

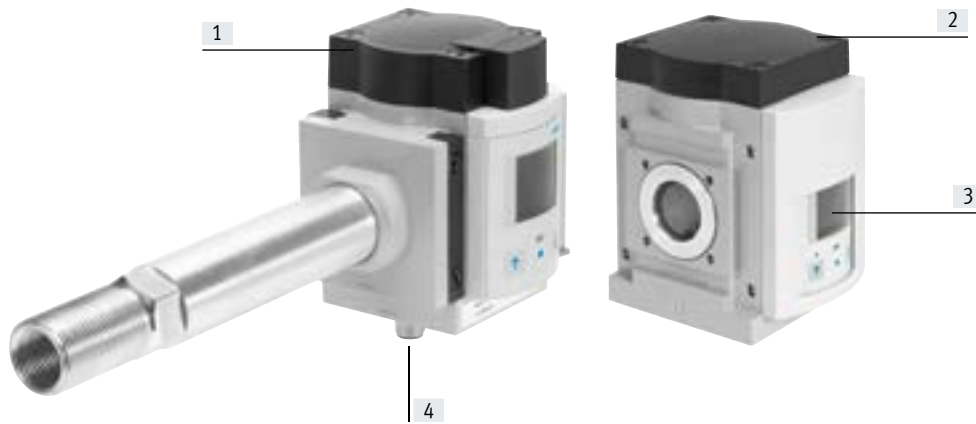
Flow sensors SFAM

FESTO



Key features

At a glance



- [1] Threaded mounting of individual device with laminar flow inlet
- [2] Can be combined with MS6 or MS9 series service units
- [3] – Very bright LCD display with blue background and white 9-segment display
– Bar chart depicts current measured value
– Switching point-dependent colour change
- [4] Central electrical connection via an M12 plug

Compact and capable of high flow rates

This modular flow sensor can operate either as a standalone unit or can be easily combined with the MS series service units.

The sensor provides:

- Absolute flow rate information
 - with threshold values and
 - convenient switching point adjustment via a display
- Cumulative air consumption measurement
- Patented – adjustable consumption-based switching pulse for cumulative air consumption measurement via the switching output

Systematically more reliable

The sensor covers a large measuring range with a specified accuracy thanks to its high dynamic response of 1:100. The sensor can provide precise information even when flow conditions are fluctuating and unreliable.

Easy to operate

- A large, illuminated LCD display increases the operational safety and makes the currently displayed flow rate or consumption values easy to read.
- Measured values outside the measuring range are visualised: flow rates are shown flashing.
- Switching outputs (NPN/PNP) can be changed via the menu
- Values that fall below or exceed the threshold values can also be identified from a distance or if the sensor is in an inaccessible location by the display changing colour.
- Easy to switch the current sensor settings in SHOW mode
- Simple switching between consumption and flow rate indication
- Values shown on the display:
 - can be shown for different standard conditions (DIN 1343, ISO 2533, ISO 6358)
 - can be filtered/averaged independently of the analogue output in the case of high dynamic response of the measurement

Convenient

- Festo plug and work solution
- Quick and easy menu prompting
- Fast commissioning thanks to easy-to-use, intuitive teach-in function
- Manual consumption measurement with start/stop and reset functionality

Easy to combine

With MS6 or MS9 series service unit thanks to innovative prism clamping technology. This saves additional installation time.

Flexible installation

The SFAM has an extremely compact, space-saving design optimised for flow performance.

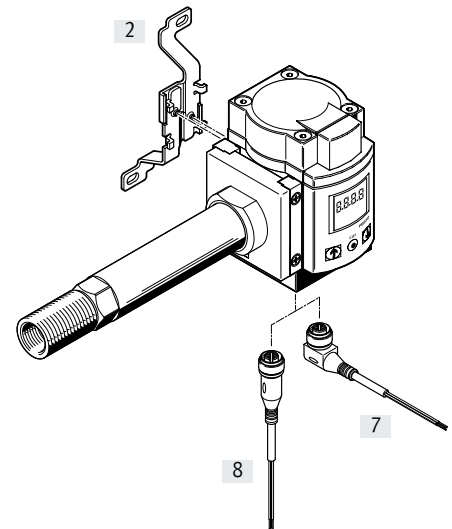
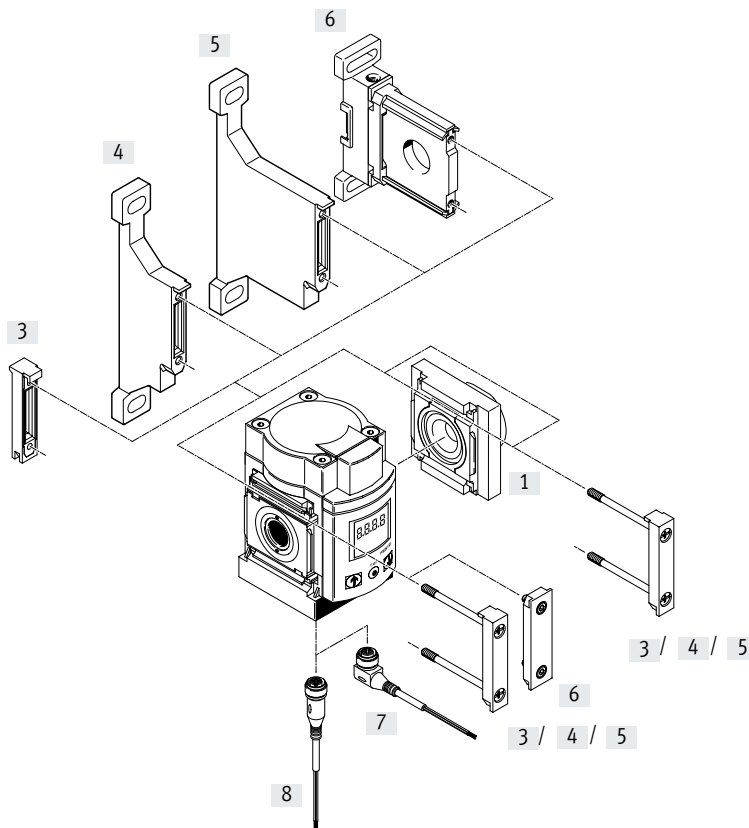
Right or left?

