

Pressure sensor SPAF

FESTO



Characteristics

At a glance

The pressure sensor SPAF is designed for automating applications with compressed air and non-corrosive gases in a wide range of situations. These range from network and controller monitoring to vacuum gripping and force control in clamping or pressing applications. Thanks to the protection class IP65, installation in difficult industrial environments is not a problem either. The piezoresistive measuring cell measures the pressure with a high accuracy of 1.5% of the measuring range. The fluid connection is via a QS4 or QS6 plug-in connection or via a G1/8 male thread, enabling the sensor to be aligned at a later stage using a TORX® screwdriver. The sensor can essentially be categorised into two variants. For simple pressure monitoring, a version with an LED switching display and a signal output is available; this can be assigned either via IO-Link® or a digital switching output. The LCD display variant, which is available with two signal outputs, provides a little more flexibility for process monitoring. The SPAF can be flexibly parameterised via IO-Link®, two digital switch outputs or one switching and one analogue output. This offers a solution for all requirements with just one product.

- Compact design with in-line pressure measurement
- Protection class IP65 for harsh industrial environments
- Switching cycle counter for predictive system maintenance
- Fast commissioning thanks to replicator function
- Adjustable switching and analogue outputs
- Fast one-button teach-in

Pressure measuring range

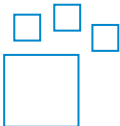
[B11]	-1 ... 10 bar	[P10]	0 ... 10 bar
[V1]	0 ... -1 bar		

Electrical output 1

[PNLK]	PNP/NPN/IO-Link
--------	-----------------

IO-Link® communication for smart remote parameterisation even in inaccessible places

Ordering data - modular system



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

Type code

001	Series	
SPAF	Pressure sensor SPAF	

002	Pressure measuring range	
B11	-1 ... 10 bar	
P10	0 ... 10 bar	
V1	0 ... -1 bar	

003	Pressure inlet	
R	Relative pressure	

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

005	Thread type	
	None	
M	Male	

006	Display	
L	LCD, backlit	
N	LED	

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

008	Electrical output 2	
	None	
VB	0 ... 10 V or 1 ... 5 V	

009	Electrical connection	
M8	Plug M8, A-coded	
M12	Plug M12, A-coded	

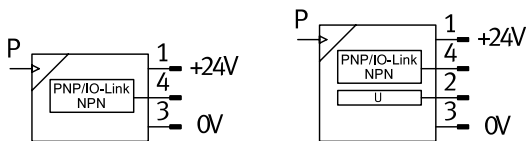
010	Mounting accessories	
	None	
MC	Mounting clip	

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	Certificate	
	None	
T	Test report	

Datasheet

General technical data



Short type code	SPAF-
Approval	RCM trademark
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
Note on materials	RoHS-compliant

Input signal, measuring element

Pressure measuring range	-1 ... 10 bar	0 ... 10 bar	0 ... -1 bar
Measured variable	Relative pressure		
Measurement method	Piezoresistive pressure sensor		
Start value for pressure measuring range	-0.1 MPa	0 MPa	
Start value for pressure measuring range	-1 bar	0 bar	
Start value for pressure measuring range	-14.5 psi	0 psi	
End value for pressure measuring range	1 MPa		-0.1 MPa
End value for pressure measuring range	10 bar		-1 bar
End value for pressure measuring range	145 psi		-14.5 psi
Overload pressure	1.5 MPa		0.5 MPa
Overload pressure	15 bar		5 bar
Overload pressure	217.5 psi		72.5 psi
Operating medium	Compressed air to ISO 8573-1:2010 [7:4:4], Inert gases		
Note on operating and pilot medium	Ester oil < 0.1mg/m ³ , according to ISO 8573-1:2010 [---:2], Lubricated operation possible		
Media temperature	0 ... 50°C		
Ambient temperature	0 ... 50°C		

Output, general

Pressure measuring range	-1 ... 10 bar	0 ... 10 bar	0 ... -1 bar
Accuracy in ± % FS	1.5 %FS		
Repetition accuracy in ± %FS	0.3 %FS		
Temperature coefficient in ± %FS/K	0.05 %FS/K		

Switching output

Switching output ¹⁾	PNP/NPN, switchable
Switching function	Window comparator, Threshold value comparator, Threshold value with variable hysteresis
Switching element function	N/C or N/O contact, switchable
Switch-on time	3 ms
Switch-off time	3 ms
Max. output current	100

1) Second PNP output can only be activated via IO-Link®.

