

Flow sensor SFAH

FESTO



Type code

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	
	None	
FP	Front panel mounting kit	
H	H-rail mounting	
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	

Datasheet

General technical data

Approval	RCM trademark, c UL us listed (OL)
CE mark (see declaration of conformity)	To EU EMC Directive, In accordance with EU RoHS Directive
UKCA marking (see declaration of conformity)	To UK instructions for EMC, To UK RoHS instructions
Certificate issuing authority	UL E322346
Note on materials	RoHS-compliant
LABS (PWIS) conformity	VDMA24364-B2-L

Input signal, measuring element

End value for flow rate measuring range ¹⁾	0.1 l/min	0.5 l/min	1 l/min	5 l/min	10 l/min	50 l/min	100 l/min	200 l/min
Start value for flow rate measuring range ²⁾	0.002 l/min	0.01 l/min	0.02 l/min	0.1 l/min	0.2 l/min	1 l/min	2 l/min	4 l/min
Measured variable	Mass flow rate, Volumetric flow rate							
Flow direction	Bidirectional, Unidirectional							
Measuring principle	Thermal							
Measurement method	Heat transfer							
Operating pressure	-0.9 ... 10 bar							
Operating medium	Argon, Compressed air to ISO 8573-1:2010 [6:4:4], Nitrogen							
Media temperature	0 ... 50°C							
Ambient temperature	0 ... 50°C							
Nominal temperature	23°C							

1) For characteristic ...B..., the measuring range applies in positive and negative direction.

2) For a flow measuring range with a starting value of 0.1 for low leakage requirements in the lower measuring range, use in connection with pneumatic connection G1/4 or G1/8 female thread.

Output, general

Accuracy of flow rate	± (2% o.m.v. + 1% FS)
Repetition accuracy offset in ± %FS	0.2 %FS
Repetition accuracy span in ± %FS	0.8 %FS
Temperature coefficient span in ± %FS/K	Typ. 0.15%FS/K
Pressure influence span in ± %FS/bar ¹⁾	1 %FS/b.

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

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	100 mA

Analogue output

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

Output, additional data

Short circuit current rating	yes
Overload protection	Available

Datasheet

IO-Link® device to IEC 61131-9

Protocol	IO-Link®
IO-Link, Protocol version	Device V 1.1
IO-Link, Profile	Smart sensor profile
IO-Link, Function classes	Binary data channel (BDC), Process data variable (PDV), Identification, Diagnostics, Teach channel
IO-Link, communication mode	COM2 (38.4 kBaud)
IO-Link, SIO-Mode support	Yes
IO-Link, Port class	A
IO-Link, Process data length IN	3 bytes
IO-Link, Process data content IN	1 bit BDC (volume monitoring), 14 bit PDV (measured flow value), 2 bit BDC (flow monitoring)
IO-Link, Service data IN	32-bit volume/mass measurement
IO-Link, Min. cycle time	4 ms
IO-Link, Data storage required	0.5 KB

Electronics

Operational voltage range DC	22 ... 26 V
No-load supply current	≤25 mA
Reverse polarity protection	For all electrical connections

Electromechanics

Electrical connection 1, type of mounting	Snap-locking, Screw-type lock, Not rotatable		
Electrical connection 1, compatible type of mounting	Compatible with latching lock, Compatible with rotatable screw-type lock		
Electrical connection 1, connection type	Plugs		
Electrical connection 1, connector system	Connection pattern L1J, M8x1, A-coded, to EN 61076-2-104		
Electrical connection 1, number of connections/cores	4		

Mechanical components

Pneumatic connection	Female thread G1/8	Female thread G1/4	For tubing O.D. 4 mm	For tubing O.D. 6 mm	For tubing O.D. 8 mm
Type of mounting	With accessories				
Mounting position	optional				
Pneumatic connection, outlet direction	Straight		Straight, Angled, adjustable		Straight
Product weight	90 g		60 g		
Material housing	PA-reinforced				
Material in contact with the medium	Anodised wrought aluminium alloy, Epoxy, NBR, PA-reinforced, Silicon, Silicon nitride, High-alloy stainless steel				

Display/operation

End value for flow rate measuring range	0.1	0.5	1	5	10	50	100	200
Display type	Illuminated LCD, multi-colour							
Displayable units	g, g/min, l, l/h, l/min, scft, scft/h			g, g/min, l, l/h, l/min, scft, scft/h, scft/min		g, g/min, l, l/min, scft, scft/h, scft/min		
Setting options	IO-Link®, Teach-in, Via display and keys							
Protection against tampering	IO-Link, PIN code							

Datasheet

Immission/emission									
End value for flow rate measuring range	0.1 l/min	0.5 l/min	1 l/min	5 l/min	10 l/min	50 l/min	100 l/min	200 l/min	
Degree of protection ¹⁾	IP40								
Maximum permissible leakage	–								
Pressure drop ²⁾	<5 mbar					12 mbar	15 mbar	56 mbar	
Protection class	III								
Corrosion resistance class CRC ³⁾	2 - Moderate corrosion stress								
Cleanroom suitability, measured according to ISO 14644-14	Class 4 according to ISO 14644-1								
Pollution degree	3								

1) Protection class IP54 is achieved in combination with the protective hood, when mounted horizontally as shown on page 3.

