

On-off/Soft-start Valves MS4N-EM1/EE/DL/DE – Inch Series



Manually operated and solenoid actuated on-off valves for pressurizing and venting pneumatic installations. Pneumatic and solenoid actuated soft-start valves for slowly pressurizing and venting pneumatic installation.

- On-off valves
 - MS4N-EM1, manually operated
 - MS4N-EE, solenoid actuated
- Soft-start valves
 - MS4N-DL, pneumatically actuated
 - MS4N-DE, solenoid actuated
- Pneumatic connection: 1/8 NPT, 1/4 NPT, 3/8 NPT
- Operating pressure
 - EM1: 0 ... 206 psi
 - EE, DL and DE: 59 ... 206 psi
- Flow rate: 35.3 ... 77.7 scfm

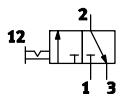
Product Range Overview														
Type	Flow rate [scfm]	Pneumatic connections		Supply voltage				Pressure indicator				Options		
		Body thread	Port plate	24 V DC (connection pattern to EN 175301)	24 V DC (connection pattern M12 to DES/INA)	110 V AC (connection pattern to EN 175301)	230 V AC (connection pattern to EN 175301)	Cover plate (without pressure gauge)	Integrated MS pressure gauge	Adapter for pressure gauge 1/8 NPT	Adapter for pressure gauge 1/4 NPT	Pressure sensor with display	Silencer	Flow direction from right to left
MS4N			AG...	V24	V24P	V110	V230	VS	AG	A8	A4	AD...	S	Z
EM1	42.4 ... 77.7	1/8 NPT, 1/4 NPT	1/8 NPT, 1/4 NPT, 3/8 NPT	-	-	-	-	■	■	■	■	■	■	■
EE	35.3 ... 70.6	1/8 NPT, 1/4 NPT	1/8 NPT, 1/4 NPT, 3/8 NPT	■	-	■	■	■	■	■	■	■	■	■
DL	35.3 ... 70.6	1/8 NPT, 1/4 NPT	1/8 NPT, 1/4 NPT, 3/8 NPT	-	-	-	-	■	■	■	■	■	-	■
DE	35.3 ... 70.6	1/8 NPT, 1/4 NPT	1/8 NPT, 1/4 NPT, 3/8 NPT	■	-	■	■	■	■	■	■	■	-	■

Contents			
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On-off Valves MS4N-EM1 – Inch Series

Technical Data

ISO Symbol



- Manually operated on-off valve for pressurizing and venting pneumatic installations
- The valve is activated by turning the rotary knob
- At connection 3 there is the facility to attach a silencer and/or to duct the exhaust air
- When the valve is closed, the rotary knob can be secured with a padlock
- Optional pressure gauge
- Optional pressure sensor with display



General Technical Data		
Pneumatic connection 1, 2	1/8 NPT	1/4 NPT
Pneumatic connection 3	1/4 NPT	
Operating pressure [psi]	0 ... 206 (Standard)	
	0 ... 147 (Pressure sensor with display AD...)	

Standard Nominal Flow Rate q _N ¹⁾ [scfm]		
Pneumatic connection	1/8 NPT	1/4 NPT
In main flow direction 1 → 2	42.4	77.7
In relief direction 2 → 3	67.1	60.0

1) Measured at p₁ = 88 psi and p₂ = 74 psi, Δp = 15 psi

Operating and Environmental Conditions		
Variant	Standard	Pressure sensor with display AD...
Operating medium	Compressed air	Filtered compressed air, lubricated or unlubricated, filtration grade 40 μm
Exhaust function	No flow control	
Switching position display	Knob actuator direction = flow direction	
Ambient temperature [°F]	14 ... 140	32 ... 122
Temperature of medium [°F]	14 ... 140	32 ... 122
Assembly position	Any	
Corrosion resistance CRC ²⁾	2	

2) Corrosion resistance class 2 according to Festo standard 940 070
 Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

Weights [lb]	
Standard	0.38
With silencer	0.42

- For spare parts go to: www.festo.com/en/spare_parts_service

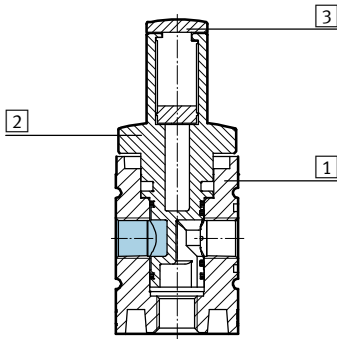
On-off Valves MS4N-EM1 – Inch Series

Technical Data, Dimensional Drawings



Materials

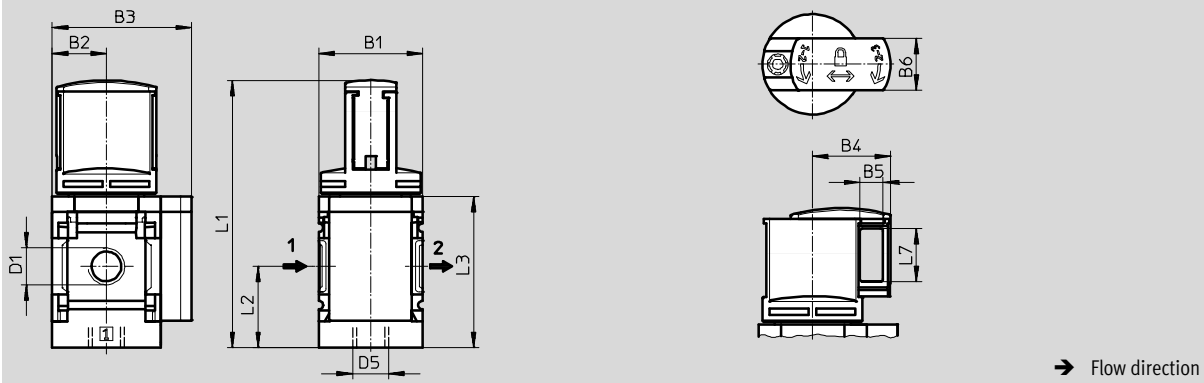
Sectional view



On-off valve		
1	Body	Die-cast aluminum
2	Rotary valve	Reinforced polyamide
3	Lock slide	Reinforced polyamide
-	Seals	Nitrile rubber, polyurethane
Note on materials		Free of copper and PTFE (not with variants AG or AD...)

Dimensions¹⁾ – Standard

Download CAD Data → www.festo.com/us/cad



Type	B1	B2	B3	B4	B5	B6	D1	D5	L1	L2	L3	L7
MS4N-EM1-1/8	1.57	0.83	2.13	1.18	0.35	0.79	1/8 NPT	1/4 NPT	4.09	1.24	2.32	0.81
MS4N-EM1-1/4							1/4 NPT					

1) Dimensions are in inches, unless otherwise noted.

On-off Valves MS4N-EM1 – Inch Series

Dimensional Drawings

Dimensions¹⁾ – Pressure Gauge Alternatives Download CAD Data → www.festo.com/us/cad

Integrated MS pressure gauge AG, display unit [psi] Adapter plate A8/A4 for EN pressure gauge 1/8/1/4, without pressure gauge

→ Flow direction

Pressure sensor with display AD1 ... AD4 Technical data SDE1 → www.festo.com/catalog/sde1

→ Flow direction

AD1 variants:
SDE1-D10-G2-MS-L-P1-M8 with 3-pin plug M8x1, 1 switching output PNP

AD2 variants:
SDE1-D10-G2-MS-L-N1-M8 with 3-pin plug M8x1, 1 switching output NPN

AD3 variants:
SDE1-D10-G2-MS-L-PI-M12 with 4-pin plug M12x1, 1 switching output PNP and 4 ... 20 mA analog

AD4 variants:
SDE1-D10-G2-MS-L-NI-M12 with 4-pin plug M12x1, 1 switching output NPN and 4 ... 20 mA analog

Type	B2	B3	D1	D4	D6	L5	L6
MS4N-EM1-1/8-...-AG	0.83	2.56	1/8 NPT	-	-	-	-
MS4N-EM1-1/4-...-AG			1/4 NPT				
MS4N-EM1-1/8-...-A8	0.83	2.30	1/8 NPT	G1/8	-	-	-
MS4N-EM1-1/4-...-A8			1/4 NPT				
MS4N-EM1-1/8-...-A4	0.83	2.30	1/8 NPT	G1/4	-	-	-
MS4N-EM1-1/4-...-A4			1/4 NPT				
MS4N-EM1-1/8-...-AD1/AD2	0.83	3.25	1/8 NPT	-	M8x1	1.38	1.84
MS4N-EM1-1/4-...-AD1/AD2			1/4 NPT				
MS4N-EM1-1/8-...-AD3/AD4	0.83	3.25	1/8 NPT	-	M12x1	1.38	2.20
MS4N-EM1-1/4-...-AD3/AD4			1/4 NPT				

1) Dimensions are in inches, unless otherwise noted.

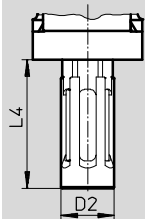
On-off Valves MS4N-EM1 – Inch Series

Dimensional Drawings, Ordering Data – Pre-configured Products



Dimensions¹⁾ – Silencer

Download CAD Data → www.festo.com/us/cad



Type	D2	L4
MS4N-EM1-...-S	0.77	1.85

1) Dimensions are in inches, unless otherwise noted.