Datasheet

Analogue output

Analogue output	0 - 10 V, 1 - 5 V
Output characteristic curve start value	0 V
Output characteristic curve end value	10 V
Accuracy analogue output in $\pm$ %FS	1.5 %FS
Linearity error in $\pm$ %FS	0.3
Rise time	6 ms
Min. load resistance voltage output	20 kOhm

Measured value display

Display range start value	0 %FS
Display range end value	100 %FS

Output, additional data

Short circuit current rating	yes
Overload protection	Available

IO-Link® device to IEC 61131-9

Protocol	IO-Link®
IO-Link, revision ID	V1.1
IO-Link, device profile	Firmware update, Function locator, Function Product URI, Function Quantity detection, Smart sensor - SSP 4.1.1
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	32 bit
IO-Link, Process data content IN	Pressure measured value 16 bit MDC, Pressure monitoring 2 bit SSC
IO-Link, Service data IN	Temperature 16 bit
IO-Link, minimum cycle time	0.9 ms
IO-Link, Data storage required	0.5 KB

Electronics

Operational voltage range DC ¹⁾	15 ... 30 V
Reverse polarity protection	For all electrical connections

1) For IO-Link® 18 - 30 V

Electromechanics

Electrical connection 1, connection type	Plugs
Electrical connection 1, connector system	M8x1, A-coded, to EN 61076-2-104
Electrical connection 1, number of connections/cores	3, 4
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
Material connector housing	Nickel-plated brass

Datasheet

Electromechanics

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	4
Electrical connection 1, type of mounting	Screw-type lock, Not rotatable
Electrical connection 1, compatible type of mounting	Compatible with rotatable screw-type lock
Material connector housing	Nickel-plated brass

Mechanical components

Pneumatic connection	Male thread G1/8	QS-4	QS-6
Type of mounting	Either:, Via male thread, With accessories	With accessories	
Mounting position	optional		
Product weight	45 g	30 g	
Material housing	PA-reinforced		
Material in contact with the medium	Stainless steel, NBR, PA-reinforced		

Display, operation

Display type	Illuminated LCD blue	LED indicator
Displayable units	MPa, bar, kPa, psi	–
Ready status indication	Through backlighting	Green LED
Switching status indication	–	Yellow LED
Setting options	IO-Link®, Teach-in, Via display and keys	IO-Link®, Teach-in
Protection against tampering	IO-Link, PIN code	IO-Link
Setting range threshold value	0 ... 100%	
Setting range hysteresis	0 ... 90%	

Immission, emission

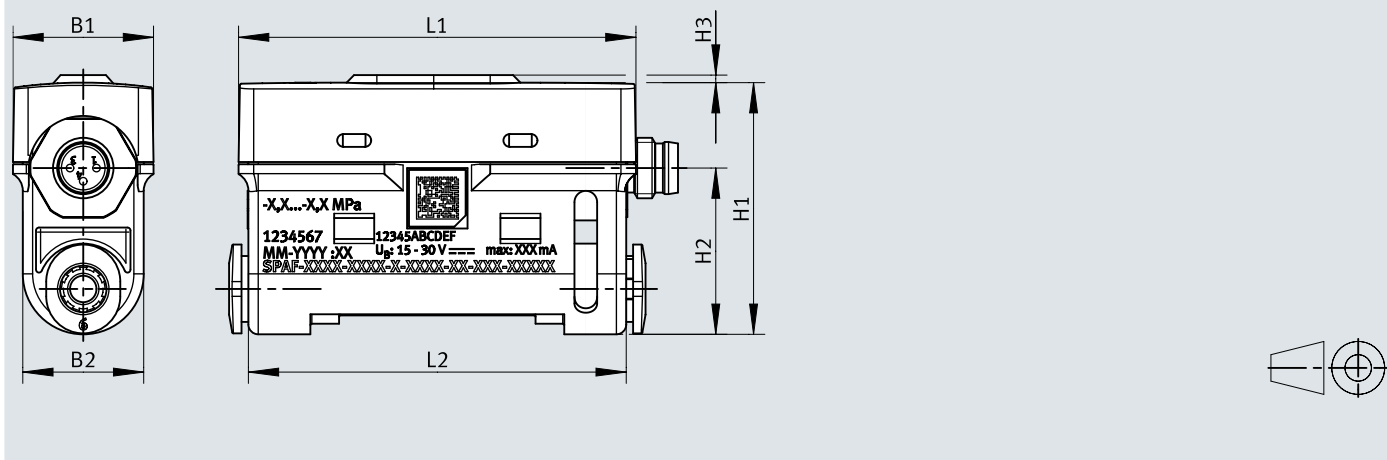
Degree of protection	IP65
Corrosion resistance class CRC ¹⁾	2 - Moderate corrosion stress
LABS (PWS) conformity	VDMA24364-B1/B2-L
Suitability for the production of Li-ion batteries	Metals with more than 1% by mass of copper are excluded from use. Exceptions are printed circuit boards, cables, electrical plug connectors and coils
Cleanroom class	Class 4 according to ISO 14644-1

1) More information www.festo.com/x/topic/kbk

Dimensions

Dimensions – SPAF-...

