

Filter regulators MS-LFR, MS series

FESTO

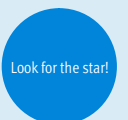


Festo core product range
Covers 80% of your automation tasks

Worldwide:
Superb:
Easy:

Always in stock
Festo quality at an attractive price
Reduces procurement and storing complexity

★ Generally ready for shipping ex works in 24 hours
Held in stock in 13 service centres worldwide
More than 2200 product
★ Generally ready for shipping ex works in 5 days
Assembled for you in 4 service centres worldwide
Up to 6 x 10¹² variants per product series



MS series service unit components

Key features



MS series service unit components

Solutions for every application

With its large product range, highly functional components and a wide choice of services, the MS series from Festo offers a complete concept for compressed air preparation. Suitable for simple standard applications as well as application-specific solutions to the highest quality standards.

Available as individual components, pre-assembled combinations ex-stock, application-specific combinations or complete turnkey solutions. The five sizes in the MS series achieve maximum flow rates with minimum space requirements.

Freely combinable function modules

Pressure regulators, on/off and soft-start valves with safety function, filter, pressure and flow sensors, dryers, sensors and lubricators. All these allow a suitable solution to be assembled for every task. Their modular structure means that the components

are freely combinable. A simple connection system saves time when replacing individual modules without dismantling the entire combination. What's more, many of the components are certified to UL and ATEX.

CAD models and configurator

Convenient aids for planning and selecting application-specific individual devices and combinations. The product configurator lets you configure customised solutions quickly and transfer the order data with no hassle.

Engineering tools

Selection tool for choosing the right service unit without oversizing, and with the right air quality class: www.festo.com/engineering/wartungseinheit



Integrated sensors

Pressure and flow sensors



- Maximum machine availability through controlled processes
- Reliable compressed air preparation and supply for systems
- Integrable or stand-alone
- Easy to connect with M8/M12 plug

Safety functions

Soft-start/quick exhaust valves
MS6-SV/MS9-SV



- Fast and reliable exhausting of systems up to Performance Level e, certified to EN ISO 13849-1
- Integrated soft-start function

Energy savings

Service units MSE6



- Fully automatic monitoring and regulation of compressed air supply
- Automatic shut-off of the compressed air in stand-by mode
- Detection and notification of leakages
- Condition monitoring of relevant process data

Intelligent mix of sizes



- Optimum flow rate with up to 18% smaller size
- Excellent energy efficiency
- Cost-optimised combinations – save up to 30%!

Size differences					
Size	MS2	MS4	MS6	MS9	MS12
Grid dimension [mm]	25	40	62	90	124
Port sizes	M5, QS-6	G1/8, G1/4, G3/8	G1/4, G3/8, G1/2, G3/4	G1/2, G3/4, G1, G1 1/4, G1 1/2	G1, G1 1/4, G1 1/2, G2
Standard nominal flow rate qnN ¹⁾ [l/min]	350	1800	6500	20000	22000

1) Using pressure regulator MS-LR as an example

MS series service unit components

Key features

Note
Information

The next few pages provide a brief overview of the complete product range for the MS series service unit components.

You can find detailed information and all of the technical data in the documentation for the corresponding service unit component.

Accessories such as connection plates or mounting brackets can be ordered either via the configurator or separately.





Structure of a service unit

The order of the individual components within a service unit is relevant for safety and functionality. It is not possible to assemble the service unit components in any order in the flow direction. There are restrictions and rules.

The configurator for service unit MSB is a reliable and convenient way of arranging individual service unit components. This ensures that the applicable rules are complied with. As a result, you get a completely assembled combination with UL or ATEX certification if you need it. When arranging a combination of individually configured and ordered service unit components, the points on the right must be adhered to under all circumstances.

- Regulators MS-LFR/LR/LRP/LRE are only permissible in the flow direction with the same or decreasing pressure regulation range
- Filters MS-LFR/LF/LFM/LFX are only permissible in the flow direction with an increasing grade of filtration
- Lubricators MS-LOE are not permitted in the flow direction upstream of a filter MS-LFR/LFM/LF/LFX, water separator MS-LWS or membrane air dryer MS-LDM1
- A micro filter MS-LFM must be installed upstream of an activated carbon filter MS-LFX or membrane air dryer MS-LDM1 in the flow direction
- A flow sensor SFAM cannot be installed directly downstream of a regulator MS-LFR/LR; a branching module MS-FRM must be positioned between them
- A soft-start/quick exhaust valve MS-SV must be the last service unit component in the flow direction






Total product range for MS series service unit components

Type	Description	Size	Pneumatic connection					
			Push-in connector	Female thread			Connection plate with thread	
				M	G	NPT	G	NPT
Combinations								
Service units MSB-FRC Technical data → Internet: msb								
	Combinations of filter regulator and lubricator	4	-	-	1/8, 1/4	-	-	-
		6	-	-	1/4, 3/8, 1/2	-	-	-
Service units MSB Technical data → Internet: msb								
	7 combinations, predefined	4	-	-	1/4	-	-	-
		6	-	-	1/2	-	-	-
	Combinations freely configurable	4	-	-	1/8, 1/4	-	1/8, 1/4, 3/8	1/8, 1/4, 3/8
		6	-	-	1/4, 3/8, 1/2	-	1/4, 3/8, 1/2, 3/4	1/4, 3/8, 1/2, 3/4
		9	-	-	3/4, 1	3/4, 1	1/2, 3/4, 1, 1 1/4, 1 1/2	1/2, 3/4, 1, 1 1/4, 1 1/2
Service units MSE6 Technical data → Internet: mse6								
	Combinations with fieldbus connection for measuring pressure, flow rate and consumption	6	-	-	-	-	1/2	-

MS series service unit components

Key features







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Total product range for MS series service unit components								
Type	Description	Size	Pneumatic connection					
			Push-in connector	Female thread			Connection plate with thread	
				M	G	NPT	G	NPT
Individual devices								
Filter regulators MS-LFR							Technical data → Internet: ms-lfr	
	Filter and pressure regulator in a single device, grade of filtration 5 or 40 µm	2	QS-6	M5	–	–	–	–
		4	–	–	1/8, 1/4	–	1/8, 1/4, 3/8	1/8, 1/4, 3/8
		6	–	–	1/4, 3/8, 1/2	–	1/4, 3/8, 1/2, 3/4	1/4, 3/8, 1/2, 3/4
		9	–	–	3/4, 1	3/4, 1	1/2, 3/4, 1, 1 1/4, 1 1/2	1/2, 3/4, 1, 1 1/4, 1 1/2
		12	–	–	–	–	1, 1 1/4, 1 1/2, 2	–
Filters MS-LF								
							Technical data → Internet: ms-lf	
	Grade of filtration 5 or 40 µm	4	–	–	1/8, 1/4	–	1/8, 1/4, 3/8	1/8, 1/4, 3/8
		6	–	–	1/4, 3/8, 1/2	–	1/4, 3/8, 1/2, 3/4	1/4, 3/8, 1/2, 3/4
		9	–	–	3/4, 1	3/4, 1	1/2, 3/4, 1, 1 1/4, 1 1/2	1/2, 3/4, 1, 1 1/4, 1 1/2
		12	–	–	–	–	1, 1 1/4, 1 1/2, 2	–
Fine and micro filters MS-LFM								
							Technical data → Internet: ms-lfm	
	Grade of filtration 0.01 or 1 µm	4	–	–	1/8, 1/4	–	1/8, 1/4, 3/8	1/8, 1/4, 3/8
		6	–	–	1/4, 3/8, 1/2	–	1/4, 3/8, 1/2, 3/4	1/4, 3/8, 1/2, 3/4
		9	–	–	3/4, 1	3/4, 1	1/2, 3/4, 1, 1 1/4, 1 1/2	1/2, 3/4, 1, 1 1/4, 1 1/2
		12	–	–	–	–	1, 1 1/4, 1 1/2, 2	–
Activated carbon filters MS-LFX								
							Technical data → Internet: ms-lfx	
	For removing liquid and gaseous oil particles	4	–	–	1/8, 1/4	–	1/8, 1/4, 3/8	1/8, 1/4, 3/8
		6	–	–	1/4, 3/8, 1/2	–	1/4, 3/8, 1/2, 3/4	1/4, 3/8, 1/2, 3/4
		9	–	–	3/4, 1	3/4, 1	1/2, 3/4, 1, 1 1/4, 1 1/2	1/2, 3/4, 1, 1 1/4, 1 1/2
		12	–	–	–	–	1, 1 1/4, 1 1/2, 2	–
Water separators MS-LWS								
							Technical data → Internet: ms-lws	
	Remove condensed water from compressed air, maintenance-free	6	–	–	1/4, 3/8, 1/2	–	1/4, 3/8, 1/2, 3/4	1/4, 3/8, 1/2, 3/4
		9	–	–	3/4, 1	3/4, 1	1/2, 3/4, 1, 1 1/4, 1 1/2	1/2, 3/4, 1, 1 1/4, 1 1/2
		12	–	–	–	–	1, 1 1/4, 1 1/2, 2	–

MS series service unit components

Key features










Total product range for MS series service unit components								
Type	Description	Size	Pneumatic connection					
			Push-in connector	Female thread			Connection plate with thread	
				M	G	NPT	G	NPT
Individual devices								
Pressure regulators MS-LR Technical data → Internet: ms-lr								
	For setting the required operating pressure, 4 pressure regulation ranges	2	QS-6	M5	–	–	–	–
		4	–	–	1/8, 1/4	–	1/8, 1/4, 3/8	1/8, 1/4, 3/8
		6	–	–	1/4, 3/8, 1/2	–	1/4, 3/8, 1/2, 3/4	1/4, 3/8, 1/2, 3/4
		9	–	–	3/4, 1	3/4, 1	1/2, 3/4, 1, 1 1/4, 1 1/2	1/2, 3/4, 1, 1 1/4, 1 1/2
		12	–	–	–	–	1, 1 1/4, 1 1/2, 2	–
Pressure regulators MS-LRB Technical data → Internet: ms-lrb								
	For creating a regulator manifold with independent pressure regulation ranges. Pressure output is to the front or rear.	4	–	–	1/4	–	1/8, 1/4, 3/8	–
		6	–	–	1/2	–	1/4, 3/8, 1/2, 3/4	–
Precision pressure regulators MS-LRP Technical data → Internet: ms-lrp								
	For precise setting of the required operating pressure, 4 pressure regulation ranges, pressure hysteresis 0.02 bar	6	–	–	1/4, 3/8, 1/2	–	1/4, 3/8, 1/2, 3/4	1/4, 3/8, 1/2, 3/4
Precision pressure regulators MS-LRPB Technical data → Internet: ms-lrpb								
	For configuring a regulator manifold with independent pressure regulation ranges. Pressure output is to the front or rear.	6	–	–	1/2	–	1/4, 3/8, 1/2, 3/4	–
Electrical pressure regulators MS-LRE Technical data → Internet: ms-lre								
	Electrically adjustable pressure regulator, 4 pressure regulation ranges	6	–	–	1/4, 3/8, 1/2	–	1/4, 3/8, 1/2, 3/4	1/4, 3/8, 1/2, 3/4
Lubricators MS-LOE Technical data → Internet: ms-loe								
	Add a precisely adjustable amount of oil to the compressed air. The oil mist component is proportional to the compressed air flow rate.	4	–	–	1/8, 1/4	–	1/8, 1/4, 3/8	1/8, 1/4, 3/8
		6	–	–	1/4, 3/8, 1/2	–	1/4, 3/8, 1/2, 3/4	1/4, 3/8, 1/2, 3/4
		9	–	–	3/4, 1	3/4, 1	1/2, 3/4, 1, 1 1/4, 1 1/2	1/2, 3/4, 1, 1 1/4, 1 1/2
		12	–	–	–	–	1, 1 1/4, 1 1/2, 2	–

MS series service unit components





Key features



Total product range for MS series service unit components								
Type	Description	Size	Pneumatic connection					
			Push-in connector	Female thread			Connection plate with thread	
				M	G	NPT	G	NPT
Individual devices								
On/off valves MS-EM Technical data → Internet: ms-em								
	Manually operated on/off valve for pressurising and exhausting pneumatic installations.	4	–	–	1/8, 1/4	–	1/8, 1/4, 3/8	1/8, 1/4, 3/8
		6	–	–	1/4, 3/8, 1/2	–	1/4, 3/8, 1/2, 3/4	1/4, 3/8, 1/2, 3/4
		9	–	–	3/4, 1	3/4, 1	1/2, 3/4, 1, 1 1/4, 1 1/2	1/2, 3/4, 1, 1 1/4, 1 1/2
		12	–	–	–	–	1, 1 1/4, 1 1/2, 2	–
On/off valves MS-EE Technical data → Internet: ms-ee								
	Solenoid actuated on/off valve for pressurising and exhausting pneumatic installations.	4	–	–	1/8, 1/4	–	1/8, 1/4, 3/8	1/8, 1/4, 3/8
		6	–	–	1/4, 3/8, 1/2	–	1/4, 3/8, 1/2, 3/4	1/4, 3/8, 1/2, 3/4
		9	–	–	3/4, 1	3/4, 1	1/2, 3/4, 1, 1 1/4, 1 1/2	1/2, 3/4, 1, 1 1/4, 1 1/2
		12	–	–	–	–	1, 1 1/4, 1 1/2, 2	–
Soft-start valves MS-DL Technical data → Internet: ms-dl								
	Pneumatically actuated soft-start valve for slowly pressurising and exhausting pneumatic installations.	4	–	–	1/8, 1/4	–	1/8, 1/4, 3/8	1/8, 1/4, 3/8
		6	–	–	1/4, 3/8, 1/2	–	1/4, 3/8, 1/2, 3/4	1/4, 3/8, 1/2, 3/4
		12	–	–	–	–	1, 1 1/4, 1 1/2, 2	–
Soft-start valves MS-DE Technical data → Internet: ms-de								
	Solenoid actuated soft-start valve for slowly pressurising and exhausting pneumatic installations.	4	–	–	1/8, 1/4	–	1/8, 1/4, 3/8	1/8, 1/4, 3/8
		6	–	–	1/4, 3/8, 1/2	–	1/4, 3/8, 1/2, 3/4	1/4, 3/8, 1/2, 3/4
		12	–	–	–	–	1, 1 1/4, 1 1/2, 2	–
Soft-start/quick exhaust valves MS-SV Technical data → Internet: ms-sv								
	For building up pressure gradually and reducing pressure quickly and safely in pneumatic piping systems. Up to category 1, PL c.	6	–	–	1/2	–	1/4, 3/8, 1/2, 3/4	1/4, 3/8, 1/2, 3/4
		9	–	–	3/4, 1	3/4, 1	1/2, 3/4, 1, 1 1/4, 1 1/2	1/2, 3/4, 1, 1 1/4, 1 1/2
	Up to category 3, PL d. Up to category 4, PL e in the case of optional extension.	6	–	–	1/2	–	1/4, 3/8, 1/2, 3/4	1/4, 3/8, 1/2, 3/4
	Up to category 4, PL e.	6	–	–	1/2	–	1/4, 3/8, 1/2, 3/4	–

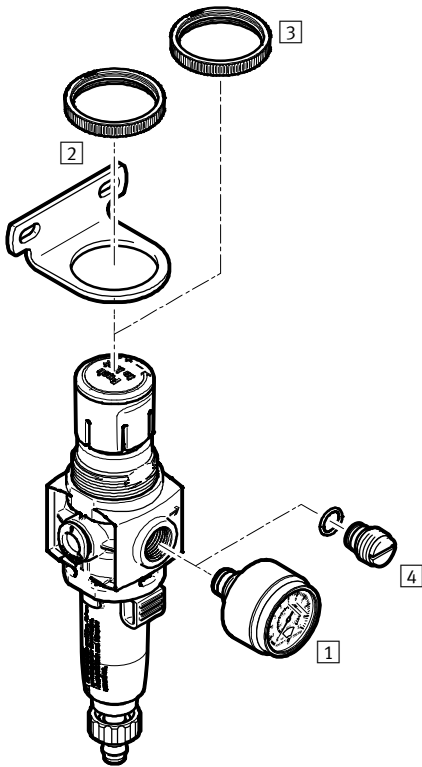
MS series service unit components

Key features

Total product range for MS series service unit components								
Type	Description	Size	Pneumatic connection					
			Push-in connector	Female thread			Connection plate with thread	
				M	G	NPT	G	NPT
Individual devices								
Membrane air dryers MS-LDM1							Technical data → Internet: ms-ldm	
	Wear-free membrane dryer with internal air consumption	4	-	-	1/8, 1/4	-	1/8, 1/4, 3/8	1/8, 1/4, 3/8
		6	-	-	1/4, 3/8, 1/2	-	1/4, 3/8, 1/2, 3/4	1/4, 3/8, 1/2, 3/4
Branching modules MS-FRM								
							Technical data → Internet: ms-frm	
	Compressed air distributor with 4 connections	4	-	-	1/8, 1/4	-	1/8, 1/4, 3/8	-
		6	-	-	1/4, 3/8, 1/2	-	1/4, 3/8, 1/2, 3/4	-
		9	-	-	3/4, 1	3/4, 1	1/2, 3/4, 1, 1 1/4, 1 1/2	1/2, 3/4, 1, 1 1/4, 1 1/2
		12	-	-	-	-	1, 1 1/4, 1 1/2, 2	-
Distributor blocks MS-FRM-FRZ								
							Technical data → Internet: ms-frm-frz	
	Compressed air distributor with 4 connections and half the grid dimension width	4	-	-	-	-	-	-
		6	-	-	-	-	-	-
Flow sensors SFAM								
							Technical data → Internet: sfam	
	For absolute flow rate information and accumulated air consumption measurement	6	-	-	-	-	1/2	1/2
		9	-	-	-	-	1, 1 1/2	1, 1 1/2

Filter regulators MS2-LFR, MS series

Peripherals overview



Mounting components and accessories		→ Page/Internet
1	Pressure gauge PAGN	57
2	Mounting bracket MS2-WR	For wall mounting, knurled nut included in scope of delivery 58
3	Nut MS2-WRS	For front panel mounting 58
4	Plug screw MS2-G18S	59
-	Filter cartridge LFP	59

Filter regulators MS2-LFR, MS series

Type codes

MS 2 - LFR - M5 - D6 - AR - BAR - C - M - B

Series

MS	Standard service unit
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Size

2	Grid dimension 25 mm
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Service function

LFR	Filter regulator
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Pneumatic connection

M5	Female thread M5
QS6	Push-in connector for tubing O.D. 6 mm

Pressure regulation range

D6	Pressure regulation range 0.5 ... 7 bar
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Pressure gauge/adaptor

AR	Pressure gauge
A8	Adapter for EN pressure gauge 1/8, without pressure gauge

Pressure gauge scale

	None
BAR	Display unit [bar/psi]
MPA	Display unit [MPa]

Grade of filtration

C	5 µm
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Condensate drain

M	Manual rotary
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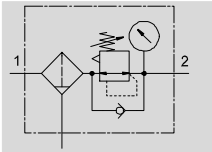
Version

B	Basic
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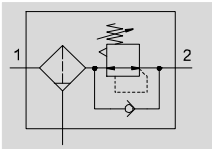
Filter regulators MS2-LFR, MS series




Technical data

With pressure gauge



Without pressure gauge



-  - Flow rate
140 ... 310 l/min
-  - Temperature range
-5 ... +50 °C
-  - Operating pressure
1 ... 10 bar



General technical data		
	With pressure gauge	With adapter for EN pressure gauge 1/8, without pressure gauge
Pneumatic connection 1, 2	M5 QS-6	
Design	Filter regulator with pressure gauge	Filter regulator without pressure gauge
Regulating function	Output pressure constant, with return flow action, with secondary venting	
Type of mounting	With accessories In-line installation Front panel mounting	
Mounting position	Vertical ±5°	
Grade of filtration [µm]	5	
Air quality class at the outlet	Compressed air to ISO 8573-1:2010 [6:4:4]	
Condensate drain	Manual rotary	
Actuator lock	Rotary knob with detent	
Pressure regulation range [bar]	0.5 ... 7	
Max. pressure hysteresis [bar]	0.25	
Pressure indicator	With pressure gauge	G1/8 prepared
Max. condensate volume [ml]	3	

Characteristic flow rate values		
Pneumatic connection 1, 2	M5	QS-6
Standard nominal flow rate [l/min] qn ¹⁾	140	310

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

Filter regulators MS2-LFR, MS series

Technical data

Operating and environmental conditions		
Pneumatic connection 1, 2	M5	QS-6
Operating pressure [bar]	1 ... 10	1 ... 8
Operating medium	Compressed air to ISO 8573-1:2010 [7:4:4]	
	Inert gases	
Ambient temperature [°C]	-5 ... +50	
Temperature of medium [°C]	-5 ... +50	
Storage temperature [°C]	-5 ... +50	
Corrosion resistance class CRC ¹⁾	1	

1) Corrosion resistance class CRC 1 to Festo standard FN 940070

Low corrosion stress. For dry indoor applications or transport and storage protection. Also applies to parts behind covers, in the non-visible interior area, and parts which are covered in the application (e.g. drive trunnions).