Ordering Data

Connection	Standard			With silencer		
	Part No.	Type	LT	Part No.	Type	LT
1/8 NPT	541284	MS4N-EM1-1/8 ²⁾	1D	541285	MS4N-EM1-1/8-S ²⁾	1D
1/4 NPT	541280	MS4N-EM1-1/4 ²⁾	1D	541281	MS4N-EM1-1/4-S ²⁾	1D

LT = Lead time

1D typically ships same day/next day

3D typically ships within 3 days

2) Free of copper and PTFE

On-off Valves MS4N-EM1 – Inch Series



Ordering Data – Configurable Products

M Mandatory Data					O Options					
Part No.	Series	Size	Thread	Function	Connection size	Silencer	Pressure gauge alternatives	Alternative pressure gauge scale	Type of mounting	Reverse flow direction
541288	MS	4	N	EM1	1/8, 1/4, AQP, AQN, AQP	S	AG, A8, A4, AD1, AD2, AD3, AD4	BAR, MPA	WP, WPM, WB, WBM	Z
Order example										
541288	MS	4	N	- EM1	- 1/4	- S	- AG	- BAR	- WB	- Z

Ordering Table		Grid dimension [mm]	40	Conditions	Code	Enter code
M	Part No.	541288				
	Series	Standard			MS	MS
	Size	4			4	4
	Thread	NPT thread			N	N
	Function	On-off valve, manual			-EM1	-EM1
	Connection size	Body thread 1/8 NPT			-1/8	
		Body thread 1/4 NPT			-1/4	
		Port plate 1/8 NPT (dimensions → 428)			-AQK	
		Port plate 1/4 NPT (dimensions → 428)			-AQN	
		Port plate 3/8 NPT (dimensions → 428)			-AQP	
O	Silencer	Silencer			-S	
	Pressure gauge alternatives	MS pressure gauge, bar (with adapter)			-AG	
		Adapter plate for EN pressure gauge 1/8, without pressure gauge			-A8	
		Adapter plate for EN pressure gauge 1/4, without pressure gauge			-A4	
		Pressure sensor with display, M8 plug, 1 switching output PNP, 3-pin		1	-AD1	
		Pressure sensor with display, M8 plug, 1 switching output NPN, 3-pin		1	-AD2	
		Pressure sensor with display, M12 plug, 1 switching output PNP, 4-pin, analog output 4 ... 20 mA		1	-AD3	
		Pressure sensor with display, M12 plug, 1 switching output NPN, 4-pin, analog output 4 ... 20 mA		1	-AD4	
	Alternative pressure gauge scale	bar		2	-BAR	
		MPa		2	-MPA	
	Type of mounting	Mounting bracket (dimensions → 429)		3	-WP	
		Mounting bracket (dimensions → 429)		3	-WPM	
		Mounting bracket (dimensions → 426)			-WB	
		Mounting bracket (dimensions → 426)			-WBM	
	Reverse flow direction	Flow direction from right to left			-Z	

- 1 AD1 ... AD4 Measuring range max. 147 psi
- 2 BAR, MPA Only with pressure gauge AG

- 3 WP, WPM Only with port plate AQK, AQN or AQP

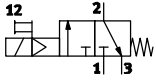
Transfer order code

541288	MS	4	N	-	EM1	-		-		-		-		-		-	
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On-off Valves MS4N-EE – Inch Series

Technical Data

ISO Symbol



- Solenoid actuated on-off valve for pressurizing and venting pneumatic installations
- Ducted exhaust possible via a threaded connection with silencer
- Pushing and detenting manual override (detenting is locked on delivery)
- Solenoid coil without plug socket, three voltage ranges available.
- Solenoid actuator can be repositioned by 180°
- Optional pressure sensor with display



General Technical Data		
Pneumatic connection 1, 2	1/8 NPT	1/4 NPT
Pneumatic connection 3	1/4 NPT	
Operating pressure [psi]	59 ... 206 (Coil parameter V24, V110, V230)	
	59 ... 147 (Coil parameter 10V24)	
	59 ... 147 (Pressure sensor with display AD...)	

Standard Nominal Flow Rate qnN ¹⁾ [scfm]		
Pneumatic connection	1/8 NPT	1/4 NPT
In main flow direction 1 → 2	35.3	70.6
In relief direction 2 → 3	56.5	

1) Measured at p1 = 88 psi and p2 = 74 psi, Δp = 15psi

Operating and Environmental Conditions			
Variant	Coil parameter V24, V110, V230	Coil parameter 10V24	Pressure sensor with display AD...
Operating medium	Compressed air		Filtered compressed air, lubricated or unlubricated, filtration grade 40 μm
Coil characteristics	V24	24 V DC (For valves with max. inlet pressure 206 psi – only available via configurator)	
	10V24	24 V DC (For valves with max. inlet pressure 147 psi)	
	V110	110 V AC	
	V230	230 V AC	
Exhaust function	Without flow control		
Ambient temperature [°F]	14 ... 140	14 ... 122	32 ... 122
Temperature of medium [°F]	14 ... 140	14 ... 122	32 ... 122
Assembly position	Any		
Corrosion resistance CRC ²⁾	2		

2) Corrosion resistance class 2 according to Festo standard 940 070
Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

Weights [lb]	
Standard	0.55
With silencer	0.58

• For spare parts go to: www.festo.com/en/spare_parts_service

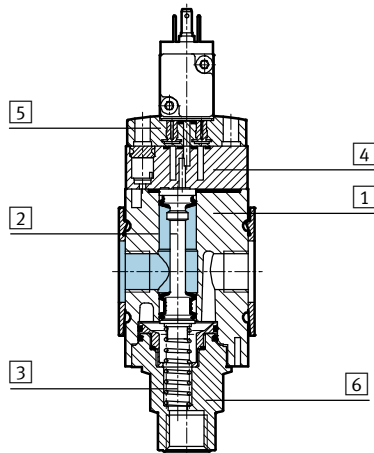
On-off Valves MS4N-EE – Inch Series

Technical Data



Materials

Sectional view



On-off valve		
1	Body	Die-cast aluminum
2	Piston spool	Nitrile rubber/Aluminum
3	Springs	High-alloy stainless steel
4	End cap	Polyamide
5	Top plate	Polyamide
6	Socket end connection	Polyamide
-	Seals	Nitrile rubber
Note on materials		Free of copper and PTFE (not with variants AG, 10V24 or AD...)

On-off Valves MS4N-EE – Inch Series

Dimensional Drawings



Dimensions¹⁾ – Standard Download CAD Data → www.festo.com/us/cad

1 Plug connection to DIN EN 175 301-803

2 Solenoid actuator can be repositioned by 180°, i.e. solenoid points to the front

3 PIN only with solenoid actuators 110 V and 230 V

→ Flow direction

Type	B1	B2	B3	B4	B5	D1	D5	L1	L2	L3	L7
MS4N-EE-1/8	1.57	1.66	2.96	0.83	2.13	1/8 NPT	1/4 NPT	5.62	2.32	3.94	0.34
MS4N-EE-1/4						1/4 NPT					

1) Dimensions are in inches, unless otherwise noted.

Dimensions¹⁾ – Pressure Gauge Alternatives Download CAD Data → www.festo.com/us/cad

Integrated MS pressure gauge AG, display unit [psi] Adapter plate A8/A4 for EN pressure gauge 1/8/1/4, without pressure gauge

→ Flow direction

Type	B2	B3	D1	D4
MS4N-EE-1/8-...-AG	1.66	3.39	1/8 NPT	-
MS4N-EE-1/4-...-AG			1/4 NPT	
MS4N-EE-1/8-...-A8	1.66	3.14	1/8 NPT	G1/8
MS4N-EE-1/4-...-A8			1/4 NPT	
MS4N-EE-1/8-...-A4	1.66	3.14	1/8 NPT	G1/4
MS4N-EE-1/4-...-A4			1/4 NPT	

On-off Valves MS4N-EE – Inch Series



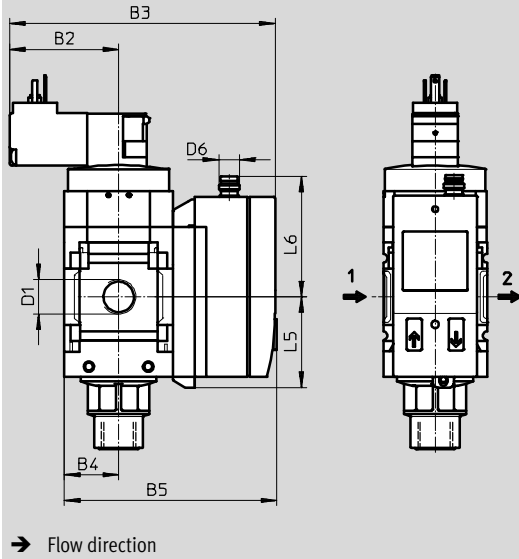
Dimensional Drawings

Dimensions¹⁾ – Pressure Gauge Alternatives

Download CAD Data → www.festo.com/us/cad

Pressure sensor with display AD1 ... AD4

Technical data SDE1 → www.festo.com/catalog/sde1



AD1 variants:
SDE1-D10-G2-MS-L-P1-M8 with 3-pin plug M8x1, 1 switching output PNP

AD3 variants:
SDE1-D10-G2-MS-L-PI-M12 with 4-pin plug M12x1, 1 switching output PNP and 4 ... 20 mA analog

AD2 variants:
SDE1-D10-G2-MS-L-N1-M8 with 3-pin plug M8x1, 1 switching output NPN

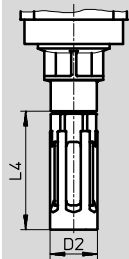
AD4 variants:
SDE1-D10-G2-MS-L-NI-M12 with 4-pin plug M12x1, 1 switching output NPN and 4 ... 20 mA analog

Type	B2	B3	B4	B5	D1	D6	L5	L6
MS4N-EE-1/8-...-AD1/AD2	1.66	4.09	0.83	3.25	1/8 NPT	M8x1	1.38	1.84
MS4N-EE-1/4-...-AD1/AD2					1/4 NPT			
MS4N-EE-1/8-...-AD3/AD4	1.66	4.09	0.83	3.25	1/8 NPT	M12x1	1.38	2.20
MS4N-EE-1/4-...-AD3/AD4					1/4 NPT			

1) Dimensions are in inches, unless otherwise noted.