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

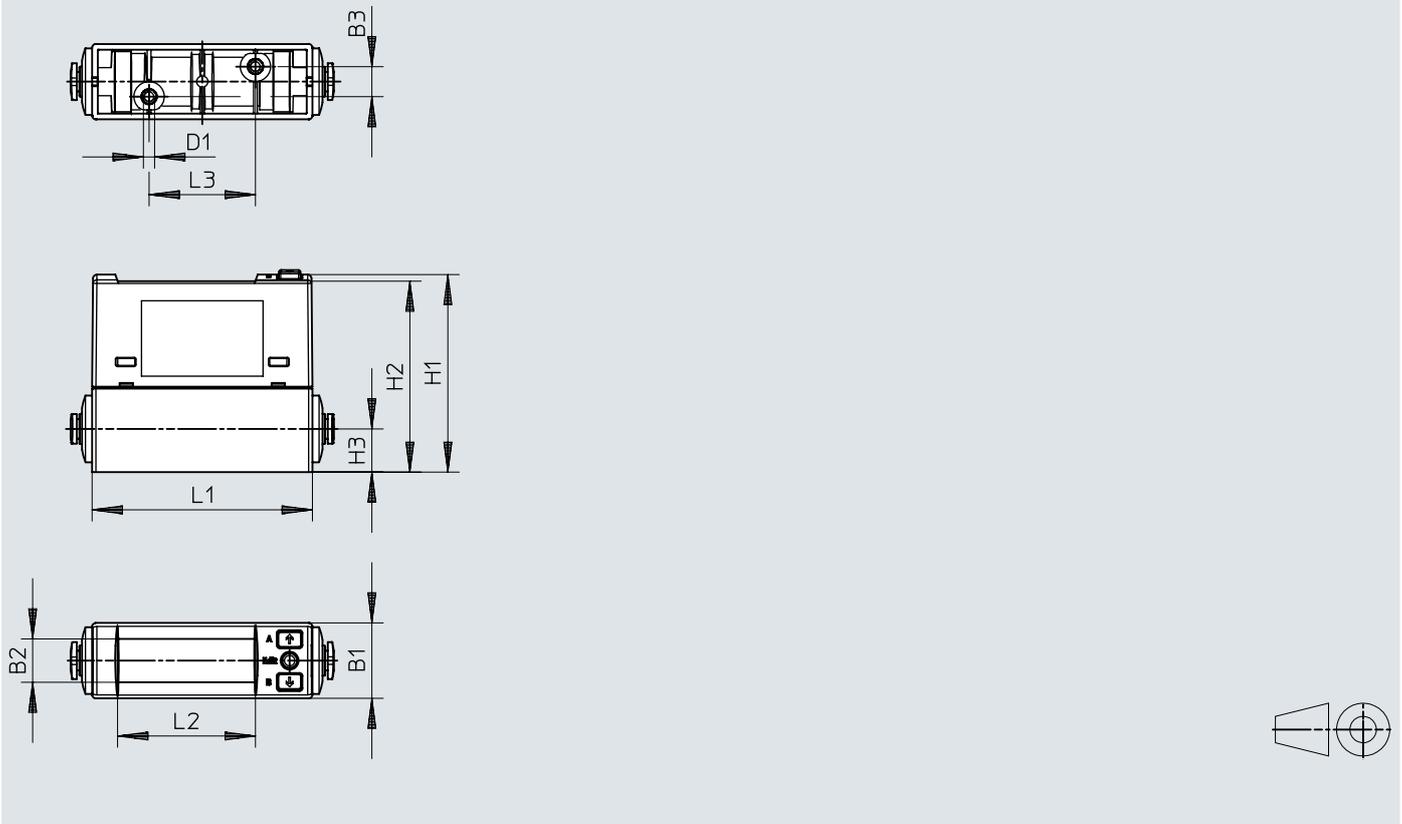
3) Corrosion resistance class CRC 2 according to Festo standard FN 940070

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

Dimensions

Dimensions – SFAH-...

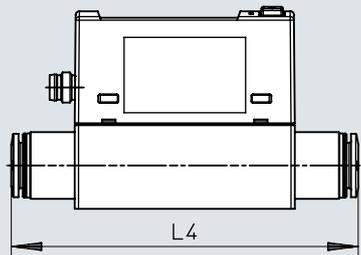
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	B1	B2	B3	D1	H1	H2	H3	L1	L2	L3
SFAH- ...	20	11,5	8	M3	~52,4	50,7	11,5	58	36,3	28

Dimensions

Dimensions – SFAH-...-Q...S-...

