Flow sensors SFAM

FESTO

Flow sensors SFAM
Key features

At a glance

Threaded mounting of individual device with stabilising zone

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
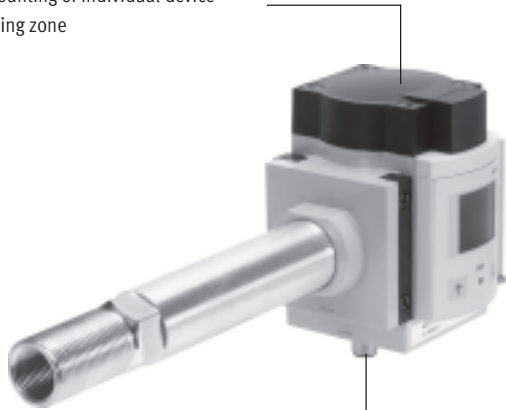
Central electrical connection via M12 plug

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.
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.

→ **Internet: www.festo.com/catalog/...**

Flow sensors SFAM

Peripherals overview

SFAM-62-…-M for manifold assembly in MS6 series service unit combination	SFAM-62-…-T/-W for individual assembly
with laminar flow cartridge	with connecting plates and stabilising zone
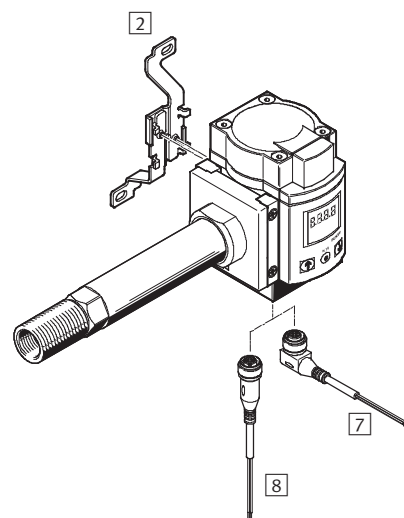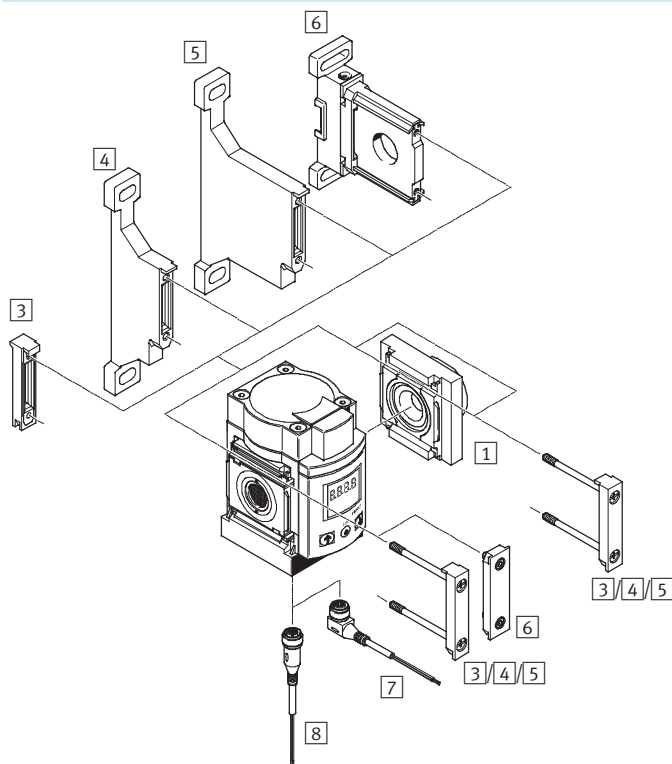
Mounting attachments and accessories				
		In MS6 series service unit combination	Individual device	→ Page/Internet
1	Connecting plate MS6-AG…	■	■ Included in the scope of delivery	ms6-ag