Dimensions¹⁾ – Silencer

Download CAD Data → www.festo.com/us/cad



Type	D2	L4
MS4N-EE-...-S	0.77	1.91

1) Dimensions are in inches, unless otherwise noted.

On-off Valves MS4N-EE – Inch Series



Ordering Data – Pre-configured Products

Ordering Data						
Connection	Without silencer			With silencer		
	Part No.	Type	LT	Part No.	Type	LT
Supply voltage 24 V DC						
1/8 NPT	542589	MS4N-EE-1/8-10V24	1D	542610	MS4N-EE-1/8-10V24-S	Q
1/4 NPT	542588	MS4N-EE-1/4-10V24	1D	542608	MS4N-EE-1/4-10V24-S	Q
Supply voltage 110 V AC						
1/8 NPT	532084	MS4N-EE-1/8-V110 ¹⁾	1D	538755	MS4N-EE-1/8-V110-S ¹⁾	Q
1/4 NPT	532083	MS4N-EE-1/4-V110 ¹⁾	1D	538749	MS4N-EE-1/4-V110-S ¹⁾	Q
Supply voltage 230 V AC						
1/8 NPT	532088	MS4N-EE-1/8-V230 ¹⁾	1D	538757	MS4N-EE-1/8-V230-S ¹⁾	Q
1/4 NPT	532087	MS4N-EE-1/4-V230 ¹⁾	1D	538751	MS4N-EE-1/4-V230-S ¹⁾	Q

LT = Lead time 1D typically ships same day/next day 3D typically ships within 3 days

1) Free of copper and PTFE

On-off Valves MS4N-EE – Inch Series

Ordering Data – Configurable Products



M Mandatory Data →

Part No.	Series	Size	Thread	Function	Connection size	Supply voltage
527710	MS	4	N	EE	1/8 1/4 AQK AQN AQP	V24 10V24 V110 V230
Order example						
527710	MS	4	N	- EE	- AQN	- V24

Ordering Table		Grid dimension [mm]	40	Conditions	Code	Enter code
M	Part No.	527710				
	Series	Standard			MS	MS
	Size	4			4	4
	Thread	NPT thread			N	N
	Function	On-off valve, electrical			-EE	-EE
	Connection size	Body thread 1/8 NPT			-1/8	
		Body thread 1/4 NPT			-1/4	
		Port plate 1/8 NPT (dimensions → 428)			-AQK	
		Port plate 1/4 NPT (dimensions → 428)			-AQN	
		Port plate 3/8 NPT (dimensions → 428)			-AQP	
	Supply voltage	24 V DC (connection pattern to EN 175301), 206 psi			-V24	
		24 V DC (connection pattern to EN 175301), 147 psi		1	-10V24	
		110 V AC (connection pattern to EN 175301), 206 psi			-V110	
		230 V AC (connection pattern to EN 175301), 206 psi			-V230	

1 10V24 Max. inlet pressure 147 psi

Transfer order code

On-off Valves MS4N-EE – Inch Series



Ordering Data – Configurable Products

→ **0 Options**

Silencer	Pressure gauge alternatives	Alternative pressure gauge scale	Type of mounting	Reverse flow direction
S	AG A8 A4 AD1 AD2 AD3 AD4	BAR MPA	WP WPM WB WBM	Z
- S	- AG	- BAR	- WP	- Z

Ordering Table		Grid dimension [mm]	40	Conditions	Code	Enter code
0 Silencer	Silencer				-S	
Pressure gauge alternatives	MS pressure gauge, psi (with adapter)				-AG	
	Adapter plate for EN pressure gauge 1/8, without pressure gauge				-A8	
	Adapter plate for EN pressure gauge 1/4, without pressure gauge				-A4	
	Pressure sensor with display, M8 plug, 1 switching output PNP, 3-pin	2			-AD1	
	Pressure sensor with display, M8 plug, 1 switching output NPN, 3-pin	2			-AD2	
	Pressure sensor with display, M12 plug, 1 switching output PNP, 4-pin, analog output 4 ... 20 mA	2			-AD3	
	Pressure sensor with display, M12 plug, 1 switching output NPN, 4-pin, analog output 4 ... 20 mA	2			-AD4	
Alternative pressure gauge scale	bar		3		-BAR	
	MPa		3		-MPA	
Type of mounting	Mounting bracket (dimensions → 429)		4		-WP	
	Mounting bracket (dimensions → 429)		4		-WPM	
	Mounting bracket (dimensions → 426)				-WB	
	Mounting bracket (dimensions → 426)				-WBM	
Reverse flow direction	Flow direction from right to left				-Z	

2 **AD1 ... AD4** Measuring range max. 147 psi
 3 **BAR, MPA** Only with pressure gauge AG

4 **WP, WPM** Only with port plate AQK, AQN or AQP

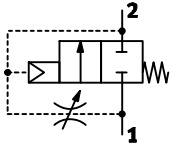
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Soft-start Valves MS4N-DL – Inch Series

Technical Data

ISO Symbol



- Pneumatically actuated soft-start valve for slowly pressurizing and venting pneumatic installations (for use with on-off valves EM1 and EE)
- The duration of the pressure build-up is adjusted using the restrictor attached to the valve cap.
- The output pressure p2 rises slowly in accordance with the restrictor setting. The main seat opens when the switch-through pressure is reached.
- Pressure switching approx. 50% of supply pressure
- When the valve is exhausted, the main seat remains open until the switch-through pressure is reached. The rest of the exhaust procedure is performed using the restrictor.



- The cylinders advance slowly and reliably into the initial position.
- Sudden and erratic movements are avoided
- Adjustable switching time delay
- Optional pressure sensor with display

General Technical Data		
Pneumatic connection 1, 2	1/8 NPT	1/4 NPT
Operating pressure [psi]	59 ... 206 (Standard)	
	59 ... 147 (Pressure sensor with display AD...)	

Standard Nominal Flow Rate qnN ¹⁾ [scfm]		
Pneumatic connection 1, 2	1/8 NPT	1/4 NPT
In main flow direction 1 → 2	35.3	70.6
In relief direction 2 → 1	35.3	70.6

1) Measured at p1 = 88 psi and p2 = 74 psi, Δp = 15 psi

Operating and Environmental Conditions		
Variant	Standard	Pressure sensor with display AD...
Operating medium	Compressed air	Filtered compressed air, lubricated or unlubricated, filtration grade 40 μm
Exhaust function	Flow control	
Direction of flow	Non-reversible	
Ambient temperature [°F]	14 ... 140	32 ... 122
Temperature of medium [°F]	14 ... 140	32 ... 122
Assembly position	Any	
Corrosion resistance CRC ²⁾	2	

2) Corrosion resistance class 2 according to Festo standard 940 070
 Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

Weights [lb]	
Soft-start valve	0.43

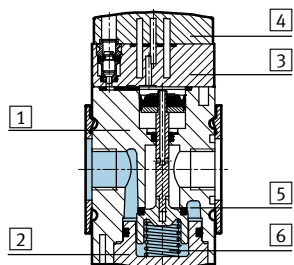
- For spare parts go to: www.festo.com/en/spare_parts_service

Soft-start Valves MS4N-DL – Inch Series

Technical Data

Materials

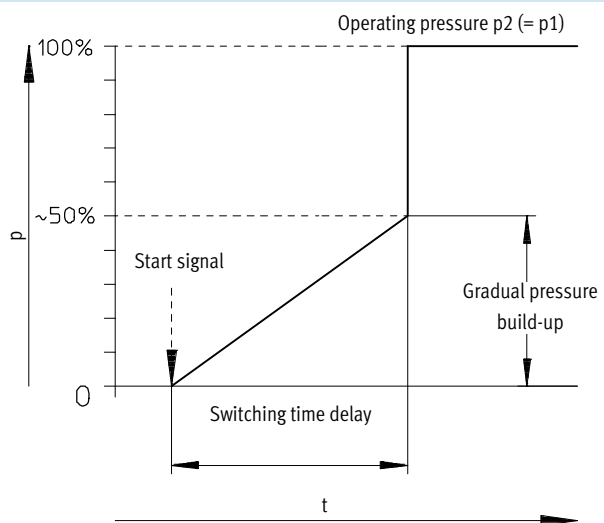
Sectional view



Soft-start valve		
1	Body	Die-cast aluminum
2	Base	Polyester
3	End cap	Polyamide
4	Top plate	Polyamide
5	Seat	Die-cast aluminum
6	Springs	Spring steel
-	Seals	Nitrile rubber
Note on materials		Free of copper and PTFE (not with variants AG or AD...)

Switching Point

Pressure p as a function of time t



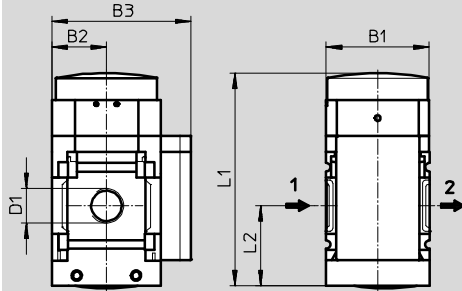
Soft-start Valves MS4N-DL – Inch Series

Dimensional Drawings



Dimensions¹⁾ – Standard

Download CAD Data → www.festo.com/us/cad



→ Flow direction

Type	B1	B2	B3	D1	L1	L2
MS4N-DL-1/8	1.57	0.83	2.13	1/8 NPT	3.26	1.22
MS4N-DL-1/4				1/4 NPT		

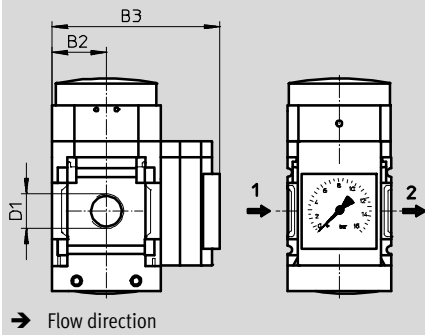
1) Dimensions are in inches, unless otherwise noted.