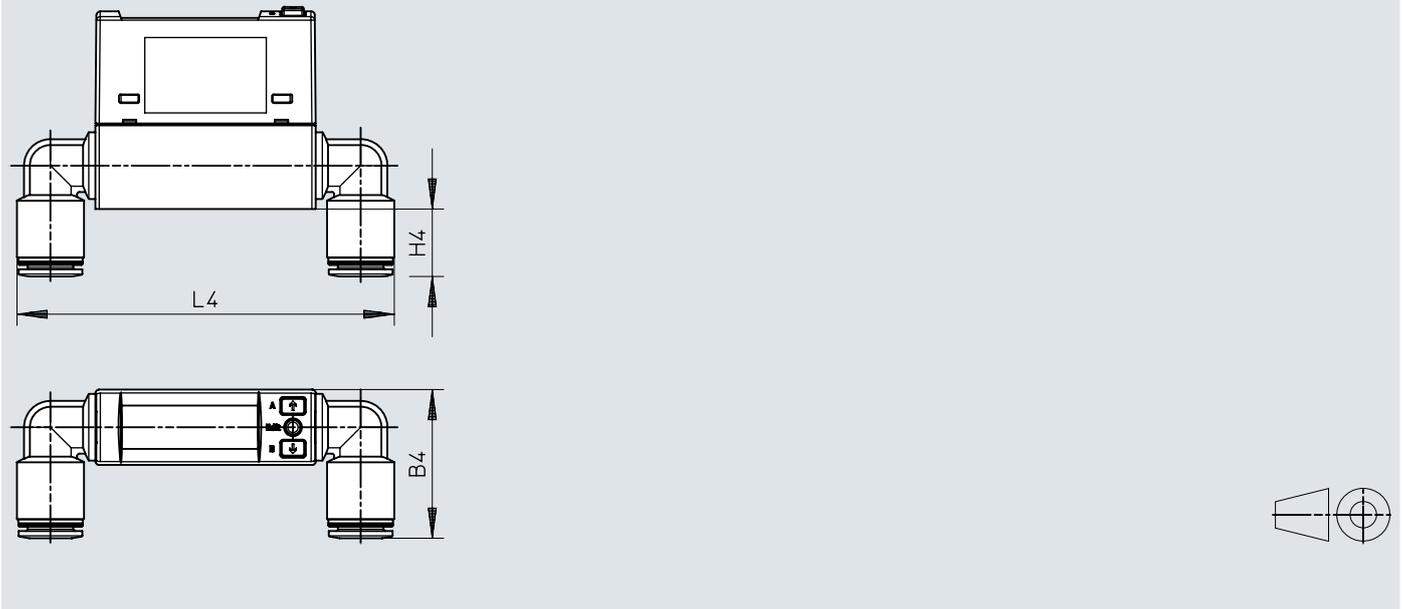
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	L4 max.
SFAH- ... -Q4S- ...	70
SFAH- ... -Q6S- ...	70
SFAH- ... -Q8S- ...	85

Dimensions

Dimensions – SFAH-...-Q...AR-...

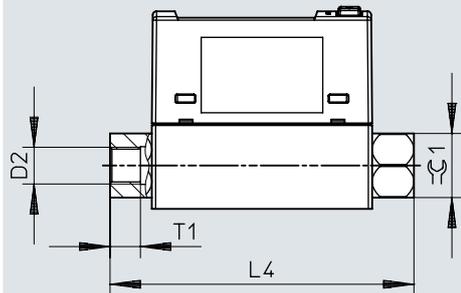
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	B4 max.	H4 max.	L4 max.
SFAH- ... -Q4AR- ...	30	8	83
SFAH- ... -Q6AR- ...	31	9	88
SFAH- ... -Q8AR- ...	38	17	98

Dimensions

Dimensions – SFAH-...-G...FS-...

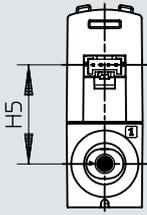
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	D2	L4	T1	± 0.1
SFAH- ... -G14FS- ...	G1/4	80	12	17
SFAH- ... -G18FS- ...	G1/8	80	8	17

Dimensions

Dimensions – SFAH-...-L1

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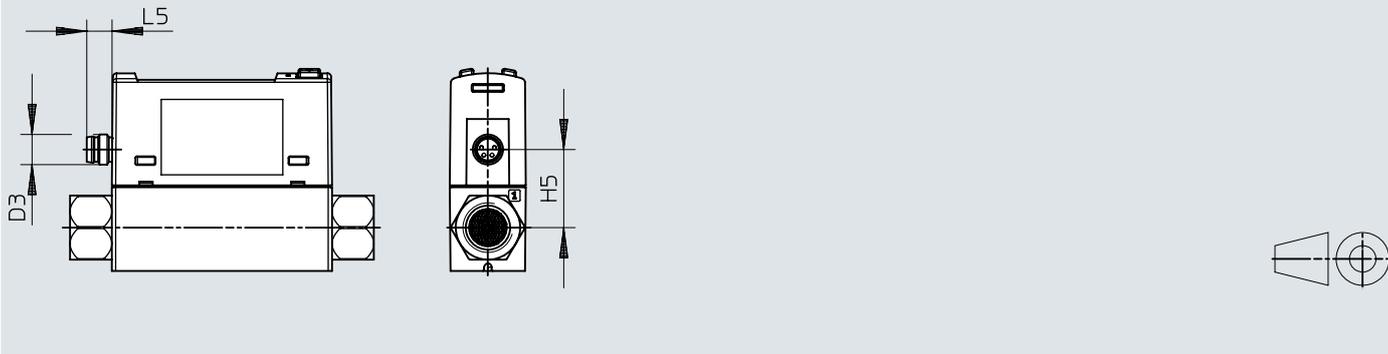


