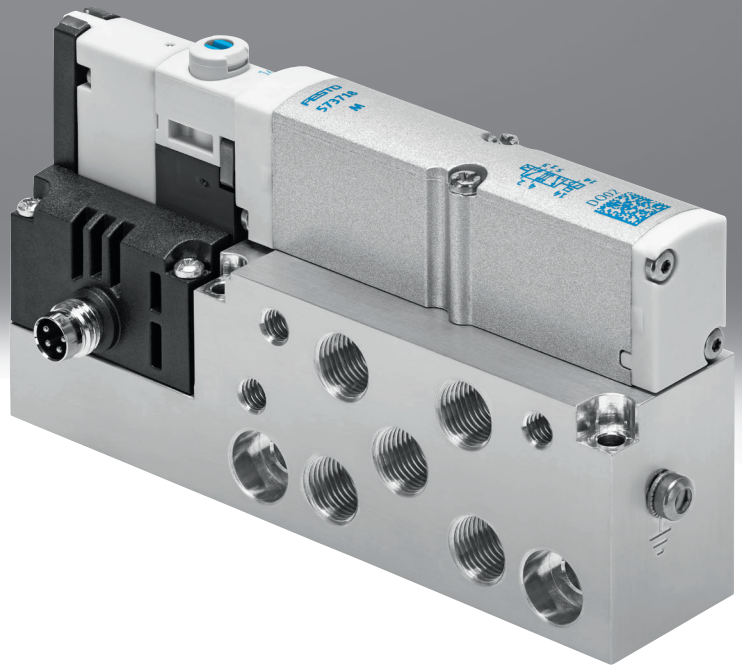
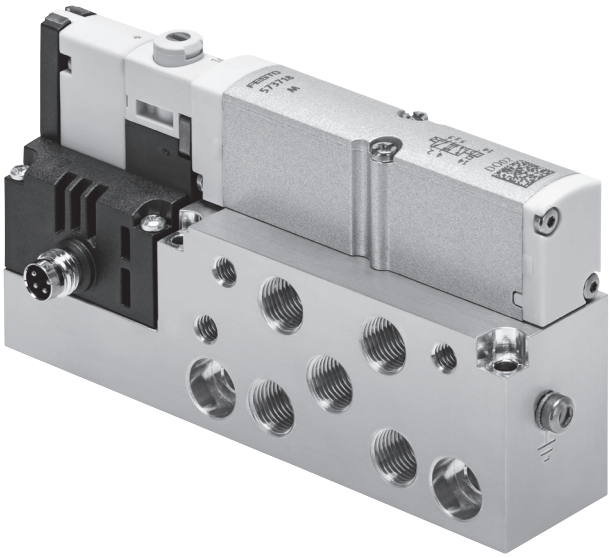
Solenoid valves VMPA



Key features



Innovative

- Flat, high-performance valves in a sturdy metal housing
- MPA1 (width 10 mm) flow rate up to 360 l/min
- MPA14 (width 14 mm) flow rate up to 670 l/min
- MPA2 (width 20 mm) flow rate up to 840 l/min

The valves are identical to the valves in the valve terminal MPA-S and MPA-L.
This simplifies planning, ordering and warehousing.

Versatile

- High pressure range
- –0.09 ... +1 MPa
- Wide range of valve functions

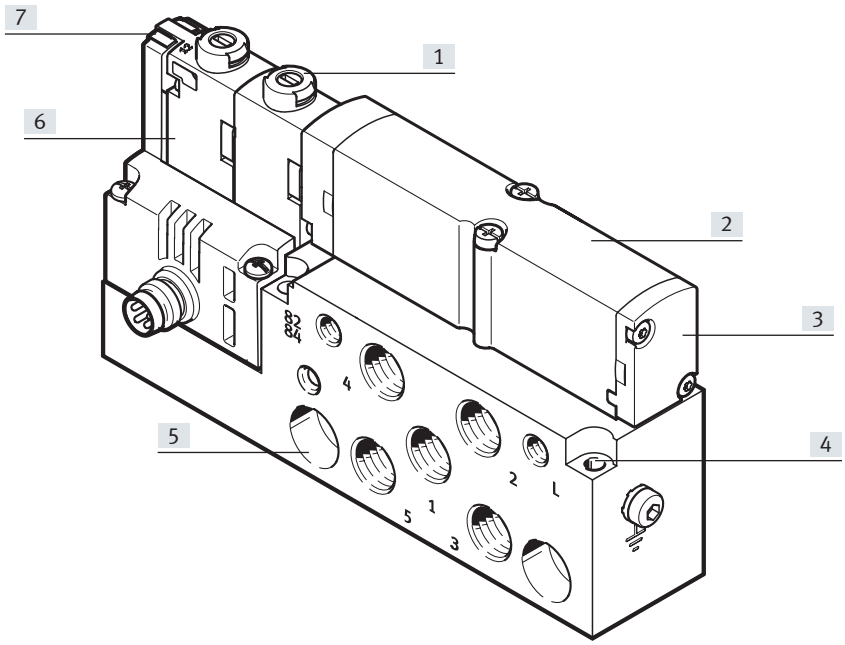
Reliable

- Fast troubleshooting with LEDs on the valves
- Extensive operating voltage range ±25%
- Easy to service thanks to replaceable valves and electronic modules
- Manual override either non-detenting, detenting or protected against unauthorised activation (concealed)

Easy to install

- Solid wall mounting

Key features



[1] Safe operation: Manual override, non-detenting/ detenting or concealed
[2] Space-saving flat valves
[3] Wide range of valve functions
[4] Quick to mount: directly using screws
[5] Practical: sturdy metal thread
[6] Width 10, 14 and 20 mm
[7] Reduced downtimes: on-site LED diagnostics

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,
- 1x normally closed
- 5/3-way valve
- Mid-position pressurised
- 5/3-way valve
- Mid-position closed
- 5/3-way valve
- Mid-position exhausted
- 2x 2/2-way valve
- Normally closed

Special features

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

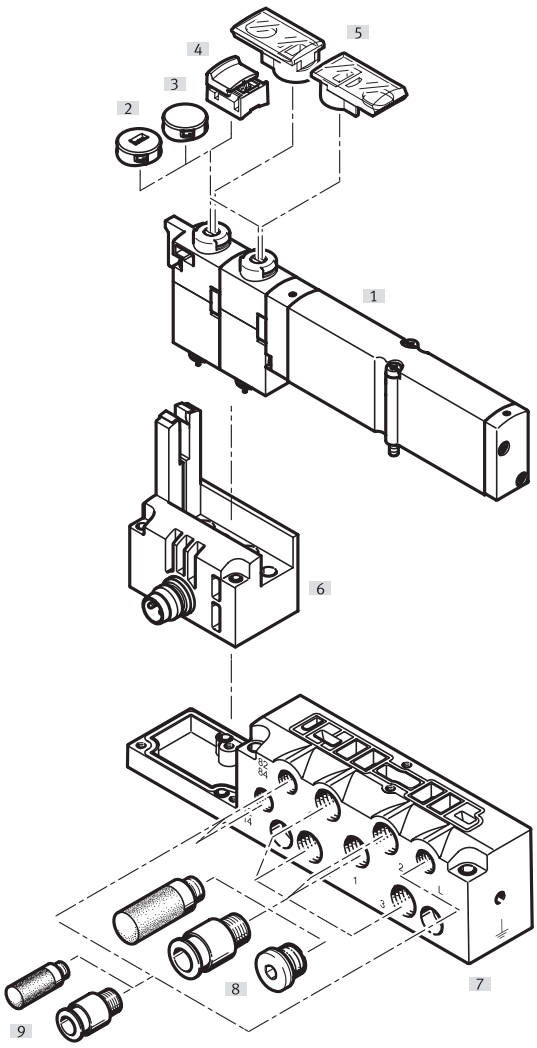
Peripherals overview

Individual sub-base for solenoid valve, width 10 mm

Ordering:
- Using individual part numbers

Individual sub-bases of type VMPA1-IC-... can be equipped with any solenoid valve VMPA1 with a width of 10 mm.

The electrical connection is established using a standard 4-pin M8 plug (EN 60947-5-2).



Designation		Brief description	→ Page/Internet
[1]	Solenoid valve	VMPA1...	26
[2]	Cover cap, coded	After fitting the cover cap, the manual override is non-detenting only	28
[3]	Cover cap, concealed	After fitting the cover cap, the manual override is blocked	28
[4]	Cover cap, manual override detenting	After fitting the cover cap, the manual override is detenting and can be operated without tools	28
[5]	Inscription label holder	Can be pushed onto the manual override	28
[6]	Electrical connection M8	4-pin	–
[7]	Sub-base	For solenoid valve VMPA1...	28
[8]	Fittings, silencers or blanking plugs	M7 for working ports (2, 4) and air supply/exhaust ports (1, 3, 5)	29
[9]	Fittings and/or silencers	M5 for pilot air supply/pilot exhaust air (12/14, 82/84) and pressure compensation	29

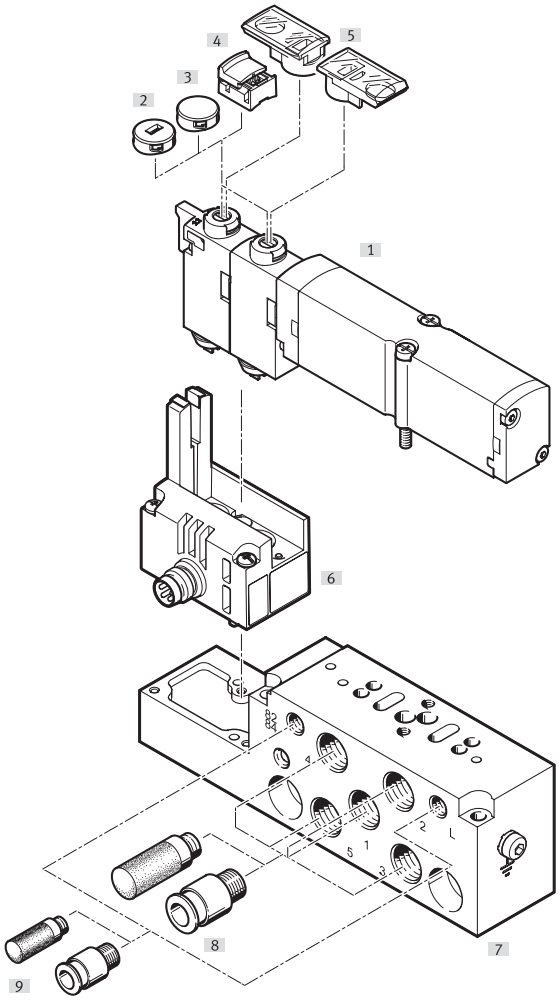
Peripherals overview

Individual sub-base for solenoid valve, width 14 mm

Ordering:
- Using individual part numbers

Individual sub-bases of type VMPA14-IC-... can be equipped with any solenoid valve VMPA14 with a width of 14 mm.

