

## Flow sensors SFAH

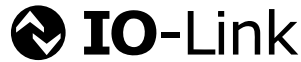
**FESTO**



## 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

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®.

### 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

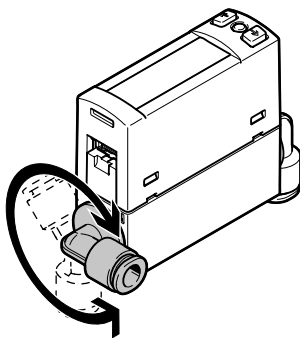
- Monitoring and setting a flow rate threshold, a flow rate range or a change in flow rate
- Monitoring using the teach-in function or by entering values
- Mass flow rate and volumetric flow rate are displayed in the common measurement units
- ECO function with option to switch off the display
- Optional 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 (replication) to other, identical sensors (devices)
- 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
- 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

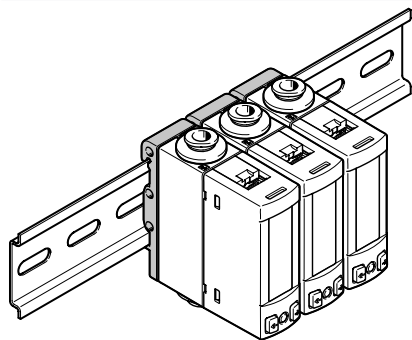
Adjustable QS elbow connections



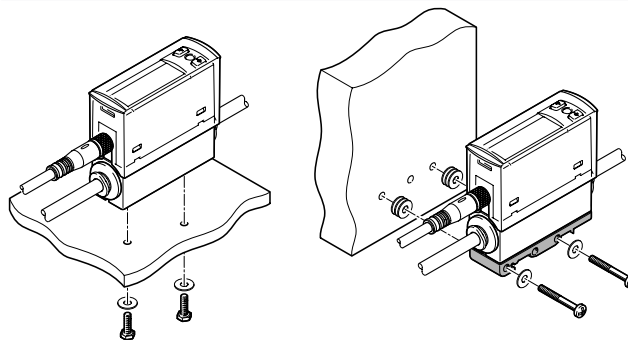
## Key features

### Mounting options

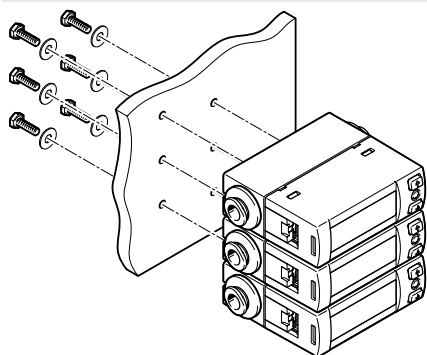
#### H-rail mounting



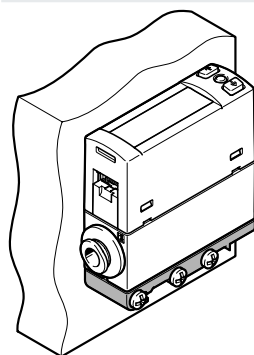
#### Safety guard



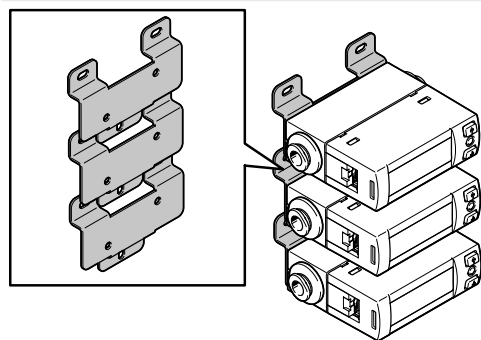
#### Plate mounting from beneath



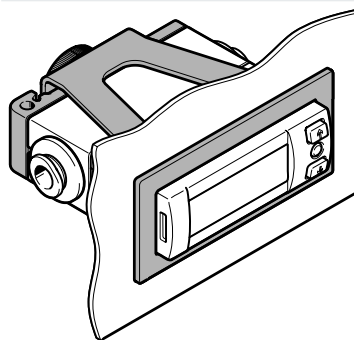
#### Plate mounting from the side



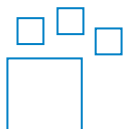
#### Wall mounting



#### Front panel mounting



### Ordering data – Product options

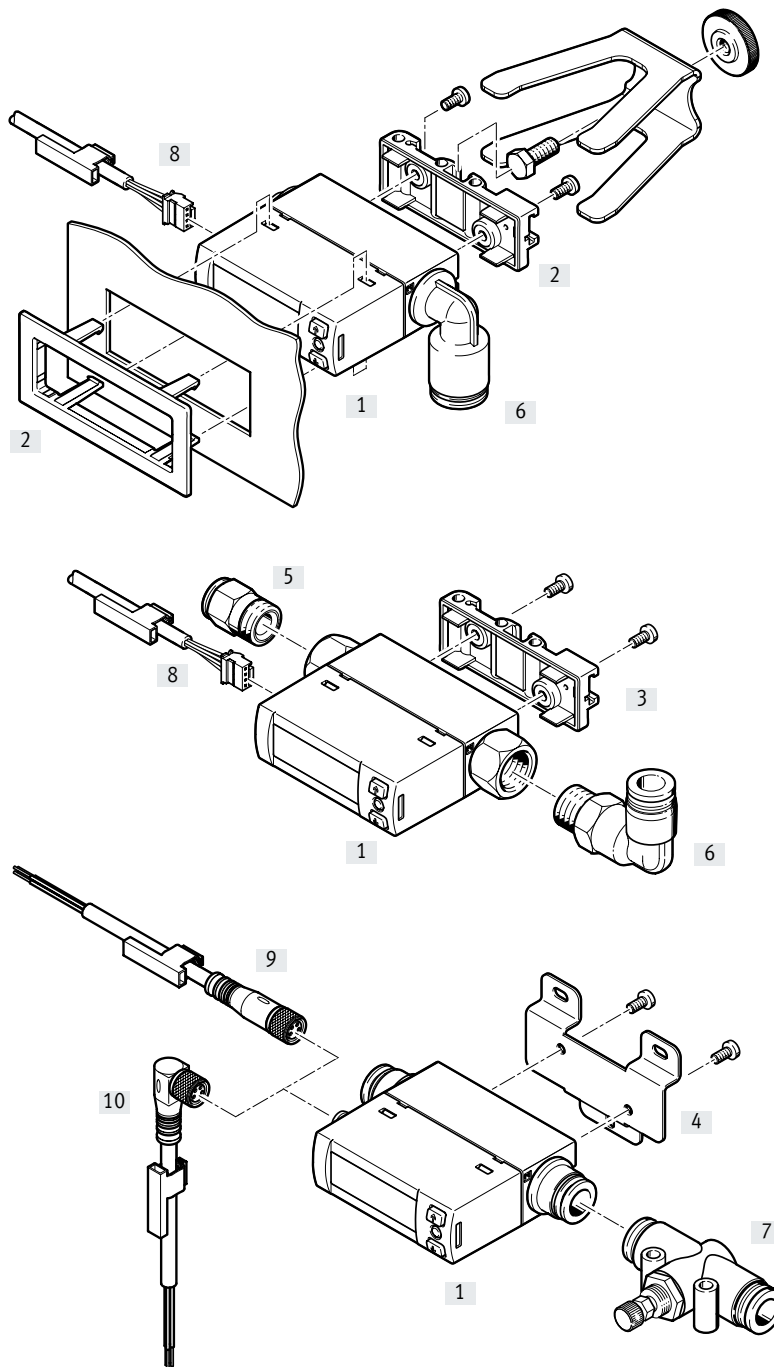


Configurable product  
This product and all its product options can be ordered using the configurator.

