

Flow sensors SFAH



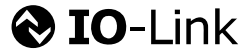
Flow sensors SFAH

Features

FESTO

At a glance

Communication interface



Universal flow measurement

- 8 flow measuring ranges from 0.002 l/min to 200 l/min
- High measuring dynamics (1:50)
- Available as uni- or bidirectional
- Excellent accuracy
- Optional test report

Quick installation

- No inlet sections required
- Adjustable QS bracket connections
- L1 and M8 plug connector for fast commissioning



Convenient design

- Compact design 20x58 mm
- Degree of protection IP40

Easy operation

- Clear 2-line display
- Configurable, red perimeter of entire display
- Intuitive menu navigation

Switchable electrical outputs

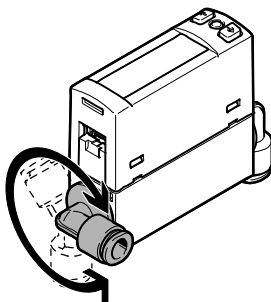
- Various switching functions
- Switching outputs (PNP/NPN, NO/NC)
- Analogue outputs (0...10V, 1...5V, 4...20 mA)

Product description

The flow sensor SFAH is suitable for monitoring compressed air and non-corrosive gases. The sensor can be used in many industry segments thanks to its compact design. The method of measurement is based on the thermal heat-transfer method. The bypass construction means that it is less susceptible to disruption by particles and moisture. The flow value is transmitted to the connected control system as a switching signal, as an analogue signal or via IO-Link®.

Space-saving

Adjustable QS angled connections



Area of application

- Process monitoring
- Handling of extremely small parts
- Monitoring of compressed air consumption
- Leak test
- Monitoring of forming gas
- Pneumatic object detection via air-gap measurement

Functions

- Monitoring and setting a flow rate threshold, a flow rate range or a change in flow rate
- Monitoring using the teach-in function or by entering values
- Mass flow rate and volumetric flow rate are displayed in the common measurement units
- ECO function with option to switch off the display
- Optional security code can be freely chosen (4-digit code)
- Adjustable low-pass filter for smoothing the flow signal
- Scaling the analogue output to increase the signal dynamics
- Offset compensation possible
- Min./max. value memory
- All settings that have been entered on one sensor (master) can be transferred (replicated) to other, identical sensors
- High pressure range –0.9 bar to 10 bar

IO-Link

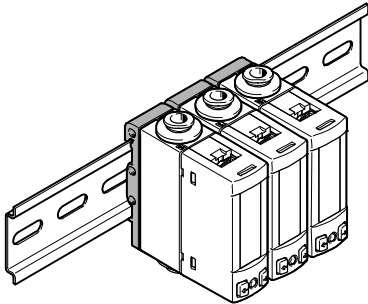
- Serial communication integrated using IO-Link® 1.1
- Cyclical transfer of two switching statuses and the measured pressure value
- Remote parameterisation of the sensor is possible using an IO-Link® master
- Easy sensor replacement with automatic parameterisation
- Sensor identification, diagnostics and teach-in possible via IO-Link®

