

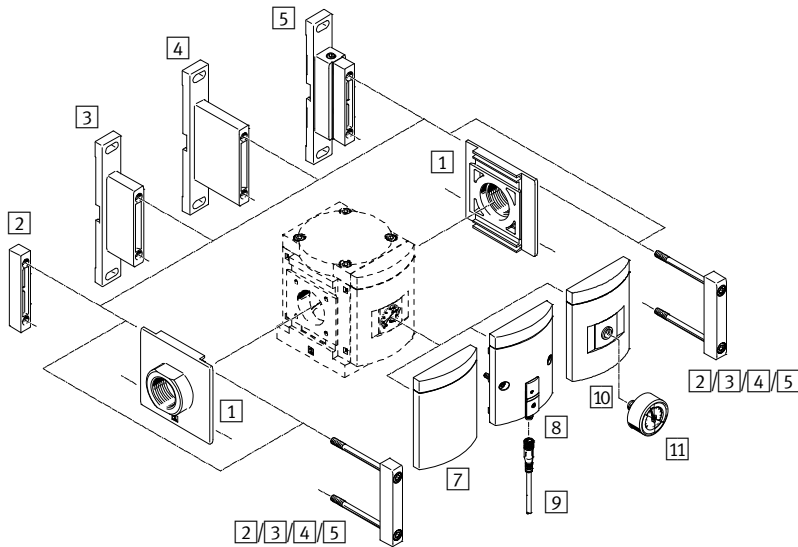
Pressure regulators MS-LR, MS series, NPT



Pressure regulators MS9-LR, MS series, NPT

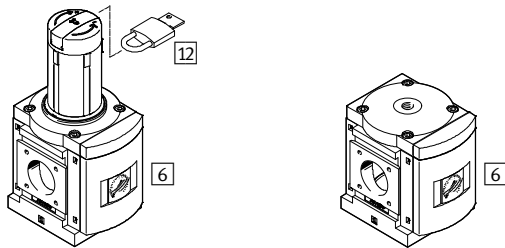
Peripherals overview

Pressure regulator MS9-LR



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

manually operated pneumatically actuated



Mounting attachments and accessories					
		Individual unit		Combination Module without connecting thread, without connecting plate NG	→ Page/ Internet
		With female thread N $\frac{3}{4}$ or N1	With connecting plate AQ...		
1	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	■	■	■	10
7	Cover plate VS	■	■	■	10
8	Pressure sensor without display AD7 ... AD10	■	■	■	10
9	Connecting cable NEBU-M8...-LE3	■	■	■	12
10	Adapter plate for EN pressure gauge $\frac{1}{4}$ A4	■	■	■	10
11	Pressure gauge MA	■	■	■	12
12	Padlock LRVS-D	■	■	■	12

Pressure regulators MS9-LR, MS series, NPT

Type codes

		MS	9	-	LR	-	NG	-	D5	-	DI	-	AG	-	PSI	-	AS	
Series																		
MS	Standard service unit																	
Size																		
9	Grid dimension 90 mm																	
Service function																		
LR	Pressure regulator																	
Connection size																		
NG	Module without connecting thread, without connecting plate																	
Pressure regulation range/operation																		
D5	0.5 ... 4 bar, manually operated																	
D6	0.5 ... 7 bar, manually operated																	
Alternative actuation principle																		
	Piloted																	
DI	Directly actuated																	
Pressure gauge																		
AG	MS pressure gauge																	
Pressure gauge scale																		
PSI	Psi																	
Security																		
AS	Rotary knob with detent, can be locked using accessories																	

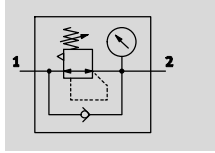
Additional variants can be ordered using the modular product system → 10

- Connecting plates
- Pressure regulation range/operation
- Pressure gauge alternatives
- Alternative pressure gauge scale
- Secondary venting
- Security lock
- Type of mounting
- UL certification
- Alternative flow direction

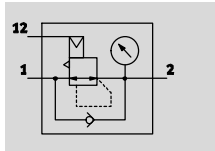
Pressure regulators MS9-LR, MS series, NPT




Technical data

Pressure regulation range/operation
D5/D6/D7/D8, manually operated



P0, pneumatically actuated



-  - Flow rate
6,500 ... 33,000 l/min
-  - Temperature range
-10 ... +60 °C
-  - Operating pressure
1 ... 20 bar



The pressure regulator maintains an essentially constant output pressure p2 independent of pressure fluctuations in the system and air consumption. The output pressure p2 can be set within the pressure regulation range either manually using the rotary

knob or pneumatically via a pilot pressure p12 by an external pilot regulator. When switching off the operating pressure, the output pressure p2 is vented via connection 3 (secondary venting).

