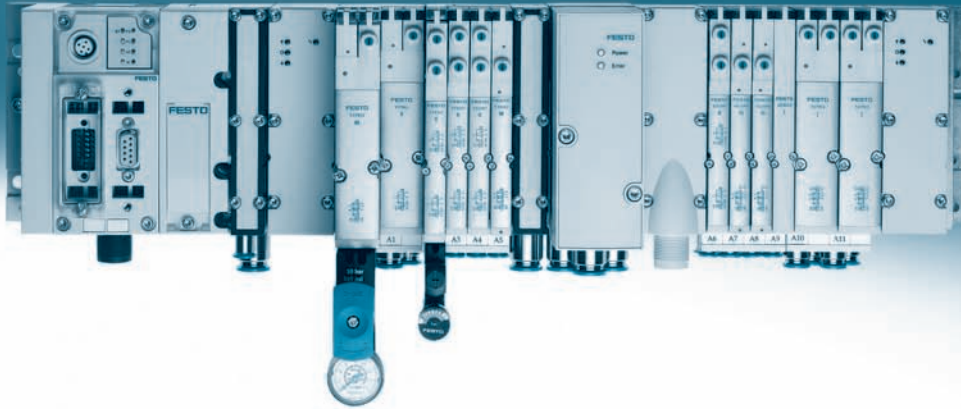


Valve terminal MPA – serial communication for comprehensive diagnostics concepts

FESTO



Compact

Highlights

- Integrated functions:
- 128 valve functions/ 64 valve positions
 - Electrical voltage zones
 - Proportional valves
 - Pressure sensors
 - Diagnostics management
 - Pressure shut-off plate (hot swap)
 - ATEX zones 2 and 22

Maximized function integration, serial communication for electrical and pneumatic components and a comprehensive diagnostics concept – that's what the MPA stands for. It provides more valve functions than any other valve terminal while its compact design sets it apart.

Cutting edge valve technology

In IP65 for centralized and decentralized installation concepts. The valves are durable, flat and robust, while the sub-bases are made of solid metal or plastic, as required.

MPA + CPX = even more options

The perfect combination for an even larger range of applications. Ideal as a standard in factory automation or in the process industry. Maximized process reliability and minimum installation expenses mean excellent cost-effectiveness.

MPA-S – compact

Has all the advantages including reduced overall costs – even in complex installation situations.

MPA-F – optimized flow rate

40 % better performance! One air supply and one exhaust point for more simultaneously switched valves.

MPA-L – modular

Flexible, lighter and less expensive per component. For use in special machine manufacturing and in the process industry.



MPA-S: small + flat



MPA-F: optimized flow rate



MPA-L: modular

MPA+.PSI.US

Product Short Information

World-class functionality, versatile and freely combinable

All-rounder with a broad range of applications

MPA valve terminals cover the majority of all possible applications in the core areas of factory automation and process automation.

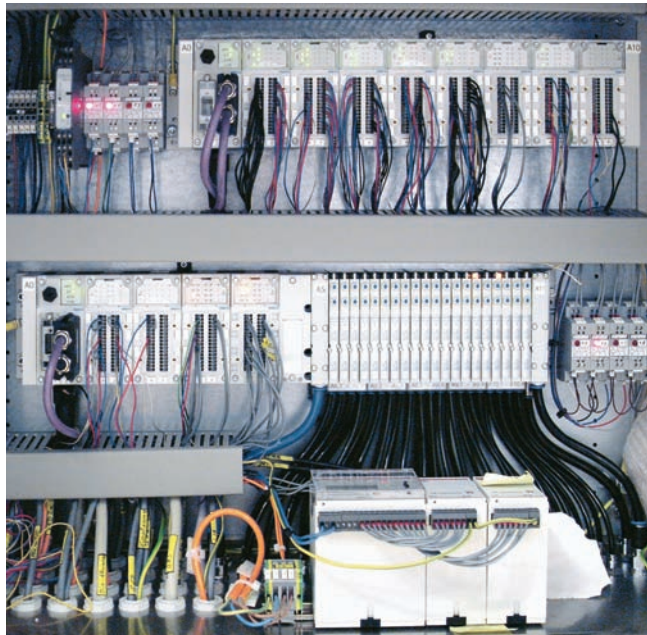
- Compact and space-optimized for high performance directly at the drive
- Or as modular, easy-to-service and configure sub-base valve terminals for centralized installation

The optimized design and varied configuration of the pneumatic port patterns and electrical connection technology are at the heart of the terminals. Ideal for minimizing overall costs as part of the total cost of ownership (TCO).

Valve functions

With an overall length of 107 mm and a width of 10.5 or 21 mm, all valves have the same compact dimensions. The MPA-S, with a height of 55 mm, perfectly matches the electrical periphery CPX.