Flow sensors SFAH

Features

Mounting options

H-rail mounting



Safety guard

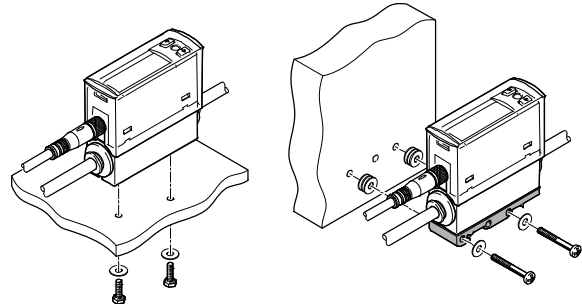


Plate mounting from beneath

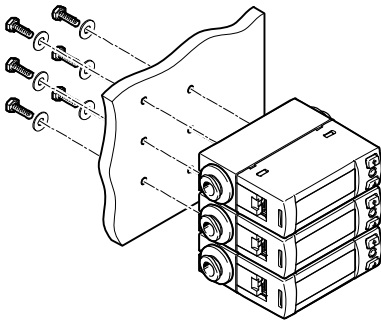
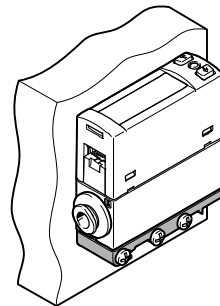
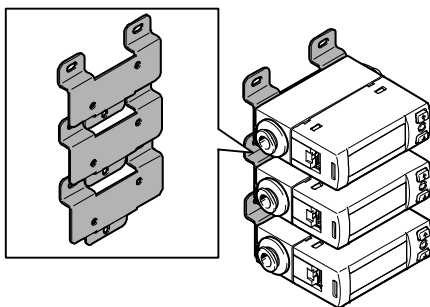


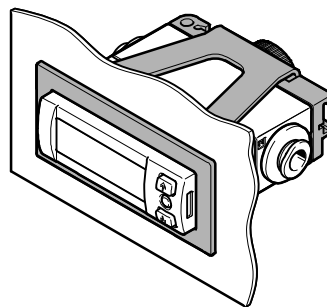
Plate mounting from the side



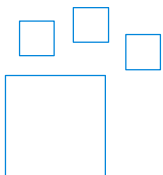
Wall mounting



Front panel mounting



Ordering data – Product options



Configurable product
This product and all its options can be ordered using the configurator.

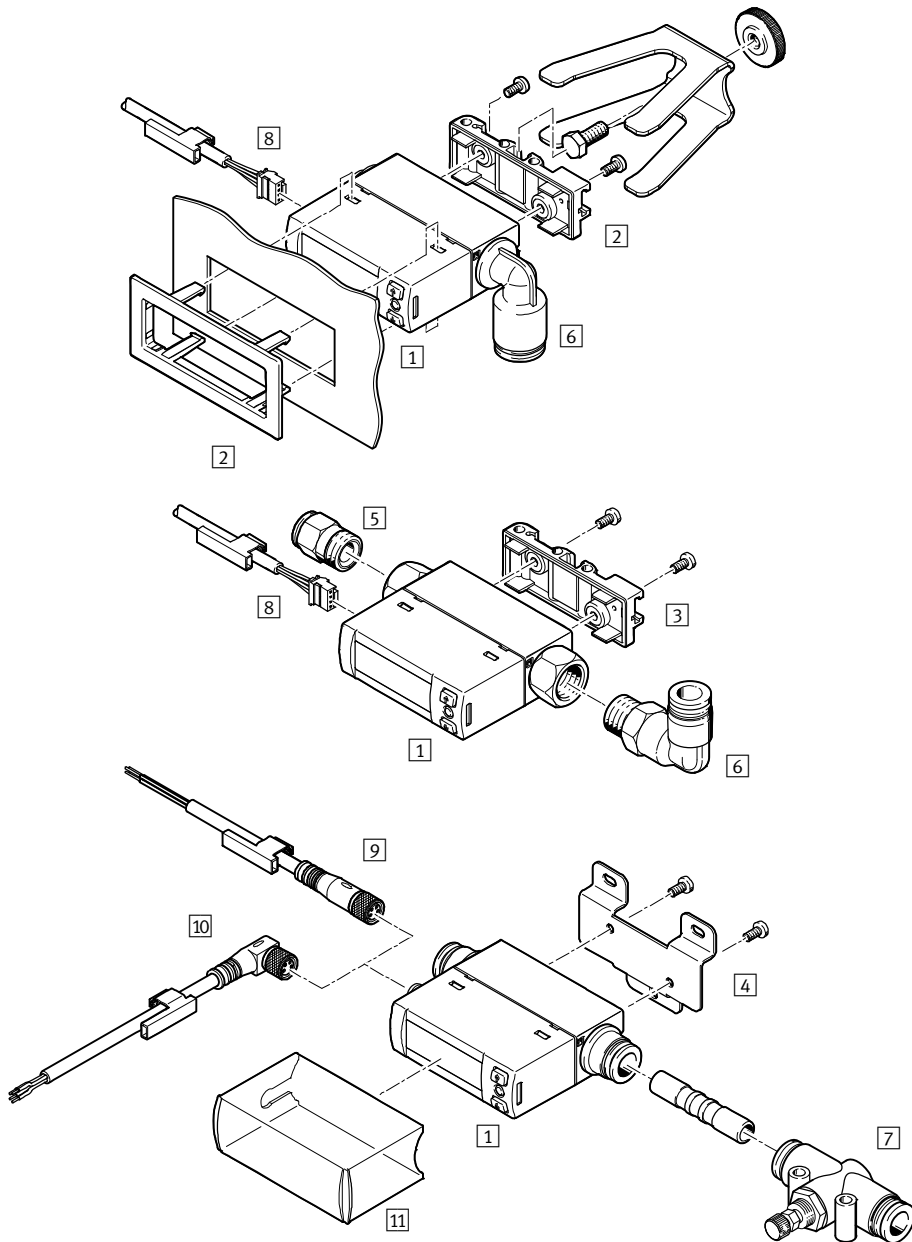
The configurator can be found under Products on the DVD or at
→ www.festo.com/catalogue/...

