

Flow sensors SFAH

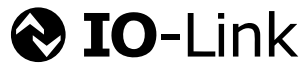
FESTO



Key features

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 run-in sections required
- Adjustable QS elbow connections
- L1 and M8 plug for fast commissioning



Practical design

- Compact design 20x58 mm
- Degree of protection IP40 or IP54

Easy operation

- Clear 2-line display
- Configurable red surround for the entire display
- Intuitive menu navigation

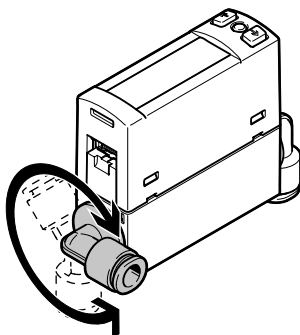
Switchable electrical outputs

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

Product description	Area of application	Functions	IO-Link
The flow sensor SFAH is suitable for monitoring compressed air and non-corrosive gases. The sensor can be used in many industries 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®.	• 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	• 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 (replication) to other, identical sensors (devices) • High pressure range –0.9 bar to 10 bar	• Serial communication integrated using IO-Link 1.1 • Cyclical transfer of two switching statuses and the measured pressure value • The sensor can be parameterised remotely using an IO-Link® master • Easy sensor replacement with automatic parameterisation • Sensor identification, diagnostics and teach-in possible via IO-Link

Space-saving

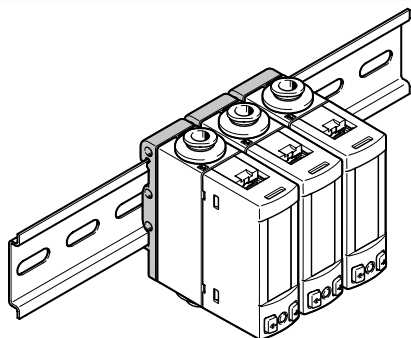
Adjustable QS elbow connections



Key features

Mounting options

H-rail mounting



Safety guard

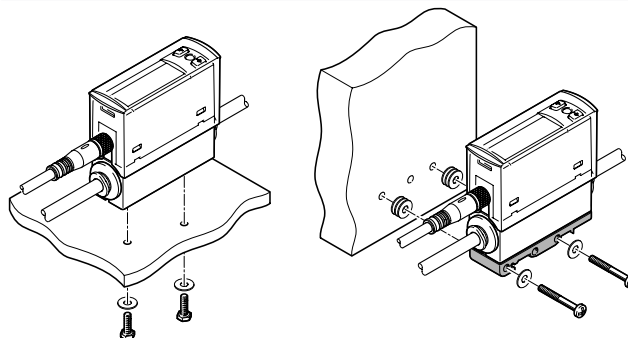


Plate mounting from beneath

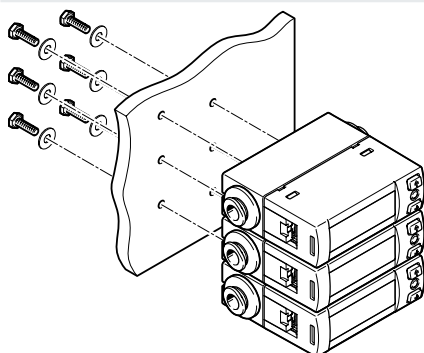
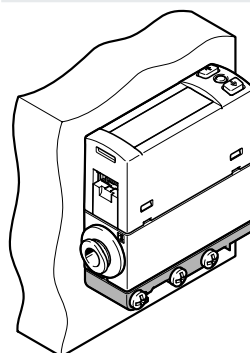
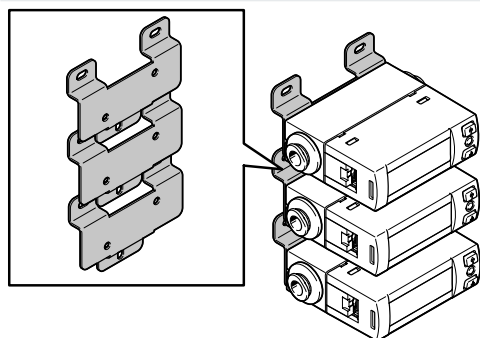