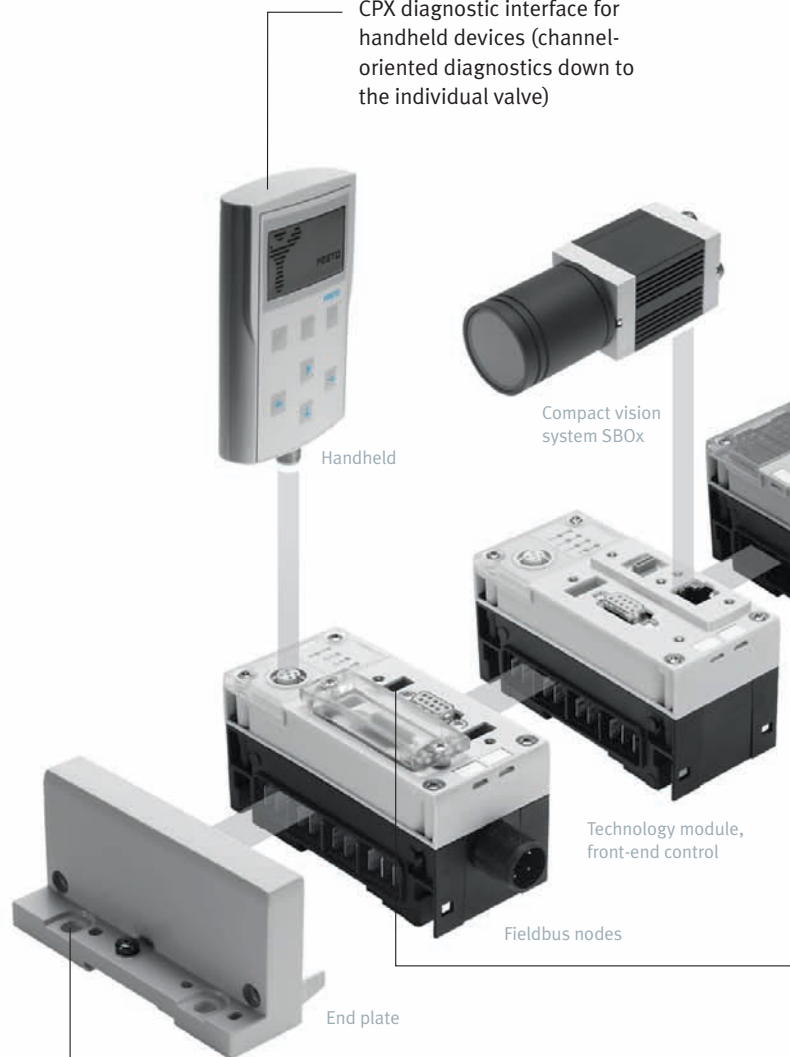
- Vertical valve stacking:
 - Manual pressure regulator
 - Pressure shut-off plate (hot swap)
- Variable:
 - 64 valve positions/ 128 solenoid coils (fieldbus)
 - 24 valve positions/ 24 solenoid coils (multi-pin)
- Space-saving: flat valves and flat plate silencers
- A great variety of valve functions



MPA-S valve terminal as an example of the MPA range

Reliable: operating voltage connection $\pm 25\%$, outputs and valves can be disconnected separately

CPX diagnostic interface for handheld devices (channel-oriented diagnostics down to the individual valve)

