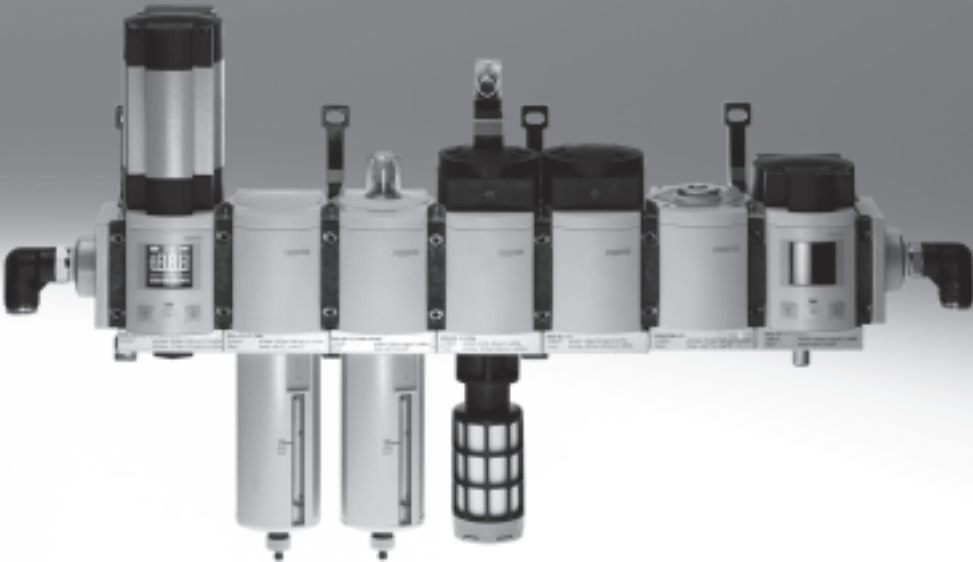
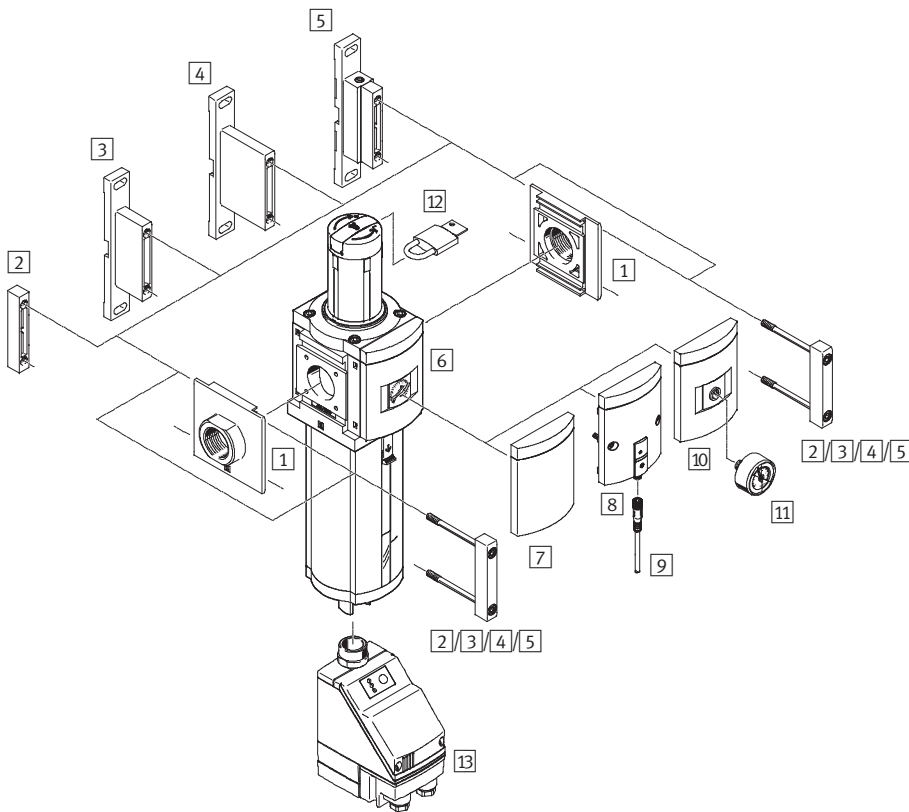