The fluid stream of the unidirectional flow sensor can be selected: either from left to right or from right to left.

Peripherals overview

SFAM-62-...-M for manifold assembly in MS6 series service unit
with laminar flow cartridge

SFAM-62-...-T/W for individual assembly
with sub-bases and laminar flow inlet



Mounting components and accessories		In service units of series MS6	Individual device	→ Page/Internet
[1]	Connecting plate MS6-AG...	■	■ Included in the scope of delivery	ms6-ag
[2]	Mounting bracket MS6-WB	-	■ Included in the scope of delivery with mounting type -W	ms6-wb
[3]	Module connector MS6-MV	■	-	ms6-mv
[4]	Mounting bracket MS6-WP	■	-	ms6-wp
[5]	Mounting bracket MS6-WPB	■	-	ms6-wpb
[6]	Mounting bracket MS6-WPM	■	-	ms6-wpm
[7]	Connecting cable NEBU-M12W5, angled socket	■	■	14
[8]	Connecting cable NEBU-M12G5, straight socket	■	■	14

Note

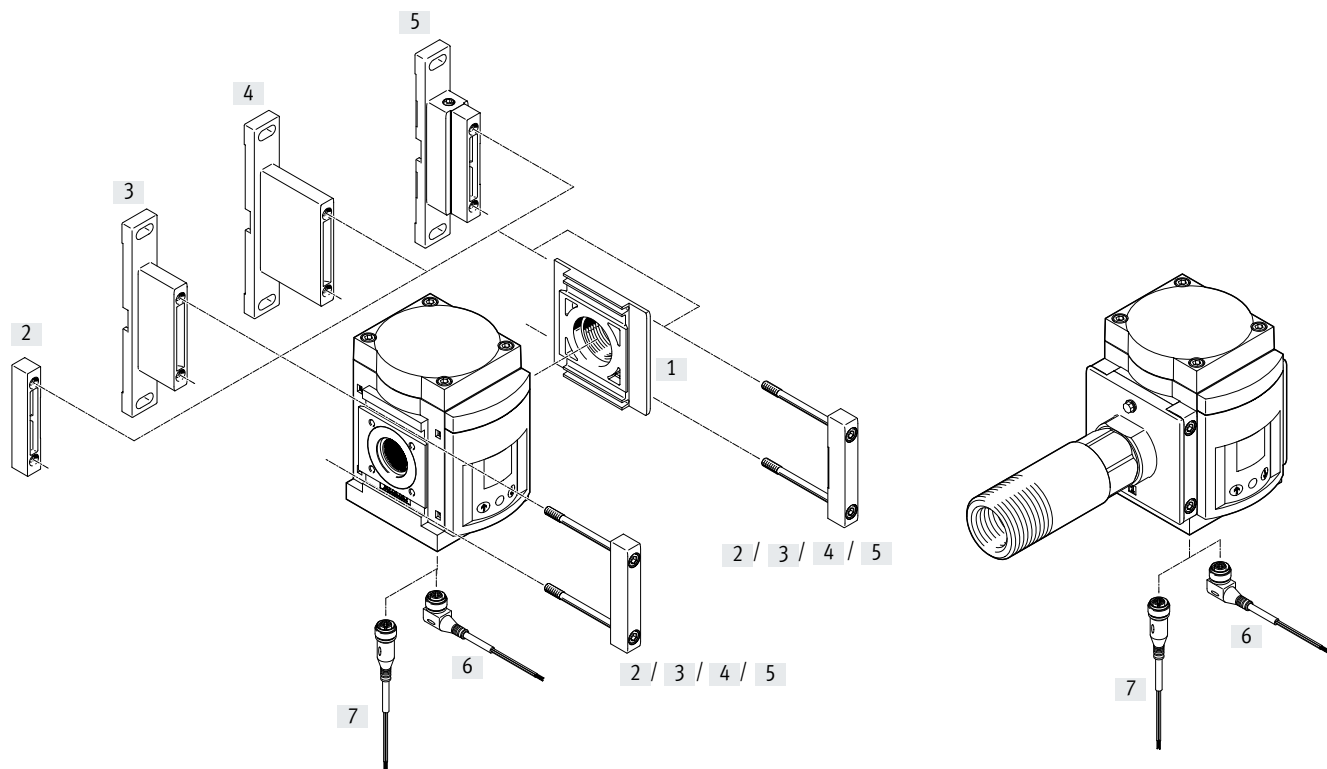
Additional accessories:

- Module connector for combination with size MS4/MS6 or size MS9
- → Internet: amv, rmv, armv
- Adapter for mounting on profiles → Internet: ipm-80, ipm-40-80, ipm-80-80

Peripherals overview

SFAM-90-...-M for manifold assembly in MS9 series service unit with laminar flow cartridge

SFAM-90-...-T for individual assembly with sub-bases and laminar flow inlet



Mounting components and accessories

Mounting components and accessories		In service units of series MS9	Individual device	→ Page/Internet
[1]	Connecting plate MS9-AG...	■	■ Included in the scope of delivery	ms9-ag
[2]	Module connector MS9-MV	■	-	ms9-mv
[3]	Mounting bracket MS9-WP	■	-	ms9-wp
[4]	Mounting bracket MS9-WPB	■	-	ms9-wpb
[5]	Mounting bracket MS9-WPM	■	-	ms9-wpm
[6]	Connecting cable NEBU-M12W5, angled socket	■	■	14
[7]	Connecting cable NEBU-M12G5, straight socket	■	■	14

Note

Additional accessories:

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

Type codes

001	Series	
SFAM	Flow sensor	
002	Size	
62	62	
90	90	
003	Flow measuring range	
1000	Max. 1000 l/min	
3000	Max. 3000 l/min	
5000	Max. 5000 l/min	
10000	Max. 10000 l/min	
15000	Max. 15000 l/min	
004	Flow rate input	
L	Unidirectional, from left	
R	Unidirectional, from right	
005	Type of mounting	
T	Threaded mounting	
M	Manifold assembly	
W	Wall mounting	

006	Pneumatic connection	
	None	
G12	G1/2	
G1	G1	
G112	G1 1/2	
N12	1/2 NPT	
N1	1 NPT	
N112	1 1/2 NPT	
007	Electrical output 1	
2SA	2x PNP or NPN, 1 analogue output 4 ... 20 mA	
2SV	2x PNP or NPN, 1 analogue output 0 ... 10 V	
008	Electrical connection	
M12	Plug M12, A-coded	
009	Connecting cable, M8, straight socket	
	None	
2.5S	2.5 m	
5S	5 m	
010	Connecting cable, M8, angled plug socket	
	None	
2.5A	2.5 m	
5A	5 m	
011	EU certification	
	None	
EX2	II 3GD	

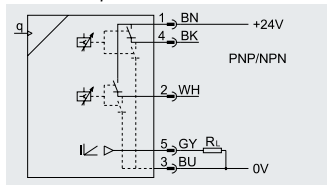
Additional variants can be ordered using the modular product system → 13

- Flow input
- Type of mounting
- Pneumatic connection
- Electrical accessories
- EU certification (ATEX)

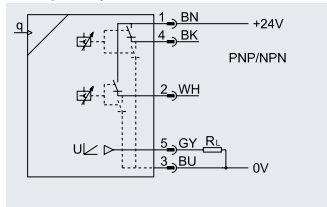
Data sheet

Function

Current output 2SA



Voltage output 2SV



- - Flow rate
10 ... 1000 l/min
30 ... 3000 l/min
50 ... 5000 l/min
100 ... 10 000 l/min
150 ... 15 000 l/min

- - Temperature range
0 ... +50°C

- - Operating pressure
0 ... 16 bar

- Analogue output 0 ... 10 V, adjustable switching outputs 2x PNP or 2x NPN
- Analogue output 4 ... 20 mA, adjustable switching outputs 2x PNP or 2x NPN
- Freely selectable pulse output for consumption measurement

- Analogue filter for setting the rise time
- Digital filter for smoothing the display values



SFAM-...-M

SFAM-...-T

- - **Note**
To comply with the specified accuracies, the SFAM must be supplied via the following connections:
 - SFAM-62-...-M via a pneumatic connection of at least G 1/2, SFAM-90-...-M via a pneumatic connection of at least G 3/4.
 - SFAM-62-...-T/W via a connection with an inside diameter of at least 10 mm, SFAM-90-...-T via a connection with an inside diameter of at least 20 mm.

- - **Note**
Downstream of a filter regulator MS-LFR or pressure regulator MS-LR, the branching module MS6-FRM-1/2 (for size MS6) or MS9-FRM-G (for size MS9) must be installed upstream of the flow sensor SFAM to maintain the indicated accuracies.

