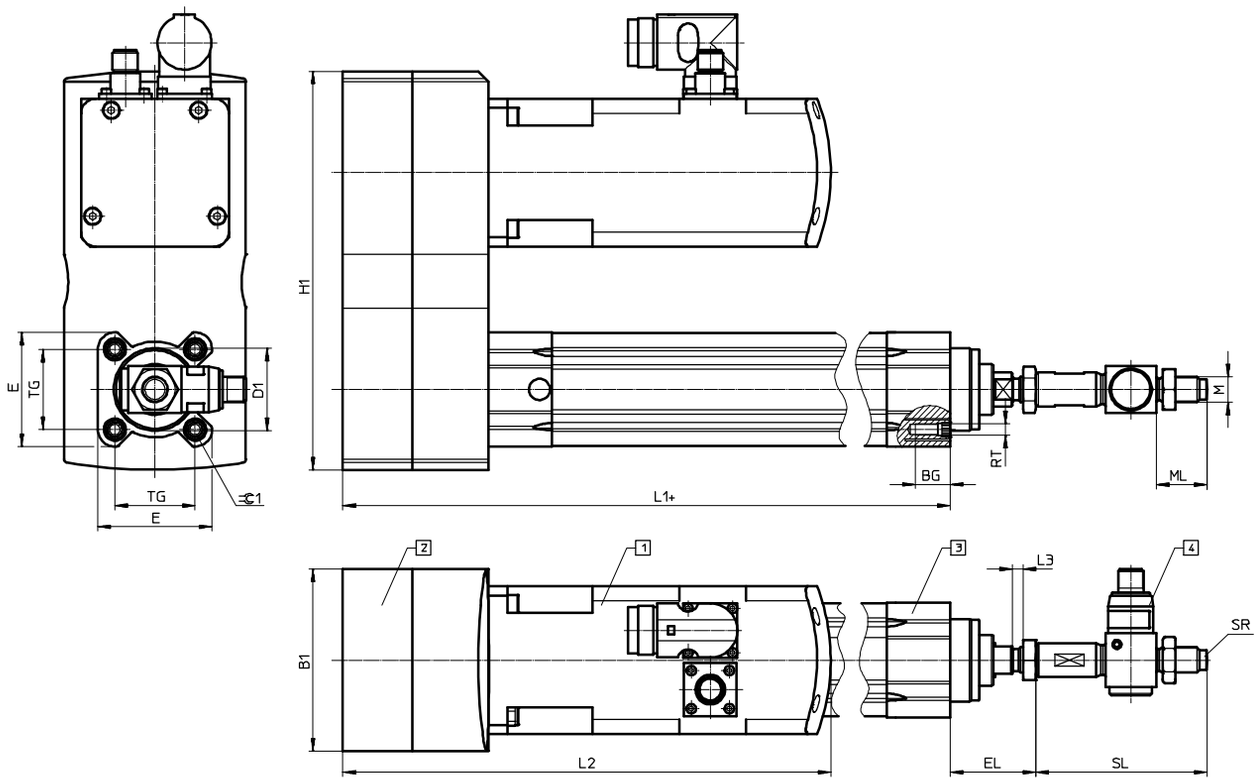
	Stroke [mm]	Part no.	Type
Guide unit order data			**Data sheets** online: ➔ eagf
	For force range up to 0.8 kN		
	100	**2782679**	**EAGF-V2-KF-32-170**
	200	**2782818**	**EAGF-V2-KF-32-270**
	300	**2782885**	**EAGF-V2-KF-32-370**
	400	**2782923**	**EAGF-V2-KF-32-470**
	For force range up to 1.5 kN		
	100	**2782939**	**EAGF-V2-KF-40-170**
	200	**2782976**	**EAGF-V2-KF-40-270**
	300	**2783047**	**EAGF-V2-KF-40-370**
	400	**2783080**	**EAGF-V2-KF-40-470**
	For force range up to 4 kN		
	100	**2783639**	**EAGF-V2-KF-50-190**
	200	**2784152**	**EAGF-V2-KF-50-290**
	300	**2784164**	**EAGF-V2-KF-50-390**
	400	**2784184**	**EAGF-V2-KF-50-490**
	For force range up to 7 kN		
	100	**1725842**	**EAGF-V2-KF-63-190**
	200	**1725843**	**EAGF-V2-KF-63-290**
	300	**1725844**	**EAGF-V2-KF-63-390**
	400	**1725845**	**EAGF-V2-KF-63-490**
	For force range up to 12 kN		
	100	**1725846**	**EAGF-V2-KF-80-220**
	200	**1725847**	**EAGF-V2-KF-80-320**
	300	**1725848**	**EAGF-V2-KF-80-420**
	400	**1725849**	**EAGF-V2-KF-80-520**
	For force range up to 17 kN		
	100	**1725850**	**EAGF-V2-KF-100-220**
	200	**1725851**	**EAGF-V2-KF-100-320**
	300	**1725852**	**EAGF-V2-KF-100-420**
	400	**1725853**	**EAGF-V2-KF-100-520**

1) Max. load capacity.

Dimensions

Download CAD data ➔ **www.festo.com**

With parallel kit



1 Servo motor
2 Parallel kit
3 Electric cylinder
4 Force sensor

Type	B1	BG min.	D1 ∅ d11	E	EL[1]	H1	L1	L2
YJKP-0.8	60	16	34	$45^{+0.5}$	35.5	157	178.5	220.4
YJKP-1.5	86	16	39	$54^{+0.5}$	40.5	188.5	213	230.8
YJKP-4	110	17	45	$64^{+0.5}$	49.5	225	245	274.3
YJKP-7	110	17	52	$75^{+0.5/-0.1}$	50	225	253	325.3
YJKP-12	140	17	60	$93^{+0.5/-0.1}$	61	348	303.5	385
YJKP-17	140	17	70	$110^{+0.5/-0.1}$	66	348	323.5	385

Type	L3	M	ML	RT	SL	SR	TG	⫩1
YJKP-0.8	5	M10x1.25	22	M6	78	60	32.5	6
YJKP-1.5	5	M12x1.25	24	M6	81	60	38	6
YJKP-4	5	M16x1.5	32	M8	107	100	46.5	8
YJKP-7	5	M16x1.5	32	M8	107	100	$56.5^{\pm 0.5}$	8
YJKP-12	5	M20x1.5	40	M10	140.5	150	$72^{\pm 0.5}$	6
YJKP-17	5	M20x1.5	40	M10	140.5	150	$89^{\pm 0.5}$	6

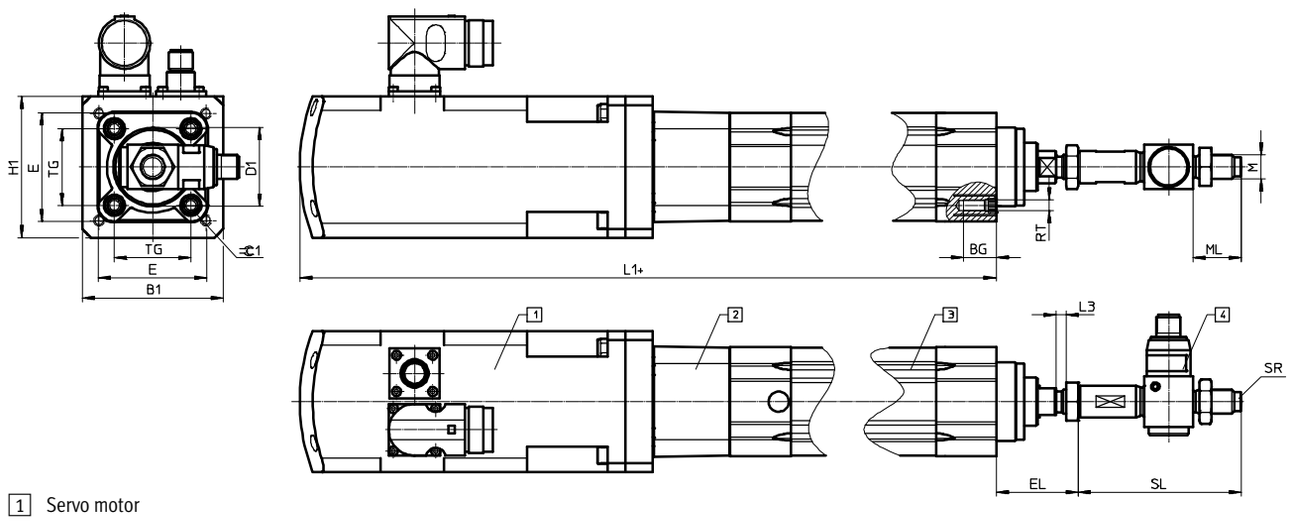
1) With a spacing of 5 mm to the lock nut (in the retracted state).

Servo press kits YJKP

Dimensions

Download CAD data ➔ **www.festo.com**

With axial kit



1 Servo motor
2 Axial kit
3 Electric cylinder
4 Force sensor

Type	B1	BG min.	D1 ∅ d11	E	EL[1)]	H1	L1
YJKP-0.8	55	16	34	$45^{+0.5}$	35.5	55	336.1
YJKP-1.5	70	16	39	$54^{+0.5}$	40.5	70	357.8
YJKP-4	100	17	45	$64^{+0.5}$	49.5	100	439.3
YJKP-7	100	17	52	$75^{+0.5/-0.1}$	50	100	492.5
YJKP-12	140	17	60	$93^{+0.5/-0.1}$	61	140	581.5
YJKP-17	140	17	70	$110^{+0.5/-0.1}$	66	140	619

Type	L3	M	ML	RT	SL	SR	TG	=C1
YJKP-0.8	5	M10x1.25	22	M6	78	60	32.5	6
YJKP-1.5	5	M12x1.25	24	M6	81	60	38	6
YJKP-4	5	M16x1.5	32	M8	107	100	46.5	8
YJKP-7	5	M16x1.5	32	M8	107	100	$56.5_{\pm 0.5}$	8
YJKP-12	5	M20x1.5	40	M10	140.5	150	$72_{\pm 0.5}$	6
YJKP-17	5	M20x1.5	40	M10	140.5	150	$89_{\pm 0.5}$	6

1) With a spacing of 5 mm to the lock nut (in the retracted state).

21 Services

+ After Sales Services:
  from commissioning through to maintenance and repair
+ Energy Saving Services:
  energy efficiency as a modular service. PreAudit and Audit to suit your specific requirements
+ Technical Support Services:
  technical advice and technical customer support

Commissioning service

+ Configuration and parameterisation on site
+ Fast, reliable, optimised

➔ page 1720

Maintenance

+ Inspection and preventive maintenance measures
+ Corrective maintenance

➔ page 1721

PreAudit – Energy Saving Services

+ Comprehensive report on your compressed air system
+ Determine savings potential for compressed air and define measures

➔ page 1724

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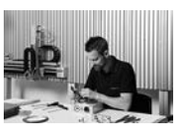
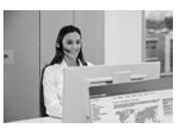
Analysis of compressed air generation 1725
Compressed air quality analysis 1726
Pressure drop measurement 1727
Compressed air consumption analysis 1728
Leakage detection and elimination 1729
Machine analysis for energy efficiency 1730

After Sales and Technical Support Services

Type	**Commissioningservice**	**Maintenance**
Services	• Mechanical, pneumatic and electrical integration and configuration of Festo automation solutions • Configuration and parameterisation • Optimisation with test run • Data backup and documentation • Technical guidance and briefing of staff responsible for the machine	Implementation of the following preventive maintenance measures to DIN 31051: • Inspections – Checking for damage and wear characteristics – Checking mechanical, pneumatic and electrical connections and connectors – Checking lubrication – Checking compressed air preparation – Carrying out component-specific inspections • Maintenance – Lubrication/relubrication of guides – Tightening of connectors – Replacement of air filters – Replacement of silencers – Carrying out component-specific preventive maintenance tasks • Repair – Troubleshooting – Solution finding – Error elimination – Elimination of leakages – Replacement or repair of components
Description	• Support with professional commissioning of Festo automation solutions • Competent briefing of staff responsible for the machine	• Preventive and corrective maintenance • Directly at your system • For high system availability and rapid assistance should the worst happen
➔ Page/online	**1720**	**1721**

After Sales and Technical Support Services

		
Type	**Repair service**	**Technical support**
Services	• Inspection • Analysis of economic efficiency • Repair or replacement of faulty components or wearing parts • Leakage testing • Functional testing	• Technical advice: answering technical questions or solving technical problems – Online support – Hotline support • Technical customer support: technical support on site – Remote support – On-site support
Description	• Extended service life • Reduced costs	• Your technical questions answered • Technical support on site
➔ Page/online	**1722**	**1723**

