

Flow sensors SFAM

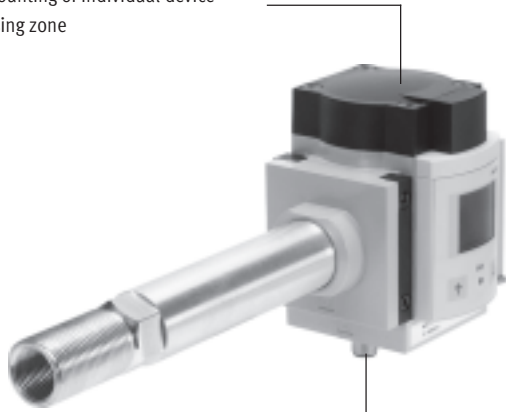


Flow sensors SFAM

Key features

At a glance

Threaded mounting of individual device with stabilising zone



Central electrical connection via M12 plug

Can be combined with MS6 or MS9 series service units

- Illuminated LCD display with blue background and white 9-segment display
- Bar graph visualises the current measured value
- Switching point-dependent colour change

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.

It 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 switched over 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 means of the display changing colour
- Simple checking of 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 measuring dynamics

Convenient

- 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 combination 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?

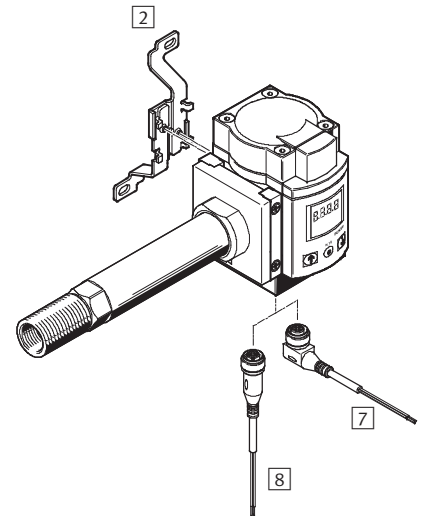
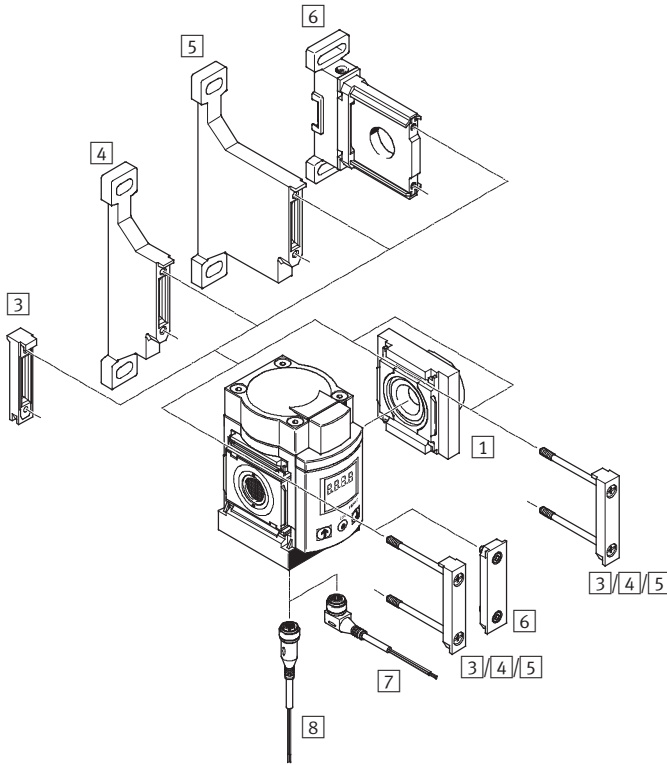
The fluid stream of the unidirectional flow sensor can be selected: either from left to right or from right to left.