General technical data

Certification	RCM trademark c UL us - Recognized (OL)
Certificate issuing authority	UL E322346
CE marking (see declaration of conformity)	To EU EMC Directive ¹⁾ To EU RoHS Directive
KC mark	KC EMC
Note on materials	RoHS-compliant

1) For information about the area of use, see the EC declaration of conformity at: www.festo.com/sp → Certificates.

If the devices are subject to usage restrictions in residential, commercial or light-industrial environments, further measures for the reduction of the emitted interference may be necessary.

ATEX

EU certification	Ex2
ATEX category gas	II 3G
Type of ignition protection for gas	Ex nA IIC T5 X Gc
ATEX category for dust	II 3D
Type of ignition protection for dust	Ex tc IIIB T80°CX Dc IP54
Explosion-proof ambient temperature	0°C ≤ Ta ≤ +50°C
CE marking (see declaration of conformity)	To EU Explosion Protection Directive (ATEX)

Data sheet

Input signal/measuring element		SFAM-62			SFAM-90		
Type		-1000	-3000	-5000	-5000	-10 000	-15 000
Flow measuring range							
Measured variable		Flow rate, consumption					
Flow direction	-L	Unidirectional P1 } P2					
	-R	Unidirectional P2 { P1					
Measuring principle		Thermal					
Flow measuring range	[l/min]	10 ... 1000	30 ... 3000	50 ... 5000	50 ... 5000	100 ... 10 000	150 ... 15 000
Operating pressure	[bar]	0 ... 16					
Nominal pressure	[bar]	6					
Operating medium		Compressed air to ISO 8573-1:2010 [7:4:4]					
		Nitrogen					
Note on the operating/pilot medium		Operation with lubricated medium not possible					
Temperature of medium	[°C]	0 ... +50					
Ambient temperature	[°C]	0 ... +50					
Nominal temperature	[°C]	23					

Output, general^{1), 2)}

Accuracy of flow rate		+/- (3% o.m.v. + 0.3% FS)					
Repetition accuracy of zero point in ±%FS	[%FS]	0.2					
Repetition accuracy of margin in ±%FS	[%FS]	0.8					
Temperature coefficient of margin in ±%FS/K	[%FS/K]	typically 0.1					
Pressure dependency margin in ± %FS/bar	[%FS/bar]	0.5					

1) Accuracy with nominal conditions (6 bar, 23°C and horizontal mounting position)

2) % FS = % of the final value in the measuring range (full scale)

Switching output

Switching output		2x PNP or 2x NPN, adjustable					
Switching function		Window comparator or threshold value comparator, adjustable					
Switching element function		N/C or N/O contact, adjustable					
Switch-on time		Adjustable (factory setting: approx. 60 ms)					
Switch-off time		Adjustable (factory setting: approx. 60 ms)					
Max. output current	[mA]	100					
Voltage drop	[V]	Max. 1.5					
Inductive protective circuit		Adapted to MZ, MY, ME coils					

Analogue output

Analogue output		SFAM-62			SFAM-90		
Type		-1000	-3000	-5000	-5000	-10 000	-15 000
Flow measuring range							
Characteristic flow rate curve	[l/min]	0 ... 1000	0 ... 3000	0 ... 5000	0 ... 5000	0 ... 10 000	0 ... 15 000
Output characteristic curve for current	[mA]	4 ... 20					
Output characteristic curve for voltage	[V]	0 ... 10					
Rise time	[ms]	15, 30, 60 (factory setting), 125, 250, 500, 999 possible settings					
Max. load resistance at current output	[ohm]	500					
Min. load resistance of voltage output	[kOhm]	10					