	H5
SFAH-...-L1	26,3

Dimensions

Dimensions – SFAH-...-M8

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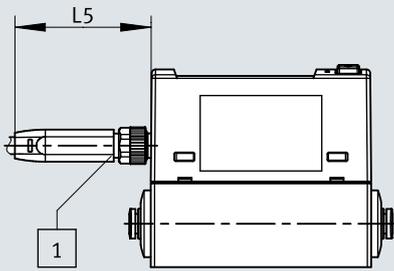


	D3	H5	L5
SFAH- ... -M8	M8x1	20,7	~6,6

Dimensions

Dimensions – SFAH-...-M8

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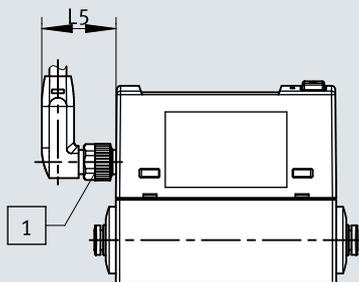


[1] NEBA-M8G4-...

	L5
SFAH-...-M8	~35,9

Dimensions

Dimensions – SFAH-...-M8

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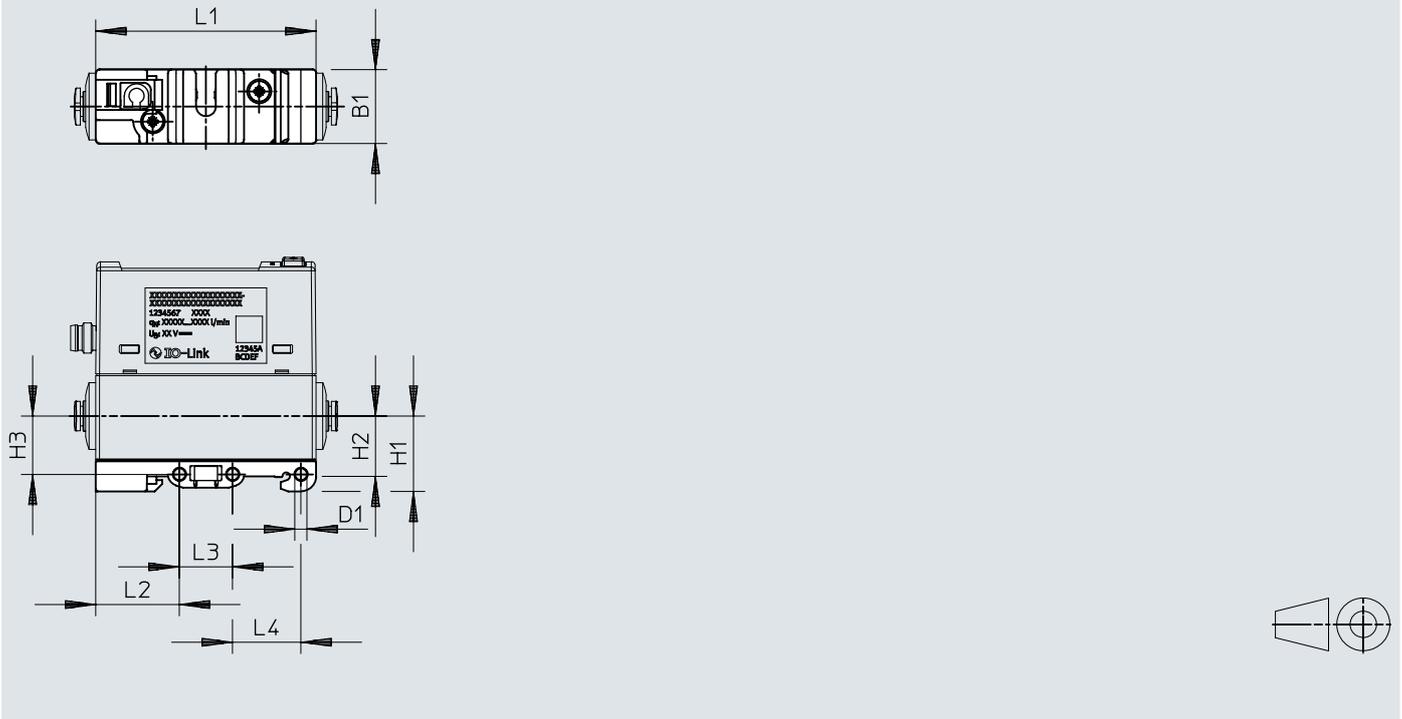
[1] NEBA-M8W4-...