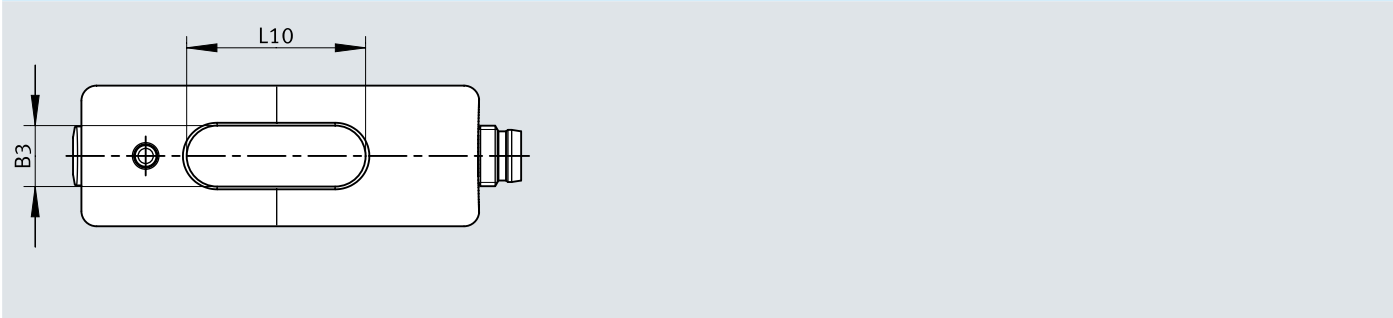
Download CAD data www.festo.com



	B1	B2	H1	H2	H3	L1	L2
SPAF-...	18,6	16	52,6	50	1	52,6	50

Dimensions

Dimensions – SPAF-...-L-... [Download CAD data](#) www.festo.com

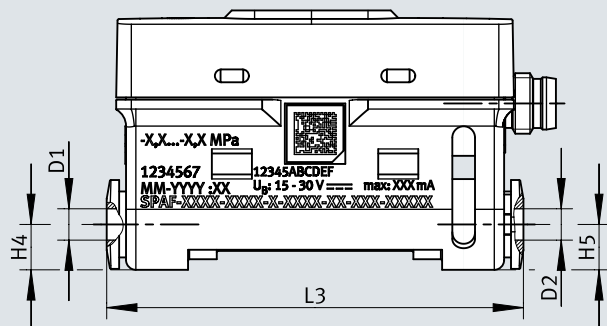


	B3	L10
SPAF-...-L-...	8	24

Dimensions

Dimensions – SPAF-...-Q-...-...

