

# Flow sensor SFAB

FESTO



## Characteristics

### At a glance



### IO-Link

- 5 measuring ranges:
- 0.1 ... 10 l/min
- 0.5 ... 50 l/min
- 2 ... 200 l/min
- 6 ... 600 l/min
- 10 ... 1000 l/min

#### Electrical outputs:

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

#### Intuitive operation:

- Intuitive menu navigation
- New: clear 2-line display

#### Select the medium:

- Compressed air
- New: nitrogen, argon, carbon dioxide
- Display can be rotated 270°

## Characteristics

### Series

The accurate flow sensor SFAB is suitable for monitoring compressed air, nitrogen, argon and carbon dioxide. The design in combination with IP65 protection class and the rotatable display mean the sensor can be used in many industries. The measuring method is based on the thermal heat-loss method. The bypass construction reduces the susceptibility to particles and humidity. The flow value is transmitted to the connected controller as a switching signal, analogue signal or via IO-Link®.

Application area:

- Process monitoring
- Compressed air consumption monitoring
- Leakage detection of machines
- Leak test
- Pneumatic object monitoring using air
- New: forming gas monitoring

Functions:

- cumulative air volume measurement
- Monitoring and setting a flow threshold, a flow rate range
- Adjustable low-pass filter for smoothing the flow signal
- Min./max. value memory
- Output of mass and volumetric flow rate in the most used flow units
- New: all settings that have been carried out on one sensor (master) can be transferred (replicated) to other identical sensors (device)
- New: offset adjustment is possible
- New: scaling the analogue output to increase the signal dynamics
- New: output of the internal temperature value

New: IO-Link®

- Serial communication integrated using IO-Link® 1.1
- According to smart sensor profile 2nd edition
- Cyclic transmission of the flow value and the temperature and two switching statuses each
- The sensor can be parameterised remotely using an IO-Link® master
- Sensor is easy to change with automatic parameterisation
- Sensor identification, diagnostics and teach-in possible via IO-Link®

### Electrical output 1

[2SA]

2x PNP or NPN, 1 analogue output 4 ... 20 mA



- Switching output or volume pulse at pin 4
- Switching output at pin 2
- Current output at pin 5
- Compressed air
- Response time 15 ms with filter OFF
- Volume measurement
- UL certification
- Can be ordered with ATEX certification

[2SV]

2x PNP or NPN, 1 analogue output 0 ... 10 V



- Switching output or volume pulse at pin 4
- Switching output at pin 2
- Voltage output at pin 5
- Compressed air
- Response time 15 ms with filter OFF
- Volume measurement
- UL certification
- Can be ordered with ATEX certification

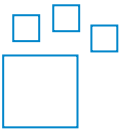
## Characteristics

[PNLK] PNP/NPN/IO-Link



- IO-Link® interface or switching output or volume pulse adjustable at pin 4
- Switching output or current output or voltage output adjustable at pin 2
- Compressed air and other gases can be adjusted
- Response time 10 ms with filter OFF
- Volume and mass unit can be adjusted
- Volume measurement
- Temperature sensing
- Replicating parameters via IO-Link® interface
- UL certification in progress
- IEC-EX certification in preparation
- Analogue output can be scaled
- Zero point adjustment possible for vertical mounting position

### Ordering data - modular system



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

## Type code

<b>001</b>	Series	
<b>SFAB</b>	Flow sensor	
<b>002</b>	Flow measuring range	
<b>10</b>	Max. 10 l/min	
<b>50</b>	Max. 50 l/min	
<b>200</b>	Max. 200 l/min	
<b>600</b>	Max. 600 l/min	
<b>1000</b>	Max. 1000 l/min	
<b>003</b>	Flow rate input	
<b>U</b>	Unidirectional	
<b>004</b>	Type of mounting	
<b>H</b>	H-rail mounting	
<b>W</b>	Wall mounting	
<b>005</b>	Pneumatic connection	
<b>Q6</b>	Push-in connector 6 mm	
<b>Q8</b>	Push-in connector 8 mm	
<b>Q10</b>	Push-in connector 10 mm	
<b>Q12</b>	Push-in connector 12 mm	
<b>T38</b>	Push-in connector 3/8"	
<b>T14</b>	Push-in connector 1/4"	
<b>T516</b>	Push-in connector 5/16"	
<b>006</b>	Electrical output 1	
<b>2SA</b>	2x PNP or NPN, 1 analogue output 4 ... 20 mA	
<b>2SV</b>	2x PNP or NPN, 1 analogue output 0 ... 10 V	
<b>PNLK</b>	PNP/NPN/IO-Link	