Weights [g]		
Pneumatic connection 1, 2	M5	QS-6
With pressure gauge	47.3	45
Without pressure gauge	42.3	40

Materials	
Housing	PA
Rotary knob	POM
Bowl	PC
Filter	PE
Separating disc	POM
Valve tappet	Wrought aluminium alloy, NBR
Diaphragm	NBR
Spring	High-alloy steel
Seals	NBR
Note on materials	RoHS-compliant

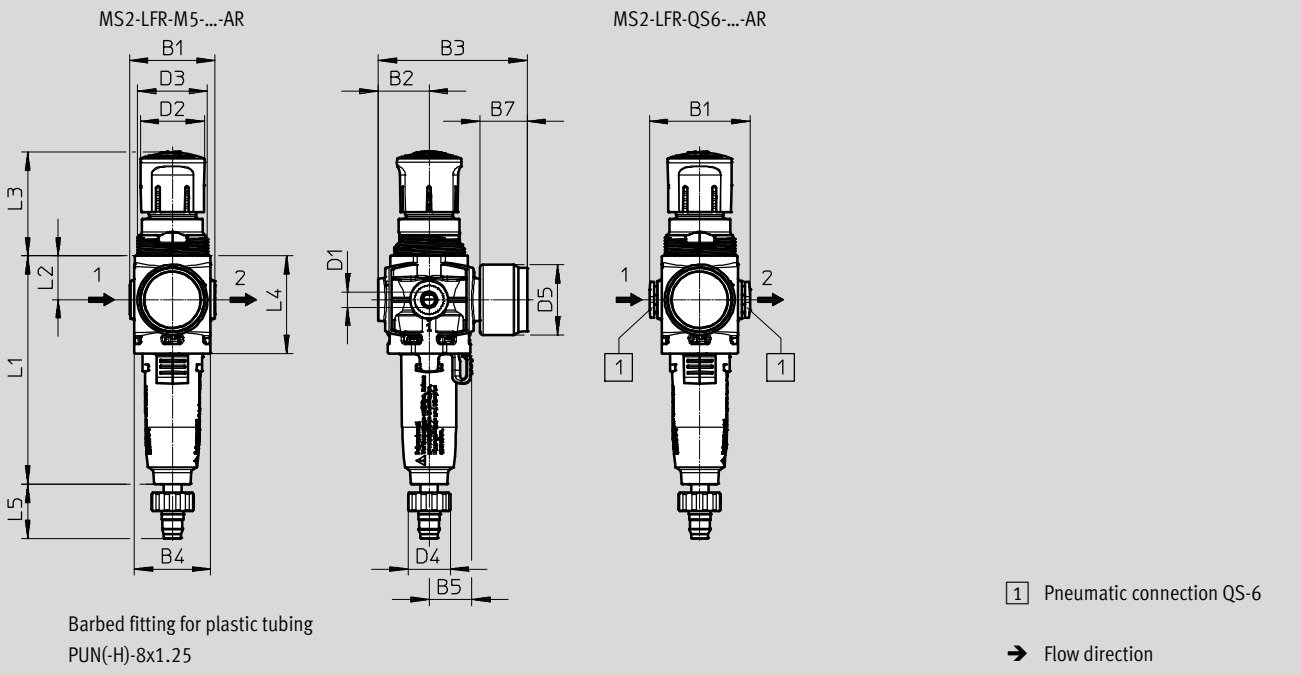
Filter regulators MS2-LFR, MS series

Technical data

Dimensions

Download CAD data → www.festo.com

With pressure gauge AR



Type	B1	B2	B3	B4	B5	B7	D1	D2 ∅	D3 ∅	D4	D5 ∅	L1	L2	L3	L4	L5
MS2-LFR-M5-...-AR	28	16.7	49	25	14	15.5	M5	21	M23x1	13.8	23	74.9	14.4	34.1	32	17.9
MS2-LFR-QS6-...-AR	33.1						QS-6									

Filter regulators MS2-LFR, MS series

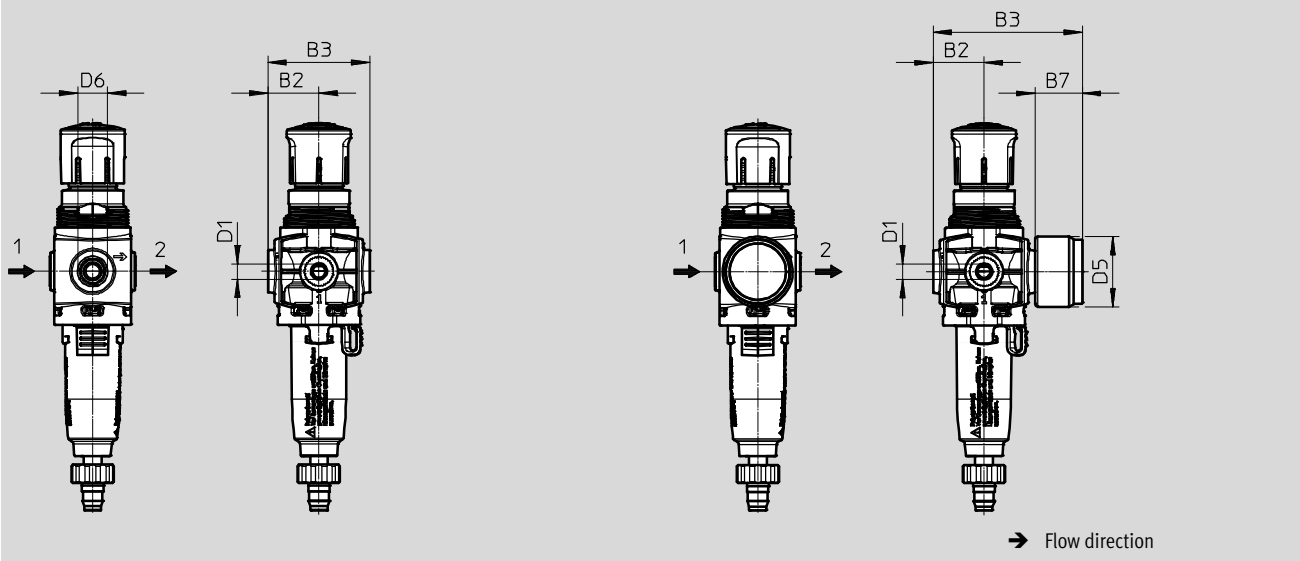
Technical data

Dimensions

Download CAD data → www.festo.com

With adapter A8 for EN pressure gauge 1/8, without pressure gauge

With pressure gauge AR



Type	B2	B3	B7	D1	D5 Ø	D6
MS2-LFR-M5-...-A8	16.7	33.4	-	M5	-	G1/8
MS2-LFR-QS6-...-A8				QS-6		
MS2-LFR-M5-...-AR	16.7	49	15.5	M5	23	-
MS2-LFR-QS6-...-AR				QS-6		

Ordering data

Pressure regulation range 0.5 ... 7 bar, rotary knob with detent

Size	Pneumatic connection 1, 2	Condensate drain	Part No.	Type
Pressure gauge, display unit [bar/psi]				
MS2	M5	Manual rotary	8086641	MS2-LFR-M5-D6-AR-BAR-C-M-B
	QS-6	Manual rotary	8086644	MS2-LFR-QS6-D6-AR-BAR-C-M-B
Pressure gauge, display unit [MPa]				
MS2	M5	Manual rotary	8086642	MS2-LFR-M5-D6-AR-MPA-C-M-B
	QS-6	Manual rotary	8086645	MS2-LFR-QS6-D6-AR-MPA-C-M-B
Adapter for EN pressure gauge 1/8, without pressure gauge				
MS2	M5	Manual rotary	8086643	MS2-LFR-M5-D6-A8-C-M-B
	QS-6	Manual rotary	8086646	MS2-LFR-QS6-D6-A8-C-M-B

Filter regulators MS4/MS6-LFR, MS series

Peripherals overview

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Mounting attachments and accessories						
		Individual device		Combination		→ Page/ Internet
		Without connecting plate	With connecting plate	Without connecting plate	With connecting plate	
1	Cover cap MS4/6-END	■	-	■	-	ms4-end, ms6-end
2	Connecting plate-SET MS4/6-AG...	-	■	-	■	ms4-ag, ms6-ag
	Connecting plate-SET MS4/6-AQ...	-	■	-	■	ms4-aq, ms6-aq
3	Module connector MS4/6-MV	-	■	■	■	ms4-mv, ms6-mv
4	Mounting bracket MS4/6-WB	■	■	-	-	ms4-wb, ms6-wb
5	Mounting bracket MS4-WBM	■	■	-	-	ms4-wbm
6	Mounting bracket MS4/6-WR	■	■	-	-	ms4-wr, ms6-wr
7	Hex nut MS4/6-WRS	■	■	■	■	ms4-wrs, ms6-wrs
8	Cover plate VS	■	■	■	■	32
9	Adapter plate for EN pressure gauge 1/8/1/4 A8/A4	■	■	■	■	32
10	Pressure gauge MA	■	■	■	■	61
11	Pressure sensor without display AD7 ... AD10	■	■	■	■	32
12	Connecting cable NEBU-M8...-LE3	■	■	■	■	61
13	Pressure sensor with display AD1 ... AD4	■	■	■	■	32
14	Connecting cable NEBU-M8...-LE3/NEBU-M12...-LE4	■	■	■	■	61
15	Fully automatic condensate drain, electrically actuated E2/E3/E4	■	■	■	■	32
16	Padlock LRVS-D	■	■	■	■	61
-	Mounting bracket MS4/6-WP/WPB/WPE/WPM	-	■	■	■	ms4-wp, ms6-wp

Filter regulators MS4/MS6-LFR, MS series

Type codes

MS 6 - LFR - 1/2 - D7 - E R M - AS -

Series	
MS	Standard service unit

Size	
4	Grid dimension 40 mm
6	Grid dimension 62 mm

Service function	
LFR	Filter regulator

Pneumatic connection	
MS4	
1/8	Female thread G1/8
1/4	Female thread G1/4
MS6	
1/4	Female thread G1/4
3/8	Female thread G3/8
1/2	Female thread G1/2

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

Grade of filtration	
C	5 µm
E	40 µm

Bowl guard	
R	Plastic bowl guard
U	Integrated as metal bowl

Condensate drain	
M	Manual rotary
V	Fully automatic

Security	
AS	Rotary knob with detent, lockable via accessories

Flow direction	
	Flow direction from left to right
Z	Flow direction from right to left

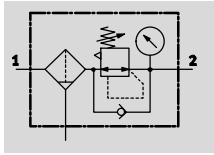
Additional variants can be ordered using the modular system → 32

- Pneumatic connection
- Pressure regulation range
- Condensate drain
- Pressure gauge alternatives
- Alternative pressure gauge scale
- Secondary venting
- Rotary knob
- Security
- Type of mounting
- EU certification
- UL certification

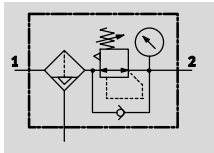
Filter regulators MS4/MS6-LFR, MS series

Technical data





Manual rotary condensate drain, with pressure gauge



Semi or fully automatic condensate drain, with pressure gauge




With this device, the filter and pressure regulator are combined into a single unit. The sintered filter with water separator removes contamination, pipe sinter, rust and condensate from the compressed air.

-  - Flow rate
850 ... 7,200 l/min
-  - Temperature range
-10 ... +60 °C
-  - Operating pressure
0.8 ... 20 bar
-  - www.festo.com



- Good regulation characteristics with low hysteresis and primary pressure compensation
- Good particle and condensate separation
- Available with or without secondary venting
- High flow rate
- Directly-actuated diaphragm regulator
- Four pressure regulation ranges: 0.3 ... 4 bar, 0.3 ... 7 bar, 0.5 ... 12 bar and 0.5 ... 16 bar
- Regulator lock for protecting the values against adjustment
- Two pressure gauge connections for different fitting options
- Return flow option for exhausting from output 2 to output 1 already integrated
- Optional pressure sensor
- Optional device variant EX4 for use in potentially explosive areas in zones 1, 2, 21 and 22
- Choice of filter cartridges: 5 µm or 40 µm
- New filter cartridges → 60

General technical data		
Size	MS4	MS6
Pneumatic connection 1, 2	Female thread	G1/8 or G1/4
	Connecting plate AG...	G1/8, G1/4 or G3/8
	Connecting plate AQ...	NPT1/8, NPT1/4 or NPT3/8
Constructional design	Filter regulator with/without pressure display	
Regulating function	Output pressure constant, with return flow action, with/without secondary venting	
Type of mounting	Via accessories	
	In-line installation	
	Front panel mounting	
Mounting position	Vertical ±5°	
Grade of filtration [µm]	5	
	40	
Air purity class at the output	Compressed air in accordance with ISO 8573-1:2010 [6:4:4] (Grade of filtration 5 µm)	
	Compressed air in accordance with ISO 8573-1:2010 [7:4:4] (Grade of filtration 40 µm)	
Bowl guard	Plastic bowl guard	
	Integrated as metal bowl	
Condensate drain	Manual rotary	
	Semi-automatic	
	Fully automatic	
	-	Fully automatic, electrically actuated
Regulator lock	Rotary knob with detent, lockable via accessories	
	Rotary knob with integrated lock	

-  - Note: This product conforms to ISO 1179-1 and to ISO 228-1

Filter regulators MS4/MS6-LFR, MS series

FESTO

Technical data

General technical data		
Size	MS4	MS6
Pressure regulation range	D5 [bar]	0.3 ... 4
	D6 [bar]	0.3 ... 7
	D7 [bar]	0.5 ... 12 (0.5 ... 10 with pressure sensor variant AD... or with UL certification)
	D8 [bar]	–
Max. hysteresis	[bar]	0.25
Pressure display	Via pressure sensor for displaying output pressure via LCD display and electrical output	
	Via pressure sensor for displaying output pressure via operational status indicator and electrical output	
	Via pressure gauge for displaying output pressure	
	Via pressure gauge with red/green scale for displaying output pressure	
	G ¹ / ₈ prepared	–
G ¹ / ₄ prepared		
Max. condensate volume	[cm ³]	19 (with plastic bowl guard) 25 (with metal bowl)
		38

Standard nominal flow rate q _{nN} ¹⁾ [l/min]						
Size	MS4			MS6		
Pneumatic connection	G ¹ / ₈	G ¹ / ₄		G ¹ / ₄	G ³ / ₈	G ¹ / ₂
D5 – Pressure regulation range 0.3 ... 4 bar						
Grade of filtration	5 µm	900 ²⁾	1,800 ²⁾	2,000 ²⁾	5,500 ²⁾	6,900 ²⁾
	40 µm	1,100 ²⁾	1,900 ²⁾	2,200 ²⁾	6,000 ²⁾	7,200 ²⁾
D6 – Pressure regulation range 0.3 ... 7 bar						
Grade of filtration	5 µm	900	1,500	2,700	5,000	5,600
	40 µm	1,000	1,700	2,800	5,700	6,200
D7 – Pressure regulation range 0.5 ... 12 bar						
Grade of filtration	5 µm	850	1,200	2,200	3,500	4,000
	40 µm	900	1,500	2,500	4,000	4,500
D8 – Pressure regulation range 0.5 ... 16 bar						
Grade of filtration	5 µm	–	–	2,000	3,300	3,800
	40 µm	–	–	2,300	3,500	4,000

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

2) Measured at p₁ = 10 bar and p₂ = 3 bar, Δp = 1 bar

· † - 125 l/min must be available for the fully automatic condensate drain to close correctly.

Filter regulators MS4/MS6-LFR, MS series

Technical data

Operating and environmental conditions							
Condensate drain	Manual rotary M		Semi-automatic H		Fully automatic V		Fully automatic, electrical E2/E3/E4
Size	MS4	MS6	MS4	MS6	MS4	MS6	MS6
Operating pressure [bar]	0.8 ... 14 (0.8 ... 10) ¹⁾	0.8 ... 20 (0.8 ... 10) ¹⁾	1.5 ... 12 (1.5 ... 10) ¹⁾	1.5 ... 12 (1.5 ... 10) ¹⁾	2 ... 12 (2 ... 10) ¹⁾	2 ... 12 (2 ... 10) ¹⁾	0.8 ... 16 (0.8 ... 10) ¹⁾
Operating medium	Compressed air in accordance with ISO 8573-1:2010 [-:4:-]		Compressed air in accordance with ISO 8573-1:2010 [-:4:-]		Compressed air in accordance with ISO 8573-1:2010 [7:4:-]		Compressed air in accordance with ISO 8573-1:2010 [-:4:-]
	Inert gases						
Ambient temperature [°C]	-10 ... +60 (0 ... +50) ²⁾		+5 ... +60 (+5 ... +50) ²⁾		+5 ... +60 (+5 ... +50) ²⁾		+1 ... +60 (+1 ... +50) ²⁾
Temperature of medium [°C]	-10 ... +60 (0 ... +50) ²⁾		+5 ... +60 (+5 ... +50) ²⁾		+5 ... +60 (+5 ... +50) ²⁾		+1 ... +60 (+1 ... +50) ²⁾
Storage temperature [°C]	-10 ... +60		-10 ... +60		-10 ... +60		+1 ... +60
Corrosion resistance class CRC ³⁾	2						
Food-safe ⁴⁾	See supplementary material information						-
UL certification ⁴⁾	cULus recognized (OL)						

1) Value in brackets applies to MS4/MS6-LFR with UL certification.

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

3) Corrosion resistance class CRC 2 to Festo standard FN 940070

Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.

4) Additional information www.festo.com/sp → Certificates.

ATEX	
EU certification	EX4
ATEX category gas	II 2G
Ex-ignition protection type gas	Ex h IIC T6 Gb X
ATEX category dust	II 2D
EX-ignition protection type dust	Ex h IIIC T60°C Db X
ATEX ambient temperature	+5 °C ≤ Ta ≤ +60 °C
CE mark (see declaration of conformity) ¹⁾	To EU Explosion Protection Directive (ATEX)

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

Weight [g]				
Size	MS4		MS6	
	Without integrated lock E11	With integrated lock E11	Without integrated lock E11	With integrated lock E11
Filter regulator with plastic bowl guard R	275	400	875	1,145
Filter regulator with metal bowl U	475	600	1,087	1,627
Filter regulator with metal bowl U and fully automatic condensate drain, electrically actuated E2/E3/E4	-	-	1,800	2,070

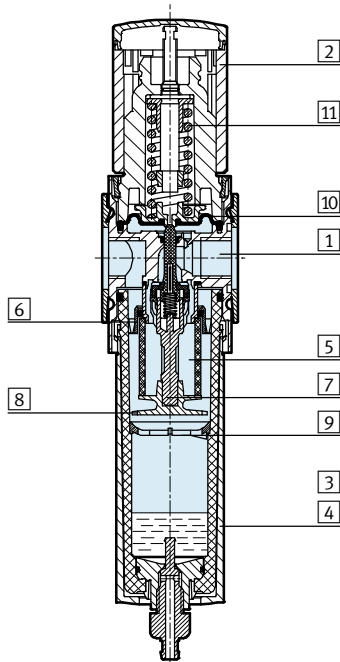
Filter regulators MS4/MS6-LFR, MS series

Technical data



Materials

Sectional view



Filter regulator		
1	Housing	Die-cast aluminium
2	Rotary knob	PA/POM
	Rotary knob with integrated lock E11	Aluminium
3	Plastic bowl guard	PC
4	Metal bowl	Wrought aluminium alloy, die-cast aluminium
	Inspection window	PA
5	Filter element	PE
6	Spin disc	POM
7	Filter holder	POM
8	Separating plate	POM
9	Stabilising disc	POM
10	Diaphragm	NBR
11	Spring	Steel
-	Seals	NBR
Note on materials		RoHS-compliant
		Free of copper and PTFE only with cover plate VS

Standard flow rate q_n as a function of output pressure p_2

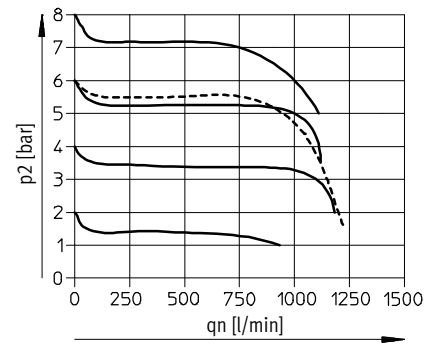
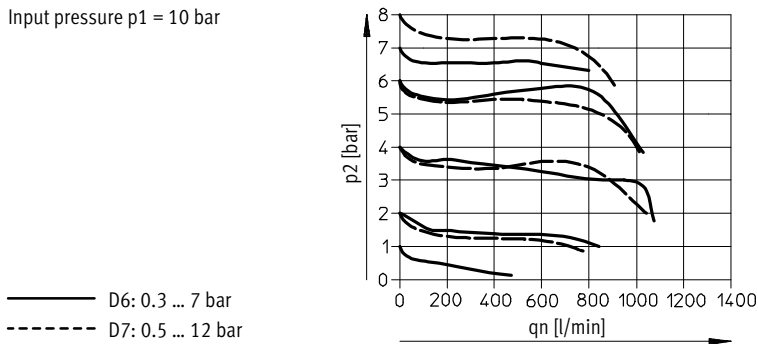
Pressure regulation range D6 or D7

Grade of filtration 5 μm

Grade of filtration 40 μm

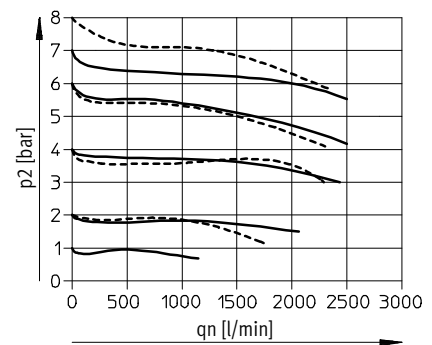
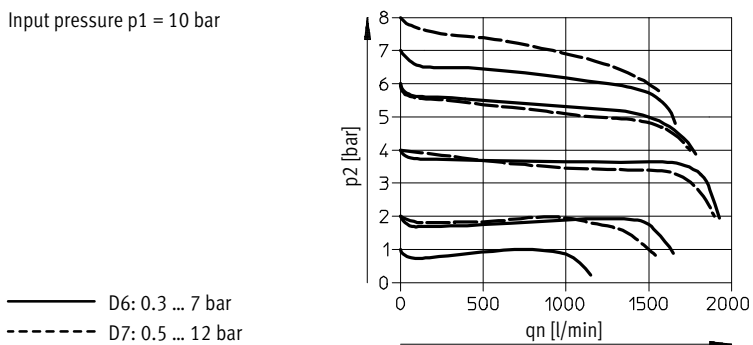
MS4-LFR-1/8