Flow sensors SFAM


Peripherals overview

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

SFAM-62-...-T/-W for individual assembly
with connecting plates and stabilising zone



Mounting attachments and accessories		In MS6 series service unit combination	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:

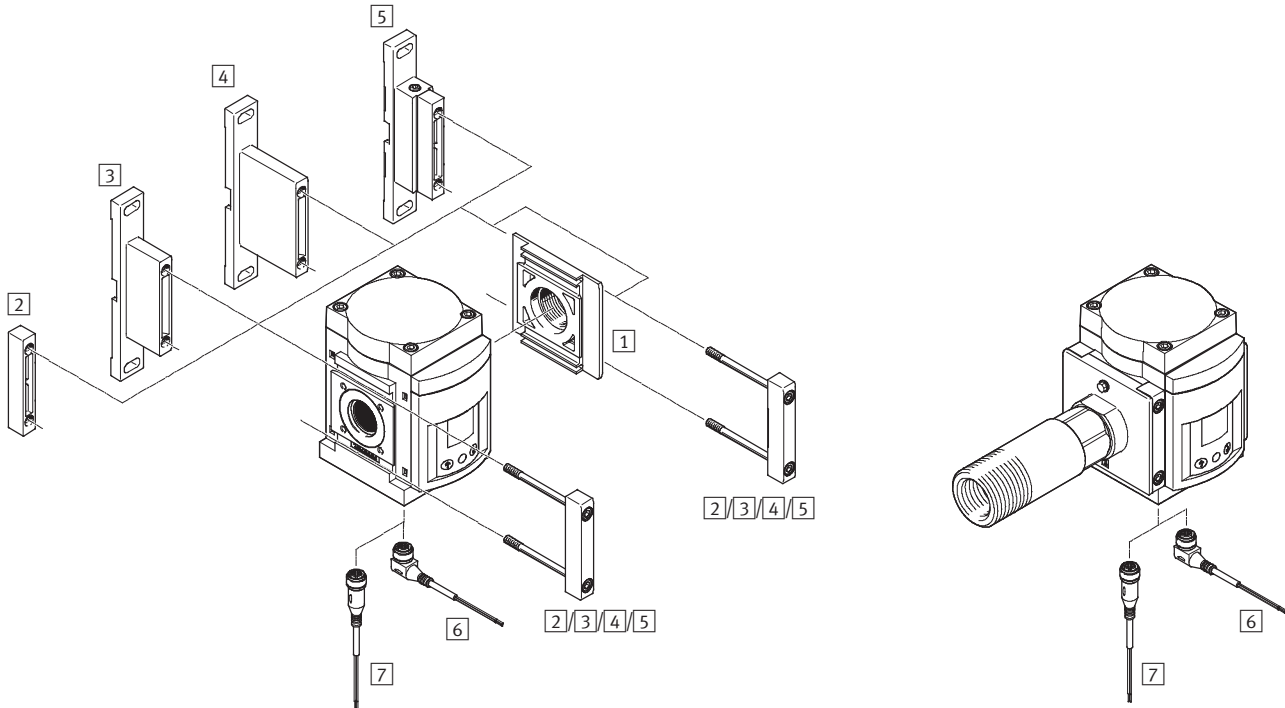
- Module connector for combination with size MS4/MS6 or size MS9 → Internet: amv, rmv, armv
- Adapter for mounting on profiles → Internet: ipm-80, ipm-40-80, ipm-80-80

Flow sensors SFAM


Peripherals overview

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

SFAM-90-...-T for individual assembly
with connecting plates and stabilising zone



Mounting attachments and accessories			
	In MS9 series service unit combination	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

Flow sensors SFAM

Type codes

SFAM - 62 - 1000 L - T G12 - 2SA - M12

Type

SFAM	Flow sensor
------	-------------

Grid dimension

62	Grid dimension 62 mm
90	Grid dimension 90 mm

Flow measuring range [l/min]

SFAM-62	
1000	Max. 1,000
3000	Max. 3,000
5000	Max. 5,000
SFAM-90	
5000	Max. 5,000
10000	Max. 10,000
15000	Max. 15,000

Flow input

L	Unidirectional, from left to right
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Type of mounting

M	Manifold assembly
T	Threaded mounting

Pneumatic connection

SFAM-62	
G12	Female thread G $\frac{1}{2}$
SFAM-90-5000L	
G1	Female thread G1
SFAM-90-10000L/15000L	
G112	Female thread G1 $\frac{1}{2}$

Electrical output

2SA	2x PNP or NPN, 1 analogue output 4 ... 20 mA
2SV	2x PNP or NPN, 1 analogue output 0 ... 10 V