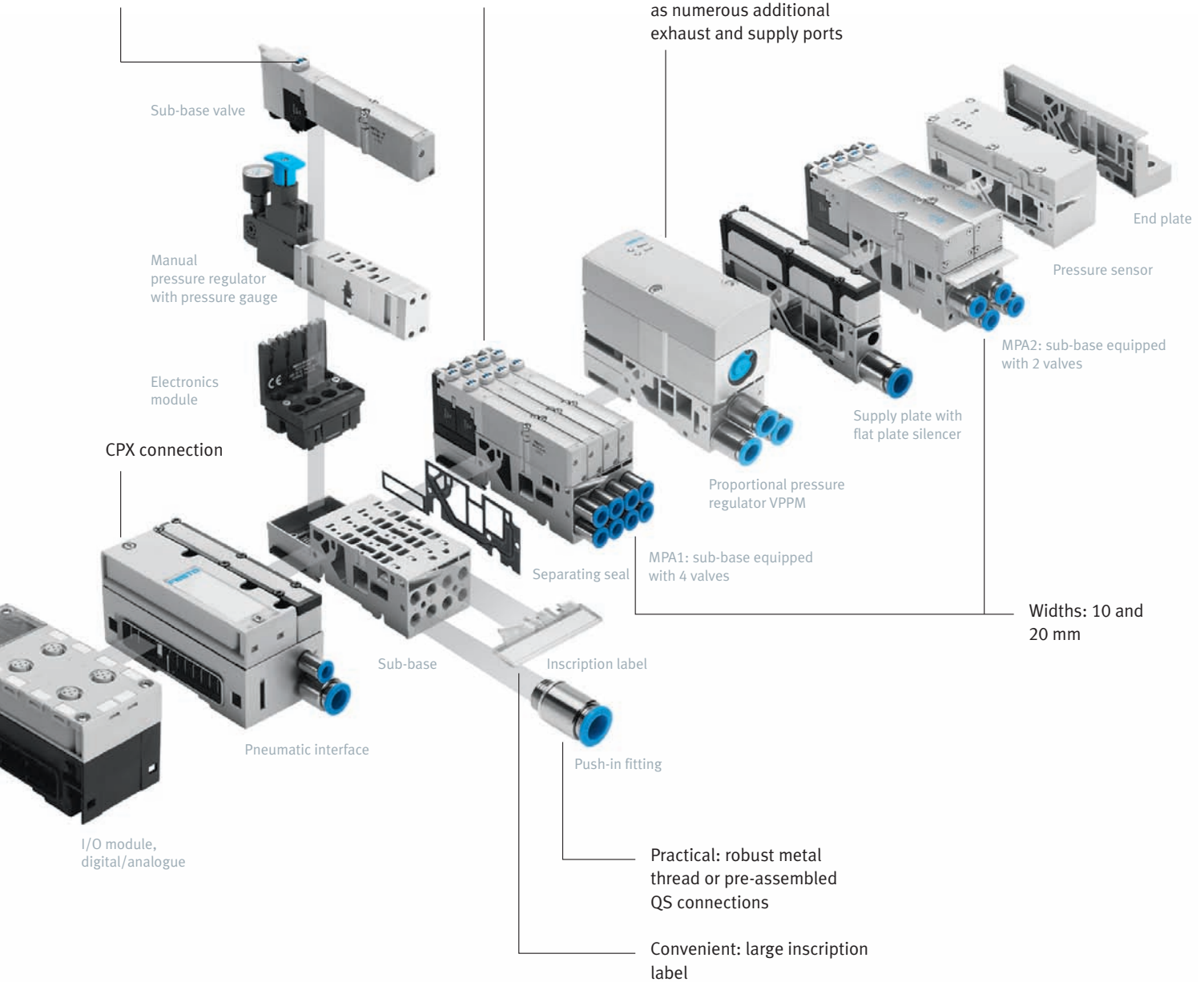


Quick installation: directly with screws or on H-rail, automatic earthing

Safe operation: manual override, non-detenting/detenting or covered

Reduce downtimes: two-color, on-site LED diagnostics

Modular: supply plates facilitate the creation of multiple pressure zones as well as numerous additional exhaust and supply ports



Straightforward electrical connections

- Multi-pin connection
- Fieldbus connection
- Integrated controller (front-end controller)
- AS-interface
- CPI system

Practical: robust metal thread or pre-assembled QS connections

Convenient: large inscription label

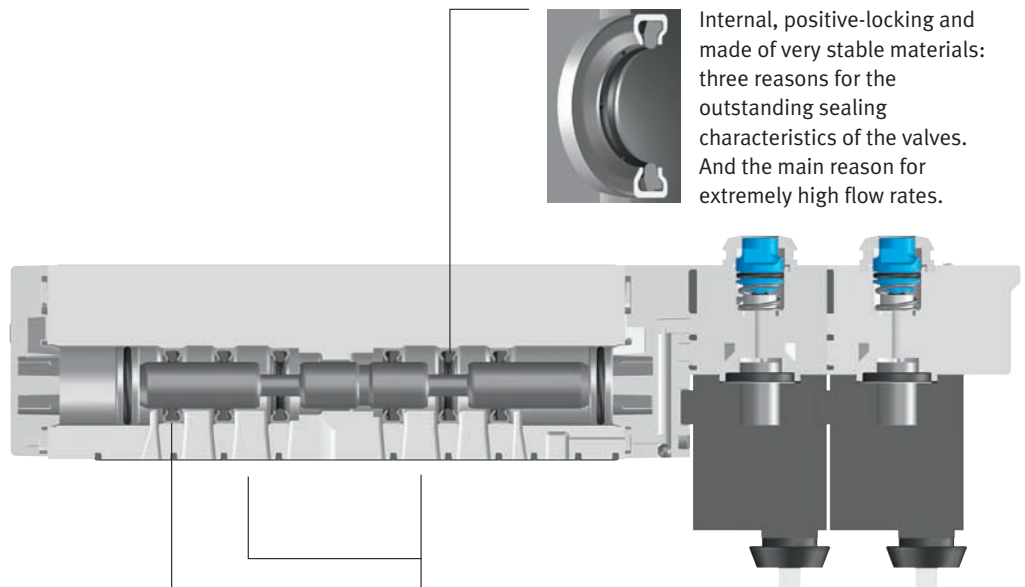
Valve functions

	Piston spool valve with pneumatic spring return		
	Piston spool valve with mechanical spring return		
	Poppet valve made of polymer with mechanical spring return		
5/2-way valve, single solenoid	X		X
5/2-way valve, double solenoid			X
2x 3/2-way valve, normally open	X	X	X
2x 3/2-way valve, normally closed	X	X	X
2x 3/2-way valve, 1x normally open, 1x closed	X	X	X
5/3-way valve, mid-position pressurized		X	
5/3-way valve, mid-position closed		X	
5/3-way valve, mid-position exhausted		X	
2x 2/2-way valve, normally closed		X	X
1x 3/2-way valve, normally closed, external compressed air supply			X
1x 3/2-way valve, normally open, external compressed air supply			X
2x 2/2-way valve, 1x normally closed, 1x normally closed, reversible			X

Leading technology: the cartridge principle

The patented cartridge principle with its internal sealing structure, the contour of the seals and the special seal materials makes Festo valves absolute top performers, even on valve terminals. They are extremely durable, highly flexible and offer outstanding flow rates.