Input pressure $p_1 = 10$ bar



MS4-LFR-1/4

Input pressure $p_1 = 10$ bar



Filter regulators MS4/MS6-LFR, MS series

Technical data

Standard flow rate q_n as a function of output pressure p_2

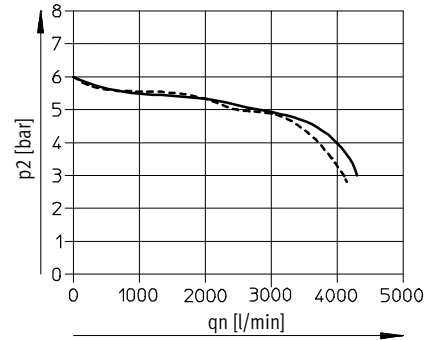
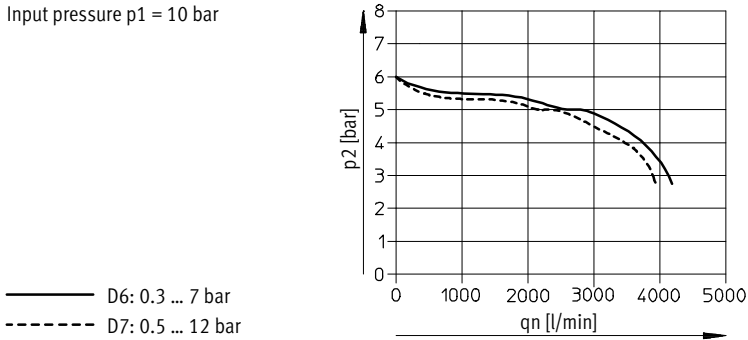
Pressure regulation range D6 or D7

Grade of filtration 5 μm

Grade of filtration 40 μm

MS6-LFR- $\frac{1}{4}$

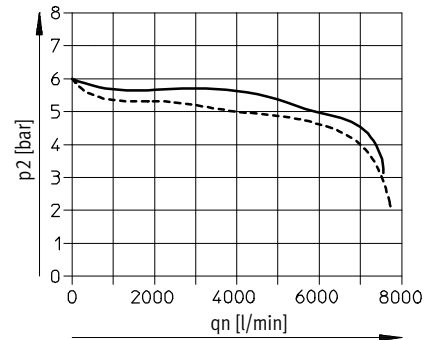
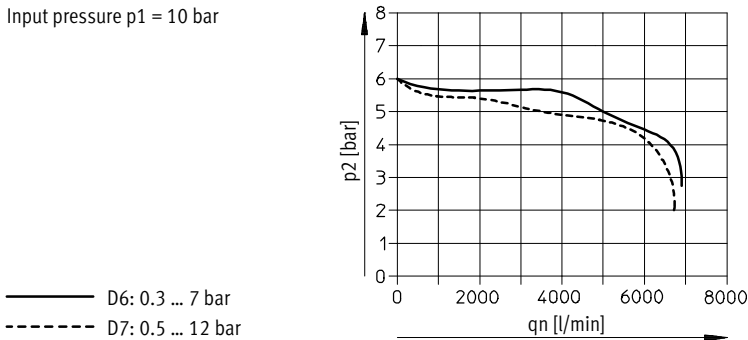
Input pressure $p_1 = 10$ bar



— D6: 0.3 ... 7 bar
- - - D7: 0.5 ... 12 bar

MS6-LFR- $\frac{3}{8}$

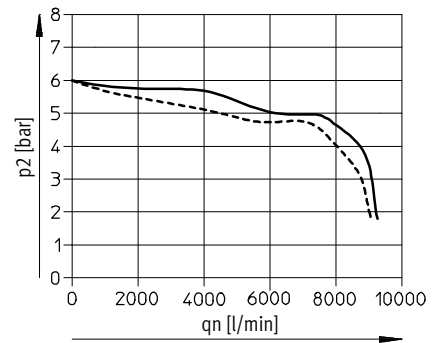
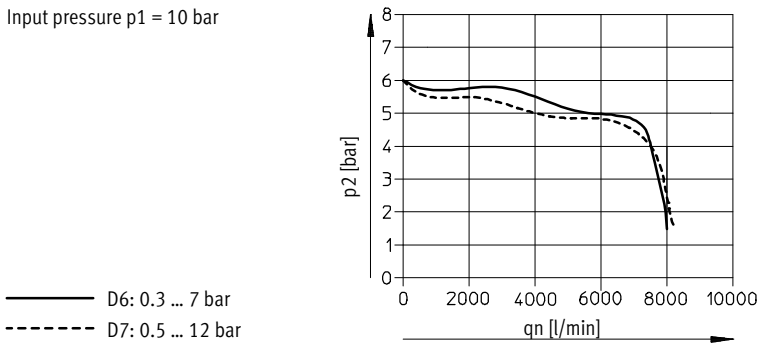
Input pressure $p_1 = 10$ bar



— D6: 0.3 ... 7 bar
- - - D7: 0.5 ... 12 bar

MS6-LFR- $\frac{1}{2}$

Input pressure $p_1 = 10$ bar



— D6: 0.3 ... 7 bar
- - - D7: 0.5 ... 12 bar

Filter regulators MS4/MS6-LFR, MS series

Technical data



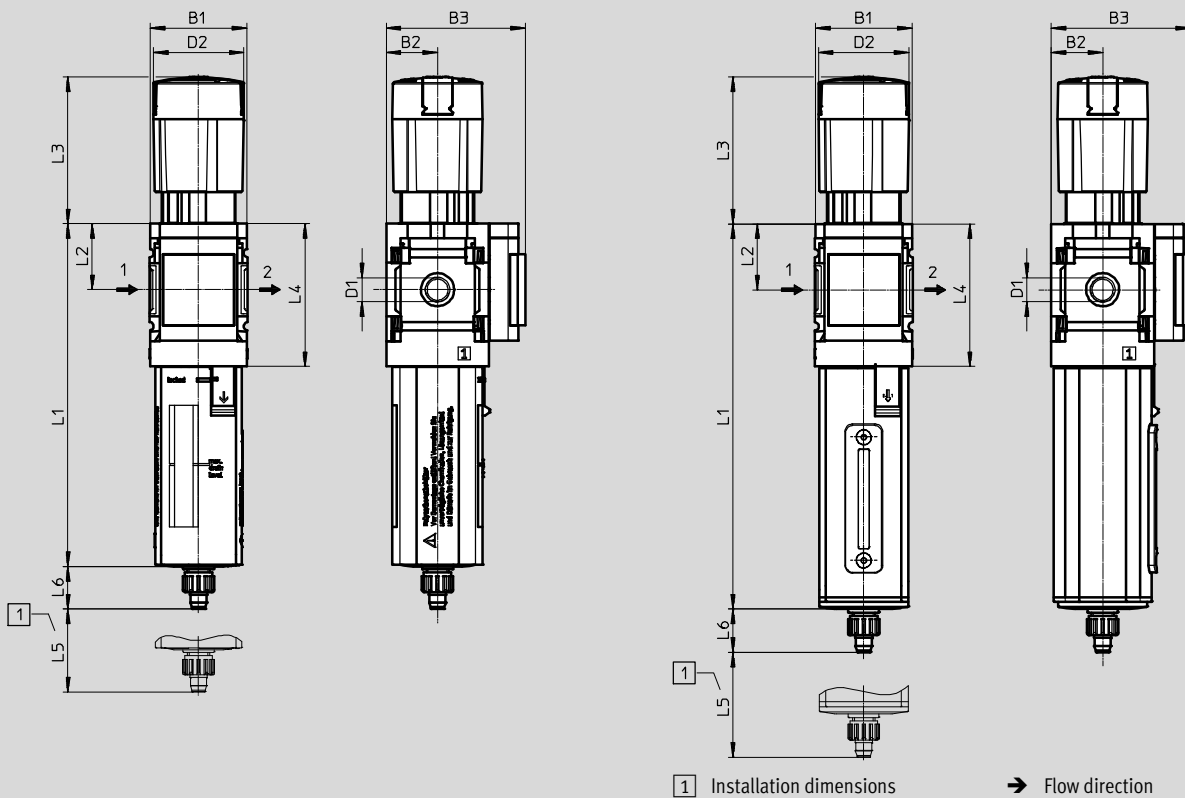
Dimensions – Basic version MS4-LFR

Download CAD data → www.festo.com

Integrated MS pressure gauge with standard scale, manual rotary condensate drain, rotary knob with detent, lockable via accessories

With plastic bowl guard R

With metal bowl U



Type	B1	B2	B3	D1	D2	L1		L2	L3	L4	L5	L6
						Plastic bowl guard	Metal bowl					
MS4-LFR-1/8	40	21	57	G1/8	37.2	140.6	158	27	60.2	58.5	25	17.7
MS4-LFR-1/4				G1/4								

• Note: This product conforms to ISO 1179-1 and to ISO 228-1

Filter regulators MS4/MS6-LFR, MS series

Technical data



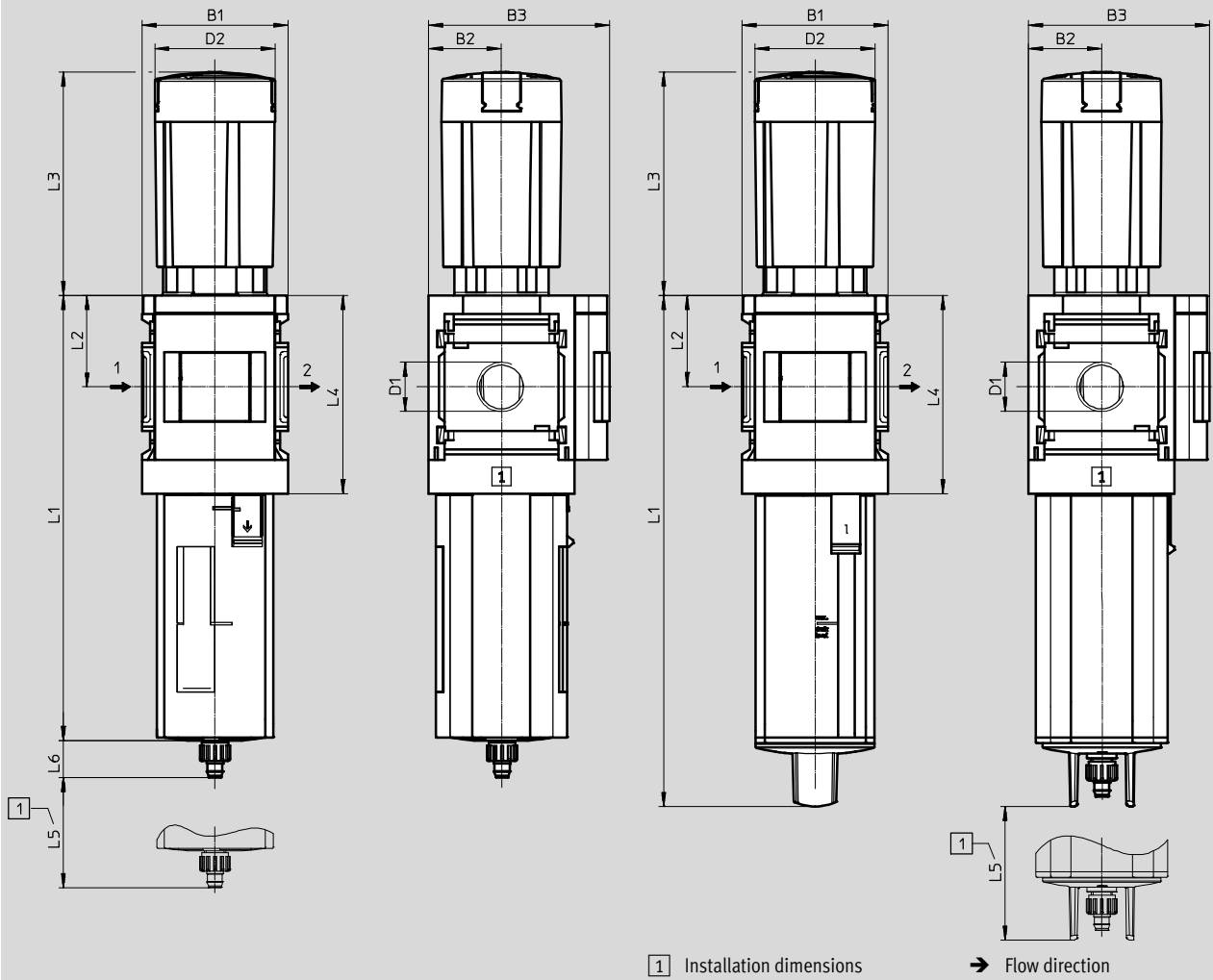
Dimensions – Basic version MS6-LFR

Download CAD data → www.festo.com

Integrated MS pressure gauge with standard scale, manual rotary condensate drain, rotary knob with detent, lockable via accessories

With plastic bowl guard R

With metal bowl U



Type	B1	B2	B3	D1	D2	L1		L2	L3	L4	L5	L6
						Plastic bowl guard	Metal bowl					
MS6-LFR-1/4	62	31	77	G1/4	51.2	190	218	39	95.1	85	68	15.8
MS6-LFR-3/8				G3/8								
MS6-LFR-1/2				G1/2								

• Note: This product conforms to ISO 1179-1 and to ISO 228-1

Filter regulators MS4/MS6-LFR, MS series

Technical data

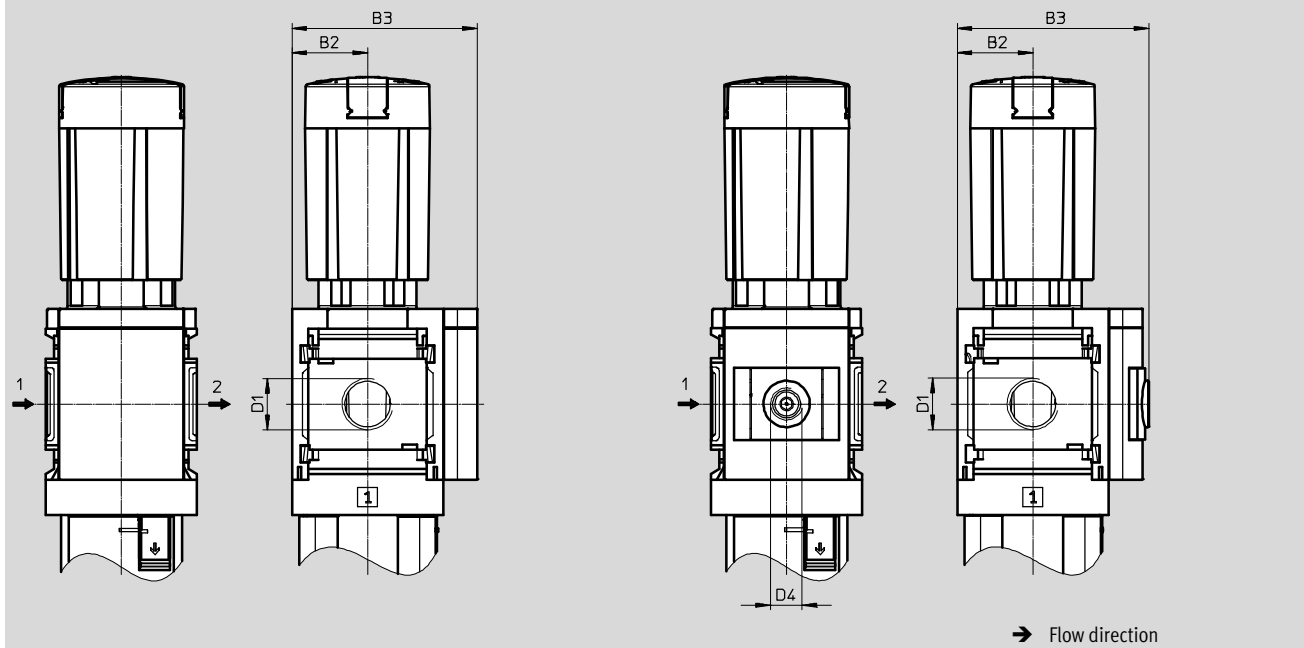
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Dimensions – Pressure gauge alternatives

Download CAD data → www.festo.com

Cover plate VS

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



Type	B2	B3	D1	D4
MS4-LFR-1/8-...-VS	21	54	G1/8	-
MS4-LFR-1/4-...-VS			G1/4	
MS4-LFR-1/8-...-A8	21	58.5	G1/8	G1/8
MS4-LFR-1/4-...-A8			G1/4	
MS4-LFR-1/8-...-A4	21	58.5	G1/8	G1/4
MS4-LFR-1/4-...-A4			G1/4	
MS6-LFR-1/4-...-VS	31	76	G1/4	-
MS6-LFR-3/8-...-VS			G3/8	
MS6-LFR-1/2-...-VS			G1/2	
MS6-LFR-1/4-...-A4	31	78.5	G1/4	G1/4
MS6-LFR-3/8-...-A4			G3/8	
MS6-LFR-1/2-...-A4			G1/2	

· || · Note: This product conforms to ISO 1179-1 and to ISO 228-1

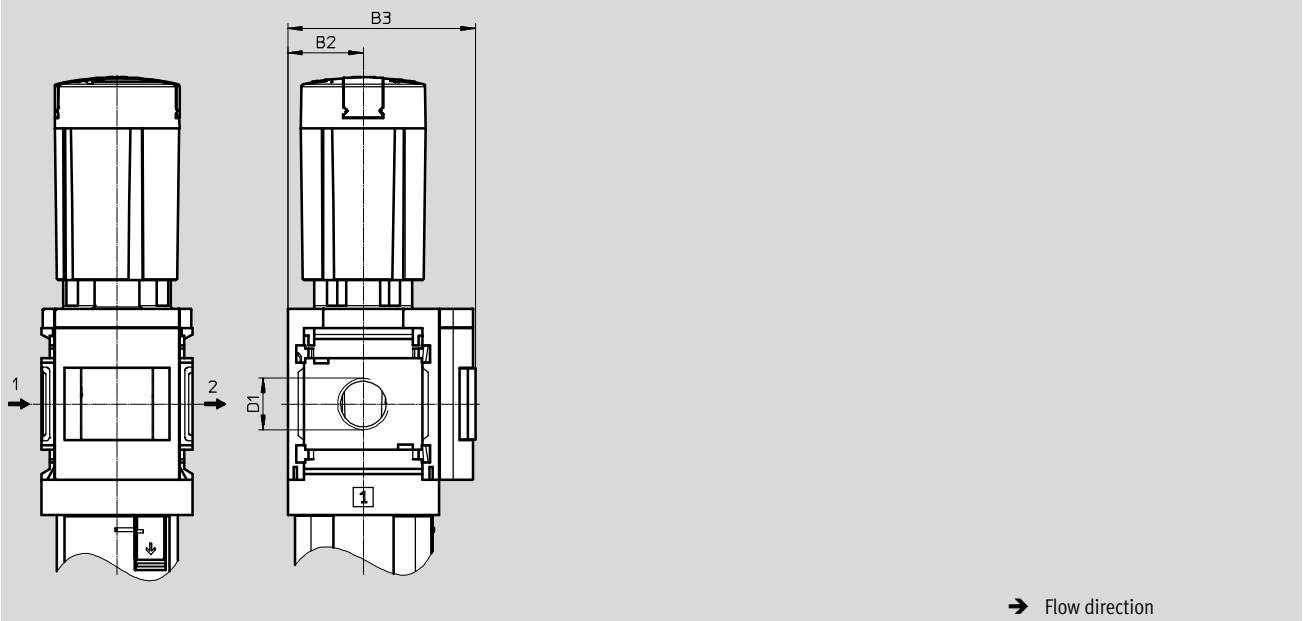
Filter regulators MS4/MS6-LFR, MS series

Technical data

Dimensions – Pressure gauge alternatives

Download CAD data → www.festo.com

Integrated MS pressure gauge with red/green scale RG



Type	B2	B3	D1
MS4-LFR-1/8-...-RG	21	58.5	G1/8
MS4-LFR-1/4-...-RG			G1/4
MS6-LFR-1/4-...-RG	31	78.5	G1/4
MS6-LFR-3/8-...-RG			G3/8
MS6-LFR-1/2-...-RG			G1/2

• || - Note: This product conforms to ISO 1179-1 and to ISO 228-1

Filter regulators MS4/MS6-LFR, MS series

Technical data

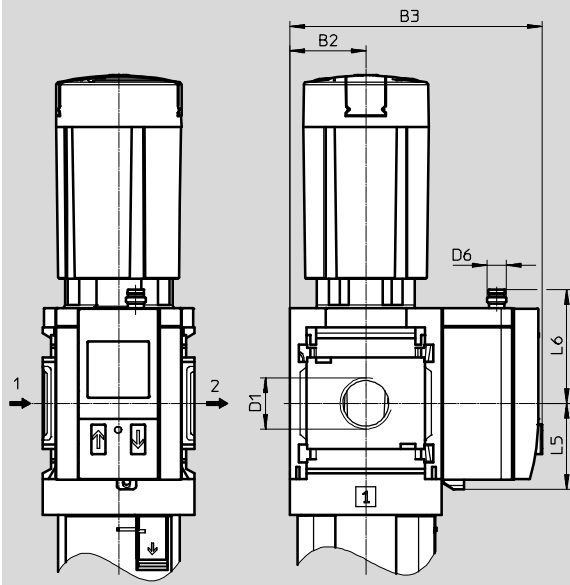
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Dimensions – Pressure gauge alternatives