Dimensions¹⁾ – Pressure Gauge Alternatives

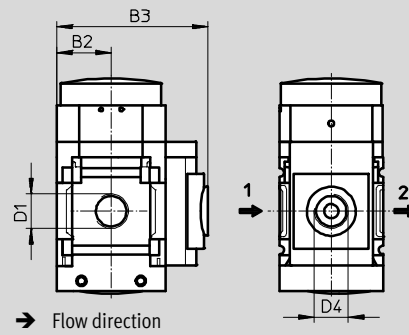
Download CAD Data → www.festo.com/us/cad

Integrated MS pressure gauge AG, display unit [psil]

Adapter plate A8/A4 for EN pressure gauge 1/8/1/4, without pressure gauge



→ Flow direction



→ Flow direction

Type	B2	B3	D1	D4
MS4N-DL-1/8-...-AG	0.83	2.56	1/8 NPT	-
MS4N-DL-1/4-...-AG			1/4 NPT	
MS4N-DL-1/8-...-A8	0.83	2.30	1/8 NPT	G1/8
MS4N-DL-1/4-...-A8			1/4 NPT	
MS4N-DL-1/8-...-A4	0.83	2.30	1/8 NPT	G1/4
MS4N-DL-1/4-...-A4			1/4 NPT	

1) Dimensions are in inches, unless otherwise noted.

Soft-start Valves MS4N-DL – Inch Series

Dimensional Drawings, Ordering Data – Pre-configured Products



Dimensions¹⁾ – Pressure Gauge Alternatives Download CAD Data → www.festo.com/us/cad
 Pressure sensor with display AD1 ... AD4 Technical data SDE1 → www.festo.com/catalog/sde1

AD1 variants:
SDE1-D10-G2-MS-L-P1-M8 with 3-pin plug M8x1, 1 switching output PNP

AD2 variants:
SDE1-D10-G2-MS-L-N1-M8 with 3-pin plug M8x1, 1 switching output NPN

AD3 variants:
SDE1-D10-G2-MS-L-PI-M12 with 4-pin plug M12x1, 1 switching output PNP and 4 ... 20 mA analog

AD4 variants:
SDE1-D10-G2-MS-L-NI-M12 with 4-pin plug M12x1, 1 switching output NPN and 4 ... 20 mA analog

→ Flow direction

Type	B2	B3	D1	D6	L5	L6
MS4N-DL-1/8-...-AD1/AD2	0.83	3.25	1/8 NPT	M8x1	1.38	1.84
MS4N-DL-1/4-...-AD1/AD2			1/4 NPT			
MS4N-DL-1/8-...-AD3/AD4	0.83	3.25	1/8 NPT	M12x1	1.38	2.20
MS4N-DL-1/4-...-AD3/AD4			1/4 NPT			

1) Dimensions are in inches, unless otherwise noted.

Ordering Data			
Connection	Part No.	Type	LT
1/8 NPT	531992	MS4N-DL-1/8 ²⁾	1D
1/4 NPT	531991	MS4N-DL-1/4 ²⁾	1D

LT = Lead time 1D typically ships same day/next day 3D typically ships within 3 days

2) Free of copper and PTFE

Soft-start Valves MS4N-DL – Inch Series

Ordering Data – Configurable Products



M Mandatory Data					O Options				
Part No.	Series	Size	Thread	Function	Connection size	Pressure gauge alternatives	Alternative pressure gauge scale	Type of mounting	Reverse flow direction
527712	MS	4	N	DL	1/8, 1/4, AQK, AQN, AQP	AG, A8, A4, AD1, AD2, AD3, AD4	BAR, MPA	WP, WPM, WB, WBM	Z
Order example									
527712	MS	4	N	-DL	-AQK	-AG	-BAR	-WB	-Z

Ordering Table		Grid dimension [mm]	40	Conditions	Code	Enter code
M	Part No.	527712				
	Series	Standard			MS	MS
	Size	4			4	4
	Thread	NPT thread			N	N
	Function	Soft-start valve, pneumatic			-DL	-DL
	Connection size	Body thread 1/8 NPT			-1/8	
		Body thread 1/4 NPT			-1/4	
		Port plate 1/8 NPT (dimensions → 428)			-AQK	
		Port plate 1/4 NPT (dimensions → 428)			-AQN	
		Port plate 3/8 NPT (dimensions → 428)			-AQP	
O	Pressure gauge alternatives	MS pressure gauge, psi (with adapter)			-AG	
		Adapter plate for EN pressure gauge 1/8, without pressure gauge			-A8	
		Adapter plate for EN pressure gauge 1/4, without pressure gauge			-A4	
		Pressure sensor with display, M8 plug, 1 switching output PNP, 3-pin		1	-AD1	
		Pressure sensor with display, M8 plug, 1 switching output NPN, 3-pin		1	-AD2	
		Pressure sensor with display, M12 plug, 1 switching output PNP, 4-pin, analog output 4 ... 20 mA		1	-AD3	
		Pressure sensor with display, M12 plug, 1 switching output NPN, 4-pin, analog output 4 ... 20 mA		1	-AD4	
		Alternative pressure gauge scale	bar		2	-BAR
	MPa		2	-MPA		
	Type of mounting	Mounting bracket (dimensions → 429)		3	-WP	
		Mounting bracket (dimensions → 429)		3	-WPM	
		Mounting bracket (dimensions → 426)			-WB	
		Mounting bracket (dimensions → 426)			-WBM	
	Reverse flow direction	Flow direction from right to left			-Z	

1 AD1 ... AD4 Measuring range max. 147 psi

2 BAR, MPA Only with pressure gauge AG

3 WP, WPM Only with port plate AQK, AQN or AQP

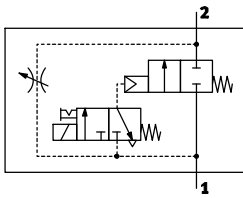
Transfer order code

527712 MS 4 N - DL - - - - -

Soft-start Valves MS4N-DE – Inch Series

Technical Data

ISO Symbol



- Solenoid actuated soft-start valve for slowly pressurizing and venting pneumatic installations
- The duration of the pressure build-up is adjusted using the restrictor attached to the valve cap.
- The output pressure p2 rises slowly in accordance with the restrictor setting. Only the air flow via the restrictor is available when the solenoid valve is not actuated. The main seat is only opened by energizing the solenoid valve.
- When the solenoid valve is switched off, the main seat is closed and only the air flow from the flow control valve is available.
- The solenoid valve should remain switched on in order to vent a system as this increases the flow rate from 2 and 1 and reduces the exhaust time.



- The cylinders advance slowly and reliably into the initial position. Sudden and erratic movements are avoided
- Switch-through pressure can be precisely controlled using a solenoid valve
- Adjustable switching time delay
- Solenoid coil without plug socket, three voltage ranges available
- Solenoid actuator can be repositioned by 180°
- Pushing and detenting manual override (detenting is locked on delivery)
- Optional pressure sensor with display

General Technical Data		
Pneumatic connection 1, 2	1/8 NPT	1/4 NPT
Operating pressure [psi]	59 ... 206 (Coil parameter V24, V110, V230)	
	59 ... 147 (Coil parameter 10V24)	
	59 ... 147 (Pressure sensor with display AD...)	

Standard Nominal Flow Rate qnN ¹⁾ [scfm]		
Pneumatic connection 1, 2	1/8 NPT	1/4 NPT
In main flow direction 1 → 2	35.3	70.6
In relief direction 2 → 1 ²⁾	35.3	70.6

1) Measured at p1 = 88 psi and p2 = 74 psi, Δp = 15psi
 2) For energized solenoid valve.

Soft-start Valves MS4N-DE – Inch Series

Technical Data

Operating and Environmental Conditions				
Variant		Coil parameter V24, V110, V230	Coil parameter 10V24	Pressure sensor with display AD...
Operating medium		Compressed air		Filtered compressed air, lubricated or unlubricated, filtration grade 40 µm
Coil characteristics	V24	24 V DC (For valves with max. inlet pressure 206 psi – only available via configurator)		
	10V24	24 V DC (For valves with max. inlet pressure 147 psi)		
	V110	110 V AC		
	V230	230 V AC		
Exhaust function		Flow control		
Direction of flow		Non-reversible		
Ambient temperature	[°F]	14 ... 140	14 ... 122	32 ... 122
Temperature of medium	[°F]	14 ... 140	14 ... 122	32 ... 122
Assembly position		Any		
Corrosion resistance	CRC ¹⁾	2		

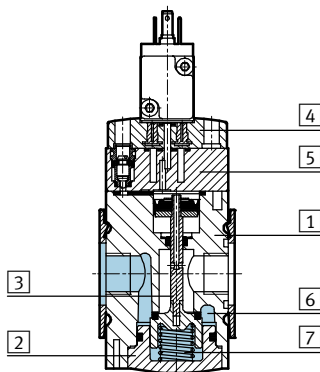
1) Corrosion resistance class 2 according to Festo standard 940 070
Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

Weights [lb]	
Soft-start valve	0.53

- For spare parts go to: www.festo.com/en/spare_parts_service

Materials

Sectional view



Soft-start valve		
1	Body	Die-cast aluminum
2	Base	Polyamide
3	Valve stem	Steel
4	End cap	Polyamide
5	Top plate	Polyamide
6	Seat	Aluminum/nitrile rubber
7	Springs	Spring steel
-	Seals	Nitrile rubber
Note on materials		Free of copper and PTFE (not with variants AG, 10V24 or AD...)