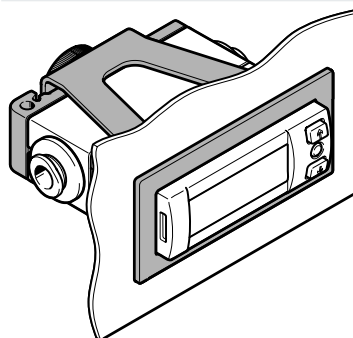
Plate mounting from the side



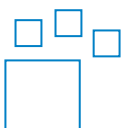
Wall mounting



Front panel mounting



Ordering data – Product options

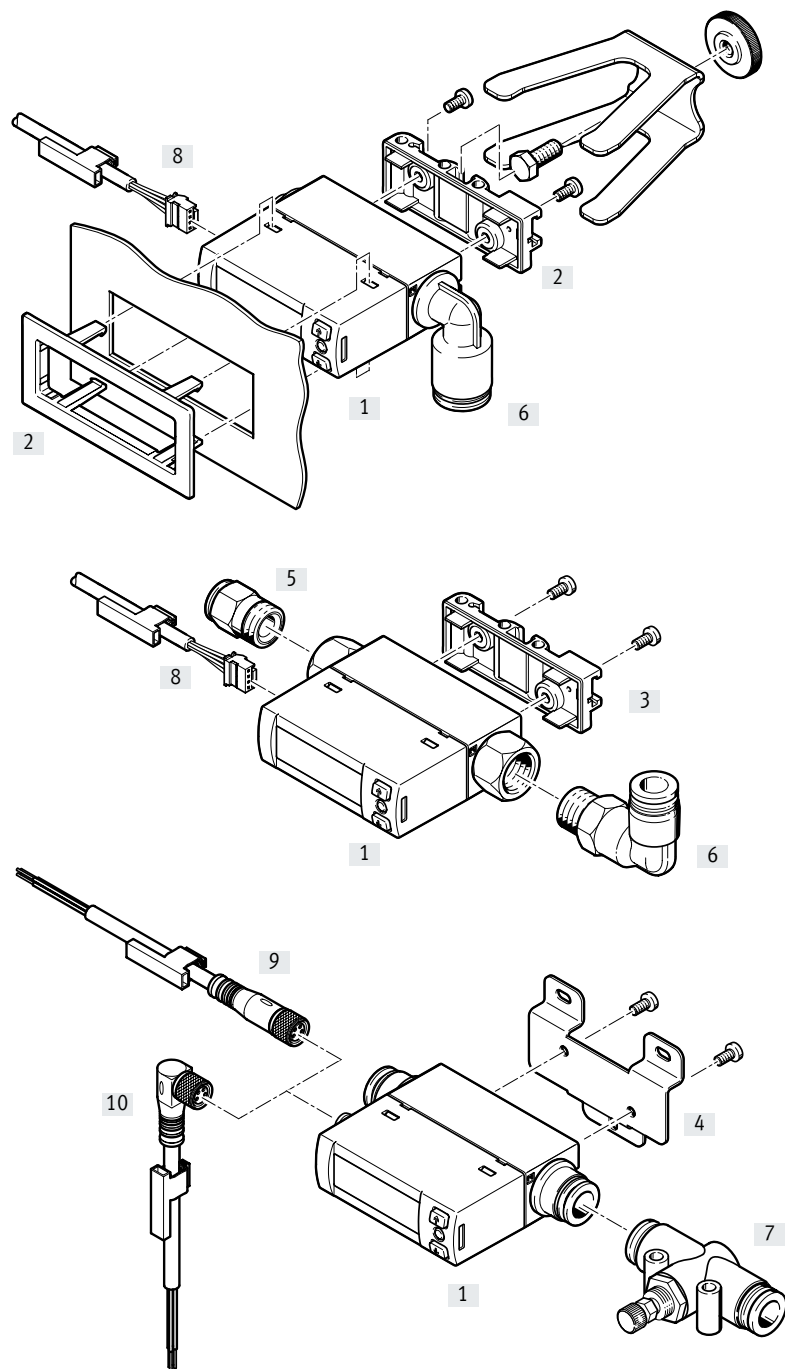


Configurable product
This product and all its product options can be ordered using the configurator.

