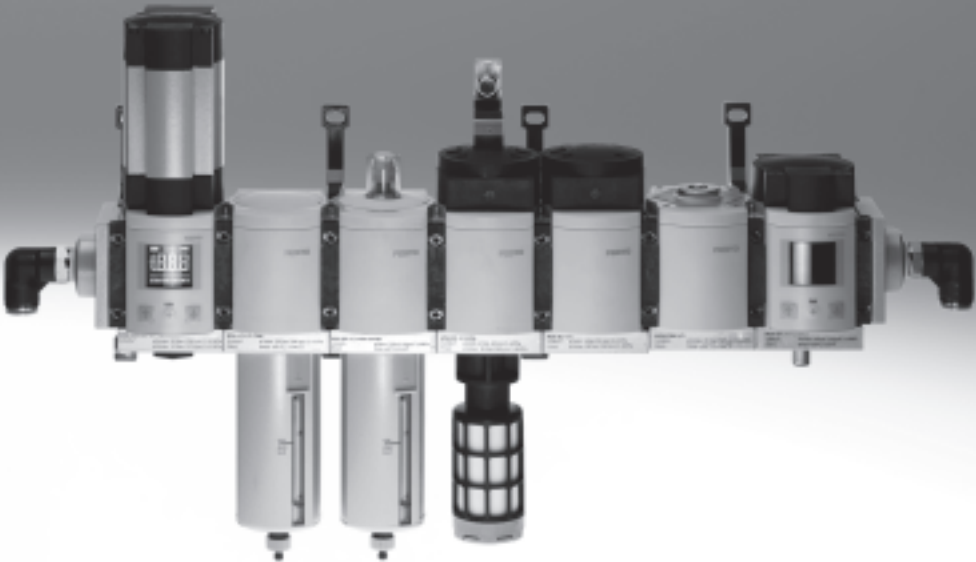
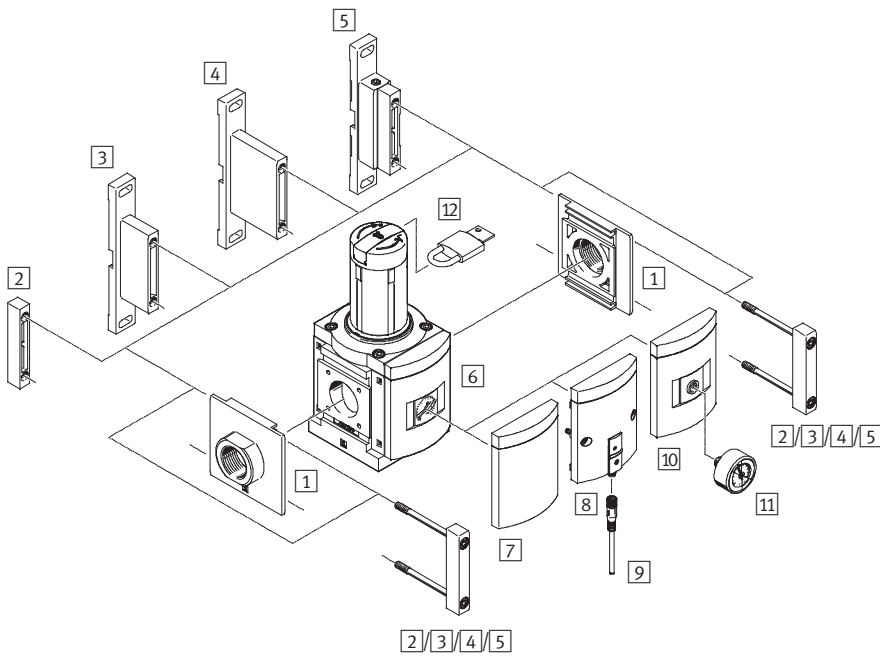



Pressure regulators MS-LR, MS series, NPT



Pressure regulators MS9-LR, 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	■	■	■	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

Variants D7, D8, PO, pilot actuated regulator:
Available from 2nd quarter 2011

 **New**

Pressure regulators MS9-LR, MS series, NPT

FESTO

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	0.3 ... 4 bar, manually operated															
D6	0.3 ... 7 bar, manually operated															
D7	0.5 ... 12 bar, manually operated															
Alternative actuation principle																
	Piloted															
DI	Directly actuated (only with pressure regulation range D5/D6)															
Pressure gauge																
AG	MS pressure gauge															
Pressure gauge scale																
PSI	Psi															
Security																
AS	Rotary knob with detent, can be locked using accessories															

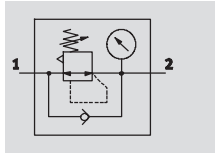
Additional variants can be ordered using the modular product system → 10




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

Pressure regulators MS9-LR, MS series, NPT

Technical data

With pressure gauge



-  - Flow rate
5,000 ... 26,500 l/min
-  - Temperature range
-10 ... +60 °C
-  - Supply pressure
0.8 ... 20 bar



The pressure regulator maintains a constant working pressure (secondary side), regardless of the pressure variations in the system (primary side) and the air consumption.