Energy Saving Services

Type	**PreAudit**	**Analysis of compressed air generation**	**Compressed air quality analysis**	**Pressure drop measurement**
Services	• Energy analysis – assessment • Compressed air quality analysis • Pressure drop measurement • Compressed air consumption analysis • Leakage detection – quick check • Machine analysis for energy efficiency – quick check • Comprehensive report on the analysis with weighted recommendations on what to do next	• Measurement of compressor operating times as well as load/idling times • Power consumption measurement • Flow measurement/consumption measurement • Pressure measurement (level and band width) • If possible, estimation of leakage volume • Comparison of energy consumption and compressed air volume supplied	• Inspection of decentralised air preparation at point of usage • Measurement of the residual oil content up to class 2 (ISO 85731:2010) • Measurement of the pressure dew point up to class 2 (ISO 85731:2010) • Analysis of measurement results and if applicable recommendation of improvement measures • Documentation of all measurement results • 3 hours on-site service (max. 3 measurements; additional time on request)	• Measurement of the pressure in the compressor room (input), in production (draw off) and storage of the results • Recording of the pressure drop using multiple pressure sensors with data loggers • Evaluation and comparison of the pressure profiles • Controlled pressure reduction following evaluation • Demonstration of pressure fluctuations in production
Description	• Implementation of the Festo Energy Saving Services to DIN ISO 11011 • Analysis of your compressed air system by experts on site • Important advice and recommendations on the topic of energy efficiency – immediate identification of worthwhile measures	• Energy Saving Service to DIN ISO 11011 • Determination of a clear consumption profile • Information about the output reserves of the compressed air system • Measurement during operation	• Energy Saving Service to DIN ISO 11011 • Assurance of optimum compressed air quality • Increased service life of components • Minimisation of unexpected production downtimes • Class 1 on request	• Energy Saving Service to DIN ISO 11011 • Recording of the pressure drop in the system • Up to 8% energy saving in generated compressed air through pressure reduction
➔ Page/online	**1724**	**1725**	**1726**	**1727**

Energy Saving Services

Type	**Compressed air consumption analysis**	**Leakage detection and elimination**	**Machine analysis for energy efficiency**
Services	• Installation and removal of the measuring equipment with standard components (fittings, tubing, etc.) • Measurement of flow rate, consumption and pressure with machine running and idle • Determination and analysis of different characteristics – Consumption per machine cycle – Average consumption per minute – Average pressure – Max./min. pressure – Max./min. rate of air flow • Documentation of measurement results including graphical representation of measurement results, optionally available as a PDF file or colour printout • 3 hours on-site service (additional time on request)	• Detection of compressed air leakages using highly sensitive ultrasound detectors during operation • Checking the complete compressed air system from the compressor to the pneumatic application • Classification of the leakages according to size and cost • Documentation of defective components • Leakage report containing: – Recommended measures – Spare parts required – Estimate of repair time – Prioritisation of measures – Assessment as to whether repair can be carried out while machine is in operation • Information on optimisation options • Documentation of measures carried out • Online access to all results and repair data via the Energy Saving Assessment Portal	• Identification and analysis of the pneumatic applications of relevance to energy consumption • Measurement of flow rate, consumption and pressure of the relevant compressed air applications • Ascertain and recommendation of optimisation measures • Estimation of the costs and savings, including the predicted amortisation time • Installation and removal of the measuring equipment with standard components (fittings, tubing, etc.) • Measurement of flow rate, consumption and pressure with machine running and idle • Documentation of the measurement results including graphical representation
Description	• Energy Saving Service to DIN ISO 11011 • Determination of exact compressed air consumption • Optimal configuration of compressed air supply • No pressure drop due to undersupply • No unnecessary energy costs due to oversupply	• Energy Saving Service to DIN ISO 11011 • Detection and repair of leakages in production plants • Immediate energy and operating cost savings	• Energy Saving Service to DIN ISO 11011 • Reviewing of systems with respect to possible energy optimisation potential • Documentation of the analysed compressed air applications
➔ Page/online	**1728**	**1729**	**1730**

Commissioning service

- Professional commissioning of Festo automation solutions
- Competent briefing of staff responsible for the machine
- Fast – reliable – optimised

Objectives

- Professional commissioning of Festo components and solutions in your plant
- Competent briefing of staff responsible for the machine

Services

- Mechanical, pneumatic and electrical integration and configuration of Festo automation solutions
- Configuration and parameterisation
- Optimisation with test run
- Data backup and documentation
- Technical guidance and briefing of staff responsible for the machine

Requirements and prerequisites

Optimum prerequisites

- Use of Festo components
- Access to the machine or system
- Mechanical, pneumatic and electrical work is complete
- Qualified personnel responsible for the machine present on the agreed date

The benefits to you

- Optimum configuration and parameterisation
- Time saving
- Maximum system availability

Are you interested in this service?
Ask your Festo sales engineer or visit our website ➔ **www.festo.com/services**

Maintenance

- Preventive and corrective maintenance
- Directly at your system
- For high system availability and rapid assistance should the worst happen

Objectives

- Optimal preventive maintenance of pneumatic and electrical automation components and systems
- Prevention of unplanned production downtime
- Fast and effective support in the event of malfunctions or production downtime
- Reduced energy consumption

Services

Implementation of the following preventive maintenance measures to DIN 31051:

- Inspections
  - Checking for damage and wear characteristics
  - Checking mechanical, pneumatic and electrical connections and connectors
  - Checking lubrication
  - Checking compressed air preparation
  - Carrying out component-specific inspections
- Maintenance
  - Lubrication/relubrication of guides
  - Tightening of connectors
  - Replacement of air filters
  - Replacement of silencers
  - Carrying out component-specific preventive maintenance tasks
- Repair
  - Troubleshooting
  - Solution finding
  - Error elimination
  - Elimination of leakages
  - Replacement or repair of components

The benefits to you

- Professional implementation of preventive maintenance measures for optimum machine operation by specialists from Festo
- The entire compressed air system is always in a good condition
- High system availability and prevention of unplanned downtimes
- Reduced workload for your maintenance personnel
- Individual services available on request

Are you interested in this service?

Ask your Festo sales engineer or visit our website ➔ **www.festo.com/services**

Repair service

- Extended service life
- Reduced costs

Objectives

- Cost-effective extension of the service life of high-quality components and assemblies

Services

- Inspection
- Analysis of economic efficiency
- Repair or replacement of faulty components or wearing parts
- Leakage testing
- Functional testing

Please send the faulty component and a detailed error description to your Festo national company.
Detailed spare parts lists can be found on the Festo website.

The benefits to you

- Extension of the service life of components and assemblies through replacement or repair of defective or worn parts
- Also available in some countries as an Express Repair Service (e.g. repair within 2 hours) and at a fixed price

Are you interested in this service?
Ask your Festo sales engineer or visit our website ➔ **www.festo.com/services**

Technical support

- Your technical questions answered
- Technical support on site

Services

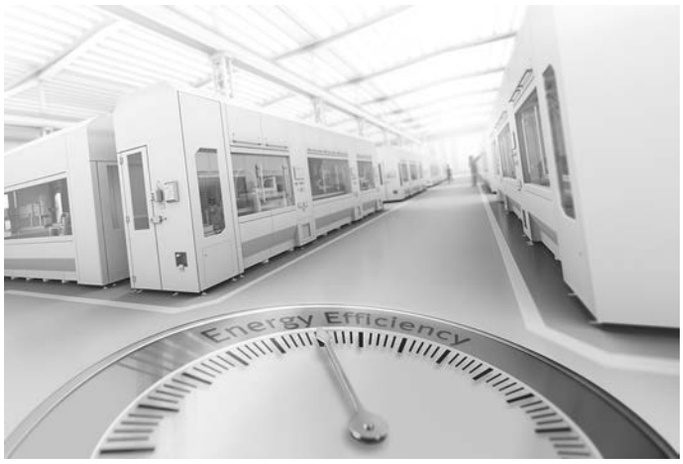
- Technical advice:
  answering technical questions or solving technical problems using Festo automation solutions
  - Online support
  - Hotline support
- Technical customer support:
  technical support on site
  - Remote support
  - On-site support

The benefits to you

- Worldwide availability of technical support services
- Time saving when answering technical questions and solving problems
- Optimum sizing and increased availability of your system

Are you interested in this service?
Ask your Festo sales engineer or visit our website ➔ **www.festo.com/services**

PreAudit



- Implementation of the Festo Energy Saving Services to DIN ISO 11011
- Analysis of your compressed air system by experts on site
- Important advice and recommendations on the topic of energy efficiency – immediate identification of worthwhile measures

Objectives

- Determine a detailed picture of the energy situation in your compressed air system
- Demonstrate potential improvements and possible weaknesses

Services

Implementation of the Festo Energy Saving Services to DIN ISO 11011:

- Analysis of compressed air generation – assessment
  - Assessment of the compressors – utilisation
  - Documentation of compressor-specific performance data and all relevant maintenance data
- Compressed air quality analysis
  ➔ Page 1726 "Compressed air quality analysis"
- Pressure drop measurement
  ➔ Page 1727 "Pressure drop measurement"
- Compressed air consumption analysis
  ➔ Page 1728 "Compressed air consumption analysis"
- Leakage detection – quick check
  - Systematic identification of leaks in the compressed air system
  - Leakage detection and documentation on one machine by way of example
- Machine analysis for energy efficiency – quick check
  - Review of one machine's pneumatic energy efficiency by way of example
  - Documentation of the analysed compressed air applications
  - Comprehensive report on the analysis with weighted recommendations on what to do next

General technical conditions

- Duration approx. 1 to 1 ½ days on site, 1 day for evaluation and report, ½ day for presentation of the results
- Access required to the compressor station, the systems and the plant. Accompanied by one of the customer's employees, provision of the data requested in advance.
- See Energy Saving Services for further general requirements

The benefits to you

- Important advice and recommendations on how to improve energy efficiency
- Immediate identification of weaknesses and worthwhile measures

Are you interested in this service?

Ask your Festo sales engineer or visit our website ➔ **www.festo.com/energysaving**

Analysis of compressed air generation

The Festo Energy Saving Services offer a tailored range of services for identifying and exploiting potential compressed air savings. Part of this is the analysis of compressed air generation:

- Determination of a clear consumption profile
- Information about the output reserves of the compressed air system
- Measurement during operation

Objectives

- Determine a clear consumption profile for compressed air requirements including fluctuations in consumption at different operating times
- Identify potential savings

Services

- Measurement of compressor operating times as well as load/idling times
- Power consumption measurement
- Flow measurement/consumption measurement
- Pressure measurement (level and band width)
- If possible, estimation of leakage volume
- Comparison of energy consumption and compressed air volume supplied

General technical conditions

- Simultaneous power consumption measurement on up to 6 compressors
- Simultaneous power consumption measurement on 6 to 12 compressors on request
- Pressure measurement up to 16 bar
- Volumetric flow rate measurement in main line up to DN 300 (approx. 39,500 Nm3/h)
- Flow sensor can be installed during operation and under pressure
- Measurement duration 1 week (different measurement duration on request)
- Documentation of results as a PDF file and printout in colour

The benefits to you

- Information about compressed air costs and potential savings
- Transparent energy consumption of the entire system
- Information about the output reserves of the compressed air system
- Manufacturer-independent measurement
- Installation of the measuring devices during operation

Are you interested in this service?

Ask your Festo sales engineer or visit our website ➔ **www.festo.com/energysaving**

Compressed air quality analysis

The Festo Energy Saving Services offer a tailored range of services for identifying and exploiting potential compressed air savings. Part of this is the compressed air quality analysis:

- Assurance of optimum compressed air quality
- Increased service life of components
- Minimisation of unexpected production downtimes

Objectives

- Optimise the current compressed air quality of the compressed air system
- Increase machine availability and process reliability
- Reduce maintenance costs

Services

- Inspection of decentralised air preparation at point of usage
- Measurement of residual oil content
- Measurement of pressure dew point
- Analysis of measurement results and if applicable recommendation of improvement measures
- Documentation of all measurement results
- 3 hours on-site service (max. 3 measurements; additional time on request)
- General technical requirements: sampling ideally using standard push-pull fittings or standard O.D. tubing
- Brief interruption of the compressed air supply necessary to install the measurement technology
- Pressure range up to 10 bar
- Measurement of the residual oil content up to class 2 (ISO 8573-1:2010)
- Measurement of the pressure dew point up to class 2 (ISO 8573-1:2010)
- Measurement of pressure dew points and residual oil class 1 (ISO 8573-1:2010) on request and in accordance with individual quotation

The benefits to you

- Assurance of optimum compressed air quality
- Targeted adaptation of compressed air preparation to requirements
- Minimisation of unexpected production downtimes
- Increased service life of pneumatic components and process reliability
- Analysis and documentation of measurement results by compressed air specialists

Are you interested in this service?
Ask your Festo sales engineer or visit our website ➔ **www.festo.com/energysaving**

Pressure drop measurement

The Festo Energy Saving Services offer a tailored range of services for identifying and exploiting potential compressed air savings. Part of this is the pressure drop measurement:

- Record the pressure drop in the system
- Up to 8% energy saving in generated compressed air through pressure reduction

Objectives

- Record the pressure drop in the system
- Reduce pressure

Services

- Measurement of the pressure in the compressor room (input), in production (draw off) and storage of the results
- Recording of the pressure drop using multiple pressure sensors with data loggers
- Evaluation and comparison of the pressure profiles
- Controlled pressure reduction following evaluation
- Demonstration of pressure fluctuations in production

The benefits to you

- Process reliability thanks to constant pressure level
- Potential savings from pressure reduction: up to 8% of the energy for generated compressed air

Are you interested in this service?
Ask your Festo sales engineer or visit our website ➔ **www.festo.com/energysaving**

Compressed air consumption analysis

The Festo Energy Saving Services offer a tailored range of services for identifying and exploiting potential compressed air savings. Part of this is the compressed air consumption analysis:

- Determination of exact compressed air consumption
- Optimal configuration of compressed air supply
- No pressure drop due to undersupply
- No unnecessary energy costs due to oversupply

Objectives

- Determine and analyse compressed air consumption and leakage of machines and machine lines
- Identify inappropriate compressed air usage and of improvement potential

Services

- Installation and removal of the measuring equipment with standard components (fittings, tubing, etc.)
- Measurement of flow rate, consumption and pressure with machine running and idle
- Determination and analysis of different characteristics
  - Consumption per machine cycle
  - Average consumption per minute
  - Average pressure
  - Max./min. pressure
  - Max./min. rate of air flow
- Documentation of measurement results including graphical representation of measurement results, optionally available as a PDF file or colour printout
- 3 hours on-site service (additional time on request)

General technical conditions

- Measurement of flow rates from 6 l/min ... 5000 l/min (higher flow rates on request)
- Accuracy of flow rate measurements: +/–4.5%
- Flow measurements in 1" ... 12" lines on request
- Applied measuring principles: usually calorimetric, sometimes differential pressure method
- Pressure range 1 ... 10 bar
- Pressure range up to 50 bar on request
- Sensor installation in supply line or bypass as special solution
- Brief interruption of the compressed air supply line necessary to install/remove the measurement technology
- Compressed air quality min. class 7:4:2 (to ISO 8573-1:2010)
- Provision of measurement results as a CSV file and as a colour printout
- Parallel measurement of multiple flow rates and pressures, including documentation, on request

The benefits to you

- Information about potential compressed air savings
- Use of state-of-the-art, highly accurate pressure and flow measurement technology
- All relevant measuring ranges are covered
- Analysis of measurement results by compressed air specialists

Are you interested in this service?