Soft-start Valves MS4N-DE – Inch Series

Dimensional Drawings



Dimensions¹⁾ – Standard Download CAD Data → www.festo.com/us/cad

- 1 Plug connection to DIN EN 175 301-803
- 2 Solenoid actuator can be repositioned by 180°, i.e. solenoid points to the front
- 3 PIN only with solenoid actuators 110 V and 230 V

→ Flow direction

Type	B1	B2	B3	B4	B5	D1	L1	L2	L7
MS4N-DE-1/8	1.57	1.66	2.96	0.83	2.13	1/8 NPT	4.54	1.24	0.34
MS4N-DE-1/4						1/4 NPT			

1) Dimensions are in inches, unless otherwise noted.

Dimensions¹⁾ – Pressure Gauge Alternatives Download CAD Data → www.festo.com/us/cad

Integrated MS pressure gauge AG, display unit [psi] Adapter plate A8/A4 for EN pressure gauge 1/8/1/4, without pressure gauge

→ Flow direction

Type	B2	B3	D1	D4
MS4N-DE-1/8-...-AG	1.66	3.39	1/8 NPT	-
MS4N-DE-1/4-...-AG			1/4 NPT	
MS4N-DE-1/8-...-A8	1.66	3.14	1/8 NPT	G1/8
MS4N-DE-1/4-...-A8			1/4 NPT	
MS4N-DE-1/8-...-A4	1.66	3.14	1/8 NPT	G1/4
MS4N-DE-1/4-...-A4			1/4 NPT	

1) Dimensions are in inches, unless otherwise noted.

Soft-start Valves MS4N-DE – Inch Series

Dimensional Drawings, Ordering Data – Pre-configured Products



Dimensions¹⁾ – Pressure Gauge Alternatives Download CAD Data → www.festo.com/us/cad
 Pressure sensor with display AD1 ... AD4 Technical data SDE1 → www.festo.com/catalog/sde1

AD1 variants:
SDE1-D10-G2-MS-L-P1-M8 with 3-pin plug M8x1, 1 switching output PNP

AD2 variants:
SDE1-D10-G2-MS-L-N1-M8 with 3-pin plug M8x1, 1 switching output NPN

AD3 variants:
SDE1-D10-G2-MS-L-PI-M12 with 4-pin plug M12x1, 1 switching output PNP and 4 ... 20 mA analog

AD4 variants:
SDE1-D10-G2-MS-L-NI-M12 with 4-pin plug M12x1, 1 switching output NPN and 4 ... 20 mA analog

→ Flow direction

Type	B2	B3	B4	B5	D1	D6	L5	L6
MS4N-DE-1/8-...-AD1/AD2	1.66	4.09	0.83	3.25	1/8 NPT	M8x1	1.38	1.84
MS4N-DE-1/4-...-AD1/AD2					1/4 NPT			
MS4N-DE-1/8-...-AD3/AD4	1.66	4.09	0.83	3.25	1/8 NPT	M12x1	1.38	2.20
MS4N-DE-1/4-...-AD3/AD4					1/4 NPT			

1) Dimensions are in inches, unless otherwise noted.

Ordering Data			
Connection	Part No.	Type	LT
Supply voltage 24 V DC			
1/8 NPT	542569	MS4N-DE-1/8-10V24	1D
1/4 NPT	542568	MS4N-DE-1/4-10V24	1D
Supply voltage 110 V AC			
1/8 NPT	532004	MS4N-DE-1/8-V110 ²⁾	1D
1/4 NPT	532003	MS4N-DE-1/4-V110 ²⁾	1D
Supply voltage 230 V AC			
1/8 NPT	532008	MS4N-DE-1/8-V230 ²⁾	1D
1/4 NPT	532007	MS4N-DE-1/4-V230 ²⁾	1D

LT = Lead time 1D typically ships same day/next day 3D typically ships within 3 days

2) Free of copper and PTFE

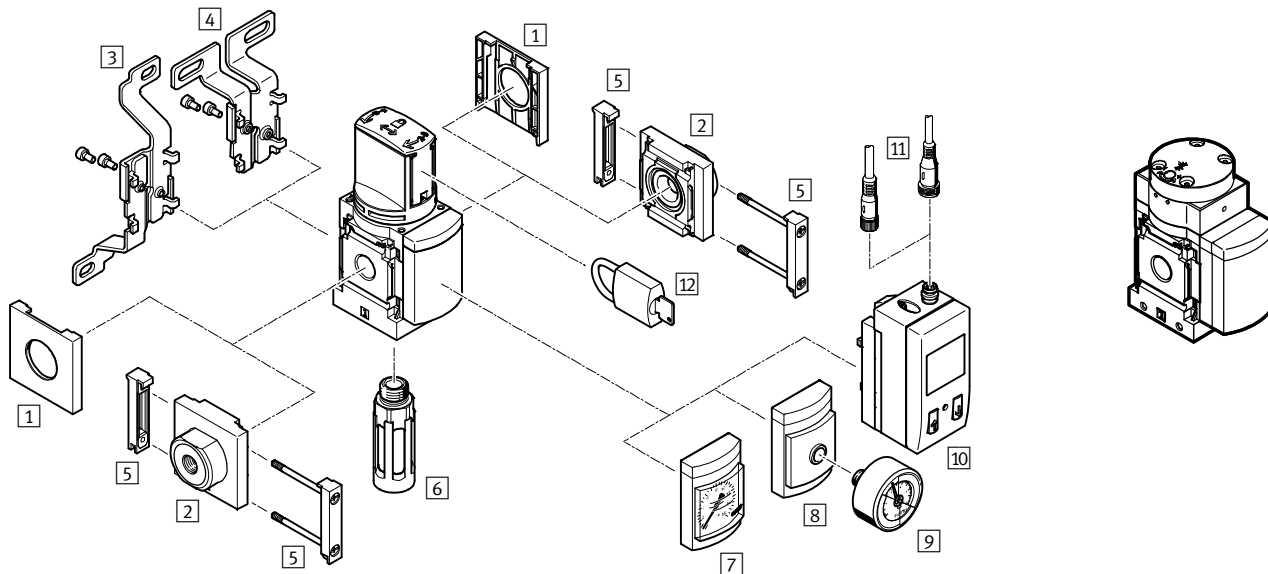
On-off/Soft-start Valves MS4N-EM1/DL – Inch Series

Accessories Overview

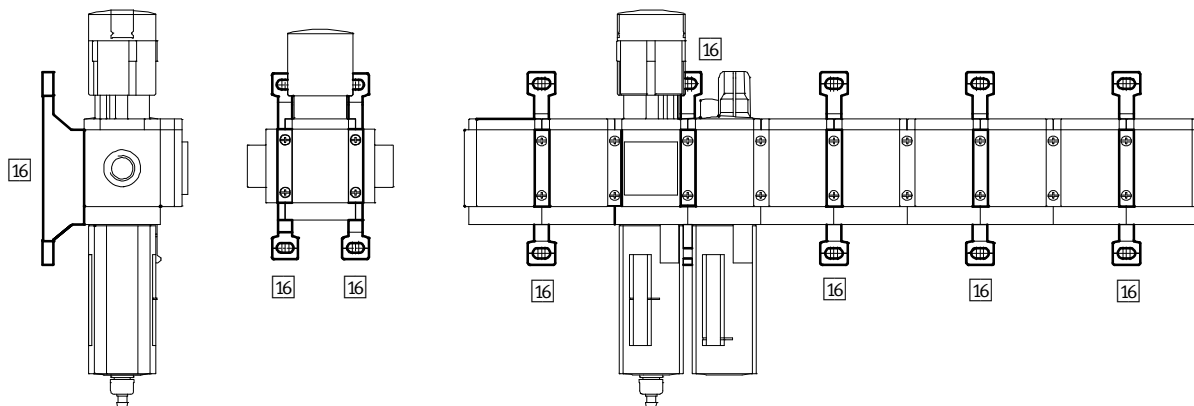
Mounting Attachments and Accessories

On-off Valve EM1 – manually actuated

Soft-start Valve DL – pneumatically actuated



Single unit and combination unit mounting brackets.