Filter regulators MS-LFR, MS series, NPT



**Filter regulators MS9-LFR, MS series, NPT**

Peripherals overview



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

Mounting attachments and accessories		Individual unit		Combination	→ Page/Internet
		Without connecting thread	With connecting thread NPT $\frac{3}{4}$ -14 or NPT1-11 $\frac{1}{2}$		
1	Connecting plate 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	■	■	■	12
7	Cover plate VS	■	■	■	12
8	Pressure sensor without display AD7 ... AD10	■	■	■	12
9	Connecting cable NEBU-M8...-LE3	■	■	■	15
10	Adapter plate for EN pressure gauge $\frac{1}{4}$ A4	■	■	■	12
11	Pressure gauge MA	■	■	■	15
12	Padlock LRVS-D	■	■	■	15
13	Condensate drain, fully automatic, electrically actuated E1/E2/E3/E4	■	■	■	12

## Filter regulators MS9-LFR, MS series, NPT

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Type codes

		MS	9	-	LFR	-	NG	-	D6	-	E	U	M	-	DI	-	AG	-	PSI	-	AS
<b>Series</b>																					
MS	Standard service unit																				
<b>Size</b>																					
9	Grid dimension 90 mm																				
<b>Service function</b>																					
LFR	Filter regulator																				
<b>Connection size</b>																					
NG	Module without connecting thread, without connecting plate																				
<b>Pressure regulation range/operation mode</b>																					
D6	0.3 ... 7 bar, manually operated																				
D7	0.5 ... 12 bar, manually operated																				
<b>Grade of filtration</b>																					
C	5 µm																				
E	40 µm																				
<b>Bowl guard</b>																					
U	Integrated as metal bowl																				
<b>Condensate drain</b>																					
M	Manual rotary																				
V	Fully automatic																				
<b>Regulator type</b>																					
	Piloted																				
DI	Directly actuated (only with pressure regulation range D6)																				
<b>Pressure gauge</b>																					
AG	MS pressure gauge																				
<b>Pressure gauge scale</b>																					
PSI	Psi																				
<b>Security</b>																					
AS	Rotary knob with detent, can be locked using accessories																				

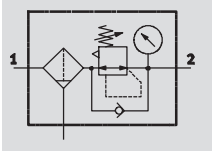
### Additional variants can be ordered using the modular system → 12

- Connecting plates
- Pressure regulation range
- Condensate drain
- Pressure gauge alternatives
- Alternative pressure gauge scale
- Secondary venting
- Security lock
- Type of mounting
- Alternative flow direction

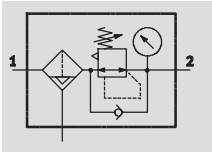
**Filter regulators MS9-LFR, MS series, NPT**

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  
3,600 ... 21,500 l/min
-  - Temperature range  
-10 ... +60 °C
-  - Supply pressure  
0.8 ... 20 bar



- 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: 0.3 ... 4 bar, 0.3 ... 7 bar, 0.5 ... 12 bar and 0.5 ... 16 bar
- Actuator lock to protect set values against adjustment
- Pressure gauge connection for different fitting options
- Available with manual, semi-automatic, fully automatic or fully automatic, electrically actuated condensate drain
- Optional pressure sensor
- Choice of filter cartridges: 5 µm or 40 µm
- New filter cartridges → 14

General technical data					
Pneumatic connection 1, 2		NPT3/4-14	NPT1-11½	NPT1½-14 ... NPT1½-11½ (with connecting plate AQ...)	- (without connecting thread NG)
Design		Piloted filter-diaphragm regulator			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 quality class at the output 3.7.- to DIN ISO 8573-1)			
		40 (air quality class at the output 5.7.- to DIN ISO 8573-1)			
Bowl guard		Integrated as metal bowl			
Condensate drain		Manual rotary			
		Semi-automatic			
		Fully automatic			
		Fully automatic, electrically actuated			
Security		Rotary knob with detent			
		Rotary knob with detent, can be locked using accessories			
		Rotary knob with integrated lock			
Pressure regulation range/operation mode	D5 [bar]	0.3 ... 4, manually operated			
	D6 [bar]	0.3 ... 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...)			
Max. pressure hysteresis		[bar]	0.3		
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			
		G¼ prepared			
Max. condensate volume		[ml]	220		