Pressure sensor with LCD display AD1 ... AD4

Download CAD data → www.festo.com

Technical data → Internet: sde1



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

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

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

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

→ Flow direction

Type	B2	B3	D1	D6	L5	L6
MS4-LFR-1/8-...-AD1/AD2	21	82.6	G1/8	M8x1	35.1	46.7
MS4-LFR-1/4-...-AD1/AD2			G1/4			
MS4-LFR-1/8-...-AD3/AD4	21	82.6	G1/8	M12x1	35.1	55.8
MS4-LFR-1/4-...-AD3/AD4			G1/4			
MS6-LFR-1/4-...-AD1/AD2	31	103	G1/4	M8x1	35.1	46.7
MS6-LFR-3/8-...-AD1/AD2			G3/8			
MS6-LFR-1/2-...-AD1/AD2			G1/2			
MS6-LFR-1/4-...-AD3/AD4	31	103	G1/4	M12x1	35.1	55.8
MS6-LFR-3/8-...-AD3/AD4			G3/8			
MS6-LFR-1/2-...-AD3/AD4			G1/2			

• | • Note: This product conforms to ISO 1179-1 and to ISO 228-1

Filter regulators MS4/MS6-LFR, MS series

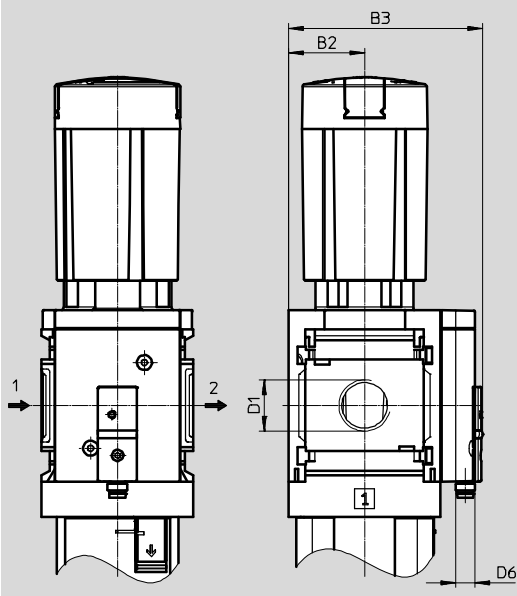
Technical data

Dimensions – Pressure gauge alternatives

Download CAD data → www.festo.com

Pressure sensor without LCD display (operational status indicator only) AD7 ... AD10

Technical data → Internet: sde5



Variant AD7:
SDE5-D10-O-...-P-M8 with 3-pin plug M8x1, threshold value comparator, 1 switching output PNP, N/O contact

Variant AD9:
SDE5-D10-O3-...-P-M8 with 3-pin plug M8x1, window comparator, 1 switching output PNP, N/O contact

Variant AD8:
SDE5-D10-C-...-P-M8 with 3-pin plug M8x1, threshold value comparator, 1 switching output PNP, N/C contact

Variant AD10:
SDE5-D10-C3-...-P-M8 with 3-pin plug M8x1, window comparator, 1 switching output PNP, N/C contact

→ Flow direction

Type	B2	B3	D1	D6
MS4-LFR-1/8-...-AD7/AD8/AD9/AD10	21	59.1	G1/8	M8x1
MS4-LFR-1/4-...-AD7/AD8/AD9/AD10			G1/4	
MS6-LFR-1/4-...-AD7/AD8/AD9/AD10	31	79	G1/4	M8x1
MS6-LFR-3/8-...-AD7/AD8/AD9/AD10			G3/8	
MS6-LFR-1/2-...-AD7/AD8/AD9/AD10			G1/2	

- | - Note: This product conforms to ISO 1179-1 and to ISO 228-1

Filter regulators MS4/MS6-LFR, MS series

Technical data



Dimensions – Rotary knob

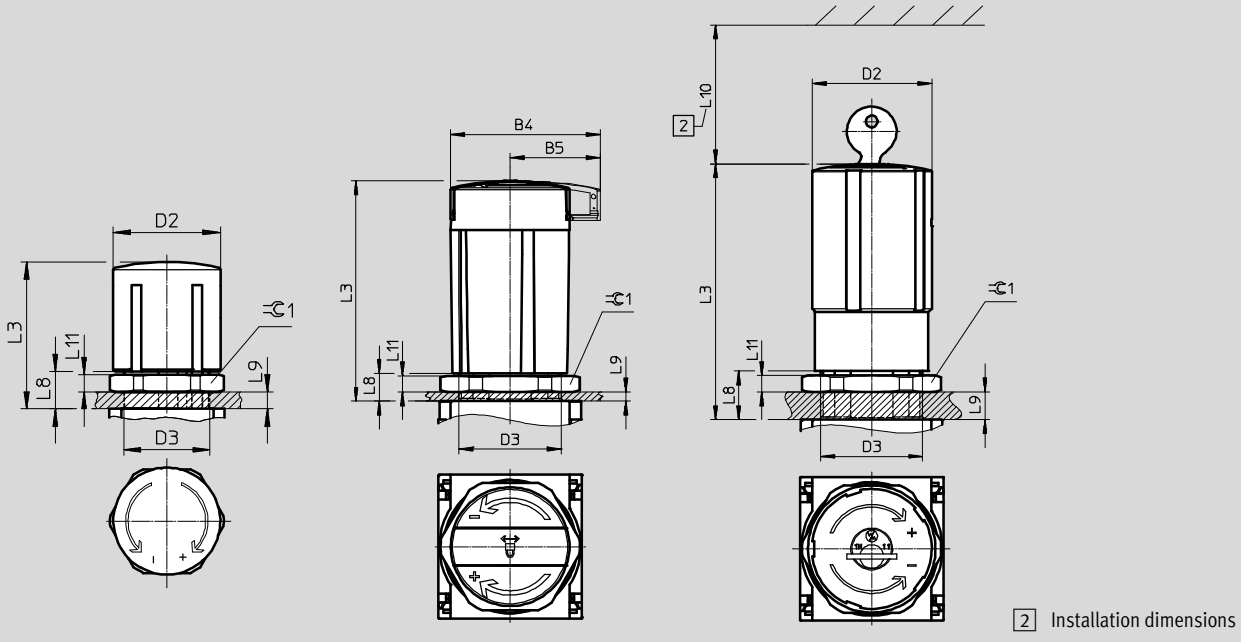
Download CAD data → www.festo.com

For installation into control panel or attaching with hex nut MS4/6-WRS (not included in the scope of delivery)

Rotary knob with detent

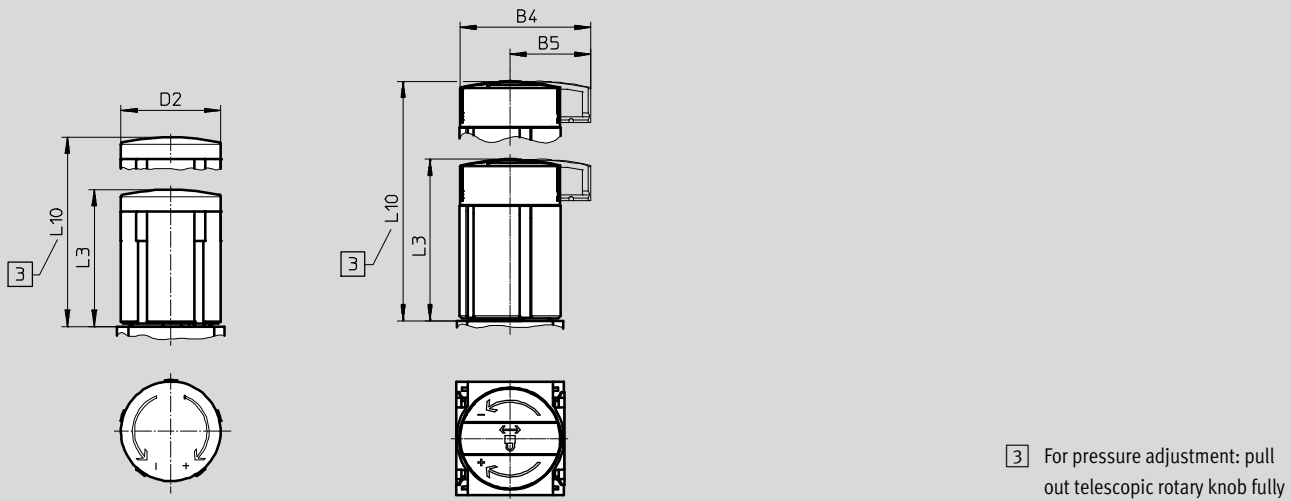
Rotary knob with detent, lockable via accessories AS

Rotary knob with integrated lock E11



Long rotary knob with detent LD

Long rotary knob with detent, lockable via accessories LD-AS

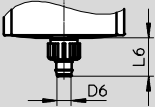
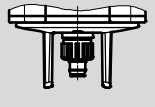
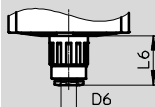
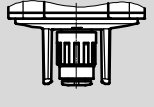
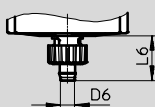
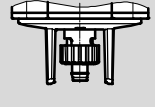


Type	B4	B5	D2	D3	L3	L8	L9	L10	L11	⌀1
MS4-LFR-...	-	-	37.2	M30x1.5	51.1	13	5	-	6	36
MS4-LFR-...-AS	48.6	30			60.2	13	5			
MS4-LFR-...-E11	-	-			76	14	6			
MS4-LFR-...-LD	-	-		-	-	-	76.8	-	-	
MS4-LFR-...-LD-AS	48.6	30	-	-	60	-	-	85.7	-	-
MS6-LFR-...	-	-	51.2	M44x1	86	21	14	-	7	55
MS6-LFR-...-AS	64.4	38.8			95.1	12	5			
MS6-LFR-...-E11	-	-			110	21	14			
MS6-LFR-...-LD	-	-		-	-	-	139	-	-	
MS6-LFR-...-LD-AS	64.4	38.8		-	-	95.5	-	-	148.5	-

Filter regulators MS4/MS6-LFR, MS series

Technical data

Download CAD data → www.festo.com

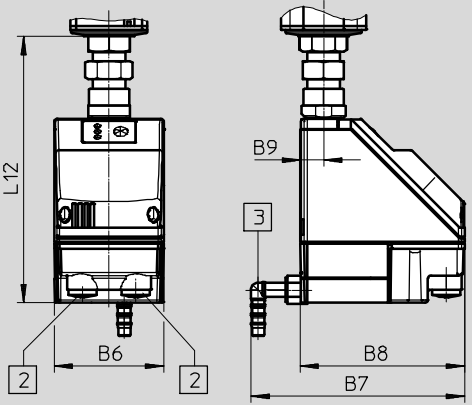
Manual rotary M		Semi-automatic H		Fully automatic V	
MS4-...-R/U-M	MS6-...-U-M	MS4-...-R/U-H	MS6-...-U-H	MS4-...-R/U-V	MS6-...-U-V
MS6-...-R-M		MS6-...-R-H		MS6-...-R-V	
					
Barbed connector for plastic tubing PUN(H)-8x1,25		Push-in connector for plastic tubing PUN-6/PAN-6		Barbed connector for plastic tubing PUN(H)-8x1,25	

Type	D6 Ø	L6
Plastic bowl guard R		
MS4-LFR-...-M	5.6	17.7
MS6-LFR-...-M		15.8
Metal bowl U		
MS4-LFR-...-M	5.6	17.7
MS6-LFR-...-M		-

Type	D6 Ø	L6
Plastic bowl guard R		
MS4-LFR-...-H	6.2	22.1
MS6-LFR-...-H		20.4
Metal bowl U		
MS4-LFR-...-H	6.2	22.1
MS6-LFR-...-H		-

Type	D6 Ø	L6
Plastic bowl guard R		
MS4-LFR-...-V	5.6	20.4
MS6-LFR-...-V		18.5
Metal bowl U		
MS4-LFR-...-V	5.6	20.4
MS6-LFR-...-V		-

Technical data → Internet: [pwea](http://pwea.com)



Condensate drain PWEA:

- 2 Electrical connection: Screw terminal PG9
- 3 Connection 360° rotatable for plastic tubing PUN-H-12x2

Type	B6	B7	B8	B9	L12
MS6-LFR-...-E2/E3/E4	72	140	108	15	174.5

Filter regulators MS4/MS6-LFR, MS series

Technical data

★ Core product range

Ordering data						
Pressure regulation range 0.3 ... 7 bar, plastic bowl guard, integrated MS pressure gauge with standard scale, display unit [bar], rotary knob with detent, lockable via accessories						
Size	Connection	Condensate drain	Grade of filtration 5 µm		Grade of filtration 40 µm	
			Part No.	Type	Part No.	Type
Flow direction from left to right						
MS4	G1/4	Manual rotary	★ 529144	MS4-LFR-1/4-D6-CRM-AS	★ 529148	MS4-LFR-1/4-D6-ERM-AS
		Fully automatic	★ 529146	MS4-LFR-1/4-D6-CRV-AS	★ 529150	MS4-LFR-1/4-D6-ERV-AS
MS6	G1/2	Manual rotary	★ 529176	MS6-LFR-1/2-D6-CRM-AS	★ 529180	MS6-LFR-1/2-D6-ERM-AS
		Fully automatic	★ 529178	MS6-LFR-1/2-D6-CRV-AS	★ 529182	MS6-LFR-1/2-D6-ERV-AS

Ordering data						
Pressure regulation range 0.5 ... 12 bar, plastic bowl guard, integrated MS pressure gauge with standard scale, display unit [bar], rotary knob with detent, lockable via accessories						
Size	Connection	Condensate drain	Grade of filtration 5 µm		Grade of filtration 40 µm	
			Part No.	Type	Part No.	Type
Flow direction from left to right						
MS4	G1/4	Manual rotary	★ 529152	MS4-LFR-1/4-D7-CRM-AS	★ 529156	MS4-LFR-1/4-D7-ERM-AS
		Fully automatic	★ 529154	MS4-LFR-1/4-D7-CRV-AS	★ 529158	MS4-LFR-1/4-D7-ERV-AS
MS6	G1/2	Manual rotary	★ 529184	MS6-LFR-1/2-D7-CRM-AS	★ 529188	MS6-LFR-1/2-D7-ERM-AS
		Fully automatic	★ 529186	MS6-LFR-1/2-D7-CRV-AS	★ 529190	MS6-LFR-1/2-D7-ERV-AS

Ordering data						
Pressure regulation range 0.5 ... 12 bar, integrated as metal bowl, integrated MS pressure gauge with standard scale, display unit [bar], rotary knob with detent, lockable via accessories						
Size	Connection	Condensate drain	Grade of filtration 5 µm		Grade of filtration 40 µm	
			Part No.	Type	Part No.	Type
Flow direction from left to right						
MS4	G1/4	Manual rotary	-	-	★ 535724	MS4-LFR-1/4-D7-EUM-AS
		Fully automatic	★ 535720	MS4-LFR-1/4-D7-CUV-AS	★ 535722	MS4-LFR-1/4-D7-EUV-AS
MS6	G1/2	Manual rotary	★ 530338	MS6-LFR-1/2-D7-CUM-AS	★ 529192	MS6-LFR-1/2-D7-EUM-AS
		Fully automatic	★ 530340	MS6-LFR-1/2-D7-CUV-AS	★ 529194	MS6-LFR-1/2-D7-EUV-AS

Festo core product range

- ★ Generally ready for shipping ex works in 24 hours
- ☆ Generally ready for shipping ex works in 5 days

Filter regulators MS4/MS6-LFR, MS series

Technical data

Ordering data						
Pressure regulation range 0.3 ... 7 bar, plastic bowl guard, integrated MS pressure gauge with standard scale, display unit [bar], rotary knob with detent, lockable via accessories						
Size	Connection	Condensate drain	Grade of filtration 5 µm		Grade of filtration 40 µm	
			Part No.	Type	Part No.	Type
Flow direction from left to right						
MS4	G ¹ / ₈	Manual rotary	529160	MS4-LFR- ¹ / ₈ -D6-CRM-AS	529164	MS4-LFR- ¹ / ₈ -D6-ERM-AS
		Fully automatic	529162	MS4-LFR- ¹ / ₈ -D6-CRV-AS		529166
MS6	G ¹ / ₄	Manual rotary	529196	MS6-LFR- ¹ / ₄ -D6-CRM-AS	529200	MS6-LFR- ¹ / ₄ -D6-ERM-AS
		Fully automatic	–	–		529202
	G ³ / ₈	Manual rotary	529216	MS6-LFR- ³ / ₈ -D6-CRM-AS	529220	MS6-LFR- ³ / ₈ -D6-ERM-AS
		Fully automatic	529218	MS6-LFR- ³ / ₈ -D6-CRV-AS		529222
Flow direction from right to left						
MS4	G ¹ / ₄	Manual rotary	529145	MS4-LFR- ¹ / ₄ -D6-CRM-AS-Z	529149	MS4-LFR- ¹ / ₄ -D6-ERM-AS-Z
		Fully automatic	–	–		529151
MS6	G ³ / ₈	Fully automatic	529219	MS6-LFR- ³ / ₈ -D6-CRV-AS-Z	–	–
		G ¹ / ₂	Manual rotary	529177	MS6-LFR- ¹ / ₂ -D6-CRM-AS-Z	529181
	Fully automatic		–	–	529183	

Ordering data						
Pressure regulation range 0.5 ... 12 bar, plastic bowl guard, integrated MS pressure gauge with standard scale, display unit [bar], rotary knob with detent, lockable via accessories						
Size	Connection	Condensate drain	Grade of filtration 5 µm		Grade of filtration 40 µm	
			Part No.	Type	Part No.	Type
Flow direction from left to right						
MS4	G ¹ / ₈	Manual rotary	529168	MS4-LFR- ¹ / ₈ -D7-CRM-AS	529172	MS4-LFR- ¹ / ₈ -D7-ERM-AS
		Fully automatic	529170	MS4-LFR- ¹ / ₈ -D7-CRV-AS		529174
MS6	G ¹ / ₄	Manual rotary	529204	MS6-LFR- ¹ / ₄ -D7-CRM-AS	529208	MS6-LFR- ¹ / ₄ -D7-ERM-AS
		Fully automatic	529206	MS6-LFR- ¹ / ₄ -D7-CRV-AS		529210
	G ³ / ₈	Manual rotary	529224	MS6-LFR- ³ / ₈ -D7-CRM-AS	529228	MS6-LFR- ³ / ₈ -D7-ERM-AS
		Fully automatic	529226	MS6-LFR- ³ / ₈ -D7-CRV-AS		529230
Flow direction from right to left						
MS4	G ¹ / ₄	Manual rotary	529153	MS4-LFR- ¹ / ₄ -D7-CRM-AS-Z	529157	MS4-LFR- ¹ / ₄ -D7-ERM-AS-Z
		Fully automatic	529155	MS4-LFR- ¹ / ₄ -D7-CRV-AS-Z		529159
MS6	G ¹ / ₄	Manual rotary	529205	MS6-LFR- ¹ / ₄ -D7-CRM-AS-Z	–	–
		G ¹ / ₂	Manual rotary	529185	MS6-LFR- ¹ / ₂ -D7-CRM-AS-Z	529189
	Fully automatic		529187	MS6-LFR- ¹ / ₂ -D7-CRV-AS-Z	529191	

Ordering data						
Pressure regulation range 0.5 ... 12 bar, integrated as metal bowl, integrated MS pressure gauge with standard scale, display unit [bar], rotary knob with detent, lockable via accessories						
Size	Connection	Condensate drain	Grade of filtration 5 µm		Grade of filtration 40 µm	
			Part No.	Type	Part No.	Type
Flow direction from left to right						
MS6	G ³ / ₈	Manual rotary	–	–	529232	MS6-LFR- ³ / ₈ -D7-EUM-AS
		Fully automatic	530348	MS6-LFR- ³ / ₈ -D7-CUV-AS		529234

Filter regulators MS4/MS6-LFR, MS series

FESTO

Ordering data – Modular products

Ordering table							
Grid dimension	[mm]	40	62	Condi- tions	Code	Enter code	
M	Module No.	526489	526490				
	Series	Standard			MS	MS	
	Size	4	6		...		
	Function	Filter regulator			-LFR	-LFR	
	Pneumatic connection	Female thread G $\frac{1}{8}$	–	1	- $\frac{1}{8}$		
		Female thread G $\frac{1}{4}$	Female thread G $\frac{1}{4}$	1	★- $\frac{1}{4}$		
		–	Female thread G $\frac{3}{8}$	1	- $\frac{3}{8}$		
		–	Female thread G $\frac{1}{2}$	1	★- $\frac{1}{2}$		
		Connecting plate G $\frac{1}{8}$	–		-AGA		
		Connecting plate G $\frac{1}{4}$	Connecting plate G $\frac{1}{4}$		★-AGB		
		Connecting plate G $\frac{3}{8}$	Connecting plate G $\frac{3}{8}$		-AGC		
		–	Connecting plate G $\frac{1}{2}$		★-AGD		
		–	Connecting plate G $\frac{3}{4}$		-AGE		
		Connecting plate NPT $\frac{1}{8}$	–	1	-AQK		
		Connecting plate NPT $\frac{1}{4}$	Connecting plate NPT $\frac{1}{4}$	1	-AQN		
		Connecting plate NPT $\frac{3}{8}$	Connecting plate NPT $\frac{3}{8}$	1	-AQP		
		–	Connecting plate NPT $\frac{1}{2}$	1	-AQR		
		–	Connecting plate NPT $\frac{3}{4}$	1	-AQS		
	Pressure regulation range	0.3 ... 4 bar			★-D5		
		0.3 ... 7 bar			★-D6		
		0.5 ... 12 bar			★-D7		
		–	0.5 ... 16 bar	1	-D8		
	Grade of filtration	40 μ m			★-E		
		5 μ m			★-C		
	Bowl	Plastic bowl with plastic bowl guard			★-R		
		Metal bowl			-U		
	Condensate drain	Manual			★-M		
		Semi-automatic (P1 max. 12 bar)		2	-H		
		Fully automatic (P1 max. 12 bar)		2	★-V		
		External, fully automatic, electrical	–	115 V AC, terminals	1 3	-E2	
			–	230 V AC, terminals	1 3	-E3	
	–		24 V DC, terminals	1 3	-E4		