Output, additional data

Short circuit current rating		Yes					
Overload protection		Provided					

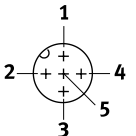
Data sheet

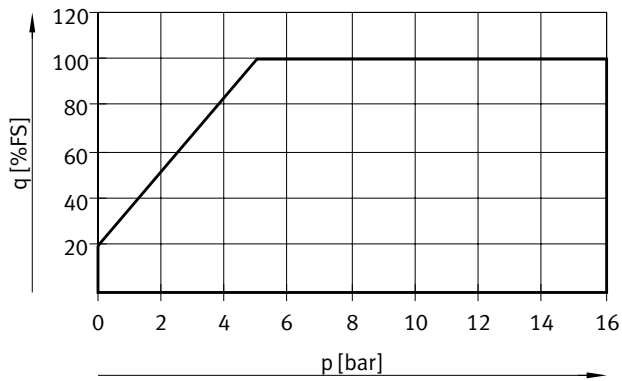
Electronics									
Operating voltage range DC	[V]	15 ... 30							
Reverse polarity protection		For all electrical connections							
Electromechanics									
Electrical connection		Straight plug, M12x1, 5-pin							
Max. connecting cable length	[m]	30							
Mechanics									
Type		SFAM-62			SFAM-90				
Type of mounting		-M	-TG12/-WG12	-TN12/-WN12	-M	-TG1	-TN1	-TG112	-TN112
Mounting position		Horizontal							
Pneumatic connection		-	G 1/2	1/2 NPT	-	G 1	1 NPT	G 1 1/2	1 1/2 NPT
Product weight	[g]	600	1100	1100	1500	2400	2400	2750	2750
Information on materials: Housing		PA-reinforced, die-cast aluminium							
Display/operation									
Type		SFAM-62			SFAM-90				
Flow measuring range		-1000	-3000	-5000	-5000	-10 000	-15 000		
Display type		Illuminated LCD, blue							
Displayable units		l/min, scfm, l, m ³ , scf							
Setting range for flow rate threshold values	[%FS]	1 ... 100							
Setting range for consumption pulse threshold values	[l]	3 ... 19 999	10 ... 19 999	15 ... 19 999	15 ... 19 999	30 ... 19 999	50 ... 19 999		
	[m ³]	1 ... 19 999							
	[scf]	0.1 ... 1999.9	0.4 ... 1999.9	0.5 ... 1999.9	0.5 ... 1999.9	1 ... 1999.9	2 ... 1999.9		
Hysteresis setting range	[%FS]	0 ... 90							
Immission/emission									
Type		SFAM-62			SFAM-90				
Flow measuring range		-1000	-3000	-5000	-5000	-10 000	-15 000		
Storage temperature	[°C]	-20 ... +80							
Degree of protection		IP65							
Pressure drop at 50%FS flow rate and 6 bar with mounting type -M	[mbar]	0 ... 100	0 ... 100	0 ... 100	0 ... 40	0 ... 100	0 ... 200		
Pressure drop at 50%FS flow rate with mounting type -T/-W	[mbar]	0 ... 100	0 ... 100	0 ... 100	0 ... 100	0 ... 100	0 ... 100		
Protection class		III							
Corrosion resistance class CRC ¹⁾		2							

1) Corrosion resistance class 2 to Festo standard 940070

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

Data sheet

Pin allocation		Pin	Meaning
Plug M12x1, 5-pin			
	1	Operating voltage +24 V DC	
	2	Binary output B	
	3	0 V	
	4	Binary output A	
	5	Analogue output C	

Flow measuring range¹⁾ q_n as a function of operating pressure p_1 

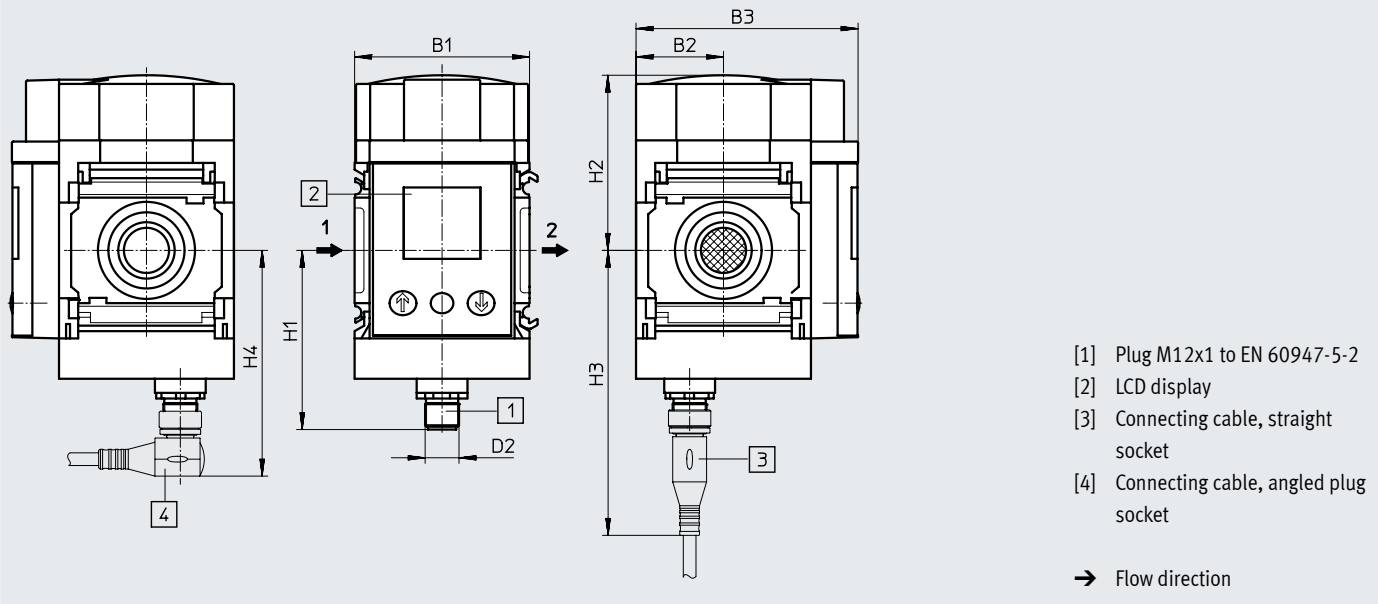
- 1) For an operating pressure of more than 5 bar, the flow sensor can determine measured values with the specified accuracy over the entire measuring range. For an operating pressure below 5 bar, the measuring range with the specified accuracy is reduced as shown in the graph.