Electrical connection

M12	Straight plug, M12x1, 5-pin
-----	-----------------------------

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

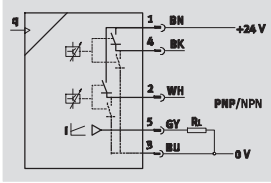
- Flow input
- Type of mounting
- Pneumatic connection
- Electrical accessories
- EU certification (ATEX)

Flow sensors SFAM

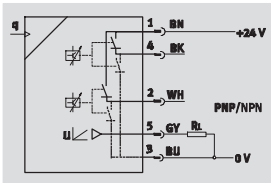
Technical data




Function

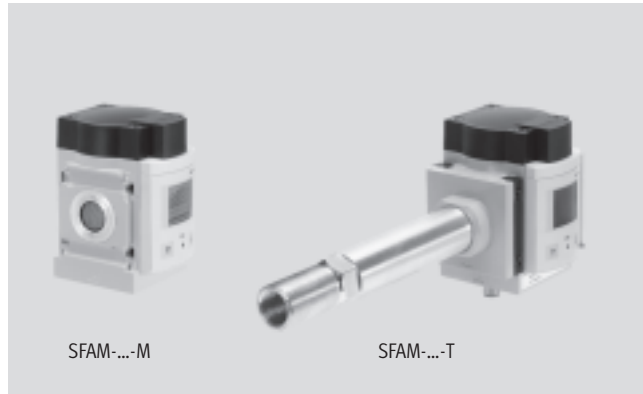
Current output 2SA



Voltage output 2SV





-  - Flow rate
 10 ... 1,000 l/min
 30 ... 3,000 l/min
 50 ... 5,000 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

-  - 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 $\frac{1}{2}$, SFAM-90-...-M via a pneumatic connection of at least G $\frac{3}{4}$.
 – 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
 To comply with the specified accuracies, a branching module MS6-FRM- $\frac{1}{2}$ (with size MS6) or MS9-FRM- $\frac{3}{4}$ (with size MS9) must be installed downstream of a filter regulator MS-LFR or pressure regulator MS-LR and upstream of the flow sensor SFAM.

General technical data	
Certification	C-Tick cULus recognized (OL)
CE marking (see declaration of conformity)	To EU EMC Directive ¹⁾
Note on materials	RoHS-compliant

1) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com → Support → User documentation.
 If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.

ATEX	
EU certification	EX2
ATEX category for gas	II 3G
Explosion ignition protection type for gas	Ex nA II T5 X
ATEX category for dust	II 3D
Explosion ignition protection type for dust	Ex tD A22 IP54 T80°C X
Explosion-proof temperature rating	0 °C ≤ Ta ≤ +50 °C
CE marking (see declaration of conformity)	To EU Explosion Protection Directive (ATEX)

Flow sensors SFAM

Technical data

Input signal/measuring element						
Type	SFAM-62			SFAM-90		
Flow measuring range	-1000	-3000	-5000	-5000	-10000	-15000
Measured variable	Flow rate, consumption					
Direction of flow	-L	Unidirectional P1 → P2				
	-R	Unidirectional P2 ← P1				
Measuring principle	Thermal					
Flow measuring range	[l/min]	10 ... 1,000	30 ... 3,000	50 ... 5,000	50 ... 5,000	100 ... 10,000 150 ... 15,000
Operating pressure	[bar]	0 ... 16				
Nominal pressure	[bar]	6				
Operating medium	Air quality class 5:4:3 to DIN ISO 8573-1					
	Nitrogen					
Temperature of medium	[°C]	0 ... +50				
Ambient temperature	[°C]	0 ... +50				
Nominal temperature	[°C]	23				

Output, general ^{1), 2)}		
Accuracy of zero point in ±%FS	[%FS]	0.3
Accuracy of margin in ±%FS	[%FS]	3
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 dependence of margin in ±%FS/bar	[%FS/bar]	0.5

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

2) % FS = % of the measuring range final value (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						
Type	SFAM-62			SFAM-90		
Flow measuring range	-1000	-3000	-5000	-5000	-10000	-15000
Characteristic curve for flow rate	[l/min]	0 ... 1,000	0 ... 3,000	0 ... 5,000	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]	Possible settings: 15, 30, 60 (factory setting), 125, 250, 500, 999				
Max. load resistance at current output	[ohms]	500				
Min. load resistance at voltage output	[kohms]	10				

