

Filters MS-LF/LFM/LFX, MS series, NPT

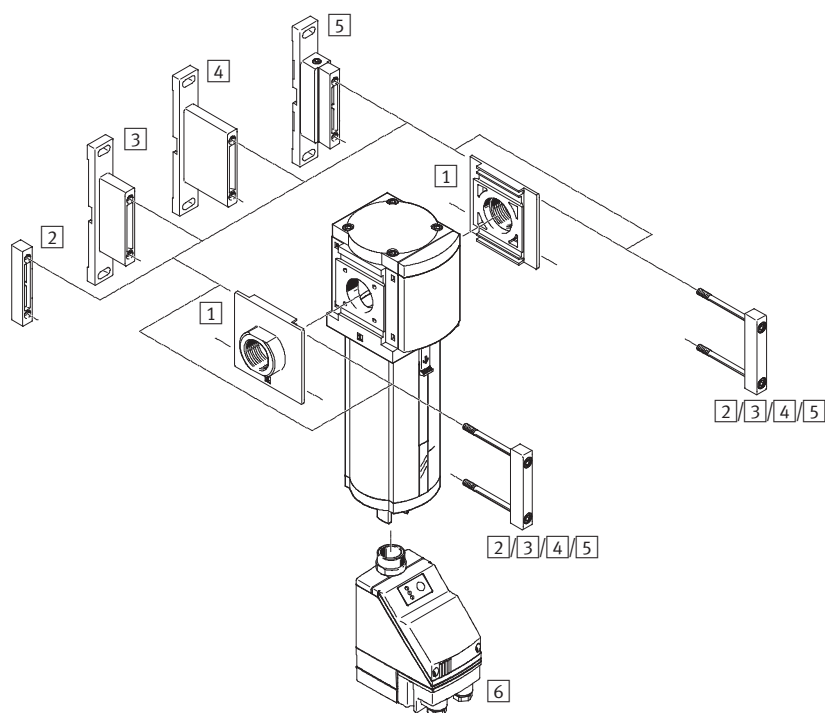
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## Filters MS9-LF, MS series, NPT

Peripherals overview

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### Note

Additional accessories:

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

Mounting attachments and accessories					
		Individual device		Combination	➔ Page/Internet
		without connecting thread	with connecting thread NPT¾-14 or NPT1-11½		
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	Condensate drain, fully automatic, electrically actuated E1/E2/E3/E4	■	■	■	8

# Filters MS9-LF, MS series, NPT

Type codes

		MS	9	-	LF	-	G	-	E	U	M
<b>Series</b>											
MS	Standard service unit										
<b>Size</b>											
9	Grid dimension 90 mm										
<b>Service function</b>											
LF	Filter										
<b>Connection size</b>											
G	Module without connecting thread, without connecting plate										
<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										

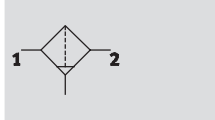
Additional variants can be ordered using the modular system → 8

- Connecting plates
- Condensate drain
- Type of mounting
- Alternative flow direction

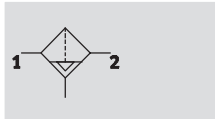
## Filters MS9-LF, MS series, NPT

Technical data

Condensate drain,  
manual rotary



Condensate drain,  
semi or fully automatic



Flow rate  
6,000 ... 16,000 l/min

Temperature range  
-10 ... +60 °C

Pressure  
0 ... 20 bar



- Good particle and condensate separation
- High flow rate with minimal pressure drop
- Available with manual, semi-automatic, fully automatic or fully automatic, electrically actuated condensate drain
- Choice of filter cartridges: 5 µm or 40 µm
- New filter cartridges → 29

General technical data				
Size	MS9			
Pneumatic connection 1, 2	NPT3/4-14	NPT1-11½	NPT1½-14 ... NPT1½-11½ (with connecting plate AQ...)	– (without connecting thread G)
Design	Sintered filter with centrifugal separator			
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			
Max. condensate volume [ml]	220			

Standard nominal flow rate q <sub>N</sub> <sup>1)</sup> [l/min]				
Pneumatic connection	Connecting plate AQR	Thread NPT3/4-14 or connecting plate AQS	Thread NPT1-11½ or connecting plate AQT/AQU/AQV	
Grade of filtration 5 µm	6,000	8,500	9,500	
40 µm	8,000	12,500	16,000	

1) Measured at p<sub>1</sub> = 6 bar and Δp = 1 bar

# Filters MS9-LF, MS series, NPT

Technical data

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Operating and environmental conditions				
Condensate drain	Manual rotary M	Semi-automatic H	Fully automatic V	Fully automatic, electrically actuated E1/E2/E3/E4
Supply pressure [bar]	0 ... 20	1.5 ... 12	2 ... 12	0.8 ... 16
Operating medium	Air quality class 5.7.- to DIN ISO 8573-1			
Ambient temperature [°C]	-10 ... +60	+5 ... +60	+5 ... +60	+1 ... +60
Temperature of medium [°C]	-10 ... +60	+5 ... +60	+5 ... +60	+1 ... +60
Storage temperature [°C]	-10 ... +60	+5 ... +60	+5 ... +60	+1 ... +60
Corrosion resistance class CRC <sup>1)</sup>	2			

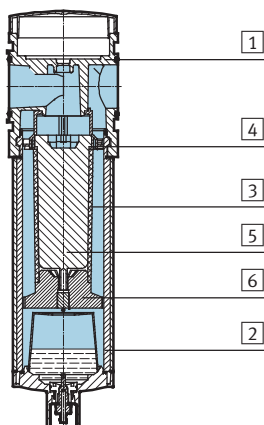
1) Corrosion resistance class 2 according to Festo standard 940 070

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]	
Filter	2,000
Filter with condensate drain, fully automatic, electrically actuated E1/E2/E3/E4	2,400

## Materials

Sectional view

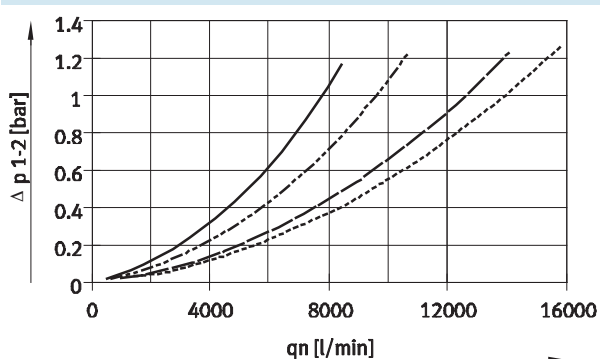


Filter		
1	Housing	Die-cast aluminium
2	Bowl	Wrought aluminium alloy
	Inspection window	PA
3	Filter	PE
4	Spin disc	POM
5	Filter holder	POM
6	Separating plate	POM
-	Cover	PA reinforced
-	Connecting plate, module connector, mounting bracket	Die-cast aluminium
-	Seals	NBR
Note on materials		RoHS-compliant (not with variant E1, E2, E3 or E4)

## Standard flow rate $q_n$ as a function of differential pressure $\Delta p_{1-2}$

Grade of filtration 5  $\mu\text{m}$

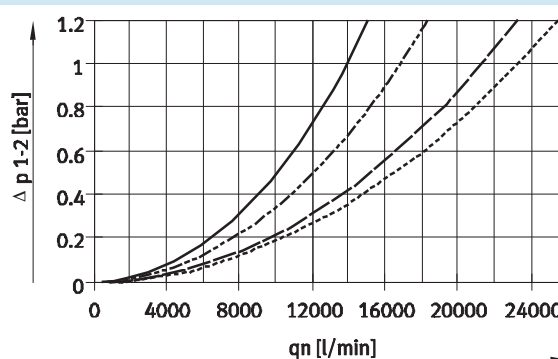
MS9-LF-N1/AQT, pneumatic connection NPT1-11½