<b>007</b>	Electrical output 2	
	None	
<b>PNVBA</b>	PNP or NPN or 0 ... 10 V or 1 ... 5 V or 4 ... 20 mA	
<b>008</b>	Electrical connection	
<b>M12</b>	Plug M12, A-coded	
<b>009</b>	Connecting cable, straight socket	
	None	
<b>2.5S</b>	2.5 m	
<b>5S</b>	5 m	
<b>010</b>	Connecting cable, angled plug socket	
<b>2.5A</b>	2.5 m	
<b>5A</b>	5 m	
	None	
<b>011</b>	EU certification	
	None	
<b>EX2</b>	II 3GD	
<b>012</b>	Electrical accessories	
	None	
<b>2.5A</b>	Angled socket, cable 2.5 m	
<b>2.5S</b>	Straight socket, cable 2.5 m	
<b>5A</b>	Angled socket, cable 5 m	
<b>5S</b>	Straight socket, cable 5 m	
<b>013</b>	Electrical accessories	
<b>014</b>	Certificate	
	None	
<b>T</b>	Test report	

## Datasheet

## General technical data - 2SA/2SV

Approval	RCM trademark, c UL us - Recognized (OL)
CE marking (see declaration of conformity) <sup>1)</sup>	To UK instructions for EMC, To UK RoHS instructions
Certificate issuing authority	UL E322346
CE mark (see declaration of conformity) <sup>2)</sup>	To EU EMC Directive, To EU Explosion Protection Directive (ATEX), In accordance with EU RoHS Directive
Note on materials	RoHS-compliant
LABS (PWIS) conformity	VDMA24364-B1/B2-L

1) For information about the area of use, see the declaration of conformity at: [www.festo.com/catalogue/sfab](http://www.festo.com/catalogue/sfab) → Support/Downloads.

If the devices are subject to usage restrictions in residential, commercial or light-industrial environments, further measures for the reduction of emitted interference may be necessary.

2) For information about the area of use, see the declaration of conformity at: [www.festo.com/catalogue/sfab](http://www.festo.com/catalogue/sfab) → Support/Downloads.

If the devices are subject to usage restrictions in residential, commercial or light-industrial environments, further measures for the reduction of emitted interference may be necessary.

## General technical data – PNLK-PNVBA

Approval	RCM trademark
CE marking (see declaration of conformity) <sup>1)</sup>	To UK instructions for EMC, To UK RoHS instructions
CE mark (see declaration of conformity) <sup>2)</sup>	To EU EMC Directive, In accordance with EU RoHS Directive
Note on materials	RoHS-compliant
LABS (PWIS) conformity	VDMA24364-B1/B2-L

1) For information about the area of use, see the EC declaration of conformity at: [www.festo.com/catalogue/sfab](http://www.festo.com/catalogue/sfab) → Support/Downloads.

If the devices are subject to usage restrictions in residential, commercial or light-industrial environments, further measures for the reduction of the emitted interference may be required.

2) For information about the area of use, see the EC declaration of conformity at: [www.festo.com/catalogue/sfab](http://www.festo.com/catalogue/sfab) → Support/Downloads.

If the devices are subject to usage restrictions in residential, commercial or light-industrial environments, further measures for the reduction of the emitted interference may be required.

## Input signal – measuring element – 2SA/2SV

End value for flow rate measuring range	1,000 l/min
Start value for flow rate measuring range	10 l/min
Measured variable	Volume, Volumetric flow rate
Flow direction	Unidirectional, P1 -> P2
Measuring principle	Thermal
Operating pressure	0 ... 10 bar
Operating pressure	0 ... 1 MPa
Operating medium	Compressed air to ISO 8573-1:2010 [7:4:4], Nitrogen
Media temperature	0 ... 50°C
Ambient temperature	0 ... 50°C
Nominal temperature	23°C

## Input signal – measuring element – PNLK-PNVBA

End value for flow rate measuring range	10 ... 1,000 l/min
Start value for flow rate measuring range	0.1 ... 10 l/min
Measured variable	Mass flow rate, Temperature, Volume, Volumetric flow rate
Flow direction	Unidirectional, P1 -> P2
Measuring principle	Thermal
Operating pressure	0 ... 10 bar
Operating pressure	0 ... 1 MPa
Operating medium	Argon, Compressed air to ISO 8573-1:2010 [6:4:4], Compressed air to ISO 8573-1:2010 [7:4:4], Carbon dioxide, Nitrogen
Media temperature	0 ... 50°C
Ambient temperature	0 ... 50°C
Nominal temperature	23°C

## Datasheet

**Electrical data – General output - 2SA/2SV**

Accuracy of flow rate <sup>1)</sup>	± (3% o.m.v. + 0.3% FS)
Repetition accuracy offset in ± %FS <sup>2)</sup>	0.2 %FS
Repetition accuracy span in ± %FS	0.8 %FS

1) The accuracy of the flow rate value applies under nominal conditions (compressed air, 6 bar, 23 °C and horizontal mounting position). See the operating instructions for additional information on accuracy.

2) % FS = % of the measuring range end value (full scale)

**Electrical data - General output - PNLK-PNVBA**

Accuracy of flow rate <sup>1)</sup>	± (3% o.m.v. + 0.3% FS)
Repetition accuracy offset in ± %FS <sup>2)</sup>	0.2 %FS
Repetition accuracy span in ± %FS	0.8 %FS
Accuracy temperature in ± °C	5°C

1) The accuracy of the flow rate value applies to nominal conditions (compressed air, 6 bar, 23 °C and horizontal mounting position). For further information on accuracy, see the operating instructions.