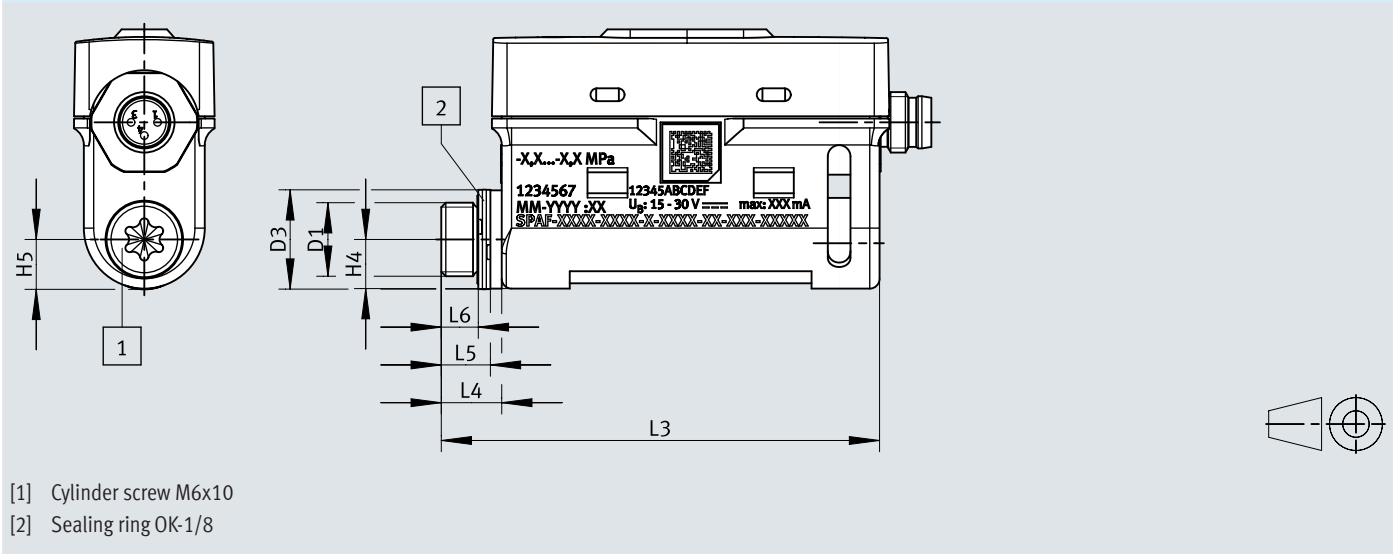
Download CAD data www.festo.com



	D1	D2	H4	H5	L3
SPAF-...-Q4-...	4	4	6	6	54,4
SPAF-...-Q6-...	6	6			

Dimensions

Dimensions – SPAF-...-G18M-... Download CAD data www.festo.com

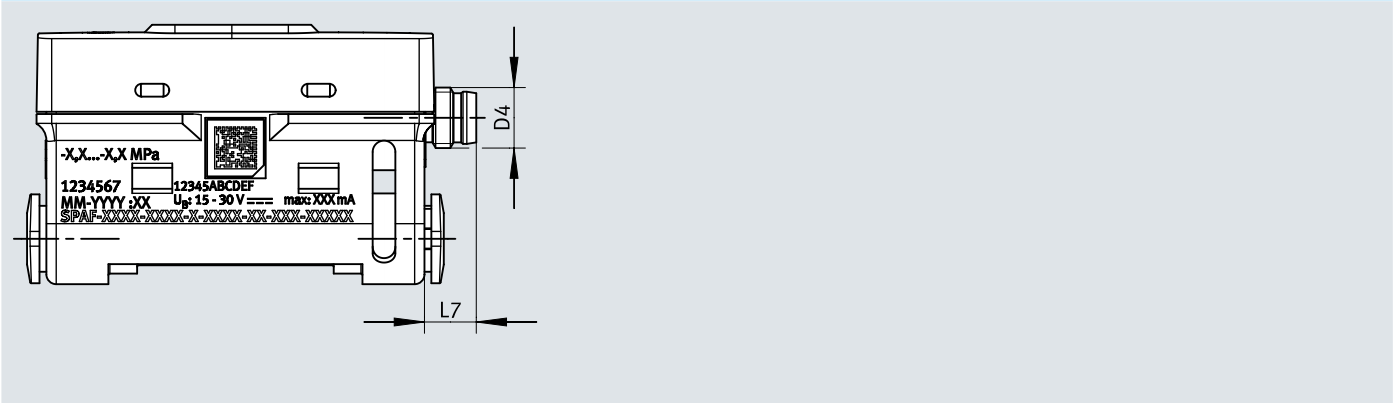


	D1	D3 Ø	H4	H5	L3	L4	L5	L6
SPAF-...-G18M-...	G1/8	13,2	6,5	6,5	58	8	6,5	4,9

Dimensions

Dimensions – SPAF-...-M8-...