— 4 bar      — 10 bar  
- - - 6 bar      - - - 12 bar

Grade of filtration 40  $\mu\text{m}$

MS9-LF-N1/AQT, pneumatic connection NPT1-11½



## Filters MS9-LF, MS series, NPT

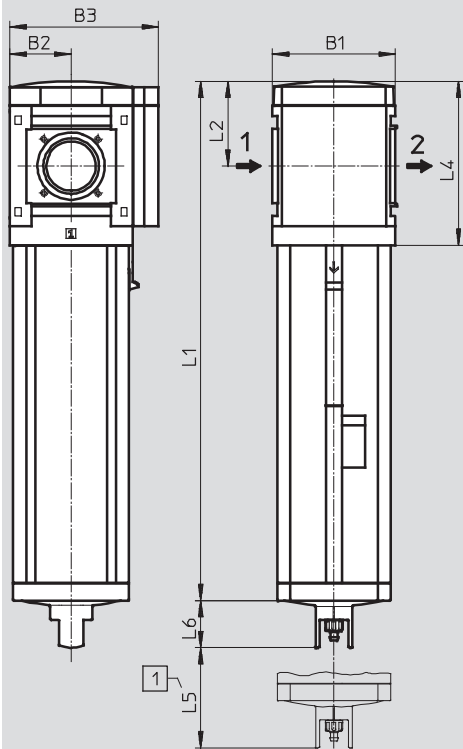
Technical data

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### Dimensions – Basic version

Download CAD Data → [www.festo.com/us/cad](http://www.festo.com/us/cad)

Without connecting thread G



1 Installation dimensions

→ Flow direction

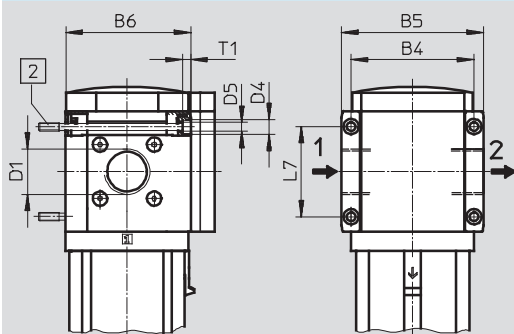
Type	B1	B2	B3	L1	L2	L4	L5	L6
MS9-LF-G	90	45	109	310.5	62	120	150	34.5

### Dimensions – Connecting thread/connecting plate

Download CAD Data → [www.festo.com/us/cad](http://www.festo.com/us/cad)

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

With connecting plate AQ...



2 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	L7	T1	⌀
MS9-LF-N $\frac{3}{4}$	90	104	91.5	-	-	NPT $\frac{3}{4}$ -14	11	6.5	66	6	-
MS9-LF-N1						NPT1-11 $\frac{1}{2}$					
MS9-LF-AQR	-	-	-	112	132	NPT $\frac{1}{2}$ -14	-	-	-	-	30
MS9-LF-AQS					132	NPT $\frac{3}{4}$ -14					36
MS9-LF-AQT					142	NPT1-11 $\frac{1}{2}$					41
MS9-LF-AQU					162	NPT1 $\frac{1}{4}$ -11 $\frac{1}{2}$					50
MS9-LF-AQV					176	NPT1 $\frac{1}{2}$ -11 $\frac{1}{2}$					55

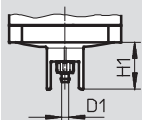
# Filters MS9-LF, MS series, NPT

Technical data

## Dimensions – Condensate drain

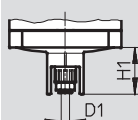
Download CAD Data → [www.festo.com/us/cad](http://www.festo.com/us/cad)

### Manual rotary M/fully automatic V



Barbed fitting for plastic tubing  
PCN-4

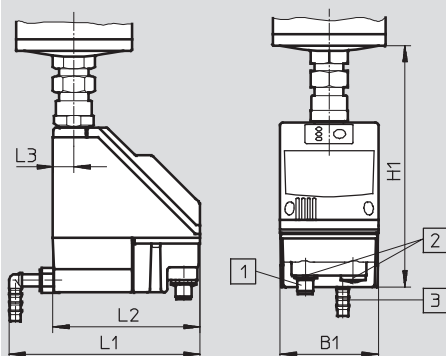
### Semi-automatic H



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

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

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



- 1 Variant E1:  
Condensate drain PWEA-AP  
with M12x1 plug, 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-LF-...M/V	–	5	34.5	–	–	–
MS9-LF-...H		6				
MS9-LF-...E1/E2/E3/E4	72	–	178	140	108	15

## Ordering data

Size	Condensate drain	Connection	Grade of filtration 5 µm		Grade of filtration 40 µm	
			Part No.	Type	Part No.	Type
MS9	Manual rotary	–	564108	MS9-LF-G-CUM	564106	MS9-LF-G-EUM
	Fully automatic	–	564109	MS9-LF-G-CUV	564107	MS9-LF-G-EUV

# Filters MS9-LF, MS series, NPT

Ordering data – Modular products

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## Mandatory data →

Module No.	Series	Size	Function	Connection size	Grade of filtration	Bowl
562532	MS	9	LF	N $\frac{3}{4}$ , N1, AQR, AQS, AQT, AQU, AQV, G	E, C	U
<b>Ordering example</b>						
<b>562532</b>	<b>MS</b>	<b>9</b>	<b>- LF</b>	<b>- AQR</b>	<b>- E</b>	<b>- U</b>

Ordering table					
Grid dimension	[mm]	90	Condition s	Code	Enter code
<b>M</b> Module No.	<b>562532</b>				
Series	Standard			<b>MS</b>	MS
Size	9			<b>9</b>	9
Function	Filter			<b>-LF</b>	-LF
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>-G</b>	
Grade of filtration	40 µm			<b>-E</b>	
	5 µm			<b>-C</b>	
<b>↓</b> Bowl	Metal bowl			<b>-U</b>	-U

Transfer order code

562532	MS	9	- LF	-		-		- U
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## Filters MS9-LF, MS series, NPT

Ordering data – Modular products

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→ <b>M</b> Mandatory data		<b>O</b> Options	
Condensate drain		Type of mounting	Alternative flow direction
M, H, V, E1 ... E4		WP, WPM, WPB	Z
- <b>M</b>		- <b>WP</b>	- <b>Z</b>

Ordering table					
Grid dimension	[mm]	90	Condition s	Code	Enter code
↓ <b>M</b>	Condensate drain	Manual		-M	
		Semi-automatic (P1 max. 12 bar)		-H	
		Fully automatic (P1 max. 12 bar)		-V	
	External, fully automatic, electric	24 V DC, M12 (P1 max. 16 bar) - 1		-E1	
		110 V AC, terminals (P1 max. 16 bar)		-E2	
		230 V AC, terminals (P1 max. 16 bar)		-E3	
		24 V DC, terminals (P1 max. 16 bar)		-E4	
<b>O</b>	Type of mounting	Mounting bracket	1	-WP	
		Mounting bracket	1	-WPM	
		Mounting bracket for large wall gap	1	-WPB	
	Alternative flow direction	Flow direction from right to left		-Z	

1 WP, WPM, WPB Not with module G

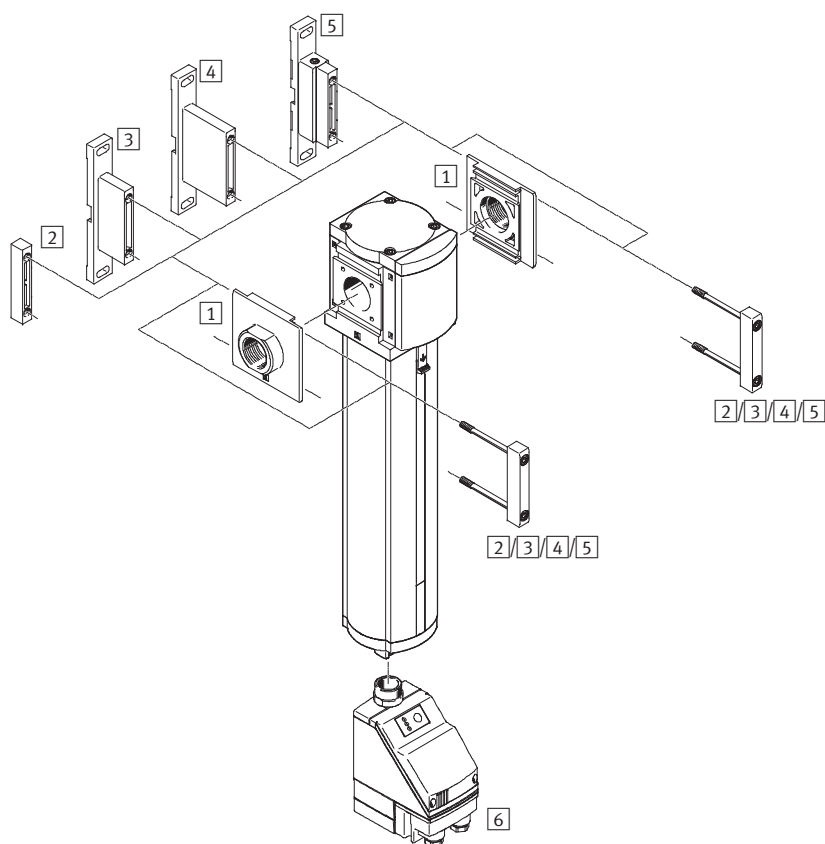
Transfer order code

-  -  -

## Fine and micro filters MS9-LFM, MS series, NPT

Peripherals overview

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### Note

Other accessories:

- Module connector for combination with size MS6, MS9 or MS12

→ Internet: rmv, armv

Mounting attachments and accessories					
		Individual device		Combination	➔ Page/Internet
		without connecting thread	with connecting thread NPT¾-14 or NPT1-11½		
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	Condensate drain, fully automatic, electrically actuated E1/E2/E3/E4	■	■	■	20

## Fine and micro filters MS9-LFM, MS series, NPT

Type codes

		MS	9	-	LFM	-	N1	-	A	U	M	-	HF	-	DA
<b>Series</b>															
MS	Standard service unit														
<b>Size</b>															
9	Grid dimension 90 mm														
<b>Service function</b>															
LFM	Fine and micro filter														
<b>Pneumatic connection</b>															
N3/4	Thread NPT3/4-14														
N1	Thread NPT1-11 1/2														
G	Module without connecting thread, without connecting plate														
<b>Grade of filtration</b>															
A	0.01 µm														
B	1 µm														
<b>Bowl guard</b>															
U	Integrated as metal bowl														
<b>Condensate drain</b>															
M	Manual rotary														
V	Fully automatic														
<b>Flow rate</b>															
	Standard														
HF	High flow rate														
<b>Filter contamination sensor</b>															
	Without differential pressure indicator														
DA	Differential pressure indicator														

Further variants can be ordered using the modular system → 20

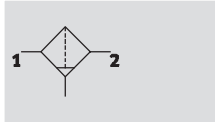
- Connecting plates
- Condensate drain
- Type of mounting
- Alternative flow direction

## Fine and micro filters MS9-LFM, MS series, NPT

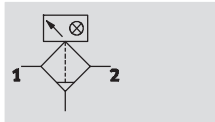
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Technical data

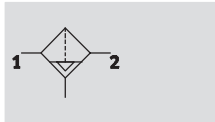
Condensate drain  
Manual rotary  
Without differential pressure indicator



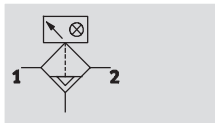
With differential pressure indicator



Condensate drain  
Semi or fully automatic  
Without differential pressure indicator



With differential pressure indicator



Flow rate  
325 ... 10,000 l/min

Temperature range  
-10 ... +60 °C

Pressure  
0 ... 20 bar



- High-performance filter for exceptionally clean compressed air
- Air quality to DIN ISO 8573-1
- Available with manual, semi-automatic, fully automatic or fully automatic, electrically actuated condensate drain
- Available with differential pressure indicator for indication of contamination
- Choice of filter cartridges: 0.01 µm or 1 µm
- New filter cartridges → 29

MS9-LFM-A:  
ISO class 1 for particles:  
max. particle density 0.1 mg/m<sup>3</sup>  
ISO class 2 for oil aerosols:  
max. oil concentration 0.1 mg/m<sup>3</sup>  
Filter efficiency 99.9999%

MS9-LFM-B:  
ISO class 2 for particles:  
max. particle density 1 mg/m<sup>3</sup>  
ISO class 3 for oil aerosols:  
max. oil concentration 1 mg/m<sup>3</sup>  
Filter efficiency 99.99%

General technical data				
Size	MS9			
Pneumatic connection 1, 2	NPT3/4-14	NPT1-11½	NPT½-14 ... NPT1½-11½ (with connecting plate AQ...)	– (without connecting thread G)
Constructional design	Fibre filter			
Type of mounting	Via accessories In-line installation			
Installation position	Vertical ±5°			
Grade of filtration [µm]	0.01 (micro filter MS9-LFM-A, air purity class at the output 1.7.2 to DIN ISO 8573-1) 1 (fine filter MS9-LFM-B, air purity class at the output 2.7.3 to DIN ISO 8573-1)			
Bowl guard	Integrated as metal bowl			
Condensate drain	Manual rotary Semi-automatic Fully automatic Fully automatic, electrically actuated			
Differential pressure indicator	Visual indicator			
Residual oil content [mg/m <sup>3</sup> ]	≤0.01 (micro filter MS9-LFM-A) ≤0.5 (fine filter MS9-LFM-B)			
Max. condensate volume [cm <sup>3</sup> ]	225			

## Fine and micro filters MS9-LFM, MS series, NPT

Technical data

Standard flow rate $q_n^{1)}$ [l/min]		
Version	Standard	High flow rate HF
Micro filter MS9-LFM-A		
$q_n$ min	325	390
$q_n$ max	6,500	7,800
Fine filter MS9-LFM-B		
$q_n$ min	350	500
$q_n$ max	7,000	10,000

1) Measured at  $p_1 = 6$  bar

Operating and environmental conditions				
Version	Condensate drain			
	Manual rotary	Semi-automatic	Fully automatic	Fully automatic, electrically actuated
	M	H	V	E1 ... E4
Supply pressure [bar]	0 ... 20	1.5 ... 12	2 ... 12	0.8 ... 16
Operating medium for micro filter MS9-LFM-A	Filtered compressed air, unlubricated, grade of filtration 1 $\mu$ m			
Operating medium for fine filter MS9-LFM-B	Filtered compressed air, unlubricated, grade of filtration 5 $\mu$ m			
Ambient temperature [°C]	-10 ... +60	+5 ... +60	+5 ... +60	+1 ... +60
Temperature of medium [°C]	-10 ... +60	+5 ... +60	+5 ... +60	+1 ... +60
Storage temperature [°C]	-10 ... +60	+5 ... +60	-10 ... +60	+1 ... +60
Corrosion resistance CRC <sup>1)</sup>	2			

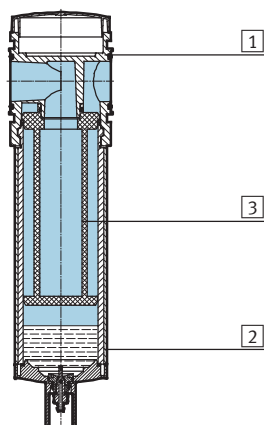
1) Corrosion resistance class 2 as per Festo standard 940 070

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.

Weights [g]		
Version	Standard	High flow rate HF
Fine and micro filter	2,000	2,500
Fine and micro filter with condensate drain fully automatic, electrically actuated E1 ... E4	2,900	2,900

### Materials

Sectional view



Fine and micro filters	
1 Housing	Die-cast aluminium
2 Bowl Inspection window	Wrought aluminium alloy PA
3 Filter	Borosilicate fibre
- Cover	PA
- Seals	NBR
Note on materials	Free of copper and PTFE

## Fine and micro filters MS9-LFM, MS series, NPT

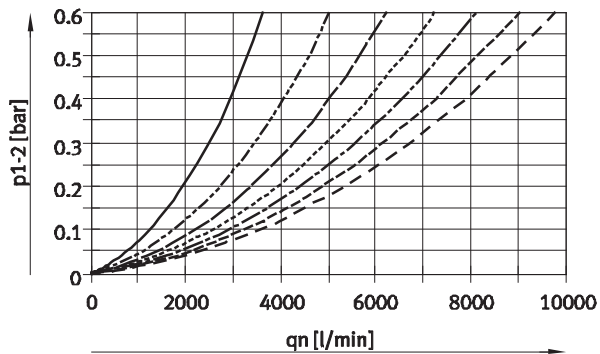
Technical data

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### Standard flow rate $q_n$ as a function of the differential pressure $p_{1-2}$