The electrical connection is established using a standard 4-pin M8 plug (EN 60947-5-2).



Designation		Brief description	→ Page/Internet
[1]	Solenoid valve	VMPA14...	26
[2]	Cover cap, coded	After fitting the cover cap, the manual override is non-detenting only	28
[3]	Cover cap, concealed	After fitting the cover cap, the manual override is blocked	28
[4]	Cover cap, manual override detenting	After fitting the cover cap, the manual override is detenting and can be operated without tools	28
[5]	Inscription label holder	Can be pushed onto the manual override	28
[6]	Electrical connection M8	4-pin	–
[7]	Sub-base	For solenoid valve VMPA14...	28
[8]	Fittings, silencers or blanking plugs	G1/8 for working ports (2, 4) and air supply/exhaust ports (1, 3, 5)	29
[9]	Fittings and/or silencers	M5 for pilot air supply/pilot exhaust air (12/14, 82/84) and pressure compensation	29

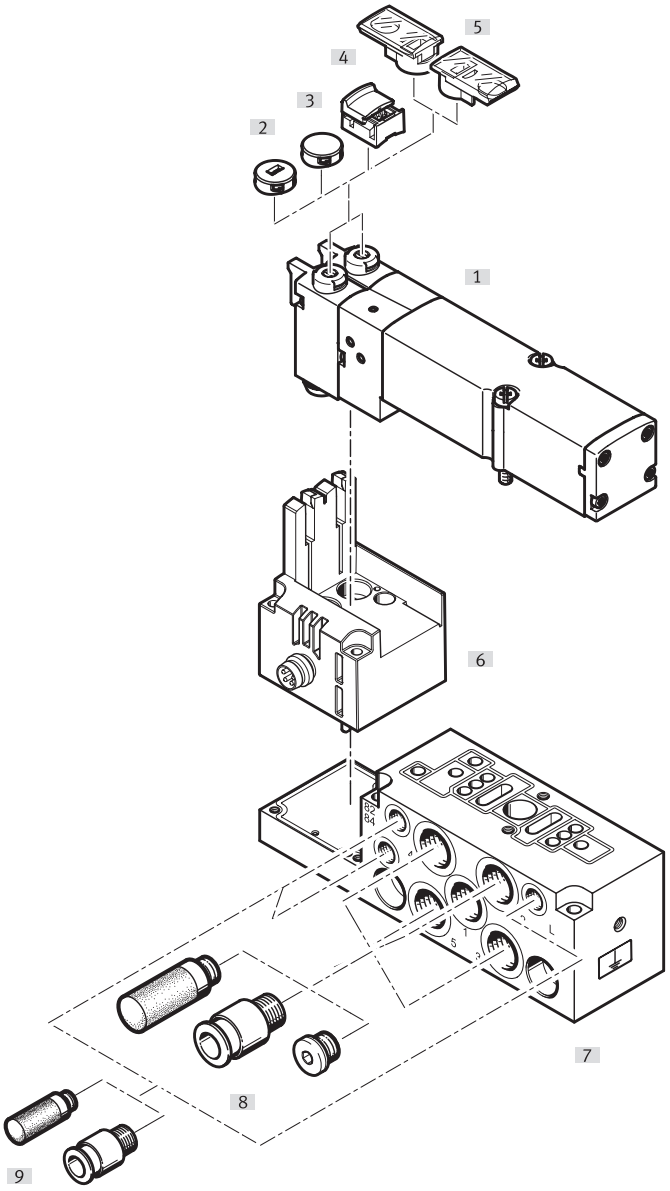
Peripherals overview

Individual sub-base for solenoid valve, width 20 mm

Ordering:
- Using individual part numbers

Individual sub-bases of type VMPA2-IC-... can be equipped with any solenoid valve VMPA2 with a width of 20 mm

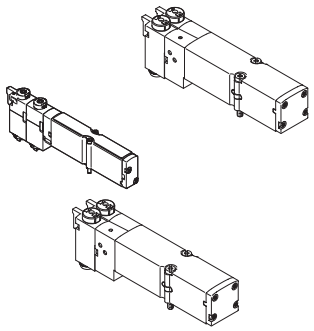
The electrical connection is established using a standard 4-pin M8 plug (EN 60947-5-2).



Designation		Brief description	→ Page/Internet
[1]	Solenoid valve	VMPA2...	26
[2]	Cover cap, coded	After fitting the cover cap, the manual override is non-detenting only	28
[3]	Cover cap, concealed	After fitting the cover cap, the manual override is blocked	28
[4]	Cover cap, manual override detenting	After fitting the cover cap, the manual override is detenting and can be operated without tools	28
[5]	Inscription label holder	Can be pushed onto the manual override	28
[6]	Electrical connection M8	4-pin	–
[7]	Sub-base	For solenoid valve VMPA2...	28
[8]	Fittings, silencers or blanking plugs	G1/8 for working ports (2, 4) and air supply/exhaust ports (1, 3, 5)	29
[9]	Fittings and/or silencers	M5 for pilot air supply/pilot exhaust air (12/14, 82/84) and pressure compensation	29

Key features – Pneumatic components

Solenoid valve



VMPA offers a comprehensive range of valve functions. All valves have a patented sealing system, which ensures efficient sealing, a broad pressure range and a long service life. They have a pneumatic pilot control for optimising performance. Compressed air is supplied via a pilot air supply port.

Solenoid valves can be replaced quickly since the tubing connections remain on the sub-base.
This design is also very flat.

Independent of the valve function, there are solenoid valves with one solenoid coil (single solenoid) or with two solenoid coils (double solenoid or two single solenoid valves in one housing).

Design

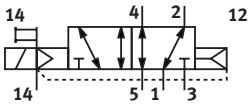
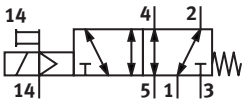
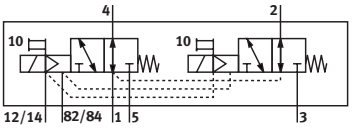
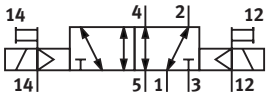
Replacing valves

The valves are attached to the metal sub-base using two screws, which means that they can be easily replaced. The sturdy mechanical structure of the sub-base ensures efficient, durable sealing.

Valve code

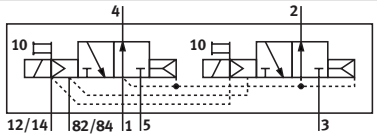
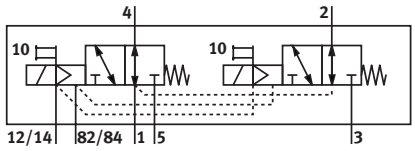
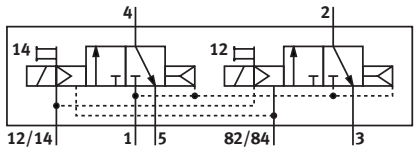
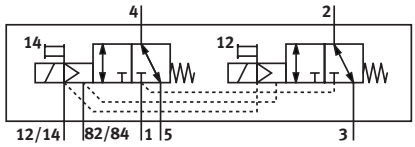
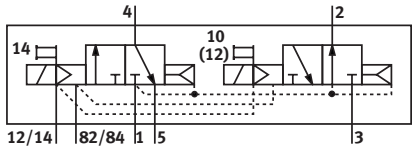
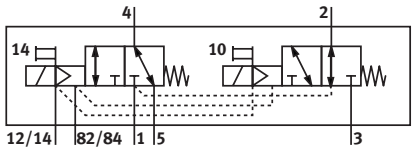
The valve code (M, MS, MSC, MU, J, N, NS, NU, K, KS, KU, H, HS, HU, B, G, E, X, W, D, DS, I) is located on the front of the valve beneath the manual override

5/2-way valve

Type	Circuit symbol	Width [mm]	Description
M		10, 14, 20	• Single solenoid • Pneumatic spring return • Reversible • Operating pressure –0.09 ... +1 MPa
MS		14	• Single solenoid • Piston spool valve • Mechanical spring return • Reversible • Operating pressure –0.09 ... +0.8 MPa
MSC		10, 14, 20	• Single solenoid • Poppet valve with spring return • Mechanical spring return • Reversible • Operating pressure –0.09 ... +1 MPa
J		10, 14, 20	• Double-solenoid • Reversible • Operating pressure –0.09 ... +1 MPa

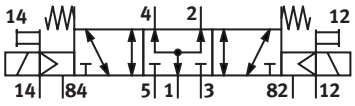
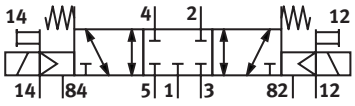
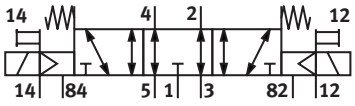
Key features – Pneumatic components

2x 3/2-way valve

Type	Circuit symbol	Width [mm]	Description
N		10, 14, 20	• Single solenoid • Normally open • Pneumatic spring return • Operating pressure 0.3 ... 1 MPa
NS		14	• Single solenoid • Normally open • Mechanical spring return • Reversible • Operating pressure –0.09 ... +0.8 MPa
K		10, 14, 20	• Single solenoid • Normally closed • Pneumatic spring return • Operating pressure 0.3 ... 1 MPa
KS		14	• Single solenoid • Normally closed • Mechanical spring return • Reversible • Operating pressure –0.09 ... +0.8 MPa
H		10, 14, 20	• Single solenoid • Normal position – 1x normally closed – 1x normally open • Pneumatic spring return • Operating pressure 0.3 ... 1 MPa
HS		14	• Single solenoid • Normal position – 1x normally closed – 1x normally open • Mechanical spring return • Reversible • Operating pressure –0.09 ... +0.8 MPa