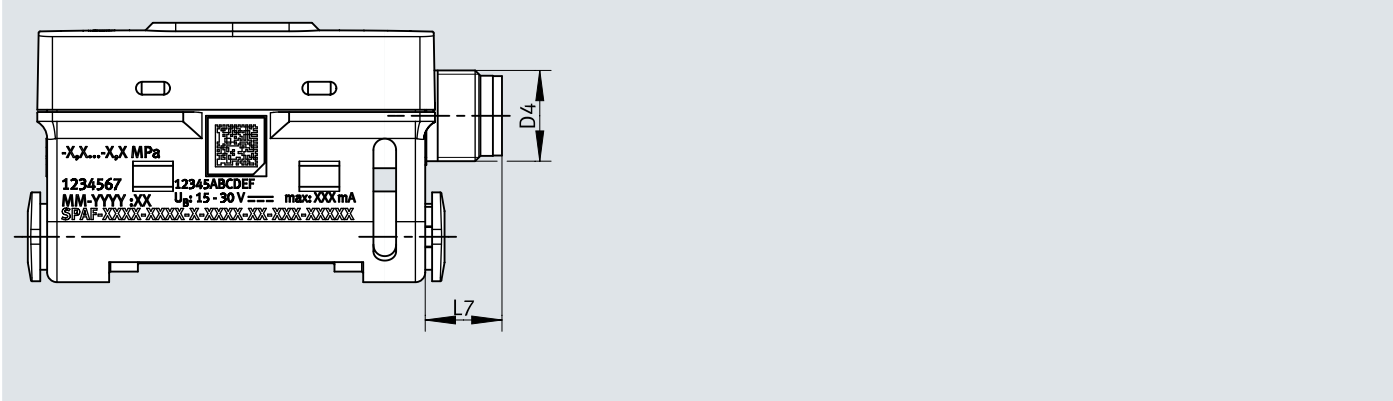
Download CAD data www.festo.com



	D4	L7
SPAF-...-M8-...	M8x1	6,9

Dimensions

Dimensions – SPAF-...-M12-... [Download CAD data](#) www.festo.com

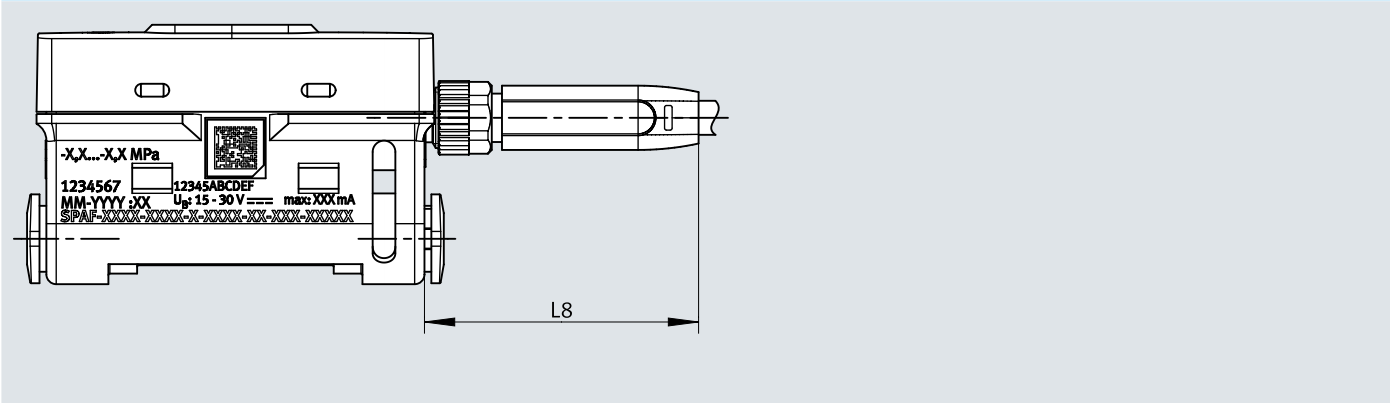


	D4	L7
SPAF-...-M12-...	M12x1	10,2

Dimensions

Dimensions – SPAF-...-M8-...S

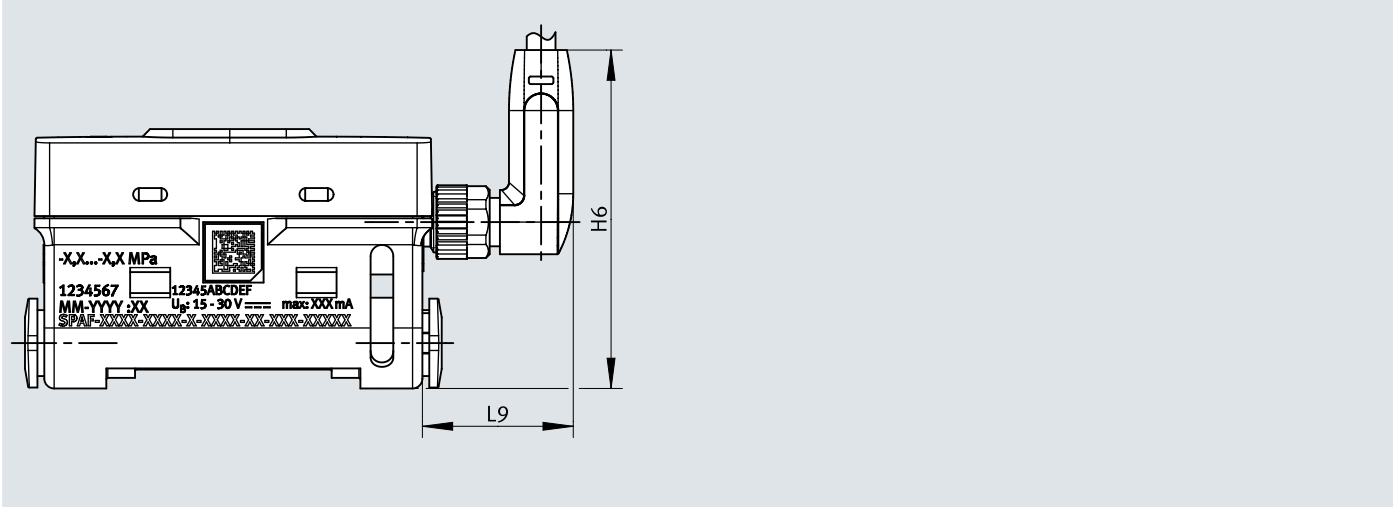
Download CAD data www.festo.com



	L8
SPAF-...-M8-...S	36

Dimensions

Dimensions – SPAF-...-M8-...A Download CAD data www.festo.com

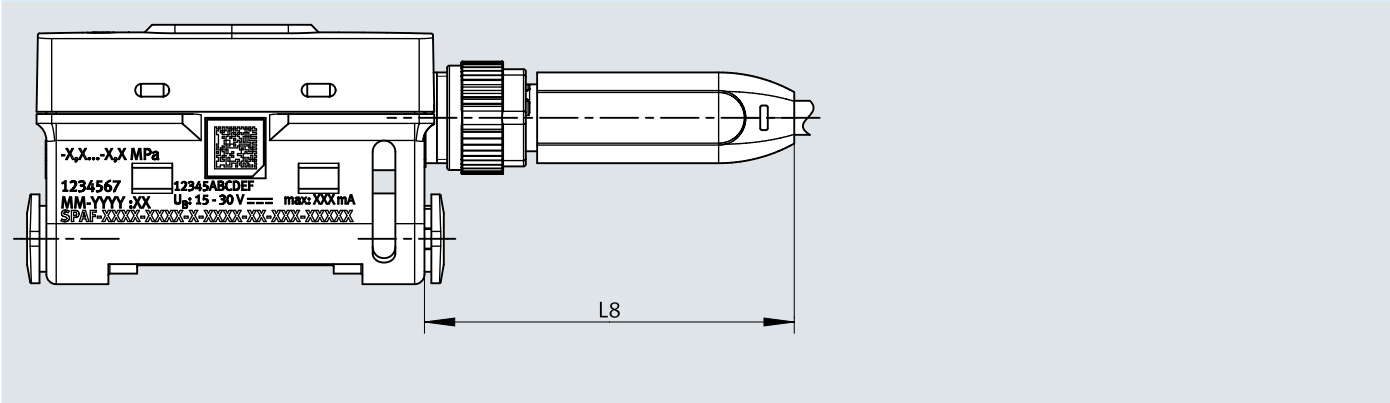


	H6	L9
SPAF-...-M8-...A	44,8	20

Dimensions

Dimensions – SPAF-...-M12-...S

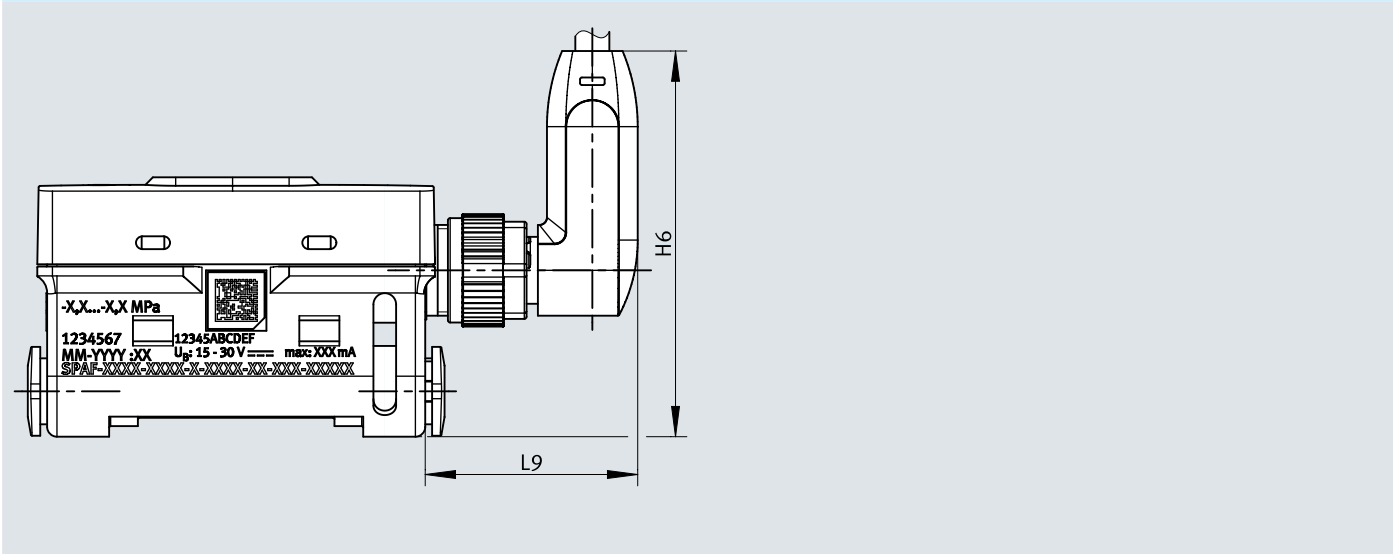
Download CAD data www.festo.com



	L8
SPAF-...-M12-...S	49

Dimensions