2) % FS = % of the measuring range end value (full scale)

**Electrical data – Switching output - 2SA/2SV**

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

**Electrical data – Switching output – PNLK-PNVBA**

Switching output	2 x PNP or 2 x NPN, switchable
Switching function	Window comparator, Threshold value comparator
Switching element function	N/C or N/O contact, switchable
Switch-on time	10 ms
Switch-off time	10 ms
Max. output current	100 mA

**Electrical data – Analogue output – 2SA/2SV**

Analogue output	4 - 20 mA
Flow characteristic curve start value	0 l/min
Flow characteristic curve end value	1,000 l/min
Output characteristic curve start value	–
Output characteristic curve end value	–
Output characteristic curve starting value	4 mA
Output characteristic curve end value	20 mA
Max. load resistance current output	500 Ohm
Min. load resistance voltage output	–

## Datasheet

### Electrical data – Analogue output – PNLK-PNVBA

Analogue output	0 - 10 V, 4 - 20 mA, 1 - 5 V
Flow characteristic curve start value	0 l/min
Flow characteristic curve end value	10 l/min, 50 l/min, 200 l/min, 600 l/min, 1,000 l/min
Output characteristic curve start value	0 V
Output characteristic curve end value	10 V
Output characteristic curve starting value	4 mA
Output characteristic curve end value	20 mA
Max. load resistance current output	500 Ohm
Min. load resistance voltage output	20 kOhm

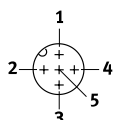
### Electrical data – Output, additional data

Short circuit current rating	yes
Overload protection	Available

### Electrical data – Electronics

Operational voltage range DC	15 ... 30 V
Reverse polarity protection	For all electrical connections

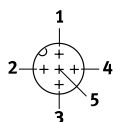
### Electrical data – Electromechanics – 2SA/2SV



- 1 = Operating voltage + 24 V DC
- 2 = Binary output B
- 3 = 0 V
- 4 = Binary output A
- 5 = Analogue output

Electrical connection 1, connection type	Plugs
Electrical connection 1, connector system	M12x1, A-coded to EN 61076-2-101
Electrical connection 1, number of connections/cores	5

### Electrical data - Electromechanics - PNLK/PNVBA



- 1 = Operating voltage + 24 V DC
- 2 = Binary output B / analogue output
- 3 = 0 V
- 4 = Binary output A / IO-Link®
- 5 = Not used

Electrical connection 1, connection type	Plugs
Electrical connection 1, connector system	M12x1, A-coded to EN 61076-2-101
Electrical connection 1, number of connections/cores	5



## Datasheet

### Mechanics

Mounting position	optional
Pneumatic connection	For tubing O.D. 6 mm, For tubing O.D. 8 mm, For tubing outside diameter of 10 mm, For tubing O.D. 12 mm, For tubing outside Ø 1/4", For tubing outside Ø 5/16", For tubing outside Ø 3/8"
Product weight	160 g
Material housing	PA-reinforced

### Display - operation - 2SA/2SV

Display type	Illuminated LCD, multi-colour
Displayable units	l, l/min, m <sup>3</sup> , scf, scfm
Setting options	Teach-in, Via display and keys
Protection against tampering	PIN code

### Display – Operation – PNLK-PNVBA

Display type	Illuminated LCD, multi-colour
Displayable units	g, g/min, l, l/min, m <sup>3</sup> , m <sup>3</sup> /h, scf, scfm
Setting options	IO-Link®, Teach-in, Via display and keys
Protection against tampering	IO-Link, PIN code

### Immission – emission

Degree of protection	IP65
Pressure drop	<100 mbar
Protection class	III
Corrosion resistance class CRC <sup>1)</sup>	2 - Moderate corrosion stress

1) More information [www.festo.com/x/topic/kbk](http://www.festo.com/x/topic/kbk)