2	Mounting bracket MS6-WB	–	■ Included in the scope of delivery with mounting type -W	ms6-wb
3	Module connector MS6-MV	■	–	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
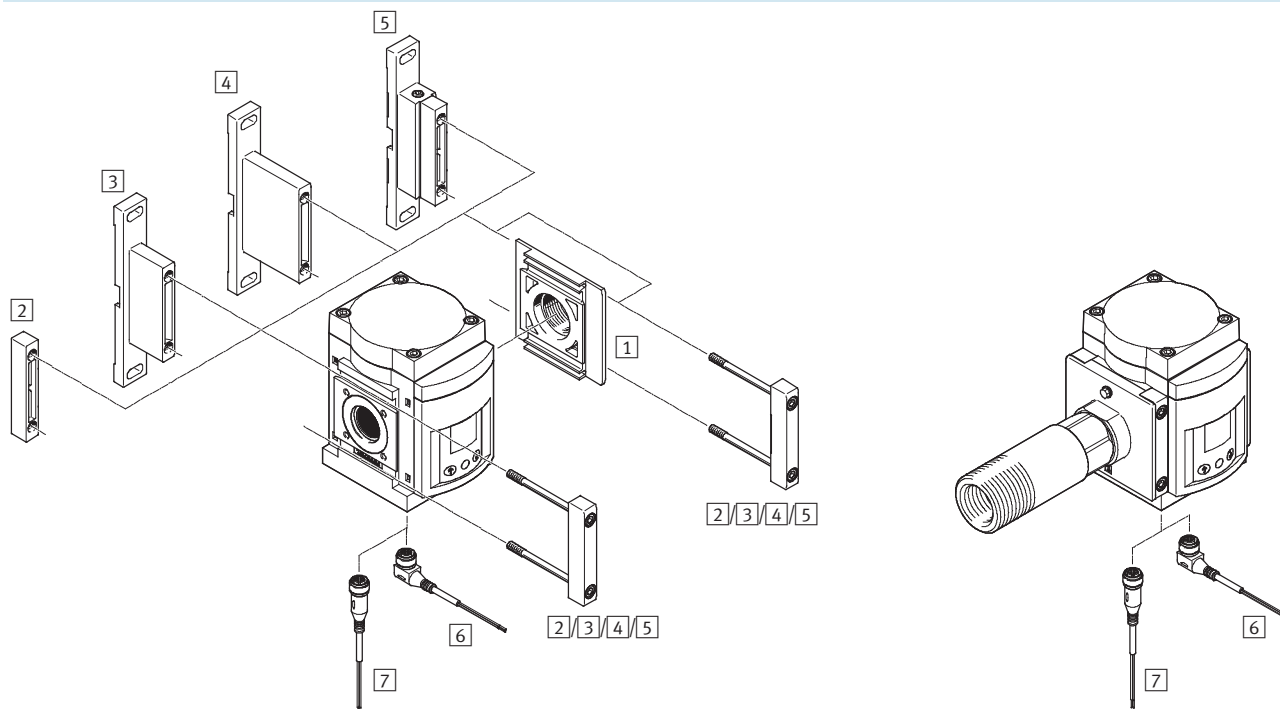 → Internet: ipm-80, ipm-40-80, ipm-80-80

Flow sensors SFAM

Peripherals overview

SFAM-90-…-M for manifold assembly in MS9 series service unit combination	**SFAM-90-…-T for individual assembly**
with laminar flow cartridge	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

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	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

Type of mounting	
M	Manifold assembly
T	Threaded mounting

Pneumatic connection	
SFAM-62	
G12	Female thread G½
SFAM-90-5000L	
G1	Female thread G1
SFAM-90-10000L/15000L	
G112	Female thread G1½

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

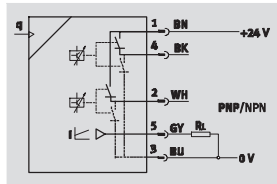**Additional variants can be ordered using the modular product system ➔ 13**