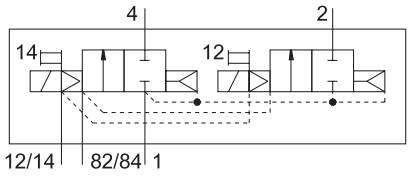
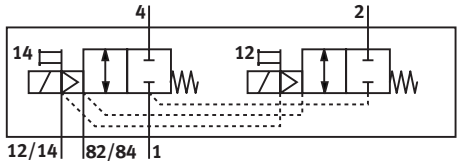
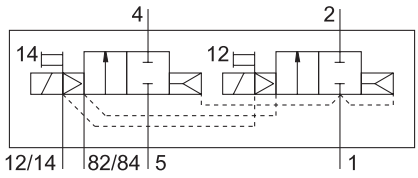
Key features – Pneumatic components

5/3-way valve

Type	Circuit symbol	Width [mm]	Description
B		10, 14, 20	• Mid-position pressurised[1)] • Mechanical spring return • Reversible • Operating pressure –0.09 ... +1 MPa
G		10, 14, 20	• Mid-position closed[1)] • Mechanical spring return • Reversible • Operating pressure –0.09 ... +1 MPa
E		10, 14, 20	• Mid-position exhausted[1)] • Mechanical spring return • Reversible • Operating pressure –0.09 ... +1 MPa

1) If neither solenoid coil is energised, the valve assumes its mid-position by spring force.
If both coils are energised at the same time, the valve remains in the previously assumed switching position.

2x 2/2-way valve

Type	Circuit symbol	Width [mm]	Description
D		10, 14, 20	• Single solenoid • Normally closed • Pneumatic spring return • Operating pressure 0.3 ... 1 MPa
DS		14	• Single solenoid • Normally closed • Mechanical spring return • Reversible • Operating pressure –0.09 ... +0.8 MPa
I		10, 14, 20	• Single solenoid • 1x normally closed • 1x normally closed, reversible only • Pneumatic spring return • Operating pressure 0.3 ... 1 MPa • Vacuum at port 3/5 only

Note

A filter must be installed upstream of valves operated in vacuum mode. This prevents any foreign matter in the intake air getting into the valve (e.g. when operating a suction cup).

Key features – Pneumatic components

Pilot air supply

The pneumatic connection is located on the individual sub-base.
The ports differ for the following types of pilot air supply:
- internal pilot air and
- external pilot air.

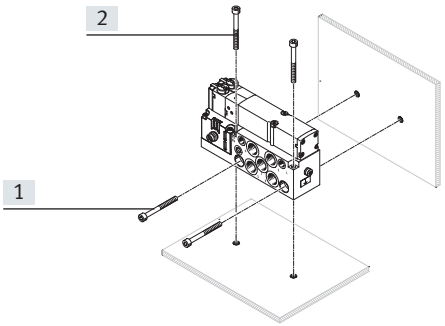
Internal pilot air supply
Internal pilot air supply can be selected if the required working pressures are between 0.3 and 0.8 MPa.
In this case, the pilot air supply in the sub-base is branched from the compressed air supply 1 using an internal connection. Port 12/14 is sealed at the factory with a blanking plug.

External pilot air supply
If the supply pressure is less than 0.3 MPa or greater than 0.8 MPa, you must operate your VMPA valve using external pilot air.
The pilot air is then supplied via port 12/14 of the sub-base.

Note
If a gradual pressure build-up is required in the system by using a soft-start valve, then external pilot air should be selected so that the pilot pressure is already applied in full at the point of switch-on.

Key features – Mounting and operation

Assembly



[1] Horizontal mounting holes
[2] Vertical mounting holes

The individual sub-base for wall mounting is designed 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 signal status of the coil for output 2
- Indicator 14 shows the signal status of the coil for output 4

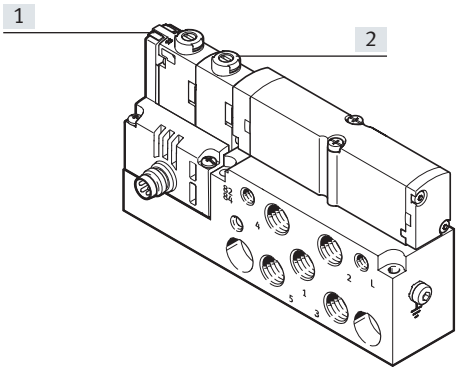
Manual override

The manual override (MO) enables the valve to be switched when not electrically activated or energised.

The pilot valve is switched by pushing the manual override. The set switching status can also be locked by turning the manual override.

Alternatives:

- A covering (VMPA-HBT-B) prevents the manual override from being locked. The manual override can then only be activated by pushing it.
- A covering (VMPA-HBV-B) can be fitted over the manual override to prevent it from being accidentally activated.
- The cover cap (VAMC-L1-CD) can be used to operate the manual override in detenting mode without additional tools.



[1] LED indicator
[2] Manual override

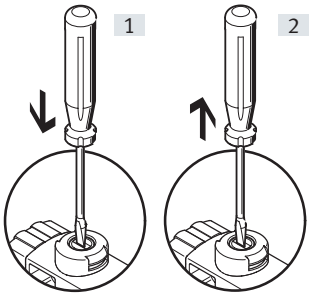
Note

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

Key features – Mounting and operation

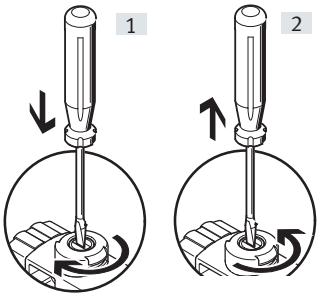
Manual override (MO)

MO with automatic return (non-detenting)



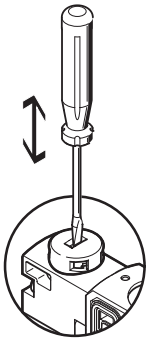
[1] Press in the plunger of the MO with a pointed object or screwdriver.
The pilot valve switches and actuates the main valve.
[2] Remove the pointed object or screwdriver.
The spring force pushes the plunger of the manual override back.
The pilot valve returns to its normal position as does the main single solenoid valve (not the case with double solenoid valve code J).

MO with locking (detenting)



[1] Press in the plunger of the MO with a pointed object or screwdriver until the valve switches and then turn the plunger 90° clockwise until the stop is reached.
The valve remains in the switching position
[2] Turn the plunger 90° anticlockwise until the stop is reached and then remove the pointed object or screwdriver.
The spring force pushes the plunger of the manual override back.
The valve returns to its normal position (not with double solenoid valve code J).

MO with automatic return (non-detenting)

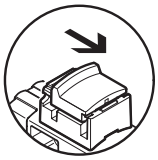


MO is actuated by pushing it with a pointed object or screwdriver and reset by spring force (detenting position prevented by coded cover cap).

MO with latch – Assembly

Turn MO to clip it onto the pilot valve.
The cap for the MO can then be operated (detenting) without tools.

MO with latch – Actuation



Sliding the cap for the MO with latch in the direction of the arrow results in:
- Cap locks into the end position
- The pilot valve switches and actuates the main valve.

MO with latch – Actuation

Sliding the cap for the MO with latch in the direction of the arrow results in:
- Cap locks into the end position
- The spring force pushes the plunger of the manual override back.
- The pilot valve returns to its normal position as does the main single solenoid valve (not the case with double solenoid valve code J).

Key features – Electrical components

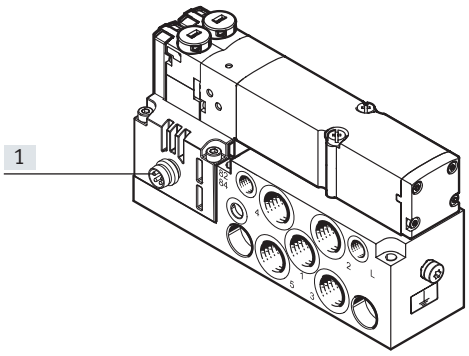
Electrical power as a result of current reduction

Each MPA solenoid coil is protected with a spark arresting protective circuit as well as against polarity reversal.

In addition, all valve types have integrated current reduction.

MPA valves are supplied with operating voltage in the range 18 ... 30 V (24 V +/–25%). This high tolerance is made possible by the integrated control electronics and offers additional safety, e.g. in the case of a drop in operating voltage.

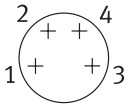
Electrical connection



[1] Electrical connection, plug 4-pin, M8, to EN 60947-5-2

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

Pin assignment to ISO 20401



Pin	With positive logic	With negative logic
1	n.c.	n.c.
2	U_B for coil 12	0 V for coil 12
3	0 V for coil 12 and 14	U_B for coil 12 and 14
4	U_B for coil 14	0 V for coil 14

Instructions for use

Operating materials

Operate your system with unlubricated compressed air, if possible. Festo valves and cylinders are designed so that, if used as intended, they will not require additional lubrication and will still achieve 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 the entire system with lubricated compressed air. The lubricators should, where possible, always be installed directly upstream of the actuator requiring them.

Incorrect additional oil and too high an oil content in the compressed air reduce the service life of the valve terminal.
Use Festo special oil OFSW-32 or the alternatives listed in the Festo catalogue (as specified in DIN 51524 HLP32; basic oil viscosity 32 CST at 40°C).

Bio-oils

When using bio-oils (oils which are based on synthetic or native esters, e.g. rapeseed oil methyl ester), the maximum residual oil content of 0.1 mg/m^3 must not be exceeded (see ISO 8573-1 Class 2).

Mineral oils

When using mineral oils (e.g. HLP oils to DIN 51524, parts 1 to 3) or similar oils based on polyalphaolefins (PAO), the maximum residual oil content of 5 mg/m^3 must not be exceeded (see ISO 8573-1 Class 4).
A higher residual oil content is not permitted, regardless of the compressor oil, because the permanent lubrication would otherwise be flushed out over a period of time.