Ask your Festo sales engineer or visit our website ➔ **www.festo.com/energysaving**

Leakage detection and elimination

The Festo Energy Saving Services offer a tailored range of services for identifying and exploiting potential compressed air savings. Part of this is leakage detection and elimination:

- Detection and repair of leakages in production plants
- Immediate energy and operating cost savings

Objectives

- Transparency of energy and money losses as well as CO_2 emissions
- Assess and classify the individual leaks
- Lower compressed air requirements and thus lower operating costs

Services

- Detection of compressed air leakages using highly sensitive ultrasound detectors during operation
- Checking the complete compressed air system from the compressor to the pneumatic application
- Classification of the leakages according to size and cost
- Documentation of defective components
- Leakage report
  - Recommended measures
  - Required spare parts
  - Estimate of repair time
  - Prioritisation of measures
  - Assessment as to whether repair can be carried out while machine is in operation
- Information on optimisation options
- Documentation of measures carried out
- Online access to all results and repair data via the Energy Saving Assessment Portal

General technical conditions

- Contactless ultrasound detection and classification of compressed air leakages (other gases on request)
- Detection while the machines are running, usually no or only short production downtimes required
- Max. detection distance: 20 m
- Documentation of the results in the Energy Saving Assessment Portal

The benefits to you

- No production downtime required
- Fast and professional checking of your entire plant for compressed air leakages
- Detailed documentation of required measures, including spare parts
- Online access to the prepared data via the Energy Saving Assessment Portal
- Software tools for optimum planning of leakage rectification
- No investment in measurement technology for leakage detection needed
- Experience from many major projects

Are you interested in this service?
Ask your Festo sales engineer or visit our website ➔ **www.festo.com/energysaving**

Machine analysis for energy efficiency

The Festo Energy Saving Services offer a tailored range of services for identifying and exploiting potential compressed air savings. Part of this is the machine analysis for energy efficiency:

- Reviewing of systems with respect to possible energy optimisation potential
- Documentation of the analysed compressed air applications

Objectives

- Analyse and establish recommendations for optimising the energy consumption of your compressed air applications
- Determine and analyse compressed air consumption and of leakage of applications and machines
- Identify inappropriate compressed air usage and of improvement potential

Services

- Identification and analysis of the pneumatic applications of relevance to energy consumption
- Measurement of flow rate, consumption and pressure of the relevant compressed air applications
- Ascertain and recommendation of optimisation measures
- Estimation of the costs and savings, including the predicted amortisation time
- Installation and removal of the measuring equipment with standard components (fittings, tubing, etc.)
- Measurement of flow rate, consumption and pressure with machine running and idle
- Documentation of the measurement results including graphical representation

General technical conditions

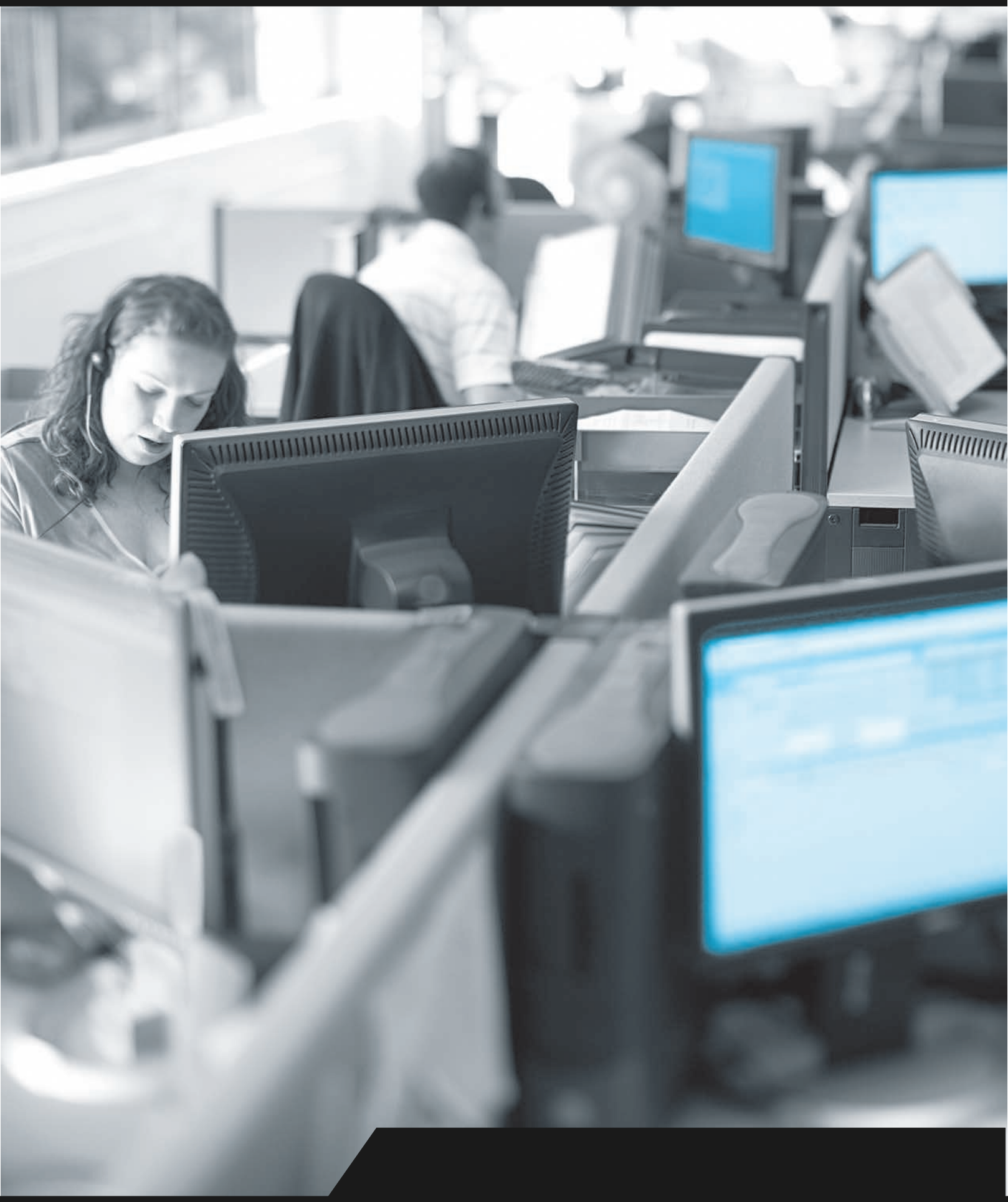
- Sensor installation in supply line or bypass as special solution
- Brief interruption of the compressed air supply line necessary to install/remove the measurement technology
- Compressed air quality min. class 7:4:2 (to ISO 8573-1:2010)
- Parallel measurement of multiple flow rates and pressures, including documentation, on request
- On request: installation and commissioning of the developed solutions

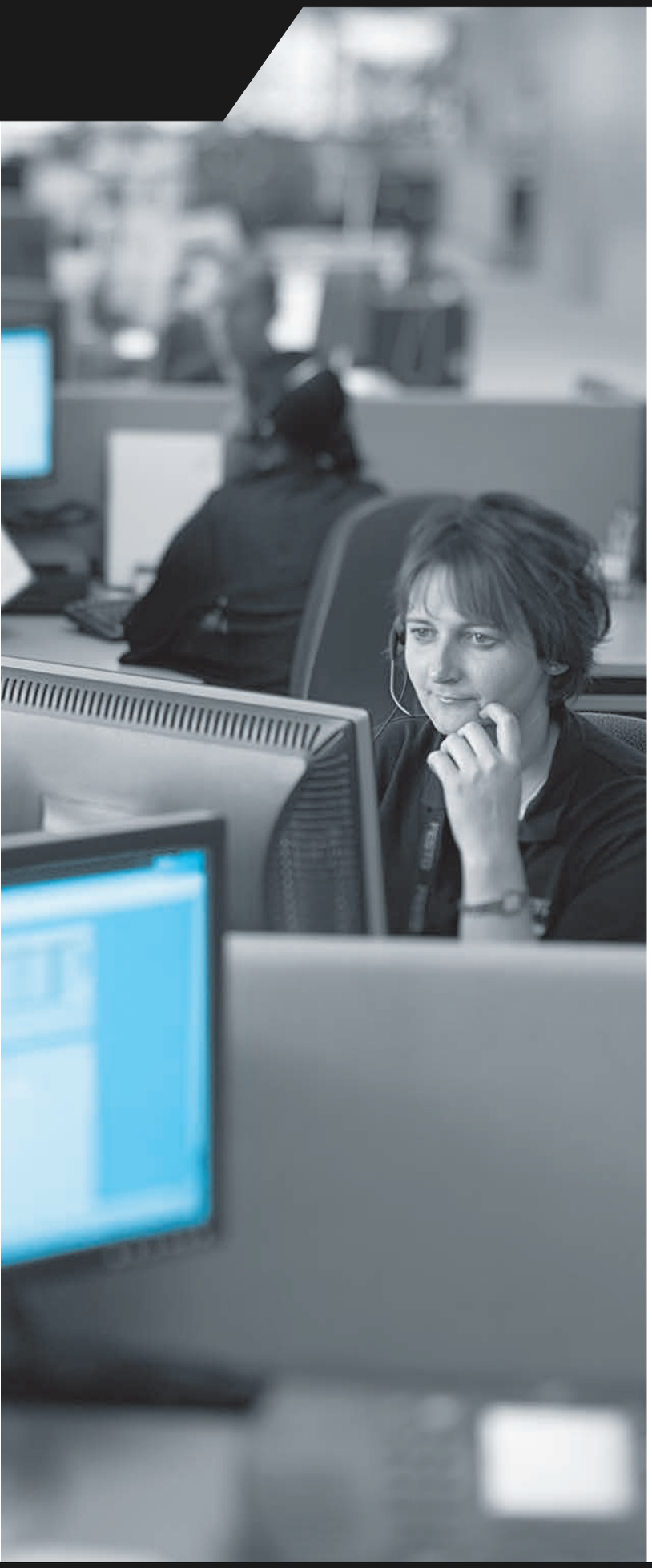
The benefits to you

- Systematic review by experienced pneumatic specialists
- Rapid identification of measures that are economically sensible and technically feasible
- Certification of the energy efficiency of pneumatic solutions

Are you interested in this service?
Ask your Festo sales engineer or visit our website ➔ **www.festo.com/energysaving**

Appendix





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Conditions for using, storing and transporting Festo products

What must be taken into account when using Festo products?

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

The pneumatic components must be supplied with correctly prepared compressed air free of aggressive media
➔ page 1736 ff.
Take the ambient conditions at the place of use into consideration. Corrosive, abrasive and dusty environments (e.g. water, ozone, grinding dust) will reduce the service life of the product.
Check the resistance of the materials of Festo products with respect to the media used and surrounding media
➔ page 1752.

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

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

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

All technical data is correct at the time of going to print.
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All technical data is subject to change according to technical updates.

Storage conditions

Temperature
The temperature range in storage areas must be between 10 °C and 40 °C all year round. Rapid changes of temperature in the storage area should be avoided. Heat sources such as heating elements, heating pipes and the like should be shielded to ensure the stored goods are not directly subject to radiant heat.

UV radiation
No direct sunlight (skylights, vent flaps, etc.) and no high-UV artificial lighting. Use fluorescent tubes with UV protection.

Ambient air
Air circulation and permanently feeding (proportionally) ambient air to the storage room is absolutely essential.
You must prevent any media that may affect the materials, e.g. solvents and the like arising from production processes, from entering the storage areas.
The storage location should not contain any equipment that generates ozone such as indoor air ionisers or high-voltage equipment.
The relative humidity should not exceed 75%. Condensation must be avoided in all cases.

Dust
The parts must be stored in suitable containers. The storage room must as far as possible be free of dust. Attention should be paid in particular to using abrasion-resistant, non-porous floor coverings, and ingress of dust particles from external sources (ambient air) should be prevented.
When repairs are being made to the building technology systems in the warehouse (welding, grinding etc.), the stored goods should be protected from welding spatter, chips etc.

Adding to/removing from storage
The parts should not be exposed to any extreme fluctuations in temperature.