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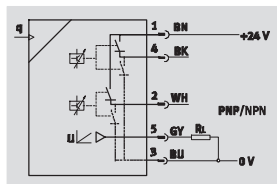
Flow sensors SFAM

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Technical data

Function
Current output 2SA

Voltage output 2SV

- 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

Flow rate
10 ... 1,000 l/min
30 ... 3,000 l/min
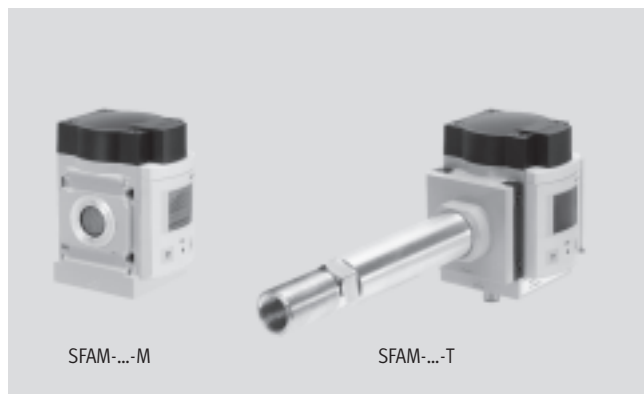50 ... 5,000 l/min
100 ... 10,000 l/min
150 ... 15,000 l/min

Temperature range
0 ... +50 °C

Pressure
0 ... 16 bar

- 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 G½, SFAM-90-...-M via a pneumatic connection of at least G¾.
- 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

When using a filter regulator MS-LFR or a pressure regulator MS-LR, a branching module MS6-FRM-½ (with size MS6) or MS9-FRM-G (with size MS9) must be installed between the filter regulator or pressure regulator and the (downstream) flow sensor SFAM in order to maintain the specified accuracies.

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

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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 $\longrightarrow$ P2					
	-R	Unidirectional P2 $\longleftarrow$ 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 … 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

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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		–	G½	NPT½	–	G1	NPT1	G1½	NPT1½
Product weight	[g]	600	1,100	1,100	1,500	2,400	2,400	2,750	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	50 … 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	2 … 1,999.9
Hysteresis setting range	[%FS]	0 … 90					
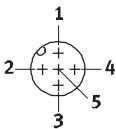
Immissions/emissions							
Type		SFAM-62			SFAM-90		
Flow measuring range		-1000	-3000	-5000	-5000	-10000	-15000
Storage temperature	[°C]	−20 … +80					
Protection class		IP65					
Pressure drop at 50 %FS flow rate and 6 bar with mounting type -M	[mbar]	0 … 100	0 … 100	0 … 100	0 … 40	0 … 100	0 … 200
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
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