On-off/Soft-start Valves MS4N-EM1/DL – Inch Series

Accessories Overview

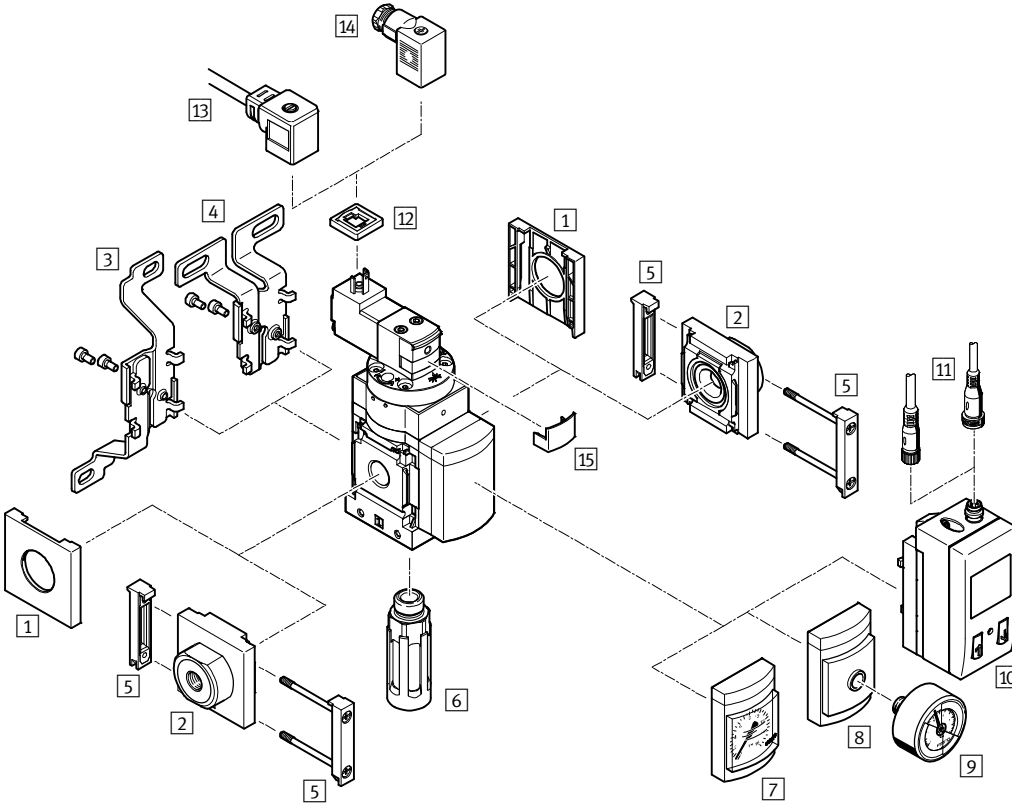
Mounting Attachments and Accessories						
		Single unit		Combination unit → 2.1-49		→ Page
		without port plate	with port plate	without port plate	with port plate	
1	Cover cap MS4-END	■	-	■	-	427
2	Port plate MS4N-AQ...	-	■	-	■	428
3	Mounting bracket MS4-WB	■	■	-	-	426
4	Mounting bracket MS4-WBM	■	■	-	-	426
5	Body connector MS4-MV	-	■	■	■	428
6	Silencer U	■ with EM1	■ with EM1	■ with EM1	■ with EM1	433
7	MS pressure gauge AG	■	■	■	■	EM1 404 DL 416
8	Adapter for EN pressure gauge 1/8/1/4 A8/A4	■	■	■	■	EM1 404 DL 416
9	Pressure gauge MA	■	■	■	■	433
10	Pressure sensor SDE1-...-MS AD1 ... AD4	■	■	■	■	EM1 404 DL 416
11	Plug socket with cable SIM-M8-3.../SIM-M12-4...	■	■	■	■	432
12	Padlock LRVS-D	■	■	■	■	433
16	Mounting bracket MS4-WP/WPB/WPM	-	■	■	■	429

On-off/Soft-start Valves MS4N-EE/DE – Inch Series

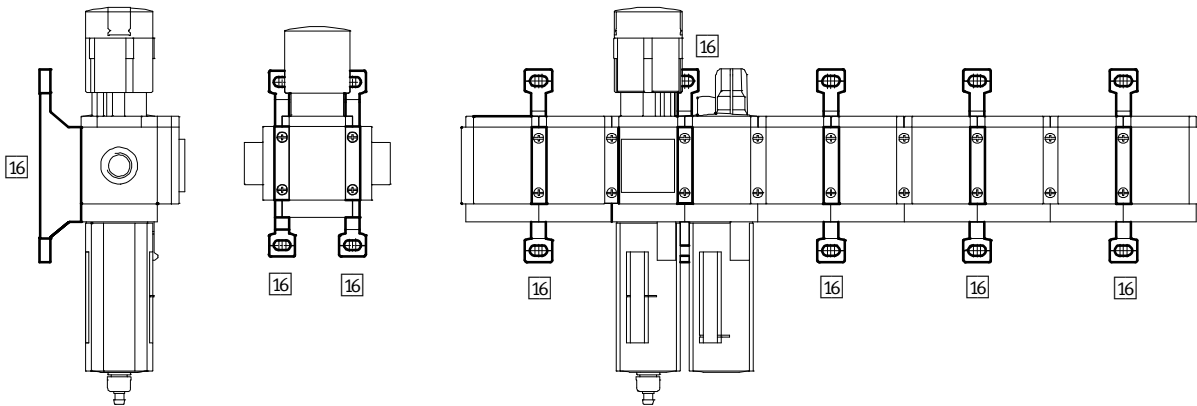
Accessories Overview

Mounting Attachments and Accessories

On-off/Soft-start Valve EE/DE – solenoid actuated



Single unit and combination unit mounting brackets.



On-off/Soft-start Valves MS4N-EE/DE – Inch Series

Accessories Overview

Mounting Attachments and Accessories						
		Single unit		Combination unit → 2.1-49		→ Page
		without port plate	with port plate	without port plate	with port plate	
1	Cover cap MS4-END	■	-	■	-	427
2	Port plate MS4N-AQ...	-	■	-	■	428
3	Mounting bracket MS4-WB	■	■	-	-	426
4	Mounting bracket MS4-WBM	■	■	-	-	426
5	Body connector MS4-MV	-	■	■	■	428
6	Silencer U	■ with EE	■ with EE	■ with EE	■ with EE	433
7	Pressure gauge MS AG	■	■	■	■	EE 410 DE 421
8	Adapter for EN pressure gauge 1/8/1/4 A8/A4	■	■	■	■	EE 410 DE 421
9	Pressure gauge MA	■	■	■	■	433
10	Pressure sensor SDE1-...-MS AD1 ... AD4	■	■	■	■	EE 410 DE 421
11	Plug socket with cable SIM-M8-3.../SIM-M12-4...	■	■	■	■	432
12	Illuminating seal MEB-LD	■	■	■	■	432
13	Plug socket with cable KMEB	■	■	■	■	432
14	Plug socket MSSD-EB	■	■	■	■	432
15	Locking clip CPV18-HV	■	■	■	■	432
16	Mounting bracket MS4-WP/WPB/WPM	-	■	■	■	429

On-off/Soft-start Valves MS4N-EM1/EE/DL/DE – Inch Series

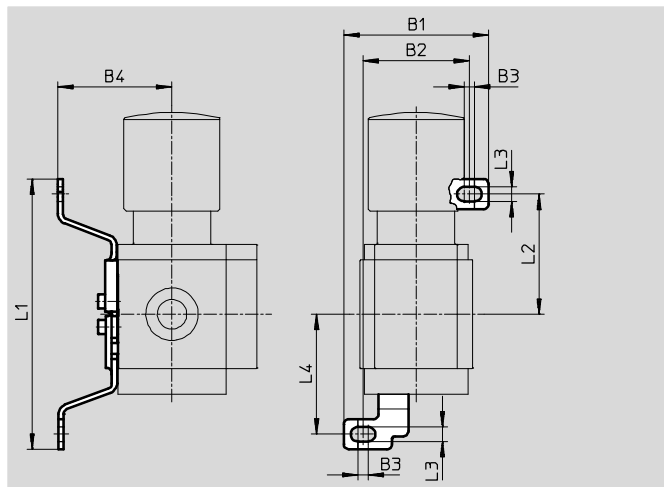


Accessories

3 Mounting bracket MS4-WB

- For wall mounting

Material:
Steel

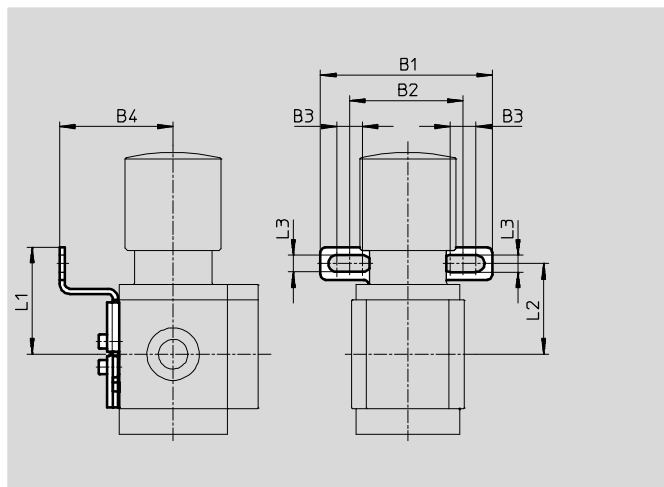


Dimensions and Ordering Data										
B1	B2	B3	B4	L1	L2	L3	L4	Weight [lb]	Part No.	Type
2.21	1.62	0.16	1.74	4.12	1.83	0.22	1.83	0.09	532185	MS4-WB

4 Mounting bracket MS4-WBM

- For wall mounting

Material:
Steel



Dimensions and Ordering Data									
B1	B2	B3	B4	L1	L2	L3	Weight [lb]	Part No.	Type
2.62	1.73	0.39	1.73	1.63	1.38	0.26	0.10	526062	MS4-WBM

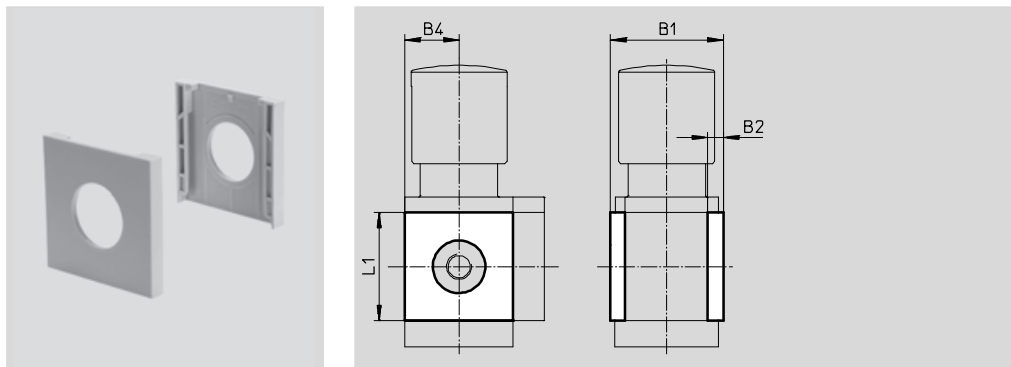
On-off/Soft-start Valves MS4N-EM1/EE/DL/DE – Inch Series

Accessories

1 Cover cap MS4-END

- Can be used to cover the body sides of the first and last module if port plates are not used.