Data sheet

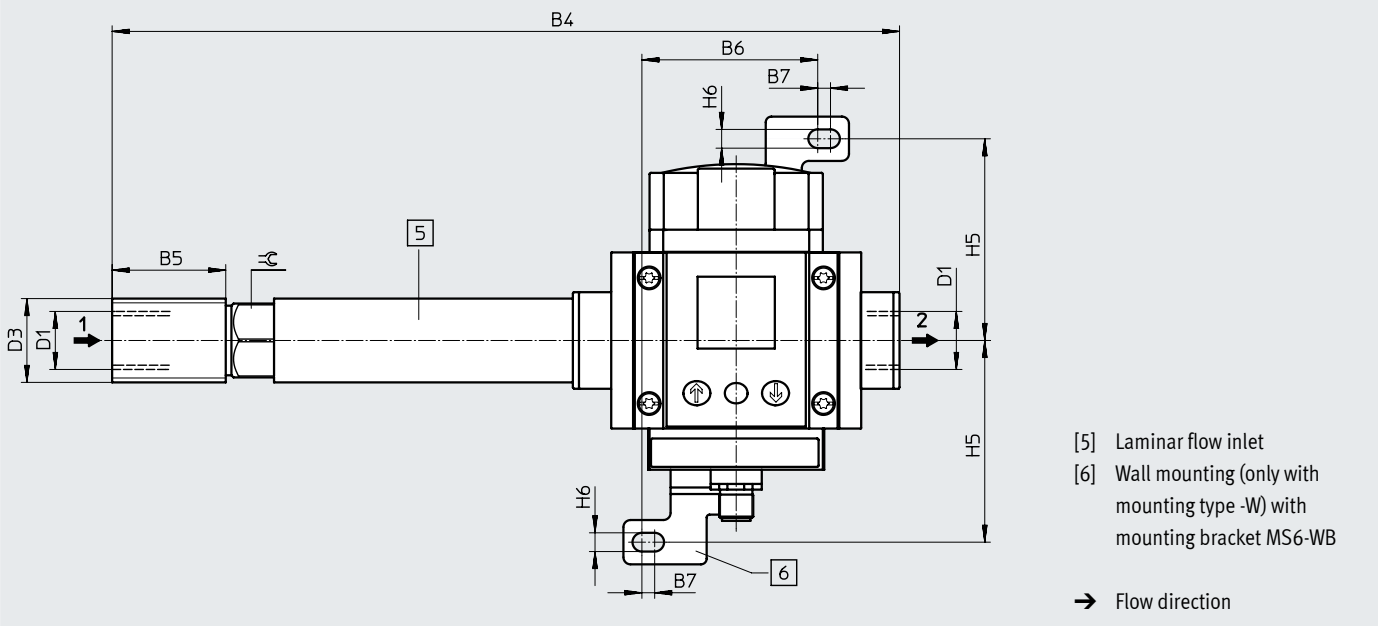
Dimensions – SFAM-62

Download CAD data → www.festo.com

SFAM-62-...-M for manifold assembly in MS6 series service unit



SFAM-62-...-T/W for individual assembly



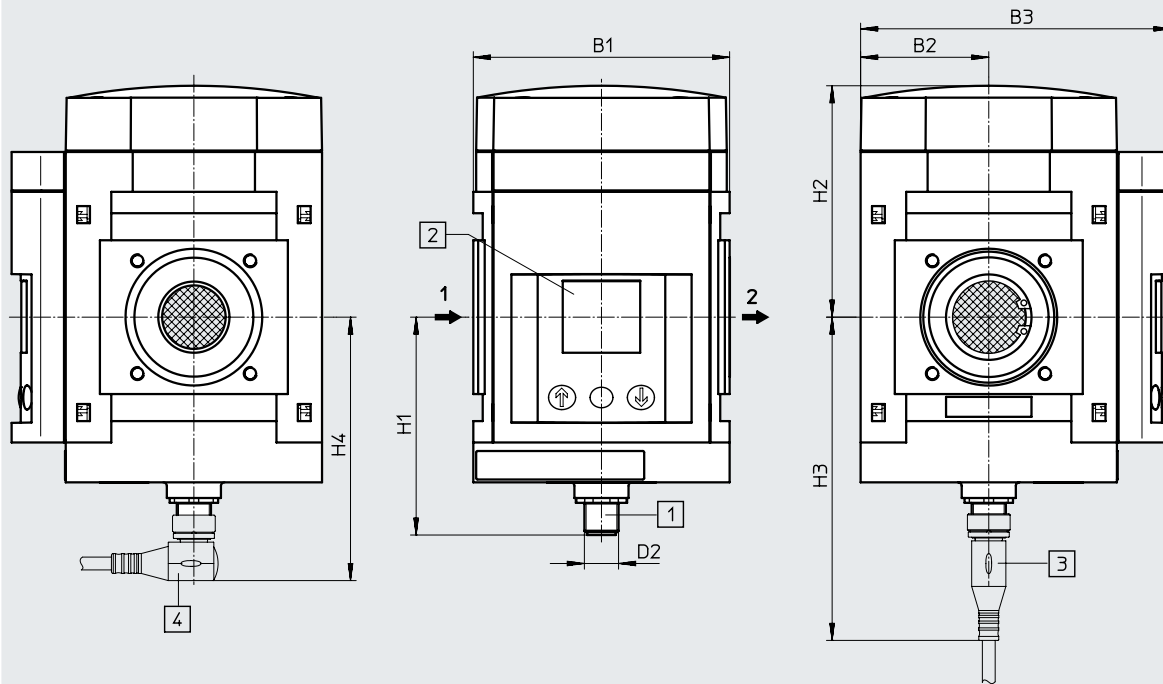
Type	B1	B2	B3	B4	B5	B6	B7	D1	D2	D3	H1	H2	H3	H4	H5	H6	⊕
SFAM-62-...-M	62	31	78.7	-	-	-	-	-	M12x1	-	63.5	62.1	101	80	-	-	-
SFAM-62-...-TG12	62	31	78.7	277	40	-	-	G 1/2	M12x1	G 3/4	63.5	62.1	101	80	-	-	26
SFAM-62-...-WG12						61.9	4.5								71	6.6	
SFAM-62-...-TN12	62	31	78.7	277	40	-	-	1/2 NPT	M12x1	NPT 3/4	63.5	62.1	101	80	-	-	26
SFAM-62-...-WN12						61.9	4.5								71	6.6	