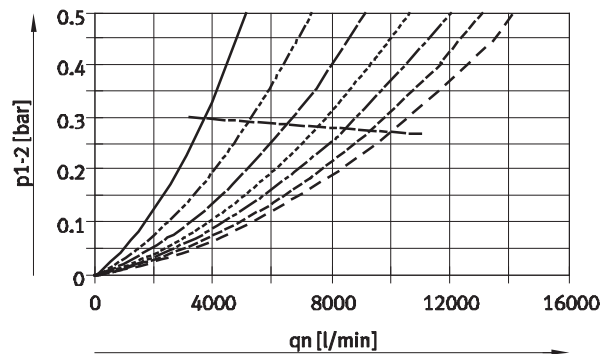
Grade of filtration 0.01  $\mu\text{m}$

MS9-LFM-AQR, Pneumatic connection NPT $\frac{1}{2}$ -14



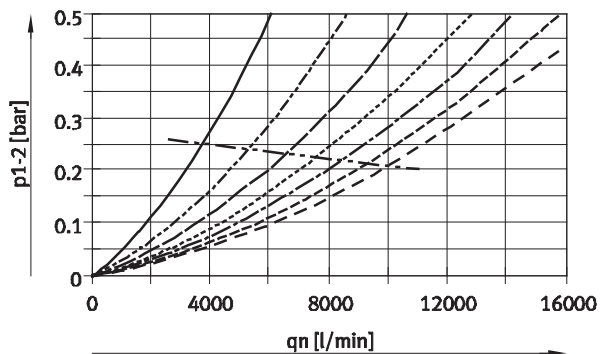
Grade of filtration 0.01  $\mu\text{m}$

MS9-LFM-N $\frac{3}{4}$ /AQS, Pneumatic connection NPT $\frac{3}{4}$ -14



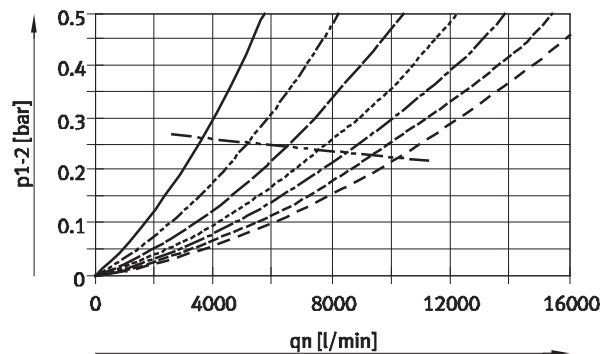
Grade of filtration 0.01  $\mu\text{m}$

MS9-LFM-N1/AQT, Pneumatic connection NPT1-11 $\frac{1}{2}$



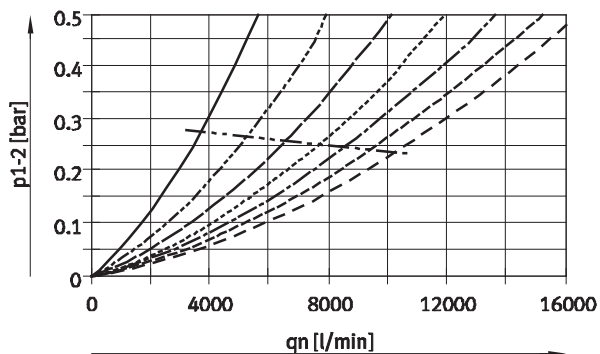
Grade of filtration 0.01  $\mu\text{m}$

MS9-LFM-AQU, Pneumatic connection NPT1 $\frac{1}{4}$ -11 $\frac{1}{2}$



Grade of filtration 0.01  $\mu\text{m}$

MS9-LFM-AQV, Pneumatic connection NPT1 $\frac{1}{2}$ -11 $\frac{1}{2}$



- 2 bar
- - - 4 bar ( $q_{n \text{ min}}$ : 268 l/min)
- · · 6 bar ( $q_{n \text{ min}}$ : 325 l/min)
- · - 8 bar
- - - 10 bar ( $q_{n \text{ min}}$ : 420 l/min)
- - - 12 bar
- - - 14 bar ( $q_{n \text{ min}}$ : 498 l/min)
- - -  $q_{n \text{ max}}$   
(with MS9-LFM-AQR:  $q_{n \text{ max}}$ -values lie above the measured  $q_n$ -values)

## Fine and micro filters MS9-LFM, MS series, NPT

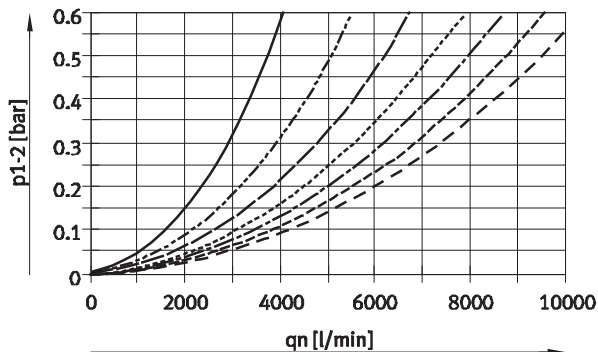
Technical data

FESTO

### Standard flow rate $q_n$ as a function of the differential pressure $p_{1-2}$

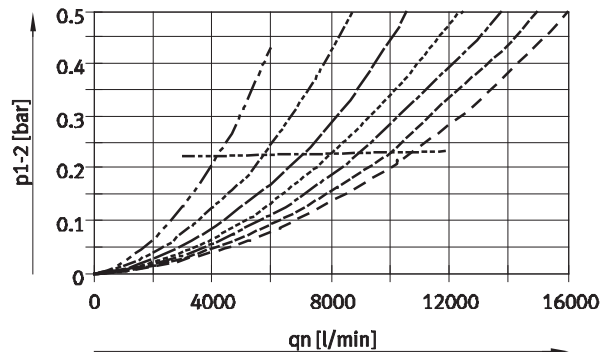
Grade of filtration 1  $\mu\text{m}$

MS9-LFM-AQR, Pneumatic connection NPT $\frac{1}{2}$ -14



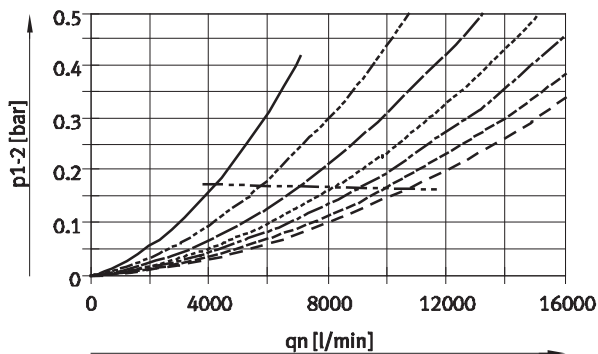
Grade of filtration 1  $\mu\text{m}$

MS9-LFM-N $\frac{3}{4}$ /AQS, Pneumatic connection NPT $\frac{3}{4}$ -14



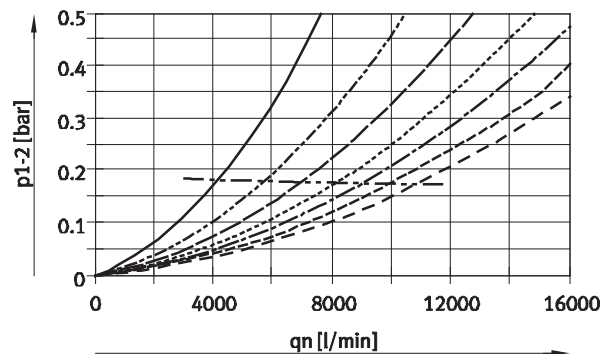
Grade of filtration 1  $\mu\text{m}$

MS9-LFM-N1/AQT, Pneumatic connection NPT1-11 $\frac{1}{2}$



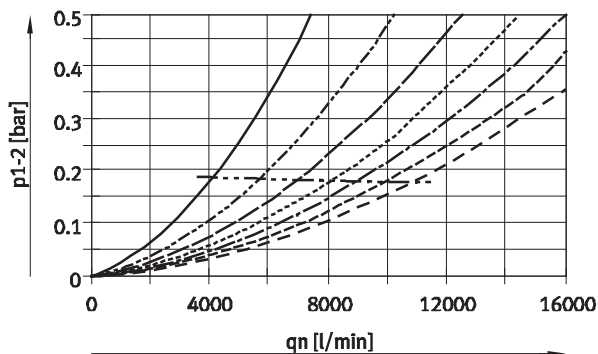
Grade of filtration 1  $\mu\text{m}$

MS9-LFM-AQU, Pneumatic connection NPT1 $\frac{1}{4}$ -11 $\frac{1}{2}$



Grade of filtration 1  $\mu\text{m}$

MS9-LFM-AQV, Pneumatic connection NPT1 $\frac{1}{2}$ -11 $\frac{1}{2}$



- 2 bar
- - - 4 bar ( $q_{n \min}$ : 289 l/min)
- · - 6 bar ( $q_{n \min}$ : 350 l/min)
- · · 8 bar
- - - - 10 bar ( $q_{n \min}$ : 450 l/min)
- - - - 12 bar
- - - - 14 bar ( $q_{n \min}$ : 540 l/min)
- - - -  $q_{n \max}$
- (with MS9-LFM-AQR:  $q_{n \max}$ -values lie above the measured  $q_n$ -values)