Enter the type (or part number) in the search field:

- SFAH 8035300

Flow sensors SFAH

Peripherals overview



Accessories	→ Page/Internet
1 Flow sensor SFAH	6
2 Front panel mounting kit SAMH-FH-F	15
3 H-rail mounting SAMH-FH-H	14
4 Wall mounting SAMH-FH-W	14
5 Push-in fitting QS	16
6 Push-in fitting QSL	16
7 One-way flow control valve GRO-QS-...	gro
8 Connecting cable NEBS-L1G4-...	16
9 Connecting cable NEBU-M8G4-...	16
10 Connecting cable NEBU-M8W4-...	16
11 Safety guard SACC-FH-G-S3, only in combination with electrical connection M8	15

Flow sensors SFAH

Type codes

	SFAH	-		-		-		-		-		-		+		
Type																
SFAH	Flow sensor															
Flow measuring range																
0,1 ¹⁾	Max. 0.1 l/min															
0,5	Max. 0.5 l/min															
1	Max. 1 l/min															
5	Max. 5 l/min															
10	Max. 10 l/min															
50	Max. 50 l/min															
100	Max. 100 l/min															
200	Max. 200 l/min															
Flow input																
B	Bidirectional															
U	Unidirectional															
Pneumatic connection																
Q4	Push-in connector 4 mm															
Q6	Push-in connector 6 mm															
Q8	Push-in connector 8 mm															
G14	G1/4															
G18	G1/8															
Thread type																
	None															
F	Female thread															
Outlet orientation																
S	Straight															
AR	Angled, rotatable															
Electrical output 1																
PNLK	PNP, NPN or IO-Link®															
Electrical output 2																
PNVBA	PNP, NPN 0 ... 10 V, 1 ... 5 V or 4 ... 20 mA															
Electrical connection																
L1	Plug connector, design L1															
M8	Plug connector M8															
Certificates																
	None															
T	Test report															

1) For low leakage requirements at the bottom of the measuring range, use G1/4 or G1/8 female thread in conjunction with pneumatic connection.

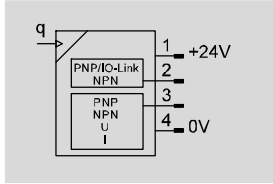
Flow sensors SFAH

Technical data

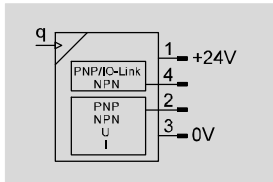
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Function

SFAH-...-L1



SFAH-...-M8



- Flow rate
 - 0.002 ... 0.1 l/min
 - 0.01 ... 0.5 l/min
 - 0.02 ... 1 l/min
 - 0.1 ... 5 l/min
 - 0.2 ... 10 l/min
 - 1 ... 50 l/min
 - 2 ... 100 l/min
 - 4 ... 200 l/min
- Maximum versatility and reduced warehousing thanks to switchable electrical outputs
- Measuring signal filter for setting the rise time
- Additional filter for smoothing the display values



General technical data	
Certification	RCM compliance mark
CE marking (see declaration of conformity)	To EU EMC Directive
	To EU RoHS Directive
KC marking	KC-EMV
Note on materials	RoHS-compliant

