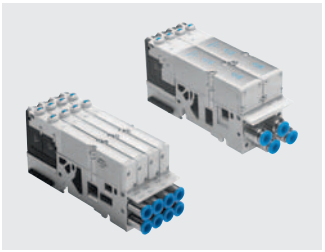
MPA Valve Manifolds

Maximum System Efficiency

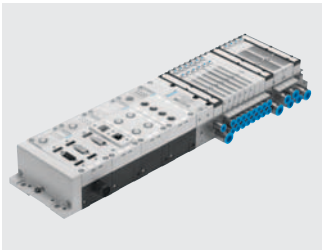
MPA Valves

- Sizes: MPA1 and MPA2
- Flow rate: Up to 700 l/min
- Multi-pin and Fieldbus connections
- Inch and metric connections



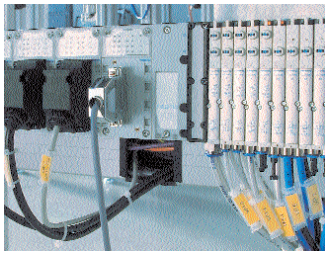
MPA Manifolds with Electrical CPX Modules

- Powerful electronic modules
- Advanced internal communication system
- Diagnosis down to the individual valve
- Combine size 1 and 2 MPA valves on same manifold

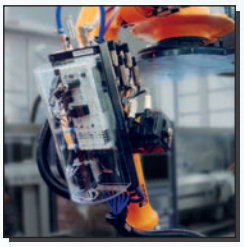


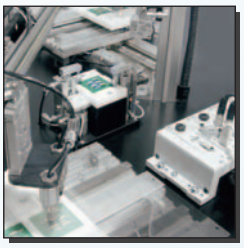
Application

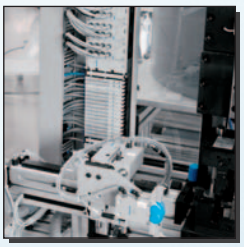
- The new standard in valve modularity
- Simple, flexible solutions
- Boost productivity
- Installation diagnostics on the plant floor



The New Standard In Valve Modularity







Two Worlds Grow Together For Maximum System Efficiency
The optimal integration of pneumatics and electrical control: the robust, highly modular MPA Valve Manifold; and the modular CPX Electrical Terminal – an unbeatable combination.

Festo's MPA: Built From The Pneumatic Engineer's Viewpoint
- Maximum process reliability
- Minimal installation costs
- Maximum economy

Tried and Trusted Valve Technology
All-metal valve bodies and valves offering toughness and a long service life. For...

... More Modularity and Flexibility –
through flexible pressure supply. More pressure zones, which can be extended by adding further valves. And again easily configurable. Serial valve actuation for up to 128 solenoid coils is included in fieldbus terminals. Slim valves and electrical modules can be replaced easily with the existing wiring.

... More Installation-saving Solutions –
through direct integration thanks to protection class IP65. Two sizes (MPA1 up to 360 l/min; MPA2 up to 700 l/min) can be combined.

... More Diagnostic Capabilities –
through two-color LED display on the valve; notification via serial bus to the fieldbus.

Festo...Your Automation Partner Worldwide

As a global leader in industrial automation components and systems, with over $1.8 billion sales worldwide, Festo has the resources and application experience to be your long term partner for cost-effective automation solutions.

- 56 independent subsidiaries worldwide
- Representation in 180 countries
- Worldwide networking for consistent standards of products, consultancy, sales and services.
- Worldwide support provided by over 10,500 team members

Festo Quality Assurance, ISO 9001 Certification

Festo Corporation is committed to supply all Festo products and services that will meet or exceed our customers' requirements in product quality, delivery, customer service and satisfaction.

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All Festo locations within the United States are registered to ISO 9001.

Online Literature
Literature in PDF format is available for download at:
www.festo.com/us/MPA

MPA Type 32 Valve Manifolds

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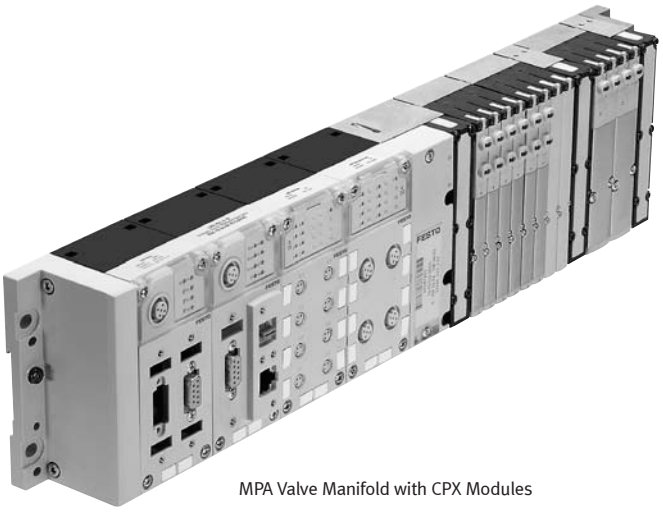
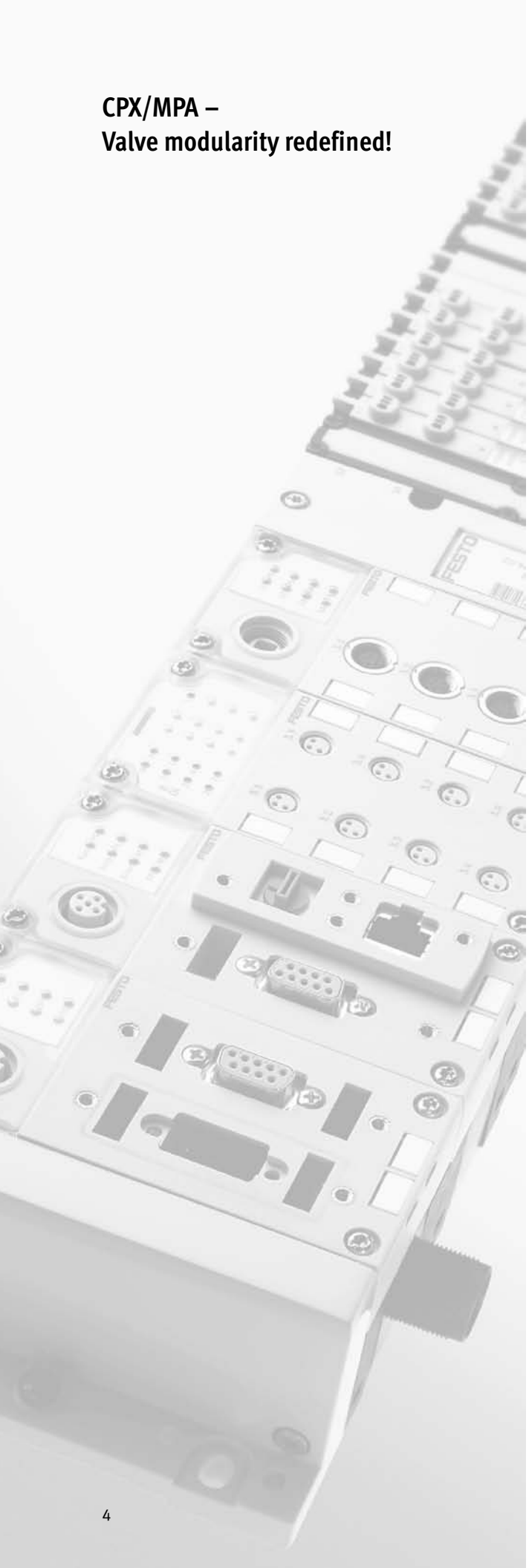
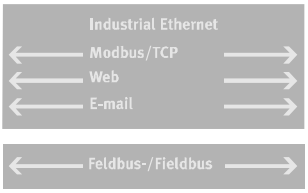


MPA Valve Manifold with CPX Modules

CPX/MPA –
Valve modularity redefined!

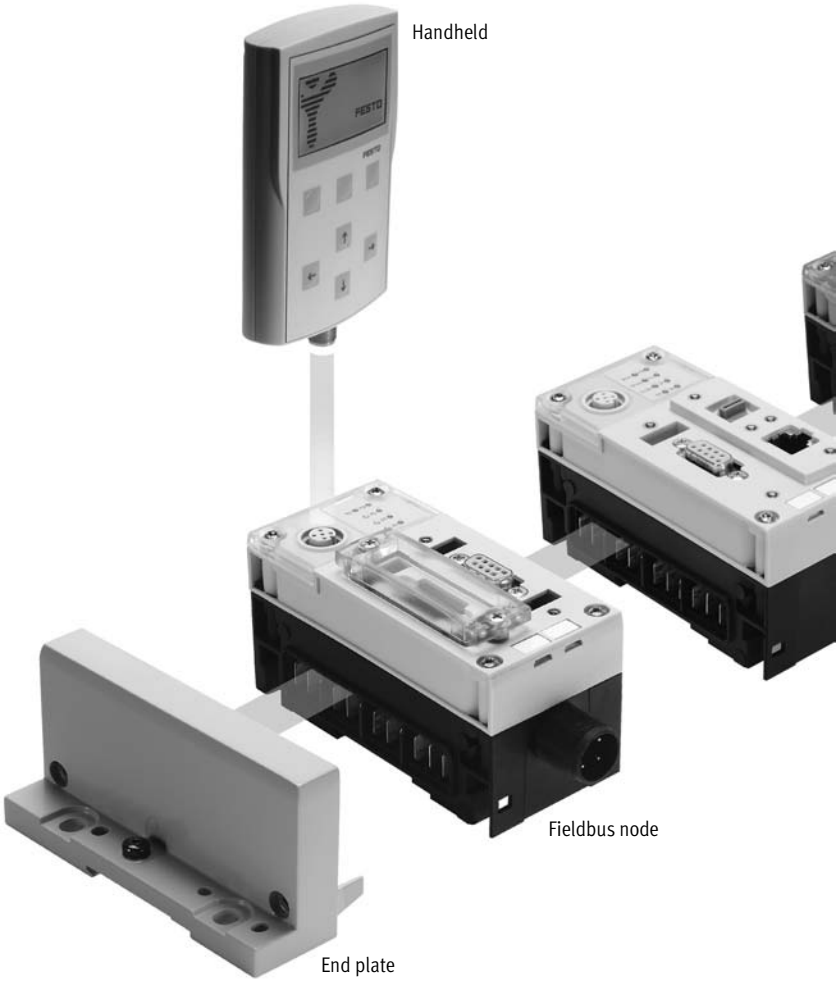


Flexible – Integration in Automation systems
The MPA valve manifold with fieldbus connection speaks many different languages and can communicate with the fieldbus systems and automation systems of leading manufacturers.



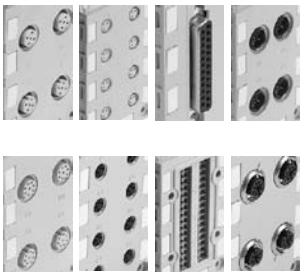
PROFIBUS
INTERBUS
CANopen
DeviceNet
CC-Link
EtherNet/IP

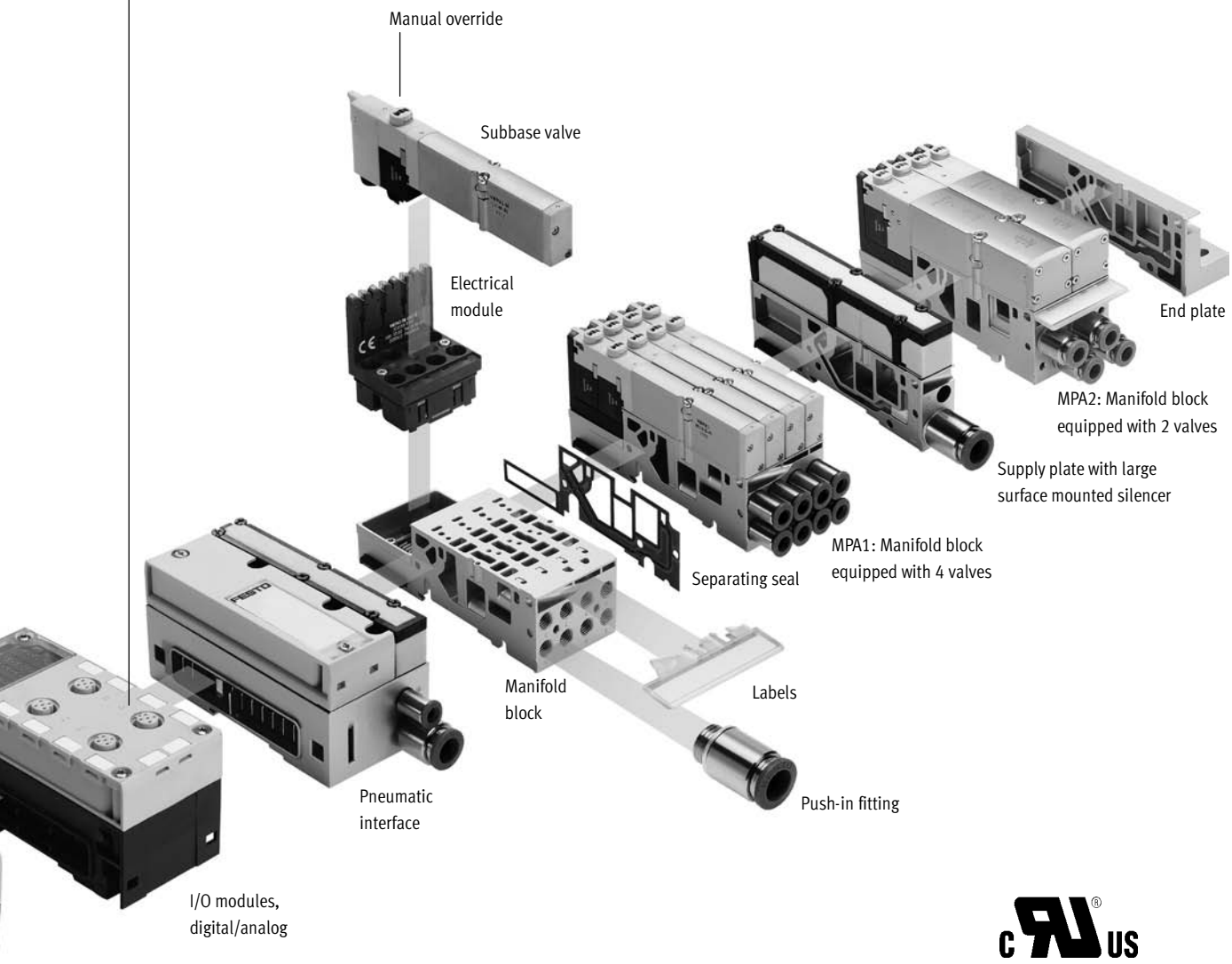
Easy Service and Commissioning
The small, convenient handheld CPX-MMI (Man-Machine Interface) provides data request, configuration and diagnosis functions for CPX terminals.
It is also extremely flexible. Data can be read in or out at any location with one-hand operation.



Extremely flexible with connection technology
Connection technology creates an adaptable system, optimized with connected peripherals such as sensors and actuators and with IP20, IP65/IP67 application environments.

Connection technologies:
3-pin M8, 5-pin M12, Sub-D, Harax®, 4-pin M8 , 8-pin M12, CageClamp®, 5-pin M12 metal thread (Speedcon)



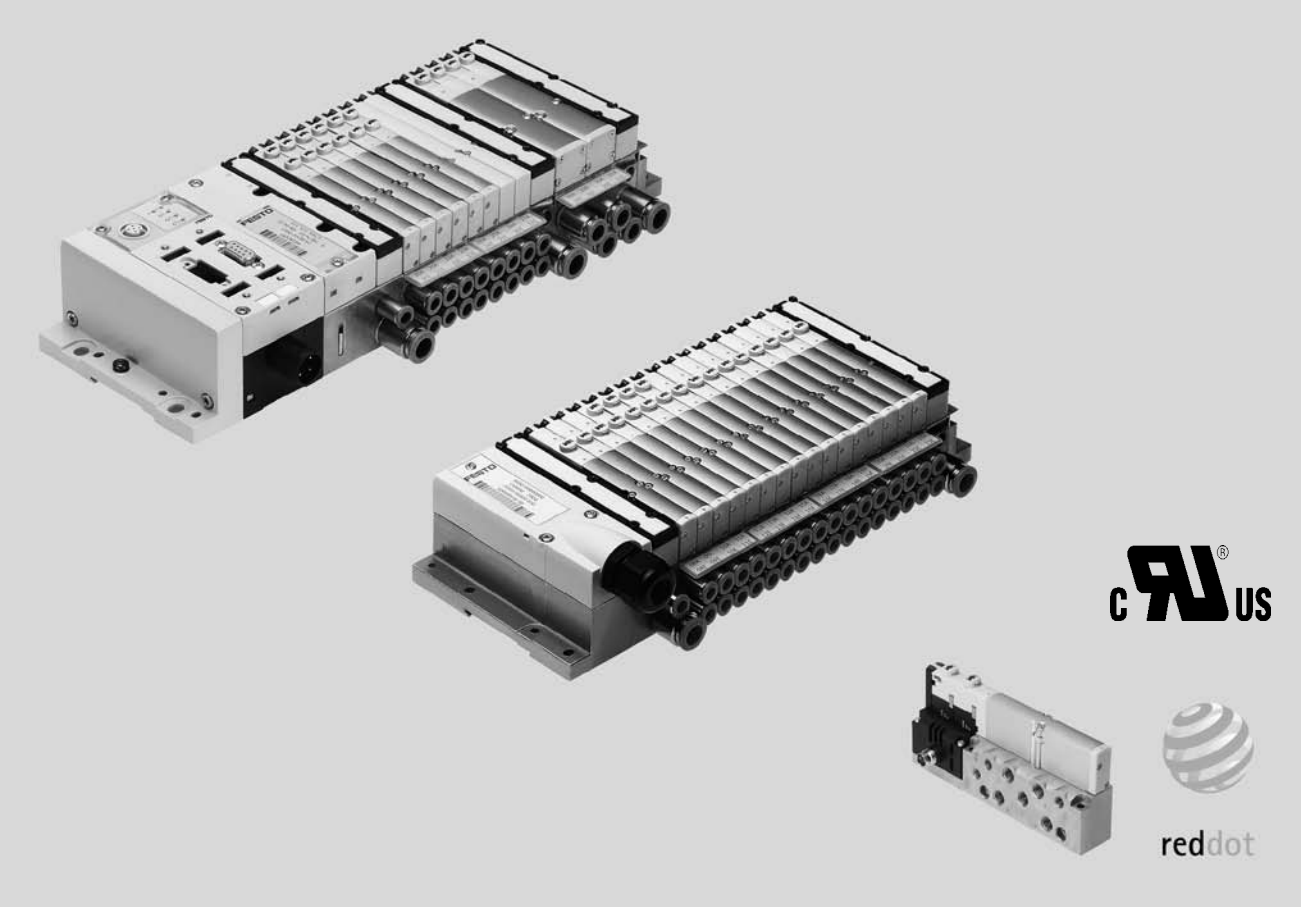


Better performance thanks to the technology module
Using technology modules, central and remote pneumatic/electrical components can be placed side by side in the same system, yielding higher cycle rates and lower wiring expense.

CPX-FEC provides a programmable valve terminal: the technology module offers remote controller fieldbus / Ethernet as a preliminary preparatory unit for remote, autonomous subsystems for direct machine mounting. The CPX-CP interface allows you to connect all CP modules to the electrical peripherals for valve terminals.