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

Part no.	Type
8035300	SFAH

Peripherals overview



Accessories		→ Page/Internet
[1]	Flow sensor SFAH	6
[2]	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
-	Safety guard SACC-FH-G-S3, only in combination with electrical connection M8	15

Type codes

001	Series	
SFAH	Flow sensor	

002	Flow measuring range	
0.1	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	

003	Flow rate input	
B	Bidirectional	
U	Unidirectional	

004	Pneumatic connection	
G18	G1/8	
G14	G1/4	
Q4	Push-in connector 4 mm	
Q6	Push-in connector 6 mm	
Q8	Push-in connector 8 mm	

005	Thread type	
	None	
F	Female	

006	Outlet orientation	
S	Straight	
AR	Angled, adjustable	

007	Electrical output 1	
PNLK	PNP/NPN/IO-Link	

008	Electrical output 2	
PNVBA	PNP or NPN or 0 ... 10 V or 1 ... 5 V or 4 ... 20 mA	

009	Electrical connection	
L1	Plug type L1	
M8	Plug M8, A-coded	

010	Mounting accessories	
H	H-rail mounting	
FP	Front panel mounting kit	
W	Wall mounting	

011	Electrical accessories	
	None	
2.5A	Angled socket, cable 2.5 m	
2.5S	Straight socket, cable 2.5 m	
5A	Angled socket, cable 5 m	
5S	Straight socket, cable 5 m	

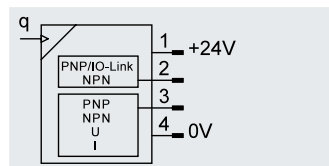
012	Protective devices	
	None	
G	Protective hood	

013	Certificate	
	None	
T	Test report	

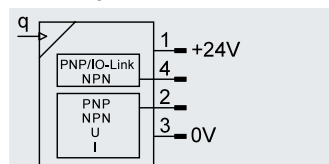
Data sheet

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 c UL us listed (OL)
CE marking (see declaration of conformity)	To EU EMC Directive To EU RoHS Directive
KC mark	KC EMC
Certificate issuing authority	UL E322346
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							
Measurement method		Heat transfer							
Flow measuring range start value	[l/min]	0.002	0.01	0.02	0.1 ²⁾	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.

2) For low leakage requirements in the lower measuring range, use G1/4 or G1/8 female thread in combination with pneumatic connection.

Output, general	
Accuracy of flow rate	+/- (2% o.m.v. + 1% FS)
Repetition accuracy zero point	[%FS]
Repetition accuracy span	[%FS]
Temperature coefficient span	[%FS/K]
Pressure influence span ¹⁾	[%FS]

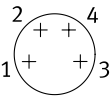
1) In the pressure range -0.9 ... -0.7 bar, an additional pressure influence span of typically ±4% FS can be expected.

Data sheet

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, 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 current rating		Yes			
Overload protection		Provided			
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 kBd)			
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)			
Service data content IN		32 bit PDV (measured volume value)			
Minimum cycle time		4 ms			
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			

Data sheet

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

Terminal allocation		
	Pin	Meaning
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

Mechanics		-Q4	-Q6	-Q8	-G18F	-G14F
Type of mounting		Via accessories				
Mounting position		Optional				
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, adjustable				–
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				

Data sheet

Display/operation								
Display type		Multi-coloured, illuminated LCD						
Displayable units								
	0.1	l/min, l/h, scft/h, g/min, l, scft, g						
	0.5							
	1							
	5	l/min, l/h, scft/min, scft/h, g/min, l, scft, g						
	10							
	50	l/min, scft/min, scft/h, g/min, l, scft, g						
	100							
	200							
Setting options		Teach-in						
		IO-Link						
		Via display and pushbuttons						
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 mounted horizontally as illustrated on page 3.