Data sheet

Dimensions – SFAM-90

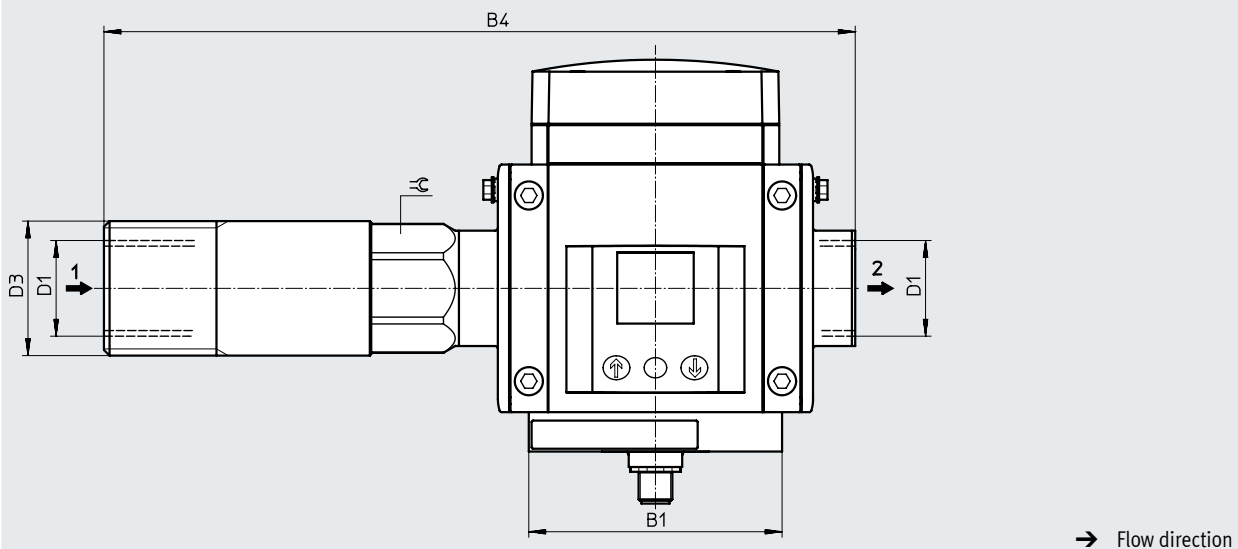
Download CAD data → www.festo.com

SFAM-90-...-M for manifold assembly in MS9 series service unit




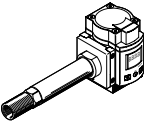
- [1] Plug M12x1 to EN 60947-5-2
- [2] LCD display
- [3] Connecting cable, straight socket
- [4] Connecting cable, angled plug socket

SFAM-90-...-T for individual assembly



Type	B1	B2	B3	B4	D1	D2	D3	H1	H2	H3	H4	⌀
SFAM-90-...-M	90	45	109	-	-	M12x1	-	76.5	81.3	114	93	-
SFAM-90-...-TG1	90	45	109	267	G 1	M12x1	G 1 1/2	76.5	81.3	114	93	41
SFAM-90-...-TG112				301	G 1 1/2		G2					55
SFAM-90-...-TN1	90	45	109	267	1 NPT	M12x1	1 1/2 NPT	76.5	81.3	114	93	41
SFAM-90-...-TN112				301	1 1/2 NPT		2 NPT					55