Input signal, measuring element		-0.1	-0.5	-1	-5	-10	-50	-100	-200
Measured variable		Mass flow rate, volumetric flow rate							
Flow direction	B	Bidirectional							
	U	Unidirectional							
Measuring principle		Thermal							
Method of measurement		Heat transfer							
Flow measuring range start value	[l/min]	0.002	0.01	0.02	0.1	0.2	1	2	4
Flow measuring range end value ¹⁾	[l/min]	0.1	0.5	1	5	10	50	100	200
Operating pressure	[bar]	-0.9 ... 10							
Operating medium		Compressed air to ISO 8573-1:2010 [6:4:4]							
		Nitrogen							
		Argon							
Temperature of medium	[°C]	0 ... 50							
Ambient temperature	[°C]	0 ... 50							
Nominal temperature	[°C]	23							

1) For feature ...B-...: The measuring range applies in both the positive and negative direction.

Output, general	
Accuracy of flow rate	+/- (2% o.m.v. + 1% FS)
Repetition accuracy zero point	[%FS] ±0.2
Repetition accuracy span	[%FS] ±0.8
Temperature coefficient span	[%FS/K] Typ. ±0.15 (max. ±0.3)
Pressure influence span ¹⁾	Typ. ±1 (in the pressure range -0.7 ... 10 bar)

1) In the pressure range -0.9 ... -0.7 bar, an additional pressure influence span of typ. ±4% FS can be expected.

Flow sensors SFAH

Technical data

Switching output		
Switching output	2 x PNP or 2 x NPN, switchable	
Switching function	Window comparator	
	Threshold value comparator	
	Auto difference monitoring	
Switching element function	N/C or N/O contact, switchable	
Max. output current	[mA]	100

Analogue output				
Analogue output	-PNVBA-	0 ... 10 V	1 ... 5 V	4 ... 20 mA
Max. load resistance of current output	[Ohm]	500		
Min. load resistance of voltage output	[kOhm]	20		

Output, additional data	
Short circuit protection	Yes
Overload protection	Yes

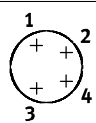

IO-Link® device to IEC 61131-9	
Protocol	IO-Link®
Protocol version	Device V 1.1
Profile	Smart sensor profile
Function classes	Binary data channel (BDC)
	Process data variable (PDV)
	Identification
	Diagnostics
	Teach channel
Communication mode	COM2 (38.4 kBaud)
SIO mode support	Yes
Port class	A
Process data width IN	3 bytes
Process data content IN	2 bit BDC (flow monitoring)
	1 bit BDC (volume monitoring)
	14 bit PDV (measured flow value)
IO-Link®, service data contents IN	32 bit PDV (measured volume value)
IO-Link®, minimum cycle time	4 ms
IO-Link®, data memory required	< 0.5 KB

Electronics		
Operating voltage range DC	[V]	22 ... 26
Idle current	[mA]	≤ 25
Reverse polarity protection	For all electrical connections	

Flow sensors SFAH

Technical data

Electromechanical components	M8	L1
Connection type	Plug connector	
Connection technology	M8x1, A-coded, to EN 61076-2-104	L1J
Number of pins, wires	4	

Pin allocation		
	Pin	Significance
M8		
	1	Operating voltage +24 V
	2	Electrical output 2 (OutB or Anlg)
	3	Operating voltage 0 V
	4	Electrical output 1 (OutA, C/Q line for IO-Link®)
L1		
	1	Operating voltage +24 V
	2	Electrical output 1 (OutA, C/Q line for IO-Link®)
	3	Electrical output 2 (OutB or Anlg)
	4	Operating voltage 0 V

Mechanical system	-Q4	-Q6	-Q8	-G18F	-G14F
Type of mounting	Via accessories				
Mounting position	Any				
Pneumatic connection	For tubing O.D. 4 mm	For tubing O.D. 6 mm	For tubing O.D. 8 mm	Female thread Ø G1/8	Female thread Ø G1/4
Outlet orientation	S	Straight			
	AR	Angled, rotatable			-
Product weight	[g]	60		90	
Materials					
Housing	PA reinforced				
Materials in contact with the media	NBR				
	Silicon				
	PA reinforced				
	Silicon nitride				
	High-alloy stainless steel				
	Epoxy				
Anodised wrought aluminium alloy					