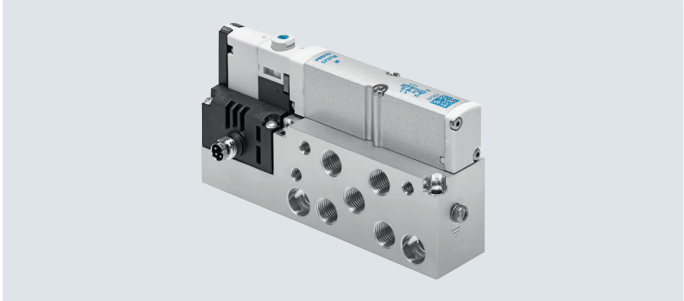
Datasheet – Solenoid valve on sub-base

- Flow rate
  VMPA1: up to 360 l/min
  VMPA14: up to 670 l/min
  VMPA2: up to 700 l/min

- Voltage
  24 V DC

- Repair service

- Valve width
  VMPA1: 10 mm
  VMPA14: 14 mm
  VMPA2: 20 mm



General technical data				
Width		10 mm	14 mm	20 mm
Lubrication		Life-time lubrication, PWIS-free (free of paint-wetting impairment substances)		
Type of mounting		With through-hole		
Mounting position		Any		
Manual override		Non-detenting, detenting		
Weight of sub-base	[g]	92	184	233
Pneumatic connections				
Pneumatic connection		Via sub-base		

Technical data – Valve width 10 mm												
Code			M	J	N	K	H	B	G	E	D	I
Design			Piston spool valve									
Sealing principle			Soft									
Overlap			Positive overlap									
Reset method			Pneumatic spring	–	Pneumatic spring			Mechanical spring			Pneumatic spring	
Switching times	On	[ms]	11	10	10	10	10	10	10	10	10	8
	Off	[ms]	20	–	20	20	20	35	35	35	20	20
	Changeover	[ms]	–	15	–	–	–	15	15	15	–	–
Standard nominal flow rate		[l/min]	360	360	300	230	300	300	320	240	230	260
Operating pressure		[MPa]	–0.09 ... +1		0.3 ... 1			–0.09 ... +1			0.3 ... 1	
		[bar]	–0.9 ... +10		3 ... 10			–0.9 ... +10			3 ... 10	
Pilot pressure		[MPa]	0.3 ... 0.8									
		[bar]	3 ... 8									
Max. tightening torque for valve mounting		[Nm]	0.25									
Materials			Die-cast aluminium									
Product weight		[g]	49	56	56	56	56	56	56	56	56	56

Technical data – Valve width 10 mm			
Code			MSC
Design			Poppet valve with spring return
Sealing principle			Soft
Overlap			Negative overlap
Reset method			Mechanical spring
Switching position indication			Via built-in sensor
Switching times	On	[ms]	10
	Off	[ms]	8
	Changeover	[ms]	–
Standard nominal flow rate		[l/min]	190
Operating pressure		[MPa]	–0.09 ... +0.8
		[bar]	–0.9 ... +8
Pilot pressure		[MPa]	0.4 ... 0.8
		[bar]	4 ... 8
Max. tightening torque for valve mounting		[Nm]	0.25
Materials			Reinforced PPA
Product weight		[g]	96

Datasheet – Solenoid valve

Technical data – Valve width 14 mm

Code			M	J	N	K	H	B	G	E	D	I
Design			Piston spool valve									
Sealing principle			Soft									
Overlap			Positive overlap									
Reset method			Pneumatic spring					Mechanical spring				
Switching times	On	[ms]	13	9	12	12	12	16	13	13	12	9
	Off	[ms]	30	–	38	38	38	44	44	44	30	25
	Changeover	[ms]	–	24	–	–	–	26	26	26	–	–
Standard nominal flow rate		[l/min]	550	590	580	550	550	560	540	460	570	570
Operating pressure		[MPa]	–0.09 ... +1		0.3 ... 1			–0.09 ... +1			0.3 ... 1	
		[bar]	–0.9 ... +10		3 ... 10			–0.9 ... +10			3 ... 10	
Pilot pressure		[MPa]	0.3 ... 0.8									
		[bar]	3 ... 8									
Max. tightening torque for valve mounting		[Nm]	0.65									
Materials			Die-cast aluminium									
Product weight		[g]	77									

Technical data – Valve width 14 mm

Code			MS	MSC	NS	KS	HS	DS
Design			Piston spool valve	Poppet valve with spring return	Piston spool valve			
Sealing principle			Soft					
Overlap			Positive overlap	Negative overlap	Positive overlap			
Reset method			Pneumatic spring	Mechanical spring	Pneumatic spring			
Switching position indication			–	Via built-in sensor	–			
Switching times	On	[ms]	13	10	12	12	12	10
	Off	[ms]	41	10	23	23	23	25
	Changeover	[ms]	–	–	–	–	–	–
Max. switching frequency		[Hz]	2	–	–	–	–	–
Standard nominal flow rate		[l/min]	550 ... 670		460	500	460	510
Note on standard nominal flow rate			MPA-S: 550 l/min, MPA-L: 670 l/min		–	–	–	–
Operating pressure		[MPa]	–0.09 ... +0.8					
		[bar]	–0.9 ... +8					
Pilot pressure		[MPa]	0.3 ... 0.8	0.4 ... 0.8	0.3 ... 0.8			
		[bar]	3 ... 8	4 ... 8	3 ... 8			
Max. tightening torque for valve mounting		[Nm]	0.65	0.25				
Materials			Die-cast aluminium	Reinforced PPA	Die-cast aluminium			
Product weight		[g]	77	118	77			

Technical data – Valve width 20 mm

Code			M	J	N	K	H	B	G	E	D	I
Design			Piston spool valve									
Sealing principle			Soft									
Overlap			Positive overlap									
Reset method			Pneumatic spring					Mechanical spring			Pneumatic spring	
Switching times	On	[ms]	15	9	8	8	8	11	10	11	7	7
	Off	[ms]	28	–	28	28	28	46	40	47	25	25
	Changeover	[ms]	–	22	–	–	–	23	21	23	–	–
Standard nominal flow rate		[l/min]	700	670	550 600	500	550	450	610	590	650	650
Note on standard nominal flow rate			–	–	MPA-S: 550 l/min MPA-L: 600 l/min	–	–	–	–	–	–	–
Operating pressure		[MPa]	–0.09 ... +1		0.3 ... 1			–0.09 ... +1			0.3 ... 1	
		[bar]	–0.9 ... +10		3 ... 10			–0.9 ... +10			3 ... 10	
Pilot pressure		[MPa]	0.3 ... 0.8									
		[bar]	3 ... 8									
Max. tightening torque for valve mounting		[Nm]	0.65									
Materials			Die-cast aluminium									
Product weight		[g]	100									

Datasheet – Solenoid valve

Technical data – Valve width 20 mm			
Code			MSC
Design			Poppet valve with spring return
Sealing principle			Soft
Overlap			Negative overlap
Reset method			Mechanical spring
Switching position indication			Via built-in sensor
Switching times	On	[ms]	14
	Off	[ms]	10
	Changeover	[ms]	–
Standard nominal flow rate		[l/min]	670 ... 840
Note on standard nominal flow rate			MPA-S: 670 l/min MPA-L: 840 l/min
Operating pressure		[MPa]	–0.09 ... +0.8
		[bar]	–0.9 ... +8
Pilot pressure		[MPa]	0.4 ... 8
		[bar]	4 ... 8
Max. tightening torque for valve mounting		[Nm]	0.25
Materials			Reinforced PPA
Product weight		[g]	140

Datasheet – Solenoid valve

Safety data				
		Valve width 10 mm	Valve width 14 mm	Valve width 20 mm
Max. positive test pulse with logic 0	[µs]	400	400	400
Max. negative test pulse with logic 1	[µs]	200	200	900
Shock resistance		Shock test with severity level 2 to FN 942017-5 and EN 60068-2-27		
Vibration resistant		Transport application test with severity level 2 to FN 942017-4 and EN 60068-2-6		

Current consumption per solenoid coil at nominal voltage				
Width		10 mm	14 mm	20 mm
Nominal pick-up current	[mA]	50	50	110
Nominal current with current reduction	[mA]	10	10	23
Time until current reduction	[ms]	20	20	20

Electrical data		
Nominal voltage	[V DC]	24
Operating voltage range	[V DC]	18 ... 30
Residual ripple	[Vss]	4
Degree of protection to EN 60529		IP67 (for all types of signal transmission in assembled state)

Operating and environmental conditions		
Operating medium		Compressed air to ISO 8573-1:2010 [7:4:4]
Note on operating/ Pilot medium		Lubricated operation possible (in which case lubricated operation will always be required)
Ambient temperature	[°C]	–5 ... +50
Temperature of medium	[°C]	–5 ... +50
Storage temperature	[°C]	–20 ... +40
Relative humidity		Max. 90% at 40 °C
Corrosion resistance class CRC[1)]		1
CE marking (see declaration of conformity)		To EU EMC Directive[2)]
		To EU RoHS Directive[2)]
UKCA marking (see declaration of conformity)		To UK EMC regulations[2)]
		To UK RoHS regulations[2)]
Certification		c UL us - Recognized (OL)

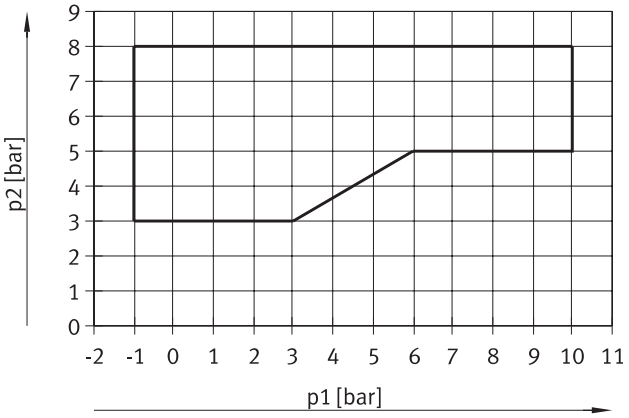
1) More information www.festo.com/x/topic/crc
2) For information about the area of use, see the EC declaration of conformity at: www.festo.com/catalogue/VMPA d Support/Downloads.