Mechanical effect
All products, including packs of spare parts/wearing parts for example, should be stored in such a way that they are not mechanically deformed or damaged, i.e. no buckling or sagging, no point loads. Direct contact between elastomer products and copper or manganese for an extended period should also be avoided because of possible reciprocal effects.

Stock management
To avoid storing parts for long periods of time, the first-in first-out principle should be followed. The total storage duration should be kept as short as possible. In principle, the specified guarantee periods apply.

Transport conditions

In principle, there are no restrictions in terms of operating conditions during land/sea or air transport, provided the products are sufficiently protected in accordance with the specifications in the product data sheet by using appropriate product and shipping packaging. If necessary, special transport such as temperature-controlled transport can be organised. However, this should be agreed contractually and as a separate financial matter.

Standards in pneumatics

Standards in pneumatics

Standards are also of great importance in pneumatics. Standards mean harmonisation. Standardisation is also the basis for the free trade of goods and services between companies nationally as well as internationally. Standards in industry describe the latest state of technology. They provide a common basis for the evaluation of technical aspects. Standards relevant for pneumatics deal with dimensions, safety and quality. Festo has for many years been actively working with the relevant national and international standards organisations.

Pneumatic drives

- Standards-based cylinders to ISO 6432
- Standards-based cylinders to ISO 21287
- Standards-based cylinders to ISO 15552 (ISO 6431, DIN ISO 6431, VDMA 24 562), NFE 49003.1 and UNI 10290.
- Rod clevises to ISO 8140 and DIN 71752
- Rod eyes to ISO 12240-4, dimension series K

Valves/valve terminals

- Valve terminals for standard valves
- Solenoid and pneumatic valves with port pattern to ISO 15407-1
- Valve sub-bases to ISO 15407-1
- Valve terminals with port pattern to ISO 15407-2
- Solenoid and pneumatic valves with port pattern to ISO 5599-1
- Valve terminals with port pattern to DIN ISO 5599-2
- Valve sub-bases with port pattern to ISO 5599-1 and external dimensions to VDMA 24345
- Solenoid valves with port pattern to VDI/VDE 3845 (NAMUR)

Compressed air preparation

- Compressed air quality according to ISO 8573-1 (2010)
- Bourdon tube pressure gauge to EN 837-1
- Capsule pressure gauge to EN 837-3
- Reservoirs to directive 2014/68/EU, 2014/29/EU or EN 286-1.

Compressed air preparation

Why compressed air preparation?

Properly prepared compressed air helps to prevent faults in pneumatic components. It increases the service life of the components and reduces machine failures and downtime, thereby increasing process reliability.
Compressed air contains contaminants in the form of

- particles,
- water and
- oil.

Water and oil can be in liquid or gaseous form and change from one state to another within the compressed air system. An actual compressed air system will not have any of these contaminants in their pure form; they will occur in a mixture. The composition of this mixture can vary greatly at different times in different places in the system. For example, water can collect in branch lines or particles can become deposited in empty spaces over time, and then suddenly be propelled along by a pressure surge.

Poorly prepared compressed air causes faults such as:

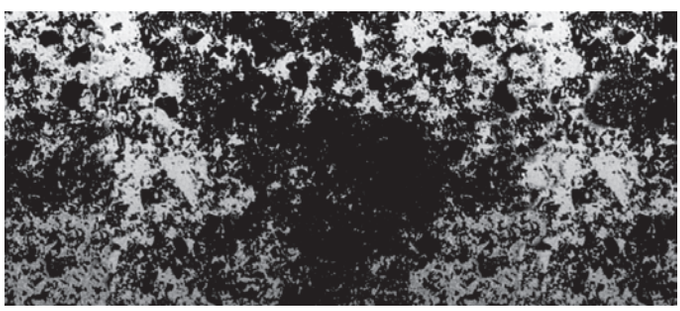
- Accelerated wearing of seals
- Oil-fouled valves in the control section
- Dirty silencers

Possible effects for the user and machine:

- Reduced machine availability
- Higher energy costs due to leakages
- Higher maintenance costs
- Shorter component and system service life

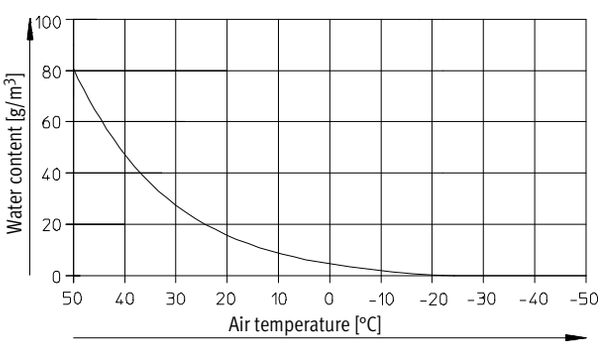
Particles

Particles in the compressed air usually occur in the form of dust (carbon black, abraded and corrosion particles). Metal chips (e.g. from conversion work) and residues of sealants such as PFTE tape can also occasionally get into the compressed air via the compressed air system.
The particles are classified as
fine dust: size 0.1 ... 5 µm and
coarse dust: size > 5 µm
in accordance with ISO 8573-1:2010.



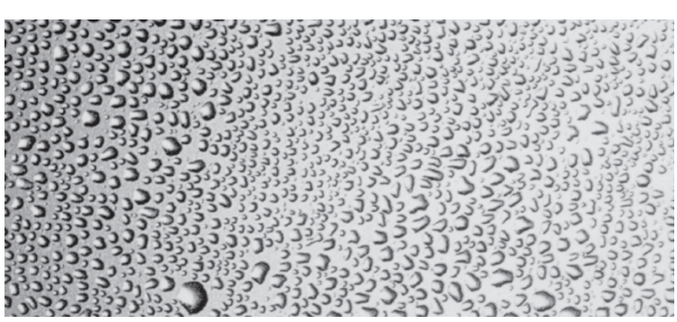
Water content in air

The maximum water content in air (100% relative air humidity) is dependent on temperature. Air can only absorb a certain amount of water (in g) per volumetric unit (in m³), irrespective of pressure. The warmer the air, the more water it can absorb. Excessive humidity manifests itself as condensation. If the air temperature drops, for example from 20 °C to 3 °C, the maximum water content of compressed air is reduced from 18 g/m³ to 6 g/m³. The compressed air can therefore only absorb approx. 1/3 as much water as before. The rest (12 g/m³) is precipitated as drops (dew) and must be drawn off so that it cannot cause any malfunctions.



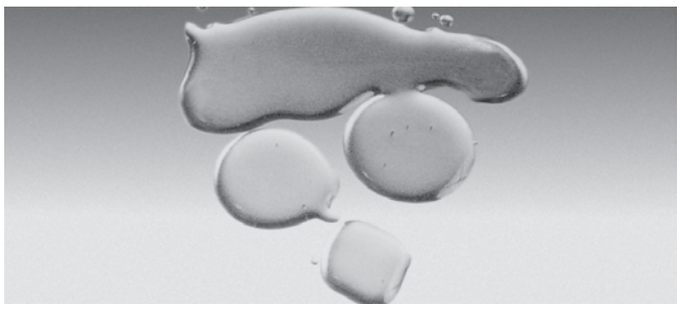
Water condensation

Water is always present in the air in the form of humidity. When compressed air is cooled, water is released in large quantities. Drying helps to prevent corrosion damage in compressed air systems and prevents malfunctions in the connected consuming devices.



Oil contamination

Similarly, in the case of compressors that operate without oil, oil aerosols present in the drawn-in air also lead to a residue of oil pollutants. However, this oil is not suitable for the lubrication of drives and can even lead to the clogging of sensitive parts.



How clean should compressed air be?

The compressed air quality is determined by the requirements

The answer is quite simple: compressed air must be so clean that it cannot cause any malfunctions or damage.

As each filter also creates a flow resistance, compressed air should be as clean as possible for economic reasons.

The wide application range of compressed air places many different requirements on compressed air quality.

If high quality is required, several filtration stages are necessary ➔ page 1740. If just a single "fine" filter were used, it would quickly become ineffective.

Sizing

Note

Equipment at an air branching/ air distribution input should have a high flow rate as it must supply the total demand for air.

More information ➔ Chapter 13

The size of the service unit depends on the system's air consumption. Undersizing leads to pressure fluctuations and to reduced filter service life. For cost reasons, high quality compressed air should only be used where it is absolutely necessary. Branching modules between the individual filter stages enable the user to tap off compressed air of various qualities.

Service unit functions

Compressed air filters remove particles and moisture droplets from the air. Particles > 40 ... 5 µm (depending on the grade of filtration) are retained by a sintered filter. Liquids are separated by centrifugal force. The condensate which accumulates in the filter bowl must be emptied from time to time, because it would otherwise be drawn in by the air flow.

Several industries often require finely filtered air. Fine and micro filters are used for this. Fine filters are used for pre-filtering down to a particle size of 1 µm.

Micro filters further purify pilot air, removing practically all remaining water and oil droplets and contamination particles. The degree of compressed air filtration is 99.999% relative to a particle size of 0.01 µm.

The pressure regulator maintains a constant working pressure (secondary side), regardless of the pressure variations in the system (primary side) and the air consumption. Inlet pressure must always be greater than working pressure.

The compressed air lubricator provides pneumatic components with adequate lubricant if required. Oil is drawn from a reservoir and atomised when it comes into contact with the air stream. The lubricator is only functional when the air flow is sufficiently strong.

Compressed air preparation

Lubricated compressed air

The following notes must be observed when lubricated compressed air is used:

- Use Festo special oil OFSW-32 or the alternatives listed in the Festo catalogue (as specified in DIN 51524-HLP 32, viscosity 32 cSt at 40 °C).
- If lubricated compressed air is used, additional lubrication must not exceed 25 mg/m^3 (ISO 8573-1:2010). The quality of compressed air downstream of the compressor must correspond to that of unlubricated compressed air.
- The lifetime lubrication required for unlubricated operation can be "flushed out" when products are operated using lubricated compressed air. This can result in malfunctions if a system is switched back to unlubricated operation after lubricated operation.
- The lubricators should, where possible, always be installed directly upstream of the cylinders used in order to prevent operating the entire system with lubricated air.
- Never over-lubricate the system. To determine the correct lubricator settings, the following "oil form test" can be implemented: hold a piece of white card approx. 10 cm away from the exhaust port (without silencer) of a working valve of the cylinder furthest away. Allow the system to work for some time; the card should only show a pale yellow colouration. If oil droplets appear, this is an indication that too much oil has been used.
- The colour and condition of the exhaust silencer provide further evidence of over-lubrication. Marked yellow coloration and dripping oil indicate that the lubrication setting is too high.
- Dirty or incorrectly lubricated compressed air will reduce the service life of the pneumatic components.
- Service units must be inspected at least twice a week for condensate and correct lubrication settings. These inspections should be included in the machine maintenance plan.
- To protect the environment, as little lubrication as possible should be used. Festo pneumatic valves and cylinders have been designed in such a manner that, under permitted operating conditions, additional lubrication is not required and yet a long service life is guaranteed.

Oil content

A differentiation must be made between residual oil for operation with unlubricated air and additional oil for operation with lubricated air.

Unlubricated operation:
Examinations involving residual oil content have revealed that the various types of oil have entirely different effects. A distinction must therefore be made between the following oil types when analysing the residual oil content:

- Bio-oils: oils based on synthetic or natural ester (e.g. rapeseed oil methyl ester). In this case, residual oil content must not exceed 0.1 mg/m^3. This corresponds to ISO 8573-1:2010 class 2 ➔ Chapter 13. Larger amounts of oil result in damage to O-rings, seals and other component parts (e.g. filter bowls) in pneumatic systems, and may result in premature product failure.
- Mineral oils (e.g. HLP oils to DIN 51524, part 2) or similar oils based on polyalphaolefins (PAO). In this case, residual oil content must not exceed 5 mg/m^3. This corresponds to ISO 8573-1:2010 class 4 ➔ Chapter 13. A higher residual oil content is not permitted, regardless of the compressor oil, because permanent lubrication would otherwise be flushed out over a period of time. This can lead to malfunctions.

Humidity

Max. pressure dew point 3 °C.
Corresponds to ISO 8573-1:2010, at least class 4 ➔ Chapter 13.

Note
The pressure dew point must be at least 10 K lower than the temperature of the medium, since ice would otherwise form in the expanded compressed air.

Solids

Permissible particle load max. 10 mg/m³, particle size max. 40 µm.
Corresponds to ISO 8573-1:2010 class 7 ➔ Chapter 13.

Suitable oils

Special oil in 1 litre containers:
Order code OFSW-32

Note
Optimum compressed air preparation means fewer machine failures and greater process reliability. See **Compressed air quality analysis** ➔ 1726

Purity classes for particles to ISO 8573-1:2010

Class	Maximum number of particles per m³ as a function of particle size d		
	0.1 µm < d ≤ 0.5 µm	0.5 µm < d ≤ 1.0 µm	1.0 µm < d ≤ 5.0 µm
0	As stipulated by the user or supplier of the equipment, stricter requirements than class 1		
1	≤ 20,000	≤ 400	≤ 10
2	≤ 400,000	≤ 6,000	≤ 100
3	Not specified	≤ 90,000	≤ 1,000
4	Not specified	Not specified	≤ 10,000
5	Not specified	Not specified	≤ 100,000

Class	Mass concentration C_p [mg/m³]
6[1)]	$0 < C_p \leq 5$
7[1)]	$5 < C_p \leq 10$
X	$C_p > 10$

1) Air cleaned using universal filters designed for particle sizes of 5 µm (class 6) and 40 µm (class 7) is normally used for the compressed air supply to industrial tools and pneumatic machines. These designs have been used for many years, before the latest systems for measuring particle sizes were developed, and have enabled satisfactory operation while minimising pressure (and therefore performance) losses.
These filters are not 100% efficient; they offer an efficiency of at least 95% based on the specified particle size, i.e. for class 6, 95% of all particles of size 5 µm are filtered; for class 7, 95% of all particles of size 40 µm are filtered (measured as per ISO 12500-3).