## Fine and micro filters MS9-LFM, MS series, NPT

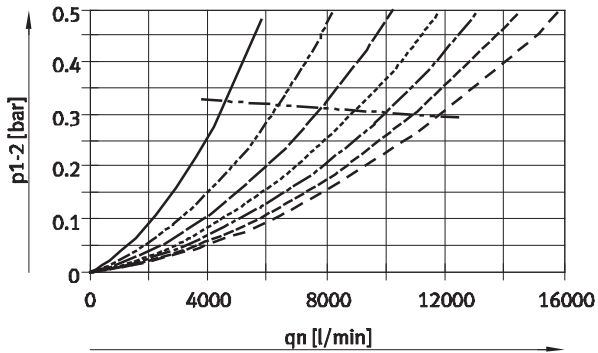
**FESTO**

Technical data

### Standard flow rate $q_n$ as a function of the differential pressure $p_{1-2}$

Grade of filtration 0.01  $\mu\text{m}$

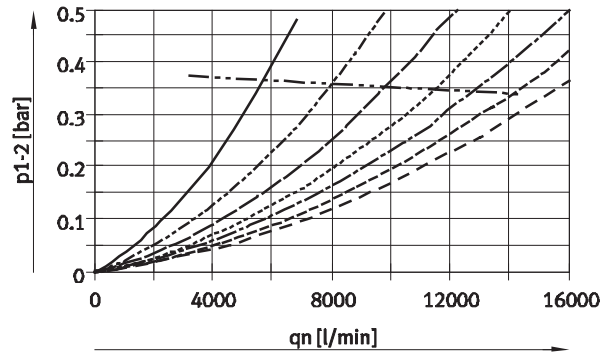
MS9-LFM-N $\frac{3}{4}$ -...-HF, Pneumatic connection NPT $\frac{3}{4}$ -14



- 2 bar
- - - 4 bar
- · · 6 bar ( $q_{n \min}$ : 390 l/min)
- · - 8 bar
- - - 10 bar
- - - 12 bar
- · - 14 bar
- · ·  $q_{n \max}$

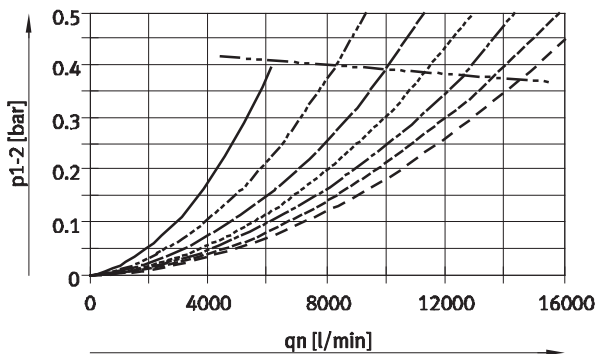
Grade of filtration 0.01  $\mu\text{m}$

MS9-LFM-N1-...-HF, Pneumatic connection NPT1-11 $\frac{1}{2}$



Grade of filtration 1  $\mu\text{m}$

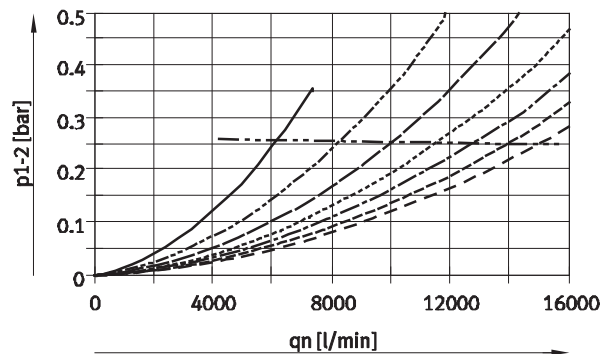
MS9-LFM-N $\frac{3}{4}$ -...-HF, Pneumatic connection NPT $\frac{3}{4}$ -14



- 2 bar
- - - 4 bar
- · · 6 bar ( $q_{n \min}$ : 500 l/min)
- · - 8 bar
- - - 10 bar
- - - 12 bar
- · - 14 bar
- · ·  $q_{n \max}$

Grade of filtration 1  $\mu\text{m}$

MS9-LFM-N1-...-HF, Pneumatic connection NPT1-11 $\frac{1}{2}$





# Fine and micro filters MS9-LFM, MS series, NPT

Technical data

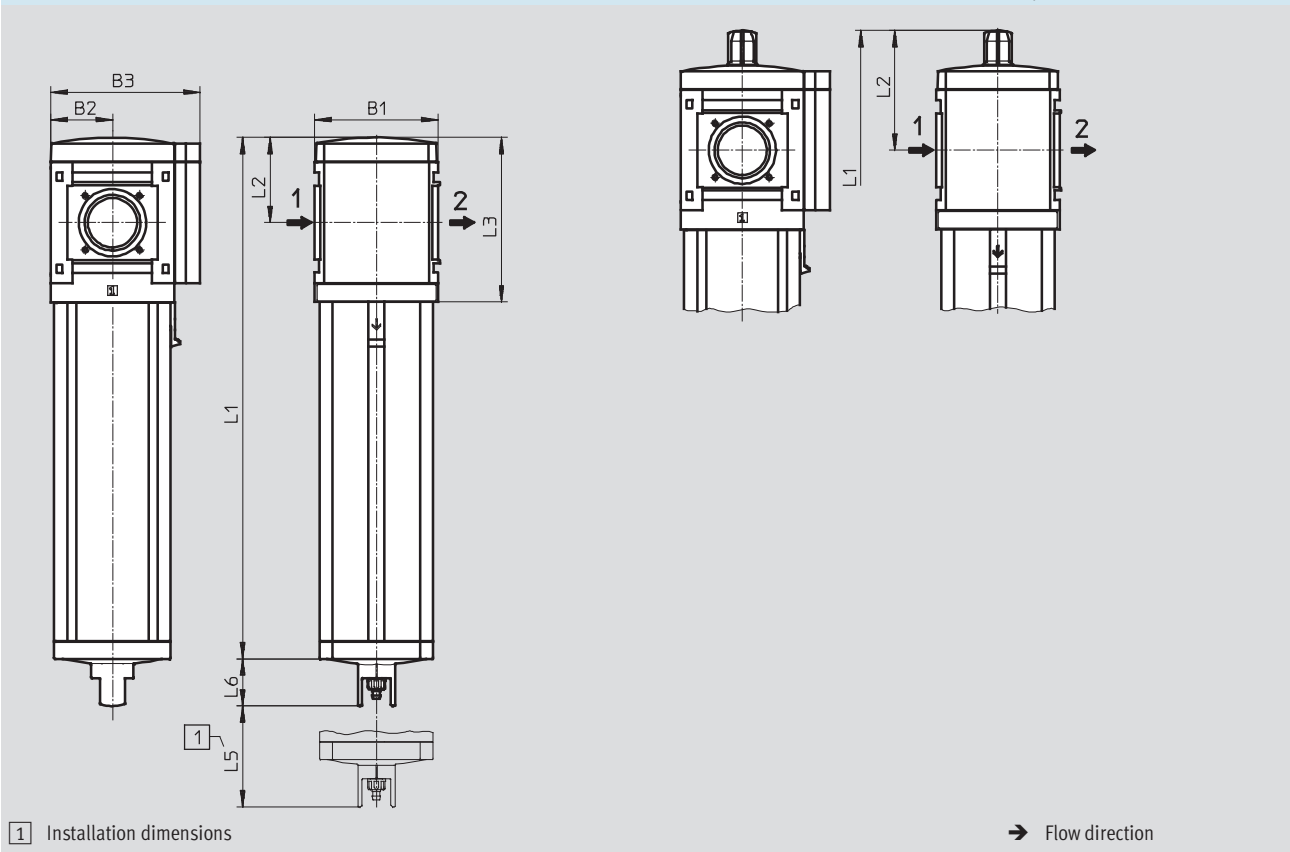
FESTO

## Dimensions – Basic version

without connecting thread G

Download CAD Data → [www.festo.com/us/cad](http://www.festo.com/us/cad)

without connecting thread G, with differential pressure indicator DA



Type	B1	B2	B3	L1		L2	L3	L5	L6
				Standard	High flow rate HF				
MS9-LFM-G	90	45	109	380.5	480.5	62	120	50	34.5
MS9-LFM-G-...-DA				405.5	505.5	87			