Flow sensors SFAH

Technical data

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Display/operation	
Display type	Illuminated LCD, multi-colour
Displayable units	
	0.1 0.5 1 5 10 50 100 200
	l/min, l/h, scft/h, g/min, l, scft, g
	l/min, l/h, scft/min, scft/h, g/min, l, scft, g
	l/min, scft/min, scft/h, g/min, l, scft, g
Setting options	Teach-in IO-Link® Via display and keys
Tamper-proof	IO-Link® PIN code

Immissions/emissions	0.1	0.5	1	5	10	50	100	200
Degree of protection ¹⁾	IP40							
Maximum permissible leakage [l/h]	0.1							
Pressure drop delta p ²⁾ [mbar]	< 5					12	15	56
Protection class	III							
Corrosion resistance class CRC ³⁾	2							

1) Protection to IP54 is provided in combination with a safety guard assembled horizontally as illustrated on page 3.

2) With 6 bar at the input and q max.

3) Corrosion resistance class CRC 2 to Festo standard FN 940070

Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.

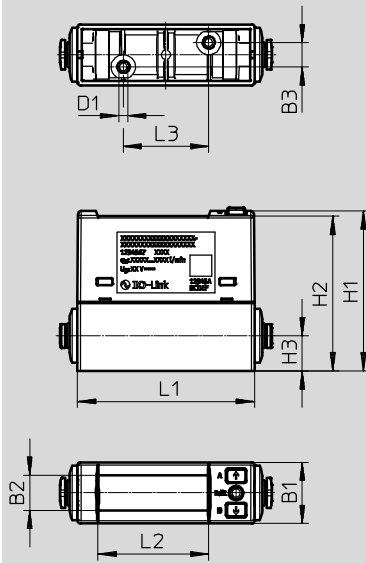
Flow sensors SFAH

Technical data

FESTO

Dimensions

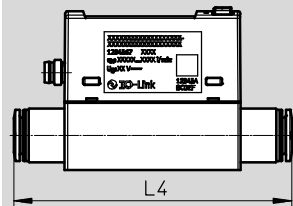
Download CAD data → www.festo.com



Type	B1	B2	B3	D1	H1	H2	H3	L1	L2	L3
SFAH- ...	20	11.5	8	M3	~52.4	50.7	11.5	58	36.3	28

Dimensions

Download CAD data → www.festo.com



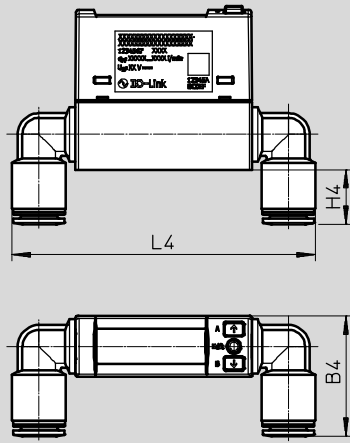
Type	L4 Max.
SFAH- ... -Q4S- ...	70
SFAH- ... -Q6S- ...	70
SFAH- ... -Q8S- ...	85

Flow sensors SFAH

Technical data

Dimensions

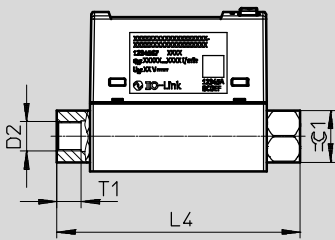
Download CAD data → www.festo.com



Type	B4 Max.	H4 Max.	L4 Max.
SFAH- ... -Q4AR- ...	30	8	83
SFAH- ... -Q6AR- ...	31	9	88
SFAH- ... -Q8AR- ...	38	17	98