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

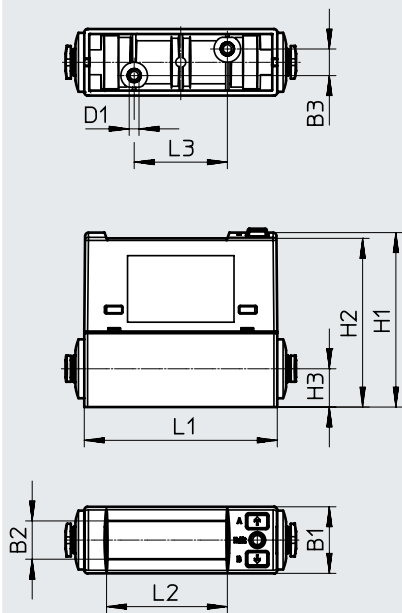
3) Corrosion resistance class CRC 2 to Festo standard FN 940070

Moderate corrosion stress. Indoor applications in which condensation can occur. External visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment.

Data sheet

Dimensions

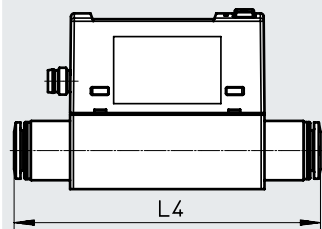
Download CAD data → www.festo.com



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

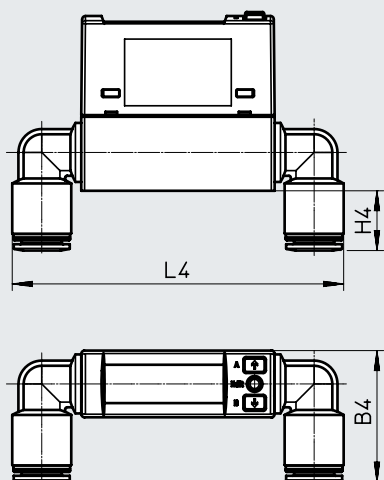
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Type	L4 max.
SFAH- ... -Q4S- ...	70
SFAH- ... -Q6S- ...	70
SFAH- ... -Q8S- ...	85

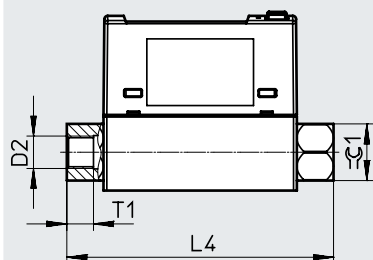
Data sheet

Dimensions

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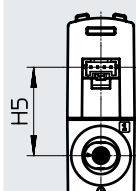
Type	B4 max.	H4 max.	L4 max.
SFAH- ... -Q4AR- ...	30	8	83
SFAH- ... -Q6AR- ...	31	9	88
SFAH- ... -Q8AR- ...	38	17	98