- Good regulation characteristics with low hysteresis and primary pressure compensation
- High flow rate with minimal pressure drop
- Piloted or directly actuated diaphragm regulator
- Four pressure regulation ranges: 0.5 ... 4 bar, 0.5 ... 7 bar, 0.5 ... 12 bar and 0.5 ... 16 bar
- Available with or without secondary venting
- Actuator lock to protect set values against adjustment
- Return flow option for exhausting from output port 2 to output port 1 already integrated
- Optional pressure sensor

General technical data					
Pneumatic connection 1, 2		NPT3/4-14	NPT1-11 1/2	NPT1/2-14 ... NPT1 1/2-11 1/2 (with connecting plate AQ...)	– (without connecting thread NG)
Pilot air connection 12 with pressure regulation range/operation P0		G1/4			
Design		Piloted diaphragm regulator			
		Directly actuated 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				
	Front panel mounting				
Mounting position	Any ¹⁾				
Actuation security	Rotary knob with detent				
	Rotary knob with detent, can be locked using accessories				
	Rotary knob with integrated lock				
Pressure regulation range/operation	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...)			
	P0 [bar]	0.5 ... 16, pneumatically actuated ²⁾			
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				
	G1/4 prepared				

1) The pressure regulator must be mounted vertically when combined with a pressure sensor as condensate must not collect in the pressure sensor.

2) Output pressure p2 corresponds roughly to the applied pilot pressure p12.

Pressure regulators MS9-LR, MS series, NPT

Technical data

Standard nominal flow rate $q_{nN}^{1)2)}$ [l/min]					
Design		Piloted diaphragm regulator		Directly actuated diaphragm regulator DI	
Pneumatic connection		NPT $\frac{3}{4}$ -14	NPT1-11 $\frac{1}{2}$	NPT $\frac{3}{4}$ -14	NPT1-11 $\frac{1}{2}$
Pressure regulation range	D5	19,000 ³⁾	26,000 ³⁾	14,000 ³⁾	20,000 ³⁾
	D6	17,000	20,000	14,000	11,000
	D7	17,000	20,000	–	–
	D8	17,000	20,000	–	–
	PO	21,000	25,000	–	–

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

Operating and environmental conditions		
Variant	Standard	Pressure sensor AD...
Supply pressure [bar]	1 ... 20	1 ... 20
Operating medium	Compressed air in accordance with ISO 8573-1:2010 [7:4:4]	
Note on operating/pilot medium	Operation with lubricated medium possible (in which case lubricated operation will always be required)	
Ambient temperature [°C]	-10 ... +60	0 ... +50
Temperature of medium [°C]	-10 ... +60	0 ... +50
Storage temperature [°C]	-10 ... +60	-10 ... +60
Corrosion resistance class CRC ¹⁾	2	
Certification (variant UL1)	cULus recognized (OL)	

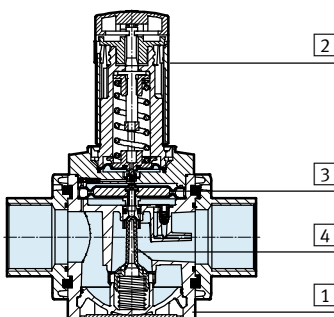
1) Corrosion resistance class CRC 2 to Festo standard FN 940070

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.