Dimensions

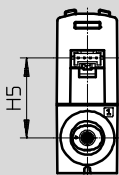
Download CAD data → www.festo.com



Type	D2	L4	T1	⌀1
SFAH- ... -G14FS- ...	G1/4	80	12	17
SFAH- ... -G18FS- ...	G1/8	80	8	17

Dimensions

Download CAD data → www.festo.com



Type	H5
SFAH- ... -L1	26.3

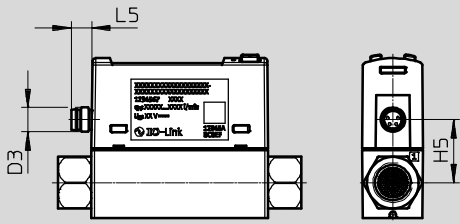
Flow sensors SFAH

Technical data

FESTO

Dimensions

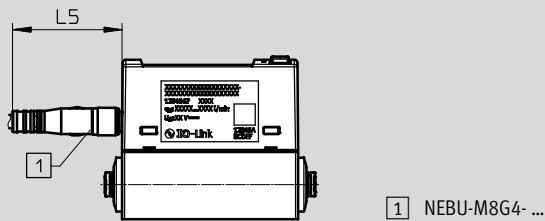
Download CAD data → www.festo.com



Type	D3	H5	L5
SFAH-...-M8	M8x1	20.7	~6.6

Dimensions

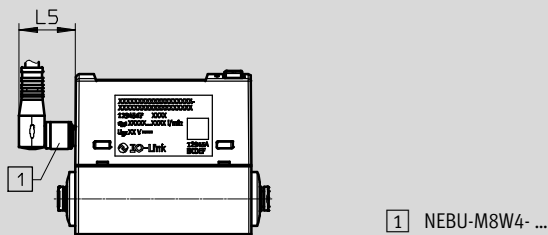
Download CAD data → www.festo.com



Type	L5
SFAH-...-M8	~35.9

Dimensions

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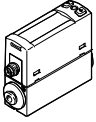


Type	L5
SFAH-...-M8	~18.5

Flow sensors SFAH

Technical data

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Ordering data				
Version	Flow measuring range [l/min]	Connection type	Part No.	Type
	0.1 l/min	For tubing O.D. 4 mm	8058461	SFAH-0.1U-Q4S-PNLK-PNVBA-L1
	0.5 l/min		8058462	SFAH-0.1U-Q4S-PNLK-PNVBA-M8
			8058463	SFAH-0.5U-Q4S-PNLK-PNVBA-L1
	1 l/min		8058464	SFAH-0.5U-Q4S-PNLK-PNVBA-M8
			8058465	SFAH-1U-Q4S-PNLK-PNVBA-L1
	8058466		SFAH-1U-Q4S-PNLK-PNVBA-M8	
	5 l/min	For tubing O.D. 6 mm	8058467	SFAH-5U-Q6S-PNLK-PNVBA-L1
	10 l/min		8058468	SFAH-5U-Q6S-PNLK-PNVBA-M8
			8058469	SFAH-10U-Q6S-PNLK-PNVBA-L1
			8058470	SFAH-10U-Q6S-PNLK-PNVBA-M8
	50 l/min	For tubing O.D. 8 mm	8058471	SFAH-50U-Q8S-PNLK-PNVBA-L1
			8058472	SFAH-50U-Q8S-PNLK-PNVBA-M8
	100 l/min	Female thread G1/8	8058473	SFAH-50U-G18FS-PNLK-PNVBA-M8
		For tubing O.D. 8 mm	8058474	SFAH-100U-Q8S-PNLK-PNVBA-L1
			8058475	SFAH-100U-Q8S-PNLK-PNVBA-M8
	200 l/min	Female thread G1/4	8058476	SFAH-100U-G14FS-PNLK-PNVBA-M8
For tubing O.D. 8 mm		8058477	SFAH-200U-Q8S-PNLK-PNVBA-L1	
		8058478	SFAH-200U-Q8S-PNLK-PNVBA-M8	
	Female thread G1/4	8058479	SFAH-200U-G14FS-PNLK-PNVBA-M8	