Dimensions

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

Dimensions

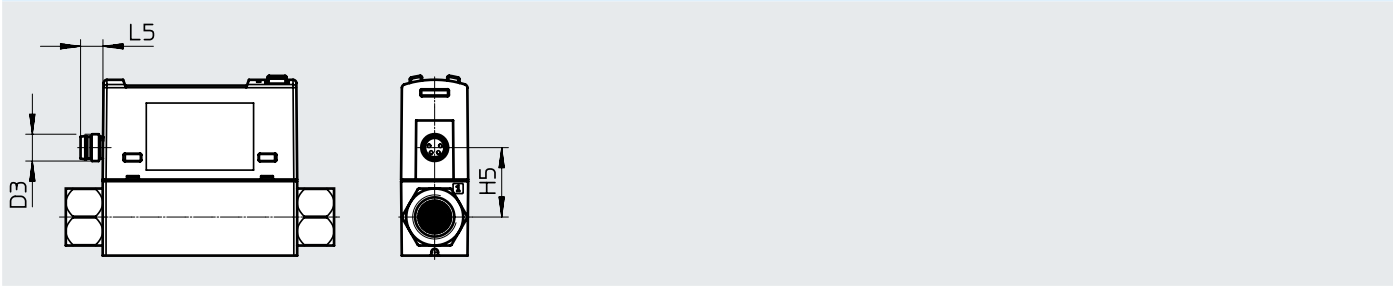
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Type	H5
SFAH- ... -L1	26.3

Data sheet

Dimensions

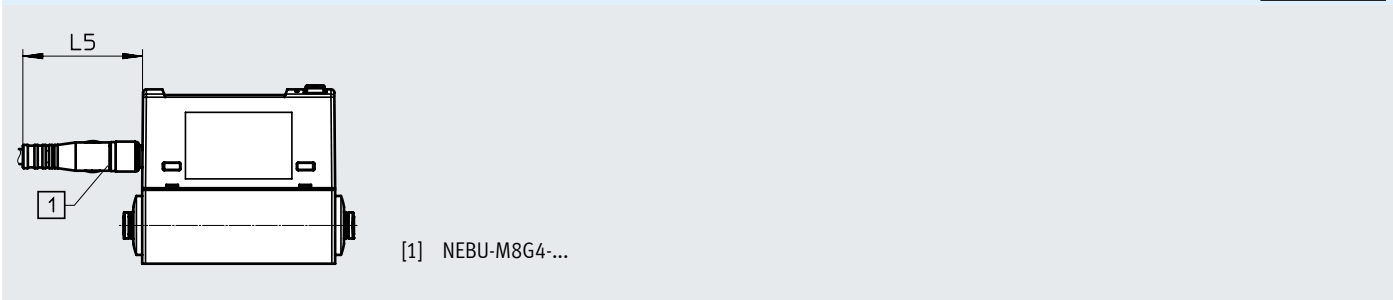
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Type	D3	H5	L5
SFAH- ... -M8	M8x1	20.7	~6.6

Dimensions

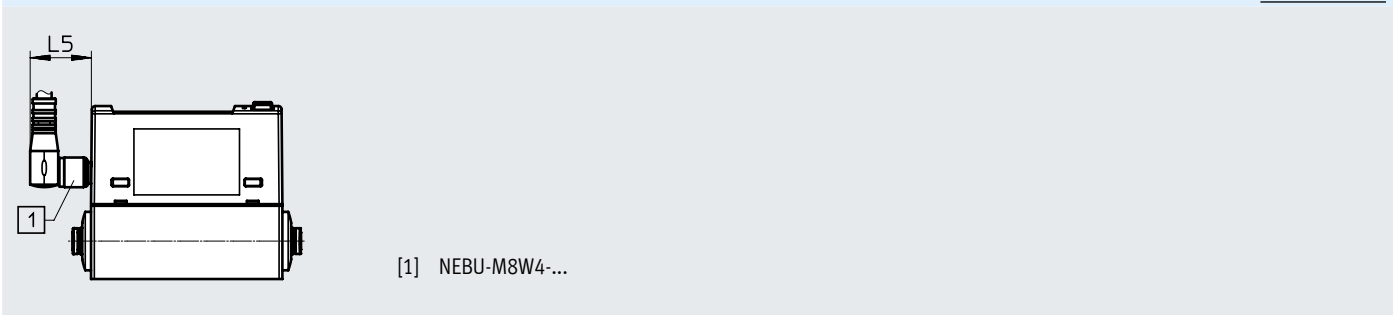
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Type	L5
SFAH- ... -M8	~35.9