- Up to 100 % more flow
- Smaller valves with higher flow rates for lower costs
- Higher pressure of up to 10 bar for maximized energy density and more power
- Vacuum compatible
- Reversible – two pressures at a single valve at the same time
- Very high temperature ranges
- No overlap – totally reliable separation of the air ducts during dual pressure operation
- Minimal leakage

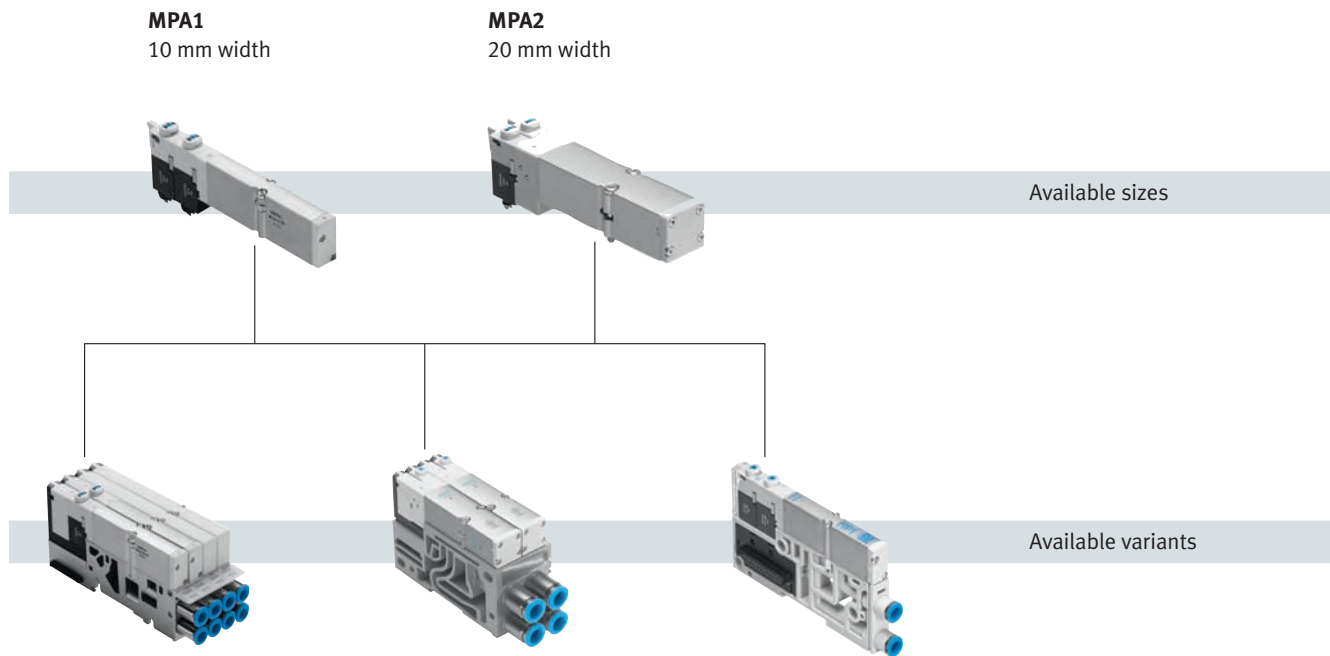


Internal, positive-locking and made of very stable materials: three reasons for the outstanding sealing characteristics of the valves. And the main reason for extremely high flow rates.

Patented: the design, layout and materials of the cartridges ensure their exceptionally high performance.

Reversible: two pressures in a single valve (ports 3 and 5); exhaust air flows through port 1.

Whatever you've got in mind, nearly anything is possible



MPA-S – compact

Integrated functionality, serial communication and an innovative design concept mean that even in critical installation situations all advantages are still assured, including long-term reduction of costs (TCO).

- Integrated pressure sensors and proportional pressure regulators
- Comprehensive communication and diagnostics on the MPA
- With metal sub-base
- For small and mid-sized drives

MPA-F – optimized flow rate

40 % better performance! The MPA-F's superb reliability and top performance make it a winner for applications with demanding requirements.

No shortcuts: it has all the functional and communicative advantages of the MPA-S, but overall costs are reduced.

- Improved switching reliability thanks to more simultaneously switched valves and only one air supply and one exhaust point. Made possible by higher sub-bases and optimized flow cross-sections.
- Integrated pressure sensor

MPA-L – modular

MPA1 flexible system for individual sub-bases – modular in single steps. Pneumatic performance can thus be perfectly adapted to any application, reducing both size and costs.

- Modularity and flexibility
- Valves can be individually combined at any time, or expanded in single steps
- Use of various sizes, making different flow rates possible
- Parallel, internal valve linking
- Durability and inexpensive technical layout
- Very lightweight, corrosion-resistant sub-bases made of plastic
- Sturdy, durable end plates made of coated aluminum

MPA1 (10 mm)
MPA2 (20 mm)

**Modular valve terminals
MPA-S/MPA-F**
Having different flow rates in an application no longer poses a problem!

A combination of MPA1 and MPA2 is possible with MPA-S and MPA-F, thus successfully and efficiently avoiding the use of oversized valves.