The configurator can be found under Products on the DVD or at  
→ [www.festo.com/catalogue/...](http://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

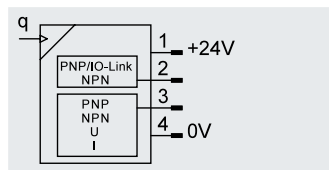
## Type codes

<b>001</b>	<b>Series</b>		<b>005</b>	<b>Thread type</b>	
<b>SFAH</b>	Flow sensor			None	
<b>002</b>	<b>Flow measuring range</b>		<b>F</b>	Female	
<b>0.1</b>	Max. 0.1 l/min		<b>006</b>	<b>Outlet orientation</b>	
<b>0.5</b>	Max. 0.5 l/min		<b>S</b>	Straight	
<b>1</b>	Max. 1 l/min		<b>AR</b>	Angled, adjustable	
<b>5</b>	Max. 5 l/min		<b>007</b>	<b>Electrical output 1</b>	
<b>10</b>	Max. 10 l/min		<b>PNLK</b>	PNP or NPN or IO-Link®	
<b>50</b>	Max. 50 l/min		<b>008</b>	<b>Electrical output 2</b>	
<b>100</b>	Max. 100 l/min		<b>PNVBA</b>	PNP or NPN or 0 ... 10 V or 1 ... 5 V or 4 ... 20 mA	
<b>200</b>	Max. 200 l/min		<b>009</b>	<b>Electrical connection</b>	
<b>003</b>	<b>Flow rate input</b>		<b>L1</b>	Plug type L1	
<b>B</b>	Bidirectional		<b>M8</b>	Plug M8	
<b>U</b>	Unidirectional		<b>010</b>	<b>Certificate</b>	
<b>004</b>	<b>Pneumatic connection</b>			None	
<b>G18</b>	G1/8		<b>T</b>	Test report	
<b>G14</b>	G1/4				
<b>Q4</b>	Push-in connector 4 mm				
<b>Q6</b>	Push-in connector 6 mm				
<b>Q8</b>	Push-in connector 8 mm				

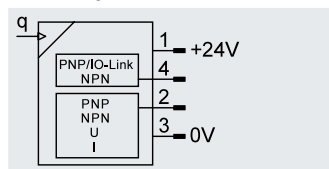
## Data sheet

### 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
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 <sup>2)</sup>	0.2	1	2	4
Flow measuring range end value <sup>1)</sup>	[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] ±0.2
Repetition accuracy span	[%FS] ±0.8
Temperature coefficient span	[%FS/K] Typ. ±0.15 (max. ±0.3)
Pressure influence span <sup>1)</sup>	[%FS] Typically ±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 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

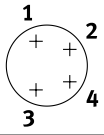
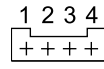
Analogue output				
Analogue output	-PNVBA-	0 ... 10 V	1 ... 5 V	4 ... 20 mA
Max. load resistance of current output	[ohm]	500		
Min. load resistance of voltage output	[kOhm]	20		

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 <sup>1)</sup>	IP40
Maximum permissible leakage [l/h]	0.1
Pressure drop delta p <sup>2)</sup> [mbar]	< 5   12   15   56
Protection class	III
Corrosion resistance class CRC <sup>3)</sup>	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.

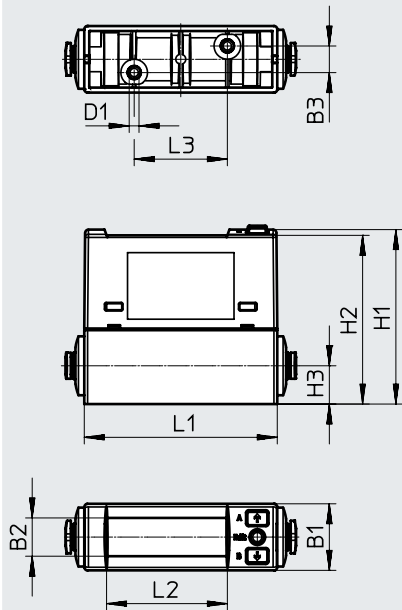
3) Corrosion resistance class CRC 2 to Festo standard FN 940070

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

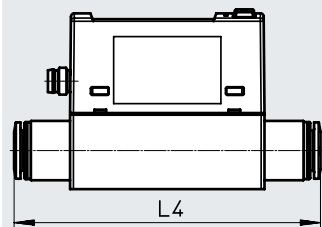
Download CAD data → [www.festo.com](http://www.festo.com)