	L5
SFAH-...-M8	~18,5

Dimensions

Dimensions – H-rail mounting SAMH-FH-H

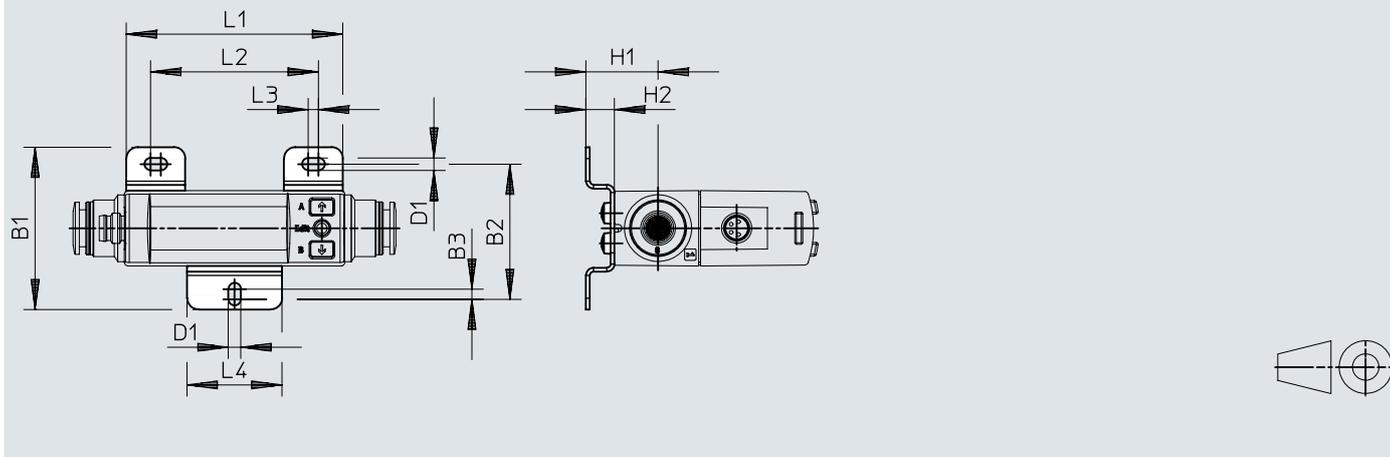
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	B1	D1 ∅	H1	H2	H3	L1	L2	L3	L4
SAMH-FH-H	19,6	3,2	20	16	15,5	58	22	14	18

Dimensions

Dimensions – Wall mounting SAMH-FH-W

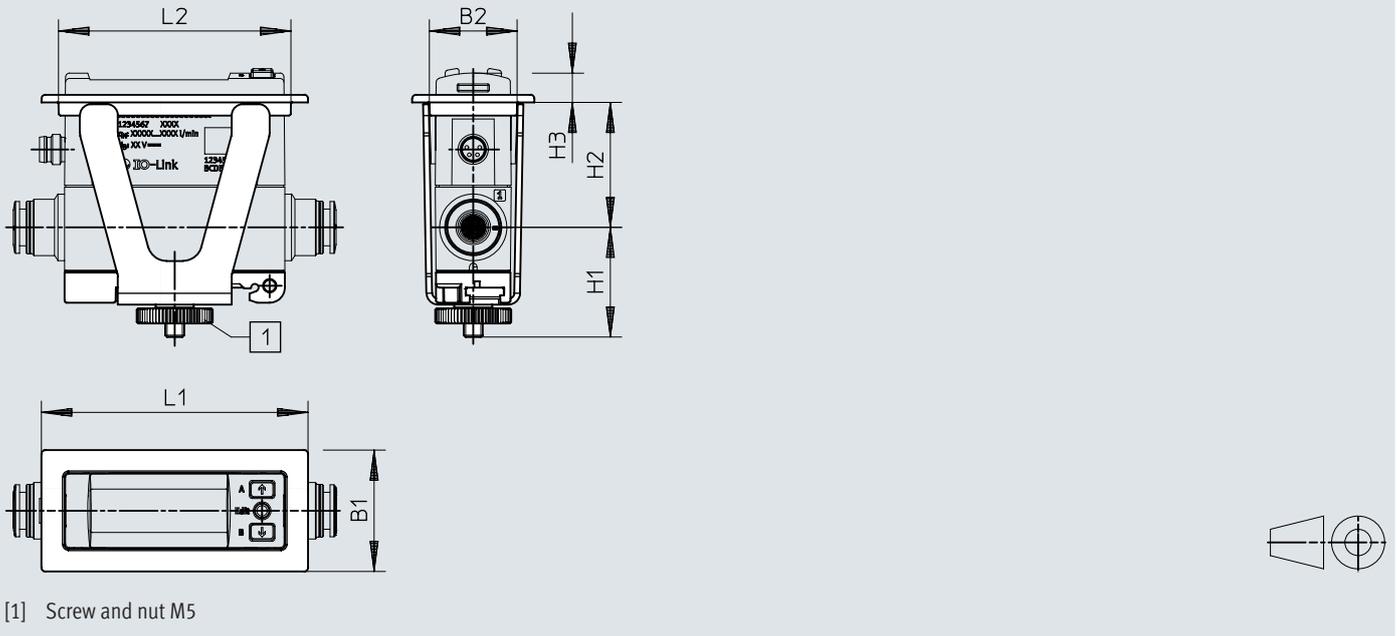
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	B1	B2	B3	D1	H1	H2	L1	L2	L3	L4
SAMH-FH-W	43,1	35,9	2,7	3,3	18,5	7,5	57	44,2	2,7	25