Weight [g]	
Pressure regulator	1,400
Pressure regulator with rotary knob with integrated lock E11	1,700

Materials

Sectional view



Pressure regulator		
1	Housing	Die-cast aluminium
2	Rotary knob	PA
	Rotary knob with integrated lock E11	Aluminium
3	Diaphragm	NBR
4	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

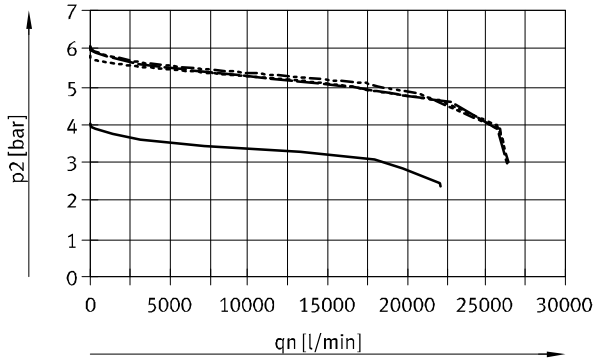
Pressure regulators MS9-LR, MS series, NPT

Technical data

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

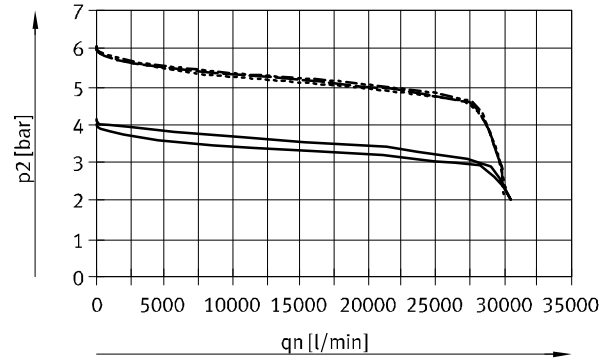
Piloted diaphragm regulator

Pneumatic connection NPT $\frac{3}{4}$ -14



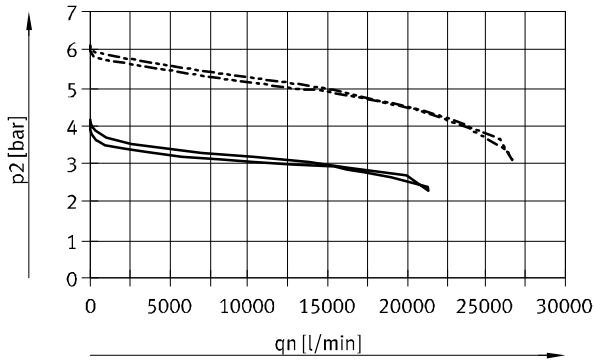
— D5: 0.5 ... 4 bar - · - · D7: 0.5 ... 12 bar
- - - - D6: 0.5 ... 7 bar · · · · D8: 0.5 ... 16 bar

Pneumatic connection NPT1-11 $\frac{1}{2}$



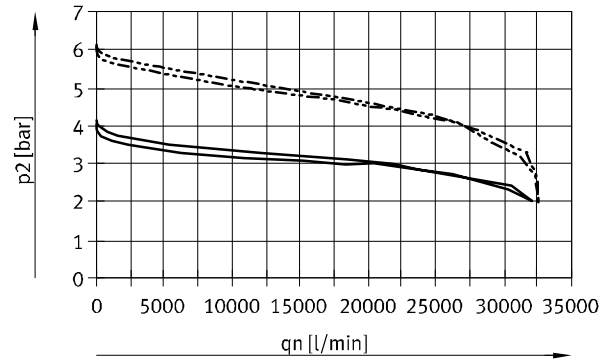
Directly actuated diaphragm regulator DI

Pneumatic connection NPT $\frac{3}{4}$ -14



— D5: 0.5 ... 4 bar
- - - - D6: 0.5 ... 7 bar

Pneumatic connection NPT1-11 $\frac{1}{2}$



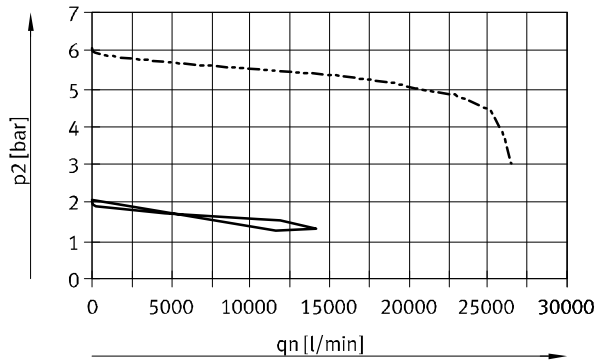
Pressure regulators MS9-LR, MS series, NPT