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](http://www.festo.com)

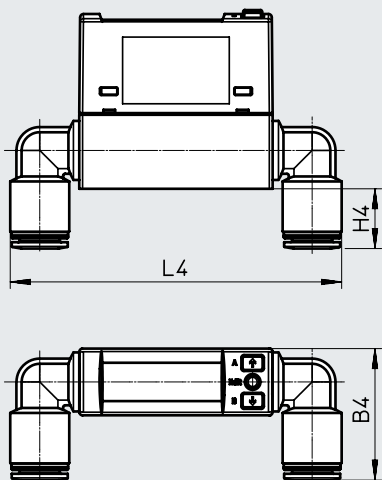


Type	L4 max.
SFAH- ... -Q4S- ...	70
SFAH- ... -Q6S- ...	70
SFAH- ... -Q8S- ...	85

Data sheet

Dimensions

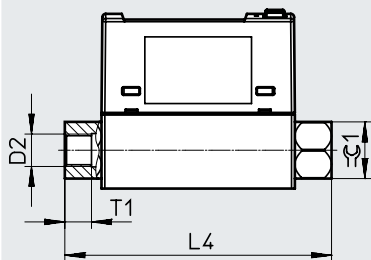
Download CAD data → [www.festo.com](http://www.festo.com)



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

Dimensions

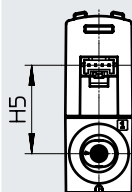
Download CAD data → [www.festo.com](http://www.festo.com)



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](http://www.festo.com)

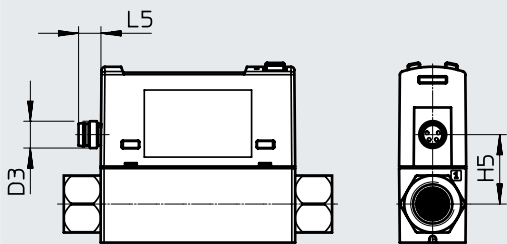


Type	H5
SFAH- ... -L1	26.3

Data sheet

Dimensions

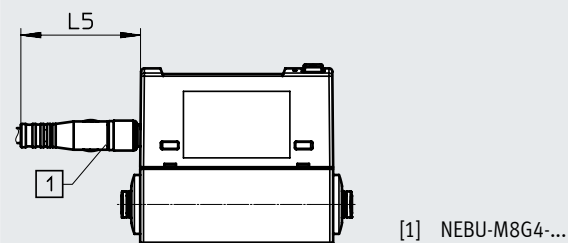
Download CAD data → [www.festo.com](http://www.festo.com)



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

Dimensions

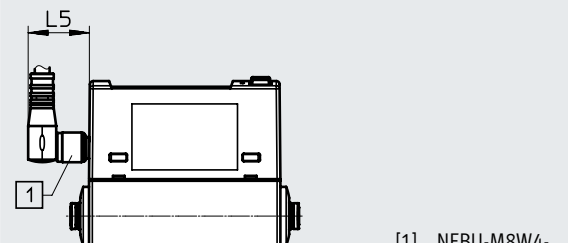
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Type	L5
SFAH- ... -M8	~35.9

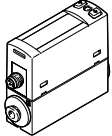
Dimensions

Download CAD data → [www.festo.com](http://www.festo.com)