- 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: 0.3 ... 4 bar, 0.3 ... 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		NPT $\frac{3}{4}$ -14	NPT1-1 $\frac{1}{2}$	NPT $\frac{1}{2}$ -14 ... NPT1 $\frac{1}{2}$ -1 $\frac{1}{2}$ (with connecting plate AQ...)	- (without connecting thread NG)
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⁾			
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]	0.3 ... 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...)			
	PO [bar]	Max. 16, pneumatically actuated			
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			
		G $\frac{1}{4}$ prepared			

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

Variants D7, D8, PO, pilot actuated regulator:
Available from 2nd quarter 2011



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Pressure regulators MS9-LR, MS series, NPT

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	6,500 \pm 15% ²⁾	12,000 \pm 15% ²⁾
	D6	6,500 \pm 15%	9,000 \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		
Variant	Standard	Pressure sensor AD...
Supply pressure [bar]	0.8 ... 20	0.8 ... 20
Operating medium	Air quality class 5:7:- to DIN ISO 8573-1	Filtered compressed air, lubricated or unlubricated, grade of filtration 40 μ m
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	

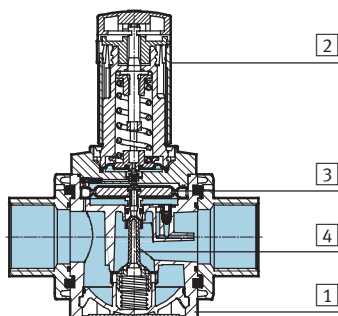
1) Corrosion resistance class 2 according to Festo standard 940 070

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]	
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

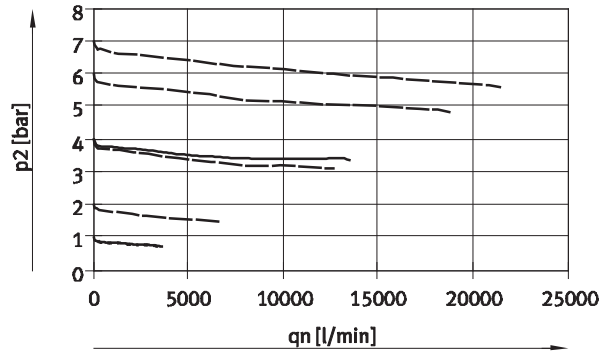
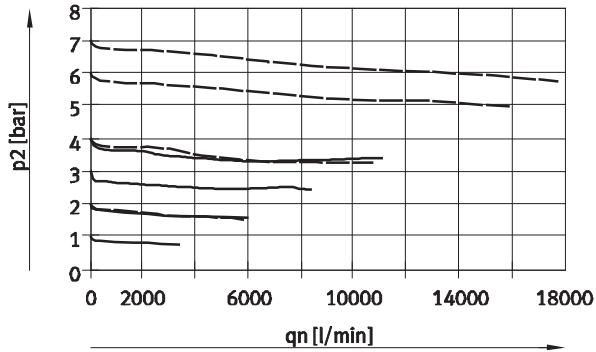
Technical data

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

MS9-LR-N $\frac{3}{4}$

MS9-LR-N1

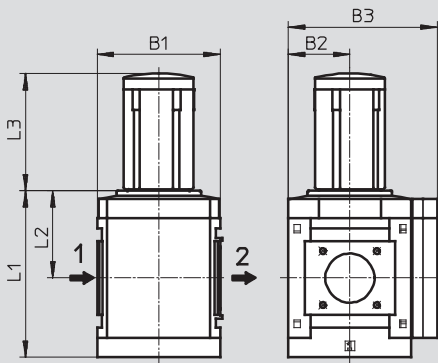


— D5: 0.3 ... 4 bar
- - - D6: 0.3 ... 7 bar

Dimensions – Basic version

Download CAD data → www.festo.com

Without connecting thread NG, rotary knob with detent



→ Flow direction

Type	B1	B2	B3	L1		L2		L3
				pilot actuated	directly actuated DI	pilot actuated	directly actuated DI	
MS9-LR-NG	90	45	109	129	122	71.4	64	86