1 $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$, AQK, AQN, AQP, AQR, AQS, D8, E2, E3, E4, AD1 ... AD4, AD7 ... AD10, 3 E2, E3, E4 Only with metal bowl U

E11, WPM

Not with EU certification EX4

2 H, V Not with pressure regulation range D8

M Mandatory data

O Options

Transfer order code

MS - **LFR** - - - - -

Festo core product range

★ Generally ready for shipping ex works in 24 hours

☆ Generally ready for shipping ex works in 5 days

Filter regulators MS4/MS6-LFR, MS series

Ordering data – Modular products

Ordering table								
Grid dimension	[mm]	40	62	Condi- tions	Code	Enter code		
O	Pressure gauge alternatives	Cover plate			★ -VS			
		Adapter plate for EN pressure gauge 1/8, without pressure gauge	-		-A8			
		Adapter plate for EN pressure gauge 1/4, without pressure gauge				-A4		
		Integrated pressure gauge, red-green scale			4	-RG		
		Pressure sensor with LCD display, plug M8, 1 switching output PNP, 3-pin			1 5	-AD1		
		Pressure sensor with LCD display, plug M8, 1 switching output NPN, 3-pin			1 5	-AD2		
		Pressure sensor with LCD display, plug M12, 1 switching output PNP, 4-pin, analogue output 4 ... 20 mA			1 5	-AD3		
		Pressure sensor with LCD display, plug M12, 1 switching output NPN, 4-pin, analogue output 4 ... 20 mA			1 5	-AD4		
		Pressure sensor with operational status indicator, plug M8, threshold value comparator, PNP, N/O contact			1 5	-AD7		
		Pressure sensor with operational status indicator, plug M8, threshold value comparator, PNP, N/C contact			1 5	-AD8		
		Pressure sensor with operational status indicator, plug M8, window comparator, PNP, N/O contact			1 5	-AD9		
		Pressure sensor with operational status indicator, plug M8, window comparator, PNP, N/C contact			1 5	-AD10		
		Alternative pressure gauge scale	psi			6	-PSI	
			MPa			6	-MPA	
Secondary venting	Without secondary venting				-OS			
Rotary knob	Long rotary knob			7	-LD			
M	Security	Without						
		Lockable via accessories			★ -AS			
		With integrated lock			1	-E11		
O	Type of mounting	Mounting bracket with knurled nut for regulator head			8	★ -WR		
		Mounting bracket standard design			9	-WP		
		Mounting bracket for attaching the service units			1 9	-WPM		
		Mounting bracket centrally at rear (wall mounting top and bottom), connecting plates not required				★ -WB		
		Mounting bracket centrally at rear (wall mounting top), connecting plates not required	-			-WBM		
		EU certification	II 2GD to EU Explosion Protection Directive (ATEX)				-EX4	
UL certification	cULus, ordinary location for Canada and USA				-UL1			
Flow direction	Flow direction from right to left				-Z			

4 **RG** Alternative pressure gauge scale PSI serves only as an auxiliary scale

5 **AD1 ... AD4, AD7 ... AD10**
Measuring range max. 10 bar
Not with pressure regulation range D8

6 **PSI, MPA** Not with pressure gauge alternatives VS, A8, A4, AD1 ... AD4, AD7 ... AD10

7 **LD** Not with security E11

8 **WR** Not with long rotary knob LD

9 **WP, WPM** Only with connecting plate AGA, AGB, AGC, AGD, AGE, AQK, AQN, AQP, AQR or AQS

M Mandatory data

O Options

Transfer order code

- [] - [] - [] - [] - [] - [] - [] - [] - []

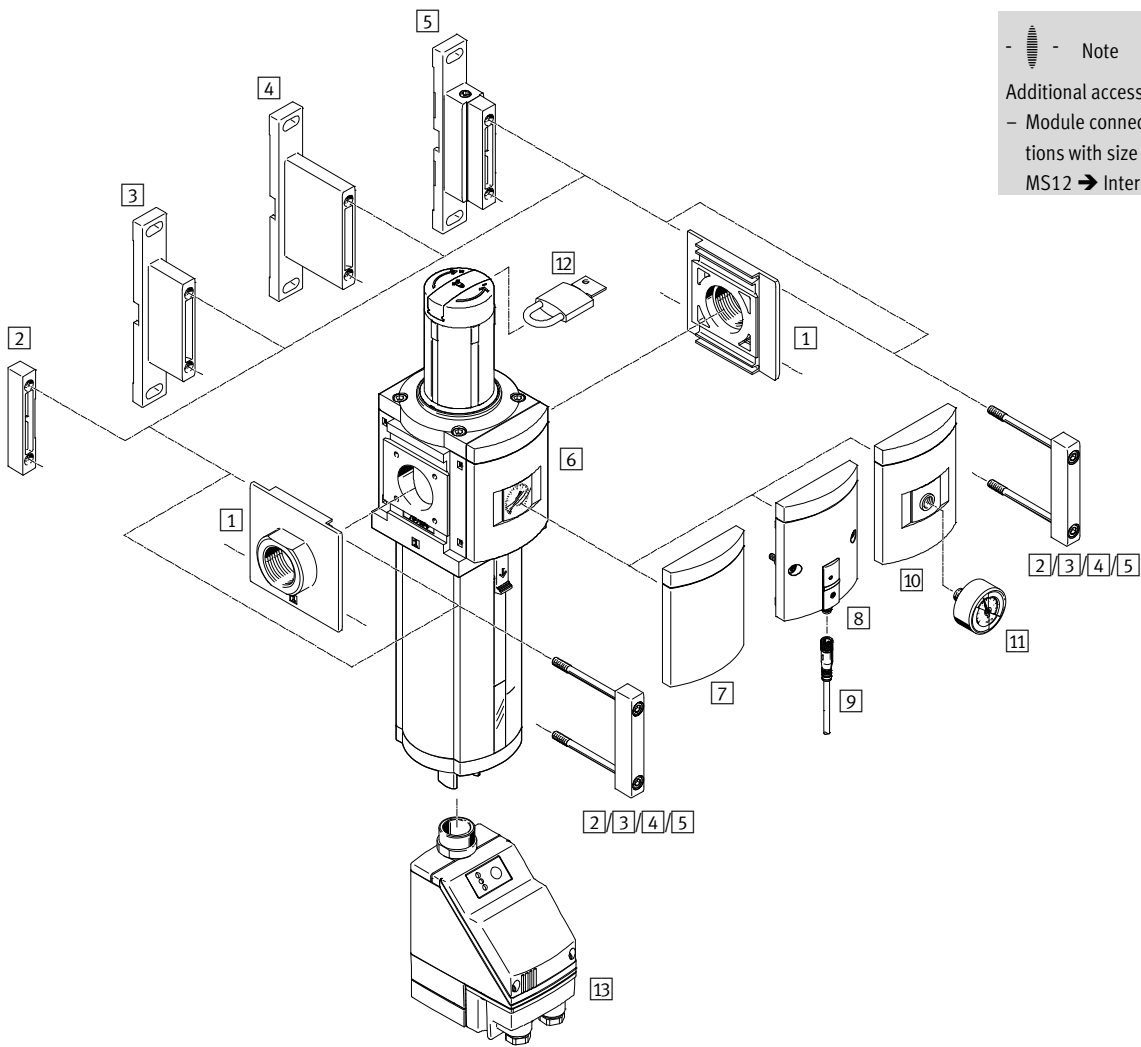
Festo core product range


★ Generally ready for shipping ex works in 24 hours

☆ Generally ready for shipping ex works in 5 days

Filter regulators MS9-LFR, MS series

Peripherals overview



-  - Note

Additional accessories:
 - Module connector for combinations with size MS6, MS9 or MS12 → Internet: rmv, armv

Filter regulators MS9-LFR, MS series

Peripherals overview

FESTO

Mounting attachments and accessories					
		Individual unit		Combination Module without connect- ing thread, without connecting plate G/NG	→ Page/ Internet
		With female thread 3/4/1/N3/4/N1	With connecting plate AG.../AQ... Without EU certification EX4		
1	Connecting plate-SET MS9-AG...	-	■	■	ms9-ag
	Connecting plate-SET MS9-AQ...	-	■	-	ms9-aq
2	Module connector MS9-MV	-	-	-	ms9-mv
3	Mounting bracket MS9-WP	■	■	■	ms9-wp
4	Mounting bracket MS9-WPB	■	■	■	ms9-wp
5	Mounting bracket MS9-WPM	■	■	-	ms9-wp
6	MS pressure gauge AG	■	■	■	46
7	Cover plate VS	■	■	■	46
8	Pressure sensor without display AD7 ... AD10	■	■	-	46
9	Connecting cable NEBU-M8...-LE3	■	■	-	61
10	Adapter plate for EN pressure gauge 1/4 A4	■	■	■	46
11	Pressure gauge MA	■	■	■	61
12	Padlock LRVS-D	■	■	■	61
13	Condensate drain, fully automatic, electrically actuated E2/E3/E4	■	■	-	46

Filter regulators MS9-LFR, MS series

Type codes

FESTO

MS 9 - LFR - G - D6 - E U M - DI - AG - BAR - AS

Series

MS	Standard service unit
----	-----------------------

Size

9	Grid dimension 90 mm
---	----------------------

Service function

LFR	Filter regulator
-----	------------------

Pneumatic connection

G	Module without connecting thread, without connecting plate
NG	Module without connecting thread, without connecting plate (inch)

Pressure regulation range/operation mode

D6	0.5 ... 7 bar, manually operated
D7	0.5 ... 12 bar, manually operated

Grade of filtration

C	5 µm
E	40 µm

Bowl guard

U	Integrated as metal bowl
---	--------------------------

Condensate drain

M	Manual rotary
V	Fully automatic

Regulator type

	Piloted
DI	Directly actuated

Pressure gauge

AG	MS pressure gauge
----	-------------------

Pressure gauge scale

BAR	bar
PSI	psi

Security

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

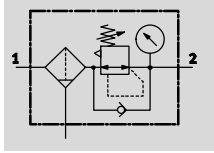
Additional variants can be ordered using the modular system → 46

- Pneumatic connection
- Pressure regulation range
- Condensate drain
- Pressure gauge alternatives
- Alternative pressure gauge scale
- Secondary venting
- Security lock
- Type of mounting
- EU certification
- UL certification
- Flow direction

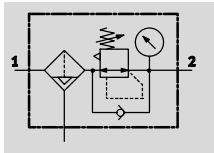
Filter regulators MS9-LFR, MS series

Technical data

Manual rotary condensate drain, with pressure gauge



Semi or fully automatic condensate drain, with pressure gauge



With this component, the filter and pressure regulator are combined into a single unit. The sintered filter with water separator removes contamination, pipe sinter, rust and condensate from the compressed air.

- - Flow rate
10,000 ... 23,000 l/min
- - Temperature range
-10 ... +60 °C
- - Supply pressure
1 ... 20 bar
- - www.festo.com



- Good regulation characteristics with low hysteresis and primary pressure compensation
- Good particle and condensate separation
- Piloted or directly actuated filter-diaphragm regulator
- High flow rates
- Available with or without secondary venting
- Four pressure regulation ranges: 0.5 ... 4 bar, 0.5 ... 7 bar, 0.5 ... 12 bar and 0.5 ... 16 bar
- Pressure gauge connection for different fitting options
- Available with manual, semi-automatic, fully automatic or fully automatic, electrically actuated condensate drain
- Actuator lock to protect set values against adjustment
- Optional pressure sensor
- Choice of filter cartridges: 5 µm or 40 µm
- New filter cartridges → 60
- Optional device variant EX4 for use in potentially explosive areas in zones 1, 2, 21 and 22

General technical data		
Pneumatic connection 1, 2		
Female thread		G3/4, G1, NPT3/4 or NPT1
Connecting plate AG...		G1/2, G3/4, G1, G1 1/4 or G1 1/2
Connecting plate AQ...		NPT1/2, NPT3/4, NPT1, NPT1 1/4 or NPT1 1/2
Module without connecting thread/plate G/NG		-
Design		
	Piloted	Piloted filter-diaphragm regulator
	Directly actuated	Directly actuated filter-diaphragm regulator
Regulator type		
	Piloted	Output pressure constant, with return flow action, with primary pressure compensation, with secondary venting
	Directly actuated	Output pressure constant, with return flow action, with/without secondary venting
Type of mounting		
		Via accessories
		In-line installation
Mounting position		
		Vertical ±5°
Grade of filtration [µm]		
		5 (air purity class at the output: compressed air in accordance with ISO 8573-1:2010 [6:4:4])
		40 (air purity class at the output: compressed air in accordance with ISO 8573-1:2010 [7:4:4])
Bowl guard		
		Integrated as metal bowl
Condensate drain		
		Manual rotary
		Semi-automatic
		Fully automatic
		Fully automatic, electrically actuated
Security		
		Rotary knob with detent, lockable via accessories
		Rotary knob with integrated lock
Pressure regulation range/operation mode		
D5	[bar]	0.5 ... 4, manually operated
D6	[bar]	0.5 ... 7, manually operated
D7	[bar]	0.5 ... 12, manually operated (0.5 ... 10 with pressure sensor variant AD...)
D8	[bar]	0.5 ... 16, manually operated (0.5 ... 10 with pressure sensor variant AD...)

- - Note: This product conforms to ISO 1179-1 and to ISO 228-1

Filter regulators MS9-LFR, MS series

FESTO

Technical data

General technical data	
Max. pressure hysteresis [bar]	0.4
Pressure display	Via pressure sensor for displaying output pressure via operational status indicator and electrical output
	Via pressure gauge for displaying output pressure
	Via pressure gauge with red/green scale for displaying output pressure
	G $\frac{1}{4}$ prepared
Max. condensate volume [ml]	220

Standard nominal flow rate $q_{nN}^{1)2)}$ [l/min]					
Design	Piloted filter-diaphragm regulator			Directly actuated filter-diaphragm regulator DI	
Pneumatic connection	G $\frac{3}{4}$ /NPT $\frac{3}{4}$	G1/NPT1	G $\frac{3}{4}$ /NPT $\frac{3}{4}$	G1/NPT1	
D5 – Pressure regulation range 0.5 ... 4 bar					
Grade of filtration	5 μ m	17,000 ³⁾	20,000 ³⁾	16,000 ³⁾	18,000 ³⁾
	40 μ m	18,000 ³⁾	23,000 ³⁾	16,000 ³⁾	20,000 ³⁾
D6 – Pressure regulation range 0.5 ... 7 bar					
Grade of filtration	5 μ m	15,000	18,000	12,000	10,000
	40 μ m	16,000	20,000	12,000	10,000
D7 – Pressure regulation range 0.5 ... 12 bar					
Grade of filtration	5 μ m	15,000	18,000	–	–
	40 μ m	16,000	20,000	–	–
D8 – Pressure regulation range 0.5 ... 16 bar					
Grade of filtration	5 μ m	15,000	18,000	–	–
	40 μ m	16,000	20,000	–	–

1) All values $\pm 15\%$

2) Measured at $p_1 = 10$ bar and $p_2 = 6$ bar, $\Delta p = 1$ bar

3) Measured at $p_1 = 10$ bar and $p_2 = 4$ bar, $\Delta p = 1$ bar

- \downarrow 125 l/min must be available for the fully automatic condensate drain to close correctly.

Operating and environmental conditions				
Condensate drain	Manual rotary	Semi-automatic	Fully automatic	Fully automatic, electrically actuated
	M	H	V	E2/E3/E4
Operating pressure [bar]	1 ... 20	1.5 ... 12	2 ... 12	1 ... 16
Operating medium	Compressed air in accordance with ISO 8573-1:2010 [-:4:-]	Compressed air in accordance with ISO 8573-1:2010 [-:4:-]	Compressed air in accordance with ISO 8573-1:2010 [7:4:-]	Compressed air in accordance with ISO 8573-1:2010 [-:4:-]
	Inert gases			
Ambient temperature [°C]	-10 ... +60	+5 ... +60	+5 ... +60	+1 ... +60
Ambient temperature with pressure sensor AD [°C]	0 ... +50	+5 ... +50	+5 ... +50	+1 ... +50
Temperature of medium [°C]	-10 ... +60	+5 ... +60	+5 ... +60	+1 ... +60
Temperature of medium with pressure sensor AD [°C]	0 ... +50	+5 ... +50	+5 ... +50	+1 ... +50
Storage temperature [°C]	-10 ... +60	+5 ... +60	+5 ... +60	+1 ... +60
Corrosion resistance class CRC ¹⁾	2			
UL certification ²⁾	cULus recognized (OL)			

1) Corrosion resistance class CRC 2 to Festo standard FN 940070

Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.

2) Additional information www.festo.com/sp → Certificates.

Filter regulators MS9-LFR, MS series

Technical data

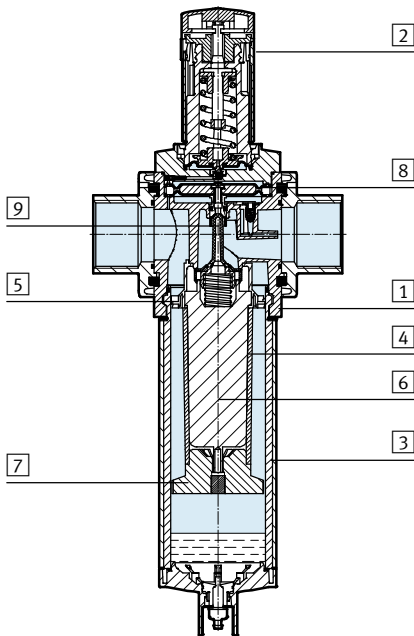
ATEX	
EU certification	EX4
ATEX category gas	II 2G
Ex-ignition protection type gas	Ex h IIC T6 Gb X
ATEX category dust	II 2D
EX-ignition protection type dust	Ex h IIIC T60°C Db X
ATEX ambient temperature	+5 °C ≤ Ta ≤ +60 °C
CE mark (see declaration of conformity) ¹⁾	To EU Explosion Protection Directive (ATEX)

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

Weight [g]		
Rotary knob	Without integrated lock E11	With integrated lock E11
Filter regulator with metal bowl U	2,400	2,700
Filter regulator with metal bowl U and fully automatic condensate drain, electrically actuated E2/E3/E4	2,800	3,100

Materials

Sectional view



Filter regulator	
1	Housing Die-cast aluminium
2	Rotary knob PA
	Rotary knob with integrated lock E11 Aluminium
3	Bowl Wrought aluminium alloy
	Inspection window PA
4	Filter element PE
5	Spin disc POM
6	Filter holder POM
7	Separating plate POM
8	Diaphragm NBR
9	Valve stem Wrought aluminium alloy, NBR, POM
-	Cover PA reinforced
-	Connecting plate, module connector, mounting bracket Die-cast aluminium
-	Seals NBR
Note on materials RoHS-compliant	

Filter regulators MS9-LFR, MS series

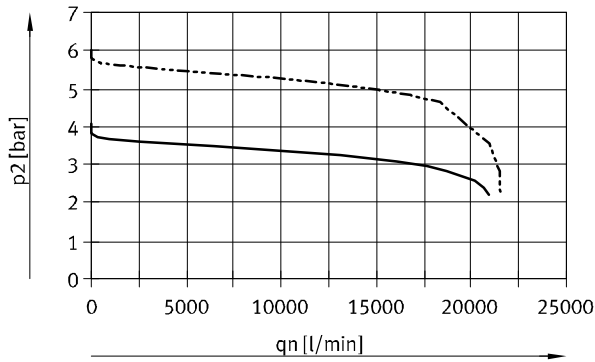
Technical data



Standard flow rate q_n as a function of output pressure p_2 at operating pressure $p_1 = 10$ bar

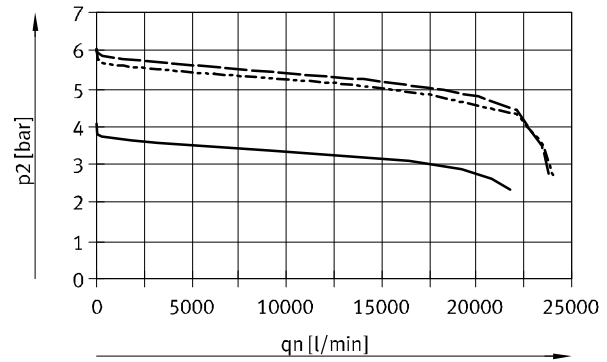
Piloted filter-diaphragm regulator

Grade of filtration 5 μm , pneumatic connection G $\frac{3}{4}$ /NPT $\frac{3}{4}$