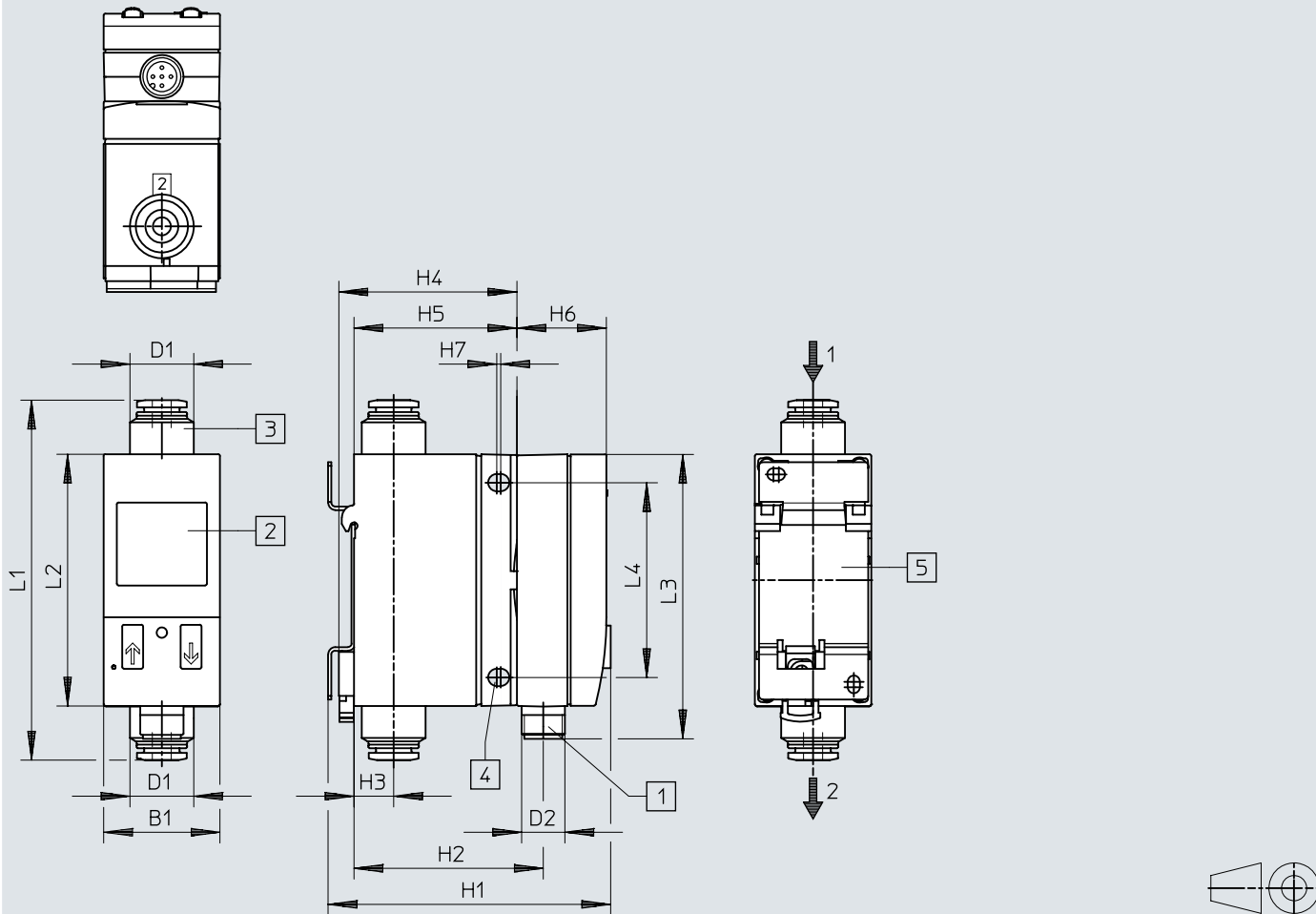
### IO-LINK®

IO-Link, revision ID	V1.1
IO-Link, device profile	Function Extended identification, Function Measurement data, standard resolution, Function Multiple switching signal, Firmware update, Function locator, Function Product URI, Function Teach single value, Identification and diagnostics, Smart sensor - SSP 4.1.2
IO-Link, transmission rate	COM3
IO-Link, SIO-Mode support	Yes
IO-Link, port type	Class A
IO-Link, process data length output	0 bit
IO-Link, process data length input	64 bit
IO-Link, Process data content IN	Flow rate measured value 16-bit MDC, Flow rate monitoring 2-bit SSC, Temperature measured value 16 bit MDC, Temperature monitoring 2-bit SSC, Volume / mass pulse 1 bit SSC
IO-Link, Service data IN	Volume/mass measured value 32 bit
IO-Link, minimum cycle time	1.2 ms
IO-Link, Data storage required	0.5 KB

## Dimensions

Dimensions – SFAB-...-2SA/2SV-...