## Filter regulators MS9-LFR, MS series, NPT

**FESTO**

Technical data

Standard nominal flow rate $q_{nN}^{1)}$ [l/min]			
Pneumatic connection		With connecting thread NPT $\frac{3}{4}$ -14	With connecting thread NPT1-1 $\frac{1}{2}$
		With connecting plate AQR, AQS	With connecting plate AQT, AQU, AQV
Directly actuated diaphragm regulator DI			
Pressure regulation range	D5	8,000 $\pm 15\%^{2)}$	13,000 $\pm 15\%^{2)}$
	D6	7,000 $\pm 15\%$	10,000 $\pm 15\%$

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

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

Operating and environmental conditions				
Condensate drain	Manual rotary	Semi-automatic	Fully automatic	Fully automatic, electrically actuated
	M	H	V	E1 ... E4
Operating pressure [bar]	0.8 ... 20	1.5 ... 12	2 ... 12	0.8 ... 16
Operating medium	Air quality class 5:7:- to DIN ISO 8573-1			
Operating medium with pressure sensor AD	Filtered compressed air, lubricated or unlubricated, grade of filtration 40 $\mu$ m			
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 <sup>1)</sup>	2			

1) Corrosion resistance class 2 according to Festo standard 940 070

Components subject to moderate corrosion stress. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

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 E1 ... E4	2,800	3,100

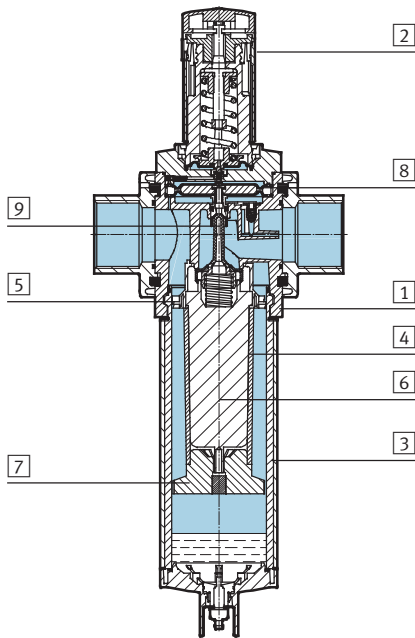
## Filter regulators MS9-LFR, MS series, NPT