Output, additional data	
Protection against short circuit	Yes
Protection against overloading	Yes

Flow sensors SFAM

Technical data

Electronic components		
Operating voltage range DC	[V]	15 ... 30
Reverse polarity protection		For all electrical connections

Electromechanical components		
Electrical connection		Straight plug, M12x1, 5-pin
Max. connecting cable length	[m]	30

Mechanical components								
Type	SFAM-62			SFAM-90				
Type of mounting	-M	-TG12/-WG12	-TN12/-WN12	-M	-TG1	-TN1	-TG112	-TN112
Mounting position	Horizontal ±5°							
Pneumatic connection	-	G1/2	NPT1/2	-	G1	NPT1	G1 1/2	NPT1 1/2
Product weight	[g]	600	1,100	1,100	1,500	2,400	2,400	2,750
Housing materials	PA-reinforced, die-cast aluminium							

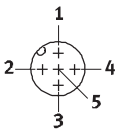
Display/operation						
Type	SFAM-62			SFAM-90		
Flow measuring range	-1000	-3000	-5000	-5000	-10000	-15000
Display type	Illuminated LCD, blue					
Displayable units	l/min, scfm, l, m ³ , scf					
Setting range for flow rate threshold values	[%FS]	1 ... 100				
Setting range for consumption pulse threshold values	[l]	3 ... 19,999	10 ... 19,999	15 ... 19,999	15 ... 19,999	30 ... 19,999
	[m ³]	1 ... 19,999				
	[scf]	0.1 ... 1,999.9	0.4 ... 1,999.9	0.5 ... 1,999.9	0.5 ... 1,999.9	1 ... 1,999.9
Hysteresis setting range	[%FS]	0 ... 90				

Immissions/emissions						
Type	SFAM-62			SFAM-90		
Flow measuring range	-1000	-3000	-5000	-5000	-10000	-15000
Storage temperature	[°C]	-20 ... +80				
Protection class	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
Pressure drop at 50 %FS flow rate with mounting type -T/-W	[mbar]	0 ... 100	0 ... 100	0 ... 100	0 ... 100	0 ... 100
Electrical protection class	III					
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.

Flow sensors SFAM

Technical data

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

Flow measuring range¹⁾ qn as a function of operating pressure p1



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.