Dimensions

Dimensions – Panel mounting kit SAMH-FH-F

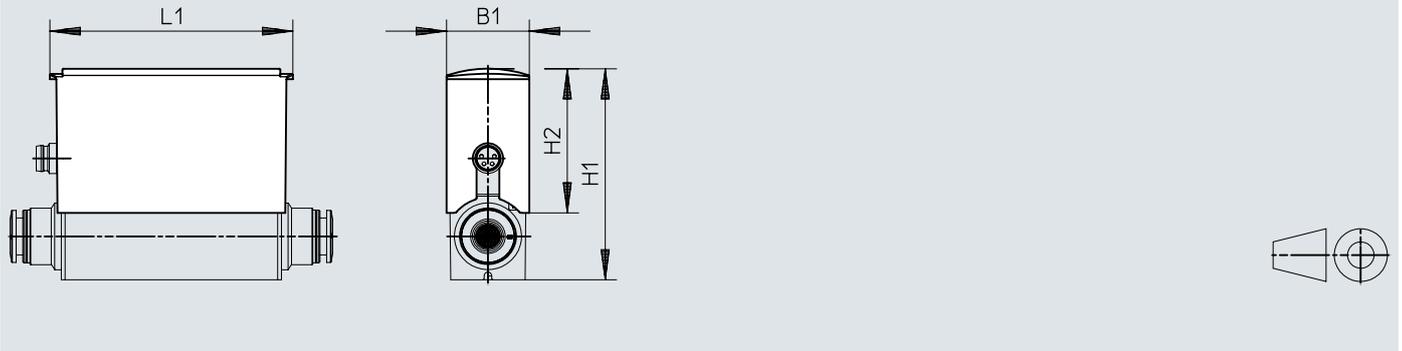
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	B1	B2	H1 max.	H2	H3	L1	L2
SAMH-FH-F	32,2	23,1	30	33,2	7,7	70,2	61,2

Dimensions

Dimensions – Protective hood SACC-FH-G-S3

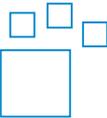
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	B1	H1	H2	L1
SACC-FH-G-S3	22,2	~56	38,3	64