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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 range[1] qn as a function of operating pressure p1
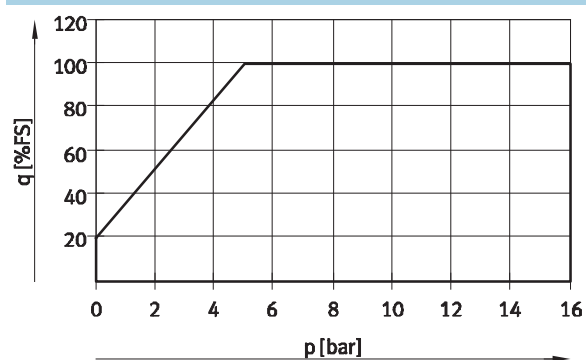
1) For an operating pressure of more than 5 bar, the flow sensor can determine measured values with the specified accuracy over the entire measuring range. For an operating pressure below 5 bar, the measuring range with the specified accuracy is reduced as shown in the graph.
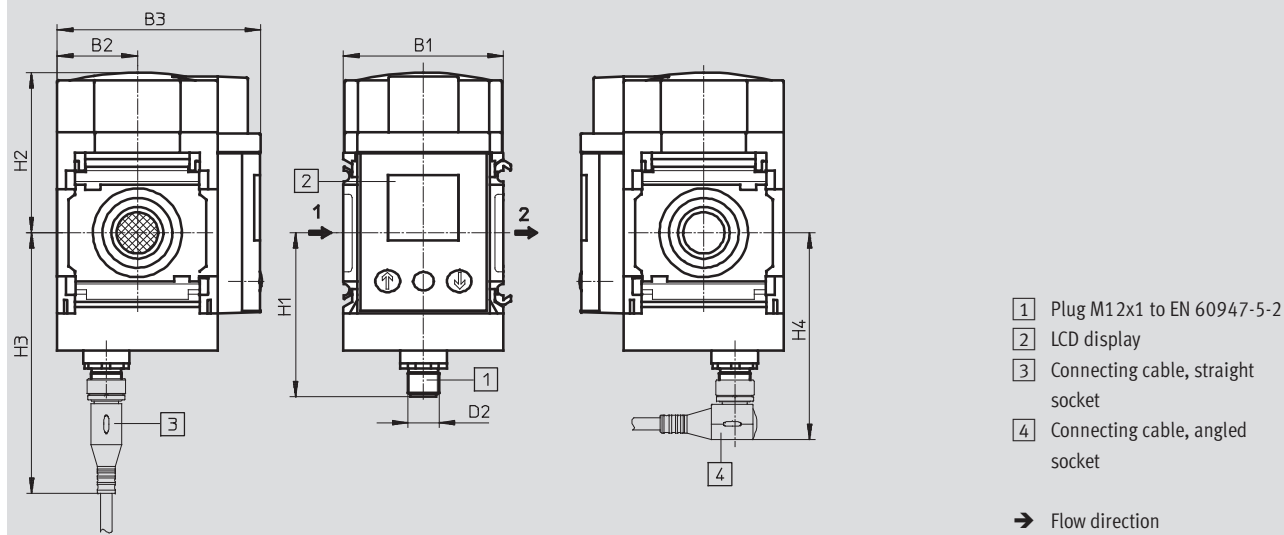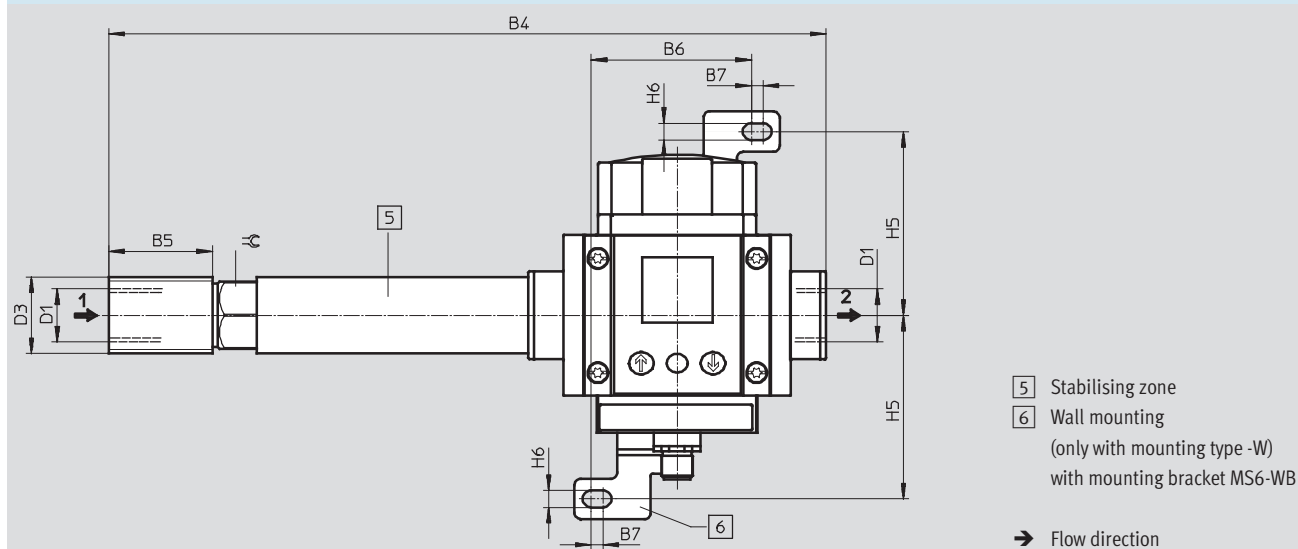
Flow sensors SFAM