Dimensions – SPAF-...-M12-...A Download CAD data www.festo.com

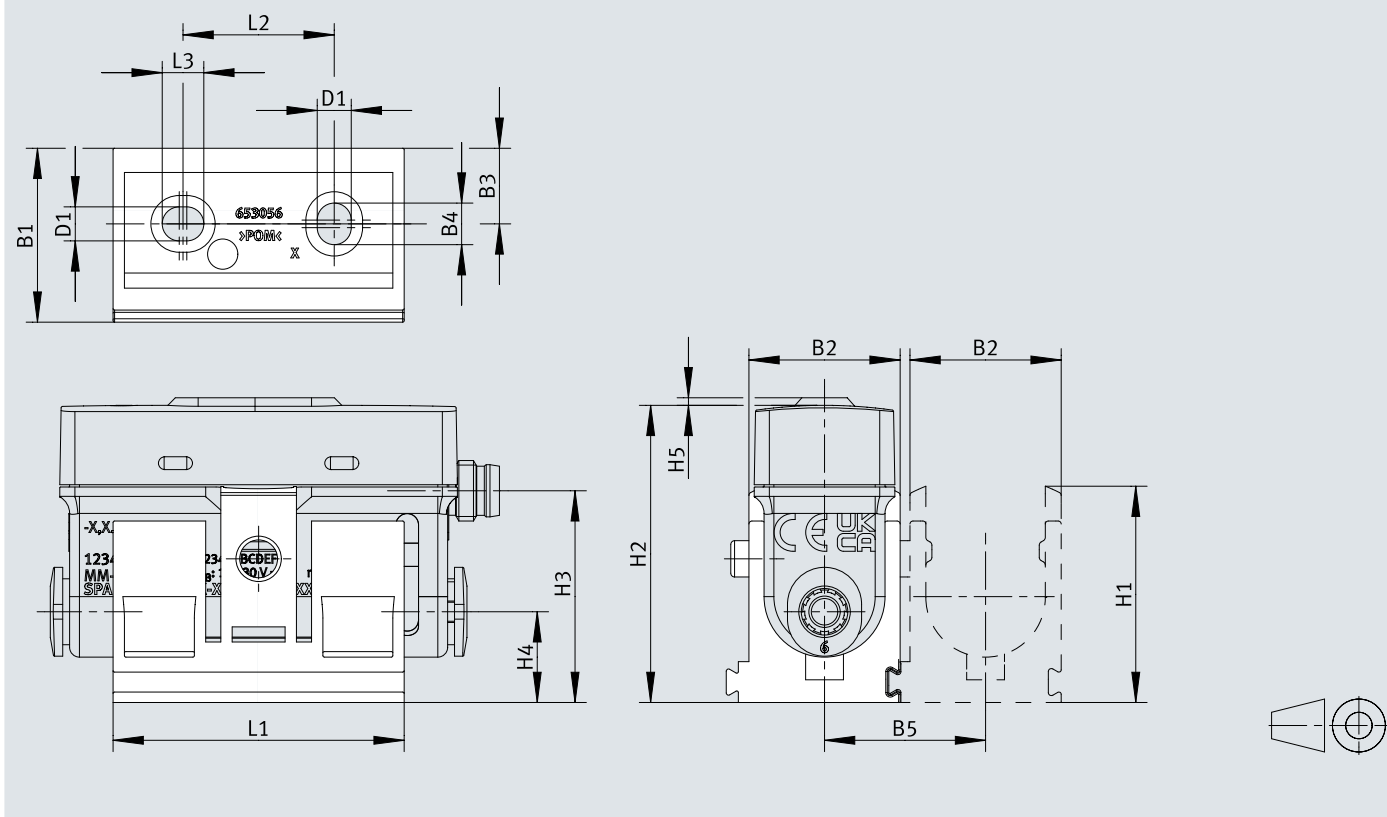


	H6	L9
SPAF-...-M12-...A	51	28

Dimensions

Dimensions – SPAF-...-MC-...

Download CAD data www.festo.com



	B1	B2	B3	B4	B5	D1	H1	H2	H3	H4	H5	L1	L2	L3
SPAF-...-MC-...	23	20	10	5,5	21,3	4,5	28,6	39,3	28	12	1	38,5	20	5,5

Ordering data

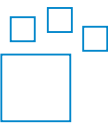
Ordering data with LCD display

	Electrical connection 1, connector system	Pneumatic connection	Switching output	Type of mounting	Part no.	Type	
	M12x1, A-coded to EN 61076-2-101	Male thread G1/8	PNP/NPN, switchable	Either:, Via male thread, With accessories	8181237	SPAF-P10R-G18M-L-PNLK-VB-M12	
					8181238	SPAF-B11R-G18M-L-PNLK-VB-M12	
					8181236	SPAF-V1R-G18M-L-PNLK-VB-M12	