Technical data

FESTO

### 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 (not with variant E1, E2, E3 or E4)

## Filter regulators MS9-LFR, MS series, NPT

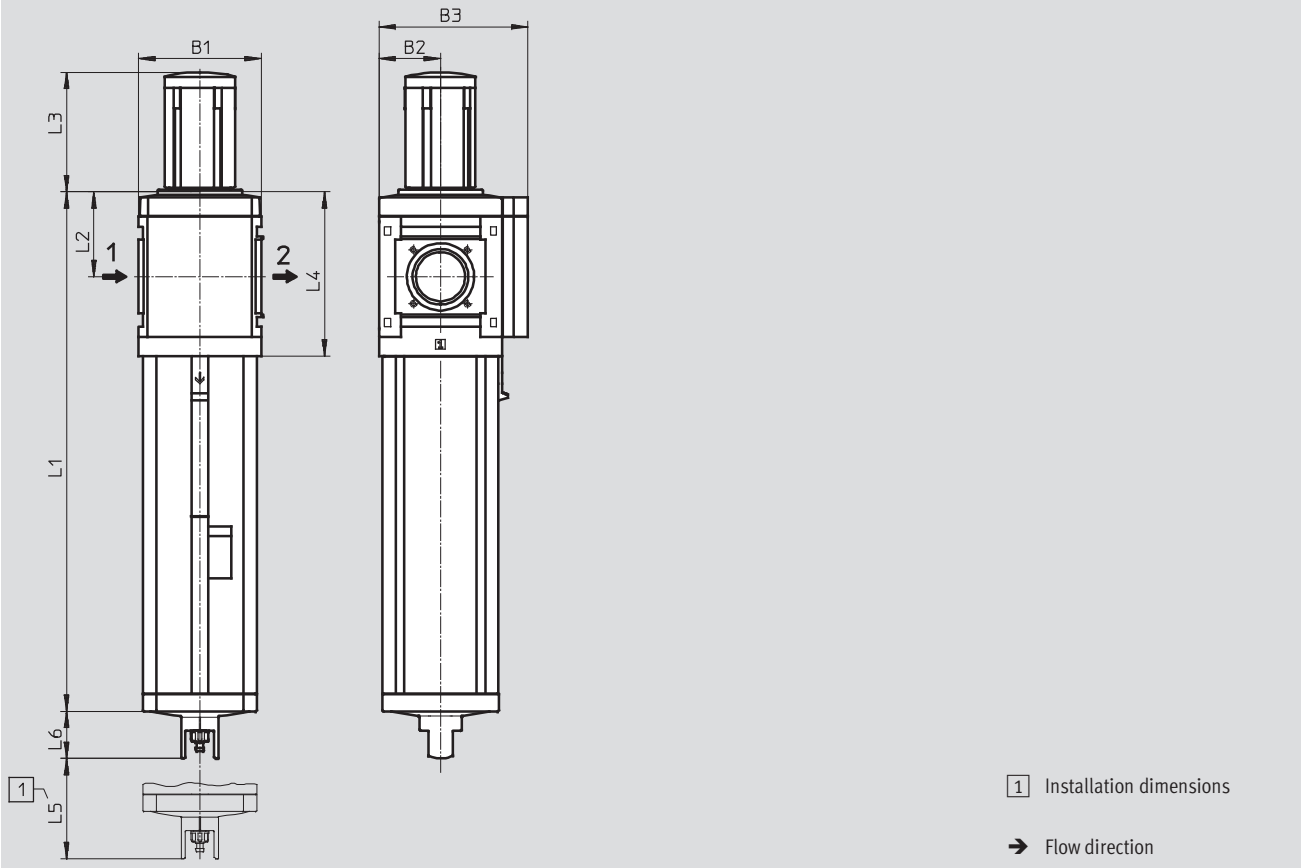
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Technical data

### Dimensions – Basic version

Download CAD data → [www.festo.com](http://www.festo.com)

Without connecting thread NG, rotary knob with detent



Type	B1	B2	B3	L1		L2		L3	L4		L5	L6
				pilot actuated	directly actuated DI	pilot actuated	directly actuated DI		pilot actuated	directly actuated DI		
MS9-LFR-NG	90	45	109	320	313	69	62	86	127	120	150	34.5

**Filter regulators MS9-LFR, MS series, NPT**

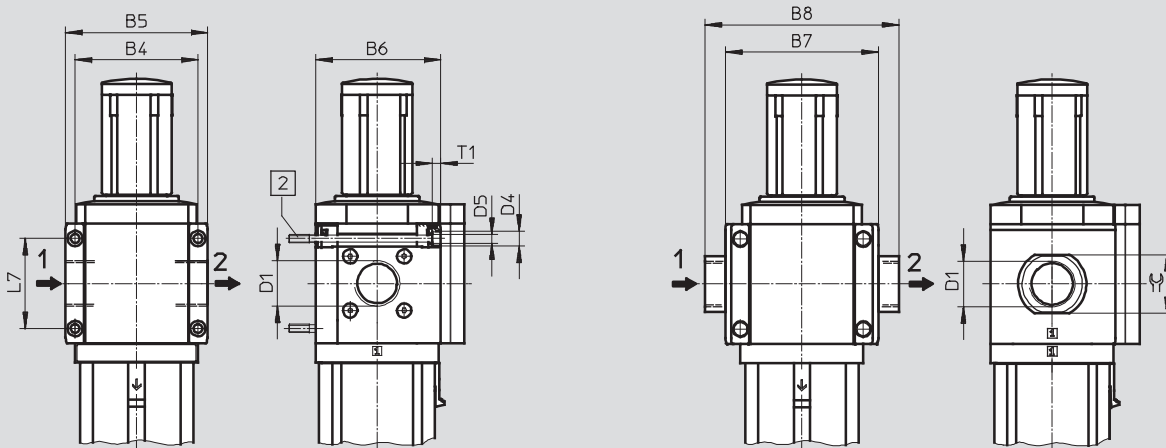
Technical data

**Dimensions – Connecting thread/connecting plate**

Download CAD data → [www.festo.com](http://www.festo.com)

With connecting thread N $\frac{3}{4}$  or N1

With connecting plate AQ...