Material:
Reinforced polyamide
Free of copper and PTFE

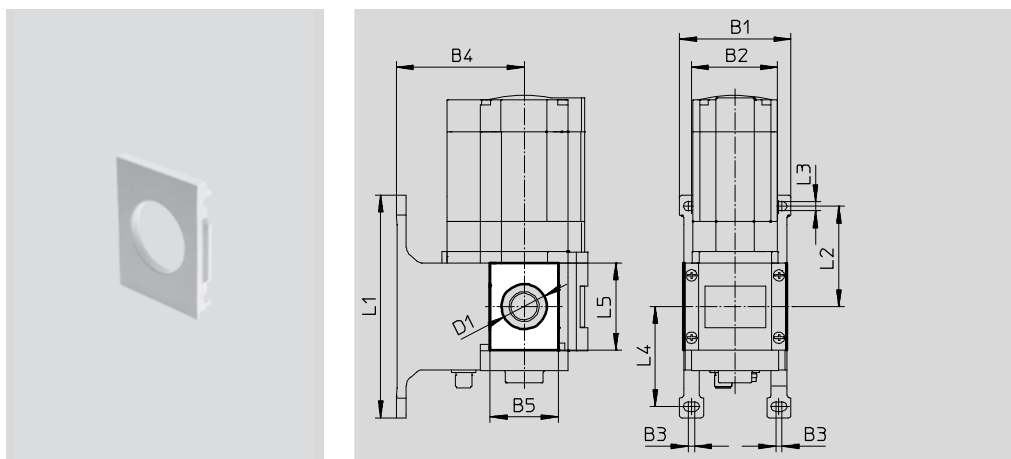


Dimensions and Ordering Data						
B1	B2	B4	L1	Part No.	Type	
1.72	0.24	0.83	1.65	538779	MS4-END	

Mounting plate MS4-AEND

- In combination with mounting bracket MS-WP or MS-WPB for mounting an individual unit on a wall with body thread

Material:
Reinforced polyamide
Conforms to RoHS
Free of copper and PTFE



Dimensions and Ordering Data															
B1	B2	B3	B4		B5	D1 ∅	L1	L2	L3	L4	L5	CRC ¹⁾	Weight [lb]	Part No.	Type
			WP	WPB											
2.17	1.58	0.16	1.73	2.60	1.20	0.80	4.17	1.83	0.22	1.84	1.65	2	0.01	542966	MS4-AEND

1) Corrosion resistance class 2 according to Festo standard 940 070
Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

On-off/Soft-start Valves MS4N-EM1/EE/DL/DE – Inch Series

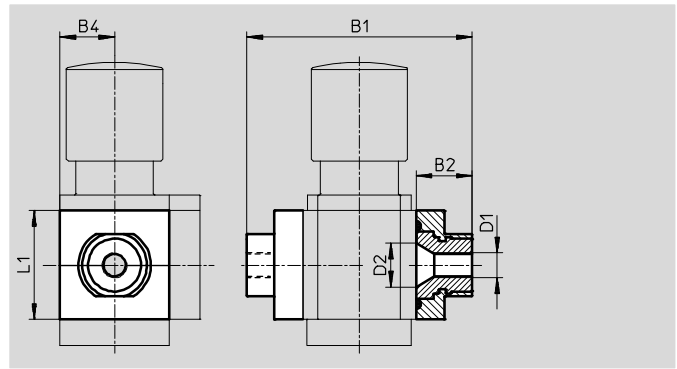
FESTO

Accessories

2 Port plate MS4N-AQ...

- Adapter for pneumatic connection

Material:
Aluminum



Dimensions and Ordering Data							
B1	B2	B4	D1	D2	L1	Weight [lb]	Part No. Type
3.29	0.85	0.83	1/8 NPT	0.66	1.65	0.26	526065 MS4N-AQK
			1/4 NPT				526066 MS4N-AQN
			3/8 NPT				526067 MS4N-AQP

5 Body connector MS4-MV

- For connecting modules

Material:
Stainless steel/polyacetate



Ordering Data		
Weight [lb]	Part No.	Type
0.07	532798	MS4-MV

On-off/Soft-start Valves MS4N-EM1/EE/DL/DE – Inch Series

Accessories

16 Mounting Bracket MS4-WP...

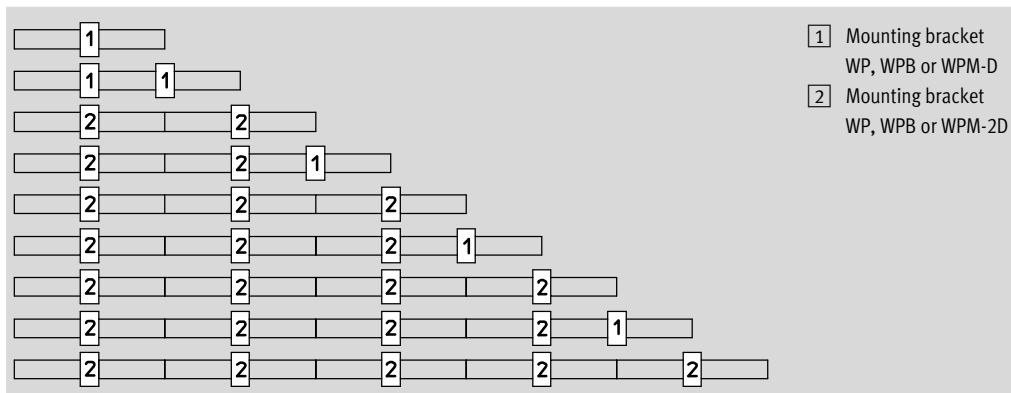
Suggested placement of wall mounting brackets when mounting air preparation combinations

1 unit: 1.575 in

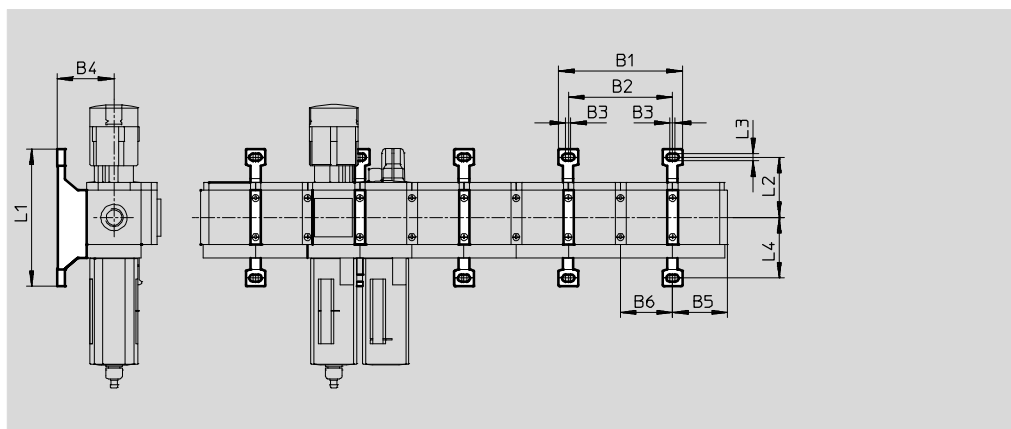
2 units: 3.15 in

Number of units

1 2 3 4 5 6 7 8 9 10



Mounting dimensions



Type	B1	B2	B3	B4	B5	B6	L1	L2	L3	L4
MS4-WP	3.75	3.15	0.16	1.73	1.65	1.57	4.17	1.83	0.22	1.84
MS4-WPB				2.60						
MS4-WPM-...D				1.73						

On-off/Soft-start Valves MS4N-EM1/EE/DL/DE – Inch Series

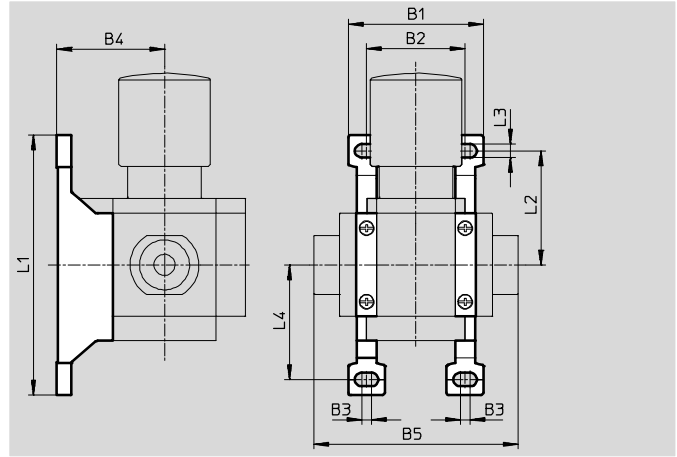


Accessories

Mounting bracket MS4-WP

- To connect the modules for wall mounting
- In combination with a port plate MS-AG... for mounting an individual unit on a wall
- In combination with mounting plate MS-AEND or for mounting an individual unit with body thread on a wall
- For pressure regulator LRB with angled outlet block B... at rear