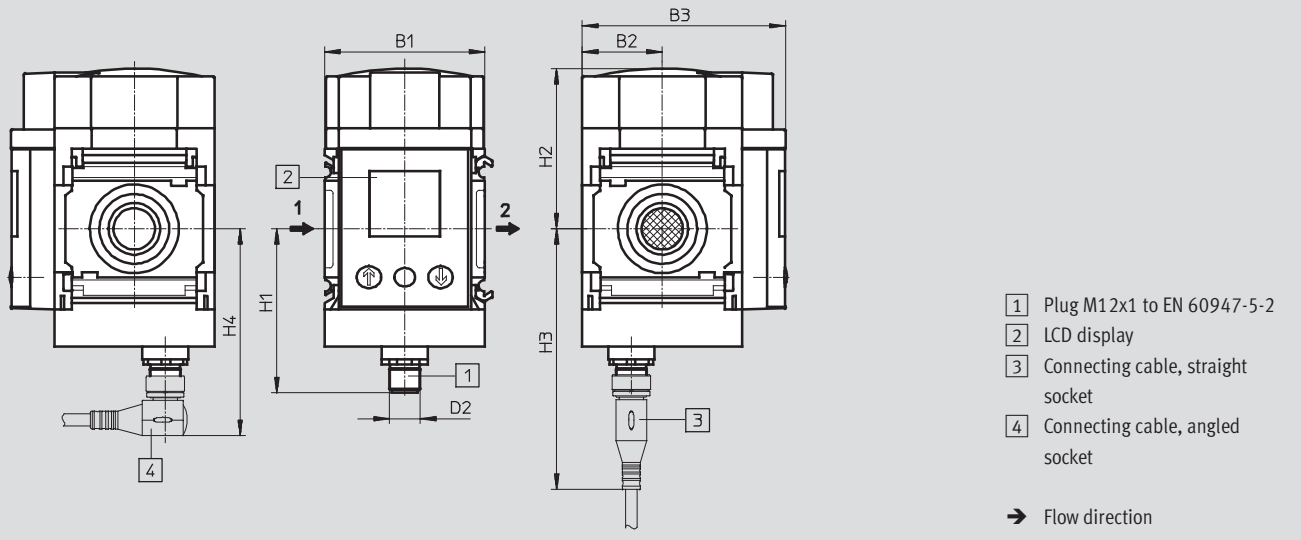
Flow sensors SFAM

Technical data

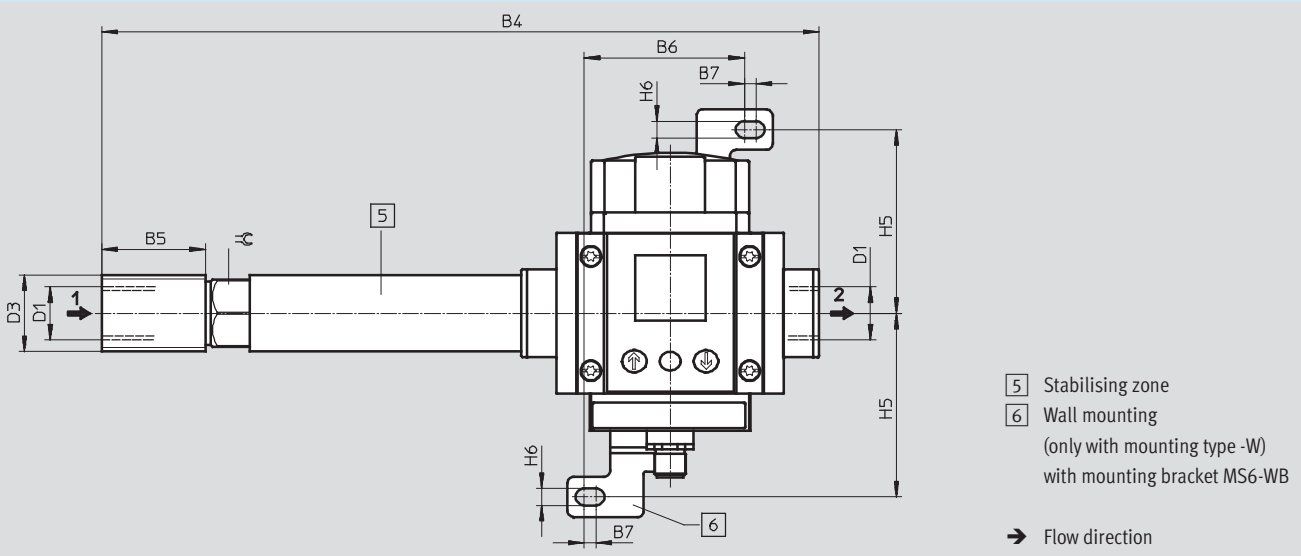
Dimensions – SFAM-62

Download CAD data → www.festo.com

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



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	-	-	G1/2	M12x1	G3/4	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	-	-	NPT1/2	M12x1	NPT3/4	63.5	62.1	101	80	-	-	26
SFAM-62-...-WN12						61.9	4.5								71	6.6	