Type	L5
SFAH- ... -M8	~18.5

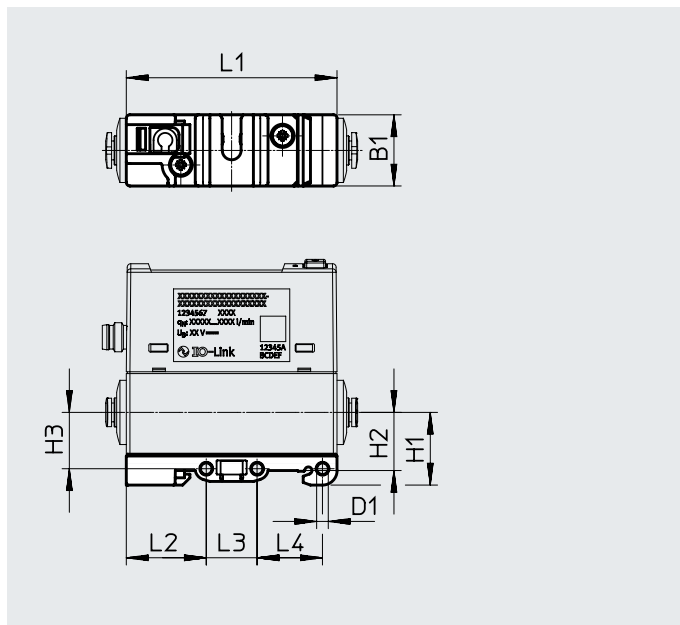
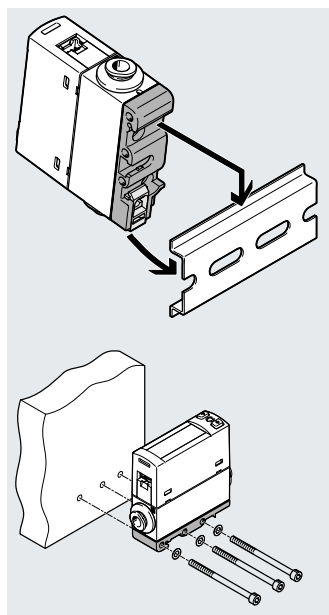
## Data sheet

Ordering data Design	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
			8058462	SFAH-0.1U-Q4S-PNLK-PNVBA-M8
	0.5 l/min		8058463	SFAH-0.5U-Q4S-PNLK-PNVBA-L1
			8058464	SFAH-0.5U-Q4S-PNLK-PNVBA-M8
	1 l/min		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
			8058468	SFAH-5U-Q6S-PNLK-PNVBA-M8
	10 l/min		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
			8058473	SFAH-50U-G18FS-PNLK-PNVBA-M8
	100 l/min	For tubing O.D. 8 mm	8058474	SFAH-100U-Q8S-PNLK-PNVBA-L1
			8058475	SFAH-100U-Q8S-PNLK-PNVBA-M8
		Female thread G1/4	8058476	SFAH-100U-G14FS-PNLK-PNVBA-M8
	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

## Accessories

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

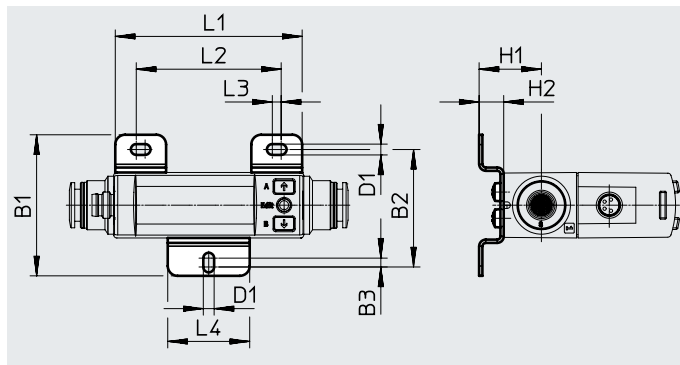
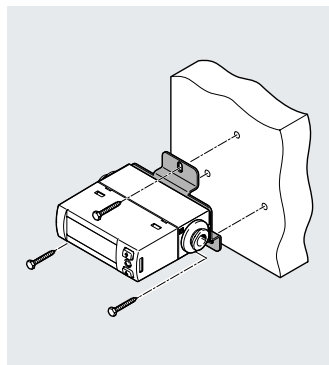
Material: PA, POM, steel  
RoHS-compliant



Dimensions and ordering data											
Type	B1	D1 ∅	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