Material:
Die-cast aluminum

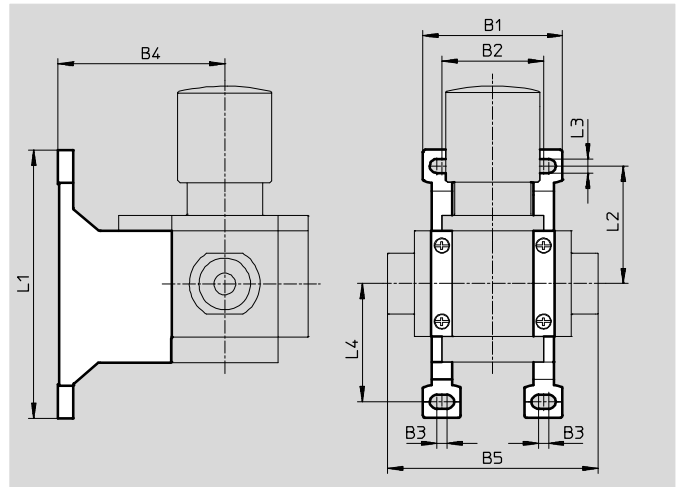


Dimensions and Ordering Data											
B1	B2	B3	B4	B5	L1	L2	L3	L4	Weight [lb]	Part No.	Type
2.17	1.58	0.16	1.73	3.28	4.17	1.83	0.22	1.84	0.08	532184	MS4-WP

Mounting bracket MS4-WPB

- To connect the modules for wall mounting
- In combination with a port plate MS-AG... for mounting an individual unit on a wall
- In combination with mounting plate MS-AEND or for mounting an individual unit with direct thread on a wall
- Provides large wall gap for pressure regulator

Material:
Die-cast aluminum



Dimensions and Ordering Data											
B1	B2	B3	B4	B5	L1	L2	L3	L4	Weight [lb]	Part No.	Type
2.17	1.58	0.16	2.60	3.28	4.17	1.83	0.22	1.84	0.11	526063	MS4-WPB

On-off/Soft-start Valves MS4N-EM1/EE/DL/DE – Inch Series

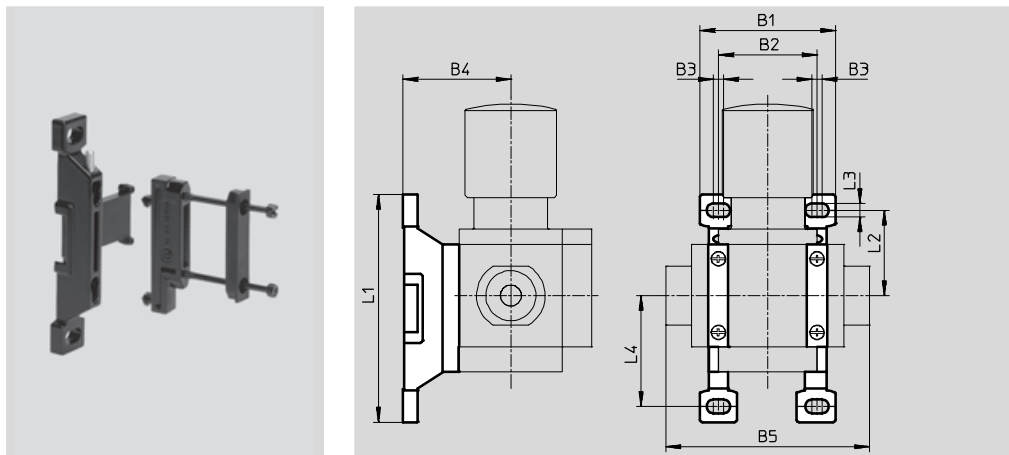
Accessories

Mounting bracket MS4-WPM

- To connect the modules for wall mounting
- In combination with a port plate MS-AG... for mounting an individual unit on a wall
- Speedy attachment and detachment
- For installation of modules with regulating knob pointing downwards

The distance piece D or 2D (designated in the type code) is included in the scope of delivery and ensures the correct clearance

Material:
Die-cast aluminum



Dimensions and Ordering Data												
B1	B2	B3	B4	B5	L1	L2	L3	L4	Clearance	Weight [lb]	Part No.	Type
2.17	1.57	0.16	1.73	3.28	3.65	1.37	0.22	1.78	1.57	0.09	526060	MS4-WPM-D
3.75	3.15			4.86					3.15	0.11	526061	MS4-WPM-2D

Body connector MS4-MVM

- For installation of modules with regulating knob pointing downwards

Material:
Die-cast aluminum





Ordering Data		
Size	Part No.	Type
MS4	532800	MS4-MVM


On-off/Soft-start Valves MS4N-EM1/EE/DL/DE – Inch Series




Accessories



14 Ordering Data – Plug Socket MSSD					Technical data → www.festo.com/catalog/mssd	
	Description	Operating voltage range	Electrical connection	Type of mounting cable connection	Part No.	Type
	for MS4N-EE/DE	≤ 250 V AC/DC	3-pin	Clamping screws	151687	MSSD-EB
			4-pin	Insulation displacement technology	192745	MSSD-EB-S-M14



13 Ordering Data – Plug Socket with Cable KMEB					Technical data → www.festo.com/catalog/kmeb	
	Description	Operating voltage range	Switching status display	Cable length [ft]	Part No.	Type
	for MS4N-EE/DE	24 V DC	LED	8.2	151688	KMEB-1-24-2,5-LED
		24 V DC	LED	16.4	151689	KMEB-1-24-5-LED
		24 V DC	LED	32.8	193457	KMEB-1-24-10-LED
		230 V AC	–	8.2	151690	KMEB-1-230AC-2,5
		230 V AC	–	16.4	151691	KMEB-1-230AC-5

12 Ordering Data – Illuminating Seal MEB-LD			Technical data → www.festo.com/catalog/meb-ld		
	Description	Operating voltage range	Part No.	Type	
	for plug socket with cable KMEB and plug socket MSSD-EB	12 ... 24 V DC	151717	MEB-LD-12-24DC	
		230 V DC/AC ±10%	151718	MEB-LD-230AC	

15 Ordering Data – Locking Clip CPV18-HV				Technical data → www.festo.com/catalog/cpv18-hv	
	Description		Part No.	Type	PU ¹⁾
	for MS4N-EE/DE...-V24	Cover for manual override, the clip prevents actuation	530056	CPV18-HV	10


1) Packaging unit quantity


11 Ordering Data – Plug Socket with Cable SIM-M8				Technical data → www.festo.com/catalog/sim-m8	
	Electrical connection	Cable length [ft]	Part No.	Type	
	M8x1, 3-pin	8.2	159420	SIM-M8-3GD-2,5-PU	
		16.4	159421	SIM-M8-3GD-5-PU	
		32.8	192964	SIM-M8-3GD-10-PU	
	M8x1, 3-pin	8.2	159422	SIM-M8-3WD-2,5-PU	
		16.4	159423	SIM-M8-3WD-5-PU	
		32.8	192965	SIM-M8-3WD-10-PU	


Ordering Data – Plug Socket with Cable SIM-M12			Technical data → www.festo.com/catalog/sim-m12		
	Electrical connection	Cable length [ft]	Part No.	Type	
	M12x1, 4-pin	16.4	164259	SIM-M12-4GD-5-PU	
	M12x1, 4-pin	16.4	164258	SIM-M12-4WD-5-PU	

On-off/Soft-start Valves MS4N-EM1/EE/DL/DE – Inch Series

Accessories

9 Ordering Data – Pressure Gauge MA					Technical data → www.festo.com/catalog/ma	
	Nominal size	Pneumatic connection	Indicating range		Part No.	Type
			[bar]	[psi]		
	Pressure gauge MA, DIN EN 837-1					
	1.57	1/4 NPT	0 ... 16	0 ... 232	183908	MA-40-16-N1/4-EN
	Pressure gauge MA, DIN EN 837-1, with red-green range					
	1.57	1/8 NPT	–	0 ... 232	530388	MA-40-232-N1/8-PSI-E-RG
	1.97	1/4 NPT	–	0 ... 232	530391	MA-50-232-N1/4-PSI-E-RG

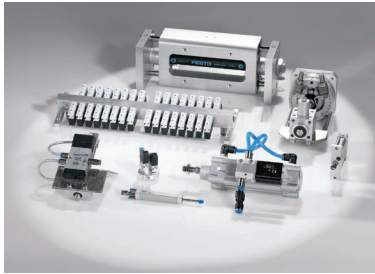
6 Ordering Data – Silencer U				Technical data → www.festo.com/catalog/u	
	Description	Pneumatic connection	Part No.	Type	
	for MS4N-EM1/EE	1/4 NPT	12639	U-1/4-B-NPT	

Ordering Data – Padlock LRV5-D				
	Description	Weight [lb]	Part No.	Type
	for regulators, filter/regulators and manual on-off valves	0.24	193786	LRV5-D

Product Range and Company Overview

A Complete Suite and Company Overview

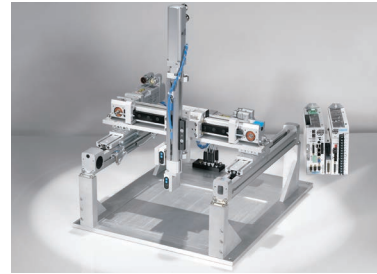
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Custom Automation Components
Complete custom engineered solutions



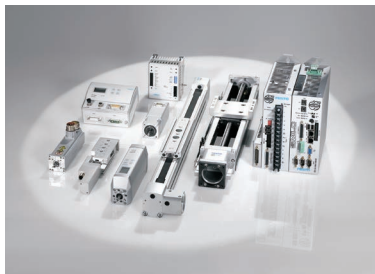
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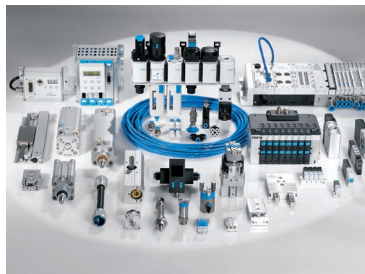
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Electromechanical actuators, motors, controllers & drivers



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