Purity classes for humidity and liquid water to ISO 8573-1:2010

Class	Pressure dew point [°C]
0	As stipulated by the user or supplier of the equipment, stricter requirements than class 1
1	≤ −70
2	≤ −40
3	≤ −20
4	≤ +3
5	≤ +7
6	≤ +10

Class	Concentration of liquid water C_w [g/m³]
7	$C_w \leq 0.5$
8	$0.5 < C_w \leq 5$
9	$5 < C_w \leq 10$
X	$C_w > 10$

Purity classes for total oil content to ISO 8573-1:2010

Class	Total concentration of oil (liquid, aerosol and vapour) [mg/m³]
0	As stipulated by the user or supplier of the equipment, stricter requirements than class 1
1	≤ 0.01
2	≤ 0.1
3	≤ 1
4	≤ 5
X	> 5

Compressed air preparation

Compressed air quality in use

Designation to ISO 8573-1:2010 [particle:water:oil]

The class that can be achieved with compressed air preparation depends on the quality of the compressed air downstream of the compressor. The specifications apply to typical compressed air systems (this list is not exhaustive).

Central air preparation		Air distribution	Decentralised air preparation		Typical applications
Component	Class	Class	Component	Class[3]	
Compressor	[–:–:–]	[–:–:–]	Water separator	[–:7:4]	All applications requiring virtually condensate-free compressed air. No defined particle filtering.
Compressor + pre-filter + air dryer	[7:4:4][1]	[–:4:–][2]	Filter 40 µm	[7:4:4]	Operating medium for valves, cylinders, secondary packaging (standard)
			Filter 5 µm	[6:4:4]	Servo-pneumatic positioning with proportional directional control valves, compressed air tools
			Filter 5 + 1 µm	[5:4:3]	Applications with a residual oil content < 0.5 mg/m³, textile industry, pneumatic spinning machines, paper industry
			Filter 5 + 1 + 0.01 µm	[1:4:2]	Applications with a residual oil content < 0.01 mg/m³, e.g. air bearings, painting, powder coating
			Filter 5 + 1 + 0.01 µm + activated carbon filter	[1:4:1]	Applications with a residual oil content < 0.003 mg/m³, reduction of oil vapours and odours, optical instruments, sealing air for precision glass scales/lasers, primary packaging
			Filter 5 + 1 + 0.01 µm + activated carbon filter + membrane air dryer	[1:3:1]	Semiconductor industry, pharmaceutical products
			Filter 5 + 1 µm + adsorption dryer	[2:2:2]	Applications in the low-temperature range, dry process air, powder transportation, food production [1:2:1]

1) Much higher classes are possible with suitable air preparation downstream of the compressor.
2) Pipe systems can increase the particle content of the compressed air (chips, rust, etc.), liquid oil can accumulate in some lines of the compressed air distribution system. Specifications apply at normal room temperature. If parts in the compressed air system are subject to lower temperatures, the humidity class must be chosen so that the pressure dew point is 10 K below the minimum expected temperature.
3) Class to ISO 8573-1:2010 at room temperature (20°C).

Definition of the compressed air purity class to ISO 8573-1:2010

The quality of the compressed air is determined by

- solid contaminants (particles),
- humidity and water, and
- oil content.

The air purity class is specified as follows:

A = Particles
B = Humidity
C = Oil content

Example:

ISO 8573-1:2010 [–:7:–]

Particles:	Not defined
Humidity:	≤ 0.5 g/m³
Oil content:	Not defined

Working conditions for valves

Medium

Under normal working conditions, pneumatic valves from Festo can be operated with lubricated or unlubricated compressed air.
If any particular product requires a different quality of compressed air, this is indicated in the technical data for the relevant product.

Operation with unlubricated compressed air is made possible by the selection of the material combination, the shape of the dynamic seals and the basic lubrication applied ex works.
Operation with unlubricated compressed air is not possible under the following working conditions:

- Once the valves have been operated with lubricated compressed air, it is essential that lubricated compressed air is always used subsequently since the oil in the lubricated air will have flushed away the basic lubrication.
- In all cases, a grade of filtration is required that removes contaminants up to 40 µm (standard filter cartridge version).

Micro compressed air filtration may be required for special applications.

Nominal size

The nominal width provides information about the smallest cross section in the main flow of the valve. It specifies the diameter of the orifice and is expressed in mm. This is a measurement that only provides a limited comparison between different components. To compare products, the standard nominal flow rate must also be considered.

Standard nominal flow rate

The standard nominal flow rate qnN is the flow rate characteristic used by Festo for a device or component expressed in l/min.

The standard nominal flow rate qnN is the flow rate based on standard conditions (to DIN 1343) under the following measurement conditions:
- Test medium air
- Temperature 20 ±3 °C (temperature of medium)
- Test specimen at ambient temperature
- The pressures to be set are for components with constant cross section (e.g. directional control valves):
  Input pressure p_1 = 6 bar
  Output pressure p_2 = 5 bar

Standard conditions to DIN 1343:
- t_n = 0 °C (standard temperature)
- p_n = 1.013 bar (standard pressure)

Exception 1:
Silencers
Input pressure p_1 = 6 bar
Output pressure $p_2 = p_{amb}$
p_{amb} = atmospheric pressure

Exception 2:
Low-pressure components
Input pressure p_1 = 0.1 bar
Output pressure $p_2 = p_{amb}$

Exception 3:
For pressure regulators:
Input pressure p_1 = 10 bar (constant) and output pressure p_2 = 6 bar at q = 0 l/min are set for the test specimen. Subsequently, the flow rate is slowly and constantly increased using the flow control valve until the output pressure reaches a value of p_2 = 5 bar. The resulting flow rate is measured.

Pressure and pressure ranges
Pressure

Force per area. There is a difference between differential pressure with respect to atmosphere and absolute pressure. Pressure specifications for pneumatic devices must normally be assumed to be the differential pressure with respect to atmosphere, unless expressly indicated otherwise.

Symbols
Differential pressure with respect to atmosphere p
Absolute pressure p_{abs}
Unit: bar, Pa (pascal)
1 bar = 100000 Pa

Operating pressure

Data quoted as "max." or "max. permissible" values refer to the maximum safe pressure at which a component or system can be operated.

Operating pressure range

This is the range between the lowest required and highest permissible operating pressure for safe operation of a component or system. In pneumatics, this pressure range is also referred to as the working pressure range.

Pilot pressure range

The range between the lowest required and highest permissible pilot pressure for correct operation of a valve or system.
The following pressures, for example, have been standardised to ISO 4399:
2.5, 6.3, 10, 16, 40 and 100 bar.

Drop-off pressure

Pressure which, if no longer maintained, causes a monostable directional control valve to return to the normal position by its spring.

Absolute pressure

Zero pressure occurs in a completely air-free space (100% vacuum). Pressure that is calculated from this theoretical zero point is absolute pressure.

Response pressure

Pressure at which a directional control valve is actuated. Catalogue specifications for response pressure signify that the indicated minimum pressure must be present at the signal input to safely switch the valve.

Port designations of pneumatic components to ISO 5599

Port designations

	Using ISO 5599 numbers (5/2-way and 5/3-way valves)	Using letters[1]
Supply port	1	P
Working ports	2	B
	4	A
		C
Exhaust ports	3	S
	5	R
		T
Pilot ports (signal)	10[2]	Z[2]
	12	Y
	14	Z
Pilot air ports (power supply)	81 (12)	
	81 (14)	
Pilot exhaust ports	83 (82)	
	83 (84)	
Leakage lines		L

1) Still frequently used.
2) Clears the output signal.

Working conditions for drives

Medium

Under normal working conditions, pneumatic drives from Festo can be operated with lubricated or unlubricated dried compressed air. If any particular product requires a different quality of compressed air, this is indicated in the technical data for the relevant product. Operation with unlubricated compressed air is made possible by the choice of materials used, the material combinations, the shape of the dynamic seals and the basic lubrication applied ex works. Operation with unlubricated compressed air is not possible under the following working conditions: Once the drives have been operated with lubricated compressed air, it is essential that lubricated compressed air is always used subsequently since the oil in the lubricated air will have flushed away the basic lubrication.

Ambient conditions

Take the ambient conditions at the place of use into consideration. Corrosive, abrasive and dusty environments (e.g. water, ozone, grinding dust) will reduce the service life of the product. Check the resistance of the materials of Festo products with respect to the media used and surrounding media ➔ page 1752.

Intended use

Pneumatic drives are intended to convert pressure energy into motion energy; this process involves the transmission and transfer of forces. "Intended use" does not include use as a spring or cushioning component, since this would involve additional loads.

Frequency

If pneumatic drives are operated at maximum possible speed, a pause time must be taken into account between the stroke movements.

Assembly position

In general, drives from Festo can be installed in any position. Any limitations or special measures are indicated in the technical data for the relevant product.

Operating pressure

"Max." or "max. permissible" values refer to the maximum safe pressure at which a drive or system can be operated.

Operating pressure range

This is the range between the lowest required and highest permissible operating pressure for safe operation of a component or system. In pneumatics, this pressure range is also referred to as the working pressure range.

Effective force with single-acting cylinders

Permissible deviation of spring forces in accordance with DIN 2095, quality class 2, must be taken into consideration for the cylinders' effective force. The effective force is also reduced by the value of prevailing frictional forces. The degree of friction depends on the mounting position and the type of load involved. Lateral forces increase friction. Frictional force must be lower than the spring return force. Single-acting cylinders should as far as possible be operated without lateral forces.

Permissible stroke deviations for standard cylinders

ISO 15552 (corresponds to the withdrawn standards ISO 6431, DIN ISO 6431, VDMA 24562, NF E 49003.1, UNI 10290), ISO 6432 and ISO 21287 permit a certain amount of stroke length deviation from the nominal value due to manufacturing tolerances. These tolerances are always positive. Refer to the table for details regarding precise permissible deviations.

Standard	Piston ∅ [mm]	Stroke length [mm]	Permissible stroke deviation [mm]
ISO 6432	8, 10, 12, 16, 20, 25	0 ... 500	+1.5
ISO 15552	32	0 ... 500	+2
	40, 50	500 ... 12,500	+3.2
	63	0 ... 500	+2
	80, 100	500 ... 12,500	+4
	125, 160	0 ... 500	+4
	200, 250, 320	500 ... 2,000	+5
ISO 21287	20, 25	0 ... 500	+1.5
	32, 40, 50	0 ... 500	+2
	63, 80, 100	0 ... 500	+2.5

Note
In the case of stroke lengths larger than those shown in the table, the tolerances must be agreed upon between the manufacturer and the user.

Contactless position sensing

Pneumatic drives from Festo with contactless position sensing are fitted with a permanent magnet on the cylinder piston, the magnetic field of which is used to actuate proximity sensors. Proximity sensors can be used to detect end or intermediate positions of cylinders. One or more proximity sensors can be clamped to a cylinder, either directly or using mounting kits.

Piston diameter

- ∅ -

This pictogram is used to indicate the piston diameter. This is just represented by ∅ in the dimensions table.

Pressure/force table

Piston force [N]

∅	Operating pressure [bar]							
	1	2	3	4	5	6	7	8
2.5	0.4	0.9	1.3	1.8	2.2	2.7	3.1	3.5
3.5	0.9	1.7	3.8	3.5	4.3	5.2	6.1	6.9
5.35	2	4	6.1	8.1	10.1	12.1	14.2	16.2
6	2.5	5.1	7.6	10.2	12.7	15.3	17.8	20.4
8	4.5	9	13.6	18.1	22.6	27.1	31.7	36.2
10	7.1	14.1	21.2	28.3	35.3	42.4	49.5	56.5
12	10.2	20.4	30.5	40.7	50.9	61.0	71.3	81.4
16	18.1	36.5	54.3	72.4	90.5	109	127	145
20	28.3	56.5	84.8	113	141	170	198	226
25	44.2	88.4	133	177	221	265	309	353
32	72.4	145	217	290	362	434	507	579
40	113	226	339	452	565	679	792	905
50	177	353	530	707	884	1,060	1,240	1,410
63	281	561	842	1,120	1,400	1,680	1,960	2,240
80	452	905	1,360	1,810	2,260	2,710	3,170	3,620
100	707	1,410	2,120	2,830	3,530	4,240	4,950	5,650
125	1,100	2,210	3,310	4,420	5,520	6,630	7,730	8,840
160	1,810	3,620	5,430	7,240	9,050	10,900	12,700	14,500
200	2,830	5,650	8,480	11,300	14,100	17,000	19,800	22,600
250	4,420	8,840	13,300	17,700	22,100	26,500	30,900	35,300
320	7,240	14,500	21,700	29,000	36,200	43,400	50,700	57,900

Piston force [N]