Variants D7, D8, P0, pilot actuated regulator:
Available from 2nd quarter 2011

 **New**

Pressure regulators MS9-LR, MS series, NPT

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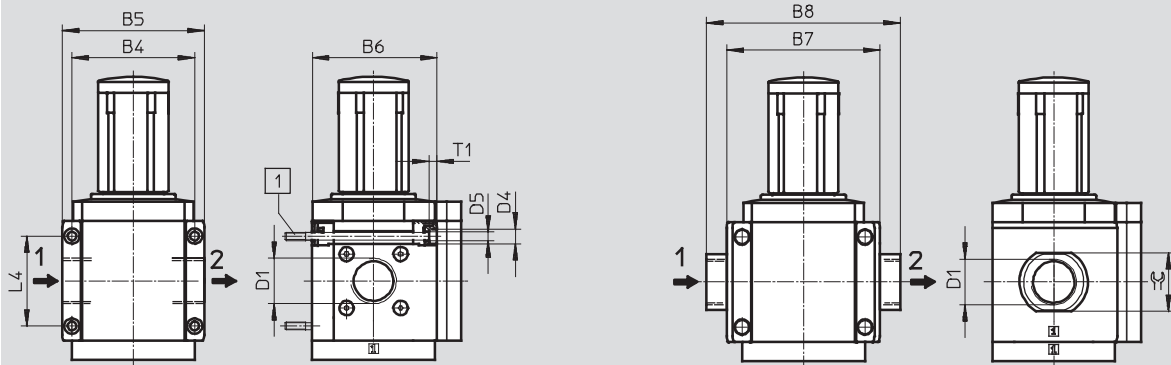
Technical data

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

Pressure regulators MS9-LR, MS series, NPT

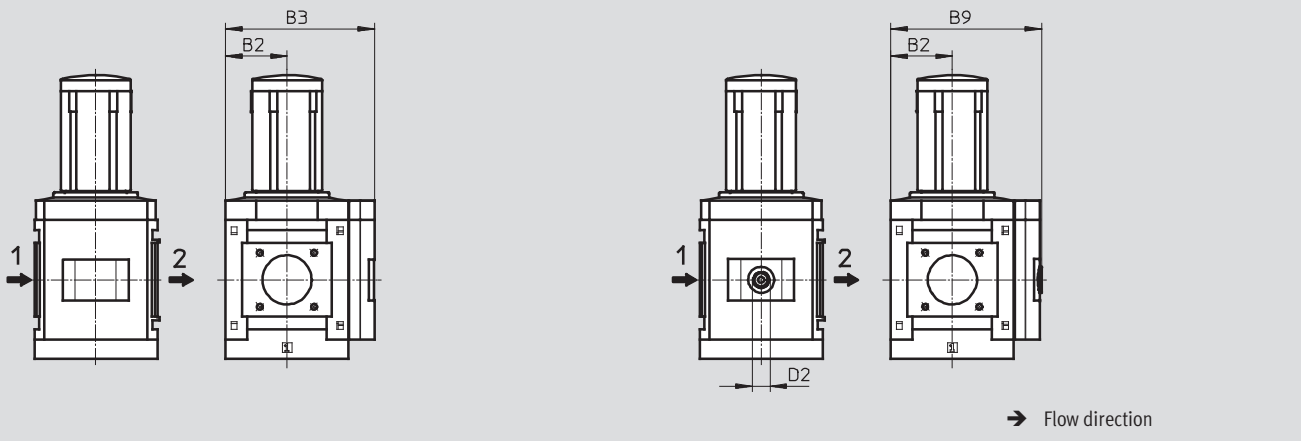
Technical data

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



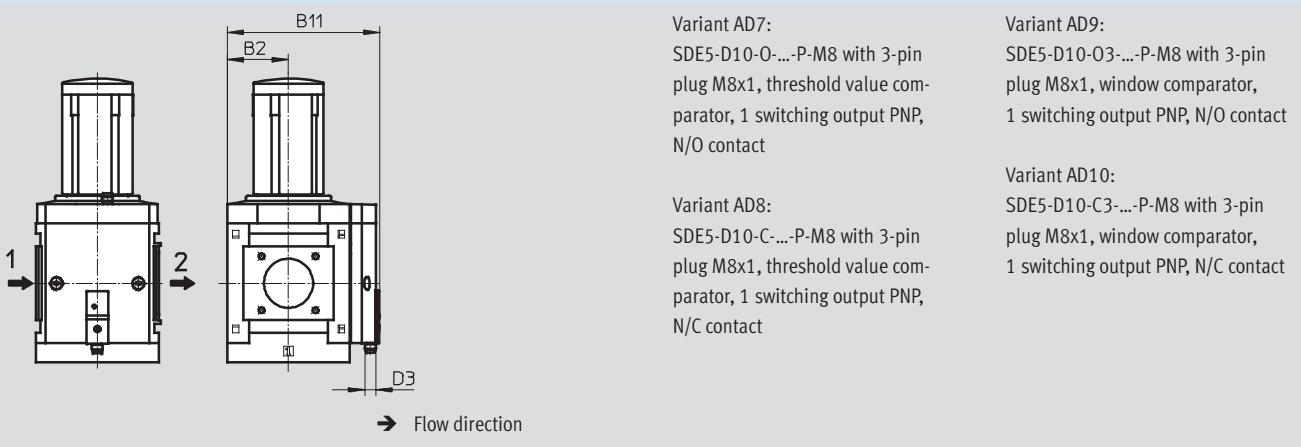
Type	B2	B3	B9	D2
MS9-LR-...-AG/RG	45	109	-	-
MS9-LR-...-A4		-	110	G1/4