Materials	
Housing	Die-cast aluminium, reinforced PPA
Seals	NBR
Note on materials	RoHs-compliant
LABS (PWIS) conformity	VDMA24364-B1/B2-L

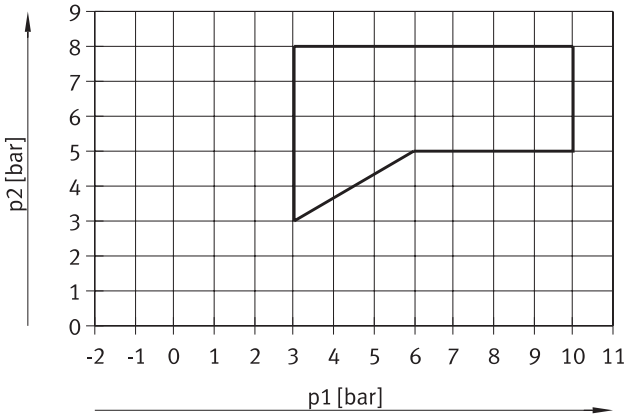
Datasheet – Solenoid valve

Pilot pressure p2 as a function of working pressure p1 with external pilot air supply

For valves with code: M, J, B, G, E, W, X

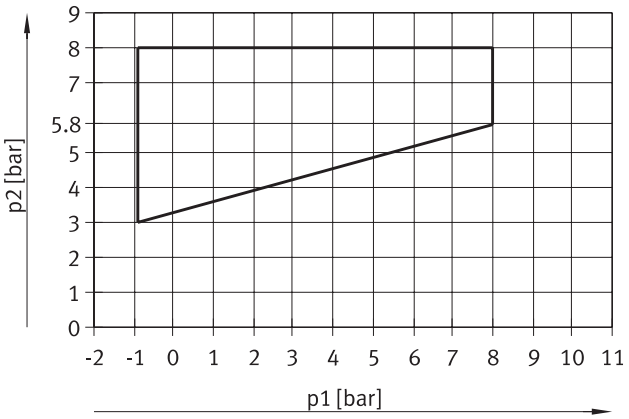


For valves with code: N, K, H, D, I

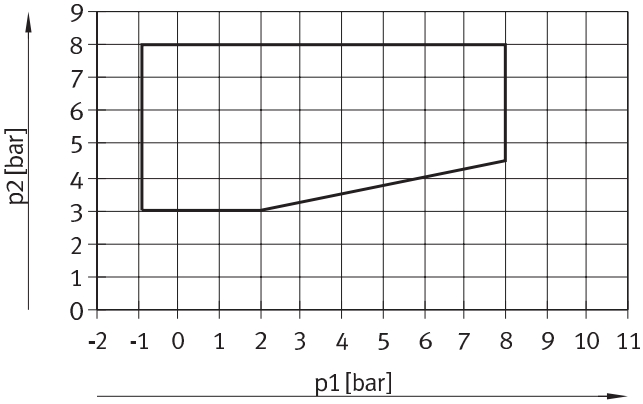


Pilot pressure p2 as a function of working pressure p1 for valves with mechanical spring return

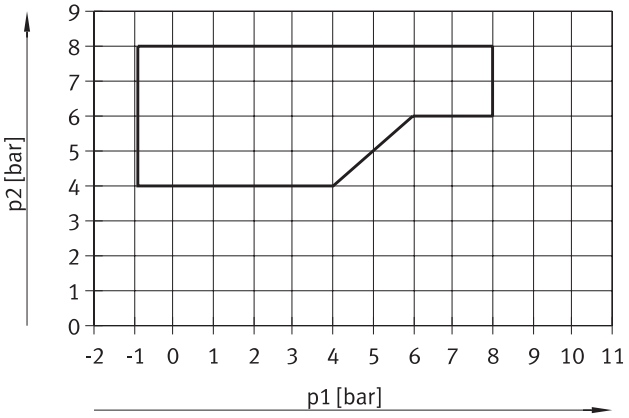
For valve width 10 mm with code: MS, NS, KS, HS, DS



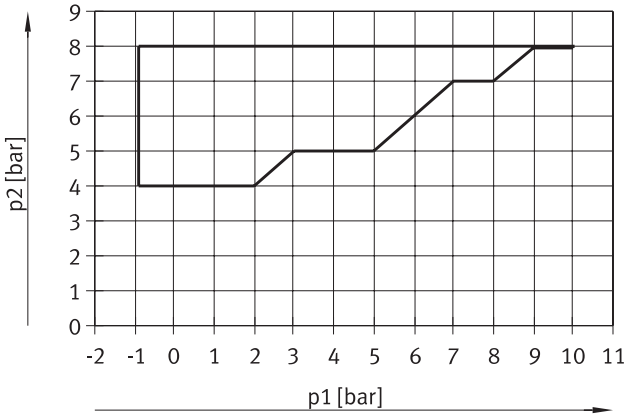
For valve width 20 mm with code: MS, NS, KS, HS, DS



For valves in width 14 mm with code: NS, KS, HS, DS



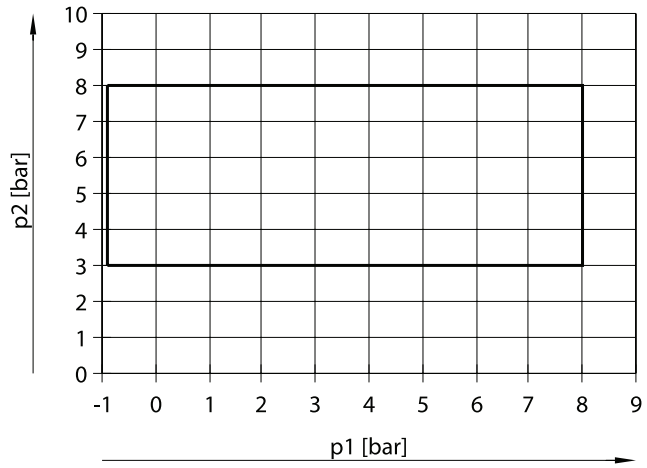
For polymer poppet valves in width 10 mm with code: MU, NU, KU, HU



Datasheet – Solenoid valve

Pilot pressure p2 as a function of working pressure p1 for valves with mechanical spring return

For valve widths 10, 14 and 20 mm with code: MSC

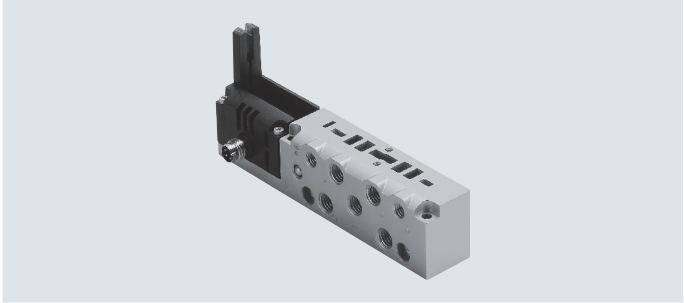


Datasheet – Sub-base

- Flow rate
  VMPA1: up to 360 l/min
  VMPA14: up to 670 l/min
  VMPA2: up to 700 l/min

- Voltage
  24 V DC

- Valve width
  VMPA1: 10 mm
  VMPA14: 14 mm
  VMPA2: 20 mm



General technical data					
Width			10 mm	14 mm	20 mm
Electrical connection			Plug M8x1, 4-pin, to EN 60947-5-2		
Type of mounting			With through-hole		
Mounting position			Any		
Pneumatic connections					
Supply port		1	M7	G1/8	G1/8
Exhaust port		3	M7	G1/8	G1/8
		5	M7	G1/8	G1/8
Working ports		2	M7	G1/8	G1/8
		4	M7	G1/8	G1/8
Pilot air connection		12/14	M5	M5	M5
Pilot exhaust air port		82/84	M5	M5	M5

Operating and environmental conditions				
Type			VMPA...-1	VMPA...-EX1E
Operating medium			Compressed air to ISO 8573-1:2010 [7:4:4]	
Note on the operating/pilot medium			Lubricated operation possible (in which case lubricated operation will always be required)	
Operating pressure	Internal pilot air supply	[MPa]	0.3 ... 0.8	
		[bar]	3 ... 8	
	External pilot air supply	[MPa]	–0.09 ... +1	
		[bar]	–0.9 ... +10	
Pilot pressure		[bar]	3 ... 8	
Ambient temperature		[°C]	–5 ... +50	
CE marking (see declaration of conformity)			To EU EMC Directive[1)]	To EU EMC Directive[1)]
			–	To EU Explosion Protection Directive (ATEX)

1) For information about the area of use, see the EC declaration of conformity at: www.festo.com/catalogue/VMPA d Support/Downloads.
If the devices are subject to usage restrictions in residential, commercial or light-industrial environments, further measures for the reduction of the emitted interference may be necessary.