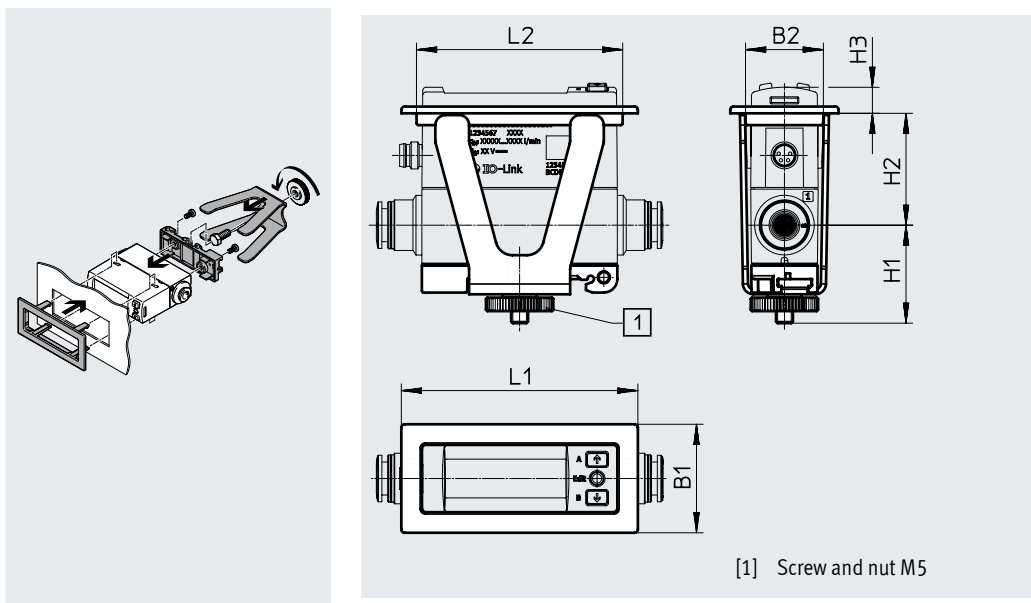
Dimensions and ordering data													
Type	B1	B2	B3	D1	H1	H2	L1	L2	L3	L4	CRC <sup>1)</sup>	Part no.	Type
SAMH-FH-W	43.1	35.9	2.7	3.3	18.5	7.5	57	44.2	2.7	25	2	8036910	SAMH-FH-W

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

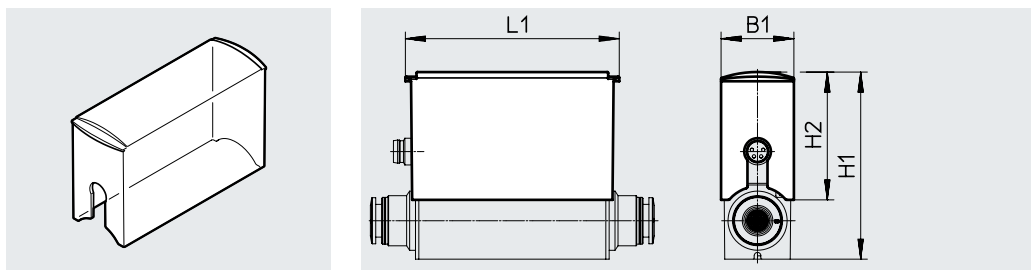


Dimensions										
Type	B1	B2	H1 max.	H2	H3	L1	L2	CRC <sup>1)</sup>	Part no.	Type
SAMH-FH-F	32.2	23.1	30	33.2	7.7	70.2	61.2	2	8058459	SAMH-FH-F

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
<b>Socket, rectangular design L1</b> <span style="float: right;">Data sheets → Internet: nebs</span>				
	4	2.5	572576	NEBS-L1G4-K-2.5-LE4
<b>M8x1, straight socket</b> <span style="float: right;">Data sheets → Internet: nebu</span>				
	4	2.5	541342	NEBU-M8G4-K-2.5-LE4
<b>M8x1, angled socket</b>				
	4	2.5	541344	NEBU-M8W4-K-2.5-LE4
Ordering data – Push-in fittings				
	Pneumatic connection O.D.	For tubing O.D.	Part no.	Type
<b>Straight connection</b>				
	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
<b>90° connection</b>				
	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				
	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