## Fine and micro filters MS9-LFM, MS series, NPT

Technical data

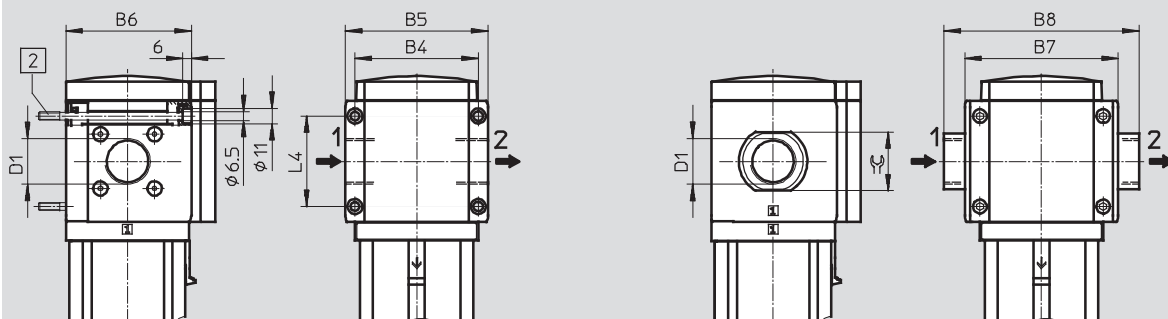
**FESTO**

### Dimensions – Connecting thread/connecting plate

Download CAD Data → [www.festo.com/us/cad](http://www.festo.com/us/cad)

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

with connecting plate AQ...



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

→ Flow direction

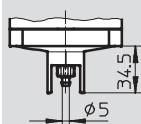
Type	B4	B5	B6	B7	B8	D1	L4	≡
MS9-LFM-N $\frac{3}{4}$	90	104	91.5	-	-	NPT $\frac{3}{4}$ -14	66	-
MS9-LFM-N1						NPT1-11 $\frac{1}{2}$		
MS9-LFM-AQR	-	-	-	112	132	NPT $\frac{1}{2}$ -14	-	30
MS9-LFM-AQS					132	NPT $\frac{3}{4}$ -14		36
MS9-LFM-AQT					142	NPT1-11 $\frac{1}{2}$		41
MS9-LFM-AQU					162	NPT1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

### Dimensions – Condensate drain

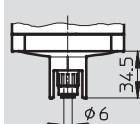
Download CAD Data → [www.festo.com/us/cad](http://www.festo.com/us/cad)

Manual rotary M/fully automatic V

Semi-automatic H



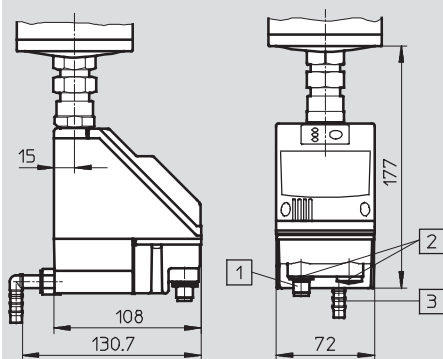
Barbed fitting for plastic tubing  
PCN-4



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

Fully automatic, electrically actuated E1 ... E4

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



- 1 Variant E1  
PWEA-AP-... with M12x1 plug,  
5-pin for NEBU-M12...-LE5
- 2 Variants E2/E3/E4  
PWEA-AC-... with cable conduit  
fitting Pg9
- 3 Connection 360° rotatable for  
plastic tubing PUN-H-12x2-...

# Fine and micro filters MS9-LFM, MS series, NPT

Technical data

Ordering data						
Without differential pressure indicator						
Size	Condensate drain	Connection	Micro filter		Fine filter	
			Grade of filtration 0.01 μm		Grade of filtration 1 μm	
			Part No.	Type	Part No.	Type
Standard						
MS9	Manual rotary	NPT¾-14	553086	MS9-LFM-N¾-AUM	553090	MS9-LFM-N¾-BUM
		NPT1-11½	553016	MS9-LFM-N1-AUM	553020	MS9-LFM-N1-BUM
		–	564047	MS9-LFM-G-AUM	564039	MS9-LFM-G-BUM
	Fully automatic	NPT¾-14	553088	MS9-LFM-N¾-AUV	553092	MS9-LFM-N¾-BUV
		NPT1-11½	553018	MS9-LFM-N1-AUV	553022	MS9-LFM-N1-BUV
		–	564049	MS9-LFM-G-AUV	564041	MS9-LFM-G-BUV
High flow rate						
MS9	Manual rotary	NPT¾-14	552980	MS9-LFM-N¾-AUM-HF	552984	MS9-LFM-N¾-BUM-HF
		NPT1-11½	553054	MS9-LFM-N1-AUM-HF	553058	MS9-LFM-N1-BUM-HF
		–	564051	MS9-LFM-G-AUM-HF	564043	MS9-LFM-G-BUM-HF
	Fully automatic	NPT¾-14	552982	MS9-LFM-N¾-AUV-HF	552986	MS9-LFM-N¾-BUV-HF
		NPT1-11½	553056	MS9-LFM-N1-AUV-HF	553060	MS9-LFM-N1-BUV-HF
		–	564053	MS9-LFM-G-AUV-HF	564045	MS9-LFM-G-BUV-HF

Ordering data						
With differential pressure indicator						
Size	Condensate drain	Connection	Micro filter		Fine filter	
			Grade of filtration 0.01 μm		Grade of filtration 1 μm	
			Part No.	Type	Part No.	Type
Standard						
MS9	Manual rotary	NPT¾-14	553094	MS9-LFM-N¾-AUM-DA	553098	MS9-LFM-N¾-BUM-DA
		NPT1-11½	553024	MS9-LFM-N1-AUM-DA	553028	MS9-LFM-N1-BUM-DA
		–	564048	MS9-LFM-G-AUM-DA	564040	MS9-LFM-G-BUM-DA
	Fully automatic	NPT¾-14	553096	MS9-LFM-N¾-AUV-DA	553100	MS9-LFM-N¾-BUV-DA
		NPT1-11½	553026	MS9-LFM-N1-AUV-DA	553030	MS9-LFM-N1-BUV-DA
		–	564050	MS9-LFM-G-AUV-DA	564042	MS9-LFM-G-BUV-DA
High flow rate						
MS9	Manual rotary	NPT¾-14	552988	MS9-LFM-N¾-AUM-HF-DA	552992	MS9-LFM-N¾-BUM-HF-DA
		NPT1-11½	553062	MS9-LFM-N1-AUM-HF-DA	553066	MS9-LFM-N1-BUM-HF-DA
		–	564052	MS9-LFM-G-AUM-HF-DA	564044	MS9-LFM-G-BUM-HF-DA
	Fully automatic	NPT¾-14	552990	MS9-LFM-N¾-AUV-HF-DA	552994	MS9-LFM-N¾-BUV-HF-DA
		NPT1-11½	553064	MS9-LFM-N1-AUV-HF-DA	553068	MS9-LFM-N1-BUV-HF-DA
		–	564054	MS9-LFM-G-AUV-HF-DA	564046	MS9-LFM-G-BUV-HF-DA

## Fine and micro filters MS9-LFM, MS series, NPT

Ordering data – Modular products

**FESTO**

M Mandatory data →						
Module No.	Series	Size	Function	Connection size	Grade of filtration	Bowl
552940	MS	9	LFM	N $\frac{3}{4}$ , N1, AQR, AQS, AQT, AQU, AQV, G	B, A	U
Order example						
552940	MS	9	- LFM	- AQR	- B	- U

Ordering table					
Grid dimension	[mm]	90	Condition s	Code	Enter code
M Module No.	552940				
Series	Standard service unit			MS	MS
Size	9			9	9
Function	Fine and micro filter			-LFM	-LFM
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			-G	
Grade of filtration $\mu\text{m}$	1			-B	
	0.01			-A	
↓ Bowl	Metal bowl			-U	-U

Transfer order code

552940	MS	9	- LFM	-		-		- U
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## Fine and micro filters MS9-LFM, MS series, NPT

Ordering data – Modular products

**FESTO**

→ <b>M</b> Mandatory data		<b>O</b> Options		
Condensate drain	Flow rate	Filter contamination sensor	Type of mounting	Alternative flow direction
M, H, V, E1, E2, E3, E4	HF	DA	WP, WPM, WPB	Z
- <b>M</b>	- <b>HF</b>	- <b>DA</b>	- <b>WP</b>	- <b>Z</b>