ATEX[1)]			
Type		VMPA...-EX1E	
ATEX category for gas		II 3G	**Note**
Type of (ignition) protection for gas		Ex ec IIC T4 Gc X	Also applies to the sub-base for individual connection type VMPA... EX1E with retrofitted valve (see declaration of conformity).
Explosion-proof ambient temperature	[°C]	–5 ≤ Ta ≤ +50	
CE marking (see declaration of conformity)		To EU Explosion Protection Directive (ATEX)	

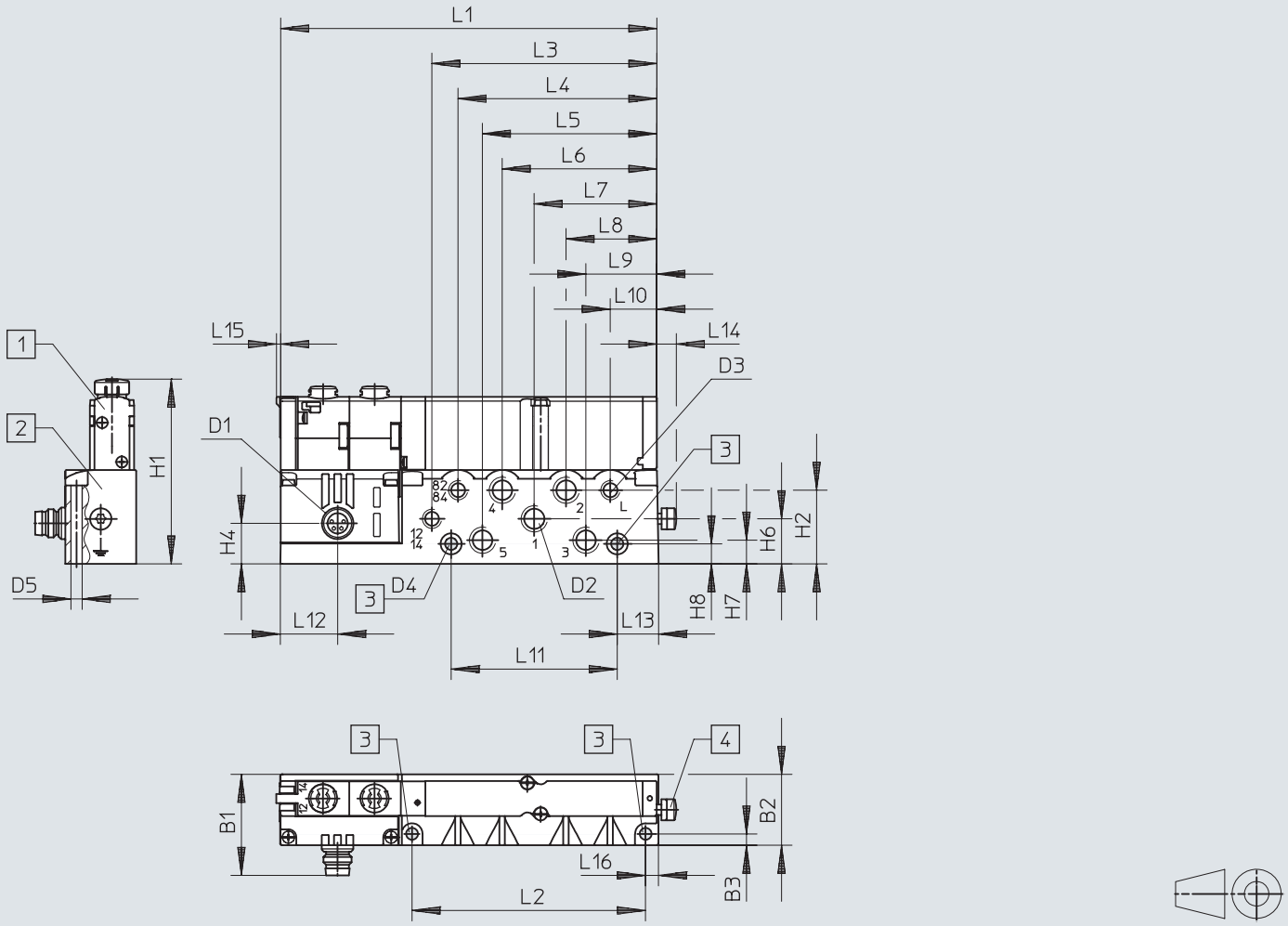
1) For special ATEX applications please speak to your technical consultant

Materials	
Sub-base	Die-cast aluminium
Note on materials	RoHs-compliant
LABS (PWIS) conformity	VDMA24364-B1/B2-L

Datasheet

Dimensions Download CAD data ➔ www.festo.com

Solenoid valve, width 10 mm, on individual sub-base



[1] Solenoid valve
[2] Individual sub-base
[3] 4x mounting holes for screw M3
[4] Earthing screw

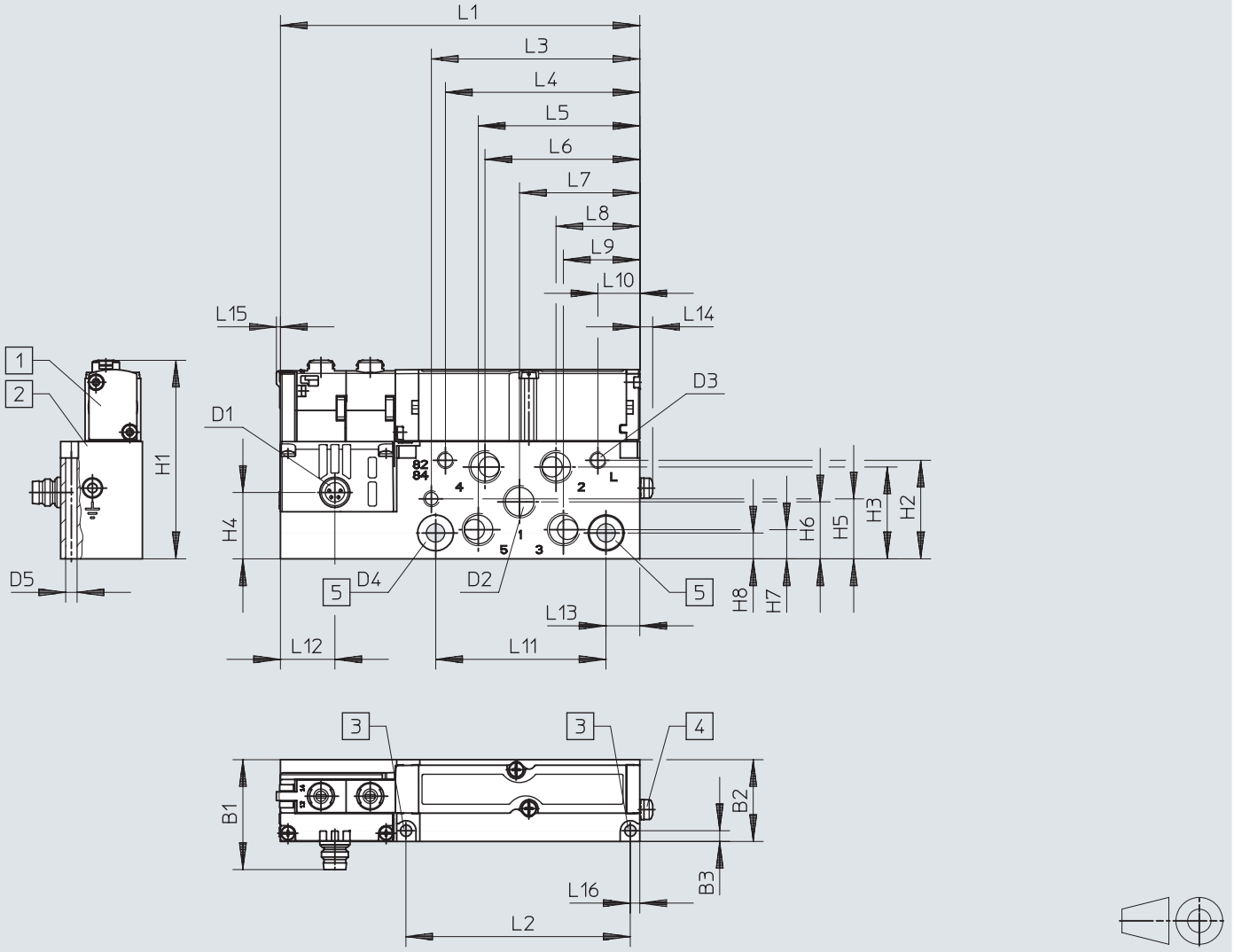
Type	B1	B2	B3	D1	D2	D3	D4 ø	D5 ø	H1	H2	H4	H6	H7	H8
VMPA1-...	28.8	20.2	3.2	M8x1	M7	M5	3.4	3.4	52.2	21	11.6	12.9	6.8	5.7

Type	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12	L13	L14	L15	L16
VMPA1-...	107.3	66.6	64.2	56.7	49.8	44.1	35	25.9	20.3	13.3	47.4	16.4	11.3	5.6	1.2	3.2

Datasheet

Dimensions Download CAD data ➔ www.festo.com

Solenoid valve, width 14 mm, on individual sub-base



[1] Solenoid valve
[2] Individual sub-base
[3] 4x mounting holes for screw M3
[4] Earthing screw
[5] 2x mounting holes for screw M5