All in all: greater energy efficiency as a result of product innovation

Technical data

		MPA-S	MPA-F	MPA-L
Electrical connection	CPX	Profibus DP, DeviceNet, CANopen, CC-Link, Interbus Ethernet/IP, ProfiNet, EtherCAT, front-end controller and more		
	Multi-pin	Sub-D 25-pin	Sub-D 25-pin	Sub-D 9-pin Sub-D 25-pin SubHD 44-pin 34-pin terminal 34-pin ribbon cable
	Other	CP installation system AS-interface		
Valve functions		5/2, 5/3, 2x3/2, 2x2/2, 1x3/2, special functions		
Valve size/flow rate (max.)				
	MPA1 (10 mm)	360 l/min.	360 l/min.	360 l/min.
	MPA2 (20 mm)	700 l/min	900 l/min	–
Solenoid coils/valve positions (max.)				
	Fieldbus	128/64		32/32
	Electrical multi-pin	24/24		32/32
	CP installation system	32/16		
	AS-interface	8/8		
Sub-bases (valve positions)				
	MPA1	4 valves		1 valve/4 valves
	MPA2	2 valves		
Sub-base material		Metal		Plastic
Pressure range (max.)		-1 ... 10 bar (Pressure ranges can be restricted depending on configuration.)		
Supply port 1				
Tubing diameter (max.)				
Metric/imperial size		10 mm / 3/8"	16 mm / 1/2"	12 mm / 1/2"
Working port 2, 4				
Tubing diameter (max.)				
Metric/imperial size				
	MPA1	6 mm / 1/4"	6 mm / 1/4"	6 mm / 1/4"
	MPA2	8 mm / 5/16"	10 mm / 3/8"	
Additional pneumatic functions		<ul style="list-style-type: none"> - Integrated proportional control valves - Manually adjustable pressure regulator 		
	Fieldbus	<ul style="list-style-type: none"> - Electrically isolated valves - Integrated pressure sensor module - Expanded diagnostics function - Condition monitoring 		
Additional electrical functions				
	Fieldbus, CP installation system	Electrical power supply for valves		
Operating voltage		24V ±25 %		
Ambient temperature		-5 ... 50 °C		
Protection		IP65		IP40/IP65

Communication and electrical functions

MPA with fieldbus connection and CPX terminal

As an integrated fieldbus node ensures transmission to the master PLC, both small and large solutions can be implemented for pneumatics and electronics.

Advantages

- Internal serial communication and linking of fieldbus interfaces with up to 16 sub-bases (128 valves, up to 512 I/O)
- Module for electrical valve activation, with or without galvanic isolation
- Electrical supply plates can be configured at any point before or after the sub-bases

- Any desired compressed air supply and creation of pressure zones is possible
- Fieldbus and Ethernet protocols
- Digital and analog I/O
- Control of electric and pneumatic drives
- Diagnostics
- Condition monitoring



Available for:

MPA-S

MPA-F

MPA-L

Your system concept determines the ideal valve terminal solution

Benefit from Festo's selection concept and choose from different solutions with functions and performance that are geared towards the requirements of your industry. Using database-aided software, amongst other tools, we provide you with quick, straightforward and competent support when you make your decision for centralized or decentralized installation.



Centralized installation

- Large number of valves reduces costs
- Function integration saves time and money
- High performance CPX installation system ensures maximum modularity and flexibility

Decentralized installation

- Short tubing lengths for faster pneumatic connections: 30 % shorter cycle times and 50 % less air consumption
- Compact dimensions save space
- Direct connection of compact I/O is possible
- Fieldbus connection

→ Decentralized installation: products and know-how from Festo for an energy-efficient layout of applications with efficient use of resources.



Available for:

MPA-S

MPA-F

MPA-L

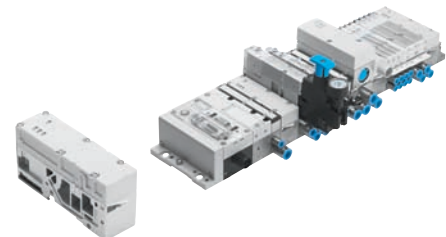
Pressure sensor MPA: ready for installation directly at the fieldbus

Pressure information via fieldbus communication, via handheld control unit or on-site via LED. Pressure range: 0 to 10 bar.