Overview / Key Features

MPA Type 32 Valve Manifolds



Innovative

- Low-profile high-performance valves in sturdy metal housing
- MPA1 flow rate up to 360 l/min
- MPA2 flow rate up to 700 l/min
- Standardized from the individual valve up to multi-pin plug and fieldbus connections and control block
- Fieldbus valve terminal suitable for CPX electrical peripherals. This means:
  - Advanced internal communication system for activation of the valves and CPX modules
  - Diagnosis down to the individual valve
  - Valves can either be activated with electrical isolation or without (standard)

Versatile

- Modular system offering a range of configuration options
- Expandable up to 64 solenoid coils, or 128 solenoid coils with an additional power supply plate
- Can be converted and expanded at a later date
- Manifold blocks can be expanded using just three screws and sturdy separating seals on metal separator plates
- Integration of innovative function modules is possible
- Supply plates permit a flexible air supply and variable pressure zones
- Pressure range:
  –0.9 ... 10 bar
- Wide range of valve functions

Reliable

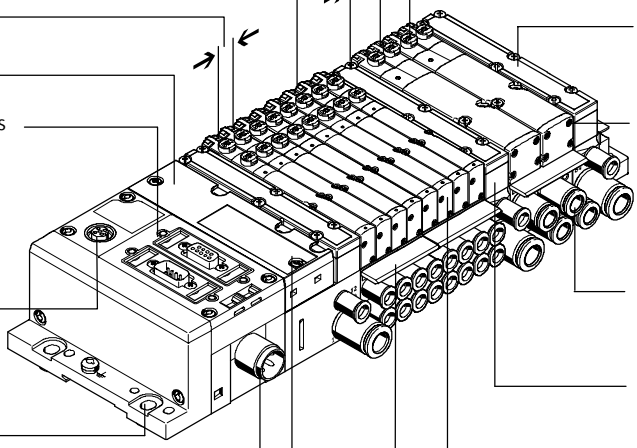
- Sturdy and durable metal components
  - Valves
  - Manifold blocks
  - Seals
- Fast troubleshooting thanks to LEDs on the valves and diagnosis via fieldbus
- Operating voltage tolerance: ±25%
- Reliable servicing with replaceable valves and electronics modules
- Manual override; either push-in, detenting or secured against unauthorized activation (covered)
- Durable thanks to the use of tried-and-tested piston spool valves
- Large and permanent labelling system, suitable for bar codes
- UL Recognized Component for Canada and the U.S.

Easy to mount

- Ready-to-install unit, already assembled and tested
- Less downtime for assembly and commissioning
- Secure wall mounting or DIN rail mounting

Overview / Key Features

MPA Type 32 Valve Manifolds



MPA2 width 20 mm
LED diagnosis on the spot, reduced downtime

MPA1 width 10 mm

Pneumatic interface to CPX

Straightforward electrical connections
- Multi-pin plug connection with pre-assembled cable
- Fieldbus connection via CPX
- Independent Control via CPX

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

Quick mounting:
Directly using screws or DIN rail

Secure:
Operating voltage connection ±25%, outputs and valves can be disconnected separately

Reliable operation:
Manual override push-in/detenting or covered

Compact:
Slim valves and flat plate silencers

Flexible:
32 valve positions / 64 solenoid coils (FB)
64 valve positions / 128 solenoid coils with an additional power supply plate (FB)
24 valve positions / 24 solenoid coils (MP)

Functional:
Robust metal thread or preassembled Quick Star fittings

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

Comprehensive valve functions

Convenient:
Large labels for bar codes

Equipment Options

Valve Functions

- 5/2-way valve, single solenoid
- 5/2-way valve, double solenoid
- 2x 3/2-way valve, normally open
- 2x 3/2-way valve, normally closed
- 2x 3/2-way valve, 1x normally open, 1 x normally closed
- 5/3-way valve, mid-position pressurized
- 5/3-way valve, mid-position closed
- 5/3-way valve, mid-position exhausted
- 2x 2/2-way valve, normally closed
- 1x 3/2-way valve, normally closed, external compressed-air supply
- 1x 3/2-way valve, normally open, external compressed-air supply

All valves have the same compact dimensions with an overall length of 107 mm and a width of 10.5 mm or 21 mm as appropriate. A height of 55 mm makes them a perfect match for the CPX electrical peripherals.

Special Features

Multi-pin Terminal
- Max. 24 valve positions/max. 24 solenoid coils
- Parallel valve linking via circuit board
- Electronics module with integrated holding current reduction
- Multiple pressure zones, any compressed air supply

Fieldbus Terminal / Control Block
- Max. 64 valve positions/max. 128 solenoid coils
- Internal CPX bus system for valve activation
- Module for electrical valve activation, with or without electrical isolation
- Any compressed-air supply
- Multiple pressure zones
- Electrical supply zones

Individual Valve
- Electrical M8 connection, 4-pin with screw connection
- Detachable electronics module with integrated holding current reduction

Combine the Following:
- MPA1 flow rate up to 360 l/min
- MPA2 flow rate up to 700 l/min
- MPA1 and MPA2 can be combined on one CPX valve terminal

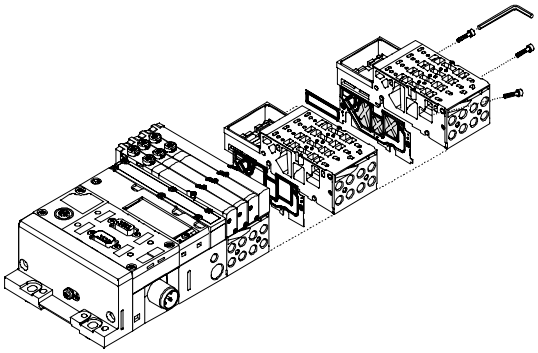
Modular Pneumatic Components

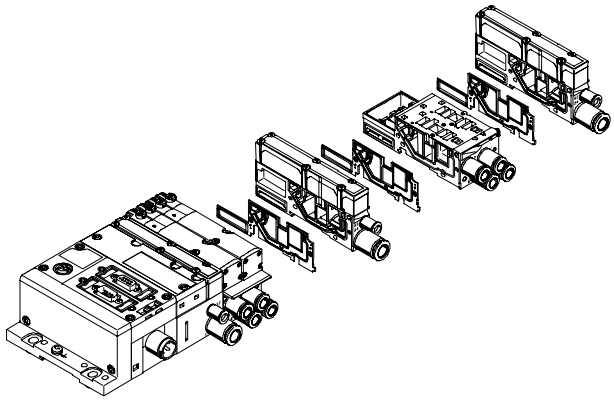
The modular design of the MPA facilitates maximum flexibility right from the planning stage and offers maximum ease of service in operation.

The system consists of manifold blocks and valves. The manifold blocks are screwed together and thus form the support system for the valves.

Inside, the manifold blocks contain the connection ducts for supplying compressed air to and venting from the valve terminal as well as the working lines for the pneumatic cylinders for each valve.

Each manifold block is connected to the next using three screws. Individual terminal sections can be isolated and further blocks inserted by loosening these screws. This ensures that the valve terminal can be rapidly and reliably expanded.





Modular Electrical Peripherals

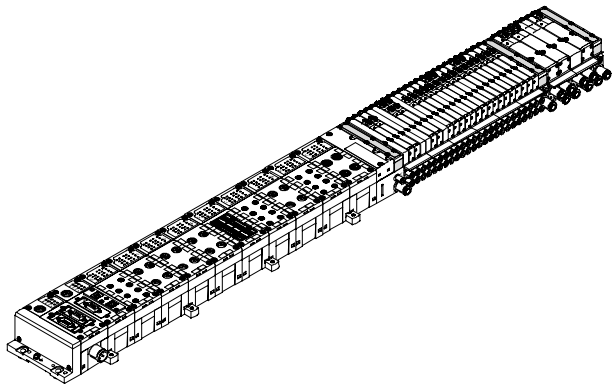
The manner in which the valves are activated differs according to whether you are using a multi-pin terminal, fieldbus terminal or individual valve.

The MPA with CPX interface is based on the internal bus system of the CPX and uses this serial communication system for all solenoid coils and a range of electrical input and output functions.

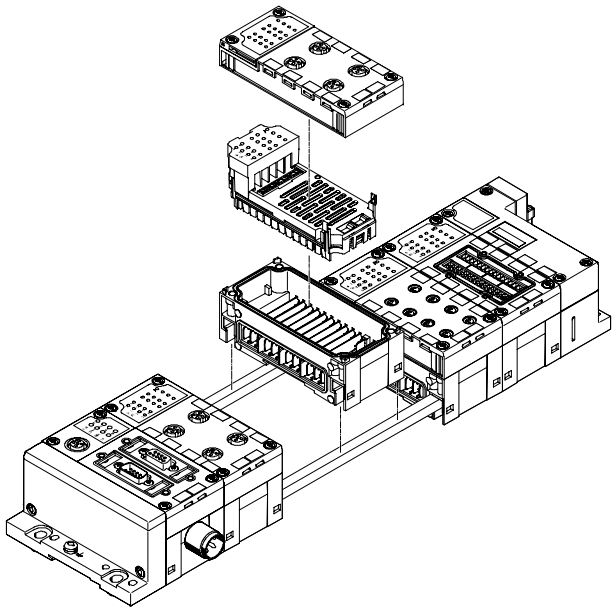
Serial linking facilitates the following:
- Transmission of switching information
- High valve density
- Compact design
- Position-based diagnosis

- Separate voltage supply for valves
- Flexible conversion without address shifting
- Transmission of status, parameter and diagnostic data
- Option of CP interface
- CPX-FEC as autonomous controller with access via Ethernet and web server

MPA with CPX Electrical Peripherals



Modularity with CPX Electrical Peripherals



MPA Valve Manifolds with Multi-pin Plug Connection

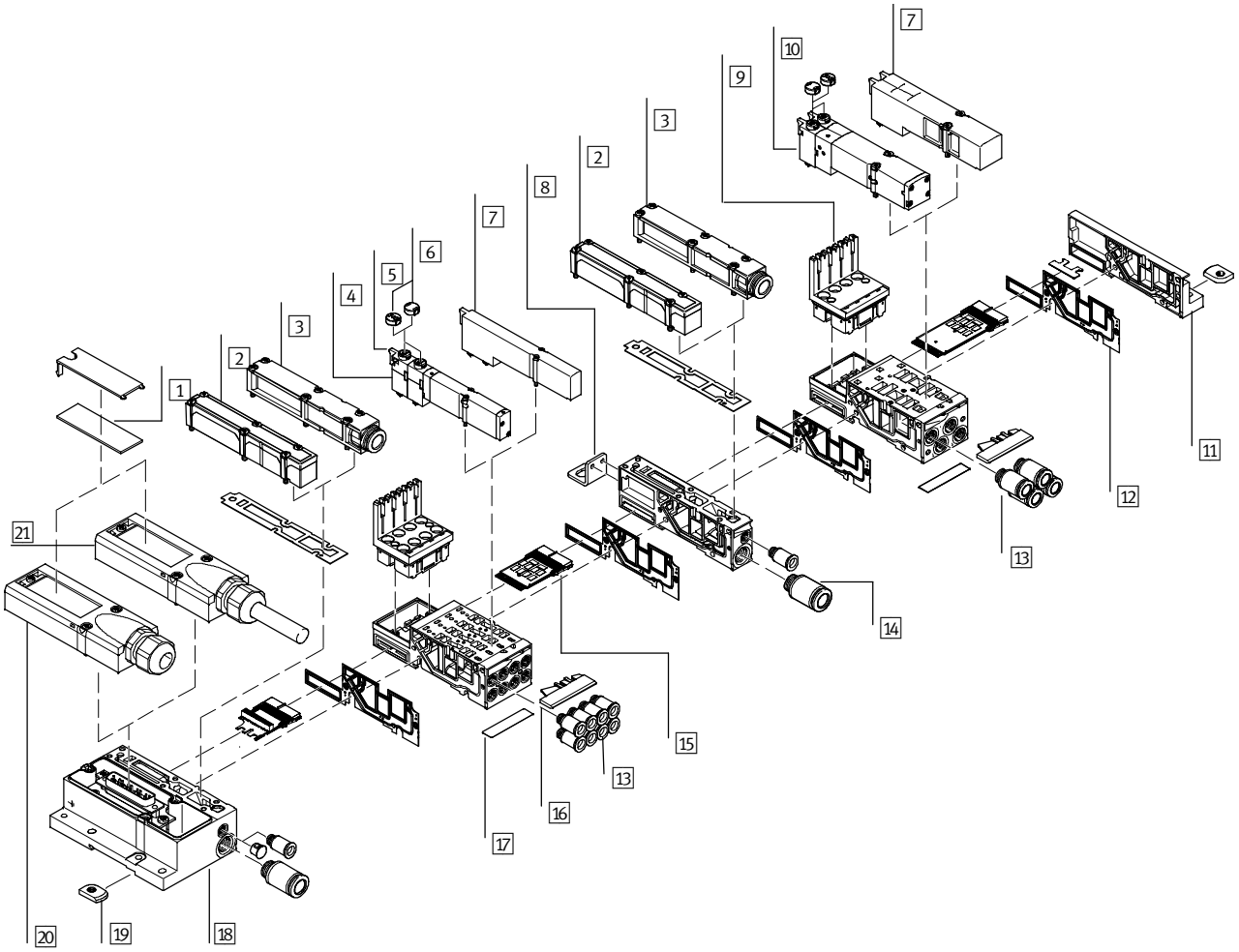
Order Code:
- 32P-... for the pneumatic components
- 32E-... for the electrical components

MPA valve manifolds with multi-pin plug connection can be expanded with up to 24 solenoid coils. The manifold blocks are either prepared for:
- 4 outputs (MPA1)
- 8 outputs (MPA1)
- 2 outputs (MPA2)
- 4 outputs (MPA2)

- Double solenoid valve positions can be equipped with any valve or a blanking plate.
- Single solenoid valve positions can only be equipped with single solenoid valves or blanking plates.

The multi-pin plug connection is designed as a removable 25-pin Sub-D connection rated to IP65. The associated cable can be selected when ordering:
- 2.5 m
- 5 m
- 10 m

Each can be used for 8 to 24 valves.



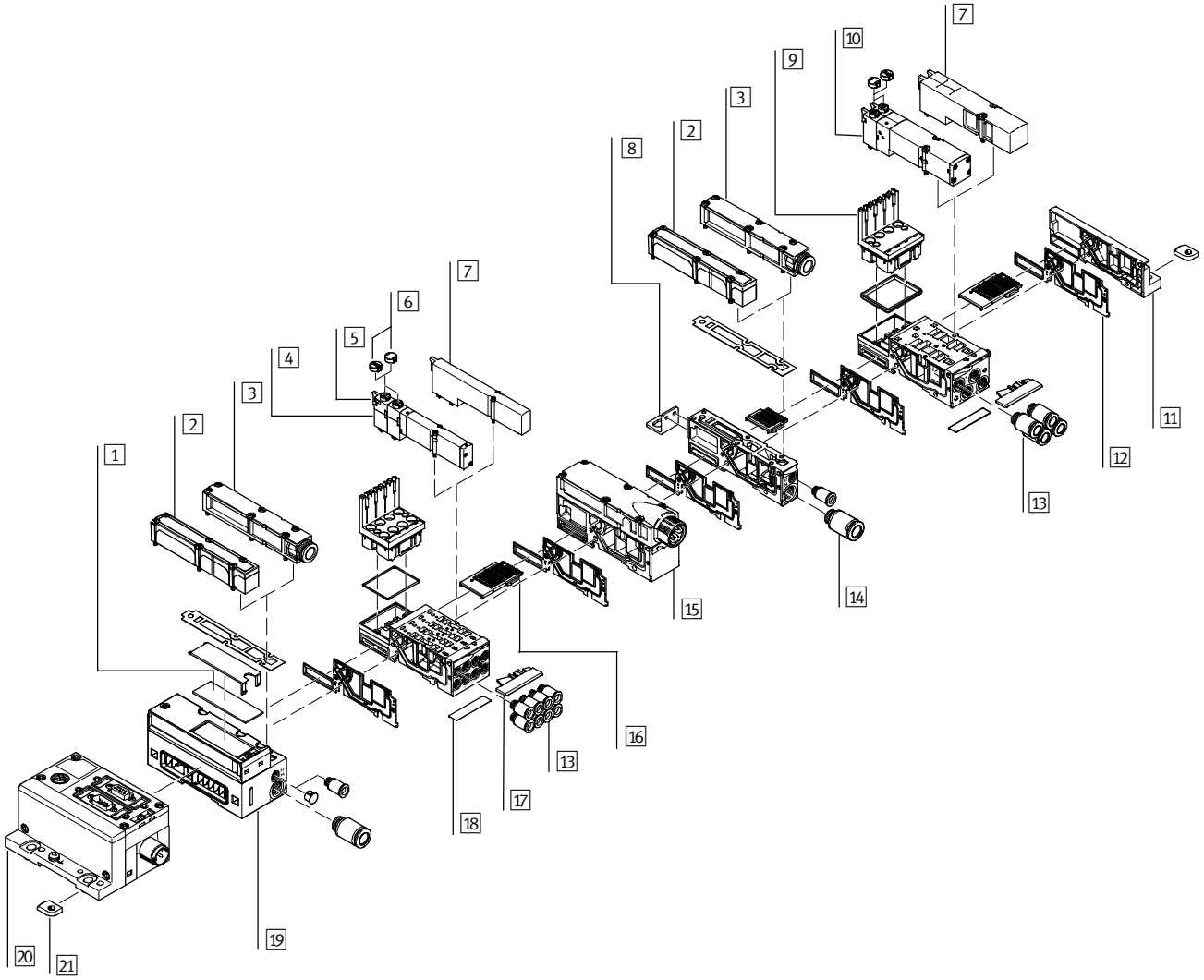
1 Label, large
2 Surface silencer
3 Ducted exhaust
4 MPA1 valve
5 Manual override (per solenoid coil, push-in/rotary-detenting)
6 Cover for manual override (push-in, covered)
7 Blanking plate for spare position
8 Mounting bracket (optional)
9 MPA1 or MPA2 electronics module
10 MPA2 valve
11 Right-hand end plate
12 Separating seal
13 Threaded connectors for working lines
14 Threaded connectors for supply plate
15 Multi-pin circuit board
16 Label holder
17 Label
18 Electrical interface (multi-pin plug)
19 DIN rail mounting
20 Multi-pin plug connection for self-assembly
21 Multi-pin plug connection with multi-pin cable

MPA Valve Manifolds with Fieldbus Connection, Control Block (CPX Electrical Peripherals)

Order code:
- 32P-... for the pneumatic components
- 50E-... for the CPX electrical components

Valve manifolds with fieldbus interfaces can be configured with up to 8 subbases or, with an additional power supply plate, up to 16 subbases. With MPA1, there are 8 solenoids per manifold block; with MPA2, there are 4 solenoids per manifold block.

The rules for CPX apply to the equipment that can be used in combination with the CPX electrical peripherals.
In general:
- Max. 10 electrical modules
- Digital inputs/outputs
- Analog inputs/outputs
- Parameterization of inputs and outputs
- Integrated high-feature diagnostic system
- Preventive maintenance concepts



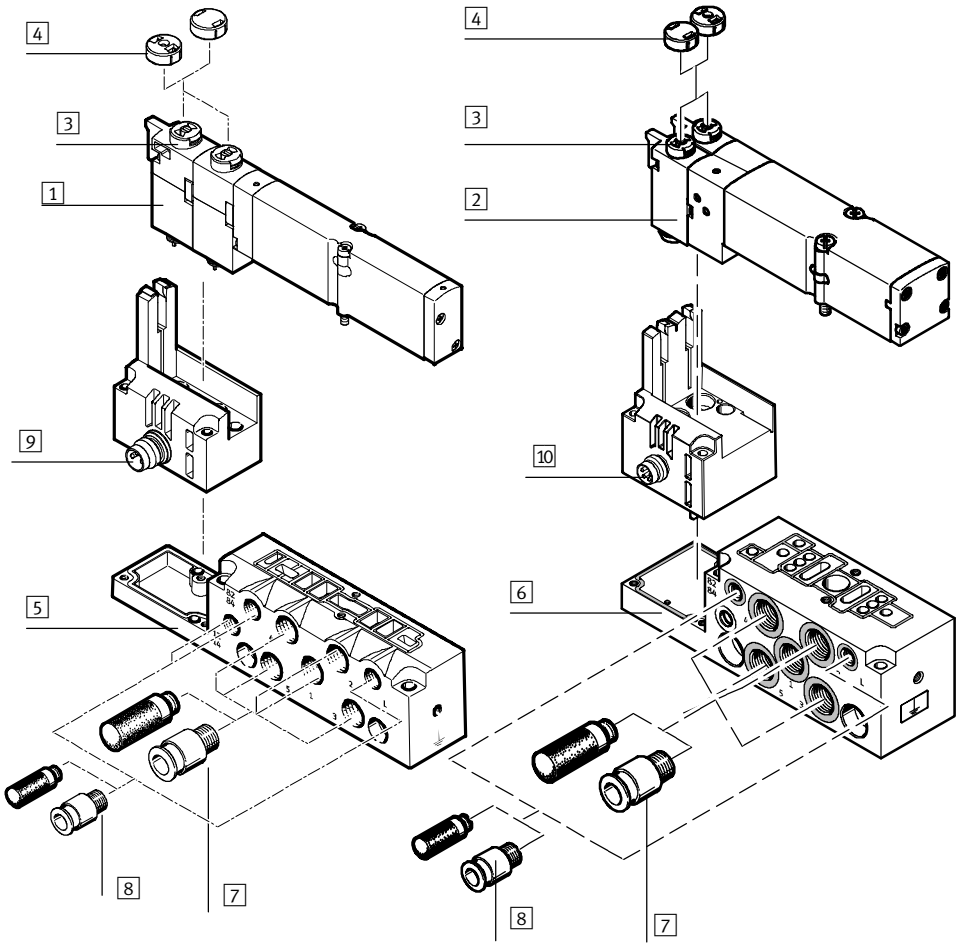
1 Label, large
2 Surface silencer
3 Ducted exhaust
4 MPA1 valve
5 Manual override (per solenoid coil, push-in/ rotary-detenting)
6 Cover for manual override (push-in, covered)
7 Blanking plate for spare valve position
8 Mounting bracket (optional)
9 MPA1 or MPA2 electronics module
10 MPA2 valve
11 Right-hand end plate
12 Separating seal
13 Threaded connectors for working lines
14 Threaded connectors for supply plate
15 Electrical supply plate
16 Fieldbus circuit board
17 Label holder
18 Label
19 Pneumatic interface (CPX interface)
20 CPX modules
21 DIN rail mounting

Individual Subbases, Sizes 1 and 2

Order valves and subbases separately, using individual part numbers (see page 49)

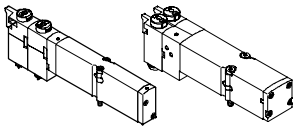
Individual subbases can be equipped with any valve.