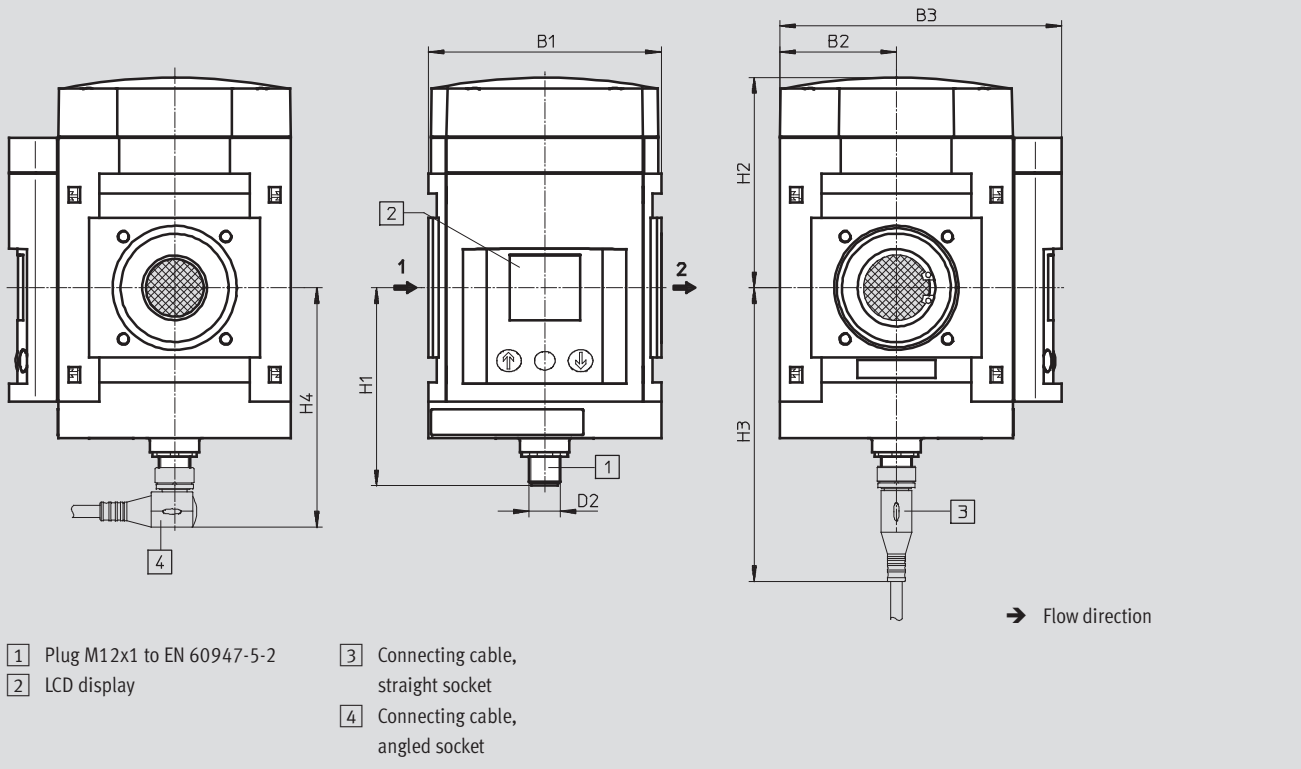
Flow sensors SFAM

Technical data

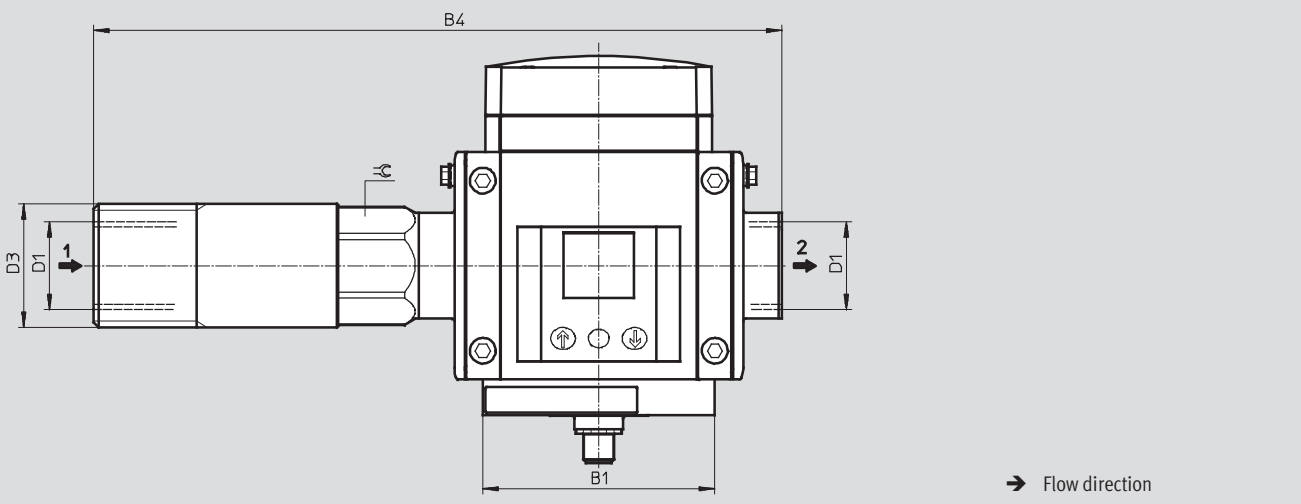
Dimensions – SFAM-90

Download CAD data → www.festo.com

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




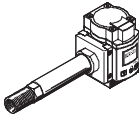
SFAM-90-...-T for individual assembly



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	G1	M12x1	G1½	76.5	81.3	114	93	41
SFAM-90-...-TG112				301	G1½		G2					55
SFAM-90-...-TN1	90	45	109	267	NPT1	M12x1	NPT1½	76.5	81.3	114	93	41
SFAM-90-...-TN112				301	NPT1½		NPT2					55

Flow sensors SFAM

Technical data

Ordering data					
Version	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 ... 1,000	564930	SFAM-62-1000L-M-2SA-M12
			30 ... 3,000	564934	SFAM-62-3000L-M-2SA-M12
			50 ... 5,000	564938	SFAM-62-5000L-M-2SA-M12
		2x PNP or NPN, 1 analogue output 0 ... 10 V	10 ... 1,000	564932	SFAM-62-1000L-M-2SV-M12
			30 ... 3,000	564936	SFAM-62-3000L-M-2SV-M12
			50 ... 5,000	564940	SFAM-62-5000L-M-2SV-M12
	90	2x PNP or NPN, 1 analogue output 4 ... 20 mA	50 ... 5,000	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 ... 5,000	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 ... 1,000	565375	SFAM-62-1000L-TG12-2SA-M12
			30 ... 3,000	565379	SFAM-62-3000L-TG12-2SA-M12
			50 ... 5,000	565383	SFAM-62-5000L-TG12-2SA-M12
		2x PNP or NPN, 1 analogue output 0 ... 10 V	10 ... 1,000	565376	SFAM-62-1000L-TG12-2SV-M12
			30 ... 3,000	565380	SFAM-62-3000L-TG12-2SV-M12
			50 ... 5,000	565384	SFAM-62-5000L-TG12-2SV-M12