Advantages

- Usable for channels 1, 3 and 5, as well as for external pressure without any assembly and installation effort

- Configuration of the switching points in the central control system
- Excellent process reliability thanks to accurate and tamper-proof information on pressure
- Static and dynamic process controls
- System diagnostics
- Protected against manipulation



Measurement of internal pressure/pressure zones
Measurement of individual pressure from the process

Available for:

MPA-S

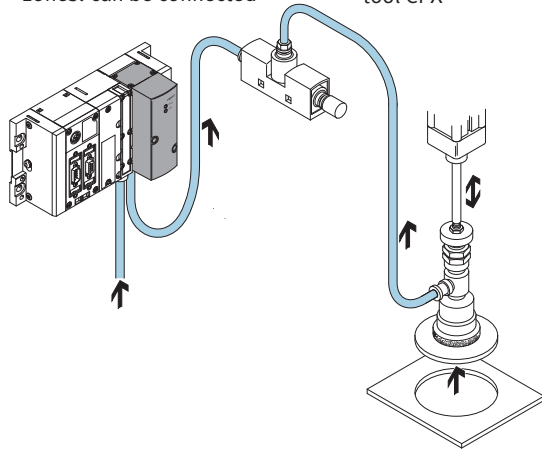
MPA-F

Proportional pressure regulator VPPM-MPA: combined pressure sensing and pressure regulation:

Unique throughout the world! An exceptional combination of two top technologies at the fieldbus: VPPM with MPA. Extremely accurate cascade control enables pressure changes during operation within a range of 0 ... 2/0 ... 6/0 ... 10 bar, and with a flow rate of 1400 liters per minute at the valve.

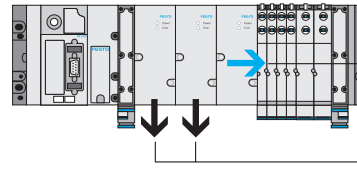
Advantages

- One valve, variable pressure zones: can be connected



sequentially even with several MPA manifold blocks

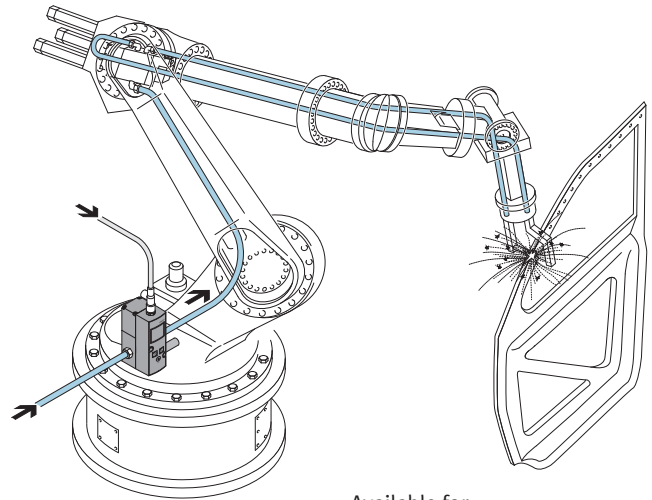
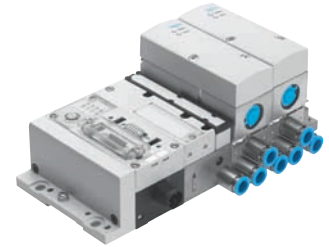
- Digitized analog values: enables individual pressure and force control within processes
- Selection of 3 presets via CPX: for enhanced speed, precision and consistency
- Handheld control unit: for commissioning without fieldbus
- Integrated diagnostic functions, such as, for example: remote maintenance, e-mail/SMS alarms, handheld control unit CPX-MMI or maintenance tool CPX



Pressure zones on the MPA

Individual pressure within the process

Control of internal pressure/ pressure zones
Control of individual pressure from the process



Available for:

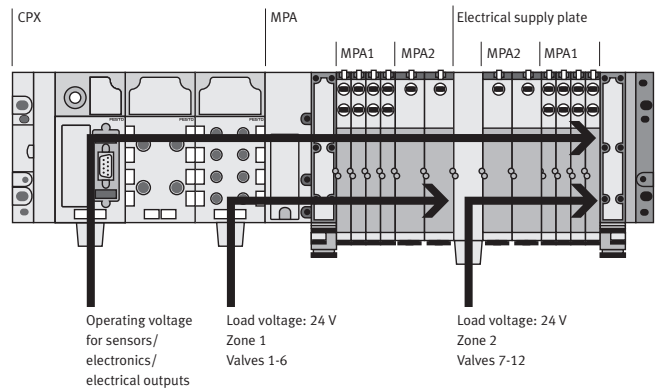


Electrical supply plate for serial valve actuation and large numbers of valves

The targeted creation of voltage zones, also on a single valve terminal, and expansion of the system for the greatest possible number of valves and valve functions definitely provides more scope. It means that valve terminals which previously had to be separated according to supply voltage can now be combined into a single valve terminal with common fieldbus nodes.

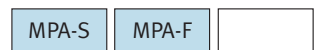
Advantages

- Voltage zones as well as targeted, voltage-free switching are possible
- Individual power supply keeps inputs, sensors and the fieldbus, as well as any other valves, ready for operation on the valve terminal
- M18 or 7/8" electrical connection (4 or 5-pin)



Valve groups with separate voltage zones can be combined at a single fieldbus node.

Available for:



Electronics modules for electrical interfaces

The electronics modules ensure optimized control of the solenoid coils by means of current regulation and also carry out additional, functional tasks. Four MPA1 or two MPA2 valves can be connected electrically to the serial fieldbus.