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



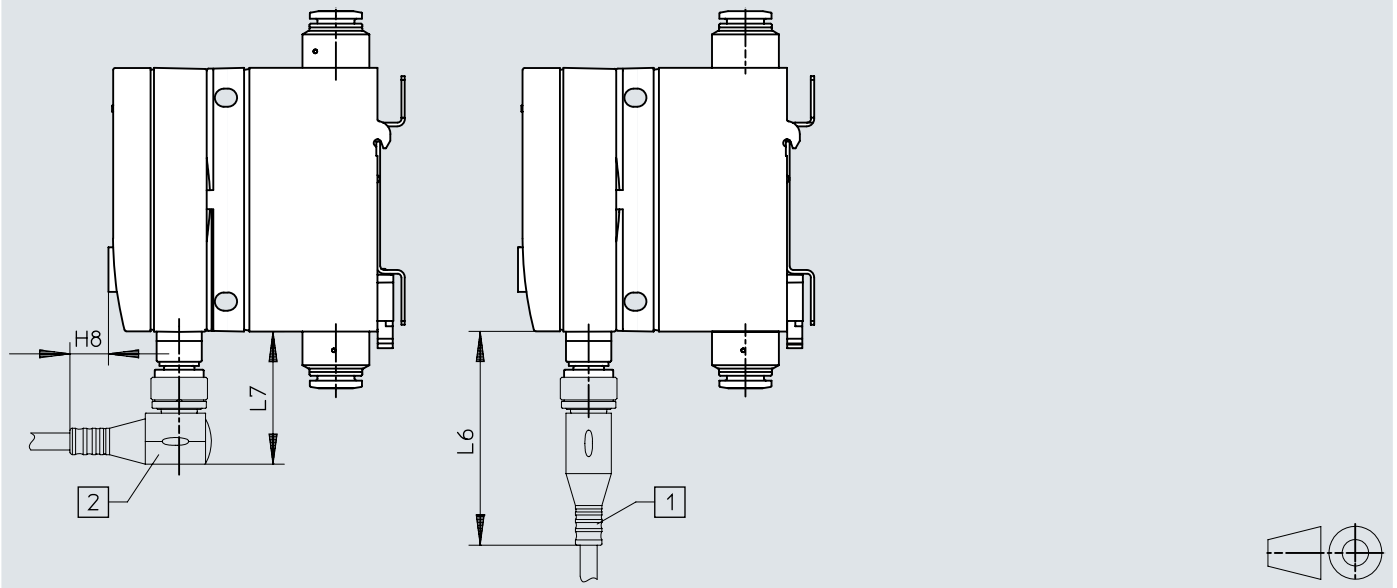
- [1] 5-pin plug M12x1
- [2] LCD display
- [3] Pneumatic connection
- [4] Drilled hole for retaining screw M4
- [5] Adapter plate for wall mounting

	B1	D1	D2	H1	H2	H3	H4	H5	H6	H7	L1	L2	L3	L4
SFAB-...-HQ6	32,3	17,7	M12x1	-	51,6	11	48,5	44,3	24,4	1,1	95,6	69,8	78,9	54
SFAB-...-HQ8		99,8												
SFAB-...-HQ10		119,8												
SFAB-...-HQ12		124,4												
SFAB-...-WQ6	32,3	17,7	M12x1	79	51,6	11	48,5	44,3	24,4	1,1	95,6	69,8	78,9	54
SFAB-...-WQ8		99,8												
SFAB-...-WQ10		119,8												

## Dimensions

Dimensions – SFAB-...-2SA/2SV-...

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



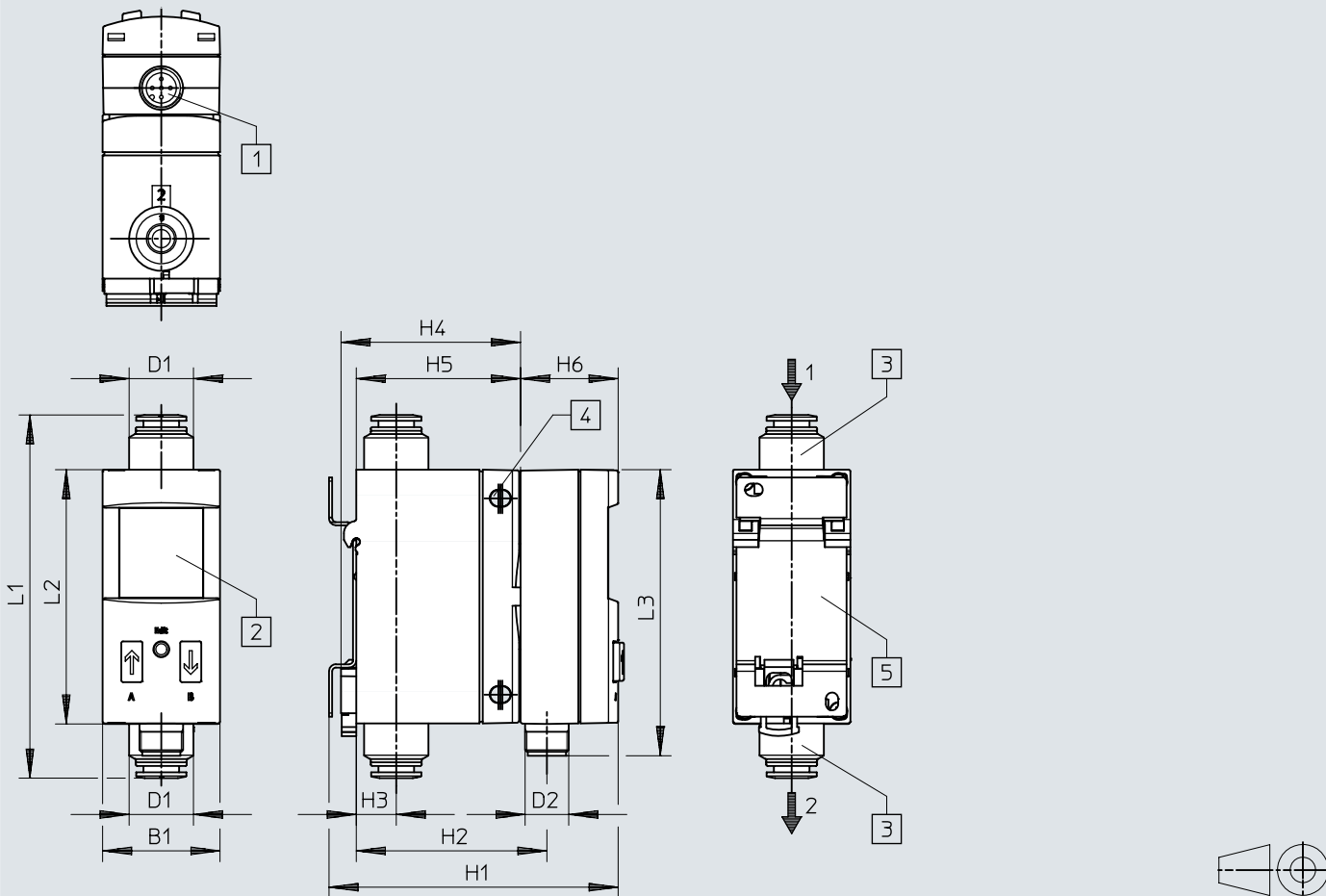
- [1] Connecting cable, straight socket
- [2] Connecting cable, angled plug socket