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



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

Variants D7, D8, PO, pilot actuated regulator:
Available from 2nd quarter 2011

 **New**

Pressure regulators MS9-LR, MS series, NPT

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Technical data

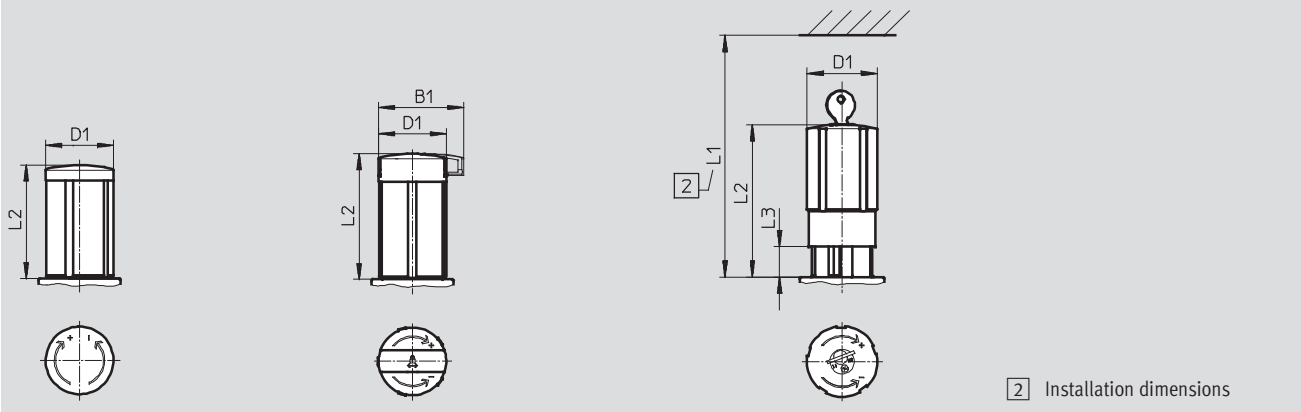
Dimensions – Rotary knob


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



 Installation dimensions

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	Piloted diaphragm regulator		Directly actuated diaphragm regulator	
		Part No.	Type	Part No.	Type
Pressure regulation range 0.3 ... 4 bar, manually actuated					
MS9	–	564139	MS9-LR-NG-D5-AG-PSI-AS	564140	MS9-LR-NG-D5-DI-AG-PSI-AS
Pressure regulation range 0.3 ... 7 bar, manually actuated					
MS9	–	564141	MS9-LR-NG-D6-AG-PSI-AS	564142	MS9-LR-NG-D6-DI-AG-PSI-AS
Pressure regulation range 0.5 ... 12 bar, manually actuated					
MS9	–	564143	MS9-LR-NG-D7-AG-PSI-AS	–	–

Pressure regulators MS9-LR, MS series, NPT

Ordering data – Modular products

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

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 N $\frac{3}{4}$			-N $\frac{3}{4}$	
		Thread N1			-N1	
		Connecting plate N $\frac{1}{2}$			-AQR	
		Connecting plate N $\frac{3}{4}$			-AQS	
		Connecting plate N1			-AQT	
		Connecting plate N1 $\frac{1}{4}$			-AQU	
		Connecting plate N1 $\frac{1}{2}$			-AQV	
		Module without connecting thread, without connecting plate			-NG	
	Pressure range/operation	0.3 ... 4 bar, manually operated			-D5	
		0.3 ... 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	

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

2 DI Not with pressure range D7, D8

Transfer order code

562530 MS 9 - LR - - - -

Variants D7, D8, PO, pilot actuated regulator:
Available from 2nd quarter 2011

 **New**

Pressure regulators MS9-LR, MS series, NPT

FESTO

Ordering data – Modular products

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

Ordering table		Grid dimension [mm]	90	Condi-tions	Code	Enter code
M	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	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	
		Alternative pressure gauge scale	Psi	5		-PSI
MPa	5			-MPA		
Bar	5			-BAR		
O	Secondary venting	Without secondary venting	6		-OS	
	Alternative mounting position	Rotary knob underneath (connection underneath with PO)			-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	
	Alternative flow direction	Flow direction from right to left			-Z	

- 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

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


Transfer order code



- - - - - - -


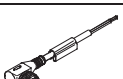
Pressure regulators MS-LR, MS series, NPT

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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
			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, 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		