Ordering table					
Grid dimension	[mm]	90	Condition s	Code	Enter code
↓ <b>M</b>	Condensate drain	Manual		-M	
		Semi-automatic (P1 max. 12 bar)		-H	
		Fully automatic (P1 max. 12 bar)		-V	
		External fully automatic condensate drain, electrical, 24 V DC, M12 - 3		-E1	
		External fully automatic condensate drain, electrical, 110 V AC, terminal strip		-E2	
		External fully automatic condensate drain, electrical, 230 V AC, terminal strip		-E3	
		External fully automatic condensate drain, electrical, 24 V DC, terminal strip		-E4	
<b>O</b>	Flow rate	High flow rate		-HF	
	Filter contamination sensor	Differential pressure indicator, visual		-DA	
	Type of mounting	Mounting bracket	1	-WP	
		Mounting bracket	1	-WPM	
		Wall mounting bracket for large wall gap	1	-WPB	
	Alternative flow direction	Flow direction from right to left		-Z	

1 WP, WPM, WPB Not with module G

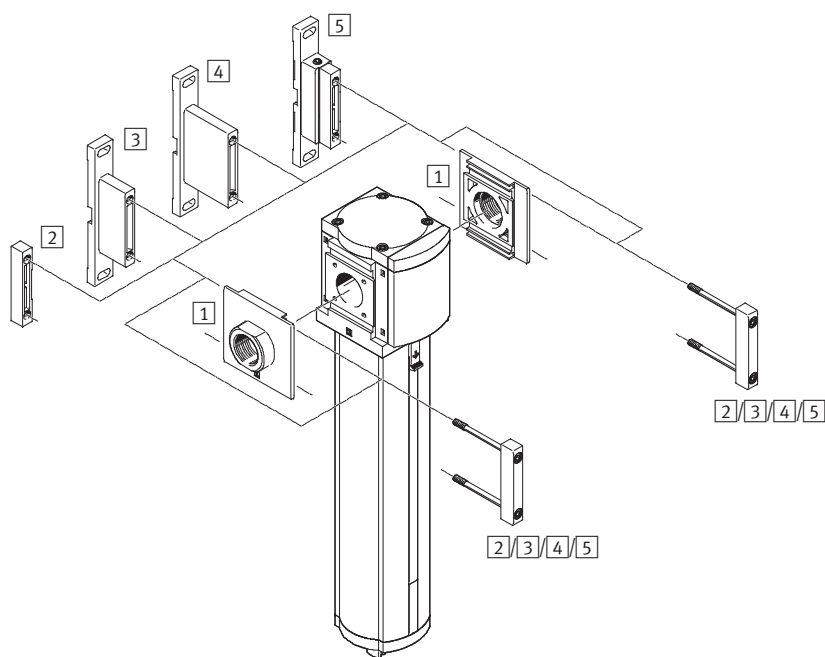
Transfer order code

-  -  -  -  -

## Activated carbon filters MS9-LFX, MS series, NPT

Peripherals overview

**FESTO**



### Note

Other accessories:

- Module connector for combination with size MS6, MS9 or MS12

→ Internet: rmv, armv

Mounting attachments and accessories					
		Individual device		Combination	➔ Page/Internet
		without connecting thread	with connecting thread NPT¾-14 or NPT1-11½		
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

# Activated carbon filters MS9-LFX, MS series, NPT

Type codes

		MS	9	-	LFX	-	N $\frac{3}{4}$	-	U
<b>Series</b>									
MS	Standard service unit								
<b>Size</b>									
9	Grid dimension 90 mm								
<b>Service function</b>									
LFX	Activated carbon filter								
<b>Pneumatic connection</b>									
N $\frac{3}{4}$	Thread NPT $\frac{3}{4}$ -14								
N1	Thread NPT1-1 $\frac{1}{2}$								
G	Module without connecting thread, without connecting plate								
<b>Bowl guard</b>									
U	Integrated as metal bowl								

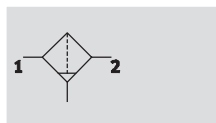
Further variants can be ordered using the modular system → 28

- Connecting plates
- Type of mounting
- Alternative flow direction

## Activated carbon filters MS9-LFX, MS series, NPT

**FESTO**

Technical data



Flow rate  
max. 6,500 l/min

Temperature range  
-10 ... +60 °C

Pressure  
0 ... 20 bar



- Removal of liquid and gaseous oil particles from compressed air using activated carbon
- Eliminates odours and vapours
- Prefiltration with micro filter MS9-LFM-A, grade of filtration 0.01 µm, recommended
- New filter cartridges → 29

General technical data				
Size	MS9			
Pneumatic connection 1, 2	NPT3/4-14	NPT1-11½	NPT½-14 ... NPT1½-11½ (with connecting plate AQ...)	– (without connecting thread G)
Constructional design	Activated carbon filter			
Type of mounting	Via accessories			
	In-line installation			
Installation position	Vertical ±5°			
Air purity class at the output <sup>1)</sup>	1.7.1 to DIN ISO 8573-1			
Bowl guard	Integrated as metal bowl			
Residual oil content [mg/m³]	≤0.003			

1) It is recommended to replace filter cartridges after 1,000 operating hours (applies to an ambient temperature of 21 °C). The service life of a filter cartridge is reduced at higher temperatures.

Standard flow rate qn <sup>1)</sup> [l/min]	
qn max.	6,500

1) Measured at p1 = 6 bar

Operating and environmental conditions		
Supply pressure [bar]	0 ... 20	
Operating medium	Filtered compressed air, unlubricated, grade of filtration 0.01 µm	
Ambient temperature [°C]	-10 ... +60	
Temperature of medium [°C]	+5 ... +30	
Storage temperature [°C]	-10 ... +60	
Corrosion resistance CRC <sup>1)</sup>	2	

1) Corrosion resistance class 2 as per 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.

Weights [g]	
Activated carbon filter	2,000

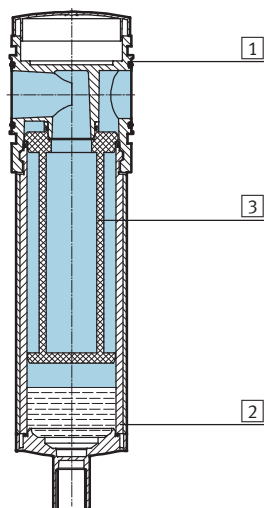


# Activated carbon filters MS9-LFX, MS series, NPT

Technical data

## Materials

Sectional view

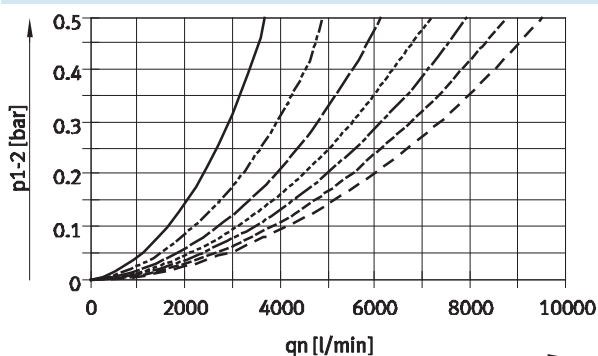


## Activated carbon filter

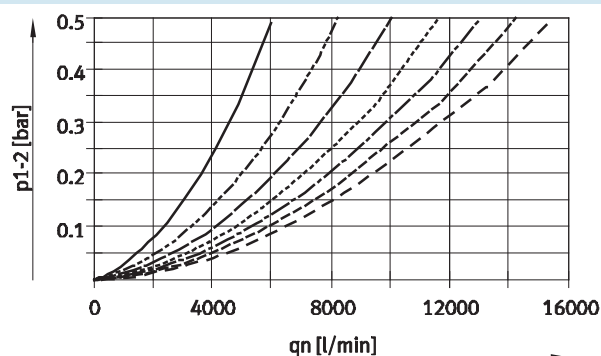
1	Housing	Die-cast aluminium
2	Bowl Inspection window	Wrought aluminium alloy PA
3	Filter	Activated carbon
–	Cover	PA
–	Seals	NBR
Note on materials		Free of copper and PTFE

## Standard flow rate $q_n$ as a function of the differential pressure $p_{1-2}$

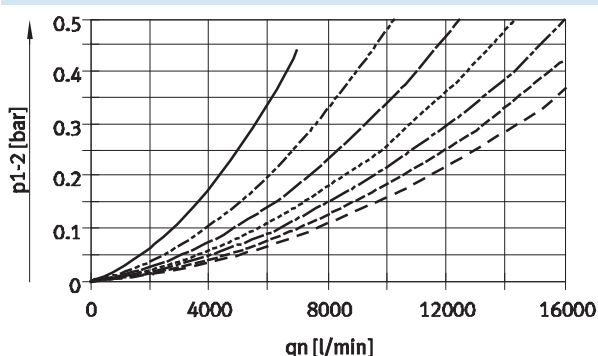
MS9-LFX-AQR, Pneumatic connection NPT $\frac{1}{2}$ -14