2 Mounting screw M6x11.90 to DIN 912 (not included in the scope of delivery) for wall mounting without mounting bracket

→ Flow direction

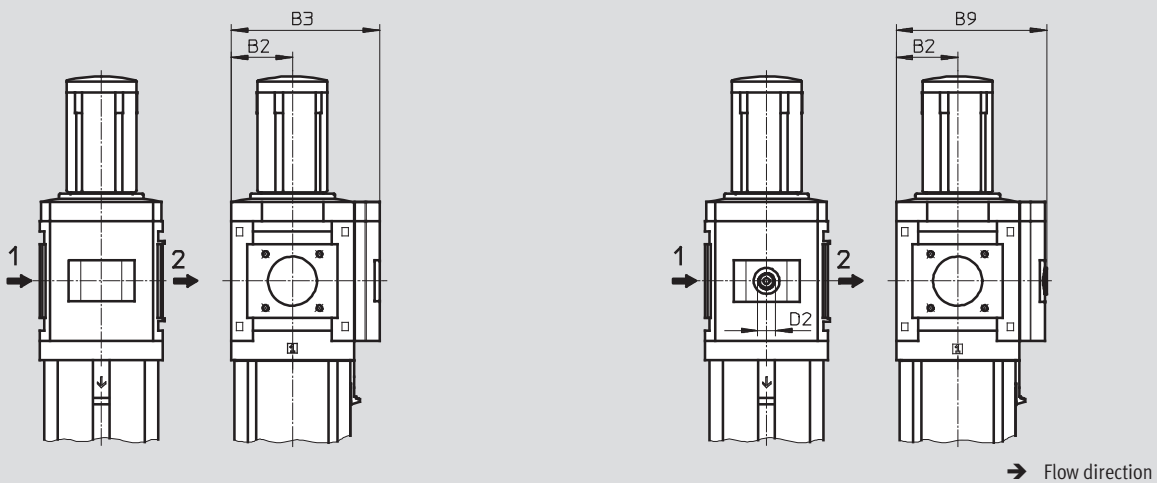
Type	B4	B5	B6	B7	B8	D1	D4	D5	L7	T1	⊕
MS9-LFR-N $\frac{3}{4}$	90	104	91.5	-	-	NPT $\frac{3}{4}$ -14	11	6.5	66	6	-
MS9-LFR-N1						NPT1-11 $\frac{1}{2}$					
MS9-LFR-AQR	-	-	-	112	132	NPT $\frac{1}{2}$ -14	-	-	-	-	30
MS9-LFR-AQS					132	NPT $\frac{3}{4}$ -14					36
MS9-LFR-AQT					142	NPT1-11 $\frac{1}{2}$					41
MS9-LFR-AQU					162	NPT1 $\frac{1}{4}$ -11 $\frac{1}{2}$					50
MS9-LFR-AQV					176	NPT1 $\frac{1}{2}$ -11 $\frac{1}{2}$					55

**Dimensions – Pressure gauge alternatives**

Download CAD data → [www.festo.com](http://www.festo.com)

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

Adapter plate A4 for EN pressure gauge  $\frac{1}{4}$ , without pressure gauge



→ Flow direction

Type	B2	B3	B9	D2
MS9-LFR-...-AG/RG	45	109	-	-
MS9-LFR-...-A4		-	110	G $\frac{1}{4}$