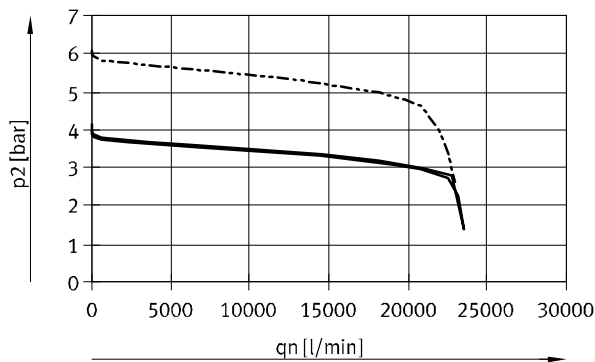
— MS9-LFR...-D5
- - - MS9-LFR...-D6/D7/D8

Grade of filtration 40 μm , pneumatic connection G $\frac{3}{4}$ /NPT $\frac{3}{4}$



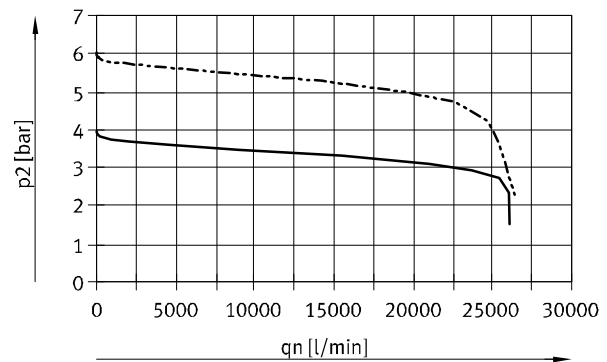
— MS9-LFR...-D5
- - - MS9-LFR...-D6/D8
- · - MS9-LFR...-D7

Grade of filtration 5 μm , pneumatic connection G1/NPT1



— MS9-LFR...-D5
- - - MS9-LFR...-D6/D7/D8

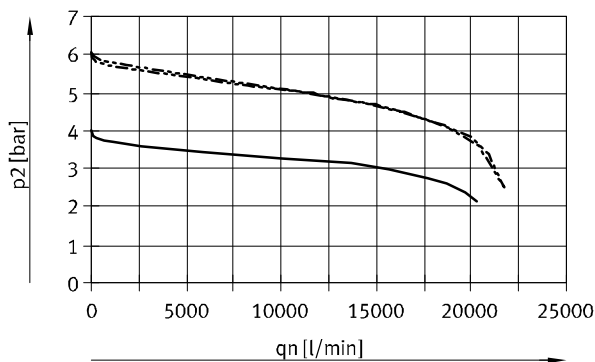
Grade of filtration 40 μm , pneumatic connection G1/NPT1



Standard flow rate q_n as a function of output pressure p_2 at operating pressure $p_1 = 10$ bar

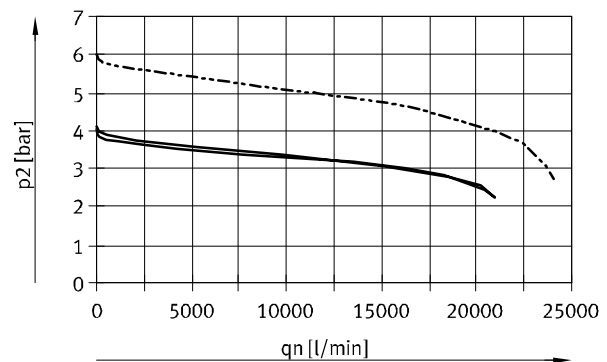
Directly actuated filter-diaphragm regulator DI

Grade of filtration 5 μm , pneumatic connection G $\frac{3}{4}$ /NPT $\frac{3}{4}$



— MS9-LFR...-D5
- - - MS9-LFR...-D6

Grade of filtration 40 μm , pneumatic connection G $\frac{3}{4}$ /NPT $\frac{3}{4}$



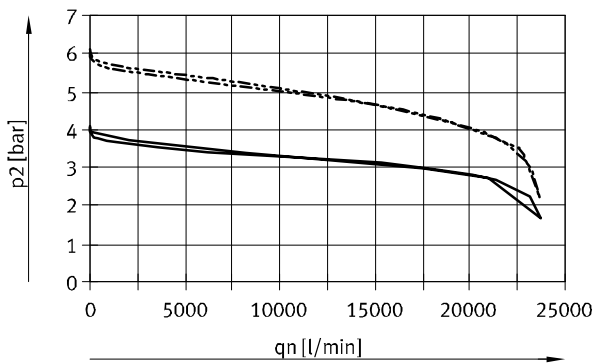
Filter regulators MS9-LFR, MS series

Technical data

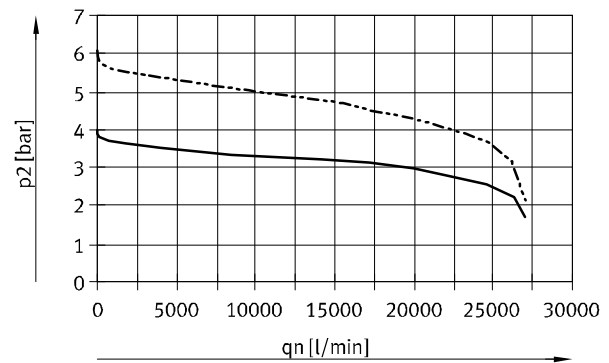
Standard flow rate q_n as a function of output pressure p_2 at operating pressure $p_1 = 10$ bar

Directly actuated filter-diaphragm regulator DI

Grade of filtration 5 μm , pneumatic connection G1/NPT1



Grade of filtration 40 μm , pneumatic connection G1/NPT1

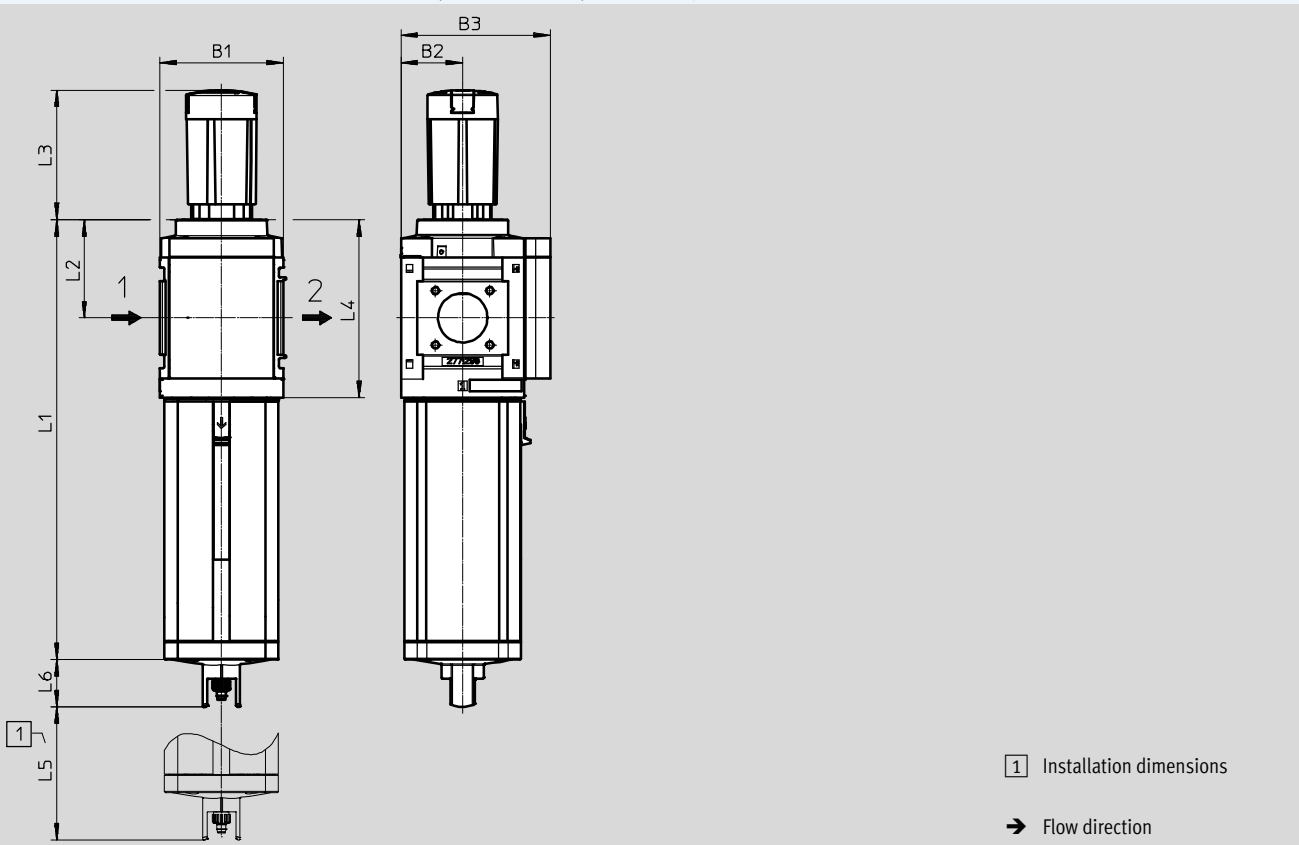


— MS9-LFR-...-D5
 - - - MS9-LFR-...-D6

Dimensions – Basic version

Download CAD data → www.festo.com

Module without connecting thread, without connecting plate G/NG, cover plate VS, rotary knob with detent, lockable via accessories



Type	B1	B2	B3	L1	L2	L3	L4	L5	L6
MS9-LFR-G/NG	90	45	109	320.5	71.5	94.5	127	150	34.5

Filter regulators MS9-LFR, MS series

Technical data

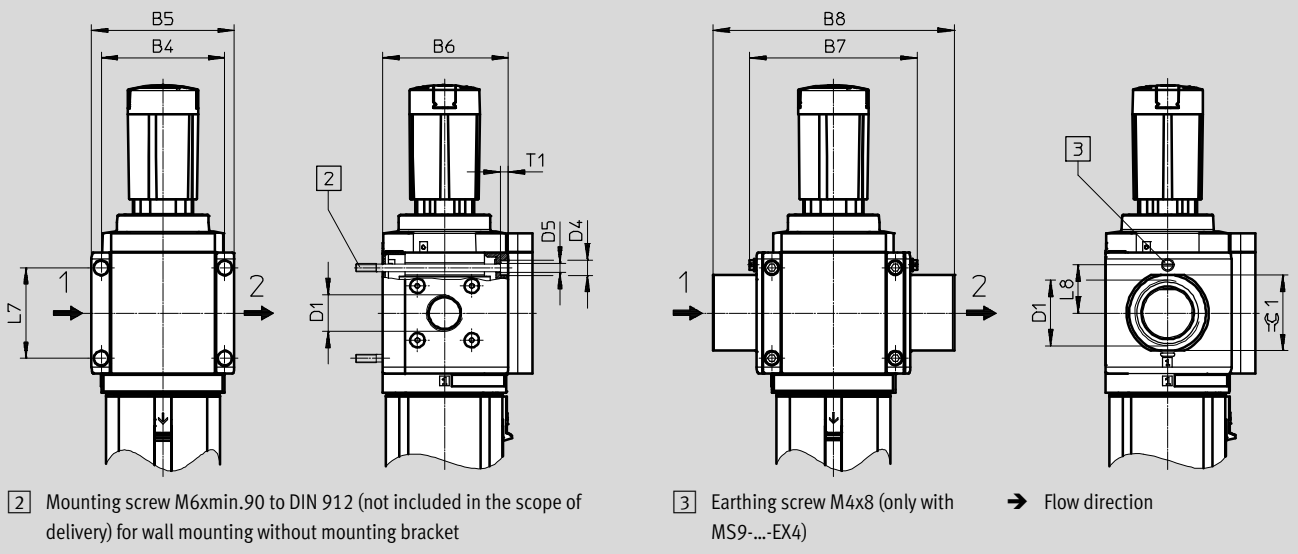
FESTO

Dimensions – Connecting thread/connecting plate

Download CAD data → www.festo.com

With female thread 3/4"/1/N3/4"/N1

With connecting plate AG.../AQ...



Type	B4	B5	B6	B7		B8	D1	D4	D5	L7	T1		≅
					EX4						L8	EX4	
MS9-LFR-3/4	90	104	91.5	-	-	-	G3/4	11	6.5	66	-	6	-
MS9-LFR-1							G1						
MS9-LFR-AGD	-	-	-	112	122	132	G1/2	-	-	-	35	-	30
MS9-LFR-AGE						132	G3/4						36
MS9-LFR-AGF						142	G1						41
MS9-LFR-AGG						162	G1 1/4						50
MS9-LFR-AGH						176	G1 1/2						55
MS9-LFR-N3/4	90	104	91.5	-	-	-	NPT3/4-14	11	6.5	66	-	6	-
MS9-LFR-N1							NPT1-11 1/2						
MS9-LFR-AQR	-	-	-	112	-	132	NPT1/2-14	-	-	-	-	-	30
MS9-LFR-AQS						132	NPT3/4-14						36
MS9-LFR-AQT						142	NPT1-11 1/2						41
MS9-LFR-AQU						162	NPT1 1/4-11 1/2						50
MS9-LFR-AQV						176	NPT1 1/2-11 1/2						55

• • Note: This product conforms to ISO 1179-1 and to ISO 228-1

Filter regulators MS9-LFR, MS series

Technical data

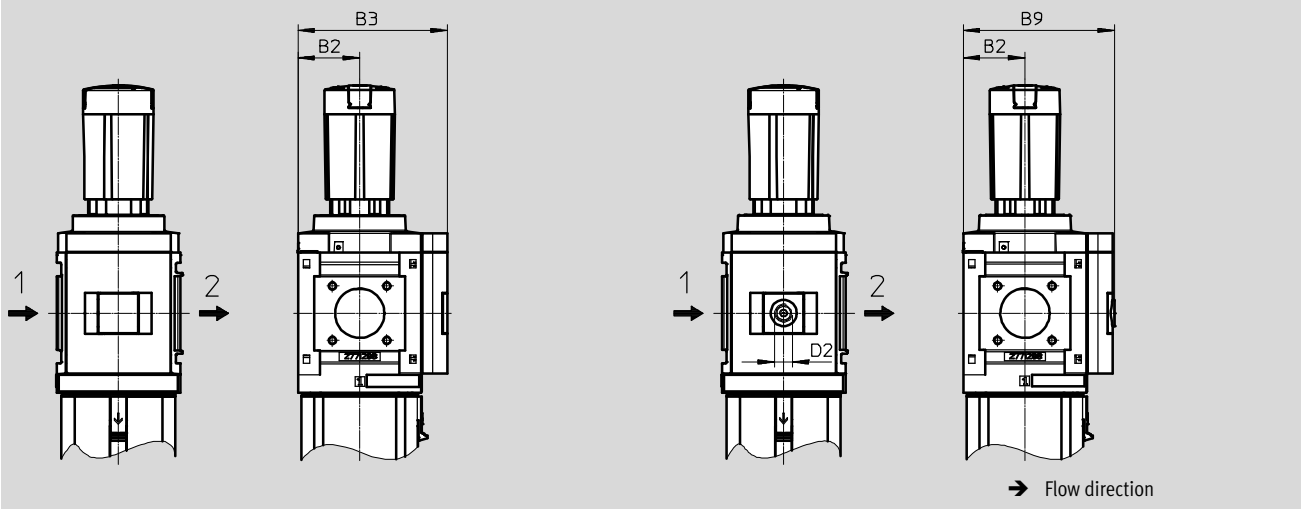
FESTO

Dimensions – Pressure gauge alternatives

Download CAD data → www.festo.com

Integrated MS pressure gauge with standard scale AG or red/green scale RG

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



Type	B2	B3	B9	D2
MS9-LFR-...-AG/RG	45	109	-	-
MS9-LFR-...-A4		-	110	G1/4

Note: This product conforms to ISO 1179-1 and to ISO 228-1

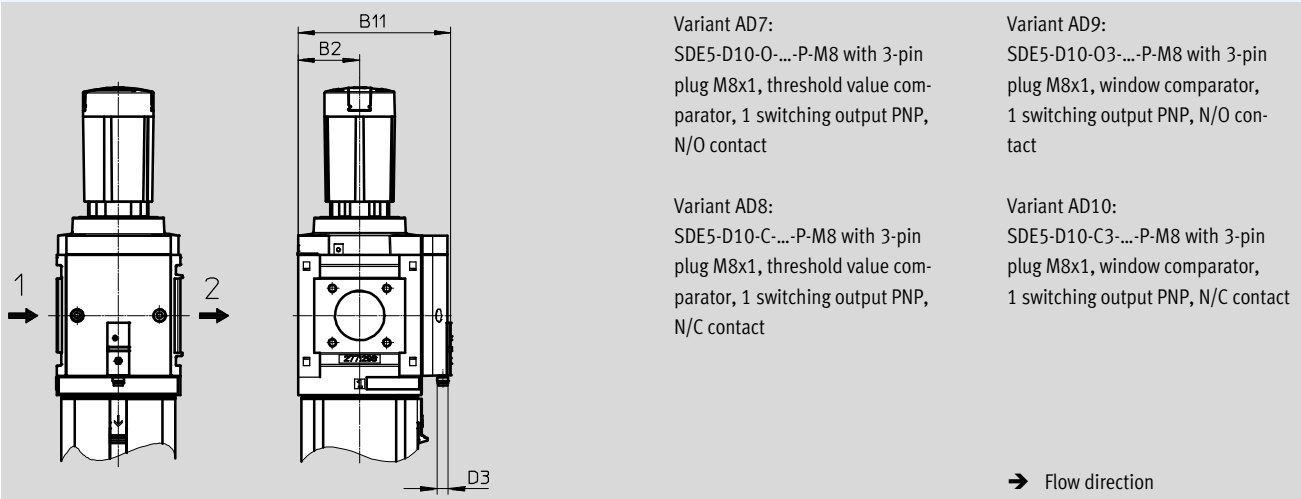
Dimensions – Pressure gauge alternatives

Download CAD data → www.festo.com

Pressure sensor without LCD display (operational status indicator only)

Technical data → Internet: sde5

AD7 ... AD10



Variant AD7:
SDE5-D10-0-...-P-M8 with 3-pin plug M8x1, threshold value comparator, 1 switching output PNP, N/O contact

Variant AD9:
SDE5-D10-03-...-P-M8 with 3-pin plug M8x1, window comparator, 1 switching output PNP, N/O contact

Variant AD8:
SDE5-D10-C-...-P-M8 with 3-pin plug M8x1, threshold value comparator, 1 switching output PNP, N/C contact

Variant AD10:
SDE5-D10-C3-...-P-M8 with 3-pin plug M8x1, window comparator, 1 switching output PNP, N/C contact

Type	B2	B11	D3
MS9-LFR-...-AD7/AD8/AD9/AD10	45	112	M8x1

Filter regulators MS9-LFR, MS series

Technical data

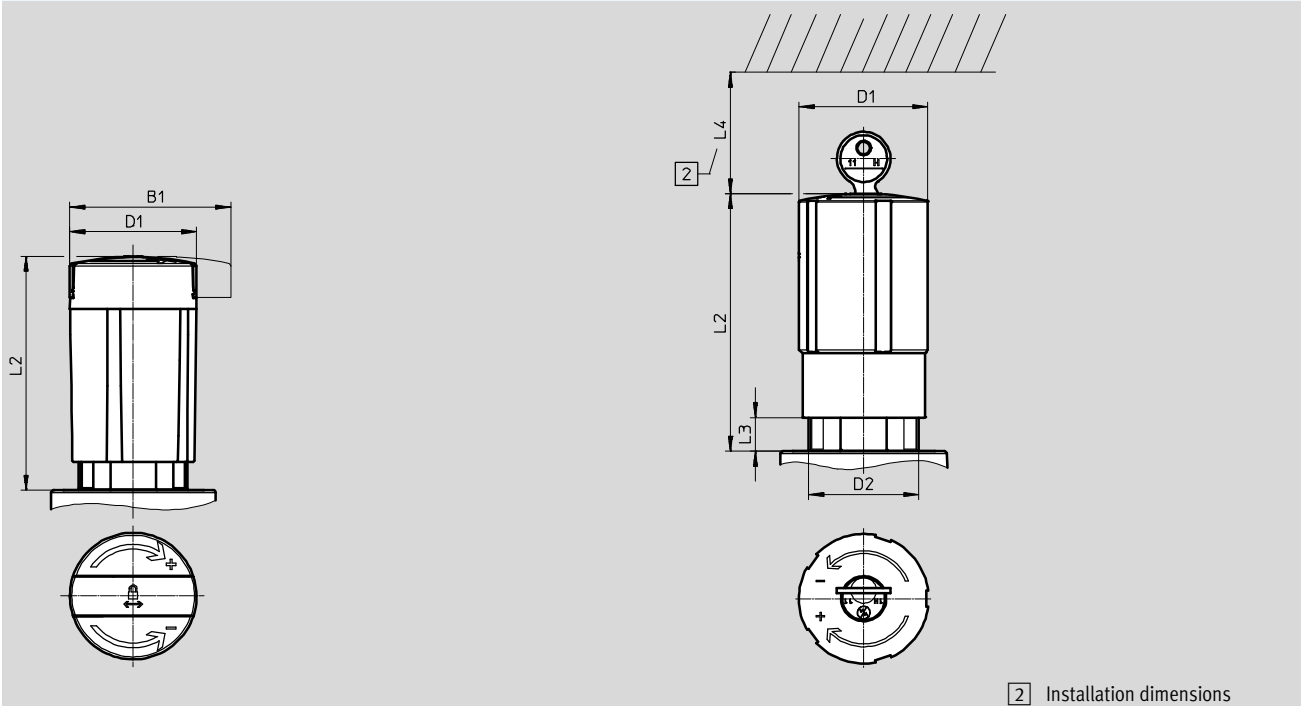
FESTO

Dimensions – Rotary knob

Download CAD data → www.festo.com

Rotary knob with detent, lockable via accessories AS

Rotary knob with integrated lock E11



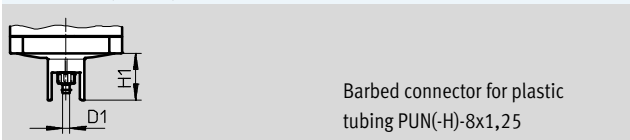
2 Installation dimensions

Type	B1	D1	D2	L2	L3	L4
MS9-LFR-...-AS	64.4	51.2	M44x1	94.5	-	-
MS9-LFR-...-E11	-			103.5	13.5	60

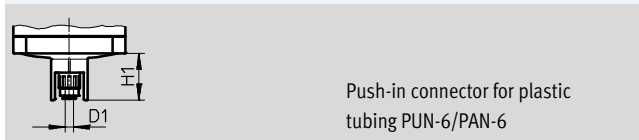
Dimensions – Condensate drain

Download CAD data → www.festo.com

Manual rotary M/fully automatic V

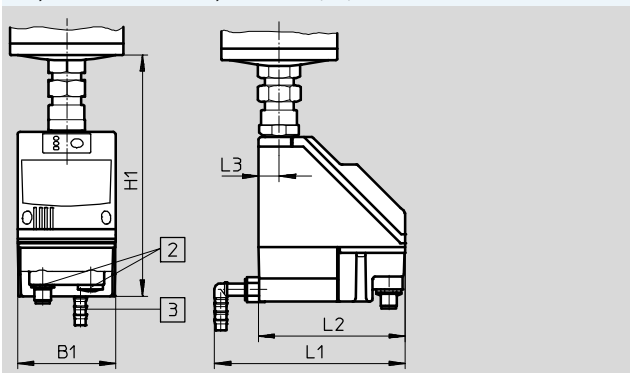


Semi-automatic H



Fully automatic, electrically actuated E2/E3/E4

Technical data → Internet: [pwea](http://pwea.com)