∅	Operating pressure [bar]						
	9	10	11	12	13	14	15
2.5	4	4.4	4.9	5.3	5.7	6.2	6.6
3.5	7.8	8.7	9.5	10.4	11.3	12.1	13
5.35	18.2	20.2	22.2	24.3	26.3	28.3	30.3
6	22.9	25.4	28	30.5	33.1	35.6	38.2
8	40.7	45.2	49.8	54.3	58.8	63.3	67.9
10	63.6	70.7	77.8	84.8	91.9	99	106
12	91.6	101	112	122	132	143	153
16	163	181	199	217	235	253	271
20	254	283	311	339	368	396	424
25	398	442	486	530	574	619	663
32	651	724	796	869	941	1,010	1,090
40	1,020	1,130	1,240	1,360	1,470	1,580	1,700
50	1,590	1,770	1,940	2,120	2,300	2,470	2,650
63	2,520	2,810	3,090	3,370	3,650	3,930	4,210
80	4,070	4,520	4,980	5,430	5,880	6,330	6,790
100	6,360	7,070	7,780	8,480	9,190	9,900	10,600
125	9,940	11,000	12,100	13,300	14,400	15,500	16,600
160	16,300	18,100	19,900	21,700	23,500	25,300	27,100
200	25,400	28,300	31,100	33,900	36,800	39,600	42,400
250	39,800	44,200	48,600	53,000	57,400	61,900	66,300
320	65,100	72,400	79,600	86,900	94,100	101,000	109,000

The piston force F can be calculated from the piston area A, the operating pressure p and the friction R using the following formulae:

Piston force (final pressure)

$$F = p \cdot A - R$$

$$F = p \cdot 10 \cdot \frac{d^2 \cdot \pi}{4} - R$$

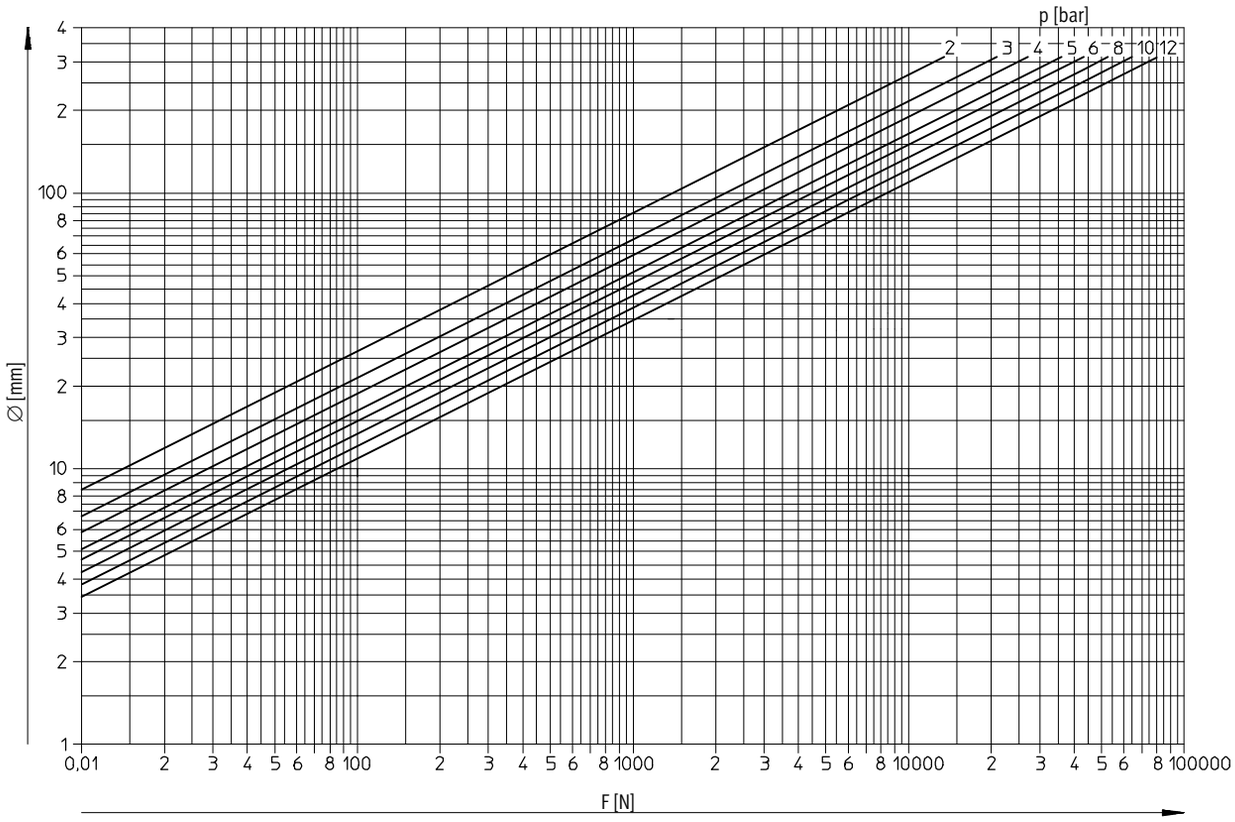
p	= Operating pressure	[bar]
d	= Piston diameter	[cm]
R	= Friction ~10%	[N]
A	= Piston area	[cm²]
F	= Effective piston force	[N]

ProPneu software tool for sizing can be found on the DVD and at www.festo.com

Pressure/force graph

Operating pressure p as a function of piston diameter and force F

An allowance of 10% has been included for frictional force



Given:
Load: 800 N
Available system pressure: 6 bar

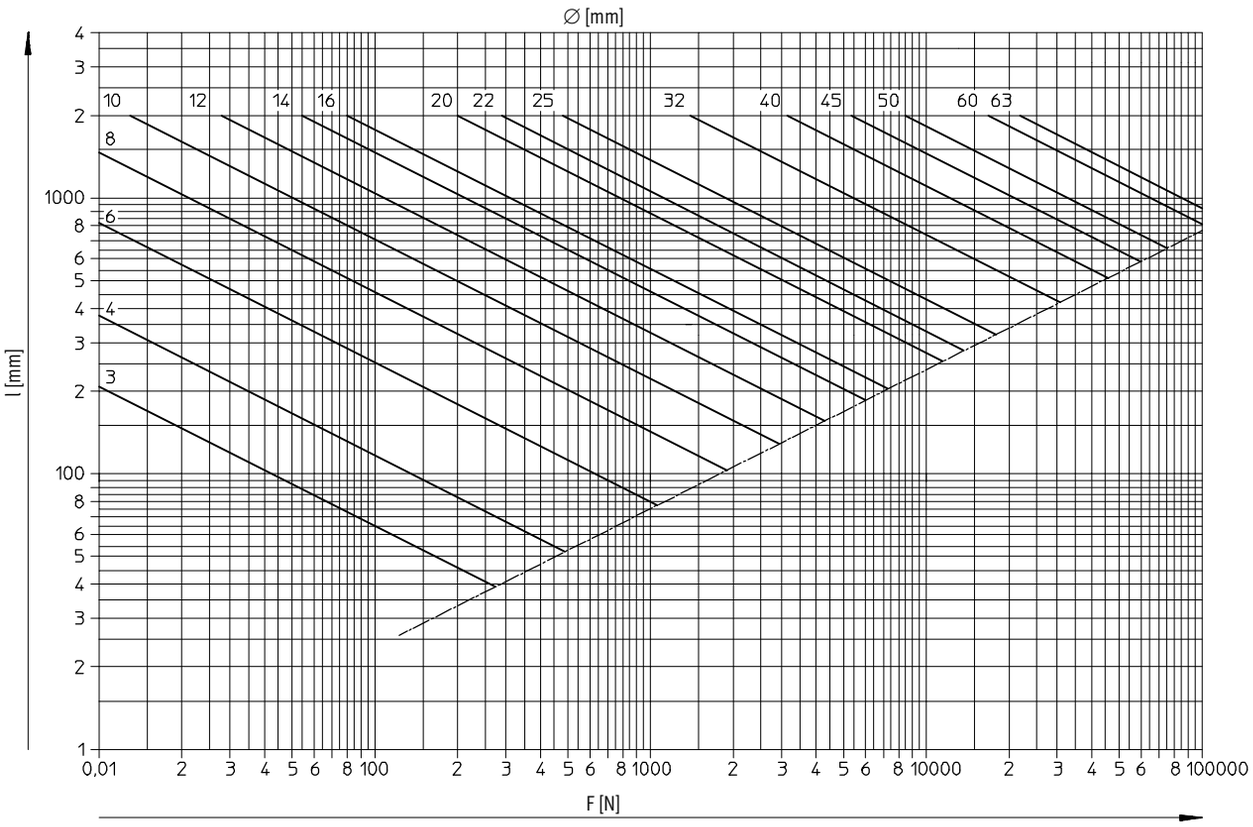
To be calculated:
Required piston diameter
Operating pressure to be set

Procedure:
From F = 800 N go straight up where it intersects the 6 bar line. The next largest piston diameter, 50 mm, lies between the lines for 4 and 5 bar, which means that the operating pressure should be set to approx. 4.5 bar.

The selection of pneumatic drives is determined primarily by the forces to be overcome and the distances to be travelled. A small percentage of the piston force is used to overcome friction, the remainder is used to drive the load.
Only approximate values can be given, since friction force depends on numerous factors (lubrication, operating pressure, back pressure, seal design, etc.). Back pressure generates a force which acts in the opposite direction and partially cancels out the effective force. Back pressure occurs in particular when exhaust air flow controls are used or the exhaust port is constricted.

Buckling load graph

Piston rod diameter as a function of stroke length l and force F



Given:
Load: 800 N
Stroke length: 500 mm
Piston diameter: 50 mm

To be calculated:
Piston rod diameter
Cylinder type: Standard cylinder

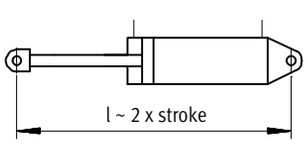
Procedure:
From F = 800 N go straight up where it intersects the horizontal line through l = 500 mm. The next largest piston rod diameter in the graph is 16 mm.
The standard cylinder DNC-50-500 with a piston rod diameter of 20 mm is suitable for this stroke length.

Due to buckling stress, the maximum permissible load for a piston rod with a long stroke length is lower than the value suggested by the maximum permissible operating pressure and piston area.
This load must not exceed certain maximum values. These depend on stroke length and piston rod diameter.

The graph shows this relationship based on the following formula:

$$F_K = \frac{\pi^2 \cdot E \cdot J}{l^2 \cdot S}$$

F_K = Permissible buckling force [N]
E = Modulus of elasticity [N/mm²]
J = Moment of inertia [cm⁴]
l = Buckling length
= 2x stroke length [cm]
S = Safety factor (selected value: 5)



Note
The least satisfactory type of mounting for this kind of stress is a swivel mounting. The permissible load is higher for other types of mounting.

Air Consumption engineering software

The "Air Consumption" engineering software determines the air consumption of a cylinder (approximate value), taking into consideration the following parameters:

- Mode of operation of the cylinder
- Piston diameter
- Number of cycles
- Stroke length
- Operating pressure

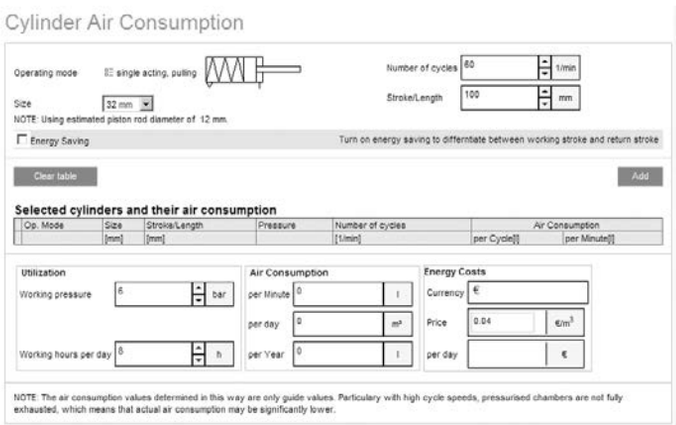
This tool can be found online under Support in the Engineering design area.

Calculating air consumption using the engineering software

Given:
Cylinder: DNC-32-500
Piston diameter: 32 mm
Piston rod diameter: 12 mm
Stroke length: 500 mm
Operating pressure: 6 bar
Number of cycles per minute: 60 1/min

To be calculated:
Air consumption

Result:
Once the parameters have been entered, the following values are returned for the air consumption:
Per cycle: 5.23 l
Per minute: 314.03 l



Calculating air consumption using the formula

$$Q = \frac{\pi}{4} \cdot (d1^2 - d2^2) \cdot h \cdot (p + 1) \cdot 10^{-6}$$

Q = Air consumption per cm stroke [l]
d1 = Piston diameter [mm]
d2 = Piston rod diameter [mm]
h = Stroke [mm]
p = Operating pressure, relative [bar]

Forward stroke:

$$Q = \frac{\pi}{4} \cdot (32mm)^2 \cdot 500mm \cdot (6bar + 1bar) \cdot 10^{-6}$$

$$Q = 2,815l$$

Return stroke:

$$Q = \frac{\pi}{4} \cdot ((32mm)^2 - (12mm)^2) \cdot 500mm \cdot (6bar + 1bar) \cdot 10^{-6}$$

$$Q = 2,419l$$

Air consumption per cycle:

$$Q = 2,815l + 2,419l = 5,234l$$

Pneumatics and explosion protection – ATEX

What does ATEX mean?

Explosive atmospheres are a constant hazard in the chemical and petrochemical industries because of the processing techniques used. These explosive atmospheres are caused by escaping gas, vapours and mist, for example. Explosive atmospheres can also occur in mills, silos and sugar and feed processing plants because of the dust/oxygen mixtures there. Electrical equipment in potentially explosive areas is therefore subject to a special directive, 2014/34/EU. This directive was also extended to non-electrical equipment on 1 July 2003.