## Filter regulators MS9-LFR, MS series, NPT

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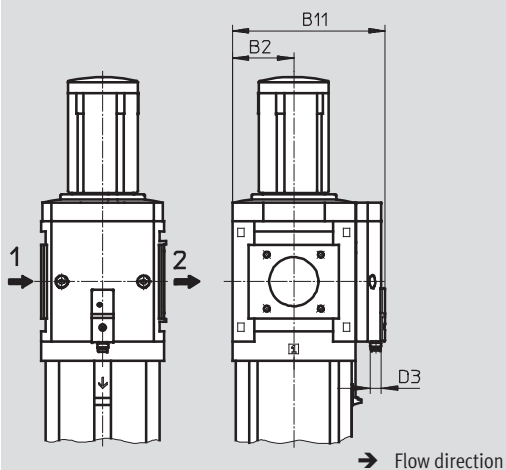
Technical data

### Dimensions – Pressure gauge alternatives

Download CAD data → [www.festo.com](http://www.festo.com)

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

Technical data → Internet: sde5



Variant AD7:  
SDE5-D10-0-...-P-M8 with  
3-pin plug M8x1, threshold  
value comparator, 1 switch-  
ing 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 switch-  
ing 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	B1	D3
MS9-LFR-...-AD7/AD8/AD9/AD10	45	112	M8

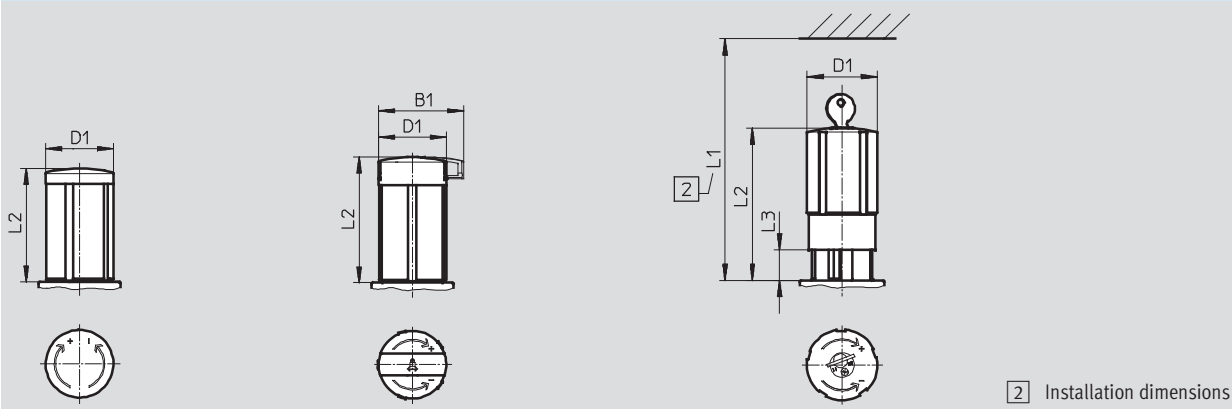
### Dimensions – Rotary knob

Download CAD data → [www.festo.com](http://www.festo.com)

Rotary knob with detent

Rotary knob with detent, can be  
locked using accessories AS

Rotary knob with integrated lock  
E11



Type	B1	D1	L1	L2	L3
MS9-LFR	-	52	-	86	-
MS9-LFR-...-AS	65	52	-	96	-
MS9-LFR-...-E11	-	52	174	114	25

**Filter regulators MS9-LFR, MS series, NPT**

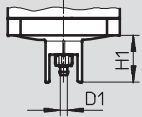
Technical data

**Dimensions – Condensate drain**

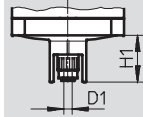
Download CAD data → [www.festo.com](http://www.festo.com)

Manual rotary M/fully automatic V

Semi-automatic H



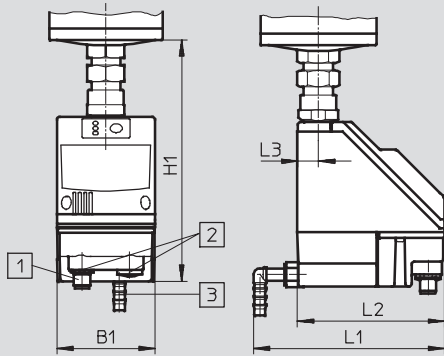
Barbed connector for plastic tubing PCN-4