Data sheet

Ordering data					
Design	Grid dimension [mm]	Electrical output	Flow measuring range [l/min]	Part no.	Type
Manifold assembly in MS series service unit combination					
	62	2x PNP or NPN, 1 analogue output 4 ... 20 mA	10 ... 1000	564930	SFAM-62-1000L-M-2SA-M12
			30 ... 3000	564934	SFAM-62-3000L-M-2SA-M12
			50 ... 5000	564938	SFAM-62-5000L-M-2SA-M12
		2x PNP or NPN, 1 analogue output 0 ... 10 V	10 ... 1000	564932	SFAM-62-1000L-M-2SV-M12
			30 ... 3000	564936	SFAM-62-3000L-M-2SV-M12
			50 ... 5000	564940	SFAM-62-5000L-M-2SV-M12
	90	2x PNP or NPN, 1 analogue output 4 ... 20 mA	50 ... 5000	573346	SFAM-90-5000L-M-2SA-M12
			100 ... 10 000	573348	SFAM-90-10000L-M-2SA-M12
			150 ... 15 000	573350	SFAM-90-15000L-M-2SA-M12
		2x PNP or NPN, 1 analogue output 0 ... 10 V	50 ... 5000	573347	SFAM-90-5000L-M-2SV-M12
			100 ... 10 000	573349	SFAM-90-10000L-M-2SV-M12
			150 ... 15 000	573351	SFAM-90-15000L-M-2SV-M12
Threaded mounting of individual device					
	62	2x PNP or NPN, 1 analogue output 4 ... 20 mA	10 ... 1000	565375	SFAM-62-1000L-TG12-2SA-M12
			30 ... 3000	565379	SFAM-62-3000L-TG12-2SA-M12
			50 ... 5000	565383	SFAM-62-5000L-TG12-2SA-M12
		2x PNP or NPN, 1 analogue output 0 ... 10 V	10 ... 1000	565376	SFAM-62-1000L-TG12-2SV-M12
			30 ... 3000	565380	SFAM-62-3000L-TG12-2SV-M12
			50 ... 5000	565384	SFAM-62-5000L-TG12-2SV-M12
	90	2x PNP or NPN, 1 analogue output 4 ... 20 mA	50 ... 5000	573352	SFAM-90-5000L-TG1-2SA-M12
			100 ... 10 000	573354	SFAM-90-10000L-TG112-2SA-M12
			150 ... 15 000	573356	SFAM-90-15000L-TG112-2SA-M12
		2x PNP or NPN, 1 analogue output 0 ... 10 V	50 ... 5000	573353	SFAM-90-5000L-TG1-2SV-M12
			100 ... 10 000	573355	SFAM-90-10000L-TG112-2SV-M12
			150 ... 15 000	573357	SFAM-90-15000L-TG112-2SV-M12

Ordering data – Modular product system

Ordering table		Conditions	Code	Enter code
Module no.	563796			
Function	Flow sensor		SFAM	-SFAM
Grid dimension	62 mm		-62	
	90 mm		-90	
Flow measuring range	Max. 1000 l/min	[1]	-1000	
	Max. 3000 l/min	[1]	-3000	
	Max. 5000 l/min		-5000	
	Max. 10 000 l/min	[2]	-10 000	
	Max. 15 000 l/min	[2]	-15 000	
Flow input	Unidirectional, from left to right		L	
	Unidirectional, from right to left		R	
Type of mounting	Manifold assembly		-M	
	Threaded mounting		-T	
	Wall mounting	[1] [4]	-W	
Pneumatic connection	n/a			
	G1/2	[1] [3]	G12	
	G1	[2] [3]	G1	
	G1 1/2	[2] [3]	G112	
	1/2" NPT	[1] [3]	N12	
	1" NPT	[2] [3]	N1	
	1 1/2" NPT	[2] [3]	N112	
Electrical output	2x PNP or NPN, 1 analogue output 4 ... 20 mA		-2SA	
	2x PNP or NPN, 1 analogue output 0 ... 10 V		-2SV	
Electrical connection	M12 plug, A-coded		-M12	M12
Electrical accessories	n/a			
	Angled socket, cable 2.5 m		-2.5A	
	Straight socket, cable 2.5 m		-2.5S	
	Angled socket, cable 5 m		-5 A	
	Straight socket, cable 5 m		-5S	
EU certification	n/a			
	II 3GD		-EX2	

[1] 1000, 3000, G12, N12, W
Not with grid dimension 90

[2] 10 000, 15 000, G1, G112, N1, N112
Not with grid dimension 62

[3] G12, G1, G112, N12, N1, N112
Not with type of mounting M



Mandatory specification with type of mounting T, W

[4] W Not with EX2

Accessories

Ordering data – Connecting cables

Data sheets → Internet: nebu

	Number of wires	Cable length [m]	Part no.	Type
M12x1, straight socket				
	5	2.5	541330	NEBU-M12G5-K-2.5-LE5
		5	541331	NEBU-M12G5-K-5-LE5
M12x1, angled socket				
	5	2.5	567843	NEBU-M12W5-K-2.5-LE5
		5	567844	NEBU-M12W5-K-5-LE5