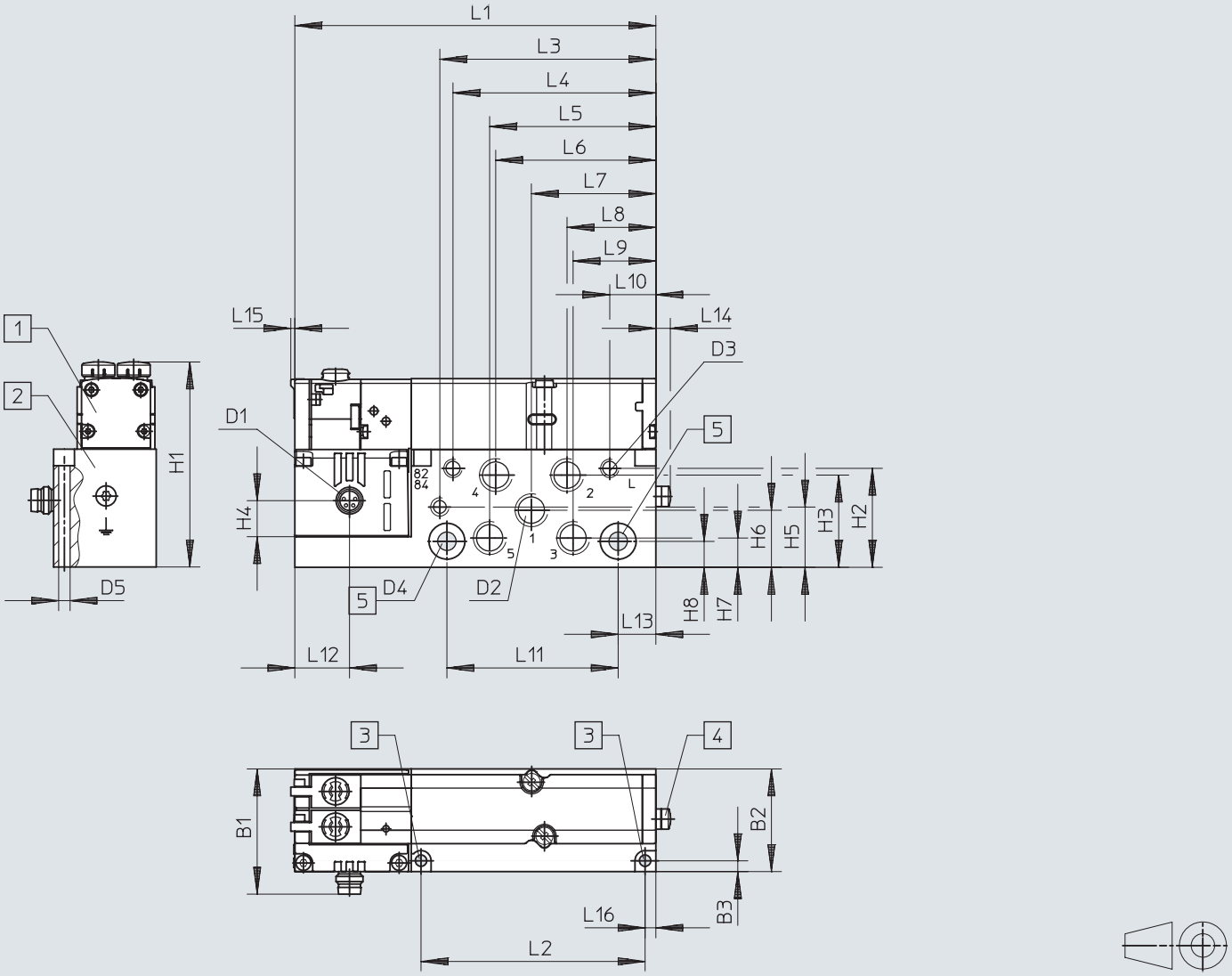
Type	B1	B2	B3	D1	D2	D3	D4 ø	D5 ø	H1	H2	H3	H4	H5	H6	H7	H8
VMPA14-...	35.1	24.4	3.2	M8x1	G1/8	M5	5.5	3.4	59	29.4	27.4	19.8	17.9	17	8.7	7.7

Type	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12	L13	L14	L15	L16
VMPA14-...	107.3	67	62.2	58	48.2	46.2	35.9	25	22.8	12.5	50.9	16.3	10.1	3.9	1.2	2.9

Datasheet

Dimensions Download CAD data ➔ www.festo.com

Solenoid valve, width 20 mm, on individual sub-base



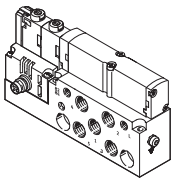
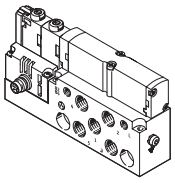
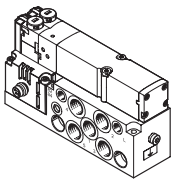
[1] Solenoid valve
[2] Individual sub-base
[3] 2x mounting holes for screw M3
[4] Earthing screw
[5] 2x mounting holes for screw M5

Type	B1	B2	B3	D1	D2	D3	D4 ø	D5 ø	H1	H2	H3	H4	H5	H6	H7	H8
VMPA2-...	37.2	30.5	3.2	M8x1	G1/8	M5	5.5	3.4	60.5	29.4	27.4	10.7	17.9	17	8.7	7.7

Type	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12	L13	L14	L15	L16
VMPA2-...	107.3	66.6	64.2	60.3	49.4	47.6	37	26.4	24.6	13.7	50.9	16.3	11.2	4.4	1.2	3.2

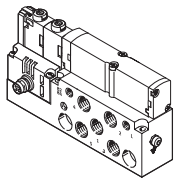
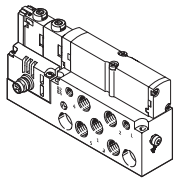
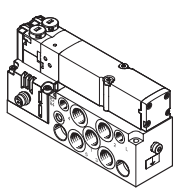
Ordering data

Ordering data

	Valve function	Width [mm]	Part no.	Type
Internal pilot air supply – Set comprising solenoid valve on individual sub-base				
	**5/2-way valve**			
	Single solenoid	10	**533376**	**VMPA1-M1H-M-M7-PI**
		14	**8023543**	**VMPA14-M1H-M-G1/8-PI**
		20	**537963**	**VMPA2-M1H-M-G1/8-PI**
	Single solenoid, mechanical reset	14	**8023554**	**VMPA14-M1H-MS-G1/8-PI**
	Double-solenoid	10	**533377**	**VMPA1-M1H-J-M7-PI**
		14	**8023542**	**VMPA14-M1H-J-G1/8-PI**
		20	**537964**	**VMPA2-M1H-J-G1/8-PI**
	**2x 3/2-way valve**			
	Normally open	10	**533382**	**VMPA1-M1H-N-M7-PI**
		14	**8023550**	**VMPA14-M1H-N-G1/8-PI**
		20	**537969**	**VMPA2-M1H-N-G1/8-PI**
	Normally open, mechanical spring return	14	**8023556**	**VMPA14-M1H-NS-G1/8-PI**
	Normally closed	10	**533381**	**VMPA1-M1H-K-M7-PI**
		14	**8023549**	**VMPA14-M1H-K-G1/8-PI**
		20	**537968**	**VMPA2-M1H-K-G1/8-PI**
	Normally closed, mechanical reset	14	**8023555**	**VMPA14-M1H-KS-G1/8-PI**
	1x normally open 1x normally closed	10	**533383**	**VMPA1-M1H-H-M7-PI**
		14	**8023551**	**VMPA14-M1H-H-G1/8-PI**
		20	**537970**	**VMPA2-M1H-H-G1/8-PI**
	1x normally open 1x normally closed, mechanical reset	14	**8023558**	**VMPA14-M1H-HS-G1/8-PI**
	5/3-way valve			
	Mid-position pressurised	10	**533378**	**VMPA1-M1H-B-M7-PI**
		14	**8023544**	**VMPA14-M1H-B-G1/8-PI**
		20	**537965**	**VMPA2-M1H-B-G1/8-PI**
	Mid-position closed	10	**533379**	**VMPA1-M1H-G-M7-PI**
		14	**8023546**	**VMPA14-M1H-G-G1/8-PI**
		20	**537966**	**VMPA2-M1H-G-G1/8-PI**
	Mid-position exhausted	10	**533380**	**VMPA1-M1H-E-M7-PI**
		14	**8023545**	**VMPA14-M1H-E-G1/8-PI**
		20	**537967**	**VMPA2-M1H-E-G1/8-PI**
	2x 2/2-way valve			
	Normally closed	10	**533384**	**VMPA1-M1H-D-M7-PI**
		14	**8023552**	**VMPA14-M1H-D-G1/8-PI**
		20	**537971**	**VMPA2-M1H-D-G1/8-PI**
	Normally closed, mechanical reset	14	**8023557**	**VMPA14-M1H-DS-G1/8-PI**
	1x normally closed 1x normally closed, reversible	10	**545230**	**VMPA1-M1H-I-M7-PI**
		14	**8023553**	**VMPA14-M1H-I-G1/8-PI**
		20	**545232**	**VMPA2-M1H-I-G1/8-PI**

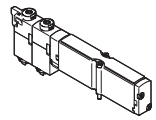
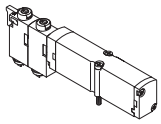
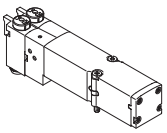
Ordering data

Ordering data

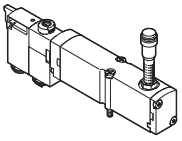
	Valve function	Width [mm]	Part no.	Type
External pilot air supply – Set consisting of solenoid valve on individual sub-base				
	**5/2-way valve**			
	Single solenoid	10	**533385**	**VMPA1-M1H-M-S-M7-PI**
		14	**8023560**	**VMPA14-M1H-M-S-G1/8-PI**
		20	**537972**	**VMPA2-M1H-M-S-G1/8-PI**
	Single solenoid, mechanical reset	14	**8023571**	**VMPA14-M1H-MS-S-G1/8-PI**
	Double-solenoid	10	**533386**	**VMPA1-M1H-J-S-M7-PI**
		14	**8023559**	**VMPA14-M1H-J-S-G1/8-PI**
		20	**537973**	**VMPA2-M1H-J-S-G1/8-PI**
	**2x 3/2-way valve**			
	Normally open	10	**533391**	**VMPA1-M1H-N-S-M7-PI**
		14	**8023567**	**VMPA14-M1H-N-S-G1/8-PI**
		20	**537978**	**VMPA2-M1H-N-S-G1/8-PI**
	Normally open, mechanical spring return	14	**8023573**	**VMPA14-M1H-NS-S-G1/8-PI**
	Normally closed	10	**533390**	**VMPA1-M1H-K-S-M7-PI**
		14	**8023566**	**VMPA14-M1H-K-S-G1/8-PI**
		20	**537977**	**VMPA2-M1H-K-S-G1/8-PI**
	Normally closed, mechanical reset	14	**8023572**	**VMPA14-M1H-KS-S-G1/8-PI**
	1x normally open 1x normally closed	10	**533392**	**VMPA1-M1H-H-S-M7-PI**
		14	**8023568**	**VMPA14-M1H-H-S-G1/8-PI**
		20	**537979**	**VMPA2-M1H-H-S-G1/8-PI**
	1x normally open 1x normally closed, mechanical reset	14	**8023575**	**VMPA14-M1H-HS-S-G1/8-PI**
	**5/3-way valve**			
	Mid-position pressurised	10	**533387**	**VMPA1-M1H-B-S-M7-PI**
		14	**8023561**	**VMPA14-M1H-B-S-G1/8-PI**
		20	**537974**	**VMPA2-M1H-B-S-G1/8-PI**
	Mid-position closed	10	**533388**	**VMPA1-M1H-G-S-M7-PI**
		14	**8023563**	**VMPA14-M1H-G-S-G1/8-PI**
		20	**537975**	**VMPA2-M1H-G-S-G1/8-PI**
	Mid-position exhausted	10	**533389**	**VMPA1-M1H-E-S-M7-PI**
		14	**8023562**	**VMPA14-M1H-E-S-G1/8-PI**
		20	**537976**	**VMPA2-M1H-E-S-G1/8-PI**
	2x 2/2-way valve			
	Normally closed	10	**533393**	**VMPA1-M1H-D-S-M7-PI**
		14	**8023569**	**VMPA14-M1H-D-S-G1/8-PI**
		20	**537980**	**VMPA2-M1H-D-S-G1/8-PI**
	Normally closed, mechanical reset	14	**8023574**	**VMPA14-M1H-DS-S-G1/8-PI**
	1x normally closed 1x normally closed, reversible only	10	**545231**	**VMPA1-M1H-I-S-M7-PI**
		14	**8023570**	**VMPA14-M1H-I-S-G1/8-PI**
		20	**545233**	**VMPA2-M1H-I-S-G1/8-PI**