Ordering data

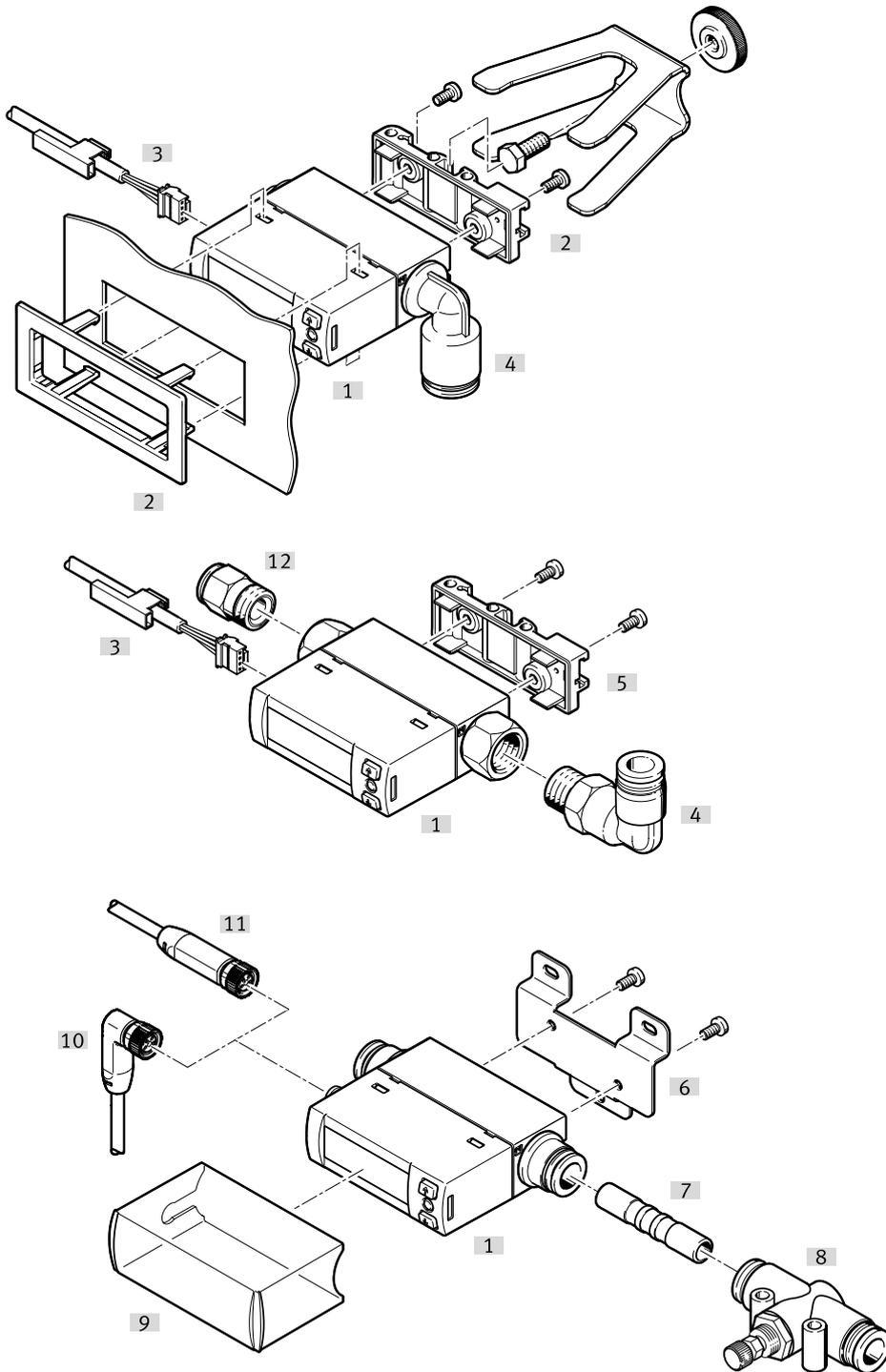
Ordering data					
	End value for flow rate measuring range	Pneumatic connection	Part no.	Type	
	0.1 l/min	Female thread G1/8	8158411	SFAH-0.1U-G18FS-PNLK-PNVBA-M8	
			8159375	SFAH-0.1U-G18FS-PNLK-PNVBA-L1	
			8158427	SFAH-0.1B-G18FS-PNLK-PNVBA-M8	
		0.5 l/min	For tubing O.D. 4 mm	8058461	SFAH-0.1U-Q4S-PNLK-PNVBA-L1
				8058462	SFAH-0.1U-Q4S-PNLK-PNVBA-M8
				8158412	SFAH-0.5B-Q4S-PNLK-PNVBA-M8
	For tubing O.D. 6 mm		8058463	SFAH-0.5U-Q4S-PNLK-PNVBA-L1	
			8058464	SFAH-0.5U-Q4S-PNLK-PNVBA-M8	
			610916	SFAH-0.5U-Q6S-PNLK-PNVBA-M8	
	1 l/min	For tubing O.D. 4 mm	8158413	SFAH-1B-Q4S-PNLK-PNVBA-M8	
			8058466	SFAH-1U-Q4S-PNLK-PNVBA-M8	
		For tubing O.D. 6 mm	8058465	SFAH-1U-Q4S-PNLK-PNVBA-L1	
			8158418	SFAH-1U-Q6S-PNLK-PNVBA-M8	
	5 l/min	Female thread G1/8	8158425	SFAH-5U-G18FS-PNLK-PNVBA-M8	
		For tubing O.D. 6 mm	8158414	SFAH-5B-Q6S-PNLK-PNVBA-M8	
			8058467	SFAH-5U-Q6S-PNLK-PNVBA-L1	
			8058468	SFAH-5U-Q6S-PNLK-PNVBA-M8	
			8058469	SFAH-10U-Q6S-PNLK-PNVBA-L1	
		10 l/min	For tubing O.D. 6 mm	610783	SFAH-10B-Q6S-PNLK-PNVBA-M8
	8058470			SFAH-10U-Q6S-PNLK-PNVBA-M8	
	8158423			SFAH-10U-Q6AR-PNLK-PNVBA-M8	
	50 l/min		Female thread G1/8	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
		8158426		SFAH-50U-Q6AR-PNLK-PNVBA-L1	
		8158424		SFAH-50U-Q6AR-PNLK-PNVBA-M8	
		For tubing O.D. 8 mm	8058472	SFAH-50U-Q8S-PNLK-PNVBA-M8	
	8058471		SFAH-50U-Q8S-PNLK-PNVBA-L1		
100 l/min	Female thread G1/4		8158416	SFAH-100B-G14FS-PNLK-PNVBA-M8	
	For tubing O.D. 6 mm		8058476	SFAH-100U-G14FS-PNLK-PNVBA-M8	
			8158422	SFAH-100U-G14FS-PNLK-PNVBA-L1	
			8158420	SFAH-100U-Q6S-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	8058479	SFAH-200U-G14FS-PNLK-PNVBA-M8	
	For tubing O.D. 6 mm	609555	SFAH-200U-G14FS-PNLK-PNVBA-L1		
		8158417	SFAH-200B-G14FS-PNLK-PNVBA-M8		
		8158421	SFAH-200U-Q6S-PNLK-PNVBA-M8		
	For tubing O.D. 8 mm	8058478	SFAH-200U-Q8S-PNLK-PNVBA-M8		
		8058477	SFAH-200U-Q8S-PNLK-PNVBA-L1		