Technical data

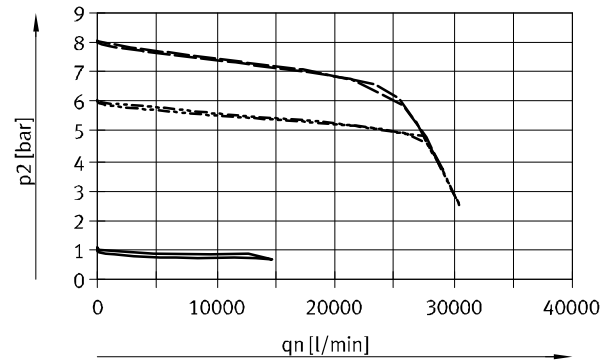
Standard flow rate q_n as a function of output pressure p_2 at operating pressure $p_1 = 10$ bar

External pilot regulator, pressure regulation range/operation PO

Pneumatic connection NPT $\frac{3}{4}$ -14



Pneumatic connection NPT1-11 $\frac{1}{2}$

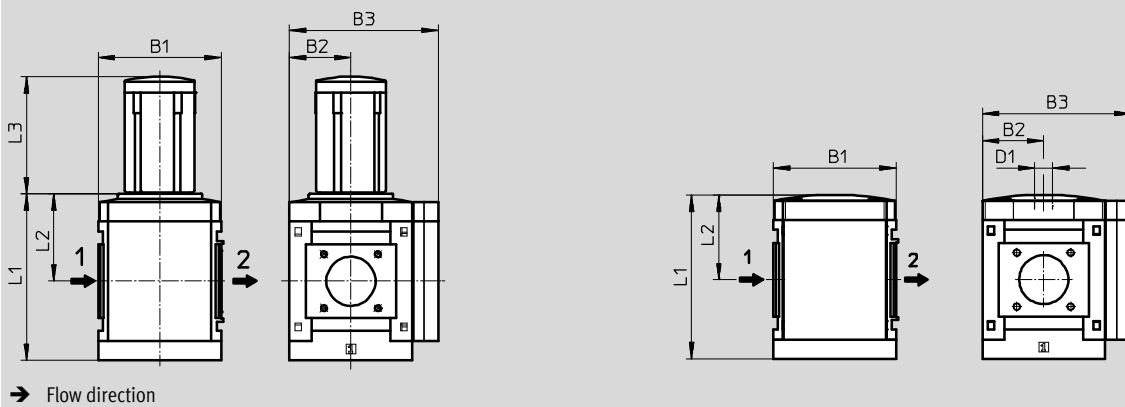


Dimensions – Basic version

Download CAD data → www.festo.com

Pressure regulation range/operation D5/D6/D7/D8, manually operated, without connecting thread NG, cover plate VS, rotary knob with detent

Pressure regulation range/operation PO, pneumatically actuated, without connecting thread NG, cover plate VS



Type	B1	B2	B3	D1	L1		L2		L3
					Piloted	Directly actuated DI	Piloted	Directly actuated DI	
MS9-LR-NG-D5/D6/D7/D8	90	45	109	–	129	122	71.4	64	86
MS9-LR-NG-PO				G $\frac{1}{4}$	120	–	62	–	–