ATEX - Directive 2014/34/EU

ATEX is an acronym of the French expression "Atmosphère explosible".

- Directive 2014/34/EU stipulates the minimum safety requirements for equipment and protective systems that are to be operated in explosive atmospheres and that have their own ignition sources.
- It applies to the sale of equipment and protective systems within the European Economic Area.
- It relates to both electrical and non-electrical devices, if they have their own potential ignition source.

Dual responsibility

When equipment for explosion protection areas is being produced, system manufacturers and component suppliers must work closely together to ensure that the correct category and explosion protection zone are chosen.

Explosion protection documentation from system manufacturer	Festo/equipment supplier
System rating Directive 1999/92/EC Result: • Zone classification • Temperature classes • Explosion groups • Ambient temperature	Equipment rating Directive 2014/34/EU Result: • Equipment categories • Temperature classes • Explosion groups • Ambient temperature
Zone	**Category**

Explosion protection classes

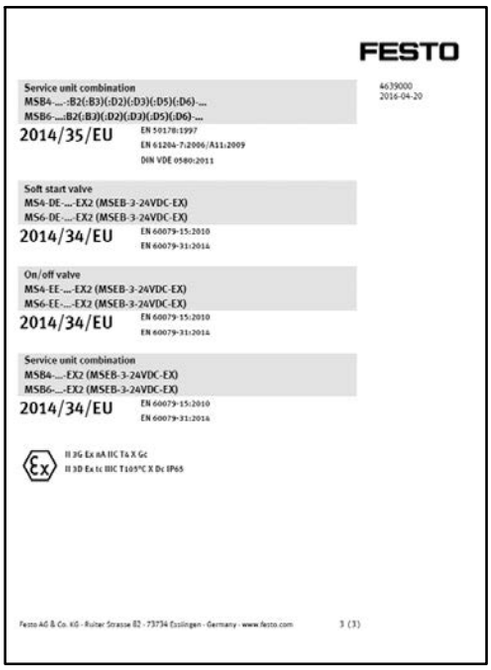
Zone Gas	Zone Dust	Frequency	Equipment group	Equipment category	Area of application
–	–	–	I	M	Mining
				M1	
				M2	
			II	–	All non-mining areas of application
0	–	Constant, frequent, long-term	II	1G	Gas, mist, vapour
–	20		II	1D	Dust
1	–	Occasional	II	2G	Gas, mist, vapour
–	21		II	2D	Dust
2	–	Seldom, short-term in the event of a fault	II	3G	Gas, mist, vapour
–	22		II	3D	Dust

ATEX at Festo

→ **www.festo.com**/atex

Products requiring approval

Products requiring approval are those that have their own potential ignition risk. They are labelled with the CE marking and the explosion protection hexagon; operating instructions and the EU declaration of conformity are provided.


FESTO

Service unit combination
MSB4-...-B2(-B3)(-D2)(-D3)(-D5)(-D6)-...
MSB6-...-B2(-B3)(-D2)(-D3)(-D5)(-D6)-...
2014/35/EU
EN 50178:1997
EN 61204-7:2006/A11:2009
DIN VDE 0580:2011

4639000
2016-04-20

Soft start valve
MS4-DE-...-EX2 (MSEB-3-24VDC-EX)
MS6-DE-...-EX2 (MSEB-3-24VDC-EX)
2014/34/EU
EN 60079-15:2010
EN 60079-31:2014

On/off valve
MS4-EE-...-EX2 (MSEB-3-24VDC-EX)
MS6-EE-...-EX2 (MSEB-3-24VDC-EX)
2014/34/EU
EN 60079-15:2010
EN 60079-31:2014

Service unit combination
MSB4-...-EX2 (MSEB-3-24VDC-EX)
MSB6-...-EX2 (MSEB-3-24VDC-EX)
2014/34/EU
EN 60079-15:2010
EN 60079-31:2014

II 3G Ex nA IIC T4 X Gc
II 3D Ex tc IIIC T105°C X Dc IP65

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Products not requiring approval

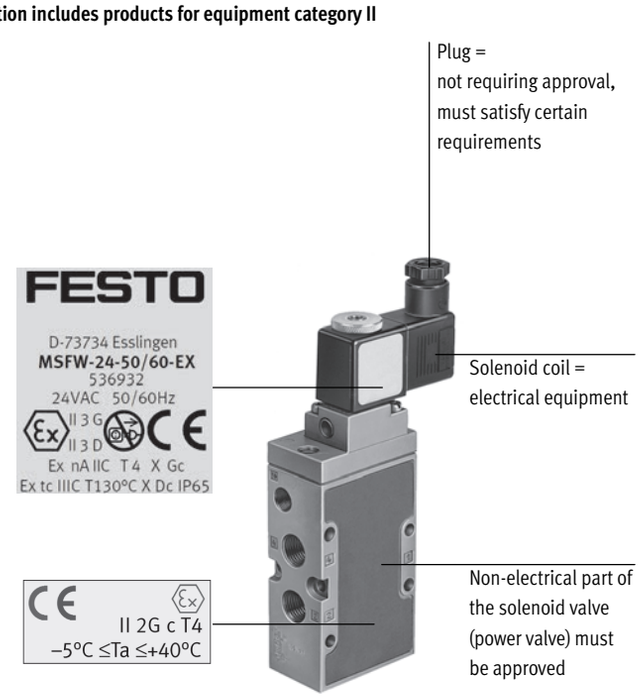
Products not requiring approval are those that do not have their own potential ignition source. These products can be used in specific explosion zones in compliance with our manufacturer's instructions:

- Pneumatic accessories
- Tubing
- Fittings
- Pneumatic sub-bases
- Flow control and shut-off valves
- Non-electrical service units
- Mechanical accessories

Festo's product range for explosion protection includes products for equipment category II

According to Directive 2014/34/EU, both the solenoid coil and the power valve require approval. At Festo, each has a separate rating plate so that it is possible to tell at a glance where the valve may be used.

Important: The equipment with the lowest equipment category defines the category for the module.



For the module in this example:
II 3G T4

Note
The permissible technical catalogue data for the equipment in question as well as the warning notices and safety information in the special documentation provided (including operating instructions or, if applicable, device documentation) must be observed.

EC directives/approvals

EC directives (CE marking)

As a fundamental principle, Festo AG & Co. KG adheres to all applicable regulations and standards. All information is based on the current level of knowledge and is subject to change. We carefully follow any amendments/additions to these regulations and will produce our products accordingly.
This guarantees that products from Festo AG & Co. KG always comply with the currently valid requirements.

Most pneumatic products are not subject to any EC directive and must therefore not be given a CE marking. Currently, products from the sales range of Festo AG & Co. KG that are labelled with the CE marking are subject to one or more of the following six EC directives in Europe.

1. EC Machinery Directive 2006/42/EC, including amendments: 2006/42/EC:2007-03-16 and 2009/127/EC:2009-10-21
Pneumatic products from Festo AG & Co. KG are designed in accordance with the standard for pneumatic systems EN ISO 4414 "Pneumatic fluid power – General rules and safety requirements for systems and their components". Our pneumatic products do not fall within the scope of application specified in the Machinery Directive.

They must therefore not be labelled with the CE marking in accordance with the Machinery Directive. Exceptions to this are safety devices. As of 29 December 2009, incomplete machines also fall under the scope of the Machinery Directive. These include handling systems intended for installation in machines, for example. Incomplete machines are not labelled with the CE marking. A declaration of incorporation is enclosed with the machines instead of a declaration of conformity.

2. EU Electromagnetic Compatibility Directive (2014/30/EU), including amendments.
The directive must be applied to our electronic and electronic/pneumatic products. The corresponding products have the CE marking and the corresponding declaration of conformity is available. For you, this means a guarantee that this equipment complies with the fundamental requirements in industrial areas. The use of this equipment in residential areas is restricted if no additional measures are taken to guarantee compliance with the fundamental requirements of the directive for residential areas.
Solenoid coils are not affected by the EMC Directive.

3. EU Low Voltage Directive (2014/35/EU), including amendments.
Electrical and electronic products from Festo designated for use within specific voltage limits (50 ... 1,000 V AC and 75 ... 1,500 V DC) must be labelled with the CE marking. The corresponding declarations of conformity are available.

4. EU Directive on Simple Pressure Vessels (2014/29/EU), including amendments.
The simple pressure vessels made from non-alloyed steel offered by Festo AG & Co. KG comply with the requirements of this directive.
These air reservoirs require CE marking above a certain volume.
These products are labelled with the CE marking. The declaration of conformity is available.

5. EU Directive on Pressure Equipment (2014/68/EU), including amendments.
The pressure vessels offered by Festo AG & Co. KG comply with the requirements of this directive. These pressure vessels require CE marking above a certain pressure/volume product or pressure/diameter product.
These products are labelled with the CE marking. The declaration of conformity is available.
Reservoirs made from stainless steel are subject to the Directive on Pressure Equipment rather than the Directive on Simple Pressure Vessels.

6. EU Directive on Equipment and Protective Systems for Use in Explosive Atmospheres - ATEX (2014/34/EC).
The products offered by Festo AG & Co. KG which are intended for use in potentially explosive atmospheres and which have their own potential ignition hazards comply with the requirements of this directive. Products that are subject to this directive are correspondingly labelled with the CE marking and identified in compliance with the directive. The corresponding declaration of conformity and the operating instructions are available.

Product markings	
CE	See above
Ex	To EU Directive 2014/34/EU (ATEX) Additional marking for equipment and protective systems for use in accordance with regulations in a potentially explosive atmosphere.
c UL us	UL certification for use in Canada and the USA. Recognized Product intended for installation, for example MPA-S valve terminal.
c UL us	UL certification for use in Canada and the USA. Listed Product, a ready-to-use device, for example limit switch with cable and plug.
c SP us	CSA certification for Canada and the USA.

Design awards

product design award

reddot

Festo products appear regularly on the winners' podium in major design competitions. There is much more to good design than being "pleasing to the eye". The design emphasises and symbolises the cutting-edge technology and long-standing value of Festo products.

Cleanroom suitability

➔ www.festo.com/en/cleanroom

Cost-effective series for cleanroom class 7
At Festo, cost-effective standard pneumatic components take the place of complex special designs because the quality concept applies to virtually all series-produced products. These standard pneumatic components are suitable for use in a class 7 cleanroom to ISO 14644-1.

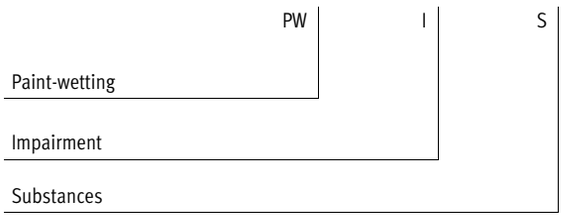
Close-to-standard products for cleanrooms to class 4
Stringent requirements but still an optimum cost/benefit ratio. At Festo, class 4 also means standard products – with just one restriction: they are not available ex-stock. However, they can be delivered to you within the shortest possible time.

Individuality made to measure
If you need to go as far as class 1, the products will be manufactured according to your specific requirements. Festo integrates these application-oriented solutions in close-to-standard production, which means they will be available the next time you need them.

The reliability to meet the highest requirements
Festo works with the Fraunhofer Institute for Production Technology and Automation (IPA) and the renowned Nanyang Technological University in Singapore to ensure that its products meet the high requirements for use in cleanrooms. A dedicated Competence Centre for Cleanroom Technology at Festo Singapore offers the necessary infrastructure for the production of pneumatic cleanroom products.

Paint-wetting impairment substances and resistance to media

PWIS-free products



PWIS are substances that cause small concave indentations at various points in the paint layer when surfaces are painted.
Silicone, fluoric materials, certain oils and greases may contain substances of this kind.

Components used in the automotive industry, and especially in painting equipment, must be free of paint-wetting impairment substances.
Because it is impossible to determine the level of paint-wetting impairment substances contained in substances and components with the naked eye, Volkswagen developed the testing standard PV 3.10.7.
All products from Festo and the lubricants used in them undergo this test.

Products from Festo are free of paint-wetting impairment substances as standard. However, grease containing paint-wetting impairment substances needs to be used for some products for functional and other reasons.

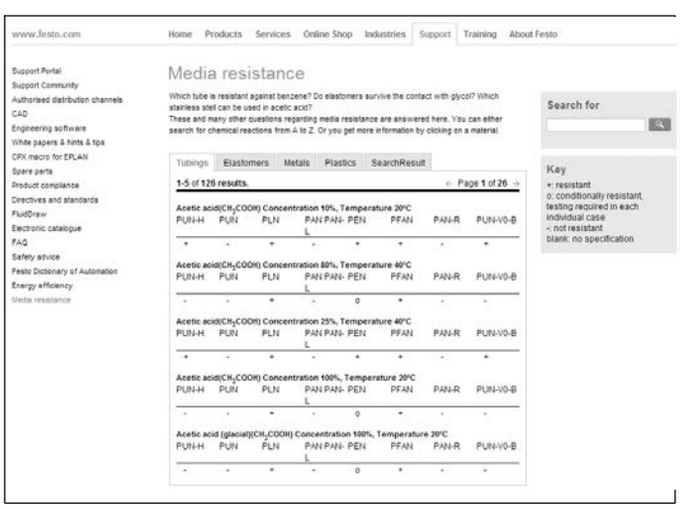
The following are PWIS-free

- Individual parts and modules that are manufactured without using materials, consumables or sundries containing paint-wetting impairment substances. Tests carried out during the sampling procedure as well as random sample tests of incoming goods by extracting them must not cause any paint-wetting impairment effects.
- Liquid or paste-like sundry materials (e.g. lubricating greases) that do not cause any paint-wetting impairment effects through application as a result of the test.
- Products that consist of PWIS-free parts and contain PWIS-free lubricants.