	90	2x PNP or NPN, 1 analogue output 4 ... 20 mA	50 ... 5,000	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 ... 5,000	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

Flow sensors SFAM

Ordering data – Modular products



Ordering table		Conditions	Code	Enter code
M	Module No.		563796	
	Function		Flow sensor	SFAM
	Grid dimension		62 mm	-62
			90 mm	-90
	Flow measuring range		Max. 1,000 l/min	¹ -1000
			Max. 3,000 l/min	¹ -3000
			Max. 5,000 l/min	-5000
			Max. 10,000 l/min	² -10000
			Max. 15,000 l/min	² -15000
	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
O	Pneumatic connection		Not specified	
			G $\frac{1}{2}$	¹ ³ G12
			G1	² ³ G1
			G1 $\frac{1}{2}$	² ³ G112
			$\frac{1}{2}$ " NPT	¹ ³ N12
			1" NPT	² ³ N1
			1 $\frac{1}{2}$ " NPT	² ³ N112
M	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		Plug M12, A-coded	-M12
O	Electrical accessories		Not specified	
			Angled socket, 2.5 m cable	-2.5A
			Straight socket, 2.5 m cable	-2.5S
			Angled socket, 5 m cable	-5A
			Straight socket, 5 m cable	-5S
		EU certification		Not specified
			II 3GD	-EX2

¹ **1000, 3000, G12, N12, W**

Not with grid dimension 90

² **10000, 15000, G1, G112, N1, N112**

Not with grid dimension 62

³ **G12, G1, G112, N12, N1, N112**

Not with mounting type M

Mandatory data for mounting type T, W

⁴ **W**



Not with EX2

Transfer order code

563796 **SFAM** - - - - - **M12** - -

Flow sensors SFAM

Accessories

Ordering data – Connecting cables			Technical data → 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