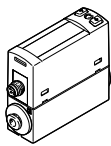
Dimensions

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Type	L5
SFAH- ... -M8	~18.5

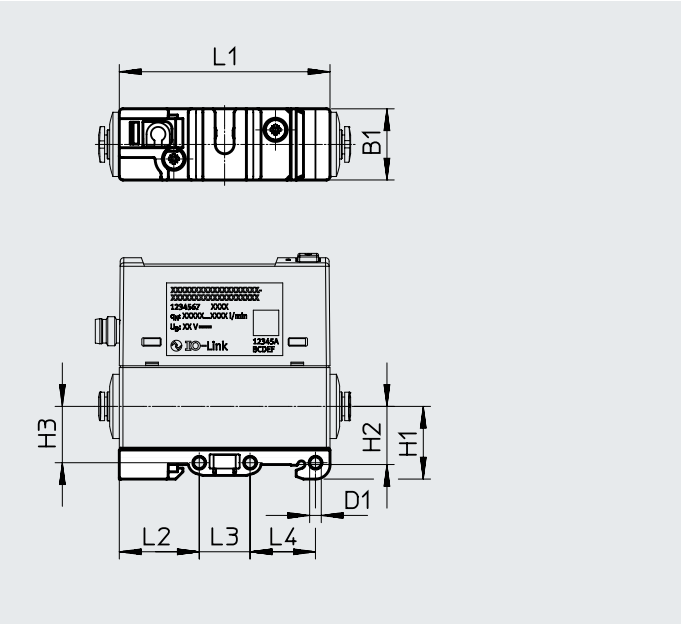
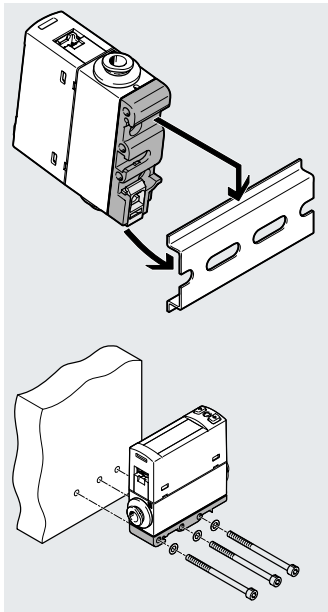
Data sheet