The electrical connection is established using a standard 4-pin M8 plug (VDMA 24571).



1 MPA1 valve
2 MPA2 valve
3 Manual override (per solenoid coil, push-in/ rotary-detenting)
4 Cover for manual override (push-in, covered)
5 Subbase for single MPA1 valve
6 Subbase for single MPA2 valve
7 Threaded connectors or M7 silencers for working lines (2, 4) and supply air/exhaust ports (1, 3, 5)
8 Threaded connectors, silencers or M5 blanking plugs for pilot air supply / exhaust ports (12/14, 82/84) and pressure compensation
9 M8 electrical connection, 4-pin, for MPA1 valve
10 M8 electrical connection, 4-pin, for MPA2 valve

Subbase Valve



MPA offers a comprehensive range of valve functions. All valves are equipped with a piston spool and patented sealing system that facilitates efficient sealing, a broad pressure range, and long service life. To minimize power, they have a pneumatic pilot control supplied with pilot air.

Subbase valves can be quickly replaced since the pipe connection remains on the subbase or manifold block. This design is also particularly slim.

Irrespective of the valve function, there are subbase valves with one solenoid coil (single solenoid) or with two solenoid coils for double solenoid or double valve functions.

Blanking plate

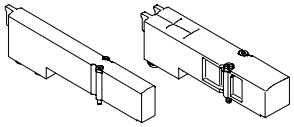
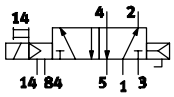
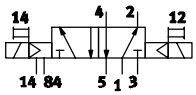
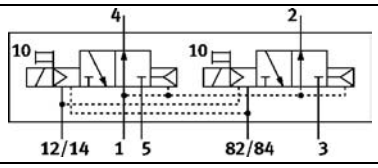
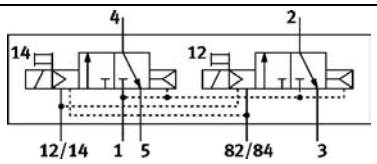
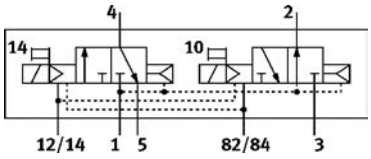
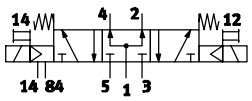


Plate without valve function for reserving valve positions on a valve terminal.

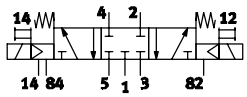
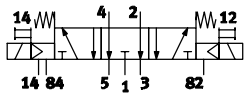
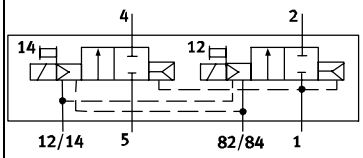
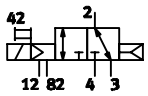
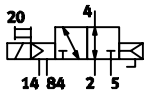
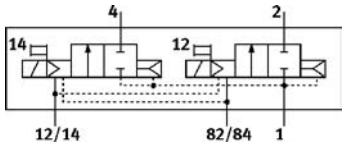
Valves and blanking plates are attached to the base block using two screws.

Valve Functions

Code	Circuit Symbol	Size MPA1	Size MPA2	Description
M		■	■	5/2-way valve, single solenoid ■ Pneumatic spring return
J		■	■	5/2-way valve, double solenoid
N		■	■	2 x 3/2-way valve, single solenoid ■ Normally open ■ Pneumatic spring return ■ Operating pressure > 3 bar
K		■	■	2 x 3/2-way valve, single solenoid ■ Normally closed ■ Pneumatic spring return ■ Operating pressure > 3 bar
H		■	■	2 x 3/2-way valve, single solenoid ■ Normally 1 x open, 1 x closed, ■ Pneumatic spring return ■ Operating pressure > 3 bar
B		■	■	5/3-way valve ■ Mid-position pressurised[1)] ■ Spring force return

1) Mid-position can be reached without electrical signal or using both signals.

Valve Functions

Code	Circuit symbol	Size MPA1	Size MPA2	Description
G		■	■	5/3-way valve ■ Mid-position closed[1)] ■ Spring force return
E		■	■	5/3-way valve ■ Mid-position exhausted[1)] ■ Spring force return
I		■	■	Vacuum valve ■ Switch external vacuum (e.g. by vacuum pump) ■ Vacuum pressure zone and standard pressure zones for cylinder operation can be combined on one valve terminal ■ Use separtion seal S ■ Mid-position closed[1)] ■ Spring force return
X		■	■	1x 3/2-way valve, external compressed-air supply ■ Normally closed ■ Pneumatic spring return Compressed air (–0.9 ... +10 bar) supplied at working line 4 can be switched whether using either internal or external pilot air
W		■	■	1x 3/2-way valve, single solenoid ■ Normally open, external compressed-air supply ■ Pneumatic spring return Compressed air (–0.9 ... +10 bar) supplied at working line 2 can be switched whether using either internal or external pilot air
D		■	■	2 x 2/2-way valve ■ Normally closed ■ Pneumatic spring return ■ Operating pressure > 3 bar
L		■	■	For valve terminal only: Blanking plate for spare position

1) Mid-position can be reached without electrical signal or using both signals.

Design

Valve replacement

The valves are attached to the metal manifold block using two screws. This means that they can be easily replaced. The mechanical robustness of the manifold block guarantees good long-term sealing tightness.

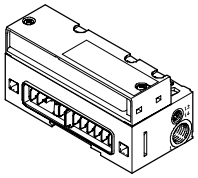
Extension

Spare positions can be replaced by valves at a later date. The dimensions, mounting points and existing pneumatic installations remain unchanged during this process.

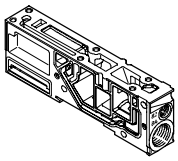
The valve code (M, J, N, K, B, G, E, X, D) is located on the front of the valve beneath the manual override.

Compressed Air Supply and Venting

Pneumatic Interface



Supply Plate



The MPA valve manifold can be supplied with compressed air at one or more points. This is a reliable way of ensuring that the manifold will always have a sufficient supply of compressed air and that this air will be vented, even with large-scale expansions.

The main supply to the manifold is located on the pneumatic interface, which links the electrical and the pneumatic parts. Additional provision is made for a number of supply plates. Venting is performed either using surface silencers or common lines for ducted exhaust.

These vents are located on the pneumatic interface as well as on the supply plates.
In the case of ducted exhaust, at least one additional supply plate is required which then contains the exhaust port for the pilot air (port 82/84).

Pilot Air Supply

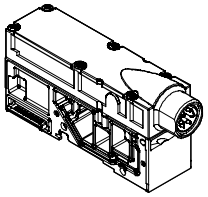
The port for the main pneumatic supply is located on the pneumatic interface.
The ports differ for the following pilot air supply types:
- internal
- external

Internal Pilot Air Supply
An internal pilot air supply can be selected if the required working pressure is between 3 and 8 bar.
The pilot air is then branched from the compressed air supply 1 at the pneumatic interface using an internal connection. The port 12/14 is closed using a blanking plug.

External Pilot Air Supply
If the supply pressure is less than 3 bar or greater than 8 bar, you must operate your MPA valve manifold using an external pilot air supply. In this case the pilot air is supplied externally via port 12/14 in the pneumatic interface.

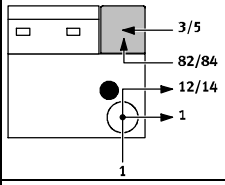
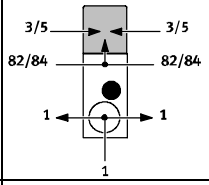
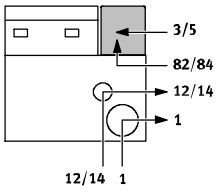
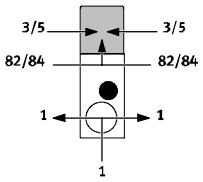
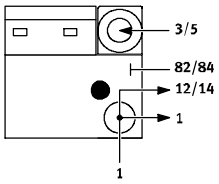
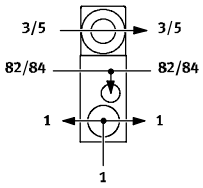
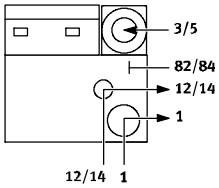
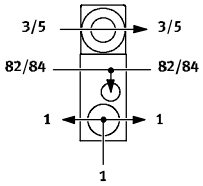
Note
If a gradual pressure buildup is required in the system using a soft-start valve, an external pilot air supply should be selected whereby the control pressure applied is already very high when the switch-on signal is received .

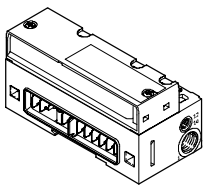
Electrical supply plate



- Increases the maximum number of valve positions possible to 64, with max. 128 solenoid coils
- Facilitates the creation of electrically isolated, individually disconnectable voltage zones
- Greater economy thanks to the higher number of valves/solenoid coils per valve manifold
- Greater safety through individual disconnection of valve groups, for example for EMERGENCY STOP functions

Note
The electrical supply plate is available either with M18 or 7/8" connection.

Compressed Air Supply and Pilot Air Supply					
Code	Graphical Symbol Type of Compressed Air Supply and Pilot Air Supply Pneumatic Interface	Supply Plate	Size MPA1	 MPA2	Notes
S			■	■	Internal pilot air supply, surface silencer ■ Pilot air supply is branched internally from port 1 in the pneumatic interface ■ Exhaust port 3/5 and pilot exhaust port 82/84 via flat plate silencer ■ For operating pressure in the range 3 ... 8 bar
T			■	■	External pilot air supply, surface silencer ■ Pilot air between 3 and 8 bar is connected at port 12/14 ■ Exhaust port 3/5 and pilot exhaust port 82/84 via flat plate silencer ■ For operating pressure in the range –0.9 ... 10 bar (suitable for vacuum)
V			■	■	Internal pilot air supply, ducted exhaust air ■ Pilot air supply is branched internally from port 1 in the pneumatic interface ■ Exhaust port 3/5: Connection to pneumatic interface and supply plate ■ Pilot exhaust port 82/84: Connection to supply plate only ■ For operating pressure in the range 3 ... 8 bar
X			■	■	External pilot air supply, ducted exhaust air ■ Pilot air between 3 and 8 bar is connected at port 12/14 ■ Exhaust port 3/5: Connection to pneumatic interface and supply plate ■ Pilot exhaust port 82/84: Connection to supply plate only ■ For operating pressure in the range –0.9 ... 10 bar (suitable for vacuum)

Pneumatic interface				
Code	Graphical Symbol Pneumatic Interface Design Variants	Size MPA1	 MPA2	Notes
M	 Type VMPA-...-EPL-...	■	■	■ In combination with compressed-air supply S, T, V, X ■ The pilot exhaust air must be vented at least at one supply plate when using V or X. In the case of multiple supply plates, port 82/84 is open on the last supply plate as delivered from the factory.

Pneumatic Supply Plate

Additional supply plates can be used for larger terminals or to create pressure zones.

If several valves are operated simultaneously at full flow rate, it is recommended that a supply module be positioned after each 8 valves (MPA1), or 4 valves (MPA2) as the case may be.

MPA with CPX
Supply plates can be configured at any point before or after manifold blocks.

MPA with MPM connection (modular multi-pin plug)
Supply plates can be configured at any point before or after manifold blocks.

Supply plates contain the ports:
- Compressed-air supply (1)
- Venting of the pilot air supply (82/84) and pressure compensation
- Exhaust air (3/5) at exhaust plate

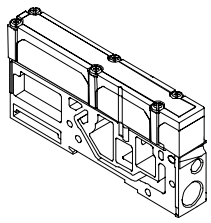
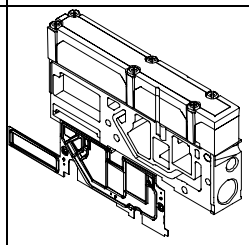
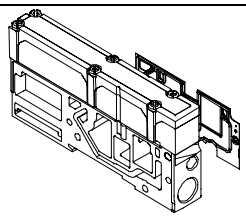
Depending on your order, the exhaust air channels are either ducted or vented via the surface silencer.

MPA with ducted exhaust air
At least one supply plate via which the exhaust port 82/84 is vented is mandatory with ducted exhaust.

The supply plate is configured using the code letter U if no directly adjoining separating seal is required.

If a separating seal (S, T or R) is selected to the direct right or left of the supply plate, then the code letter V or W identifies the position or the left-hand or right-hand separating seal. The code for the separating seal (S, T or R) is placed in front of the code for the supply plate (V or W).

Pneumatic Supply Plate

Code[1]		Size MPA1	Size MPA2	Notes
U	 Type VMPA1-...-SP...	■	■	Supply plate without separating seal (no R, S or T selected)
V	 Type VMPA1-...-SP...	■	■	Supply plate with separating seal on left, if R, S or T selected
W	 Type VMPA1-...-SP...	■	■	Supply plate with separating seal on right, if R, S or T selected

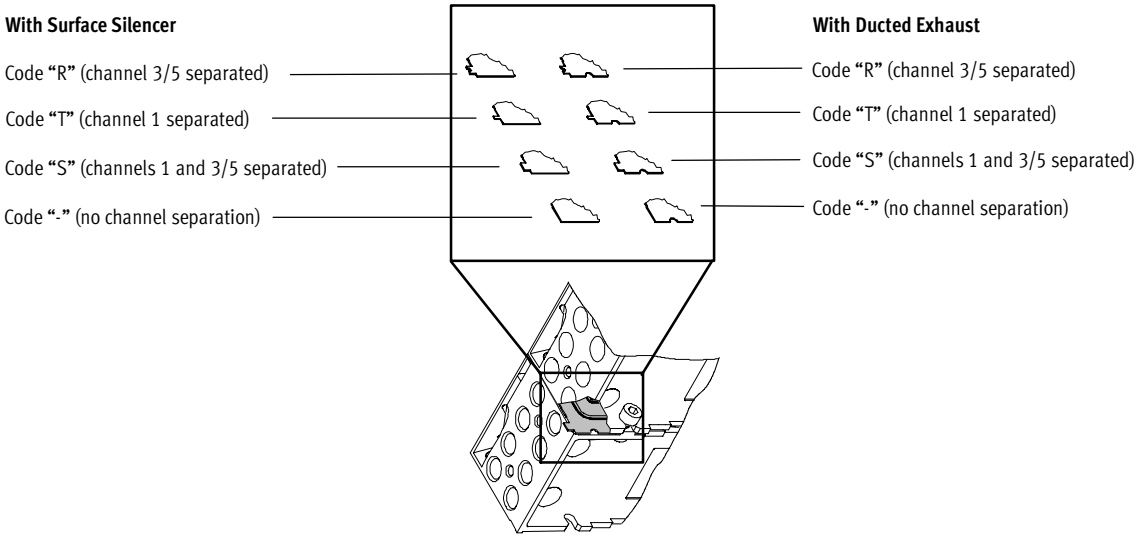
1) The supply plate is equipped with silencer or exhaust plate depending on the code for the compressed-air supply S, T, V, X.

Creation of Pressure Zones and Separation of Exhaust Air

MPA offers a number of options for creating pressure zones if different working pressures are required. Pressure zones are created by isolating the internal supply ducts in the manifold blocks using an appropriate separating seal or using a separator that is firmly incorporated in the manifold block (Code I).

Compressed air is supplied and vented via a supply plate.
The position of the supply plates and separating seals can be freely selected for MPA with CPX and MPM (multi-pin plug).

Separating seals are factory installed as per your order. Separating seals can be distinguished through their coding.

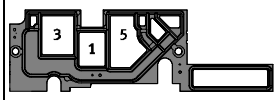
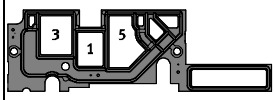
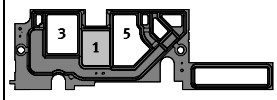
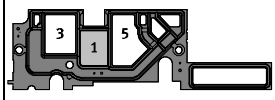
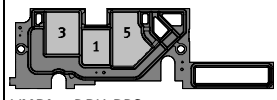
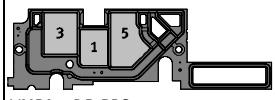
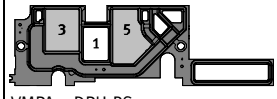
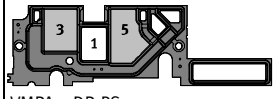


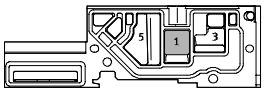
Note

The following must be taken into consideration with subsequent expansion or conversions:

Different separating seals must be ordered when the valve manifold is operated using ducted exhaust or surface silencer.

Creating Pressure Zones

Code	Separating Seal for Operation with Surface Silencer	Separating Seal for Operation with Ducted Exhaust	Size MPA1	Size MPA2	Notes
–	 VMPA...-DPU	 VMPA...-DP	■	■	Seal, no channel separation
T	 VMPA...-DPU-P	 VMPA...-DP-P	■	■	Seal, channel 1 separated
S	 VMPA...-DPU-PRS	 VMPA...-DP-PRS	■	■	Seal, channels 1 and 3/5 separated
R	 VMPA...-DPU-RS	 VMPA...-DP-RS	■	■	Seal, channel 3/5 separated

Creating Pressure Zones				
Code	Duct separation in manifold block for operation with surface silencer or with ducted exhaust air Pictorial examples	Size 1	 2	Notes
I		■	■	Duct 1 separated

Note

Duct separation in the manifold block is performed in the center of the manifold block (between valve 2 and 3 with MPA1, or between valve 1 and 2 with MPA2).

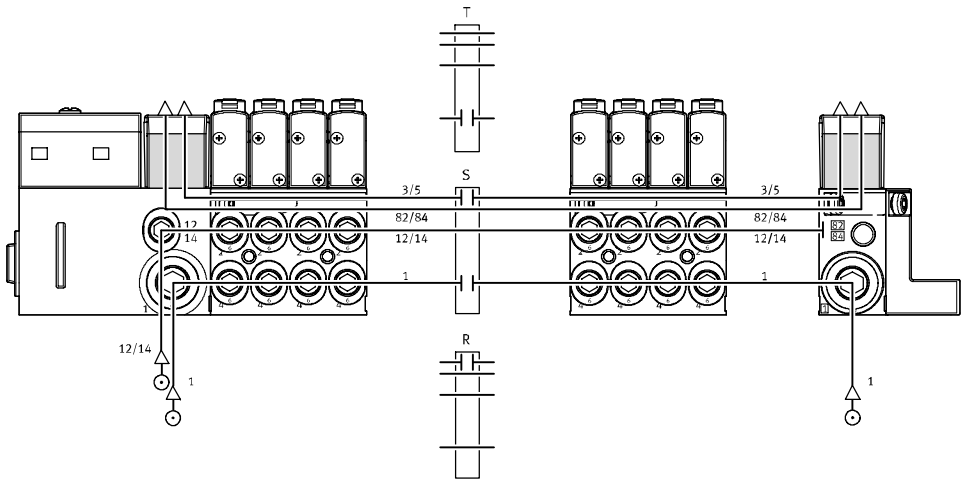
Examples: Compressed Air Supply and Pilot Air Supply

External Pilot Air Supply, Surface Silencer

Pneumatic valve manifold supply:
Code T

The diagram at right shows, for example, the configuration and connection of the compressed-air supply with an external pilot air supply. Port 12/14 on the pneumatic interface/multi-pin manifold block is equipped with a threaded connection for this purpose. Ports 3/5 and 82/84 are exhausted via the surface silencer. Port 82/84 is tightly sealed. Separating seals can be used optionally to create pressure zones.