Condensate drain PWEA:
 2 Electrical connection: Screw terminal PG9
 3 Connection 360° rotatable for plastic tubing PUN-H-12x2

Type	B1	D1	H1	L1	L2	L3
MS9-LFR-...-M/V	-	5.6	34.5	-	-	-
MS9-LFR-...-H		6.2				
MS9-LFR-...-E2/E3/E4	72	-	178	140	108	15

Filter regulators MS9-LFR, MS series

Technical data

Ordering data					
Size	Condensate drain	Grade of filtration 5 µm		Grade of filtration 40 µm	
		Part No.	Type	Part No.	Type
Pressure regulation range 0.5 ... 7 bar, piloted filter-diaphragm regulator, integrated MS pressure gauge with standard scale AG, display unit [bar], rotary knob with detent, lockable via accessories					
MS9	Manual rotary	564114	MS9-LFR-G-D6-CUM-AG-BAR-AS	564110	MS9-LFR-G-D6-EUM-AG-BAR-AS
	Fully automatic	564115	MS9-LFR-G-D6-CUV-AG-BAR-AS	564111	MS9-LFR-G-D6-EUV-AG-BAR-AS
Pressure regulation range 0.5 ... 7 bar, directly actuated filter-diaphragm regulator, integrated MS pressure gauge with standard scale AG, display unit [bar], rotary knob with detent, lockable via accessories					
MS9	Manual rotary	564116	MS9-LFR-G-D6-CUM-DI-AG-BAR-AS	564112	MS9-LFR-G-D6-EUM-DI-AG-BAR-AS
	Fully automatic	564117	MS9-LFR-G-D6-CUV-DI-AG-BAR-AS	564113	MS9-LFR-G-D6-EUV-DI-AG-BAR-AS
Pressure regulation range 0.5 ... 7 bar, directly actuated filter-diaphragm regulator, integrated MS pressure gauge with standard scale AG, display unit [psi], rotary knob with detent, lockable via accessories					
MS9	Manual rotary	564128	MS9-LFR-NG-D6-CUM-DI-AG-PSI-AS	564124	MS9-LFR-NG-D6-EUM-DI-AG-PSI-AS
	Fully automatic	564129	MS9-LFR-NG-D6-CUV-DI-AG-PSI-AS	564125	MS9-LFR-NG-D6-EUV-DI-AG-PSI-AS
Pressure regulation range 0.5 ... 12 bar, piloted filter-diaphragm regulator, integrated MS pressure gauge with standard scale AG, display unit [bar], rotary knob with detent, lockable via accessories					
MS9	Manual rotary	564120	MS9-LFR-G-D7-CUM-AG-BAR-AS	564118	MS9-LFR-G-D7-EUM-AG-BAR-AS
	Fully automatic	564121	MS9-LFR-G-D7-CUV-AG-BAR-AS	564119	MS9-LFR-G-D7-EUV-AG-BAR-AS

Filter regulators MS9-LFR, MS series

Ordering data – Modular products

Ordering table		Grid dimension [mm]	90	Condi- tions	Code	Enter code	
M	Module No.	562531					
	Series	Standard			MS	MS	
	Size	9			9	9	
	Function	Filter regulator			-LFR	-LFR	
	Pneumatic connection	Female thread G $\frac{3}{4}$		1	-$\frac{3}{4}$		
		Female thread G1		1	-1		
		Connecting plate G $\frac{1}{2}$			-AGD		
		Connecting plate G $\frac{3}{4}$			-AGE		
		Connecting plate G1			-AGF		
		Connecting plate G1 $\frac{1}{4}$			-AGG		
		Connecting plate G1 $\frac{1}{2}$			-AGH		
		Female thread NPT $\frac{3}{4}$		1	-N$\frac{3}{4}$		
		Female thread NPT1		1	-N1		
		Connecting plate NPT $\frac{1}{2}$		1	-AQR		
		Connecting plate NPT $\frac{3}{4}$		1	-AQS		
		Connecting plate NPT1		1	-AQT		
		Connecting plate NPT1 $\frac{1}{4}$		1	-AQU		
		Connecting plate NPT1 $\frac{1}{2}$		1	-AQV		
		Module without connecting thread, without connecting plate		1	-G		
		Module without connecting thread, without connecting plate (inch)		1	-NG		
		Pressure regulation range/ operation mode	0.5 ... 4 bar, manually operated			-D5	
	0.5 ... 7 bar, manually operated				-D6		
	0.5 ... 12 bar, manually operated				-D7		
	0.5 ... 16 bar, manually operated			1	-D8		
	Grade of filtration	40 μ m			-E		
		5 μ m			-C		
	Bowl	Metal bowl			-U	-U	
	Condensate drain	Manual			-M		
		Semi-automatic (P1 max. 12 bar)			-H		
		Fully automatic (P1 max. 12 bar)			-V		
		External, fully automatic, electric	115 V AC, terminals (P1 max. 16 bar)		1	-E2	
			230 V AC, terminals (P1 max. 16 bar)		1	-E3	
	24 V DC, terminals (P1 max. 16 bar)		1	-E4			

1 $\frac{3}{4}$, 1, N $\frac{3}{4}$, N1, AQR, AQS, AQT, AQU, AQV, G, NG, D8, E2, E3, E4, AD7, AD8, AD9, AD10, E11, WPM
Not with EU certification EX4

- M** Mandatory data
- O** Options

Transfer order code

562531 MS 9 - LFR - [] - [] - [] - U - []

Filter regulators MS9-LFR, MS series

Ordering data – Modular products

Ordering table					
Grid dimension	[mm]	90	Condi- tions	Code	Enter code
<input type="checkbox"/>	Regulator type	Directly actuated	<input type="checkbox"/> 2	-DI	
<input type="checkbox"/>	Pressure gauge/pressure gauge alternatives	MS pressure gauge		-AG	
		Cover plate		-VS	
		Adapter plate for EN pressure gauge 1/4, without pressure gauge		-A4	
		Integrated pressure gauge, red/green scale	<input type="checkbox"/> 3	-RG	
		Pressure sensor with operational status indicator, plug M8, threshold value comparator, PNP, N/O contact	<input type="checkbox"/> 1 <input type="checkbox"/> 4	-AD7	
		Pressure sensor with operational status indicator, plug M8, threshold value comparator, PNP, N/C contact	<input type="checkbox"/> 1 <input type="checkbox"/> 4	-AD8	
		Pressure sensor with operational status indicator, plug M8, window comparator, PNP, N/O contact	<input type="checkbox"/> 1 <input type="checkbox"/> 4	-AD9	
		Pressure sensor with operational status indicator, plug M8, window comparator, PNP, N/C contact	<input type="checkbox"/> 1 <input type="checkbox"/> 4	-AD10	
<input type="checkbox"/>	Alternative pressure gauge scale	psi	<input type="checkbox"/> 5	-PSI	
		MPa	<input type="checkbox"/> 5	-MPA	
		bar	<input type="checkbox"/> 5	-BAR	
	Secondary venting	Without secondary venting	<input type="checkbox"/> 6	-OS	
<input type="checkbox"/>	Security	Lockable via accessories		-AS	
		With integrated lock	<input type="checkbox"/> 1	-E11	
<input type="checkbox"/>	Type of mounting	Mounting bracket standard design	<input type="checkbox"/> 7	-WP	
		Mounting bracket for attaching the service units	<input type="checkbox"/> 1 <input type="checkbox"/> 7	-WPM	
		Mounting bracket for large wall gap	<input type="checkbox"/> 7	-WPB	
	EU certification	II 2GD to EU Explosion Protection Directive (ATEX)		-EX4	
	UL certification	cULus, ordinary location for Canada and USA		-UL1	
	Flow direction	Flow direction from right to left		-Z	

- 1 3/4, 1, N3/4, N1, AQR, AQS, AQT, AQU, AQV, G, NG, D8, E2, E3, E4, AD7, AD8, AD9, AD10, 6 OS Only with regulator type DI
- E11, WPM** 7 WP, WPM, WPB Not with pneumatic connection G/NG
- Not with EU certification EX4
- 2 DI Not with pressure regulation range D7, D8
- 3 RG Not with alternative pressure gauge scale PSI
- PSI scale serves only as an auxiliary scale
- 4 AD7 ... AD10 Measuring range max. 10 bar
- 5 PSI, MPA, BAR Not with pressure gauge alternatives VS, A4, AD7, AD8, AD9, AD10

- Mandatory data
- Options

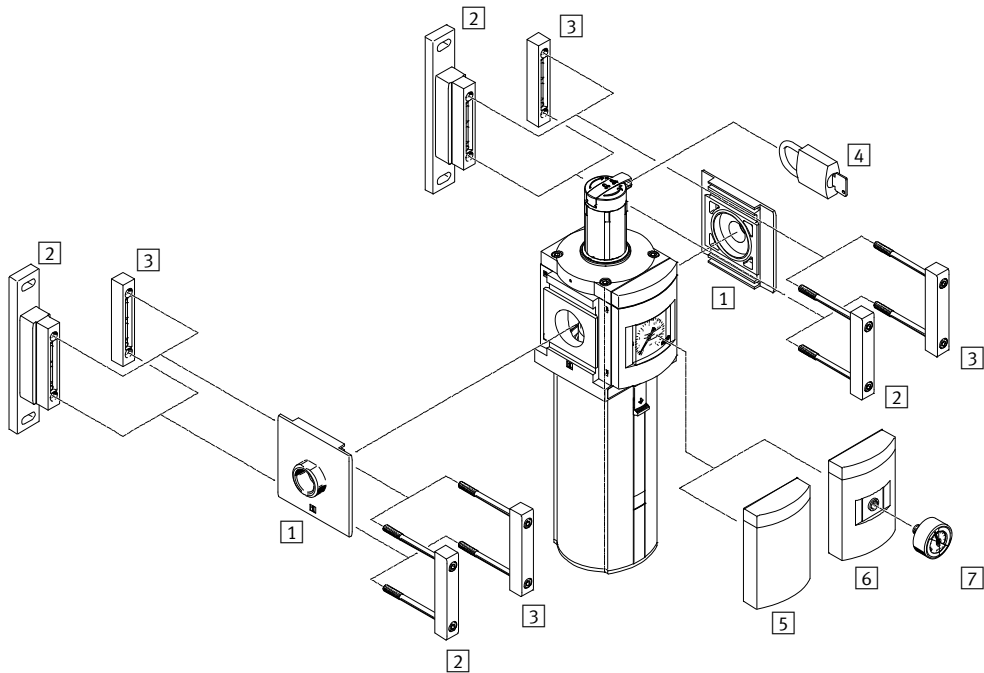
Transfer order code


- - - - - - - - - -

Filter regulators MS12-LFR, MS series

Peripherals overview

Filter regulators MS12-LFR



-  - Note
 Additional accessories:
 - Module connector for combination with size MS9 → Internet: armv

Mounting attachments and accessories

		→ Page/Internet
1	Connecting plate-SET MS12-AG...	ms12-ag
2	Mounting bracket MS12-WP	ms12-wp
3	Module connector MS12-MV	ms12-mv
4	Padlock LRVS-D	61
5	Cover plate VS	56
6	Adapter for EN pressure gauge 1/4 A4	56
7	Pressure gauge MA	61

Filter regulators MS12-LFR, MS series

Type codes

MS 12 - LFR - G - D7 - C U V - LD - AS

Series	
MS	Standard service unit
Size	
12	Grid dimension 124 mm
Service function	
LFR	Filter regulator
Pneumatic connection	
G	Module without connecting thread, without connecting plate Connecting plates → Accessories
Pressure regulation range	
D7	Pressure regulation range 0.5 ... 12 bar
Grade of filtration	
C	5 µm
E	40 µm
Bowl guard	
U	Integrated as metal bowl
Condensate drain	
V	Fully automatic
Rotary knob	
LD	Long rotary knob
Security	
AS	Rotary knob with detent, lockable via accessories

Further variants can be ordered using the modular system → 56

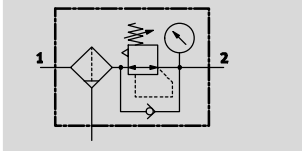
- Pneumatic connection
- Pressure regulation range
- Condensate drain
- Pressure gauge alternatives
- Alternative pressure gauge scale
- Security
- Type of mounting
- Flow direction

Filter regulators MS12-LFR, MS series

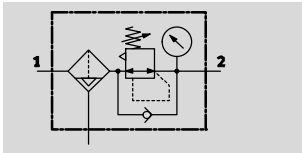
Technical data





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Function
Condensate drain
manual rotary
with pressure gauge



Condensate drain
fully automatic
with pressure gauge




-  - Flow rate
11,000 ... 17,000 l/min
-  - Temperature range
-10 ... +60 °C
-  - Operating pressure
0.8 ... 20 bar
-  - www.festo.com



With this device, the filter and pressure regulator are combined into a single unit. The sintered filter with water separator removes contamination, pipe sinter, rust and condensate from the compressed air.

- Good control characteristics with low hysteresis and primary pressure compensation
- Good particle and condensate separation
- High flow rates
- Pilot actuated diaphragm regulator without intrinsic air consumption
- Three pressure regulation ranges: 0.3 ... 7 bar, 0.5 ... 12 bar and 0.5 ... 16 bar
- Pressure gauge connection for different fitting options
- Available with manual, fully automatic or fully automatic, electrically actuated condensate drain
- Regulator lock for protecting the values against adjustment
- Choice of filter cartridges: 5 µm or 40 µm
- New filter cartridges → 60

General technical data		
Pneumatic connection 1, 2		
Connecting plate AG...		G1, G1¼, G1½ or G2
Module without connecting thread/plate G		-
Design		
Filter regulator with/without pressure gauge		
Sintered filter with centrifugal separation		
Pilot actuated diaphragm regulator		
Regulating function		
Output pressure constant, with primary pressure compensation, with secondary venting		
Type of mounting		
Via accessories		
In-line installation		
Assembly position		
Vertical ±5°		
Grade of filtration [µm]		5
		40
Air purity class at the output		
Compressed air in accordance with ISO 8573-1:2010 [6:4:4] (Grade of filtration 5 µm)		
Compressed air in accordance with ISO 8573-1:2010 [7:4:4] (Grade of filtration 40 µm)		
Bowl guard		
Integrated as metal bowl		
Condensate drain		
Manual rotary		
Fully automatic		
Fully automatic, electrical actuated		
Regulator lock		
Rotary knob with detent, lockable via accessories		
Rotary knob with integrated lock		
Pressure regulation range		D6 [bar]
		0.3 ... 7
		D7 [bar]
		0.5 ... 12
		D8 [bar]
		0.5 ... 16
Max. hysteresis [bar]		0.4
Pressure indicator		
With pressure gauge		
Max. condensate volume [cm³]		400

-  - Note: This product conforms to ISO 1179-1 and to ISO 228-1

Filter regulators MS12-LFR, MS series

Technical data

Standard nominal flow rate $q_{nN}^{1)}$ [l/min]					
Pneumatic connection	G1	G1¼	G1½	G2	
Grade of filtration	5 µm	11,000	11,500	12,000	14,000
	40 µm	12,000	12,500	13,000	17,000

- 1) Dependent on connecting plate selected, must be ordered separately as an accessory → Internet: ms12-ag
 measured at $p_1 = 10$ bar and $p_2 = 6$ bar, $\Delta p = 0.5$ bar
 - 125 l/min must be available for the fully automatic condensate drain to close correctly.

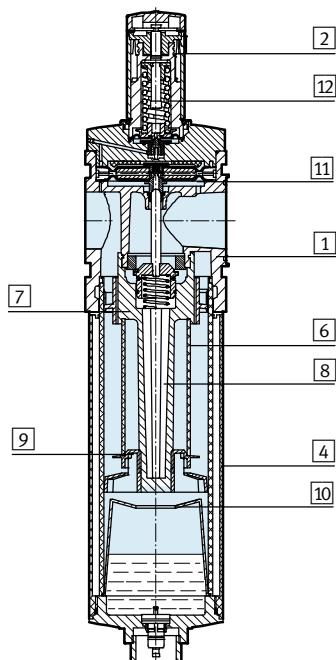
Operating and environmental conditions			
Condensate drain	Manual rotary M	Fully automatic V	Fully automatic, electrically actuated E2/E3/E4
Operating pressure [bar]	0.8 ... 20	2 ... 12	0.8 ... 16
Operating medium	Compressed air in accordance with ISO 8573-1:2010 [-:4:-]	Compressed air in accordance with ISO 8573-1:2010 [7:4:-]	Compressed air in accordance with ISO 8573-1:2010 [-:4:-]
	Inert gases		
Ambient temperature [°C]	-10 ... +60	+5 ... +60	+1 ... +60
Temperature of medium [°C]	-10 ... +60	+5 ... +60	+1 ... +60
Storage temperature [°C]	-10 ... +60	-10 ... +60	+1 ... +60
Corrosion resistance class CRC ¹⁾	2		

- 1) Corrosion resistance class CRC 2 to Festo standard FN 940070
 Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.