Technical data

Dimensions – SFAM-62

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

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

→ Flow direction

SFAM-62-…-T/W for individual assembly

[5] Stabilising zone
[6] Wall mounting
(only with mounting type -W)
with mounting bracket MS6-WB

→ Flow direction

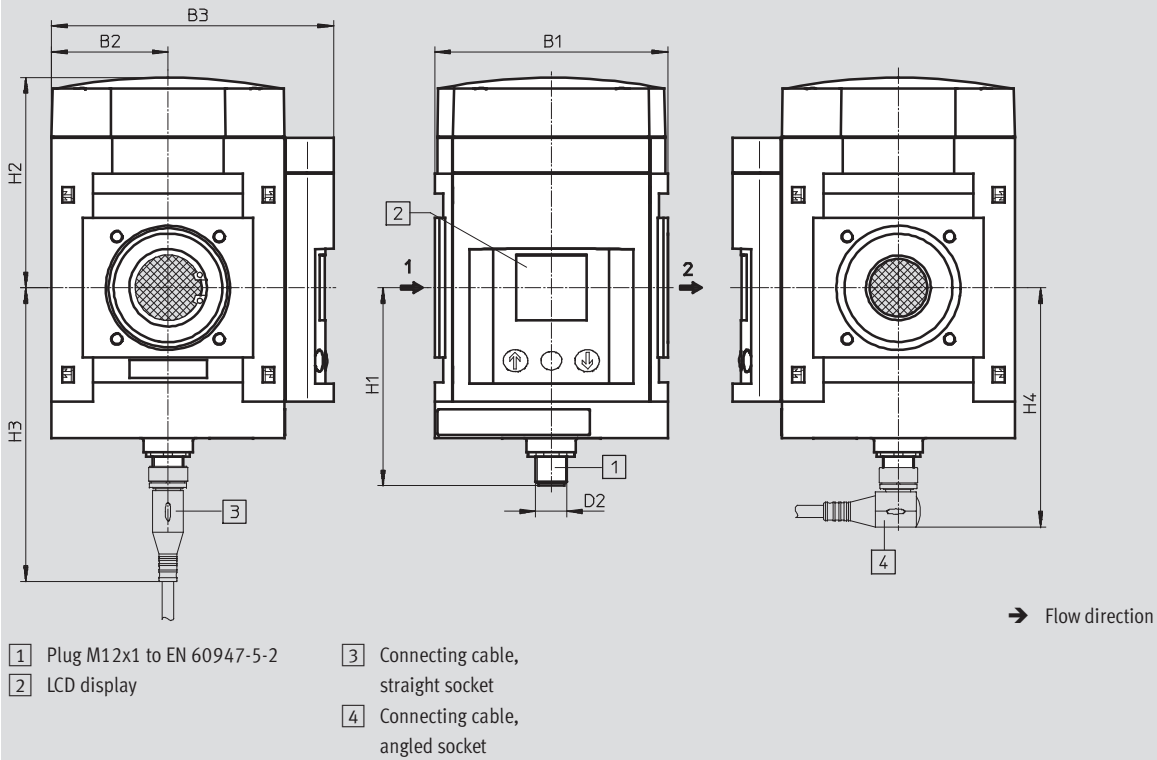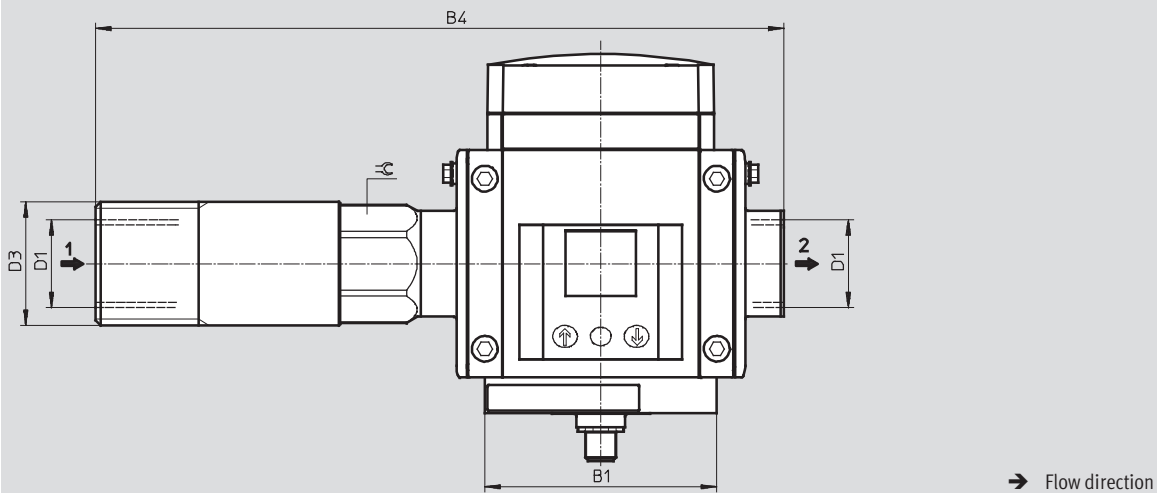| Type	B1	B2	B3	B4	B5	B6	B7	D1	D2	D3	H1	H2	H3	H4	H5	H6	⌷
SFAM-62-…-M	62	31	78.7	–	–	–	–	–	M12x1	–	63.5	62.1	101	80	–	–	–
SFAM-62-…-TG12	62	31	78.7	277	40	–	–	G½	M12x1	G¾	63.5	62.1	101	80	–	–	26
SFAM-62-…-WG12						61.9	4.5								71	6.6	
SFAM-62-…-TN12	62	31	78.7	277	40	–	–	NPT½	M12x1	NPT¾	63.5	62.1	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/us/cad**

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

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

➔ Flow direction

SFAM-90-…-T for individual assembly

➔ Flow direction
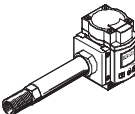
Type	B1	B2	B3	B4	D1	D2	D3	H1	H2	H3	H4	⌿
SFAM-90-…-M	90	45	109	–	–	M12x1	–	76.5	81.3	114	93	–
SFAM-90-…-TG1	90	45	109	267	G1	M12x1	G1½	76.5	81.3	114	93	41
SFAM-90-…-TG112				301	G1½		G2					55
SFAM-90-…-TN1	90	45	109	267	NPT1	M12x1	NPT1½	76.5	81.3	114	93	41
SFAM-90-…-TN112				301	NPT1½		NPT2					55

Flow sensors SFAM

Technical data

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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

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Ordering table				Conditions	Code	Enter code
M	Module No.	563796				
	Function	Flow sensor			**SFAM**	-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				
		G½		1 3	**G12**	
		G1		2 3	**G1**	
		G1½		2 3	**G112**	
		½" NPT		1 3	**N12**	
		1" NPT		2 3	**N1**	
		1½" 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**	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

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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**

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.

Printed on recycled paper at New Horizon Graphic, Inc., FSC certified as an environmentally friendly printing plant.

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