Media resistance database

➔ **www.festo.com/mediaresistance**

It is well known that the resistance of materials depends on many parameters such as concentration of contact medium, temperature, pressure, duration of contact, stroke speed and switching frequency, surface finish in the case of mating frictional parts, flow velocity and stress as well as ageing.
This applies in particular to the compatibility of elastomers with special chemical compounds.
The Festo resistance database shows you the suitable material and its resistance to chemical substances.
The information contained in this database is based on lab tests from raw material manufacturers, material tables from semi-finished product and seal suppliers and practical experience.
The information is evaluated and the tables are created based on the knowledge available. Although every effort has been made to ensure the accuracy of this database, its contents should only be used for reference purposes.
Please note that the recommendations in this resistance database can neither be guaranteed nor serve as the basis for a warranty claim.
Wherever possible and especially in cases of doubt, it is advisable to perform a practical test with the desired product under actual working conditions.



Corrosion resistance class CRC

Corrosion resistance class CRC to Festo standard FN 940070

CRC	Corrosion resistance	Description
0	No corrosion stress	Applies to small, visually irrelevant standard parts such as threaded pins, circlips and clamping sleeves which are usually only available on the market in a phosphated or burnished version (and possibly oiled) as well as to ball bearings (for components ‹ CRC 3) and plain bearings.
1	Low corrosion stress	Dry indoor applications or transport and storage protection. Also applies to parts behind covers, in non-visible interior areas, and parts which are covered in the application (e.g. drive trunnions).
2	Moderate corrosion stress	Indoor applications in which condensation can occur. External visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment.
3	High corrosion stress	Outdoor exposure under moderate corrosive conditions. External visible parts in direct contact with the ambient atmosphere typical for industrial applications, with primarily functional requirements for the surface.
4	Particularly high corrosion stress	Outdoor exposure under extreme corrosive conditions. Parts exposed to aggressive media, for instance in the chemical or food industries. These applications may need to be safeguarded by special testing (➔ also FN 940082) using appropriate media.

Protection classes to IEC/EN 60529

Protection of electrical equipment

The term "IP" (International Protection) is defined by IEC/EN 60529 "Degree of Protection Provided by Enclosures (IP Code)" and DIN 40050 "IP Protection Classes" (standard for electrical equipment in road vehicles). These standards describe the classification of the protection classes provided by enclosures for electrical equipment with rated voltages of up to and including 72.5 kV. They set forth the following:

- Protection of individuals against contact with live or moving components within enclosures (protection against accidental contact).
- Protection of equipment inside the enclosure against ingress of solid foreign matter, including dust (protection against foreign matter).
- Protection of electrical equipment against damage that would result if water were to enter the enclosure (protection against water).

The IP code to IEC/EN 60529

The degree of protection provided by an enclosure is established using standardised testing methods. The IP code is used for classifying this degree of protection. The IP code is made up of the letters IP and a two-digit code number. The definition of both digits is explained in the table below ➔ page 1755.

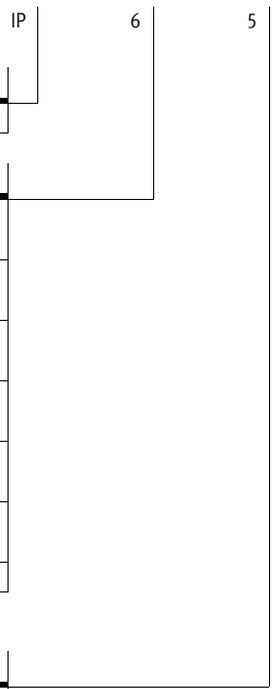
Meaning of digit 1:
Digit 1 denotes firstly the protection of individuals. It specifies the extent to which the enclosure prevents individuals from coming into contact with dangerous parts. The enclosure prevents or restricts the entry of body parts or of objects held by an individual. Secondly, digit 1 specifies the extent to which the equipment is protected against the ingress of solid foreign objects.

Meaning of digit 2:
Digit 2 refers to the protection of equipment. It rates the protection class of the enclosure with respect to the harmful effects on the equipment due to water entering the enclosure.

Note
The food industry generally uses components with degree of protection IP65 (dustproof and water-jet proof) or IP67 (dustproof and capable of brief submersion). The use of IP65 or IP67 depends on the specific application, as each is governed by completely different test criteria. IP67 is not necessarily better than IP65.
A component that fulfils the IP67 criteria does not therefore automatically meet the criteria for IP65.

Protection classes to IEC/EN 60529

IP codes



Code letters	
IP	International Protection

Digit 1	Brief description	Definition
0	Not protected	–
1	Protected against solid foreign objects, 50 mm and larger	A probing object, a ball of 50 mm in diameter, must not enter or penetrate the enclosure.
2	Protected against solid foreign objects, 12.5 mm and larger	A probing object, a ball of 12.5 mm in diameter, must not enter or penetrate the enclosure.
3	Protected against solid foreign objects, 2.5 mm and larger	A probing object, a ball of 2.5 mm in diameter, must not penetrate at all.
4	Protected against solid foreign objects, 1.0 mm and larger	A probing object, a ball of 1 mm in diameter, must not penetrate at all.
5	Protected against dust	The ingress of dust is not completely prevented. The quantity of dust that enters must not impair the safety or satisfactory operation of the equipment.
6	Dustproof	No ingress of dust

Digit 2	Brief description	Definition
0	Not protected	–
1	Protected against water droplets	Vertically falling droplets must not have any harmful effect.
2	Protected against water droplets	Vertically falling droplets must not have any harmful effect when the enclosure is at an angle of 15° either side of the vertical.
3	Protected against spraying water	Water sprayed at any angle of up to 60° either side of the vertical must not have any harmful effect.
4	Protected against splash-water	Water splashing against the enclosure from any angle must not have any harmful effect.
5	Protected against hose water	Water jets directed at the enclosure from any angle must not have any harmful effect.
6	Protected against powerful water jets	Powerful water jets directed against the enclosure from any angle must not have any harmful effect.
7	Protected against the effect of brief submersion in water	Water must not enter the equipment in amounts that can have a harmful effect if the enclosure is briefly submerged in water under standardised pressure and time conditions.
8	Protected against the effect of continuous submersion in water	Water must not enter the equipment in amounts that can have a harmful effect if the enclosure is continuously submerged in water. The conditions must be agreed on between the manufacturer and the user. The conditions must, however, be more stringent than code 7.
9K	Protected against water from high-pressure and steam jet cleaning	Water directed at the enclosure from any angle under high pressure must not have any harmful effect.

Functional earth – protective earth – PELV

Concepts for ensuring protection against electric shock to IEC 60364-4-41/VDE 0100 Part 410

Definitions

Protection against electric shock means protection against indirect and direct contact.

Protection against direct contact implies that under normal operating conditions, live parts which are not insulated are protected against accidental contact.

Protection against indirect contact implies that in the event of an insulation fault between live parts and bodies or enclosures, contact voltages outside of the permissible range cannot occur or are disconnected promptly.

The three best-known and most widely used concepts for ensuring protection against electric shock are also referred to as protection class I to III in specialist literature and standardisation documentation.

Protection class I – Protective earth conductor

In the case of electrical equipment in protection class I, protection against direct contact is ensured by basic insulation.

Protection against indirect contact is provided by prompt disconnection of the fault voltage. This disconnection is ensured by the contact with the protective earth conductor on the equipment enclosure via protective earth.

If an insulation fault occurs in the equipment, the fault current flows via the protective circuit against the earth potential, thereby triggering the upstream fuse element (e.g. residual current device protection or circuit-breaker).

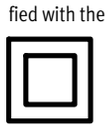
Equipment in protection class I includes lights, white goods (washing machines, dryers, etc.) and industrial machinery.
Symbol:

Protection class II – Protective insulation

In the case of equipment in protection class II, the protection refers to direct and indirect contact with the improved enclosure insulation. The enclosure insulation is reinforced or doubled so that it is not possible to come into contact with contact voltages outside of the permissible range either in the event of a fault or during operation.

Equipment in protection class II must not be connected to the protective circuit. Therefore the equipment does not have a protective contact on the plug.

Equipment in protection class II includes hi-fi components, electric power tools and household appliances and is identified with the following symbol:



Protection class III – Protective extra-low voltage

In the case of equipment in protection class III, protection against direct and indirect contact is ensured both by a sufficiently high IP degree of protection (protection against direct contact with live parts) and electrical supply of the component with PELV (protective extra-low voltage) or SELV (safety extra-low voltage) (protection against indirect contact in the event of a fault).

Equipment in protection class III is frequently identified (no mandatory identification) with the following symbol:

Functional earth – protective earth – PELV

Special protection class for components from Festo

Protection class III

On the basis of the information currently available, all 24 V DC valve terminals (e.g. CPV, MPA), position controllers (e.g. PLCs), sensors (proximity sensors, pressure switches, pressure sensors) and proportional valves from Festo belong to protection class III.

This means that, in the case of the 24 V DC components from Festo, protection against direct and indirect contact is ensured by a sufficiently high IP degree of protection as well as a protective extra-low voltage supply to the component: PELV "Protective Extra-Low Voltage".

The use of a PELV supply ensures that no contact voltages outside of the permissible range can occur in the event of a fault due to the high dielectric strength (4 kV) from the primary to the secondary side.

The earth terminal therefore is a functional earthing (discharge of electromagnetic disturbances) rather than a protective earth function and must always make contact.

Why does Festo use protection class III?

Due to the increasingly compact designs of modern automation components, protection class I is no longer the optimum solution with respect to design size. This is because the standards specify minimum distances for the air and leakage paths, which means that further minimising the size of the components is no longer possible. It is for this reason that protection class III (no protective earth conductor, as protection against electric shock is provided by protective extra-low voltage) is used in modern automation components.

What do customers need to know about installing equipment in protection class III?

The electrical supply to the equipment must only be provided by PELV circuits to IEC/EN 60204-1. The general requirements for PELV circuits to IEC/EN 60204-1 must be taken into account. Power sources are permitted if reliable electrical isolation of the operating voltage to IEC/EN 60204-1 is guaranteed. The earth terminals on the components, where available, are used for discharging electromagnetic disturbances, equipotential bonding and thus ensuring proper functioning. They must be connected to the earth potential with low resistance (short cables with large cross section).

Spark arresting

Spark arresting of switch contacts in circuits with solenoid coils

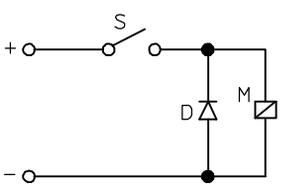
The inductance of solenoid coils stores electromagnetic energy when the circuit is switched on and this is discharged when switched off. Depending on the switch used, this energy is either converted to a voltage peak (switch-off overvoltage), which can cause a breakdown in the insulation, or an arc which can burn away the contacts (material creep). Various types of components can be used to avoid these effects by slowly and constantly discharging the electromagnetic energy.

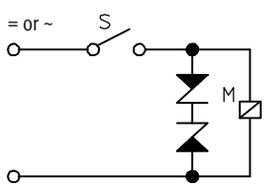
Electronic arc arrestors

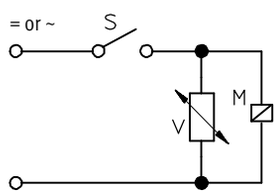
If the polarity in DC circuits is clearly defined, a simple diode can be used, wired parallel to the coil. It must be noted that this considerably increases the solenoid switch-off time.

A more suitable arrangement consists of two breakdown diodes, wired with opposing polarity parallel to the coil, which can be used for DC and AC. This prevents switch-off delay. However, several breakdown diodes must be wired in series for voltages over 150 V.

Varistors are ideal elements for reducing switch-off overvoltage; their leakage current only rises if the rated voltage is exceeded. They are suitable for DC and AC.







100% duty cycle

Within DIN VDE 0580, the 100% duty cycle test covers only the electrical part of the solenoid coil. Festo also includes the pneumatic part in this test.

The worst-case scenario is reviewed in the test. The test constitutes a functional test of the solenoid. If the solenoid is also used on valve terminals, the 100% duty cycle test is performed on the individual device and on equipment in a manifold assembly.

Conditions

- The solenoids are operated with the maximum permissible voltage (continuous operation S1 to DIN VDE 0580).
- The solenoids are subjected to the maximum permissible ambient temperature in a temperature cabinet (non-convecting).
- The solenoids are supplied with the maximum permissible operating pressure with sealed working ports.

Procedure

The solenoids are operated for at least 72 hours under the above conditions. At the end of this period, the following tests are carried out:

- Drop-off current measurement: drop-off behaviour when switched to de-energised state.
- Starting behaviour when immediately energised with the minimum operating voltage and with the least favourable pressure ratios for excitation.
- Leakage measurements.
- Once the results have been recorded, this process is repeated again until the units being tested have reached a total duty cycle of at least 1,000 hours or a termination criterion has been fulfilled.
- Following completion of the 100% duty cycle test, the sealing nipples are inspected visually for damage.

Termination criterion

The drop-off behaviour, starting behaviour or leakage exceeds or falls below the following limit values:

- Drop-off current: > 1.0 mA
- Starting voltage: > UN+10%
- Leakage: > 10 l/h

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