	H8	L6	L7
SFAB-...-HQ6			
SFAB-...-HQ8	12	56	35
SFAB-...-HQ10			
SFAB-...-HQ12			
SFAB-...-WQ6			
SFAB-...-WQ8	12	56	35
SFAB-...-WQ10			

## Dimensions

Dimensions – SFAB-...-PNLK-...

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



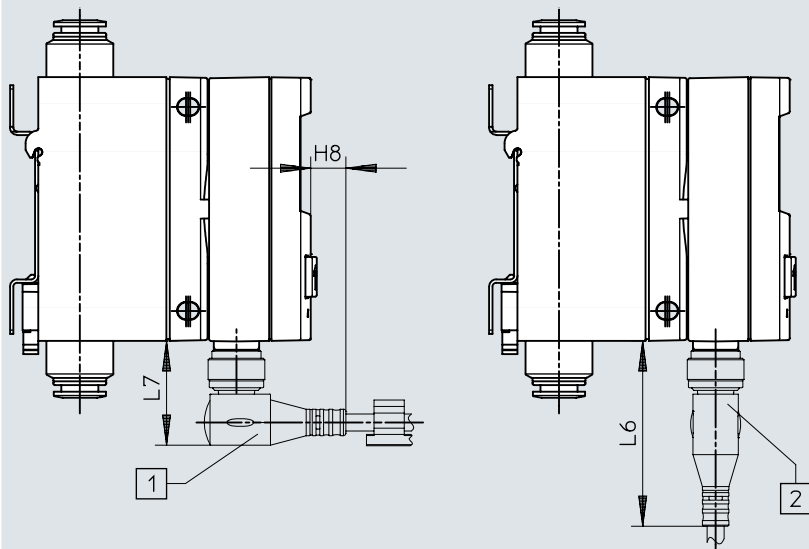
- [1] 5-pin plug M12x1
- [2] LCD display
- [3] Pneumatic connection
- [4] Drilled hole for retaining screw M4
- [5] Adapter plate for wall mounting

	B1	D1 ∅	D2	H1	H2	H3	H4	H5	H6	L1	L2	L3
SFAB-...-Q6-PNLK-PNVBA	32,3	17,7	M12x1	79,6	52,5	11	49,4	45,2	26,9	99,1	69,9	78,7
SFAB-...-Q8-PNLK-PNVBA										99,9		
SFAB-...-Q10-PNLK-PNVBA		22								123,9		
SFAB-...-Q12-PNLK-PNVBA										124,1		

## Dimensions

Dimensions – SFAB-...-PNLK-...