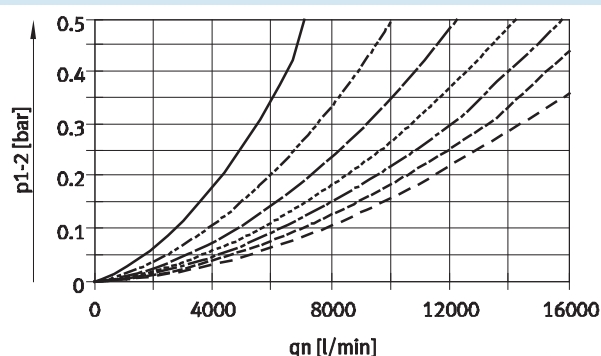
MS9-LFX-N $\frac{3}{4}$ /AQS, Pneumatic connection NPT $\frac{3}{4}$ -14



MS9-LFX-N1/AQT, Pneumatic connection NPT1-11 $\frac{1}{2}$



MS9-LFX-AQV, Pneumatic connection NPT $\frac{1}{2}$ -11 $\frac{1}{2}$



- 2 bar
- - - 4 bar
- · - 6 bar
- · · 8 bar
- - - - 10 bar
- - - - 12 bar
- · - · 14 bar

## Activated carbon filters MS9-LFX, MS series, NPT

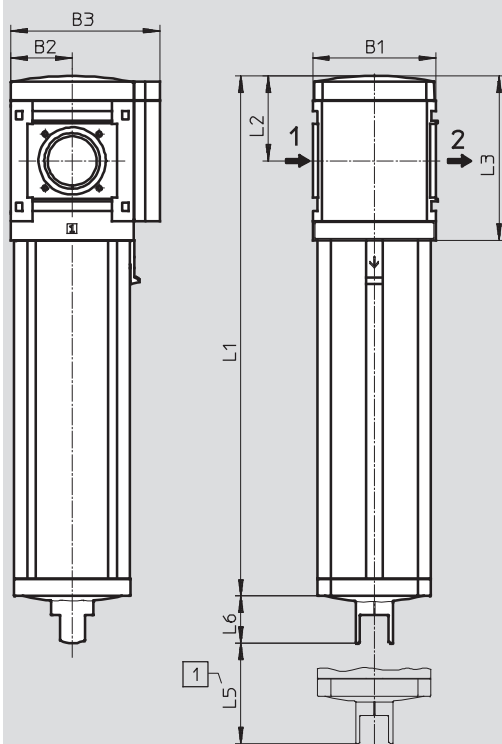
**FESTO**

Technical data

### Dimensions – Basic version

Download CAD Data → [www.festo.com/us/cad](http://www.festo.com/us/cad)

without connecting thread G



1 Installation dimensions

→ Flow direction

Type	B1	B2	B3	L1	L2	L3	L5	L6
MS9-LFX-G	90	45	109	380.5	62	120	50	34.5

# Activated carbon filters MS9-LFX, MS series, NPT

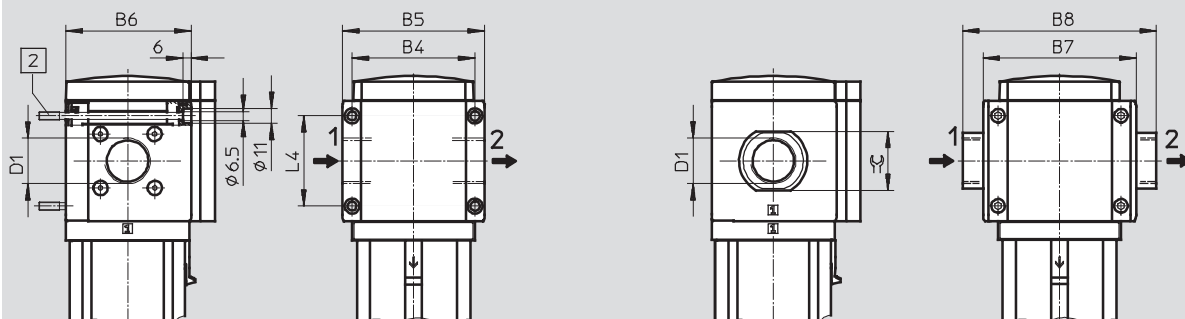
Technical data

## Dimensions – Connecting thread/connecting plate

Download CAD Data → [www.festo.com/us/cad](http://www.festo.com/us/cad)

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

with connecting plate AQ...



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

→ Flow direction

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

## Ordering data

Size	Connection	Part No.	Type
MS9	NPT $\frac{3}{4}$ -14	552998	MS9-LFX-N $\frac{3}{4}$ -U
	NPT1-11 $\frac{1}{2}$	553034	MS9-LFX-N1-U
	–	564038	MS9-LFX-G-U

## Activated carbon filters MS9-LFX, MS series, NPT

**FESTO**

Ordering data – Modular products

M Mandatory data						O Options	
Module No.	Series	Size	Function	Connection size	Bowl	Type of mounting	Alternative flow direction
552942	MS	9	LFX	N $\frac{3}{4}$ , N1, AQR, AQS, AQT, AQU, AQV, G	U	WP, WPM, WPB	Z
<b>Order example</b>							
552942	MS	9	- LFX	- AQR	- U	- WP	- Z

Ordering table							
Grid dimension		[mm]	90	Condition	s	Code	Enter code
M	Module No.	552942					
	Series	Standard service unit				MS	MS
	Size	9				9	9
	Function	Activated carbon filter				-LFX	-LFX
	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				-G	
	Bowl	Metal bowl				-U	-U
O	Type of mounting	Mounting bracket			1	-WP	
		Mounting bracket			1	-WPM	
		Wall mounting bracket for large wall gap			1	-WPB	
	Alternative flow direction	Flow direction from right to left				-Z	-Z

1 WP, WPM, WPB

Not with module G

Transfer order code

552942	MS	9	- LFX	-		- U	-		-	
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## Filters MS-LF/LFM/LFX, MS series, NPT

Accessories

Filter cartridges, MS9 series



Ordering data				
Size	Filter cartridge	Grade of filtration [μm]	Part No.	Type
MS9	Micro-filter cartridge	0.01	553036	MS9-LFM-A
	Fine-filter cartridge	1	553037	MS9-LFM-B
	Filter cartridge	5	570309	MS9-LFP-C
	Filter cartridge	40	570310	MS9-LFP-E
	Activated carbon filter cartridge	–	552946	MS9-LFX
High flow rate HF				
MS9	Micro-filter cartridge	0.01	552944	MS9-LFM-A-HF
	Fine-filter cartridge	1	552945	MS9-LFM-B-HF

## Product Range and Company Overview

### A Complete Suite of Automation Services

Our experienced engineers provide complete support at every stage of your development process, including: conceptualization, analysis, engineering, design, assembly, documentation, validation, and production.



**Custom Automation Components**  
Complete custom engineered solutions



**Custom Control Cabinets**  
Comprehensive engineering support and on-site services



**Complete Systems**  
Shipment, stocking and storage services

### The Broadest Range of Automation Components

With a comprehensive line of more than 30,000 automation components, Festo is capable of solving the most complex automation requirements.



**Electromechanical**  
Electromechanical actuators, motors, controllers & drives



**Pneumatics**  
Pneumatic linear and rotary actuators, valves, and air supply



**PLCs and I/O Devices**  
PLC's, operator interfaces, sensors and I/O devices

### Supporting Advanced Automation... As No One Else Can!

Festo is a leading global manufacturer of pneumatic and electromechanical systems, components and controls for industrial automation, with more than 12,000 employees in 56 national headquarters serving more than 180 countries. For more than 80 years, Festo has continuously elevated the state of manufacturing with innovations and optimized motion control solutions that deliver higher performing, more profitable automated manufacturing and processing equipment. Our dedication to the advancement of automation extends beyond technology to the education and development of current and future automation and robotics designers with simulation tools, teaching programs, and on-site services.

### Quality Assurance, ISO 9001 and ISO 14001 Certifications

Festo Corporation is committed to supply all Festo products and services that will meet or exceed our customers' requirements in product quality, delivery, customer service and satisfaction.

To meet this commitment, we strive to ensure a consistent, integrated, and systematic approach to management that will meet or exceed the requirements of the ISO 9001 standard for Quality Management and the ISO 14001 standard for Environmental Management.



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