Ordering data		Connection type	Part no.	Type	
Design	Flow measuring range [l/min]				
	0.1 l/min	Female thread G1/8	8158411	SFAH-0.1U-G18FS-PNLK-PNVBA-M8	
			8158427	SFAH-0.1B-G18FS-PNLK-PNVBA-M8	
			8159375	SFAH-0.1U-G18FS-PNLK-PNVBA-L1	
	0.5 l/min	For tubing O.D. 6 mm	610916	SFAH-0.5U-Q6S-PNLK-PNVBA-M8	
		For tubing O.D. 4 mm	8158412	SFAH-0.5B-Q4S-PNLK-PNVBA-M8	
	0.1 l/min	For tubing O.D. 4 mm	8058461	SFAH-0.1U-Q4S-PNLK-PNVBA-L1	
			8058462	SFAH-0.1U-Q4S-PNLK-PNVBA-M8	
			8058463	SFAH-0.5U-Q4S-PNLK-PNVBA-L1	
	0.5 l/min		8058464	SFAH-0.5U-Q4S-PNLK-PNVBA-M8	
			8058465	SFAH-1U-Q4S-PNLK-PNVBA-L1	
	1 l/min		8058466	SFAH-1U-Q4S-PNLK-PNVBA-M8	
			For tubing O.D. 4 mm	8158413	SFAH-1B-Q4S-PNLK-PNVBA-M8
			For tubing O.D. 6 mm	8158418	SFAH-1U-Q6S-PNLK-PNVBA-M8
	5 l/min	For tubing O.D. 6 mm	8058467	SFAH-5U-Q6S-PNLK-PNVBA-L1	
			8058468	SFAH-5U-Q6S-PNLK-PNVBA-M8	
			8158414	SFAH-5B-Q6S-PNLK-PNVBA-M8	
			Female thread G1/8	8158425	SFAH-5U-G18FS-PNLK-PNVBA-M8
	10 l/min	For tubing O.D. 6 mm	8058469	SFAH-10U-Q6S-PNLK-PNVBA-L1	
			8058470	SFAH-10U-Q6S-PNLK-PNVBA-M8	
			610783	SFAH-10B-Q6S-PNLK-PNVBA-M8	
			8158423	SFAH-10U-Q6AR-PNLK-PNVBA-M8	
			8058471	SFAH-50U-Q8S-PNLK-PNVBA-L1	
	50 l/min	For tubing O.D. 8 mm	8058472	SFAH-50U-Q8S-PNLK-PNVBA-M8	
			8058473	SFAH-50U-G18FS-PNLK-PNVBA-M8	
		For tubing O.D. 6 mm	8158415	SFAH-50B-Q6S-PNLK-PNVBA-M8	
			8158419	SFAH-50U-Q6S-PNLK-PNVBA-M8	
			8158424	SFAH-50U-Q6AR-PNLK-PNVBA-M8	
			8158426	SFAH-50U-Q6AR-PNLK-PNVBA-L1	
			8058474	SFAH-100U-Q8S-PNLK-PNVBA-L1	
	100 l/min	For tubing O.D. 8 mm	8058475	SFAH-100U-Q8S-PNLK-PNVBA-M8	
Female thread G1/4		8058476	SFAH-100U-G14FS-PNLK-PNVBA-M8		
		8158416	SFAH-100B-G14FS-PNLK-PNVBA-M8		
For tubing O.D. 6 mm		8158420	SFAH-100U-Q6S-PNLK-PNVBA-M8		
Female thread G1/4		8158422	SFAH-100U-G14FS-PNLK-PNVBA-L1		
200 l/min	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		
		609555	SFAH-200U-G14FS-PNLK-PNVBA-L1		
		8158417	SFAH-200B-G14FS-PNLK-PNVBA-M8		
		For tubing O.D. 6 mm	8158421	SFAH-200U-Q6S-PNLK-PNVBA-M8	

Accessories

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

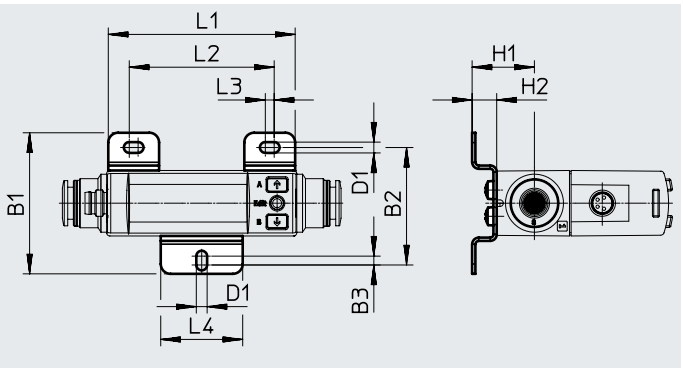
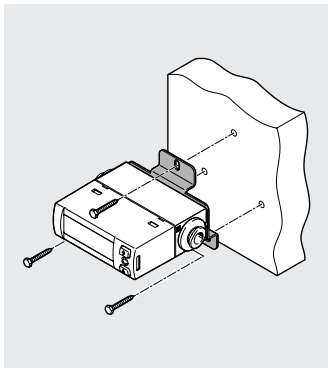
Material: PA, POM, steel
RoHS-compliant