Pressure regulators MS9-LR, MS series, NPT

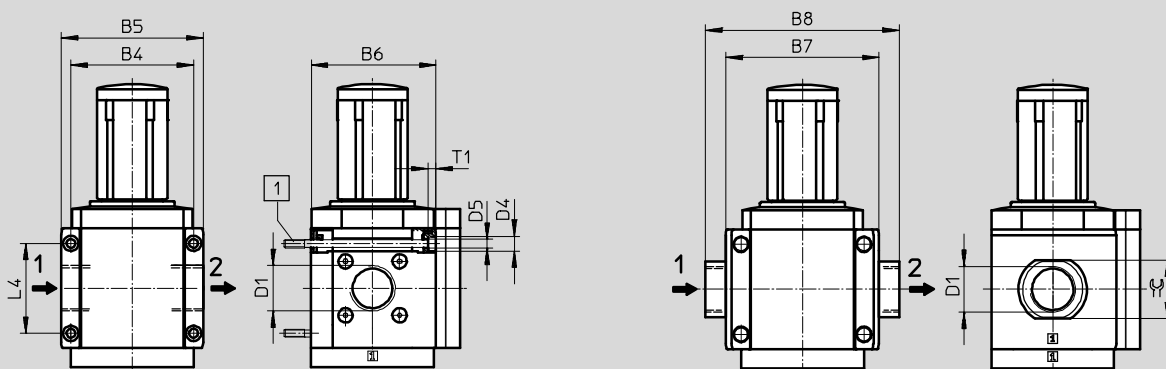
Technical data

Dimensions – Connecting thread/connecting plate

Download CAD data → www.festo.com

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

With connecting plate AQ...



1 Mounting screw M6xmin.90 to DIN 912 (not included in the scope of delivery) for wall mounting without mounting bracket

→ Flow direction

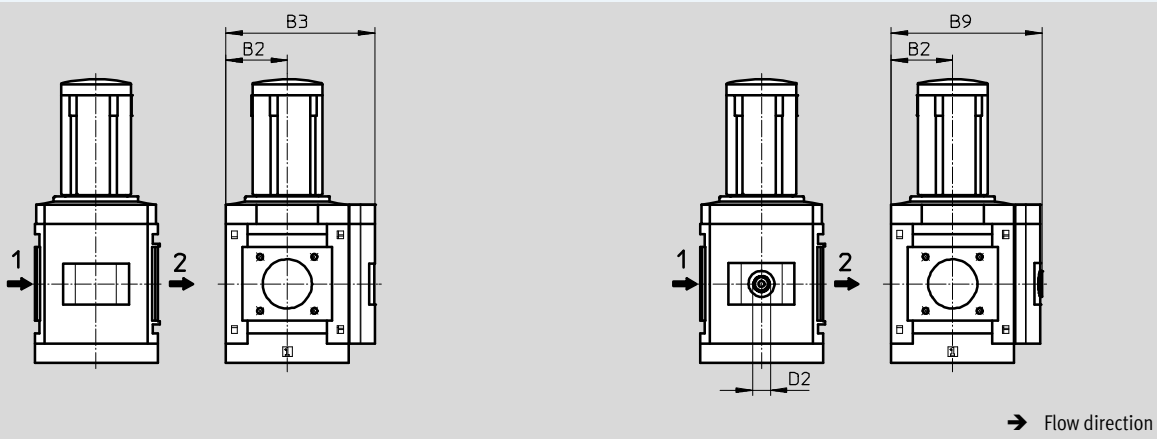
Type	B4	B5	B6	B7	B8	D1	D4	D5	L4	T1	⊕
MS9-LR-N $\frac{3}{4}$	90	104	91.5	-	-	NPT $\frac{3}{4}$ -14	11	6.5	66	6	-
MS9-LR-N1						NPT1-11 $\frac{1}{2}$					
MS9-LR-AQR	-	-	-	112	132	NPT $\frac{1}{2}$ -14	-	-	-	-	30
MS9-LR-AQS					132	NPT $\frac{3}{4}$ -14					36
MS9-LR-AQT					142	NPT1-11 $\frac{1}{2}$					41
MS9-LR-AQU					162	NPT1 $\frac{1}{4}$ -11 $\frac{1}{2}$					50
MS9-LR-AQV					176	NPT1 $\frac{1}{2}$ -11 $\frac{1}{2}$					55

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 $\frac{1}{4}$, without pressure gauge