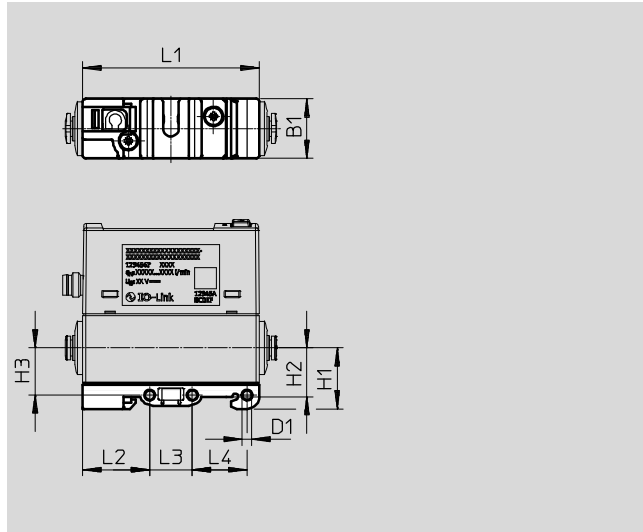
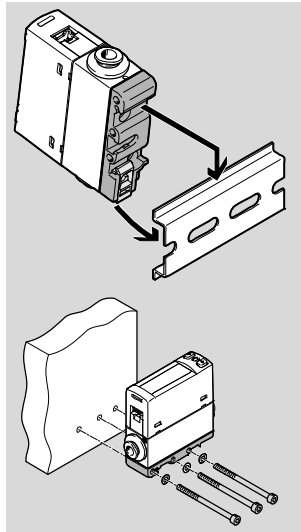
Flow sensors SFAH

Accessories



H-rail mounting SAMH-FH-H ...

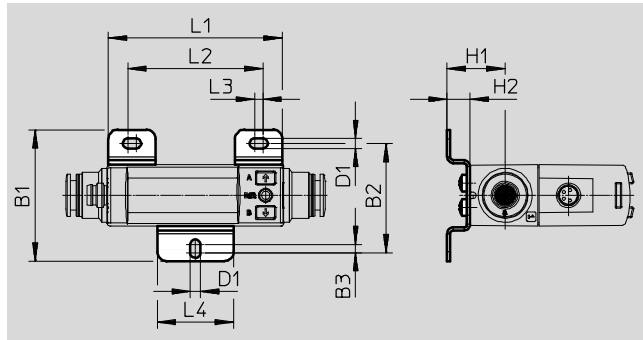
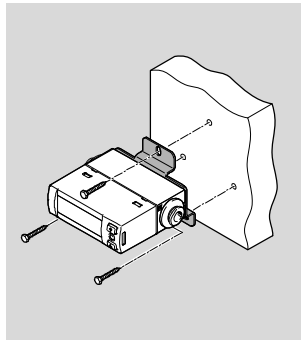
Material: PA, POM, steel
RoHS-compliant



Dimensions and ordering data											
Type	B1	D1 Ø	H1	H2	H3	L1	L2	L3	L4	Part No.	Type
SAMH-FH-H	19.6	3.2	20	16	15.5	58	22	14	18	8058460	SAMH-FH-H

Wall mounting SAMH-FH-W ...

Material: Steel, high-alloy stainless steel, RoHS-compliant



Dimensions and ordering data													
Type	B1	B2	B3	D1	H1	H2	L1	L2	L3	L4	CRC ¹⁾	Part No.	Type
SAMH-FH-W	43.1	35.9	2.7	3.3	18.5	7.5	57	44.2	2.7	25	2	8036910	SAMH-FH-W

1) Corrosion resistance class CRC 2 to Festo standard FN 940070
Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.

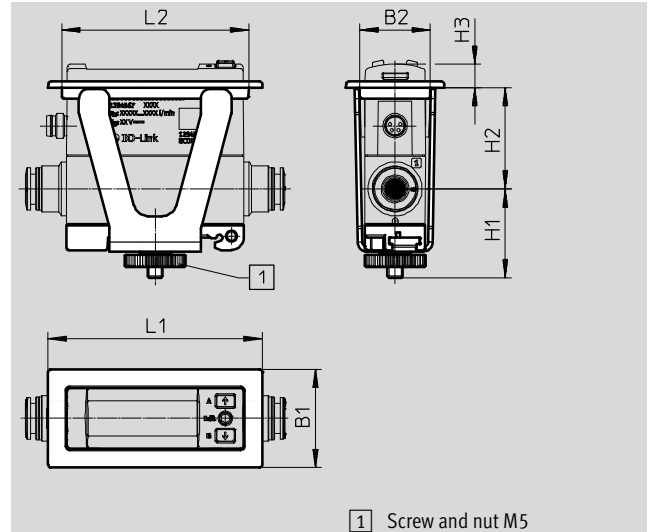
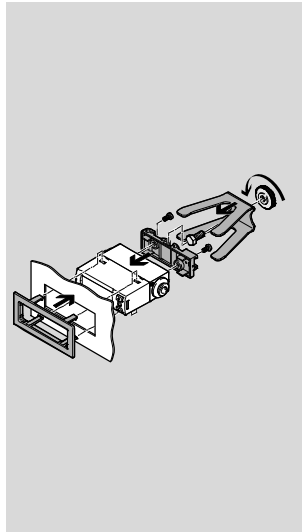
Flow sensors SFAH

Accessories



Front panel mounting kit SAMH-FH-F ...