Optional
separating seal

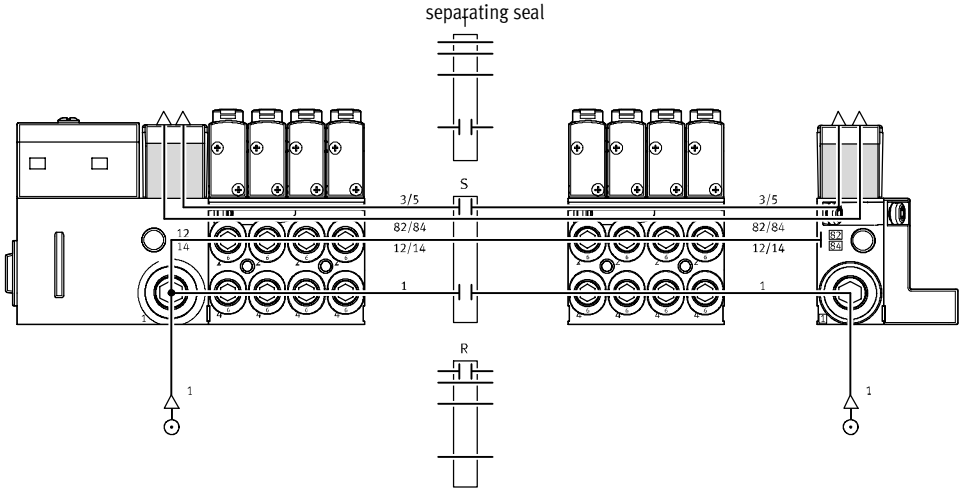


Internal Pilot Air Supply, Surface Silencer

Pneumatic valve manifold supply:
Code S

The diagram at right shows, for example, the configuration and connection of the compressed-air supply in the case of internal supply of pilot air. Port 12/14 on the pneumatic interface or the multi-pin manifold block as appropriate is tightly sealed. Ports 3/5 and 82/84 are exhausted via the surface silencer. Port 82/84 is tightly sealed. Separating seals can be used optionally to create pressure zones.

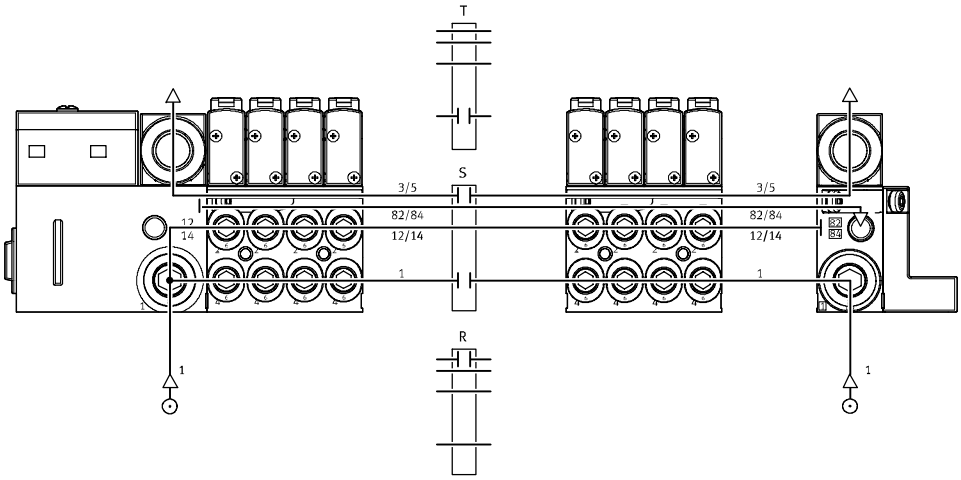
Optional
separating seal



Examples: Compressed Air Supply and Pilot Air Supply

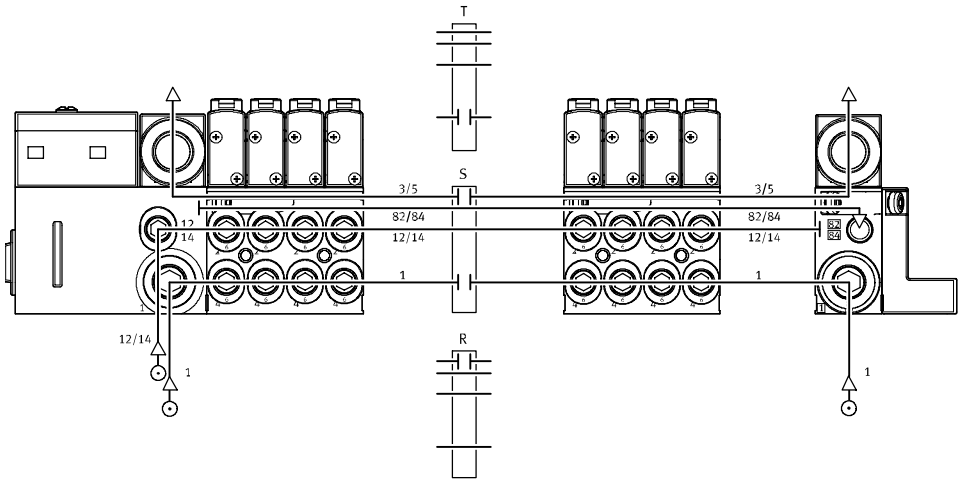
Internal Pilot Air Supply, Ducted Exhaust Air

Pneumatic valve manifold supply:
Code V
The diagram at right shows, for example, the configuration and connection of the compressed-air supply with internal pilot air supply. Port 12/14 on the pneumatic interface/multi-pin manifold block is tightly sealed. Ports 3/5 and 82/84 are exhausted via the appropriate connections. Separating seals can be used optionally to create pressure zones.



External Pilot Air Supply, Ducted Exhaust Air

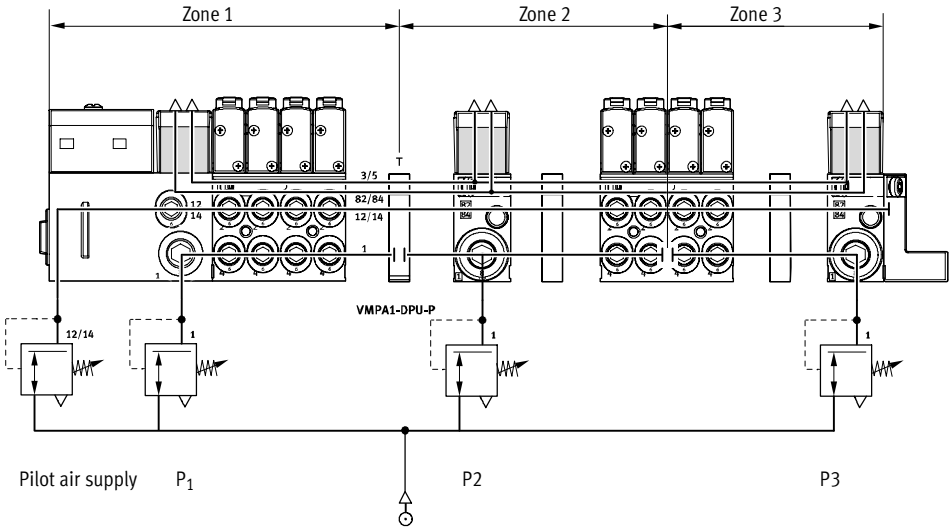
Pneumatic valve manifold supply:
Code X
The diagram at right shows, for example, the configuration and connection of the compressed-air supply with external pilot air supply. Port 12/14 on the pneumatic interface/multi-pin manifold block is equipped with a threaded connection for this purpose. Ports 3/5 and 82/84 are exhausted via the appropriate connections. Separating seals can be used optionally to create pressure zones.



Examples: Creating Pressure Zones

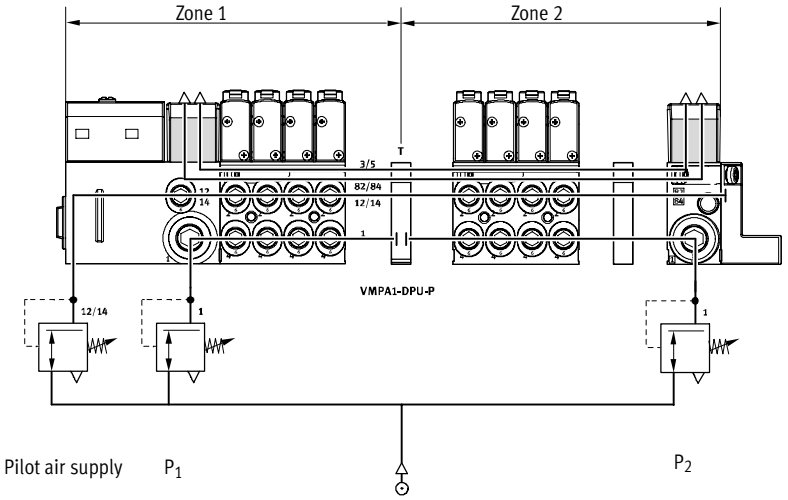
MPA with CPX Terminal Connection

MPA allows the creation of up to 16 pressure zones. The diagram at right shows, for example, the creation and connection of three pressure zones using separating seals – with an external pilot air supply.



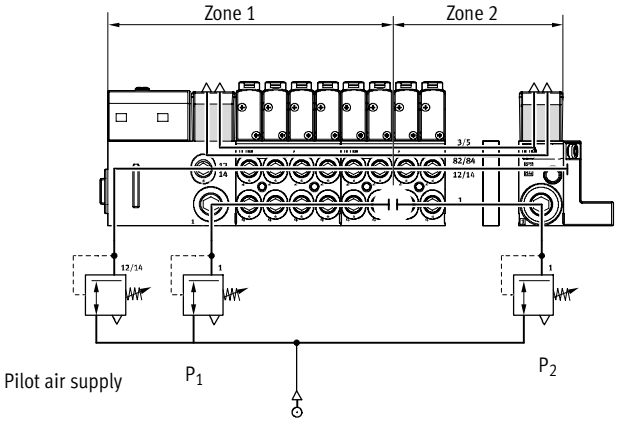
MPA with Multi-pin Connection

MPA allows the creation of multiple pressure zones. The diagram at right shows, for example, the creation and connection of the pressure zones – with an external pilot air supply.

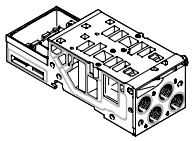


Manifold Block with Pressure Zone Separation

Another way of creating pressure zones is to use manifold blocks with pressure zone separation. Only duct 1 is separated here however.



Manifold Block



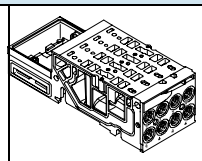
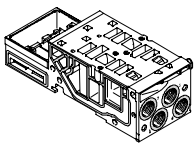
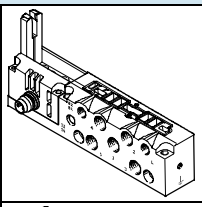
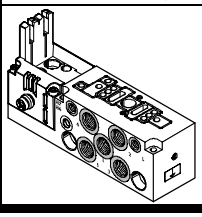
MPA is based on a modular system which consists of manifold blocks and valves.

The manifold blocks are screwed together and thus form the support system for the valves.

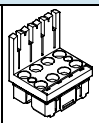
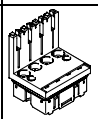
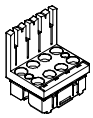
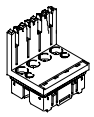
Inside, the manifold blocks contain the connection ducts for supplying compressed air to and venting from the valve manifold as well as the working lines for the pneumatic cylinders for each valve.

Each manifold block is connected to the next using three screws. Individual manifold sections can be isolated and further blocks inserted by loosening these screws. This ensures that the valve manifold can be rapidly and reliably expanded.

Manifold block variants

Code		Type	Size MPA1	Size MPA2	Number of valve positions (solenoid coils)	Notes
Manifold block for multi-pin plug/fieldbus connection						
A, C* AI, CI*		VMPA1-FB-AP-4-1 VMPA1-FB-AP-4-1-T1 (code I)	■	–	4 (8/4*)	Working lines (2, 4) on the manifold block ■ MPA1 connection sizes: M7, QS4, QS6, QS1/4, QS3/16 ■ Code I: Separation in duct 1 in the manifold block
B, D* BI, DI*		VMPA2-FB-AP-2-1 VMPA2-FB-AP-2-1-TO (code I)	–	■	2 (4/2*)	Working lines (2, 4) on the manifold block ■ MPA2 connection sizes: G1⁄8, QS6, QS8,QS1/4, QS5/16 ■ Code I: Separation in duct 1 in the manifold block
Individual subbase						
–		VMPA1-1-IC-AP-1** VMPA1-1-IC-AP-S-1***	■	–	1 (2)	■ With MPA1 working lines: M7 ■ With ports for supply air (1, 12/14) and exhaust air (3, 5, 82/84) ■ For internal/external pilot air supply
–		VMPA2-IC-AP-1** VMPA2-IC-AP-S-1***	–	■	1 (2)	■ With MPA2 working lines: G1⁄8 ■ With ports for supply air (1, 12/14) and exhaust air (3, 5, 82/84) ■ For internal/external pilot air supply

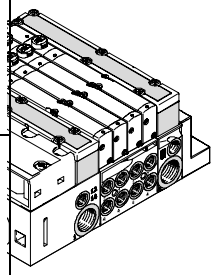
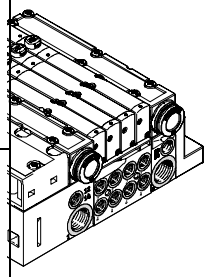
* Only possible with multi-pin plug connection
** Internal pilot air supply
*** External pilot air supply

Electrical Interface Variants						
Code			Size MPA1	MPA2	Number of Valve Positions (SolenoidCoils)	Notes
Electronics module for multi-pin plug (MPM)						
A C		VMPA1-MPM-EMM-8 VMPA1-MPM-EMM-4	■	–	4 (8) 4 (4)	Each valve solenoid coil must be assigned to a specific pin of the multi-pin plug in order for activation of the valves to take place. Regardless of the blanking plates or valves equipped, valve positions occupy ■ 1 address for activation of 1 coil ■ 2 addresses for activation of 2 coils
B D		VMPA2-MPM-EMM-4 VMPA2-MPM-EMM-2	–	■	2 (4) 2 (2)	
Electronics module for fieldbus						
A AH		VMPA...-FB-EMS-... VMPA...-FB-EMG-...	■	–	4 (8)	The electronics module contains the serial communication system and facilitates: ■ Transmission of switching information ■ Activation of up to 8 solenoid coils ■ Position-based diagnosis ■ Separate voltage supply for valves ■ Transmission of status, parameter and diagnostic data There are two variants: ■ Not electrically isolated (VMPA...-FB-EMS-...) ■ Electrically isolated (VMPA...-FB-EMG-...)
B BH		VMPA...-FB-EMS-... VMPA...-FB-EMG-...	–	■	2 (4)	

Note

- Multi-pin plug with modular linking
- Manifold blocks MPA1 and MPA2 can be combined as required
- Positive or negative switching activation is possible (mixed operation is not permitted)
- Double solenoid valves cannot be mounted on single solenoid electronics modules
- Single solenoid valves can be mounted on double solenoid electronics modules
- In fieldbus module, omit code H for not electrically isolated variant

Ports for Air Supply and Venting

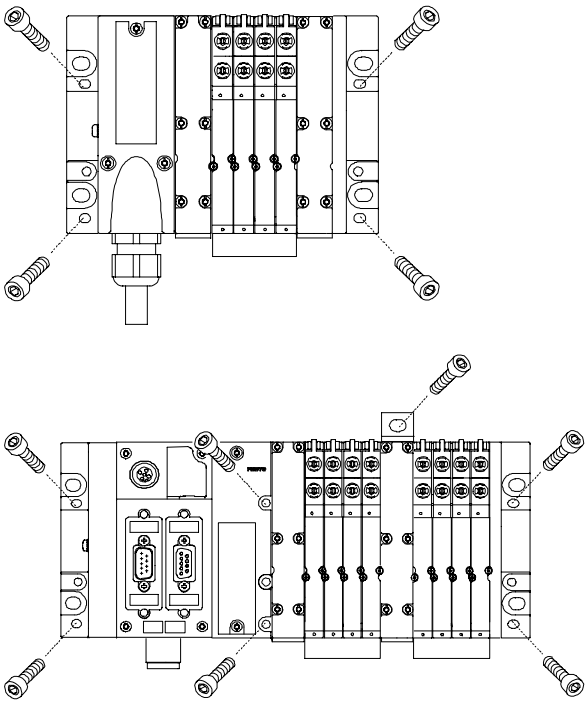
Code		Port		Designation	Code L	Code K	Code Q	Code P	Code D
					Push-in Fitting				Thread for
					Large Metric	Small Metric	Large Inch	Small Inch	Supply
S		Internal Pilot Air Supply, Silencer							
		1	Compressed air supply	Push-in fitting	QS-G¼-10-I	QS-G¼-8-I	QS-1/4-3/8-I-U-M	QS-1/4-5/16-I-U-M	G¼
		3/5	Exhaust	Surface silencer	–	–	–	–	–
		12/14	Pilot air supply	–	–	–	–	–	–
		82/84	Exhaust for pilot air supply	Surface silencer	–	–	–	–	–
			Pressure compensation	Vented to atmosphere via silencer					
T		External Pilot Air Supply, Silencer							
		1	Compressed air/ vacuum supply	Push-in fitting	QS-G¼-10-I	QS-G¼-8-I	QS-1/4-3/8-I-U-M	QS-1/4-5/16-I-U-M	G¼
		3/5	Exhaust	Surface silencer	–	–	–	–	–
		12/14	Pilot air supply	Push-in fitting	QSM-M7-6-I	QSM-M7-6-I	QSM-M7-1/4-I-U-M	QSM-M7-1/4-I-U-M	M7
		82/84	Exhaust for pilot air supply	Surface silencer	–	–	–	–	–
			Pressure compensation	Vented to atmosphere via silencer					
V		Internal Pilot Air Supply, Ducted Exhaust Air							
		1	Compressed air supply	Push-in fitting	QS-G¼-10-I	QS-G¼-8-I	QS-1/4-3/8-I-U-M	QS-1/4-5/16-I-U-M	G¼
		3/5	Exhaust	Push-in fitting	10 mm	10 mm	3/8″	3/8″	G¼
		12/14	Pilot air supply	–	–	–	–	–	–
		82/84	Exhaust for pilot air supply	Push-in fitting	QSM-M7-6-I	QSM-M7-6-I	QSM-M7-1/4-I-U-M	QSM-M7-1/4-I-U-M	M7
			Pressure compensation	Vented into 82/84 ducts					
X		External Pilot Air Supply, Ducted Exhaust Air							
		1	Compressed air/ vacuum supply	Push-in fitting	QS-G¼-10-I	QS-G¼-8-I	QS-1/4-3/8-I-U-M	QS-1/4-5/16-I-U-M	G¼
		3/5	Exhaust	Push-in fitting	10 mm	10 mm	3/8″	3/8″	G¼
		12/14	Pilot air supply	Push-in fitting	QSM-M7-6-I	QSM-M7-6-I	QSM-M7-1/4-I-U-M	QSM-M7-1/4-I-U-M	M7
		82/84	Exhaust for pilot air supply	Push-in fitting	QSM-M7-6-I	QSM-M7-6-I	QSM-M7-1/4-I-U-M	QSM-M7-1/4-I-U-M	M7
			Pressure compensation	Vented into 82/84 ducts					

Valve Manifold Assembly

Sturdy terminal attachment thanks to:

- Four through-holes for wall mounting
- Additional mounting bracket
- DIN rail mounting

Wall Mounting

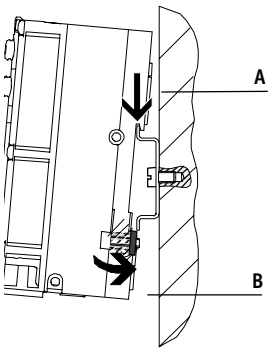


The MPA valve terminal is screwed onto the mounting surface using four M4 or M6 screws. The mounting holes are located at the following points:

- Multi-pin plug (4 pieces): at the pneumatic interface and the right-hand end plate
- Fieldbus (6 pieces): at the left-hand end plate (CPX) and right-hand end plate (MPA). The pneumatic interface additionally provides further mounting holes as well as optional mounting brackets.