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



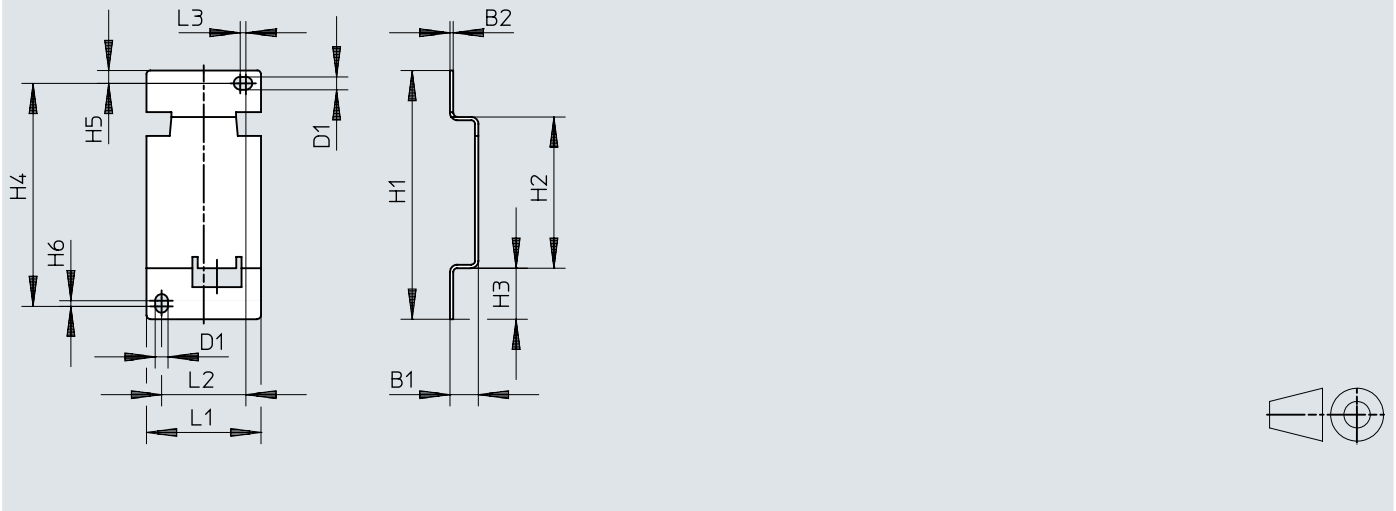
- [1] Angled connection socket M12x1, 5-pole
- [2] Connection socket straight M12x1, 5-pole

	H8	L6	L7
SFAB-...-Q6-PNLK-PNVBA	~9	~49	~28
SFAB-...-Q8-PNLK-PNVBA			
SFAB-...-Q10-PNLK-PNVBA			
SFAB-...-Q12-PNLK-PNVBA			

## Dimensions

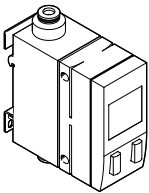
Dimensions – Adapter plate SDE1-...-W ...

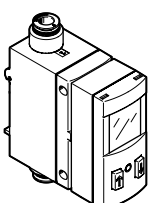
Download CAD data → [www.festo.com](http://www.festo.com)

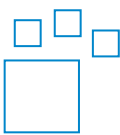


	B1	B2	D1 ∅	H1	H2	H3	H4	H5	H6	L1	L2	L3
	-0,4			±0,1								
SDE-1-...-W..	7,5	0,9	3,4	65,8	40	13,5	59	3,4	1,5	30,3	22,3	1,5

## Ordering data

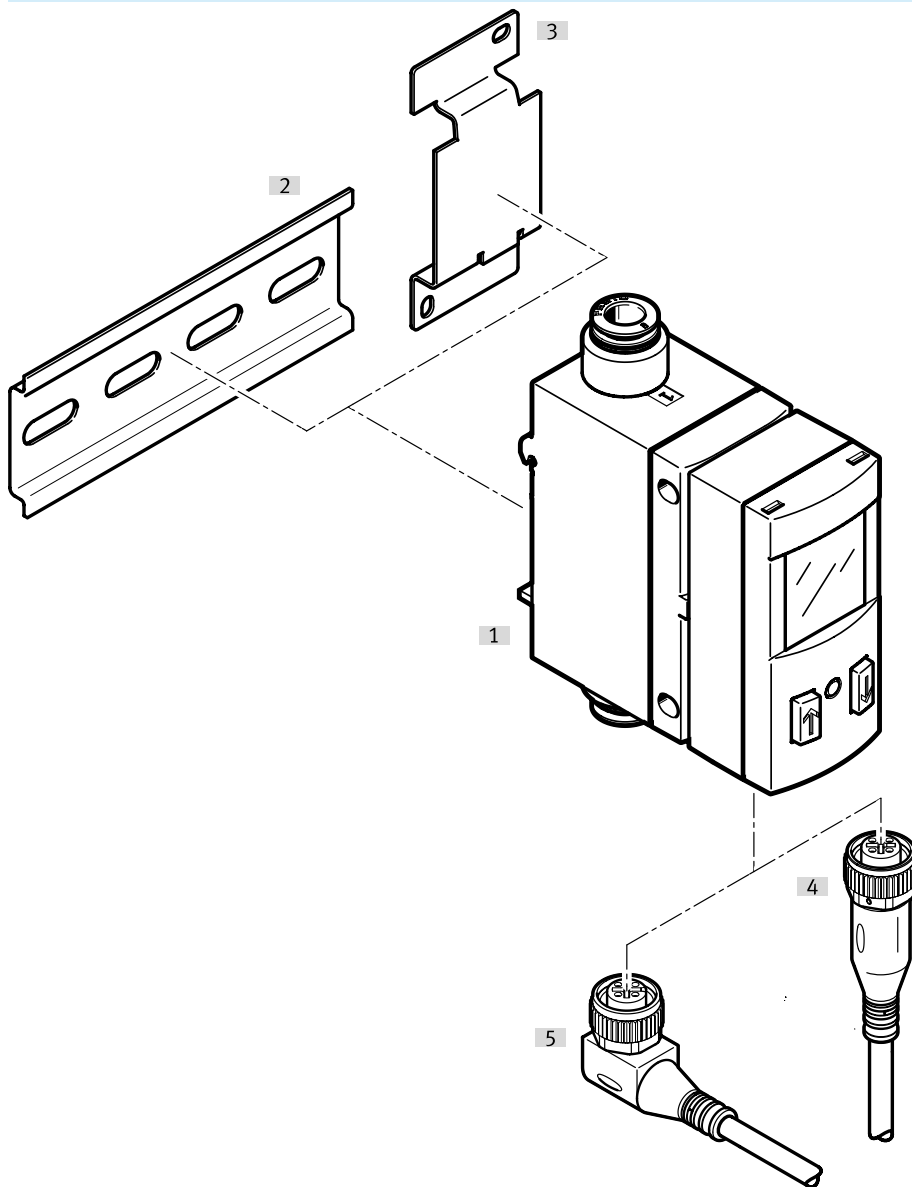
Ordering data					
	Analogue output	Start value for flow rate measuring range	End value for flow rate measuring range	Part no.	Type
	4 - 20 mA	10 l/min	1,000 l/min	565409	SFAB-1000U-HQ12-2SA-M12-EX2