→ Flow direction

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

Pressure regulators MS9-LR, MS series, NPT

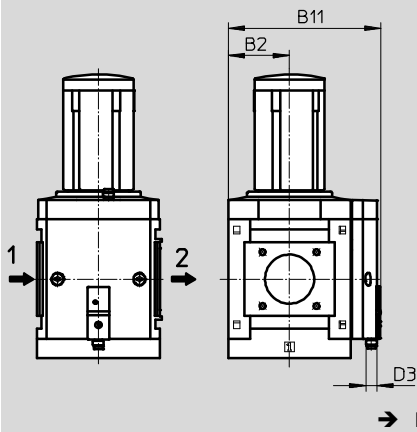
Technical data

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

Type	B2	B11	D3
MS9-LR-...-AD7/AD8/AD9/AD10	45	112	M8

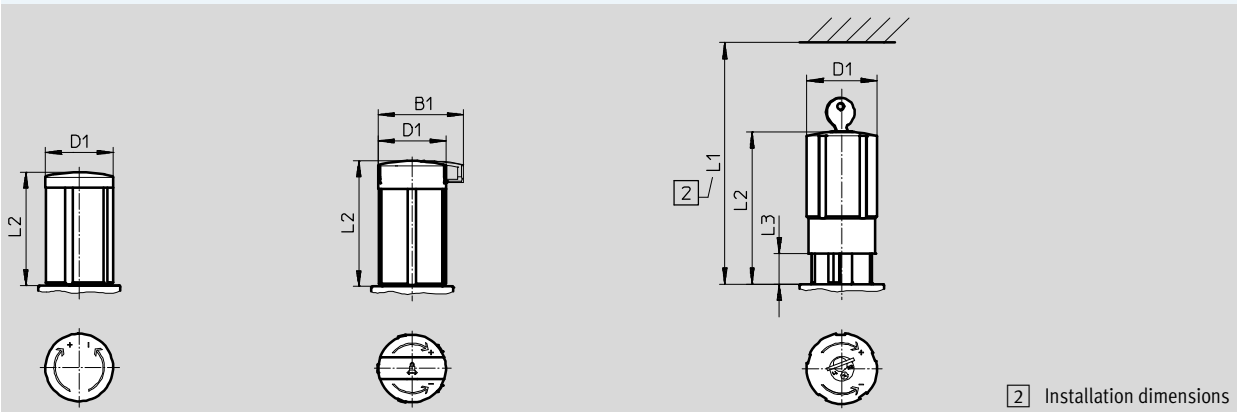
Dimensions – Rotary knob

Download CAD data → 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-LR	–	52	–	86	–
MS9-LR-...-AS	65	52	–	96	–
MS9-LR-...-E11	–	52	174	114	25

Ordering data

Integrated pressure gauge, display unit [psi], rotary knob with detent, can be locked using accessories

Size	Connection	Pressure regulation range 0.5 ... 4 bar, manually actuated		Pressure regulation range 0.5 ... 7 bar, manually actuated	
		Part No.	Type	Part No.	Type
Directly actuated diaphragm regulator					
MS9	–	564140	MS9-LR-NG-D5-DI-AG-PSI-AS	564142	MS9-LR-NG-D6-DI-AG-PSI-AS

Pressure regulators MS9-LR, MS series, NPT

Ordering data – Modular products

M Mandatory data						O Options	M
Module No.	Series	Size	Function	Connection size	Pressure range/operation	Regulator type	Pressure gauge/pressure gauge alternatives
562530	MS	9	LR	N $\frac{3}{4}$, N1, AQR, AQS, AQT, AQU, AQV, NG	D5, D6, D7, D8, PO	DI	AG, VS, A4, RG, AD7 ... AD10
Ordering example							
562530	MS	9	- LR	- NG	- D5	-	- AG