The fieldbus version additionally provides a bracket for wall mounting (MPA type bracket , Part No. 665983). The mounting brackets can be used with very long valve terminals (6 manifold blocks or more) to improve load capacity during vibrations or shocks.

DIN Rail Mounting



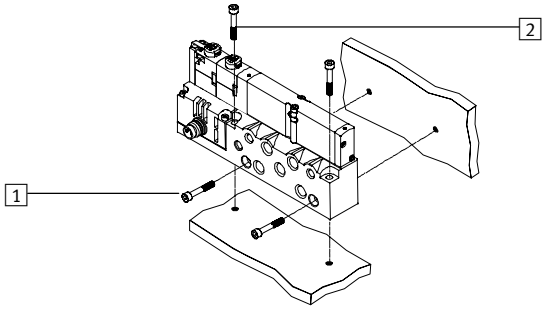
The MPA valve terminal is attached to the DIN rail (see arrow A). The terminal is then swivelled about the DIN rail and secured in place with the clamping component (see arrow B).

For DIN rail mounting of the valve terminal, you will need the following MPA mounting kit:

- With multi-pin plug:
  Part No. 173498, CPA-BG-NRH
- With fieldbus:
  Part No. 526032, CPX-CPA-BG-NRH

This will mount the valve terminal on the DIN rail to DIN EN 60715.

Individual Valve Assembly



1 Horizontal mounting holes
2 Vertical mounting holes

The individual manifold block is designed for wall mounting, for integration into a system or machine. It can be mounted horizontally or vertically.

Display and Operation

Each valve solenoid coil is allocated an LED which indicates its operating status.

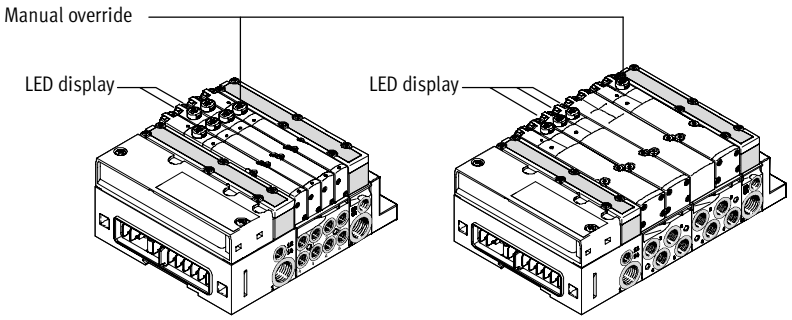
- Indicator 12 shows the switching status of the pilot control for output 2
- Indicator 14 shows the switching status of the pilot control for output 4

Manual Override

The manual override (MO) allows the valve to be activated without electronic control or power supply. The valve is activated by pushing the manual override. The set switching status can also be locked by rotating the manual override (code: R or as accessory).

Alternatives:

- A cover (code: N or as accessory) can be fitted to prevent the manual override from being locked. The valve can only be activated by pressing it.
- A cover (code: V) can be fitted over the manual override to prevent it from being activated accidentally.

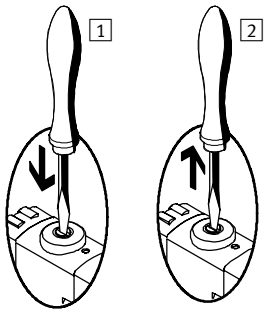


Note

A manually actuated valve (manual override) cannot be reset electrically. Conversely, an electrically actuated valve cannot be reset using the manual override.

Manual Override (MO)

Manual Override with Automatic Return (Push-in)

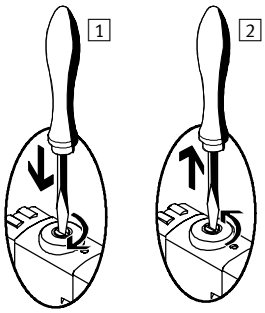


1. Press in the stem of the MO using a pin or screwdriver.
   Valve is then activated
2. Remove pin or screwdriver.
   Spring force pushes the stem of the MO back.
   Valve returns to the initial position (not with double solenoid valve code J).

Note

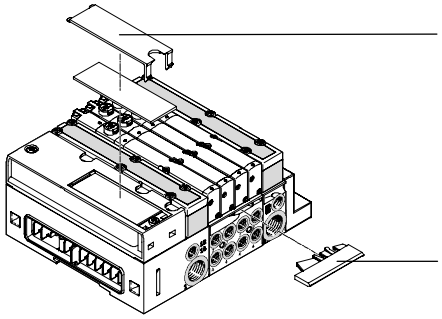
Pilot air must be supplied to ensure proper function of the manual override feature in the valve manifold.

Manual Override with Lock (Detenting)



1. Press in the stem of the MO using a pin or screwdriver until the valve activates and then turn the stem clockwise by 90° until the stop is reached.
   Valve remains activated.
2. Turn the stem anti-clockwise by 90° until the stop is reached and then remove the pin or screwdriver. Spring force pushes the stem of the MO back.
   Valve returns to the initial position (not with double solenoid valve code J).

Labelling System



A label holder can be inserted into each manifold block for the purpose of labelling the valves. This label holder (including label) can be ordered by entering code T in the order code (see Page 44 for MPM Multi-pin or Page 47 for CPX Fieldbus configuration). The following can be ordered as spares:

- Label holder (42 mm wide) with 5 labels – Part No. 533362

Small labels fit inside the 42 mm wide folding label holders:

- MPA Label (38 x 9 mm) – Part No. 663739

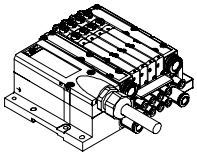
Large labels are applied to the pneumatic interface, under the snap-on clear plastic window:

- MPA Label (45 x 20 mm) – Part No. 663010

Electrical Connection Options

MPA Type 32 Valve Manifolds

Multi-pin Plug Connection

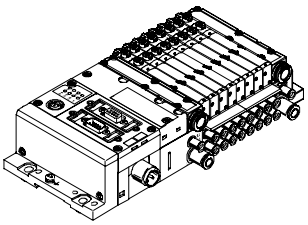


Control signals from the controller to the valve terminal are transmitted via a pre-assembled multi-core cable or a self-assembly multi-pin connection, which substantially reduces installation time.

These valve manifolds can be equipped with MPA1 and MPA2 valves, allowing control of 4 to 24 solenoid coils.

Variants
- Sub-D connection
- Multi-pin cable, pre-assembled
- Multi-pin connection, for self-assembly

Fieldbus Connection with the CPX System



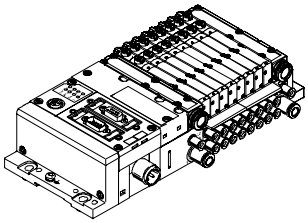
An integrated fieldbus node manages the communication connection to a higher-order PLC. This provides a space-saving pneumatic and electronic solution.

Valve manifolds with fieldbus interfaces can be configured with up to 8 subbases or, with an additional power supply plate, up to 16 subbases. With MPA1, there are 8 solenoids per manifold block; with MPA2, there are 4 solenoids per manifold block.

Variants
- Profibus DP
- Interbus
- Ethernet IP
- DeviceNet
- CANopen
- CC-Link
- CPX terminal

➔ See CPX Electrical Terminal Product Guide (Info 210)

Control Block Connection with the CPX System



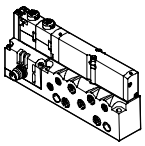
With controllers integrated in the Festo valve terminals, you can build stand-alone control units to IP65, without control cabinets.

Using the slave operation mode, these valve manifolds can be used for intelligent pre-processing and are therefore ideal modules for designing decentralized intelligence.

In the master operation mode, terminal groups can be designed with many options and functions, which can autonomously control a medium-sized machine/system.
- CPX terminal

➔ See CPX Electrical Terminal Product Guide (Info 210)

Individual Connection



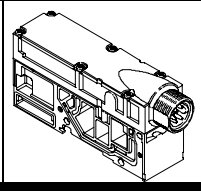
Valves can also be used on individual manifold blocks for actuators further away from the valve terminal.

The electrical connection is established using a standard 4-pin M8 plug (VDMA 24571).

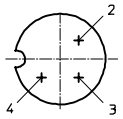
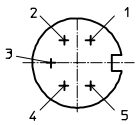
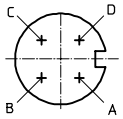
Electrical Supply Plate

Additional electrical supply plates can be used for large fieldbus manifolds. This enables up to 64 valve positions / 128 solenoid coils to be supplied.

Electrical Supply Plate

Code		Type	Size		Notes
			MPA1	MPA2	
L		VMPA-FB-SP-V-SP	■	■	Electrical supply plate with M18 plug connection, 3-pin
		VMPA-FB-SP-7/8-V-4POL	■	■	Electrical supply plate with 7/8" plug connection, 4-pin
		VMPA-FB-SP-7/8-V-5POL	■	■	Electrical supply plate with 7/8" plug connection, 5-pin

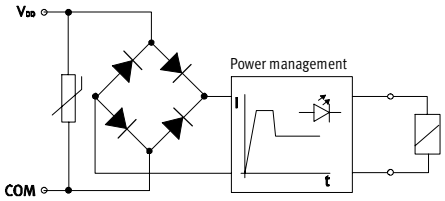
Pin Allocation for Voltage Supply

	Pin	Allocation
Pin allocation for M18		
	2	24 V DC valves
	3	0 V DC
	4	Earth/ground connection
Pin allocation for 7/8", 5-pin		
	1	0 V DC valves
	2	Not connected
	3	Earth/ground connection
	4	Not connected
	5	24 V DC valves
Pin allocation for 7/8", 4-pin		
	A	Not connected
	B	24 V DC valves
	C	Earth/ground connection
	D	0 V DC valves

Electrical Power as a Result of Current Reduction

Each valve solenoid coil is protected with a spark arresting protective circuit as well as against polarity reversal.
Additionally, all valve types are equipped with an integrated current reduction, e.g. for fieldbus with MPA1:
- Pull current: 45 mA
- Holding current after 20 ms: 8 mA

MPA valves are supplied with operating voltage in the range 18 ... 30 V (24 V +/–25%). This high tolerance is made possible through integrated control electronics and offers additional security, e.g. if the operating voltage drops.



Individual Valve

Valves can also be used on individual manifold blocks for actuators further away from the valve terminal.

- Electrical M8 connection, 4-pin with screw connection
- Detachable electronics module with integrated holding current reduction

Electrical Multi-pin Connection Code: MPM

The following multi-pin plug connection is offered for the MPA valve manifold:
- Sub-D Multi-pin plug connection (25-pin)

Pins 1 ... 24 are used for coils 1 ... 24 in order.
If there are fewer than 24 coils on the valve terminal, the remaining pins up to 24 are left free. Pin 25 is reserved for the neutral conductor.

The valves are switched by means of positive or negative logic (PNP or NPN). Mixed operation is not allowed. Each pin on the multi-pin plug can activate only one valve solenoid coil.

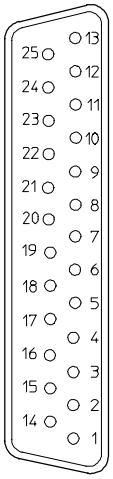
Note
If a single solenoid valve is assembled on a double solenoid valve position, the second address is unused.

Fieldbus Connection

All functions and features of the CPX electrical peripherals are allowed in connection with the CPX interface.
This means:
- The valves and electrical outputs are powered via the operating voltage connection of the CPX
- The valves can be powered separately via the code V option in the CPX configuration code.

Note
Further information can be found in
➔ Info 210 CPX Modular Electrical Terminal

Pin Allocation – Sub-D Socket, Cable



Pin	Address/coil	Core colour[1]	Pin	Address/coil	Core colour[1]
1	0	WH	17	16	WH PK
2	1	GN	18	17	PK BN
3	2	YE	19	18	WH BU
4	3	GY	20	19	BN BU
5	4	PK	21	20	WH RD
6	5	BU	22	21	BN RD
7	6	RD	23	22	WH BK
8	7	VT	24	23	BN
9	8	GY PK	25	0 V[2]	BK
10	9	RD BU			
11	10	WH GN			
12	11	BN GN			
13	12	WH YE			
14	13	YE BN			
15	14	WH GY			
16	15	GY BN			

Note
The drawing shows the view on the Sub-D socket at the VMPA-KMS1-... multi-pin cable end.

1) Core colors (to IEC 757) refer to pre-assembled multi-pin cables from Festo.
2) 0 V for positive switching control signals; connect 24 V for negative switching control signals; mixed operation is not permitted.

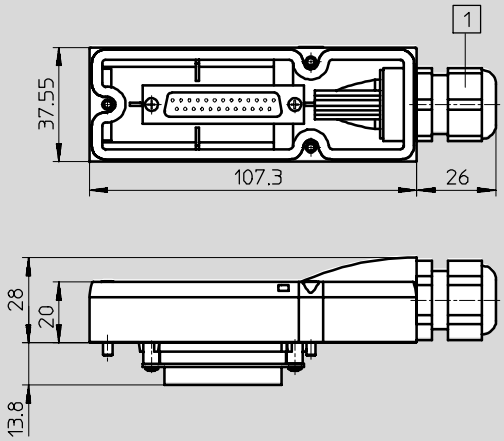
Guidelines on Addressing for Valves/Valve Solenoids

- The maximum possible number of addresses with a multi-pin plug connection is 24.
- Each manifold block/electronics module occupies a defined number of addresses/pins:
  - Manifold block MPA1 for 4 single solenoid valves: 4
  - Manifold block MPA1 for 4 double solenoid valves: 8
  - Manifold block MPA2 for 2 single solenoid valves: 2
  - Manifold block MPA2 for 2 double solenoid valves: 4
- The numbering of the addresses goes from left to right in ascending consecutive order. The following holds true at the individual valve positions: Address x for coil 14 and higher value address for coil 12.
- If single solenoid valves are mounted on manifold blocks for double solenoid valves, the address of coil 12 and the assigned pin will remain unused.

Dimensions

For Information On Obtaining CAD Data ➔ **www.festo.com/en/engineering**

Multi-pin Cable



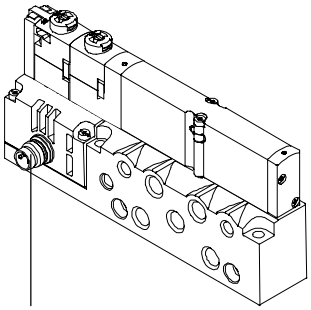
[1] Cable conduit fitting with clamping range 6 ... 12 mm

The core colors refer to the following preassembled multi-pin cables from Festo:

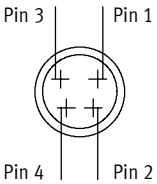
- VMPA-KMS1-8-... Valve terminal for up to 4 valve positions (8 coils)
- VMPA-KMS1-24-... Valve terminal with 4 ... 24 valve positions

Type	Sheath	Length [m]	Core x mm²	D [mm]	Part No.
VMPA-KMS1-8-2.5	PVC	2.5	10 x 0.34	6.9	**533195**
VMPA-KMS2-8-2.5-PUR	PUR	2.5	10 x 0.25	8.3	**533504**
VMPA-KMS1-8-5	PVC	5	10 x 0.34	6.9	**533196**
VMPA-KMS2-8-5-PUR	PUR	5	10 x 0.25	8.3	**533505**
VMPA-KMS1-8-10	PVC	10	10 x 0.34	6.9	**533197**
VMPA-KMS2-8-10-PUR	PUR	10	10 x 0.25	8.3	**533506**
VMPA-KMS1-24-2.5	PVC	2.5	25 x 0.34	11.4	**533192**
VMPA-KMS2-24-2.5-PUR	PUR	2.5	25 x 0.25	11.2	**533501**
VMPA-KMS1-24-5	PVC	5	25 x 0.34	11.4	**533193**
VMPA-KMS2-24-5-PUR	PUR	5	25 x 0.25	11.2	**533502**
VMPA-KMS1-24-10	PVC	10	25 x 0.34	11.4	**533194**
VMPA-KMS2-24-10-PUR	PUR	10	25 x 0.25	11.2	**533503**
VMPA-KMS-H	Cover for self-assembly				**533198**

Electrical Connection, Individual Valve



Connector plug M8 x 1, 4-pin to EN 60 947-5-2



Pin allocation on individual valve to VDMA 24 571

With positive logic:
Pin1 – Not connected
Pin2 – +24 V DC for coil 12
Pin3 – 0 V for coils 12 and 14
Pin4 – +24 V DC for coil 14

With negative logic:
Pin1 – Not connected
Pin2 – 0 V for coil 12
Pin3 – +24 V DC for coils 12 and 14
Pin4 – 0 V for coil 14

Tightening torque for M8 plug
0.25 ... 0.5 Nm (manual torque)

Connecting Cable

Type	Designation	Version	Cable Length [m]	Part No.
SIM-M8-4GD-2,5-PU	Plug socket cable	Straight socket	2.5	**158960**
SIM-M8-4GD-5-PU	Plug socket cable	Straight socket	5	**158961**
SIM-M8-4WD-2,5-PU	Plug socket cable	Angled socket	2.5	**158962**
SIM-M8-4WD-5-PU	Plug socket cable	Angled socket	5	**158963**

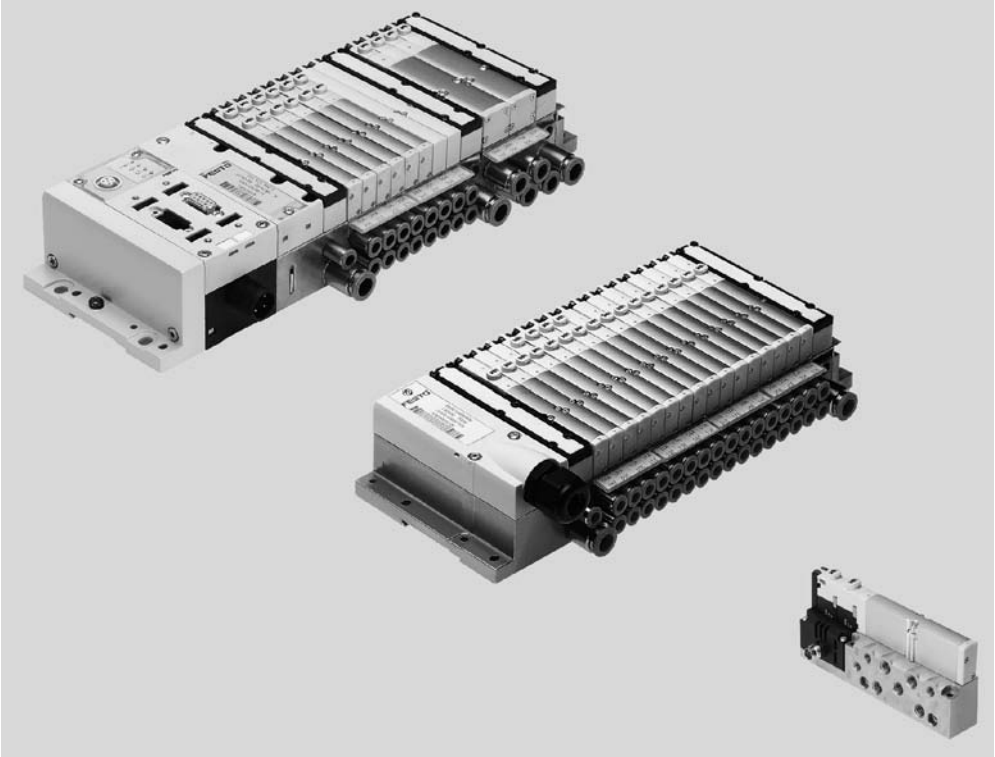
Technical Data

MPA Type 32 Valve Manifolds

Flow rate:
MPA1: up to 360 l/min
MPA2: up to 700 l/min

Valve width:
MPA1: 10 mm
MPA2: 20 mm

Voltage: 24 V DC



General Technical Data			
		MPA1	MPA2
Design		Electromagnetically actuated piston spool valve	
Width	[mm]	10.5	21
Lubrication		Lubricated for life, PWIS-free (free of paint-wetting impairment substances)	
Type of mounting		Wall mounting	
		On DIN rail to EN 60715	
Mounting position		Any	
Manual override		Push-in, rotary/detenting, covered	
Pneumatic Connections			
Pneumatic connection		Via manifold block or individual connection	
Supply port	1	G1/4 (M7 with individual subbase)	G1/4 (G⅛ with individual subbase)
Exhaust port	3/5	G1/4 (M7 with individual manifold block)	G1/4 (G⅛ with individual manifold block)
Working Lines	2/4	Depending on the connection type selected	
		■ M7 thread ■ 4 mm ■ 6 mm ■ 3/16″ ■ 1/4″	■ G⅛ thread ■ 6 mm ■ 8 mm ■ 1/4″ ■ 5/16″
Pilot air port	12/14	M7 (M5 with individual manifold block)	
Pilot exhaust air port	82/84	M7 (M5 with individual manifold block)	
Pressure compensation port	L	With ducted exhaust air: M7 via port 82/84 (M5 with individual manifold block) With surface silencer: Venting to atmosphere	

Operating and Environmental Conditions												
Valve function order code			M	J	N	K	H	B	G	E	X	W	D
Operating medium			Filtered compressed air, lubricated or unlubricated, inert gases (See Compressed Air and Lubrication text below for operating recommendations)										
Grade of filtration		[µm]	40 (average pore size)										
Operating pressure	with internal pilot air supply	[bar]	3 … 8										
	with external pilot air supply	[bar]	−0.9 … +10		3 … 10			−0.9 … +10					3 … 10
	Pilot air supply	[bar]	3 … 8										
Ambient temperature		[°C]	−5 … +50										
Temperature of medium		[°C]	−5 … +50										
Storage temperature[1)]		[°C]	−20 … +40										
Relative air humidity at 40° C		[%]	90										

1) Long-term storage

Compressed Air and Lubrication

Operate your equipment with unlubricated compressed air if possible. Festo valves and cylinders are designed for operation under normal use without any additional lubrication, yet still have a long service life. The quality of compressed air downstream of the compressor must correspond to that of unlubricated compressed air.
If possible, do not operate all of your equipment with lubricated compressed air. The lubricators should, where possible, always be located downstream of the valves, directly upstream of the cylinders used.