Ordering data – PNLK-PNVBA						
	Analogue output	Start value for flow rate measuring range	End value for flow rate measuring range	Part no.	Type	
	0 - 10 V, 4 - 20 mA, 1 - 5 V	0.1 l/min	10 l/min	8162825	SFAB-10U-WQ6-PNLK-PNVBA-M12	
				8162824	SFAB-10U-HQ6-PNLK-PNVBA-M12	
		0.5 l/min	50 l/min	8162826	SFAB-50U-HQ6-PNLK-PNVBA-M12	
				8162827	SFAB-50U-WQ6-PNLK-PNVBA-M12	
		2 l/min	200 l/min		8162830	SFAB-200U-HQ10-PNLK-PNVBA-M12
					8162831	SFAB-200U-WQ10-PNLK-PNVBA-M12
					8162828	SFAB-200U-HQ8-PNLK-PNVBA-M12
					8162829	SFAB-200U-WQ8-PNLK-PNVBA-M12
		6 l/min	600 l/min		8162833	SFAB-600U-WQ10-PNLK-PNVBA-M12
					8162832	SFAB-600U-HQ10-PNLK-PNVBA-M12
	8162835			SFAB-1000U-WQ10-PNLK-PNVBA-M12		
10 l/min	1,000 l/min	8162834	SFAB-1000U-HQ10-PNLK-PNVBA-M12			

Ordering data – Modular product system					
	Flow measuring range	Pneumatic connection	Electrical output 1	Part no.	Type
	Max. 10 l/min, Max. 50 l/min, Max. 200 l/min, Max. 600 l/min, Max. 1000 l/min	For tubing O.D. 6 mm, For tubing O.D. 8 mm, For tubing outside diameter of 10 mm, For tubing O.D. 12 mm, For tubing outside Ø 1/4", For tubing outside Ø 5/16", For tubing outside Ø 3/8"	2x PNP or NPN, 1 analogue output 4 ... 20 mA, 2x PNP or NPN, 1 analogue output 0 ... 10 V, PNP/NPN/IO-Link	563795	SFAB-

## Peripherals

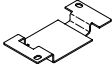
### Peripherals overview

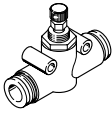



Accessories			→ Link
Type/order code	Description		
[1] Flow sensor SFAB	-		sfab
[2] DIN mounting rail NRH	To DIN EN 60715		nrh
[3] Adapter plate SDE1-...-W...	Included in the scope of delivery with SFAB-...-W...		17
[4] Connecting cable	Straight socket		17
[5] Connecting cable	Angled socket		17



## Accessories

Adapter plate SDE1-...-W...				
	Type of mounting	Part no.	Type	
	With through-hole	194297	SDE1-...-W..	

One-way flow control valve				
	Pneumatic connection, port 1	Operating pressure	Part no.	Type
	QS-4	0.2 ... 10 bar	193967	GR-QS-4
	QS-6		193969	GR-QS-6
	QS-8		193970	GR-QS-8

Connecting cable NEBA-M12, straight socket					
	Cable structure	Cable length	Product weight	Part no.	Type
	5 x 0.25 mm <sup>2</sup>	2.5 m	76 g	8078251	NEBA-M12W5-U-2.5-N-LE5
			85 g	8078242	NEBA-M12G5-U-2.5-N-LE5
		5 m	142 g	8078243	NEBA-M12G5-U-5-N-LE5
			143 g	8078252	NEBA-M12W5-U-5-N-LE5