		QS-4		With accessories	8181230	SPAF-V1R-Q4-L-PNLK-VB-M12	
					8181232	SPAF-B11R-Q4-L-PNLK-VB-M12	
					8181231	SPAF-P10R-Q4-L-PNLK-VB-M12	
		QS-6			8181235	SPAF-B11R-Q6-L-PNLK-VB-M12	
					8181233	SPAF-V1R-Q6-L-PNLK-VB-M12	
					8181234	SPAF-P10R-Q6-L-PNLK-VB-M12	
	M8x1, A-coded, to EN 61076-2-104	Male thread G1/8		Either:, Via male thread, With accessories	8181228	SPAF-P10R-G18M-L-PNLK-VB-M8	
					8181227	SPAF-V1R-G18M-L-PNLK-VB-M8	
				Via male thread	8181229	SPAF-B11R-G18M-L-PNLK-VB-M8	
		QS-4		With accessories	8181223	SPAF-B11R-Q4-L-PNLK-VB-M8	
					8181222	SPAF-P10R-Q4-L-PNLK-VB-M8	
					8181221	SPAF-V1R-Q4-L-PNLK-VB-M8	
		QS-6			8181226	SPAF-B11R-Q6-L-PNLK-VB-M8	
					8181225	SPAF-P10R-Q6-L-PNLK-VB-M8	
					8181224	SPAF-V1R-Q6-L-PNLK-VB-M8	