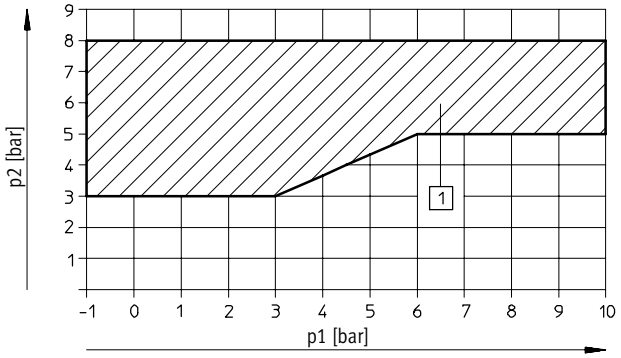
Incorrect additional oil and too high an oil content in the compressed air reduces the service life of the valve terminal. Use Festo special oil OFSW-32, P/N 152811 (1 liter) (as specified in DIN 51524-HLP32; basic oil viscosity 32 cSt at 40 °C).

Biodegradable Oils
When using bio-oils (oils which are based upon synthetic or native ester, e.g. rapeseed oil methyl ester), the maximum residual oil content of 0.1 mg/m3 must not be exceeded (see ISO 8573-1 Class 4).

Mineral Oils
When using mineral oils (e.g. HLP oils to DIN 51524, parts 1 to 3) or similar oils based on poly-alpha-olefins (PAO), the maximum residual oil content of 5 mg/m3 must not be exceeded (see ISO 8573-1 Class 4). A higher residual oil content irrespective of the compressor oil cannot be permitted, as the basic lubricant would be washed away over time.

Pilot Pressure p2 as a Function of Working Pressure p1 with External Auxiliary Pilot Air

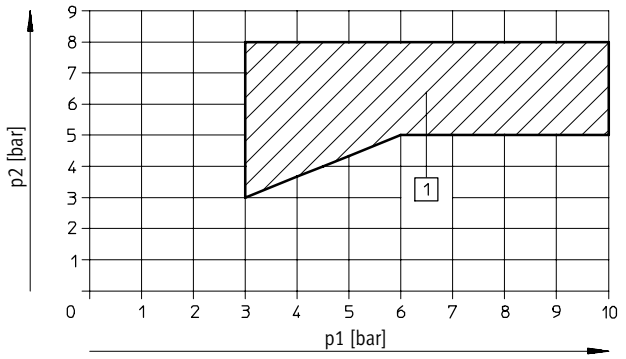
For Valves with Code M, J, B, G, E, X



1 Operating range for valves with external auxiliary pilot air

Pilot Pressure p2 as a Function of Working Pressure p1 with External Auxiliary Pilot Air

For Valves with Code N, K, H, D



1 Operating range for valves with external auxiliary pilot air

Nominal Flow Rate [l/min][1)]			
Code	Valve function	With fitting[2)] from port 1 to 2, or 1 to 4	from port 2 to 3/5, or 4 to 3/5
MPA1			
M	5/2-way valve, single solenoid	360	360
J	5/2-way valve, double solenoid	360	360
N	2x 3/2-way valve, normally open	300	300
K	2x 3/2-way valve, normally closed	230	310
H	2x 3/2-way valve, 1x normally open and 1x normally closed	280	305
B	5/3-way valve, mid-position pressurised	300 (195)[3)]	270
G	5/3-way valve, mid-position closed	320	320
E	5/3-way valve, mid-position exhausted	240	240 (180)[3)]
I	Vacuum valve	260	260
X	1x 3/2-way valve	255	295
W	1x 3/2-way valve	255	295
D	2x 2/2-way valve	230	230
MPA2			
M	5/2-way valve, single solenoid	660	670
J	5/2-way valve, double solenoid	660	670
N	2x 3/2-way valve, normally open	550	480
K	2x 3/2-way valve, normally closed	500	540
H	2x 3/2-way valve, 1x normally open and 1x normally closed	500	480
B	5/3-way valve, mid-position pressurised	510 (350)[3)]	600 (350)[3)]
G	5/3-way valve, mid-position closed	610	610
E	5/3-way valve, mid-position exhausted	590	420 (350)[3)]
I	Vacuum valve	590	420
X	1x 3/2-way valve	470	560
W	1x 3/2-way valve	470	560
D	2x 2/2-way valve	650	650

1) Values also apply to individual subbases
2) Flows measured on manifold block with fitting QS-M7-6-I for MPA1 and QS-G⅛-8-I for MPA2
3) Value for mid-position

Electrical Data			
MPA with CPX terminal			
Voltage supply for electronics ($V_{EL/SEN}$)			
Nominal voltage	[V]	24 DC	
Operating voltage range	[V]	18 ... 30 DC	
Steady rate current consumption at 24 V DC	[mA]	20	
Load voltage supply for valves (V_{VAL})			
Nominal voltage	[V]	24 DC	
Operating voltage range	[V]	18 ... 30 DC	
Steady rate current consumption at 24 V DC per electronics module			
VMPA1-FB-EMS-8 or VMPA2-FB-EMS-4	[mA]	8 not electrically isolated (max. signal line length 10 m)	
VMPA1-FB-EMG-8 or VMPA2-FB-EMG-4	[mA]	25 electrically isolated	
Diagnostic message on undervoltage (V_{OFF}) Load voltage outside function range	[V]	< 17.5	
Protection class to EN 60529		IP65 (for all types of signal transmission in assembled state)	
Max. current consumption per solenoid coil at nominal voltage		MPA1	MPA2
Nominal pull current/duration	[mA]	45/20 ms	90/20 ms
Nominal current with current reduction	[mA]	8 after 20 ms	18 after 20 ms
Calculation example			
Current consumption with two solenoid coils MPA2 switched in parallel and one electronics module without electrical isolation	[mA]	$I_{EL/SEN}$ = 20	
Nominal pull current	[mA]	I_{VAL} = 8 + (2 x 90) = 188	
Nominal current with current reduction	[mA]	I_{VAL} = 8 + (2 x 18) = 44	

MPA with multi-pin plug connection			
Power supply			
Nominal voltage	[V]	24 DC	
Operating voltage range	[V]	18 ... 30 DC	
Current consumption at Sub-D multi-pin plug connection per solenoid coil at nominal voltage		MPA1	MPA2
Nominal pull current/duration	[mA]	80/25 ms	100/50 ms
Nominal current with current reduction	[mA]	25 after 25 ms	20 after 50 ms

Data on vibrations and shock in accordance with DIN/EC68		
	MPA1	MPA2
Vibration[1)]	Tested to DIN/IEC68 / EN 60068 Parts 2 ... 6 With horizontal DIN rail mounting: Severity level 1 With wall mounting: [2)]	
Shock[1)]	Tested to DIN/IEC68 / EN 60068 Parts 2 ... 27 With horizontal DIN rail mounting: Severity level 1 With wall mounting: Severity level 1 ... 2[2)]	
Continuous shock	Tested to DIN/IEC68 / EN 60068 Parts 2 ... 29 With wall and DIN rail mounting: Severity level 1	

1) See the CPX System Description for information on vibrations and shock for the CPX terminal.
2) Valve terminal MPA with MPM connection and more than 5 manifold blocks: Severity level 1
Valve terminal MPA with CPX terminal or MPM connection and
up to 5 manifold blocks without additional mountings: Severity level 2
6 or more manifold blocks without additional mounting (wall bracket) after 2 to max. 4 manifold blocks: Severity level 2

Test conditions			
Severity level	Vibration	Shock	Continuous shock
1	0.15 mm travel at 10 ... 58 Hz; 2 g acceleration at 58 - 150 Hz	±15 g at 11 ms duration; 5 shocks per direction	±15 g at 6 ms duration; 1000 shocks per direction
2	0.35 mm travel at 10 - 60 Hz; 5 g acceleration at 60 - 150 Hz	±30 g at 11 ms duration; 5 shocks per direction	–
Continuous shock resistance	To DIN/IEC 68/EN 60068, Parts 2-29: +/–15 g at 6 ms, 1000 cycles		

Materials		
	MPA1	MPA2
Manifold block	Die-cast aluminum	
Valve	Die-cast aluminum	
Seals	NBR, elastomer	
Supply plate	Die-cast aluminum	
Right-hand end plate	Die-cast aluminum	
Left-hand pneumatic interface	Die-cast aluminum, polyamide	
Exhaust plate	Polyamide	
Surface silencer	Polyethylene	
Electronic module	Polycarbonate	
Electrical interlinking	Bronze/Polybutylene terephthalate	

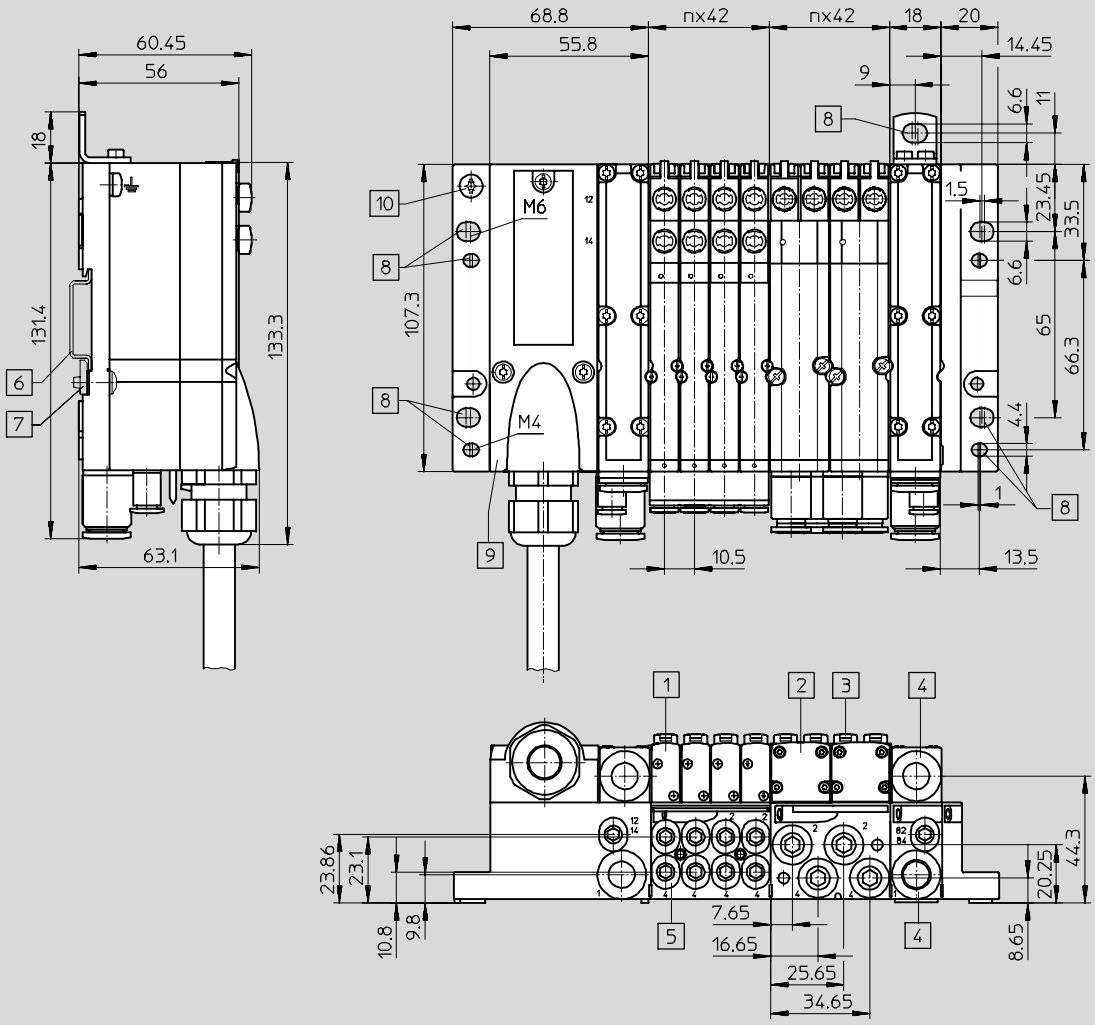
Product weight			
Approx. weights [g]	MPA1	MPA2	
Basic connection block weight[1)]	400 (4 valve positions)	400 (2 valve positions)	
Manifold block[1)]	185		
Individual sub-base	45		
Per valve M, X, W	49	100	
Per valve J, N, K, H, B, G, E, D	56	100	
Per spare position L	24	44	
Right-hand end plate	55		
Left-hand pneumatic interface[1)]			
■ With surface silencer	315		
■ With ducted exhaust air	324		
Supply plate[1)]			
■ With surface silencer	111		
■ With ducted exhaust air	120		
Push-in fittings			
QSM-M5-3-I	3		
QSM-M5-4-I	4		
QSM-M5-6-I	5		
QSM-M7-4-I	4		
QSM-M7-6-I	5		
QSM-M7-3/16-I-U-M	6		
QSM-M7-1/4-I-U-M	5		
QS-1/8-1/4-I-U-M	8		
QS-1/8-5/16-I-U-M	14		
QS-G¼-8-I	22		
QS-G¼-10-I	23		

1) With thin metal seal, label holder, screws.

Valve response times [ms]												
Valve function order code		M	J	N	K	H	B	G	E	X	W	D
MPA1												
Response times	on	10	8	10	10	10	11	9	11	10	10	10
	off	20	–	20	20	20	33	29	37	20	20	20
	reverse	–	14	–	–	–	–	–	–	–	–	–
MPA2												
Response times	on	15	9	8	8	8	10	10	11	13	13	7
	off	28	–	28	28	28	44	38	45	22	22	25
	reverse	–	22	–	–	–	–	–	–	–	–	–

Dimensions To obtain CAD Data ➔ **www.festo.com/usa, Engineering, CAD models**

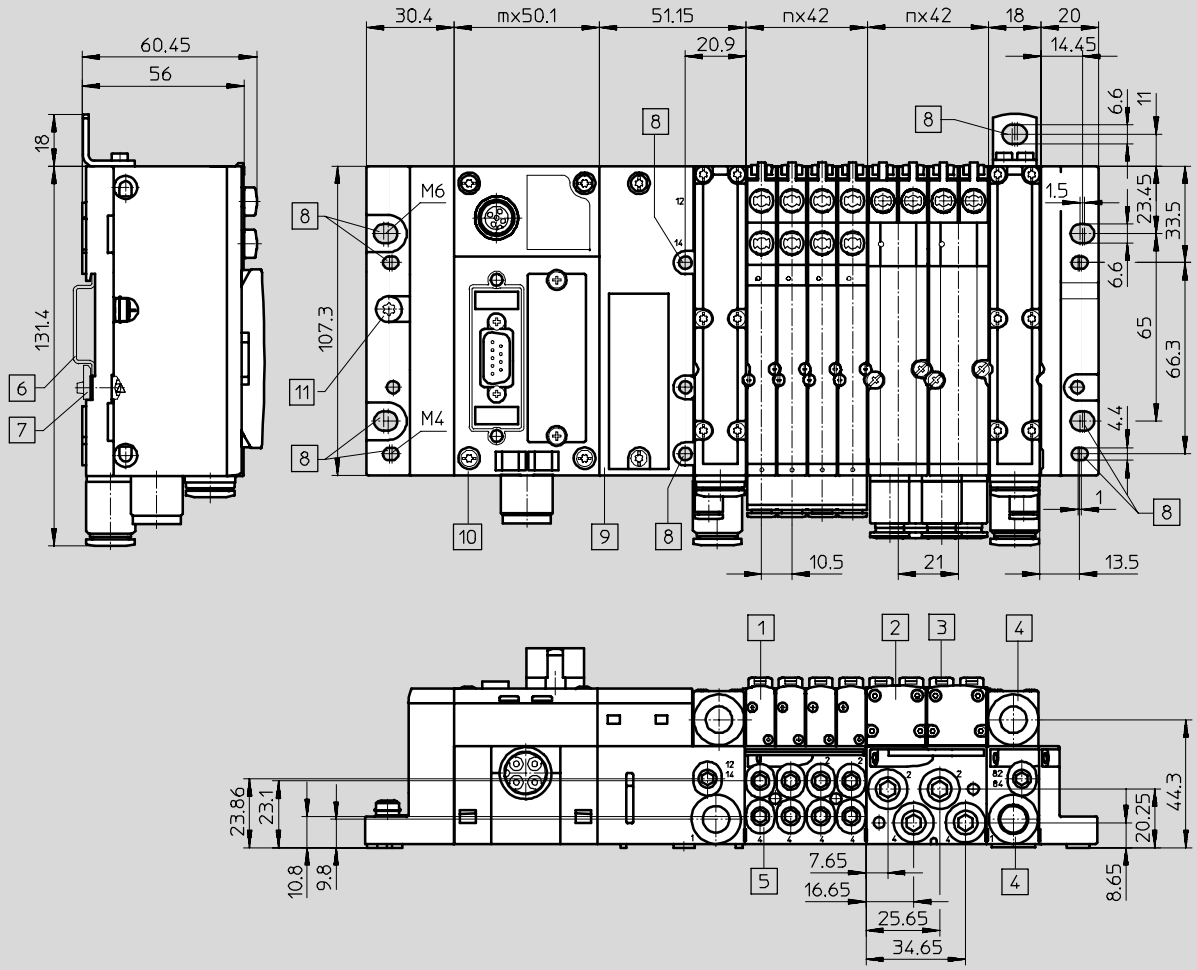
Valve Manifold with Multi-pin Plug Connection



1 MPA1 solenoid valve
2 MPA2 solenoid valve
3 Manual override
4 Supply/exhaust ports
5 Working lines
6 DIN rail
7 DIN rail mounting
8 Mounting holes
9 Multi-pin plug connection
10 Earth/ground connection screw
n Number of manifold blocks in a grid of 4 MPA1 or 2 MPA2 valves

Dimensions To obtain CAD Data ➔ **www.festo.com/usa, Engineering, CAD models**

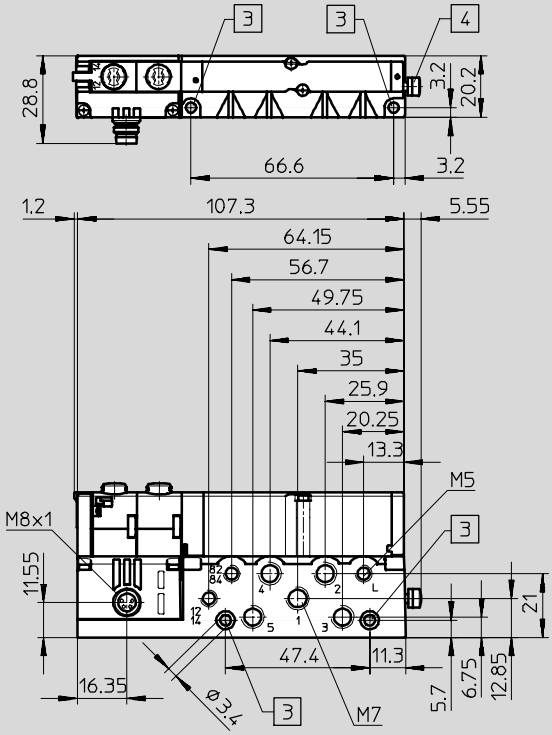
Valve Terminal with Fieldbus Connection



1 Solenoid valve MPA1	5 Working lines	9 End plate, left-hand	n Number of manifold blocks in a grid of 4 MPA1 or 2 MPA2 valves
1 Solenoid valve MPA2	6 DIN rail	10 CPX module	
3 Manual override	7 DIN rail mounting	11 Earth/ground connection screw	m Number of CPX modules
4 Supply/exhaust ports	8 Mounting holes		