Ordering table		Grid dimension [mm]	90	Condi-tions	Code	Enter code
M	Module No.	562530				
	Series	Standard			MS	MS
	Size	9			9	9
	Function	Pressure regulator			-LR	-LR
	Connection size	Thread NPT $\frac{3}{4}$			-N $\frac{3}{4}$	
		Thread NPT1			-N1	
		Connecting plate NPT $\frac{1}{2}$			-AQR	
		Connecting plate NPT $\frac{3}{4}$			-AQS	
		Connecting plate NPT1			-AQT	
		Connecting plate NPT1 $\frac{1}{4}$			-AQU	
		Connecting plate NPT1 $\frac{1}{2}$			-AQV	
		Module without connecting thread, without connecting plate			-NG	
	Pressure range/operation	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			-D8	
		Max. 16 bar, pneumatically actuated (pressure range defined by means of pilot regulator)		1	-PO	
O	Regulator type	Directly actuated		2	-DI	
M	Pressure gauge/pressure gauge alternatives	MS pressure gauge			-AG	
		Cover plate			-VS	
		Adapter plate for EN pressure gauge $\frac{1}{4}$, without pressure gauge			-A4	
		Integrated pressure gauge, red/green scale		3	-RG	
		Pressure sensor without display, plug M8, threshold value comparator, PNP, N/O contact		4	-AD7	
		Pressure sensor without display, plug M8, threshold value comparator, PNP, N/C contact		4	-AD8	
		Pressure sensor without display, plug M8, window comparator, PNP, N/O contact		4	-AD9	
		Pressure sensor without display, plug M8, window comparator, PNP, N/C contact		4	-AD10	

1 PO Not with regulator type DI
Not with security AS, E11

2 DI Not with pressure 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

Transfer order code

562530 MS 9 - LR - - - - -

Pressure regulators MS9-LR, MS series, NPT

Ordering data – Modular products

→ **0 Options**

Alternative pressure gauge scale	Secondary venting	Alternative mounting position	Security	Type of mounting	UL certification	Alternative flow direction
PSI, MPA, BAR	OS	KD	AS, E11	WP, WPM, WPB	UL1	Z
- BAR	-	-	- AS	-	-	-

Ordering table		Grid dimension [mm]	90	Condi-tions	Code	Enter code
0	Alternative pressure gauge scale	Psi		5	-PSI	
		MPa		5	-MPA	
		Bar		5	-BAR	
	Secondary venting	Without secondary venting		6	-OS	
	Alternative mounting position	Rotary knob underneath (connection underneath with P0)			-KD	
	Security	Can be locked using accessories			-AS	
		With integrated lock			-E11	
	Type of mounting	Mounting bracket		7	-WP	
		Mounting bracket		7	-WPM	
		Mounting bracket for large wall gap		7	-WPB	
	UL certification	cULus, ordinary location for Canada and USA			-UL1	
	Alternative flow direction	Flow direction from right to left			-Z	

5 **PSI, MPA, BAR** Not with pressure gauge alternatives VS, A4, AD7, AD8, AD9, AD10

6 **OS** Only with regulator type DI
 7 **WP, WPM, WPB** Not with module NG


Transfer order code


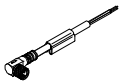
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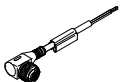
Pressure regulators MS-LR, MS series, NPT

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Accessories

Ordering data – Pressure gauge MA						
	Nominal size	Pneumatic connection	Indicating range		Part No. Type	
			[bar]	[psi]		
	Pressure gauge MA, 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, 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
	Precision pressure gauge MAP, EN 837-1 Technical data → Internet: map					
	40	R $\frac{1}{8}$	0 ... 1	0 ... 15	161126	MAP-40-1-$\frac{1}{8}$-EN
			0 ... 4	0 ... 58	162842	MAP-40-4-$\frac{1}{8}$-EN
			0 ... 6	0 ... 87	161127	MAP-40-6-$\frac{1}{8}$-EN
0 ... 16			0 ... 232	161128	MAP-40-16-$\frac{1}{8}$-EN	

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	
		5	2.5	541330	NEBU-M12G5-K-2.5-LE5	
			5	541331	NEBU-M12G5-K-5-LE5	
	M12x1, angled socket	4	2.5	550325	NEBU-M12W5-K-2.5-LE4	
			5	541329	NEBU-M12W5-K-5-LE4	

Ordering data – Sensor socket SIE-GD				Technical data → Internet: sie-gd	
	Electrical connection	Part No.	Type		
	M12x1, 4-pin	18494	SIE-GD		

Ordering data – Angled plug socket SIE-WD				Technical data → Internet: sie-wd	
	Electrical connection	Part No.	Type		
	M12x1, 4-pin	12956	SIE-WD-TR		

Ordering data – Padlock LRVS-D					
	Weight [g]	Part No.	Type		
	120	193786	LRVS-D		