Ordering information with LED display

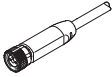
	Electrical connection 1, connector system	Pneumatic connection	Switching output	Type of mounting	Part no.	Type	
	M12x1, A-coded to EN 61076-2-101	Male thread G1/8	PNP/NPN, switchable	Either:, Via male thread, With accessories	8181220	SPAF-B11R-G18M-N-PNLK-M12	
					8181218	SPAF-V1R-G18M-N-PNLK-M12	
				QS-4	Via male thread	8181219	SPAF-P10R-G18M-N-PNLK-M12
		QS-6			With accessories	8181213	SPAF-P10R-Q4-N-PNLK-M12
						8181214	SPAF-B11R-Q4-N-PNLK-M12
				8181212		SPAF-V1R-Q4-N-PNLK-M12	
				8181217		SPAF-B11R-Q6-N-PNLK-M12	
				8181216		SPAF-P10R-Q6-N-PNLK-M12	
				8181215		SPAF-V1R-Q6-N-PNLK-M12	
	M8x1, A-coded, to EN 61076-2-104	Male thread G1/8		Either:, Via male thread, With accessories	8181209	SPAF-V1R-G18M-N-PNLK-M8	
					8181210	SPAF-P10R-G18M-N-PNLK-M8	
				QS-4	Via male thread	8181211	SPAF-B11R-G18M-N-PNLK-M8
		QS-6			With accessories	8181205	SPAF-B11R-Q4-N-PNLK-M8
						8181204	SPAF-P10R-Q4-N-PNLK-M8
				8181203		SPAF-V1R-Q4-N-PNLK-M8	
				8181207		SPAF-P10R-Q6-N-PNLK-M8	
				8181206		SPAF-V1R-Q6-N-PNLK-M8	
				8181208		SPAF-B11R-Q6-N-PNLK-M8	

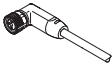
Ordering information – Modular product system

	End value for pressure measuring range	Analogue output	Electrical connection 1, connector system	Pneumatic connection	Part no.	Type
	10 bar	0 - 10 V, 1 - 5 V	M12x1, A-coded to EN 61076-2-101, M8x1, A-coded, to EN 61076-2-104	Male thread G1/8, QS-4, QS-6	8181300	SPAF-

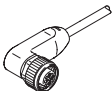
Accessories

Mounting clip SAMH						
	Type of mounting	Information on materials	Note on materials	Suitability for the production of Li-ion batteries	Part no.	Type
	Via through-hole for M4 screw	POM	RoHS-compliant	Metals with more than 1% by mass of copper are excluded from use. Exceptions are printed circuit boards, cables, electrical plug connectors and coils	8181299	SAMH-PF-MC-1

Connecting cable M8x1, straight socket						
	Cable structure	Cable length	Product weight	Part no.	Type	
	3 x 0.25 mm ²	2.5 m	50 g	8078223	NEBA-M8G3-U-2.5-N-LE3	
		5 m	96 g	8078224	NEBA-M8G3-U-5-N-LE3	
	4 x 0.25 mm ²	2.5 m	66 g	8078227	NEBA-M8G4-U-2.5-N-LE4	
		5 m	129 g	8078228	NEBA-M8G4-U-5-N-LE4	

Connecting cable M8x1, angled socket						
	Cable structure	Cable length	Product weight	Part no.	Type	
	3 x 0.25 mm ²	2.5 m	50 g	8078230	NEBA-M8W3-U-2.5-N-LE3	
		5 m	96 g	8078231	NEBA-M8W3-U-5-N-LE3	
	4 x 0.25 mm ²	2.5 m	66 g	8078233	NEBA-M8W4-U-2.5-N-LE4	
		5 m	129 g	8078234	NEBA-M8W4-U-5-N-LE4	

Connecting cable M12x1, straight socket						
	Cable structure	Cable length	Product weight	Part no.	Type	
	3 x 0.25 mm ²	2.5 m	55 g	8078236	NEBA-M12G5-U-2.5-N-LE3	
		5 m	102 g	8078237	NEBA-M12G5-U-5-N-LE3	
	4 x 0.25 mm ²	2.5 m	72 g	8078239	NEBA-M12G5-U-2.5-N-LE4	
		5 m	134 g	8078240	NEBA-M12G5-U-5-N-LE4	

Connecting cable M12x1, angled socket						
	Cable structure	Cable length	Product weight	Part no.	Type	
	3 x 0.25 mm ²	2.5 m	56 g	8078245	NEBA-M12W5-U-2.5-N-LE3	
		5 m	103 g	8078246	NEBA-M12W5-U-5-N-LE3	
	4 x 0.25 mm ²	2.5 m	73 g	8078248	NEBA-M12W5-U-2.5-N-LE4	
		5 m	135 g	8078249	NEBA-M12W5-U-5-N-LE4	