The following modules can be selected, depending on the application:

- Standard for monitoring operating voltages of 24 V DC $\pm 25\%$ and for reliable functioning of the valves after voltage drops
- With separate 0 V electrical circuits in order to isolate the electronics from the valves
- Diagnostics for detecting and monitoring undervoltage, open load and short-circuiting, as well as for condition monitoring



Available for:

MPA-S	MPA-F	
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MPA with individual connection

Valves with individual sub-bases can be used for actuators which are further away from the

valve terminal. A 4-pin, threaded M8 electrical connection is required in this case.



Available for:

MPA-S		
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MPA with multi-pin plug connection

The valve terminal can be equipped with up to 24 solenoid coils, which corresponds to 4 to 24 MPA1 or 2 to 24 MPA2 valves, or a combination of both. The MPA-L can take up to 32 valves.

Advantages

- Actuation via 24 V outputs
- Simple installation of the multi-pin cable in the machine
- Optional cable for energy chains
- Any desired compressed air supply and creation of pressure zones



Available for:

MPA-S	MPA-F	MPA-L
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MPA with AS-interface

Simultaneous transmission of data and energy is possible with a 2-wire cable. The coded cable shape prevents polarity reversal and no electrical supply plates are required thanks to the limitation to 8 valve positions/8 solenoid

coils. Ideal for installations that are spread out over large areas.

Two variants:

- With 2 to 8 modular valve positions, which corresponds to 2 to 8 MPA1 or 2 to 8 MPA2 valves or a combination of both

- With all available valve functions
- Including integrated, selectable inputs



Available for:

MPA-S		
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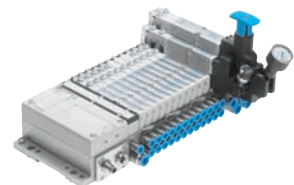
MPA for CPI installation system

Intended for connection to a master fieldbus node or as an integrated controller (front-end controller) which enables, amongst other things, the connection of decentralized I/O modules.

Advantages

- Power supply is integrated into the communication cable
- Electrical supply plates can be configured at any point before or after the sub-bases
- Max. 32 valve positions/ max. 32 solenoid coils

- Hybrid installation systems (centralized and decentralized) with a single valve range, e.g. as a sub-system at a CPX-MPA



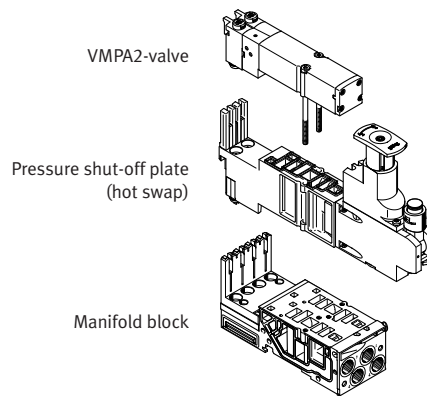
Available for:

MPA-S		
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Communication and pneumatic functions

Vertical stacking

Additional function modules can be added to each valve position between the sub-base and the valve. These so-called vertical stacking functions enable special modes of operation or control of the individual valve position.



Available for:

MPA-S

Pressure regulator MPA

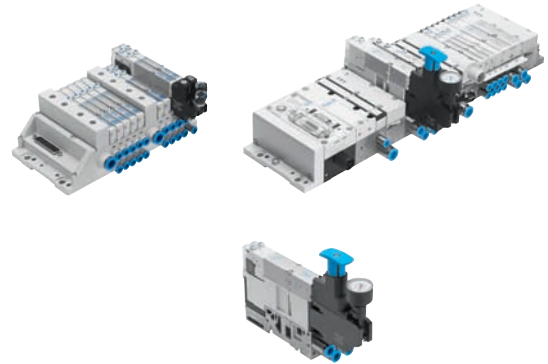
The force of the controlled actuator can be influenced using the pressure regulator which is installed between the sub-base and the valve.

Technical data

- Pressure range: 0 to 6 bar
- Regulators for channels 1, 2 and 4
- Regulators 2 and 4 can also be reversed (MPA2)
- Suitable for fieldbus, multi-pin and individual valve applications

Advantages

- Pressure regulation can be adjusted on-site
- Easy readjustment within the process is possible at any time
- Rotatable, easy-to-read pressure gauge (optional) for monitoring purposes
- Ready to install, no assembly or installation work



Available for:

MPA-S

MPA-F

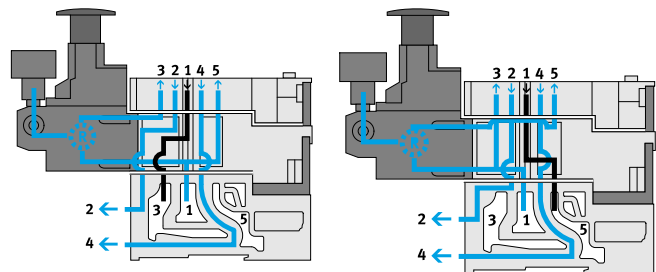
MPA-L

Variant for reverse operation

MPA valves can be operated in reverse (pressurization via ports 3 and 5, exhaust via 1). If, for example, a cylinder with piston rod is operated with different pressures (i.e. 3 and 5 are isolated from each other), both the advancing and retracting movements are subject to the same axial forces despite the different cross-sections of the surfaces (piston minus piston rod).