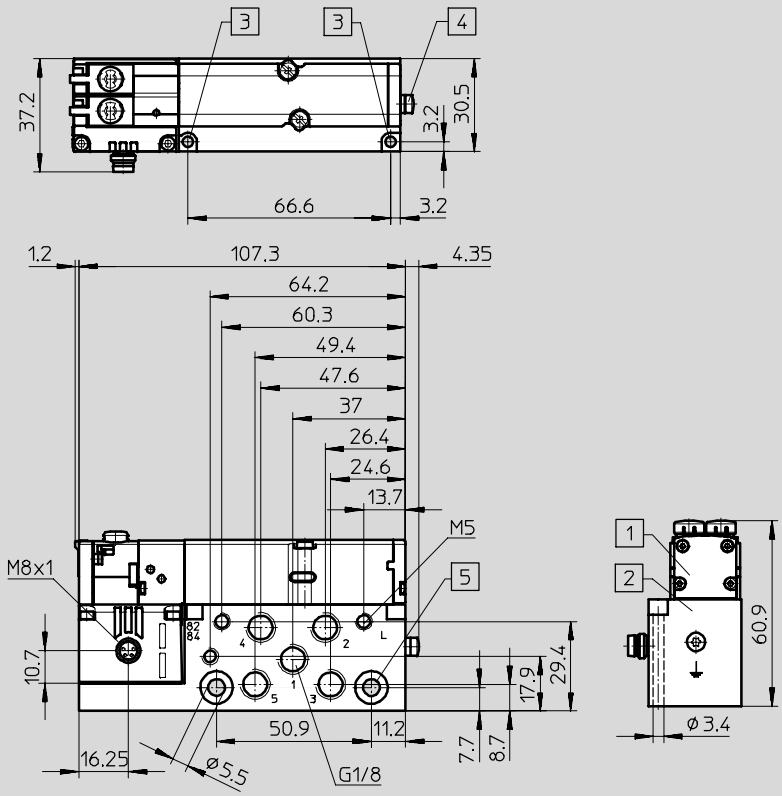
Dimensions Tor obtain CAD data ➔ **www.festo.com/usa, Engineering, CAD models**

MPA1 Valve On Individual Subbase



1 Solenoid valve
2 Individual subbase
3 4x mounting holes for M3 screw
4 Earth/ground connection screw

MPA2 valve on individual subbase



1 Solenoid valve
2 Individual subbase
3 2x mounting holes for M3 screw
4 Earth/ground connection screw
5 2x mounting holes for M5 screw

Online Product Configurator

MPA Type 32 Valve Manifolds

Configuring MPA Valve Manifolds **Online via Festo Website – Electronic Catalog at www.festo.com/usa**

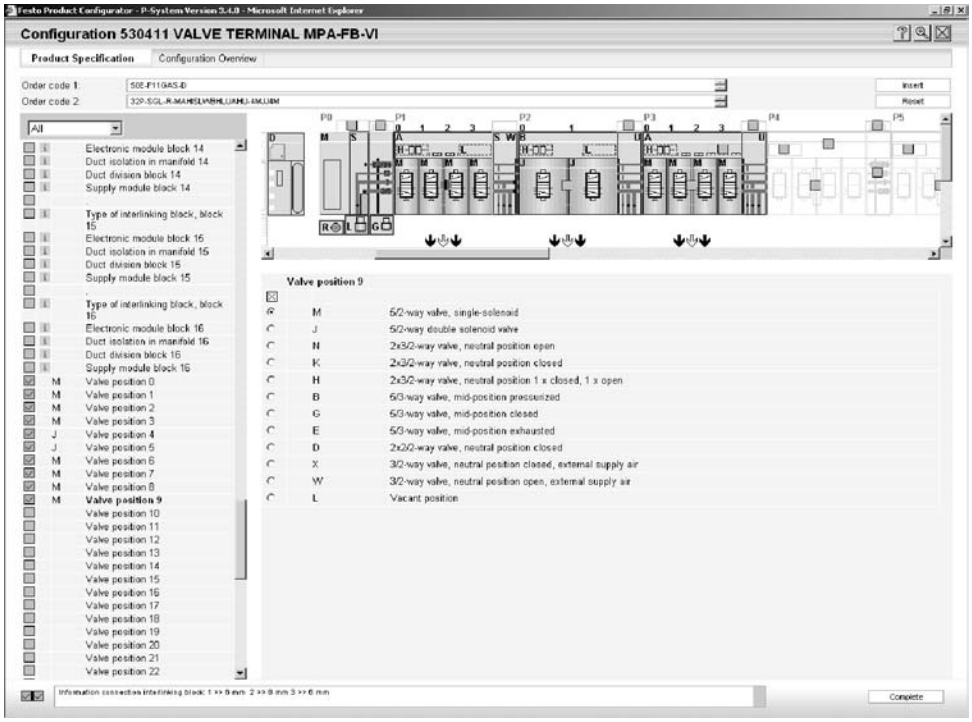
A product configurator is available to help you select a suitable MPA valve manifold.

The valve manifolds are fully assembled according to your order specifications and individually tested. This reduces on-site assembly and installation to a minimum.

You order a valve manifold using the order code.

The ordering data for valve manifolds begins on on page 41.

The illustration on this page provides an example of a valve manifold configuration in progress.



The following steps explain how you use the Festo product configurator to arrive at the order code:

Go to www.Festo.com/usa. On the Festo USA Industrial Automation home page, Select the Online Catalog log-in for Designer, Specifier, or Purchaser (or register if you have not already done so to open your free Festo Online Account). Click on the Basket log-in link in the right column.

In the "Add to basket" area, type in the part number (530411 for the CPX Fieldbus or 539105 for the MPM Modular Multi-pin), check the quantity, then click on the "Add" button. Click on the symbol in the blue area, in "Click this symbol to confugure!" to open the FACE (Festo Automation Configuration Engine) configurator.

You can now configure the valve manifold step by step (from the top down). Items with a blue box on the left are preset. Yellow boxes require a selection. Gray boxes are optional.

When you have completed your configuration, click on the "Complete" button, then the "Continue" link, to continue on with the ordering process.

Ordering Data – Electrical Section – MPM Multi-pin Configuration

MPA Type 32 Valve Manifolds

FESTO

M Mandatory Data				O Options
Module No.	**Valve Manifold, Electrical Section**	**Electrical Configuration**	**User Documentation**	**Electrical Accessories**
539105	32E	MPM	D E F I S V	H A, B, C D, E, F GA, GB, GC GD, GE, GF
Ordering example				
539105	**32E**	**– MPM**	**– E**	**+ HGD**
1	**2**	**3**	**4**	**5**

Ordering Table

			MPA1	Conditions	Code		Enter Code
M	1	Module No.	**539105**				
	2	Valve Manifold, Electrical Section	Valve manifold type 32, MPA, with electrical multi-pin plug connection		**32E**		32E
	3	Electrical Connection	Electrical multi-pin plug connection		**-MPM**		-MPM
	4	User Documentation	German manual		**-D**		
			English manual		**-E**		
			French manual		**-F**		
			Italian manual		**-I**		
			Spanish manual		**-S**		
			Swedish manual		**-V**		
O	5	Electrical Accessories			**+**		+
		DIN Rail Mounting	1		**H**		
		Multi-pin Cable	Preassembled multi-pin cable for 8 valves, 2.5 m, Sub-D, PVC	1	**A**		
			Preassembled multi-pin cable for 8 valves, 5 m, Sub-D, PVC	1	**B**		
			Preassembled multi-pin cable for 8 valves, 10 m, Sub-D, PVC	1	**C**		
			Preassembled multi-pin cable for 24 valves, 2.5 m, Sub-D, PVC		**D**		
			Preassembled multi-pin cable for 24 valves, 5 m, Sub-D, PVC		**E**		
			Preassembled multi-pin cable for 24 valves, 10 m, Sub-D, PVC		**F**		
			Preassembled multi-pin cable for 8 valves, 2.5 m, Sub-D, PUR	1	**GA**		
			Preassembled multi-pin cable for 8 valves, 5 m, Sub-D, PUR	1	**GB**		
			Preassembled multi-pin cable for 8 valves, 10 m, Sub-D, PUR	1	**GC**		
			Preassembled multi-pin cable for 24 valves, 2.5 m, Sub-D, PUR		**GD**		
			Preassembled multi-pin cable for 24 valves, 5 m, Sub-D, PUR		**GE**		
			Preassembled multi-pin cable for 24 valves, 10 m, Sub-D, PUR		**GF**		

1 Note the maximum permissible number of addresses for the module blocks.

Transfer Order Code

5339105	**32E**	**– MPM**	**–**	**+**	
1	**2**	**3**	**4**	**5**	

Ordering Data – Pneumatic Section – MPM Multi-pin Configuration

MPA Type 32 Valve Manifolds

FESTO

M **Mandatory Data** →

Module No.	Valve Maifold, Pneumatic Section		Pneumatic Supply	Pneumatic Working Port	Pneumatic Supply Connection		Manual Override
539 105	32P		S, T, V, X	G, N, F, J, C	L, K, D		N, R, V
Ordering example							
539 105	**32P**	–	**V**	**C**	**D**	–	**R**
1	**2**		**3**	**4**	**5**		**6**

Ordering Table

Size			1	2	Conditions	Code		Enter code
M	**1**	Module No.	**539 105**	**539 105**				
	2	Valve Manifold, Pneumatic Section	Valve manifold type 32, MPA modular subbase valves			**32P**		32P
	3	Pneumatic Supply to Valve Manifold	Internal pilot air supply, silencer			**-S**		
			External pilot air supply, silencer			**-T**		
			Internal pilot air supply, ducted exhaust air		1	**-V**		
			External pilot air supply, ducted exhaust air		1	**-X**		
	4	Pneumatic Working Line	Large push-in connector on working line					
			Metric (6 mm)	Metric (8 mm)		**G**		
			Inch (1/4″)	Inch (5/16″)		**N**		
			Small push-in connector on working line					
			Metric (4 mm)	Metric (6 mm)		**F**		
			Inch (3/16″)	Inch (1/4″)		**J**		
			Thread for working line			**C**		
			(M7)	(G1⁄8)				
	5	Pneumatic Connection to Supply	Push-in fitting QS10 for supply			**L**		
			Push-in fitting QS8 for supply			**K**		
			Push-in fitting QS-1/4-3/8-I-U-M for supply (3/8″)			**Q**		
			Push-in fitting QS-1/4-5/16-I-U-M for supply (5/16″)			**P**		
			Thread G1⁄4 for supply			**D**		
	6	Manual Override	Non-detenting			**-N**		
			Non-detenting/detenting			**-R**		
↓			Blocked			**-V**		

1 **V, X** At least 1 pneumatic supply plate U, V or W must be selected (position freely selectable)

Transfer order code

539 105	**32P**	–				–	
1	**2**		**3**	**4**	**5**		**6**

Ordering Data – Pneumatic Section – MPM Multi-pin Configuration

MPA Type 32 Valve Manifolds

FESTO

M Mandatory Data

Pneumatic Module Blocks 0 ... 12

7 Type of Module Block: M, A, B, C, D

O Options

8 Duct Separation: I

9 Duct Separation: S, T, R

10 Supply Plate: U, V, W

Module position

	0	1	2	3	4	5	6	7	8	9	10	11	12
–	**M**	**B**	**B**	**B**	**U**	**B**	**D**						

7 + 8 + 9 + 10

Ordering Table

Size			1	2	Conditions	Code		Enter code
↓		**Pneumatic Module Blocks 0 ... 12**				-		-
M	**7**	Type of Module Block for Block 0 ... 12	Pneumatic interface		2	**M**		Enter equipment selection for module positions in order code
			Connection block for size 1, 8 addresses	–	3	**A**		
			–	Connection block for size 2, 4 addresses	3	**B**		
			Connection block for size 1, 4 addresses (single)	–	3	**C**		
			–	Connection block for size 2, 2 addresses (single)	3	**D**		
O	**8**	Duct Separation in Connection Block 1 ... 12	Separation duct 1		4	**I**		
	9	Duct Separation for Block 0 ... 12	Separating seal for duct 1, 3, 5		4	**S**		
			Separating seal for duct 1		4	**T**		
			Separating seal for duct 3, 5		4	**R**		
	10	Pneumatic Supply Plate for Block 1 ... 12	Supply plate		5	**U**		
			Supply plate with separating seal on left		6	**V**		
↓			Supply plate with separating seal on right		6	**W**		

2 **M** Only on block 0

3 **A, B, C, D**
Each module block must be fully equipped

4 **I, S, T, R**
If a duct is separated, a pneumatic supply plate U, V or W must be selected to the right of it before the next duct separation of the same duct or before the right-hand end plate

5 **U** Must be selected if no duct separation R, S or T was selected

6 **V, W** Must be selected if duct separation R, S or T was selected

Transfer order code

Module position

	0	1	2	3	4	5	6	7	8	9	10	11	12
–													

7 + 8 + 9 + 10

Ordering Data – Pneumatic Section – MPM Multi-pin Configuration

MPA Type 32 Valve Manifolds

FESTO

M Mandatory Data	O Options
Equipment at Valve Position 0 ... 23	Pneumatic Accessories
M, J, N, K, H, B, G, E, I, D, X, W, L	...T, ...J

Valve position

–	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	+	
	J	K	M	M	M	D	L	J	M	M																8T2J
	11																									12

Ordering Table

			MPA1	MPA2	Conditions	Code		Enter code
M	11	Equipment at Valve Position 0 ... 23				-		-
		Valves	5/2-way valve, single solenoid			M		Enter equipment selection for valve positions in order code
			5/2-way valve, double solenoid		7	J		
			2x 3/2-way valve, normally open		7	N		
			2x 3/2-way valve, normally closed		7	K		
			2x 3/2-way valve, 1x normally open, 1x closed		7	H		
			5/3-way valve, mid-position pressurised		7	B		
			5/3-way valve, mid-position closed		7	G		
			5/3-way valve, mid-position exhausted		7	E		
			Vacuum valve, separate vacuum supply		7	I		
			2x 2/2-way valve, normally closed		7	D		
			3/2-way valve, normally closed, external supply air			X		
			3/2-way valve, normally open, external supply air			W		
			Blanking plate for vacant valve position			L		
O	12	Pneumatic Accessories				+		+
		Label	1 ... 99			...T		
		Sensor Bracket for Additional Wall Mounting	1 ... 99			...J		

7 **J, N, K, H, B, G, E, I, D**
Cannot be selected on module block C or D.

Transfer order code

Valve position

–	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	+	
	11																									12

Ordering Data – Pneumatic Section – CPX Fieldbus Configuration

MPA Type 32 Valve Manifolds

FESTO

M Mandatory Data →

Module No.	Valve Manifold, Pneumatic Section		Pneumatic Supply	Pneumatic Working Port	Pneumatic Supply Connection		Manual Override
530 411	32P		S, T, V, X	G, N, F, J, C	L, K, D		N, R, V
Ordering example							
530 411	**32P**	–	**V**	**C**	**D**	–	**R**
1	**2**		**3**	**4**	**5**		**6**

Ordering Table

Size			MPA1	MPA2	Conditions	Code		Enter Code
M	**1**	Module No.	**530411**	**530411**				
	2	Valve Manifold, Pneumatic Section	Valve manifold type 32 MPA modular subbase valves			**32P**		32P
	3	Pneumatic Supply to Valve Manifold	Internal pilot air supply, silencer			**-S**		
			External pilot air supply, silencer			**-T**		
			Internal pilot air supply, ducted exhaust air		1	**-V**		
			External pilot air supply, ducted exhaust air		1	**-X**		
	4	Pneumatic Working Line	Large push-in connector on working line					
			Metric (6 mm)	Metric (8 mm)		**G**		
			Inch (1/4″)	Inch (5/16″)		**N**		
			Small push-in connector on working line					
			Metric (4 mm)	Metric (6 mm)		**F**		
			Inch (3/16″)	Inch (1/4″)		**J**		
			Thread for working line					
			(M7)	(G⅛)		**C**		
	5	Pneumatic Connection to Supply	Push-in fitting QS-G1/4-10-I for supply (10 mm)			**L**		
			Push-in fitting QS-G1/4-8-I for supply (8 mm)			**K**		
			Push-in fitting QS-1/4-3/8-I-U-M for supply (3/8″)			**Q**		
			Push-in fitting QS-1/4-5/16-I-U-M for supply (5/16″)			**P**		
			Thread for supply line (G1/4)			**D**		
	6	Manual Override	Push-in			**-N**		
			Push-in/detenting			**-R**		
↓			Blocked			**-V**		

1 **V, X** At least 1 pneumatic supply plate U, V or W must be selected (position freely selectable)

Transfer order code

530 411	**32P**	–				–	
1	**2**		**3**	**4**	**5**		**6**

Ordering Data – Pneumatic Section – CPX Fieldbus Configuration

MPA Type 32 Valve Manifolds

FESTO

→ M **Mandatory Data** →

Pneumatic Module Blocks 0 ... 16

7 Type of Interlinking Block: M, A, B

O **Options**

8 Electrical Module: H

9 Duct Separation in Interlinking Block: I

10 Duct Separation: S, T, R

11 Supply Plate: U, V, W

12 Electrical Supply Plate: L

Module position

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
–	**M**	**A**	**A**	**A**	**A**	**A**	**U**										

7 + 8 + 9 + 10 + 11 + 12

Ordering Table

Size		1	2	Conditions	Code		Enter code
↓ M	**Pneumatic Module Blocks 0 ... 16**				-		-
	7 Type of Interlinking Block 0 ... 16	Pneumatic interface		2	**M**		Enter equipment selection for module positions in order code
		Manifold block for size 1	–	3 4	**A**		
		–	Manifold block for size 2	4 5	**B**		
O	**8** Electrical Module for Block 1 ... 16	Electrical module, electrically isolated		6	**H**		
	9 Duct Separation in Interlinking Block 1 ... 16	Separation duct 1		7	**I**		
	10 Duct Separation for Block 0 ... 15	Seal with duct separation 1, 3, 5		7	**S**		
		Seal with duct separation 1		7	**T**		
		Seal with duct separation 3, 5		7	**R**		
	11 Pneumatic Supply Plate for Block 1 ... 16	Supply plate		8	**U**		
		Supply plate with separating seal on left		9	**V**		
↓		Supply plate with separating seal on right		9	**W**		
	12 Electrical Supply Plate for Block 0 ... 16	Electrical supply plate		10	**L**		

2 **M** Only on block 0

3 **A** 4 valve positions. Occupies 8 digital outputs

4 **A, B** The connection block must be fully equipped.
Module blocks A or B must not be used without electrical module, electrically isolated H to the right of an electrical supply plate L or if an interlinking block with valve supply V, QP or QV was selected in the CPX part

5 **B** 2 valve positions. Occupies 4 digital outputs

6 **H** Electrical supply plate L must be selected before the first H, unless the entire valve terminal has only module blocks with electrical module, electrically isolated H

7 **I, S, T, R**
If a duct is separated, a pneumatic supply plate U, V or W must be selected to the right of it before the next duct separation of the same duct or before the right-hand end plate

8 **U** Must be selected if no separating seal R, S or T was selected

9 **V, W** Must be selected if separating seal R, S or T was selected

10 **L** Only module blocks with electrical module, electrically isolated H may be selected to the right of an electrical supply plate L.
At least one electrical supply plate L must be selected after a group of 8 connection blocks.
A maximum of 8 electrical supply plates L may be selected per valve terminal

Transfer order code

Module position

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
–																	

7 + 8 + 9 + 10 + 11 + 12

Ordering Data – Pneumatic Section – CPX Fieldbus Configuration

MPA Type 32 Valve Manifolds

M Mandatory Data	O Options
Equipment at Valve Position 0 ... 64	Pneumatic Accessories
M, J, N, K, H, B, G, E, I, D, X, W, L	...T, ...J

Valve position

–	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	...	64	+	
	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M													+	5T1J
	13																																	14