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



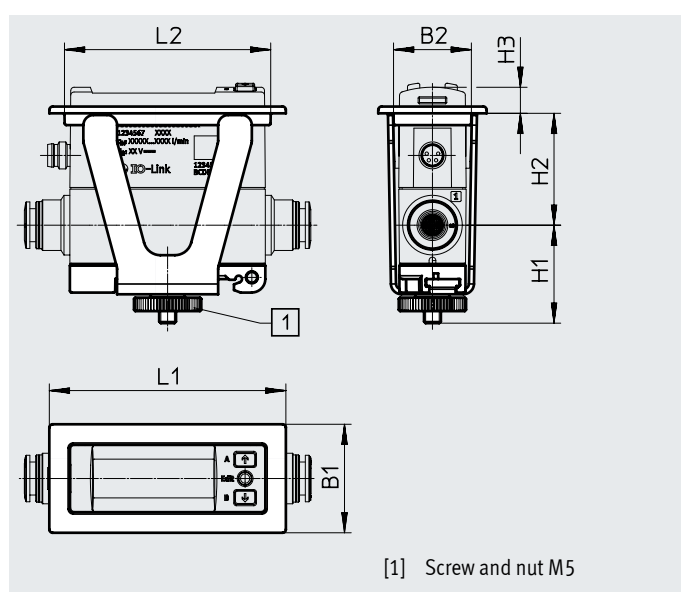
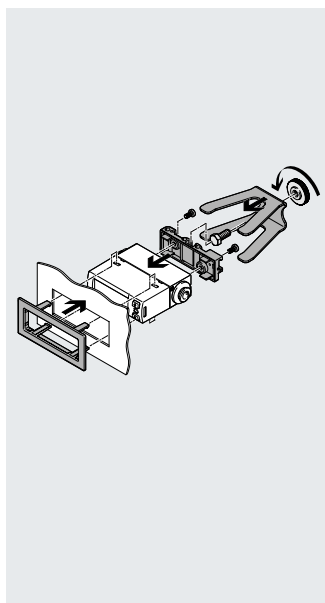
Dimensions and ordering data													
Type	B1	B2	B3	D1	H1	H2	L1	L2	L3	L4	CRC ¹⁾	Part no.	Type
SAMH-FH-W	43.1	35.9	2.7	3.3	18.5	7.5	57	44.2	2.7	25	2	8036910	SAMH-FH-W

1) Corrosion resistance class CRC 2 to Festo standard FN 940070
Moderate corrosion stress. Indoor applications in which condensation can occur. External visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment.

Accessories

Panel mounting kit SAMH-FH-F ...

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



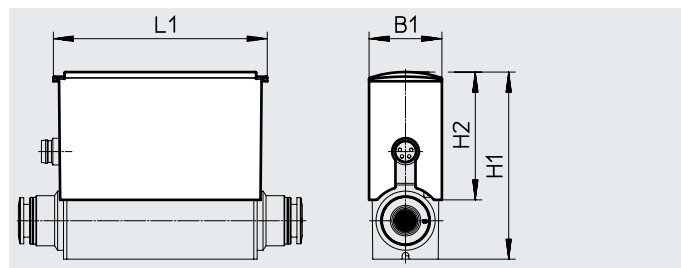
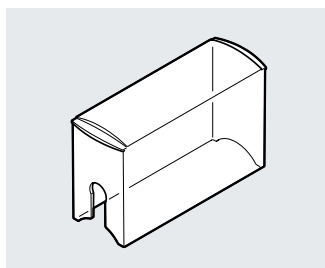
Dimensions										
Type	B1	B2	H1 max.	H2	H3	L1	L2	CRC ¹⁾	Part no.	Type
SAMH-FH-F	32.2	23.1	30	33.2	7.7	70.2	61.2	2	8058459	SAMH-FH-F

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

Moderate corrosion stress. Indoor applications in which condensation can occur. External visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment.

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 mounting as illustrated on page 3.

Accessories

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

Ordering data – Push-in fittings				Data sheets → 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 filter				Data sheets → Internet: vaf
	Connection	For tubing O.D.	Part no.	Type
	PK-3	4	535883	VAF-PK-3
	PK-4	6	15889	VAF-PK-4
	PK-6	8	160239	VAF-PK-6