Ordering data

Ordering data

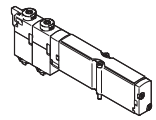
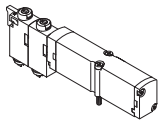
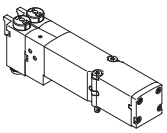
	Valve function	Width [mm]	Part no.	Type
Individual solenoid valve, piston spool valve				
	**5/2-way valve**			
	Single solenoid	10	**533342**	**VMPA1-M1H-M-PI**
		14	**573718**	**VMPA14-M1H-M-PI**
		20	**537952**	**VMPA2-M1H-M-PI**
	Single solenoid, mechanical spring return	10	**571334**	**VMPA1-M1H-MS-PI**
		14	**573974**	**VMPA14-M1H-MS-PI**
		20	**571333**	**VMPA2-M1H-MS-PI**
	Double-solenoid	10	**533343**	**VMPA1-M1H-J-PI**
		14	**573717**	**VMPA14-M1H-J-PI**
		20	**537953**	**VMPA2-M1H-J-PI**
	**2x 3/2-way valve**			
	Normally open	10	**533348**	**VMPA1-M1H-N-PI**
		14	**573725**	**VMPA14-M1H-N-PI**
		20	**537958**	**VMPA2-M1H-N-PI**
	Normally open, mechanical spring return	10	**556839**	**VMPA1-M1H-NS-PI**
		14	**575977**	**VMPA14-M1H-NS-PI**
		20	**568655**	**VMPA2-M1H-NS-PI**
	Normally closed	10	**533347**	**VMPA1-M1H-K-PI**
		14	**573724**	**VMPA14-M1H-K-PI**
		20	**537957**	**VMPA2-M1H-K-PI**
	Normally closed, mechanical spring return	10	**556838**	**VMPA1-M1H-KS-PI**
		14	**575976**	**VMPA14-M1H-KS-PI**
		20	**568656**	**VMPA2-M1H-KS-PI**
	1x normally open, 1x normally closed	10	**533349**	**VMPA1-M1H-H-PI**
		14	**573726**	**VMPA14-M1H-H-PI**
		20	**537959**	**VMPA2-M1H-H-PI**
	1x normally open, 1x normally closed, mechanical spring return	10	**556840**	**VMPA1-M1H-HS-PI**
		14	**575979**	**VMPA14-M1H-HS-PI**
		20	**568658**	**VMPA2-M1H-HS-PI**
	5/3-way valve			
	Mid-position pressurised	10	**533344**	**VMPA1-M1H-B-PI**
		14	**573719**	**VMPA14-M1H-B-PI**
		20	**537954**	**VMPA2-M1H-B-PI**
	Mid-position closed	10	**533345**	**VMPA1-M1H-G-PI**
		14	**573721**	**VMPA14-M1H-G-PI**
		20	**537955**	**VMPA2-M1H-G-PI**
	Mid-position exhausted	10	**533346**	**VMPA1-M1H-E-PI**
		14	**573720**	**VMPA14-M1H-E-PI**
		20	**537956**	**VMPA2-M1H-E-PI**

Ordering data

	Valve function	Width [mm]	Part no.	Type
Single solenoid valve, poppet valve with return spring				
	**5/2-way valve**			
	Single solenoid, mechanical spring return	10	**8186953**	**VMPA1-M1H-MSC-PI**
		14	**8186954**	**VMPA14-M1H-MSC-PI**
		20	**8186955**	**VMPA2-M1H-MSC-PI**

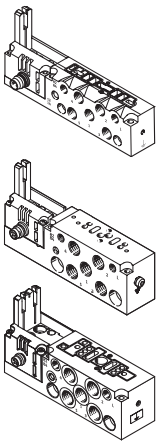
Ordering data

Ordering data

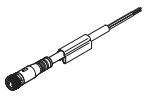
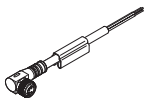
	Valve function	Width [mm]	Part no.	Type
Individual solenoid valve, piston spool valve				
	**2x 2/2-way valve**			
	Normally closed	10	**533350**	**VMPA1-M1H-D-PI**
		14	**573727**	**VMPA14-M1H-D-PI**
		20	**537960**	**VMPA2-M1H-D-PI**
	Normally closed, mechanical spring return	10	**556841**	**VMPA1-M1H-DS-PI**
		14	**575978**	**VMPA14-M1H-DS-PI**
		20	**568657**	**VMPA2-M1H-DS-PI**
	1x normally closed 1x normally closed, reversible	10	**543605**	**VMPA1-M1H-I-PI**
		14	**573728**	**VMPA14-M1H-I-PI**
		20	**543703**	**VMPA2-M1H-I-PI**

Ordering data

Ordering data

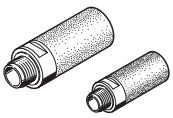
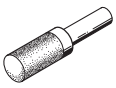
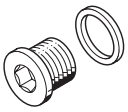
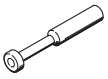
Designation			Width [mm]	Part no.	Type
Sub-base for individual connection					
	Without ATEX specification	Internal pilot air supply	10	**533394**	**VMPA1-IC-AP-1**
			14	**8023666**	**VMPA14-IC-AP-1**
			20	**537981**	**VMPA2-IC-AP-1**
		External pilot air supply	10	**533395**	**VMPA1-IC-AP-S-1**
			14	**8023667**	**VMPA14-IC-AP-S-1**
			20	**537982**	**VMPA2-IC-AP-S-1**
	With ATEX category d 20	Internal pilot air supply	10	**8005149**	**VMPA1-IC-AP-1-EX1E**
			14	**8023668**	**VMPA14-IC-AP-1-EX1E**
			20	**8005151**	**VMPA2-IC-AP-1-EX1E**
		External pilot air supply	10	**8005150**	**VMPA1-IC-AP-S-1-EX1E**
			14	**8023669**	**VMPA14-IC-AP-S-1-EX1E**
			20	**8005152**	**VMPA2-IC-AP-S-1-EX1E**

Ordering data

Designation		Part no.	Type	PU[1]
Covering				
	Cover cap for manual override with coded cover cap, manual override non-detenting	**540897**	**VMPA-HBT-B**	10
	Cover cap for manual override, concealed, manual override blocked	**540898**	**VMPA-HBV-B**	10
	Cover cap for manual override, manual override detenting, manually operated without accessories	**8002234**	**VAMC-L1-CD**	10
	Inscription label holder for an inscription label and cover of the switching status indication and the manual override (blocked)	**570818**	**ASLR-D-L1**	10
Connecting cable, individual connection				
	• Straight socket, M8x1, 4-pin, • open end, 4-core	2.5 m	**8078227**	**NEBA-M8G4-U-2.5-N-LE4**	1
		5 m	**8078228**	**NEBA-M8G4-U-5-N-LE4**	1
	• Angled socket, M8x1, 4-pin, • open end, 4-core	2.5 m	**8078233**	**NEBA-M8W4-U-2.5-N-LE4**	1
		5 m	**8078234**	**NEBA-M8W4-U-5-N-LE4**	1

1) Packaging unit.

Accessories

Ordering data Designation			Part no.	Type	PU[1]
Push-in fitting					
	Connecting thread M5 for tubing O.D.	3 mm	**153313**	**QSM-M5-3-I**	10
		4 mm	**153315**	**QSM-M5-4-I**	10
			578370	**NPQH-DK-M5-Q4-P10**	10
		6 mm	**153317**	**QSM-M5-6-I**	10
			578371	**NPQH-DK-M5-Q6-P10**	10
	Connecting thread M7 for tubing O.D.	4 mm	**153319**	**QSM-M7-4-I**	10
			578372	**NPQH-DK-M7-Q4-P10**	10
		6 mm	**153321**	**QSM-M7-6-I**	10
			132919	**QSM-M7-6-I-R-100**	100
			578373	**NPQH-DK-M7-Q6-P10**	10
	Connecting thread G1/8 for tubing O.D.	6 mm	**186107**	**QS-G1/8-6-I**	10
			578375	**NPQH-DK-G18-Q6-P10**	10
		8 mm	**186109**	**QS-G1/8-8-I**	10
			578376	**NPQH-DK-G18-Q8-P10**	10
Silencer					
	Connecting thread	M5	**165003**	**UC-M5**	1
		M7	**161418**	**UC-M7**	1
		G1/8	**161419**	**UC-1/8**	1
	Push-in sleeve connection	3 mm	**165005**	**UC-QS-3H**	1
		4 mm	**165006**	**UC-QS-4H**	1
		6 mm	**165007**	**UC-QS-6H**	1
		8 mm	**175611**	**UC-QS-8H**	1
Blanking plug					
	M5 thread		**578404**	**NPQH-BK-M5-P10**	10
	M7 thread		**174309**	**B-M7**	10
			578405	**NPQH-BK-M7-P10**	10
	G1/8 thread		**3568**	**B-1/8**	10
			578406	**NPQH-BK-G18-P10**	10
Stopper					
	Blanking plug for tubing O.D.	4 mm	**153267**	**QSC-4H**	10
		6 mm	**153268**	**QSC-6H**	10
		8 mm	**153269**	**QSC-8H**	10

1) Packaging unit.