Modular product system – Ordering information

	End value for flow rate measuring range	Pneumatic connection	Part no.	Type
	0.1 ... 200 l/min	Female thread G1/8, Female thread G1/4, For tubing O.D. 4 mm, For tubing O.D. 6 mm, For tubing O.D. 8 mm	8035300	SFAH-

Peripherals

Peripherals overview

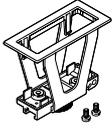
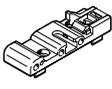
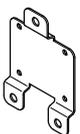
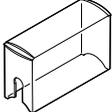
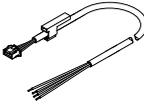


Accessories			→ Link
Type/order code	Description		
[1] Flow sensor SFAH	–		sfah
[2] Panel mounting kit SAMH-FH-F	–		21
[3] Connecting cable NEBS-L1G4-...	–		21
[4] Push-in fitting QSL	–		22
[5] H-rail mounting SAMH-FH-H	–		21
[6] Wall mounting SAMH-FH-W	–		21
[7] Push-in sleeve QSH	–		qsh
[8] One-way flow control valve GRO-QS-...	–		22
[9] Protective hood SACC-FH-G-S3	Only in combination with electrical connection M8		21

Peripherals

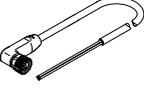
Accessories		→ Link
Type/order code	Description	
[10] Connecting cable NEBU-M8W4-...	Angled socket	22
[11] Connecting cable NEBA-M8G4-...	Straight socket	21
[12] Push-in fitting QS	–	22

Accessories

Panel mounting kit SAMH-FH-F				
	Type of mounting	Information on materials	Part no.	Type
	Front panel mounting	PA, High-alloy stainless steel	8058459	SAMH-FH-F
H-rail mounting SAMH-FH-H				
	Type of mounting	Information on materials	Part no.	Type
	On H-rail via accessories	PA, POM	8058460	SAMH-FH-H
Wall mounting SAMH-FH-W				
	Type of mounting	Information on materials	Part no.	Type
	Via through-hole and screw	High-alloy stainless steel	8036910	SAMH-FH-W
Protective hood SACC-FH-G-S3				
	Type of mounting	Information on materials	Part no.	Type
	Snapping in	PA	8069031	SACC-FH-G-S3
Connecting cables, socket, rectangular design L1				
	Electrical connection 1, number of connections/cores	Cable length	Part no.	Type
	4	2.5 m	572576	NEBS-L1G4-K-2.5-LE4
Connecting cables M8x1, straight socket				
	Electrical connection 1, number of connections/cores	Cable length	Part no.	Type
	4	2.5 m	8078227	NEBA-M8G4-U-2.5-N-LE4

Accessories

Connecting cables, M8x1, angled socket

	Electrical connection 1, number of connections/cores	Cable length	Part no.	Type
	4	2.5 m	8078233	NEBA-M8W4-U-2.5-N-LE4

Push-in fittings, straight connection

	Pneumatic connection, port 1	Pneumatic connection, port 2	Part no.	Type
	Male thread G1/8	For tubing outside diameter of 4 mm	186095	QS-G1/8-4
		For tubing outside diameter of 6 mm	186096	QS-G1/8-6
		For tubing outside diameter of 8 mm	186098	QS-G1/8-8
	Male thread G1/4	For tubing outside diameter of 6 mm	186097	QS-G1/4-6
		For tubing outside diameter of 8 mm	186099	QS-G1/4-8
		For tubing outside diameter of 10 mm	186101	QS-G1/4-10

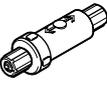
Push-in fittings, 90° connection

	Pneumatic connection, port 1	Pneumatic connection, port 2	Part no.	Type
	Male thread G1/8	For tubing outside diameter of 4 mm	186116	QSL-G1/8-4
		For tubing outside diameter of 6 mm	186117	QSL-G1/8-6
		For tubing outside diameter of 8 mm	186119	QSL-G1/8-8
	Male thread G1/4	For tubing outside diameter of 6 mm	186118	QSL-G1/4-6
		For tubing outside diameter of 8 mm	186120	QSL-G1/4-8
		For tubing outside diameter of 10 mm	186122	QSL-G1/4-10

One-way flow control valve GRO-QS-...

	Pneumatic connection, port 1	Pneumatic connection, port 2	Part no.	Type
	QS-3	QS-3	193971	GRO-QS-3
	QS-4	QS-4	193972	GRO-QS-4
	QS-6	QS-6	193973	GRO-QS-6

Vacuum filter

	Nominal size	Pneumatic connection	Part no.	Type
	2 mm	PK-3 with union nut	535883	VAF-PK-3
	3 mm	PK-4 with union nut	15889	VAF-PK-4
	4.6 mm	PK-6 with union nut	160239	VAF-PK-6