QS connector for plastic tubing PUN-6/PAN-6

Fully automatic, electrically actuated E1/E2/E3/E4

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



- 1 Variant E1:  
Condensate drain PWEA-AP with plug M12x1, 5-pin for NEBU-M12...-LE5
- 2 Variant E2/E3/E4:  
Condensate drain PWEA-AC with cable connector Pg9

- 3 Connection 360° rotatable for plastic tubing PUN-H-12x2

Type	B1	D1	H1	L1	L2	L3
MS9-LFR-...M/V	-	5	34.5	-	-	-
MS9-LFR-...H		6				
MS9-LFR-...E1/E2/E3/E4	72	-	178	140	108	15

## Filter regulators MS9-LFR, MS series, NPT

FESTO

Technical data

Ordering data						
Pressure regulation range 0.3 ... 7 bar, integrated pressure gauge, display unit [psi], rotary knob with detent, can be locked using accessories						
Size	Condensate drain	Connection	Grade of filtration 5 µm		Grade of filtration 40 µm	
			Part No.	Type	Part No.	Type
<b>Piloted filter-diaphragm regulator</b>						
MS9	Manual rotary	–	564126	MS9-LFR-NG-D6-CUM-AG-PSI-AS	564122	MS9-LFR-NG-D6-EUM-AG-PSI-AS
	Fully automatic	–	564127	MS9-LFR-NG-D6-CUV-AG-PSI-AS	564123	MS9-LFR-NG-D6-EUV-AG-PSI-AS
<b>Directly actuated filter-diaphragm regulator</b>						
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

Ordering data						
Pressure regulation range 0.5 ... 12 bar, integrated pressure gauge, display unit [psi], rotary knob with detent, can be locked using accessories						
Size	Condensate drain	Connection	Grade of filtration 5 µm		Grade of filtration 40 µm	
			Part No.	Type	Part No.	Type
<b>Piloted filter-diaphragm regulator</b>						
MS9	Manual rotary	–	564132	MS9-LFR-NG-D7-CUM-AG-PSI-AS	564130	MS9-LFR-NG-D7-EUM-AG-PSI-AS
	Fully automatic	–	564133	MS9-LFR-NG-D7-CUV-AG-PSI-AS	564131	MS9-LFR-NG-D7-EUV-AG-PSI-AS

**Filter regulators MS9-LFR, MS series, NPT**

Ordering data – Modular products

M Mandatory data →								
Module No.	Series	Size	Function	Connection size	Pressure range/operation mode	Grade of filtration	Bowl	Condensate drain
562531	MS	9	LFR	N $\frac{3}{4}$ , N1, AQR, AQS, AQT, AQU, AQV, NG	D5, D6, D7, D8	E, C	U	M, H, V, E1 ... E4
<b>Ordering example</b>								
<b>562531</b>	<b>MS</b>	<b>9</b>	<b>- LFR</b>	<b>- NG</b>	<b>- D5</b>	<b>- E</b>	<b>- U</b>	<b>- M</b>

Ordering table		Grid dimension	[mm]	90	Condi- tions	Code	Enter code	
M	Module No.	<b>562531</b>						
	Series	Standard				<b>MS</b>	MS	
	Size	9				<b>9</b>	9	
	Function	Filter regulator				<b>-LFR</b>	-LFR	
	Connection size	Thread N $\frac{3}{4}$				<b>-N<math>\frac{3}{4}</math></b>		
		Thread N1				<b>-N1</b>		
		Connecting plate N $\frac{1}{2}$				<b>-AQR</b>		
		Connecting plate N $\frac{3}{4}$				<b>-AQS</b>		
		Connecting plate N1				<b>-AQT</b>		
		Connecting plate N1 $\frac{1}{4}$				<b>-AQU</b>		
		Connecting plate N1 $\frac{1}{2}$				<b>-AQV</b>		
		Module without connecting thread, without connecting plate				<b>-NG</b>		
	Pressure range/operation mode	0.3 ... 4 bar, manually operated				<b>-D5</b>		
		0.3 ... 7 bar, manually operated				<b>-D6</b>		
		0.5 ... 12 bar, manually operated				<b>-D7</b>		
		0.5 ... 16 bar, manually operated				<b>-D8</b>		
	Grade of filtration	40 $\mu$ m				<b>-E</b>		
		5 $\mu$ m				<b>-C</b>		
	Bowl	Metal bowl				<b>-U</b>	-U	
	Condensate drain	Manual				<b>-M</b>		
		Semi-automatic (P1 max. 12 bar)				<b>-H</b>		
		Fully automatic (P1 max. 12 bar)				<b>-V</b>		
		External, fully automatic, electric	24 V DC, M12 (P1 max. 16 bar) - 7 -				<b>-E1</b>	
			110 V AC, terminals (P1 max. 16 bar)				<b>-E2</b>	
			230 V AC, terminals (P1 max. 16 bar)				<b>-E3</b>	
			24 V DC, terminals (P1 max. 16 bar)				<b>-E4</b>	