Material: PA, steel, high-alloy
stainless steel
RoHS-compliant

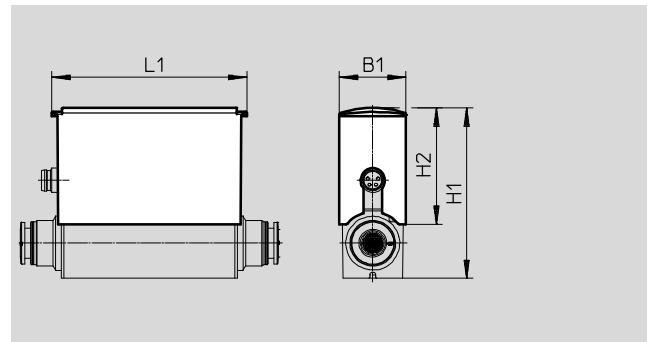
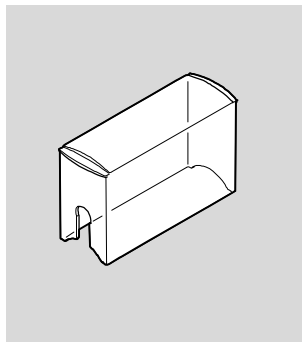


Dimensions and ordering data										
Type	B1	B2	H1 Max.	H2	H3	L1	L2	CRC ¹⁾	Part No.	Type
SAMH-FH-F	32.2	23.1	30	33.2	7.7	70.2	61.2	2	8058459	SAMH-FH-F

1) Corrosion resistance class CRC 2 to Festo standard FN 940070
Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.

Safety guard SACC-FH-G-S3

Material: PA, RoHS-compliant






Dimensions and ordering data						
Type	B1	H1	H2	L1	Part No.	Type
SACC-FH-G-S3	22.2	~56	38.3	64	8069031	SACC-FH-G-S3



Only in combination with electrical connection M8.
For degree of protection IP54, protection against splashing water from every direction to ISO 20653/DIN EN 60529 with horizontal assembly as illustrated on page 3.


Flow sensors SFAH

Accessories

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Ordering data – Connecting cables				
	Number of wires	Cable length [m]	Part No.	Type
Socket, rectangular design L1				Technical data → Internet: nebs
	4	2.5	572576	NEBS-L1G4-K-2.5-LE4
M8x1, straight socket				
				Technical data → Internet: nebu
	4	2.5	541342	NEBU-M8G4-K-2.5-LE4
	4	2.5	541344	NEBU-M8W4-K-2.5-LE4

Ordering data – Push-in fittings				Technical data → Internet: qs
	Pneumatic connection O.D.	For tubing O.D.	Part No.	Type
Straight connection				
	G1/8	4 mm	186095	QS-G1/8-4
		6 mm	186096	QS-G1/8-6
		8 mm	186098	QS-G1/8-8
	G1/4	6 mm	186097	QS-G1/4-6
		8 mm	186099	QS-G1/4-8
		10 mm	186101	QS-G1/4-10
90° connection				
	G1/8	4 mm	186116	QSL-G1/8-4
		6 mm	186117	QSL-G1/8-6
		8 mm	186119	QSL-G1/8-8
	G1/4	6 mm	186118	QSL-G1/4-6
		8 mm	186120	QSL-G1/4-8
		10 mm	186122	QSL-G1/4-10

Ordering data – Vacuum filters				
	Connection	For tubing O.D.	Part No.	Type
				Technical data → Internet: vaf
	PK-3	4	535883	VAF-PK-3
	PK-4	6	15889	VAF-PK-4
	PK-6	8	160239	VAF-PK-6