Weights [g]		
Rotary knob	Without integrated lock E11	With integrated lock E11
Filter regulator with metal bowl U	7,000	7,300
Filter regulator with metal bowl U and fully automatic, electrically actuated condensate drain E2/E3/E4	7,700	8,000

Materials

Sectional view



Filter regulator		
1	Body	Die-cast aluminium
2	Rotary knob	PA
	Rotary knob with integrated lock E11	Aluminium
4	Metal bowl	Wrought aluminium alloy
6	Filter element	Sintered bronze
7	Spin disc	POM
8	Filter holder	POM
9	Separating plate	POM
10	Stabilising disc	POM
11	Diaphragm	NBR
12	Spring	Steel
-	Seals	NBR

Filter regulators MS12-LFR, MS series

Technical data



Standard flow rate q_n as a function of output pressure p_2

Grade of filtration 40 μm

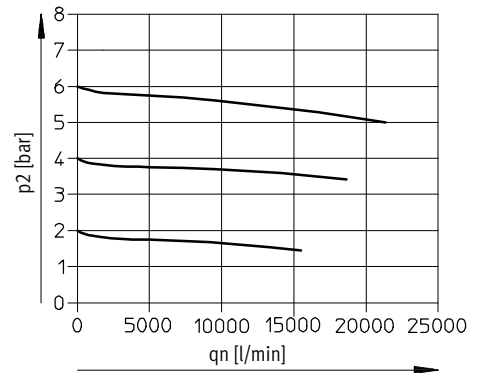
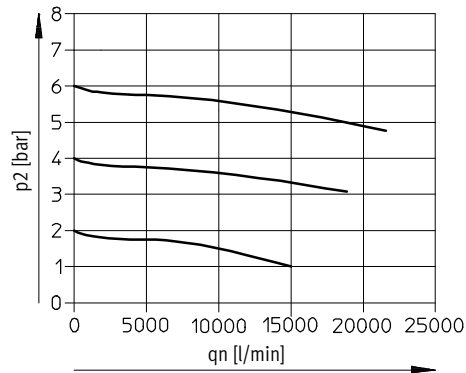
With connecting plate MS12-AGF

Pneumatic connection G1

With connecting plate MS12-AGG

Pneumatic connection G1¼

Input pressure $p_1 = 10$ bar



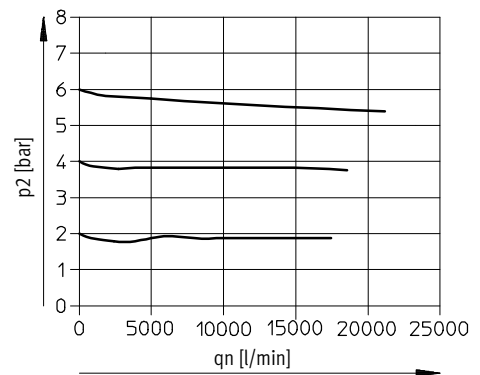
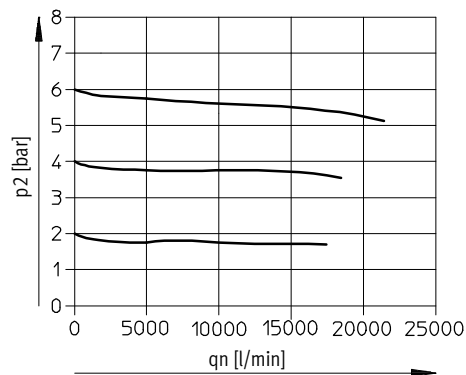
With connecting plate MS12-AGH

Pneumatic connection G1½

With connecting plate MS12-AGI

Pneumatic connection G2

Input pressure $p_1 = 10$ bar



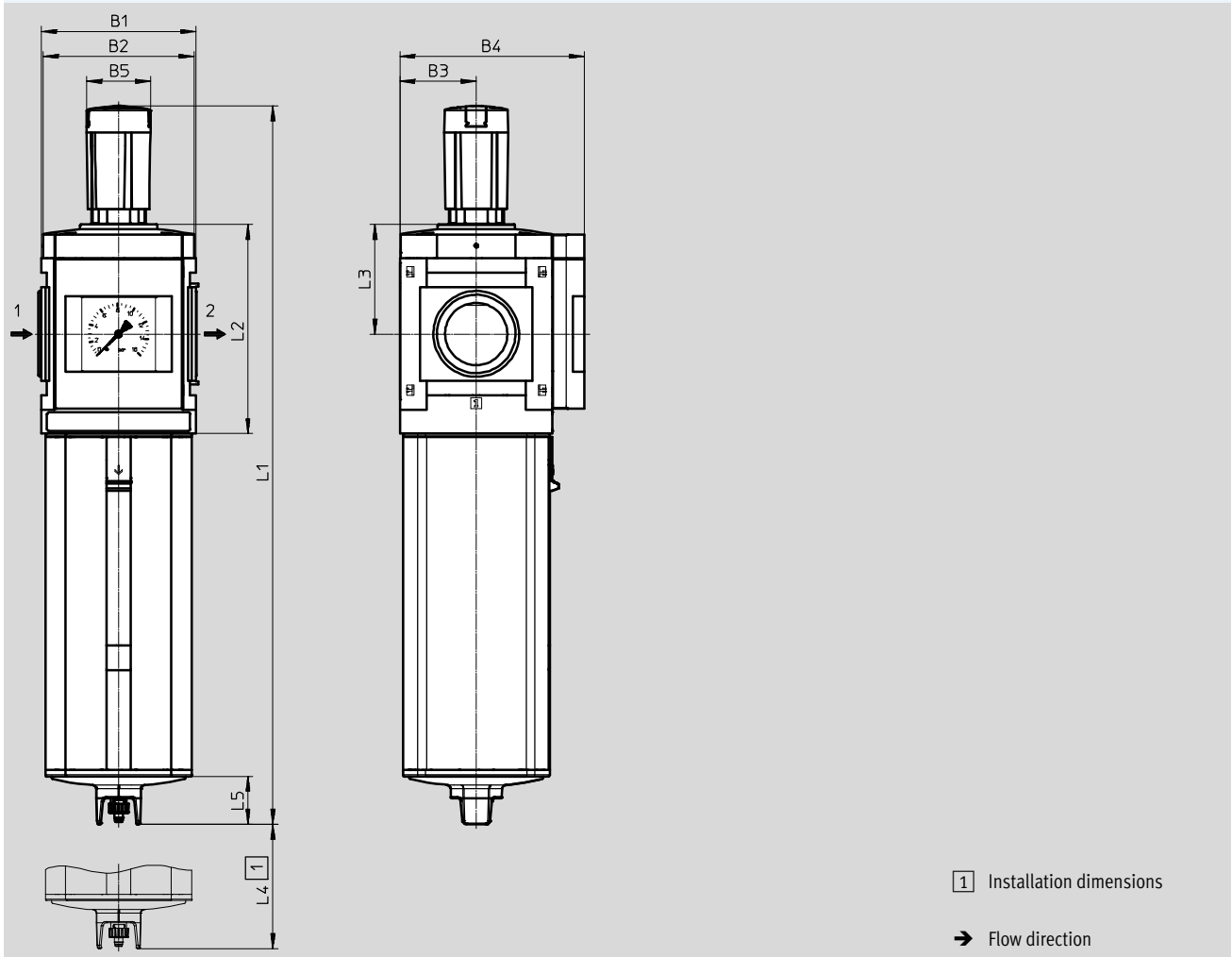
Filter regulators MS12-LFR, MS series

Technical data

Dimensions – Basic version

Download CAD data → www.festo.com

Module without connecting thread, without connecting plate, integrated MS pressure gauge with standard scale, long rotary knob with detent, lockable via accessories



Type	B1	B2	B3	B4	B5	L1	L2	L3	L4	L5
MS12-LFR-G	124	122	61	148	51.2 ∅	577	168	88	250	39

Filter regulators MS12-LFR, MS series

Technical data

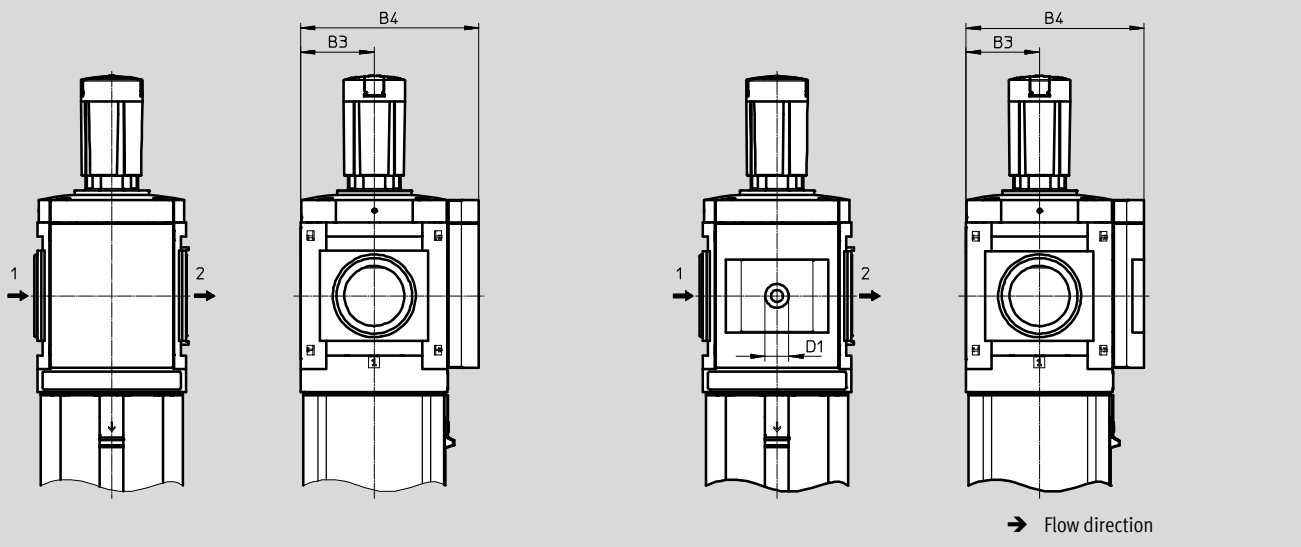
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Dimensions – Pressure gauge alternatives

Download CAD data → www.festo.com

Cover plate VS

Adapter A4 for EN pressure gauge 1/4, without pressure gauge



Type	B3	B4	D4
MS12-LFR-...-VS	61	148	–
MS12-LFR-...-A4	61	148	G1/4

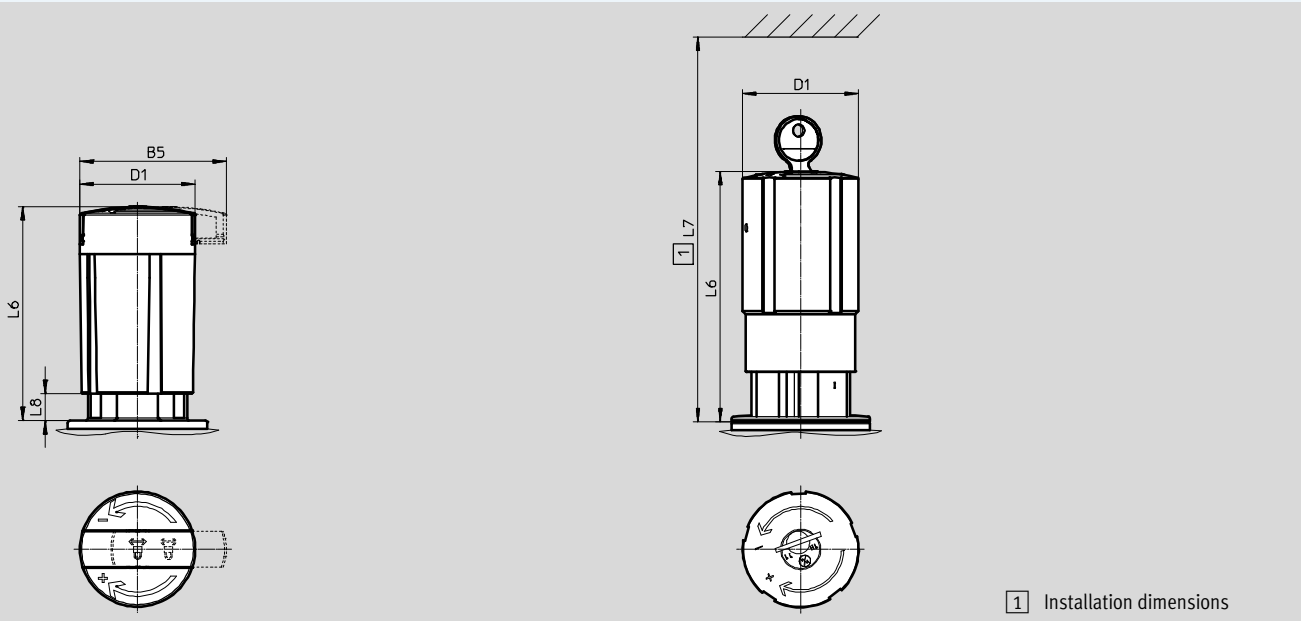
– Note: This product conforms to ISO 1179-1 and to ISO 228-1

Dimensions – Rotary knob

Download CAD data → www.festo.com

Long rotary knob with detent, lockable via accessories LD-AS

Rotary knob with integrated lock E11



Type	B5	D1	L6	L7	L8
MS12-LFR-...-LD-AS	64.4	51.2	96	–	12
MS12-LFR-...-E11	–	51.8	112	172	–

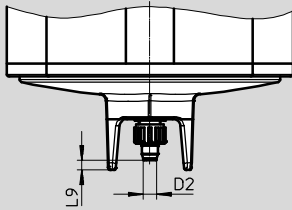
Filter regulators MS12-LFR, MS series

Technical data

Dimensions – Condensate drain

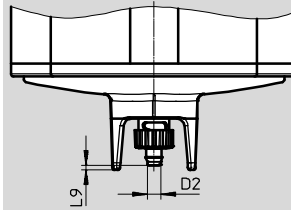
Download CAD data → www.festo.com

Manual rotary M



Barbed connector for plastic tubing PUN(-H)-8x1,25

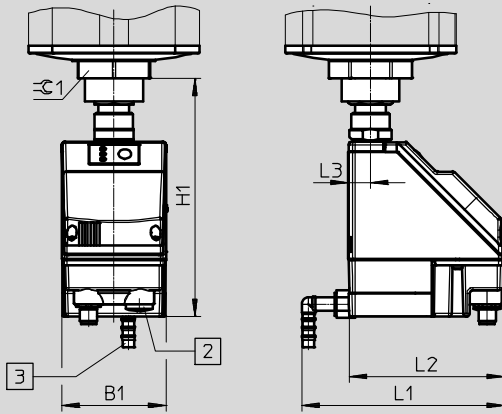
Fully automatic V



Barbed connector for plastic tubing PUN(-H)-8x1,25

Fully automatic, electrically actuated E2/E3/E4

Technical data → Internet: pwea



Condensate drain PWEA:

- 2 Electrical connection: Screw terminal PG9
- 3 Connection 360° rotatable for plastic tubing PUN-H-12x2

Type	B1	D2 Ø	H1	L1	L2	L3	L9	≈ 1
MS12-LFR-...-M	–	5.6	–	–	–	–	4	–
MS12-LFR-...-V	–	5.6	–	–	–	–	2	–
MS12-LFR-...-E2/E3/E4	72	–	164	140	108	15	–	50

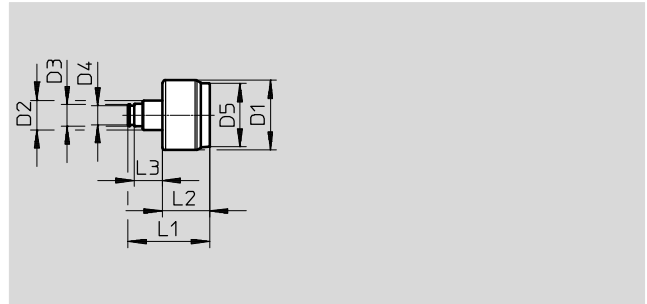
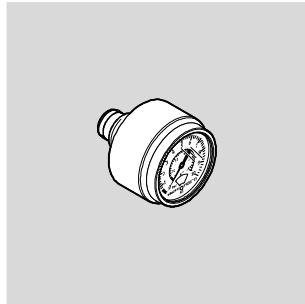
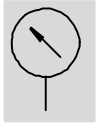
Ordering data

Size	Condensate drain	Grade of filtration 5 µm		Grade of filtration 40 µm	
		Part No.	Type	Part No.	Type
Pressure regulation range 0.5 ... 1.2 bar, metal bowl, integrated MS pressure gauge with standard scale, display unit [bar], long rotary knob with detent, lockable via accessories					
MS12	Fully automatic	537150	MS12-LFR-G-D7-CUV-LD-AS	537149	MS12-LFR-G-D7-EUV-LD-AS

Filter regulators MS2-LFR, MS series

Accessories

Pressure gauge PAGN



Dimensions							
D1	D2	D3	D4	D5	L1	L2	L3
∅		∅	∅	∅			
			±0.05				
23	G1/8	7.1	6.2	20.8	26.8	15.5	9.3

General technical data	
Nominal size	23
Pneumatic connection	G1/8 with sealing ring
Operating medium	Inert gases Neutral fluids
Note on operating/ pilot medium	No oxygen No acetylene
Design	Bourdon tube pressure gauge
Type of mounting	In-line installation
Connection position	Centred, rear side
Ambient temperature [°C]	-5 ... +50
Temperature of medium [°C]	-5 ... +50 ¹⁾
Storage temperature [°C]	-5 ... +50
Measurement accuracy class	4
Continuous load factor	0.75
Intermittent load factor	0.6
Degree of protection	IP44
Weight [g]	6

1) If the temperature of the medium used is below 0°C, ensure the operating medium is dry.

Materials	
Housing	ABS (colour: black)
Inspection window	PMMA
Screwed trunnion	ABS reinforced
Materials in contact with the medium	ABS reinforced, brass
Note on materials	RoHS-compliant

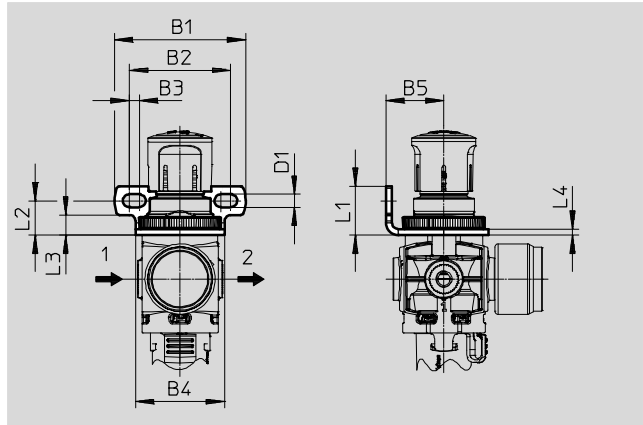
Ordering data						
Nominal size	Pneumatic connection	Operating pressure	Display range		Part No.	Type
			Outer scale	Inner scale		
23	G1/8 with sealing ring	0 ... 10 bar	0 ... 10 bar	0 ... 145 psi	8088991	PAGN-23-10-G18S
		0 ... 1 MPa	0 ... 1 MPa	–		

Filter regulators MS2-LFR, MS series

Accessories

Mounting bracket MS2-WR

- For wall mounting
- For filter regulator, pressure regulator
- Knurled nut included in scope of delivery



Dimensions									
B1	B2	B3	B4	B5	D1	L1	L2	L3	L4
±0.2			±0.15		±0.1		±0.5		
4.3	33.3	3.3	29.2	19	4.2	16	11.3	6.6	2

Materials	
Mounting bracket	Steel
Note on materials:	RoHS-compliant

Ordering data				
Size	CRC ¹⁾	Weight [g]	Part No.	Type
MS2	1	13.8	8087978	MS2-WR

1) Corrosion resistance class CRC 1 to Festo standard FN 940070
 Low corrosion stress. For dry indoor applications or transport and storage protection. Also applies to parts behind covers, in the non-visible interior area, and parts which are covered in the application (e.g. drive trunnions).

Nut MS2-WRS

- For front panel mounting



Materials	
Note on materials:	RoHS-compliant

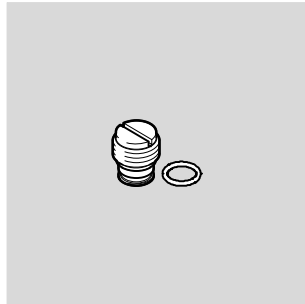
Ordering data				
Size	CRC ¹⁾	Weight [g]	Part No.	Type
MS2	1	0.7	8098037	MS2-WRS

1) Corrosion resistance class CRC 1 to Festo standard FN 940070
 Low corrosion stress. For dry indoor applications or transport and storage protection. Also applies to parts behind covers, in the non-visible interior area, and parts which are covered in the application (e.g. drive trunnions).

Filter regulators MS2-LFR, MS series

Accessories

Plug screw MS2-G18S

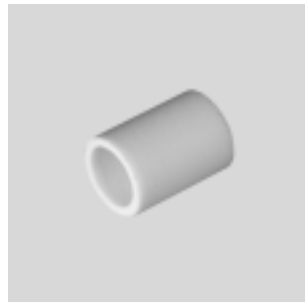


Materials	
Note on materials:	RoHS-compliant

Ordering data				
Size	CRC ¹⁾	Weight [g]	Part No.	Type
MS2	1	4.6	8095766	MS2-G18S

1) Corrosion resistance class CRC 1 to Festo standard FN 940070
 Low corrosion stress. For dry indoor applications or transport and storage protection. Also applies to parts behind covers, in the non-visible interior area, and parts which are covered in the application (e.g. drive trunnions).

Filter cartridge LFP



Ordering data			
Size	Grade of filtration [µm]	Part No.	Type
MS2	5	526818	LFP-D-MICRO-5M

Filter regulators MS-LFR, MS series

Accessories

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Filter cartridge MS-LFP

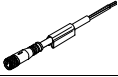





Ordering data			
Size	Grade of filtration [µm]	Part No.	Type
MS4	5 (colour: blue)	534501	MS4-LFP-C
	40 (colour: white)	534502	MS4-LFP-E
MS6	5 (colour: blue)	534499	MS6-LFP-C
	40 (colour: white)	534500	MS6-LFP-E
MS9	5	570309	MS9-LFP-C
	40	570310	MS9-LFP-E
MS12	5	537143	MS12-LFP-C
	40	537144	MS12-LFP-E


Filter regulators MS-LFR, MS series


Accessories

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Ordering data – Connecting cable NEBU-M8				Technical data → Internet: nebu	
	Electrical connection	Number of wires	Cable length [m]	Part No.	Type
	M8x1, straight socket	3	2.5	★ 541333	NEBU-M8G3-K-2.5-LE3
			5	★ 541334	NEBU-M8G3-K-5-LE3
	M8x1, angled socket	3	2.5	★ 541338	NEBU-M8W3-K-2.5-LE3
			5	★ 541341	NEBU-M8W3-K-5-LE3

Ordering data – Connecting cable NEBU-M12				Technical data → Internet: nebu	
	Electrical connection	Number of wires	Cable length [m]	Part No.	Type
	M12x1, straight socket	4	2.5	★ 550326	NEBU-M12G5-K-2.5-LE4
			5	★ 541328	NEBU-M12G5-K-5-LE4
	M12x1, angled socket	4	2.5	550325	NEBU-M12W5-K-2.5-LE4
			5	541329	NEBU-M12W5-K-5-LE4

Ordering data – Pressure gauge MA					Technical data → Internet: ma	
	Nominal size	Pneumatic connection	Indicating range		Part No.	Type
			[bar]	[psi]		
	Pressure gauge MA, DIN EN 837-1				Technical data → Internet: ma	
	40	R $\frac{1}{4}$	0 ... 16	0 ... 232	187080	MA-40-16-R $\frac{1}{4}$ -EN
		G $\frac{1}{4}$	0 ... 16	0 ... 232	183901	MA-40-16-G $\frac{1}{4}$ -EN
	Pressure gauge MA, DIN EN 837-1, with red-green range				Technical data → Internet: ma	
40	R $\frac{1}{8}$	0 ... 16	–	525726	MA-40-16-R $\frac{1}{8}$ -E-RG	
50	R $\frac{1}{4}$	0 ... 16	–	525729	MA-50-16-R $\frac{1}{4}$ -E-RG	

Ordering data – Padlock LRVS-D			Technical data → Internet: ma	
	Weight [g]	Part No.	Type	
	120	193786	LRVS-D	

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