Ordering Table

			MPA1	MPA2	Conditions	Code		Enter Code
↓	13	Equipment at Valve Position 0 ... 31				-		-
M		Valves	5/2-way valve, single solenoid			M		Enter equipment selection for valve positions in order code
			5/2-way valve, double solenoid			J		
			2x 3/2-way valve, normally open			N		
			2x 3/2-way valve, normally closed			K		
			2x 3/2-way valve, 1x normally open, 1x closed			H		
			5/3-way valve, mid-position pressurized			B		
			5/3-way valve, mid-position closed			G		
			5/3-way valve, mid-position exhausted			E		
			Vacuum valve, separate vacuum supply			I		
			2x 2/2-way valve, normally closed			D		
			3/2-way valve, normally closed, separate supply air			X		
			3/2-way valve, normally open, separate supply air			W		
			Spare position			L		
O	14	Pneumatic Accessories				+		+
		Label	1 ... 99			...T		
		Sensor Bracket for Additional Wall Mounting	1 ... 99		11	...J		

11 **J** Can only be selected if at least one pneumatic supply plate U, V or W is used

Transfer order code

Valve position

–	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	...	64	+	
	13																																	14

Ordering Data – Replacement Valves

MPA Type 32 Valve Manifolds

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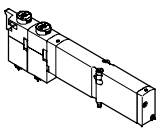
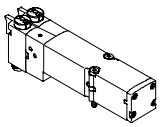
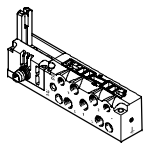
Ordering Data				
Individual Subbase Valve				
Valve	Code	Valve Function	Type	Part No.
	M	5/2-way valve, single solenoid	**VMPA1-M1H-M-PI**	**533342**
			VMPA2-M1H-M-PI	**537952**
	J	5/2-way valve, double solenoid	**VMPA1-M1H-J-PI**	**533343**
			VMPA2-M1H-J-PI	**537953**
	N	2x 3/2-way valve, normally open	**VMPA1-M1H-N-PI**	**533348**
			VMPA2-M1H-N-PI	**537958**
	W	1x 3/2-way valve, normally open, external compressed-air supply	**VMPA1-M1H-W-PI**	**540050**
			VMPA2-M1H-W-PI	**540051**
	K	2x 3/2-way valve, normally closed	**VMPA1-M1H-K-PI**	**533347**
			VMPA2-M1H-K-PI	**537957**
	H	2x 3/2-way valve, 1x normally open, 1x normally closed	**VMPA1-M1H-H-PI**	**533349**
			VMPA2-M1H-H-PI	**537959**
	B	5/3-way valve, mid-position pressurised	**VMPA1-M1H-B-PI**	**533344**
			VMPA2-M1H-B-PI	**537954**
	G	5/3-way valve, mid-position closed	**VMPA1-M1H-G-PI**	**533345**
			VMPA2-M1H-G-PI	**537955**
	E	5/3-way valve, mid-position exhausted	**VMPA1-M1H-E-PI**	**533346**
			VMPA2-M1H-E-PI	**537956**
	I	Vacuum valve, separate vacuum supply	**VMPA1-M1H-I-PI**	**543605**
			VMPA2-M1H-I-PI	**543703**
	X	1x 3/2-way valve, normally closed, external compressed-air supply	**VMPA1-M1H-X-PI**	**534415**
			VMPA2-M1H-X-PI	**537961**
	D	2x 2/2-way valve, normally closed	**VMPA1-M1H-D-PI**	**533350**
			VMPA2-M1H-D-PI	**537960**
Subbase				
	Individual connection, internal pilot air supply		**VMPA1-IC-AP-1**	**533394**
			VMPA2-IC-AP-1	**537981**
	Individual connection, external pilot air supply		**VMPA1-IC-AP-S-1**	**533395**
			VMPA2-IC-AP-S-1	**537982**

Ordering Data – Accessories

MPA Type 32 Valve Manifolds

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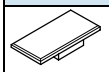
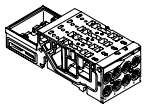
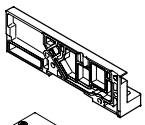
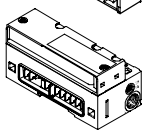
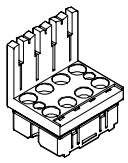
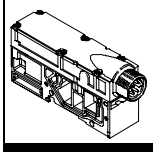
Ordering Data				
Designation			Type	Part No.
Labels and Label Holders				
	Label, white plastic, 6 x 10 mm, break-off on frame, for CPX identification (pack of 64)		**IBS-6x10**	**18576**
	Label holder, folding, 42 mm wide, for manifold block (5-pack with strip of 5 labels)		**VMPA1-ST-1-4**	**533362**
	MPA Label, 38 x 9 mm, peel-off, for manifold block (roll, minimum quantity 1,000)		**BLANKO 39.5x9-1-GR**	**663739**
	MPA Label, 45 x 20 mm, peel-off, for pneumatic interface		**BLANKO 51x20-1-GR**	**663010**
Attachment				
	For DIN rail	MPA with fieldbus	**CPX-CPA-BG-NRH**	**526032**
	For DIN rail	MPA with multi-pin plug connection	**CPA-BG-NRH**	**173498**
Manifold Block/subbase				
	4-fold		**VMPA1-FB-AP-4-1**	**533352**
	2-fold		**VMPA2-FB-AP-2-1**	**538000**
	4-fold, duct 1 closed		**VMPA1-FB-AP-4-1-T1**	**538657**
	2-fold, duct 1 closed		**VMPA2-FB-AP-2-1-T0**	**538677**
End Plates and Pneumatic Interface Fieldbus				
 	Right-hand end plate		**VMPA-EPR**	**533373**
	Pneumatic interface, ducted exhaust air, internal pilot air supply		**VMPA-FB-EPL-G**	**533370**
	Pneumatic interface, ducted exhaust air, external pilot air supply		**VMPA-FB-EPL-E**	**533369**
	Pneumatic interface, surface silencer, internal pilot air supply		**VMPA-FB-EPL-GU**	**533372**
	Pneumatic interface, surface silencer, external pilot air supply		**VMPA-FB-EPL-EU**	**533371**
Electronics Modules				
	Fieldbus, standard	4 coils	**VMPA2-FB-EMS-4**	**537983**
		8 coils	**VMPA1-FB-EMS-8**	**533360**
	Fieldbus, electrically isolated	4 coils	**VMPA2-FB-EMG-4**	**537984**
		8 coils	**VMPA-FB-EMG-8**	**533361**
	Multi-pin	2 coils	**VMPA2-MP-EMM-2**	**537985**
		4 coils	**VMPA-MP-EMS-4**	**533367**
			VMPA2-MP-EMM-4	**537986**
		8 coils	**VMPA-MP-EMS-8**	**533368**
Electrical Supply Plate				
	M18 plug connection, 3-pin		**VMPA-FB-SP-V**	**541082**
	7/8” plug connection, 4-pin		**VMPA-FB-SP-7/8-V-4POL**	**541084**
	7/8” plug connection, 5-pin		**VMPA-FB-SP-7/8-V-5POL**	**541083**

Ordering Data – Accessories

MPA Type 32 Valve Manifolds

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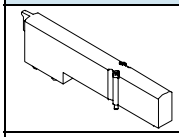
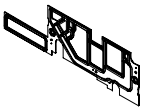
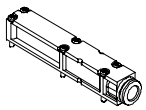
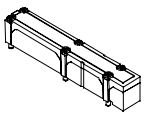
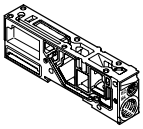
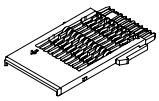
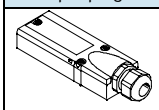
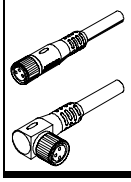
Ordering Data				
Designation			Type	Part No.
Cover				
	Cover for spare position[1]		**VMPA1-RP**	**533351**
	Cover for manual override, detenting (10 pieces)		**VMPA1-HBT**	**533366**
	Cover for manual override, covered (10 pieces)		**VMPA1-HBV**	**535257**
	Cover for manual override, detenting, for B version (10 pieces) – Use with valves from Series U8 (August 2006) or later		**VMPA-HBT-B**	**540897**
	Cover for manual override, covered, for B version (10 pieces) – Use with valves from Series U8 (August 2006) or later		**VMPA-HBV-B**	**540898**
Seals for Manifold Block				
	MPA with ducted exhaust air	No duct separated	**VMPA1-DP**	**533359**
		Duct 1 separated	**VMPA1-DP-P**	**533363**
		Duct 3/5 separated	**VMPA1-DP-RS**	**533364**
		Duct 1 and 3/5 separated	**VMPA1-DP-PRS**	**533365**
	MPA with surface silencer	No duct separated	**VMPA1-DPU**	**533355**
		Duct 1 separated	**VMPA1-DPU-P**	**533356**
		Duct 3/5 separated	**VMPA1-DPU-RS**	**533357**
		Duct 1 and 3/5 separated	**VMPA1-DPU-PRS**	**533358**
Exhaust Plate				
	With ducted exhaust air, with 10 mm push-in connector		**VMPA-AP**	**533375**
	With ducted exhaust air, with 3/8 inch push-in connector		**VMPA-AP-3/8**	**541629**
	With surface silencer		**VMPA-APU**	**533374**
Supply Plates (Without Exhaust Plate)				
	With ducted exhaust air		**VMPA1-FB-SP**	**533354**
	With surface silencer		**VMPA1-FB-SPU**	**533353**

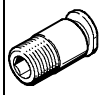
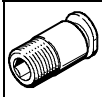
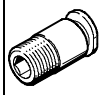
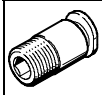
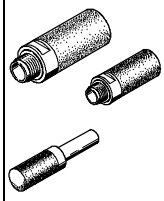
1) One self-adhesive label supplied.

Ordering Data – Accessories

MPA Type 32 Valve Manifolds

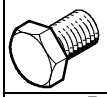
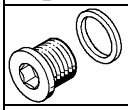
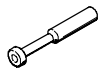
FESTO

Ordering data				
Designation			Type	Part No.
Circuit Board				
	■ Circuit board for multi-pin plug connection	2 coils MPA2	**VMPA2-MPM-EV-AB-2**	**537 989**
		4 coils MPA1, MPA2	**VMPA1-MPM-EV-AB-4**	**537 993**
		8 coils MPA1	**VMPA1-MPM-EV-AB-8**	**537 994**
	■ Circuit board for multi-pin plug connection with pneumatic supply plate	2 coils MPA2	**VMPA2-MPM-EV-ABV-2**	**537 991**
		4 coils MPA1, MPA2	**VMPA1-MPM-EV-ABV-4**	**537 995**
		8 coils MPA1	**VMPA1-MPM-EV-ABV-8**	**537 996**
	For fieldbus connection	Manifold block MPA1 and MPA2	**VMPA1-FB-EV-AB**	**537 998**
		Pneumatic supply plate	**VMPA1-FB-EV-V**	**537 999**
Multi-pin plug connection, electrical				
	Cover without connecting cable for self-assembly		**VMPA-KMS-H**	**533 198**
	PVC connecting cable for 8 solenoid coils	2.5 m	**VMPA-KMS1-8-2,5**	**533 195**
		5 m	**VMPA-KMS1-8-5**	**533 196**
		10 m	**VMPA-KMS1-8-10**	**533 197**
	PVC connecting cable for 24 solenoid coils	2.5 m	**VMPA-KMS1-8-2,5**	**533 192**
		5 m	**VMPA-KMS1-24-5**	**533 193**
		10 m	**VMPA-KMS1-24-10**	**533 194**
	PUR connecting cable for 8 solenoid coils, suitable for chain link trunking	2.5 m	**VMPA-KMS2-24-2,5-PUR**	**533 504**
		5 m	**VMPA-KMS2-8-5-PUR**	**533 505**
		10 m	**VMPA-KMS2-8-10-PUR**	**533 506**
	PUR connecting cable for 24 solenoid coils, suitable for chain link trunking	2.5 m	**VMPA-KMS2-24-2,5-PUR**	**533 501**
		5 m	**VMPA-KMS2-24-5-PUR**	**533 502**
		10 m	**VMPA-KMS2-24-10-PUR**	**533 503**
Individual Connection, Electrical				
	Plug socket cable	2.5 m	**SIM-M8-4GD-2.5-PU**	**158960**
		5 m	**SIM-M8-4GD-5-PU**	**158961**
	Plug socket cable	2.5 m	**SIM-M8-4WD-2.5-PU**	**158962**
		5 m	**SIM-M8-4WD-5-PU**	**158963**

Ordering data				
Designation			Type	Part No.
Push-in Fitting for Manifold Block, Pneumatic Interface, Supply Plate				
	Connecting thread M5 for tubing O.D.	3 mm (10 pieces)	**QSM-M5-3-I**	**153313**
		4 mm (10 pieces)	**QSM-M5-4-I**	**153315**
		6 mm (10 pieces)	**QSM-M5-6-I**	**153317**
		1/8″	**QSM-M5-1/8-I-U-M**	**183749**
		5/32″	**QSM-M5-5/32-I-U-M**	**130593**
		3/16″	**QSM-M5-3/16-I-U-M**	**183750**
		1/4″	**QSM-M5-1/4-I-U-M**	**130591**
	Connecting thread M7 for tubing O.D.	4 mm (10 pieces)	**QSM-M7-4-I**	**153319**
		6 mm (10 pieces)	**QSM-M7-6-I**	**153321**
		3/16″	**QSM-M7-3/16-I-U-M**	**183739**
		1/4″	**QSM-M7-1/4-I-U-M**	**183740**
	Connecting thread G1⁄8 for tubing O.D.	6 mm (10 pieces)	**QS-G1⁄8-6-I**	**186107**
		8 mm (10 pieces)	**QS-G1⁄8-8-I**	**186109**
		1/4″	**QS-1/8-1/4-I-U-M**	**183741**
		5/16″	**QS-1/8-5/16-I-U-M**	**183742**
	Connecting thread G1⁄4 for tubing O.D.	8 mm (10 pieces)	**QS-G1⁄4-8-I**	**186110**
		10 mm (10 pieces)	**QS-G1⁄4-10-I**	**186112**
		5/16″	**QS-1/4/5/16-I-U-M**	**183743**
		3/8″	**QS-1/4-3/8-I-U-M**	**183744**
Silencers				
	Connecting thread	M5	**UC-M5**	**165003**
		M7	**UC-M7**	**161418**
		G1⁄4	**UC-1⁄4**	**165004**
		G1⁄8	**UC-1⁄8**	**161419**
	Connection type, push-in sleeve	3 mm	**UC-QS-3H**	**165005**
		4 mm	**UC-QS-4H**	**165006**
		6 mm	**UC-QS-6H**	**165007**
		8 mm	**UC-QS-8H**	**175611**
		10 mm	**UC-QS-10H**	**526475**
	MPA surface silencer			**662567**

Ordering Data – Accessories

MPA Type 32 Valve Manifolds

Ordering data				
Designation			Type	Part No.
Blanking plugs				
	Thread M5		**B-M5**	**3843**
	Thread M7		**B-M7**	**174309**
	Thread G1⁄8		**B-1⁄8**	**3568**
	Thread G1⁄4		**B-1⁄4**	**3569**
Plugs				
	Blanking plug for tubing O.D.	3 mm	**QSMC-3H**	**153382**
		4 mm	**QSC-4H**	**153267**
		6 mm	**QSC-6H**	**153268**
		8 mm	**QSC-8H**	**153269**
		10 mm	**QSC-10H**	**153270**
		1/8″	**QSMC-1/8H-U**	**153924**
		5/32″	**QSC-5/32H-U**	**153834**
		3/16″	**QSC-3/16H-U**	**153835**
		1/4″	**QSC-1/4H-U**	**153836**
		5/16″	**QSC-5/16H-U**	**153837**
		3/8″	**QSC-3/8H-U**	**153838**
User Documentation				
	MPA user documentation	German	**P.BE-MPA-DE**	**534240**
		English	**P.BE-MPA-EN**	**534241**
		French	**P.BE-MPA-FR**	**534243**
		Spanish	**P.BE-MPA-ES**	**534242**
		Italian	**P.BE-MPA-IT**	**534244**
		Swedish	**P.BE-MPA-SV**	**534245**

Conversion Factors
The conversion table below includes the most commonly used for designing a system. They are given to enable the user to make necessary calculations.

Length or Distance

m ⇢ ft	=	x 3.281
mm ⇢ inch	=	÷ 25.4

Volume

cm^3 ⇢ in^3	=	x 0.061

Mass

g ⇢ lb	=	x 0.002
kg ⇢ lb	=	x 2.2046

Pressure

bar ⇢ psi	=	x 14.7

Temperature

C° ⇢ F°	=	x [1.8] + 32

Flow

l/min ⇢ Cv	=	x 0.001
l/min ⇢ scfm	=	x 0.0353

Force

N ⇢ lbf	=	x 0.2248
kgf ⇢ N	=	x 9.80665

Moment

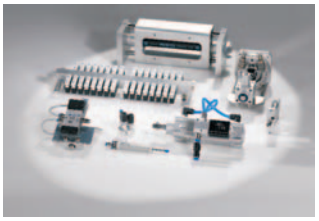
Nm ⇢ in-lb	=	x 8.8507
Nm ⇢ ft-lb	=	x 0.7376

Moment of Inertia

$kg \cdot cm^2$ ⇢ $lb\text{-}in^2$	=	x 0.3417
kg·m ⇢ lb-ft	=	x 7.233
$kg \cdot m^2$ ⇢ $oz\text{-}in^2$	=	x 5.4675

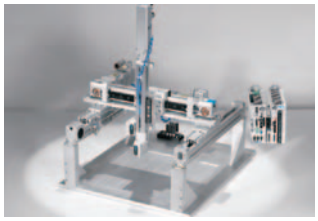
Festo Product Range

Custom Designed Automation Solutions



Custom Automation Components
- Optimized automation components
- Pneumatic & electromechanical
- Clean room, wash down, vacuum, hazardous, and corrosion resistant
- Assembly and Kitting Services

Custom Control Cabinets
- 24VDC, 110VAC, 220VAC
- UL, CE, NEMA, ETL, and IEC
- Class 10 clean room, hazardous location and corrosion resistant



Complete Systems
- Designed and built to your specifications
- Pneumatic & electromechanical
- Clean room & corrosion resistant

Electromechanical

Electric Linear Actuators
- Ball screw, lead screw & belt driven
- Repeatability up to +/- 0.005mm
- Speeds up to 10m/s
- Clean room and corrosion resistant

Motors & Controllers
- Servo and stepper motors
- 1, 3, 8, and 16-axis controllers
- 24VDC, 115VAC, 230VAC
- UL, CE, NEMA, ETL, and IEC

PLCs and I/O Devices

Controls and I/O Devices
- Programmable Logic Controllers
- Remote Access Panels and Displays
- I/O systems & handheld interfaces
- Protocols (Ethernet, DeviceNet™, Profibus, and others)

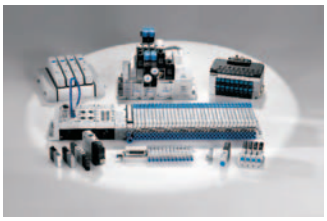
Sensors and Feedback Devices:
- Proximity and position sensors
- Optical sensors
- Pressure, vacuum & flow sensors
- Limit switches & actuator feedback

Pneumatics

Pneumatic Actuators and Cylinders
- NFPA and ISO standard cylinders
- Guided rod & rodless actuators
- Stainless steel & clean design
- Bore sizes 2.5mm (0.1in) to 320mm (12.5in)

Pneumatic Rotary Actuators
- Rotary vane & semi-rotary
- Twin piston rack-and-pinion
- Rotary/linear actuators
- Process valve control

End Effectors
- Grippers – micro, 3-point, radial, angle, T-slot, long-stroke, parallel, rotary/parallel, servo pneumatic
- Escapements – feed separators
- Vacuum grippers & generators



Valves and Valve Manifolds
- Valve manifolds with multi-pin and fieldbus connections
- High flow and high speed valves
- ISO, IP65, Plug-in, clean design and hazardous location valves

Air Preparation
- Air service units – flow rates up to 22,000L/min
- Air filters, regulators, lubricators, dryers
- Air pressure boosters
- Lockout valves – OSHA compliant

Fittings, Connectors, Flow Controls, and Tubing
- Inch, metric, and hybrid sizes
- Fittings and Connectors – various geometries
- Flow control, check, ball and shutoff valves, and pressure regulators
- Tubing – various materials

Servo Pneumatic Controllers
- Closed loop positioning accuracy with pneumatics
- Pneumatic logic elements
- Controls acceleration and velocity
- Measured value converters

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