**Transfer order code**

<b>562531</b>	<b>MS</b>	<b>9</b>	<b>- LFR</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>- U</b>	<b>-</b>
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## Filter regulators MS9-LFR, MS series, NPT

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Ordering data – Modular products

Options		Mandatory data		Options		
Regulator type	Pressure gauge/ pressure gauge alternatives	Alternative pressure gauge scale	Secondary venting	Security	Type of mounting	Alternative flow direction
DI	AG, VS, A4, RG, AD7 ... AD10	PSI, MPA, BAR	OS	AS, E11	WP, WPM, WPB	Z
- DI	- AG	- BAR	- OS	- AS		

Ordering table		Grid dimension	[mm]	90	Condi- tions	Code	Enter code
Options	Regulator type	Directly actuated			1	-DI	
Mandatory	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			2	-RG	
		Pressure sensor without display, plug M8, threshold value comparator, PNP, N/O contact			3	-AD7	
		Pressure sensor without display, plug M8, threshold value comparator, PNP, N/C contact			3	-AD8	
		Pressure sensor without display, plug M8, window comparator, PNP, N/O contact			3	-AD9	
		Pressure sensor without display, plug M8, window comparator, PNP, N/C contact			3	-AD10	
	Alternative pressure gauge scale	Psi			4	-PSI	
		MPa			4	-MPA	
		Bar			4	-BAR	
Options	Secondary venting	Without secondary venting			5	-OS	
	Security	Can be locked using accessories				-AS	
		With integrated lock				-E11	
	Type of mounting	Mounting bracket			6	-WP	
		Mounting bracket			6	-WPM	
		Mounting bracket for large wall gap			6	-WPB	
	Alternative flow direction	Flow direction from right to left				-Z	

- |                 |  |                |                             |
|-----------------|--|----------------|-----------------------------|
| 1 DI            | Not with pressure range D7, D8   | 5 OS           | Only with regulator type DI |
| 2 RG            | Not with alternative pressure gauge scale PSI<br>PSI scale serves only as an auxiliary scale | 6 WP, WPM, WPB | Not with module NG          |
| 3 AD7 ... AD10  | Measuring range max. 10 bar  |                |                             |
| 4 PSI, MPA, BAR | Not with pressure gauge alternatives VS, A4, AD7, AD8, AD9, AD10                             |                |                             |

Transfer order code

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



## Filter regulators MS-LFR, MS series, NPT

Accessories

FESTO

Filter cartridges

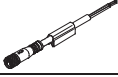





Ordering data			
Size	Grade of filtration [µm]	Part No.	Type
MS4	5 (colour: blue)	534501	MS4-LFP-C
	40 (colour: white)	534502	MS4-LFP-E
MS6	5 (colour: blue)	534499	MS6-LFP-C
	40 (colour: white)	534500	MS6-LFP-E
MS9	5	570309	MS9-LFP-C 
	40	570310	MS9-LFP-E 
MS12	5	537143	MS12-LFP-C
	40	537144	MS12-LFP-E


## Filter regulators MS-LFR, MS series, NPT


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Accessories

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						
	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
			0 ... 25	0 ... 360	187081	MA-40-25-R $\frac{1}{4}$ -EN
		G $\frac{1}{4}$	0 ... 16	0 ... 232	183901	MA-40-16-G $\frac{1}{4}$ -EN
			0 ... 25	0 ... 360	183902	MA-40-25-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		
	Weight [g]	Part No. Type
	120	193786 LRVS-D