Advantages

- Adjustment of the regulator is independent of the valve's switching position
- Greater exhaust performance because exhaust air is not routed through the regulator
- The regulator is subjected to less stress
- Can be combined with 5/2 and 5/3-way valves



Available for:

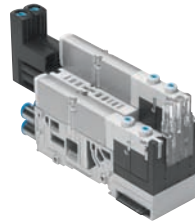
MPA-S

MPA-F

MPA-L

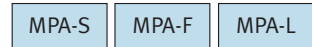
Pressure shut-off plate (hot swap): uninterrupted production!

Valves can be hot swapped for repair or maintenance purposes (i.e. under pressure during operation) thanks to the pressure shut-off plate! The process drive is exhausted in a controlled manner for additional safety.



Make way for the electro-pneumatic control loop system

Available for:



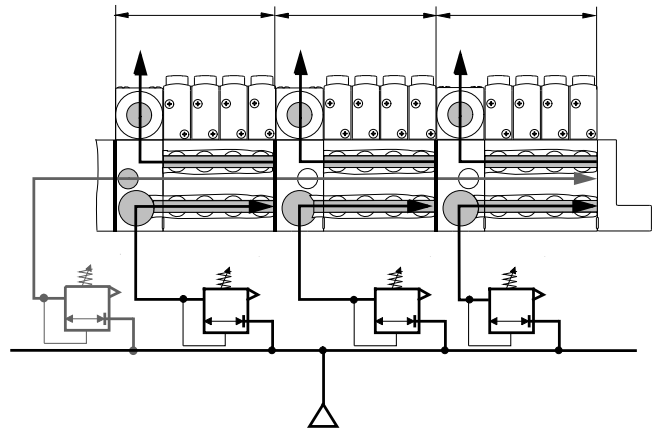
Freedom of choice for compressed air supply to the valve terminal MPA

Different pressure zones can be created in the valve terminal MPA to accommodate an expanded range of applications and reduce installation work. Additional, highly diverse pneumatic options make the MPA one of the most flexible valve terminals ever.

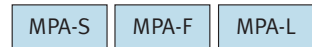
- Flexible exhaust air concept – either a space-saving flat plate silencer with excellent

exhaust performance, thread for a conventional silencer or ducted exhaust air

- Generously dimensioned internal channel cross-sections enable high, simultaneous flow rates
- Internal/external pilot air supply can be freely selected; on the MPA-F or MPA-L this can be additionally changed via a selector switch on the right-hand end plate
- Various port sizes configured for optimized flow rates or uniform tubing sizes



Available for:



Built for the future: internal, serial communication technologies

Perfect networking to the MPA with the CPX terminal

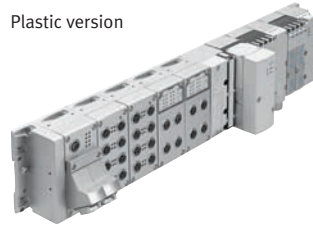
Streamlined processes, reduced costs, time savings – and increased process reliability: the valve terminal MPA's internal serial linking and communication is designed with this in mind. The digital and analog I/O modules enable simple, flexible and individual connection of pneumatic and electrical control loop systems to an automation system using all common types of connectors and with 10 additional connector technologies for sensors and actuators, as well as controllers for electric drives with IP20/IP65/IP67 protection.

Expanded range of applications

The CPX terminal supports communication with all common fieldbus systems and via Ethernet. The all-metal



Plastic version



Metal version

variant, as well as versions for Ex zones 1 and 2, complete the program.

→ For more information go to the CPX/CPI brochure available from the download area at www.festo.com/us.

Comprehensive diagnostics for maximized process reliability

The combination of the valve terminal MPA with the modular electrical terminal CPX opens up entirely new horizons for diagnostics:

- Condition monitoring
 - Pressure monitoring with integrated pressure sensors
 - Seamless integration into existing control systems
 - Device and system diagnostics (FDT/DTM, OPCServer)
 - Module/channel-oriented valve diagnostics
- Numerous IT services:
 - Error memory for the last 40 messages
 - E-mail/SMS alarms
 - CPX web monitor via Ethernet
 - Festo maintenance tool
 - Handheld control unit
 - Pre-processing with integrated controllers for customer-specific diagnostics programming (CoDeSys)

Save up to \$ 14.000 per minute!

Independent studies have revealed that between 15 and 40 % of all indirect system costs are maintenance costs. With the CPX terminal, sources of error are pinpointed 8 and even 16 times faster. And what's more, a consistent condition monitoring system (CMS) prevents up to 35 % of all unplanned downtime or reduces it greatly in 65 % of all cases.



Services

- Monitoring of specified limit values at each module and valve manifold
- ePLAN: CPX macro library for quick and reliable project engineering and layout with CPX modules
- Energy monitoring system (GFDM) service for:
 - Compressed air quality analysis
 - Compressed air consumption analysis
 - Leakage and consumption measurements at machine level
- Energy-efficient layout of the overall electro-pneumatic system for a further reduction in the total cost of ownership (TCO)



Designed and implemented by Festo: diagnostics/condition monitoring system for a tubular bag packaging machine

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