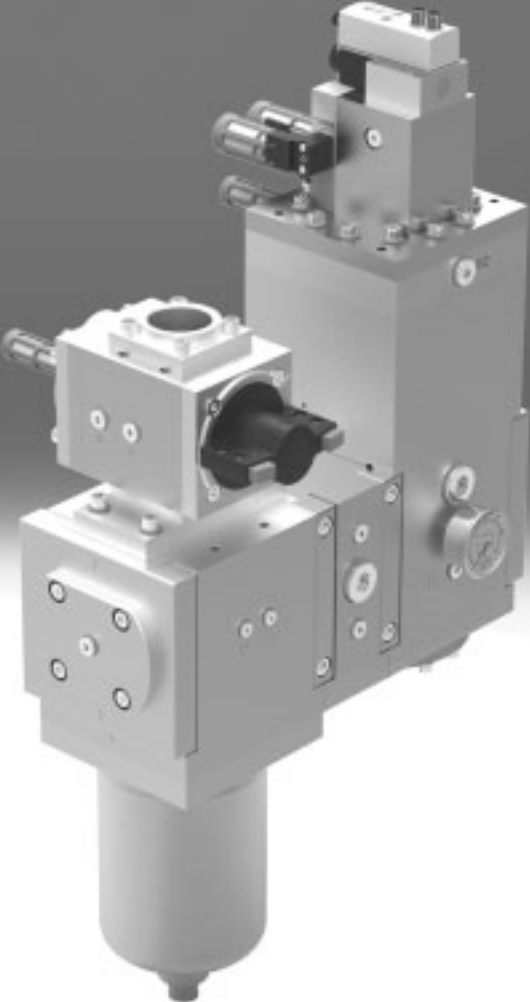
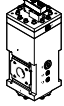

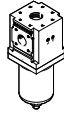





Pneumatic components for high-pressure applications



# Pneumatic components for high-pressure applications, series L

Product range overview

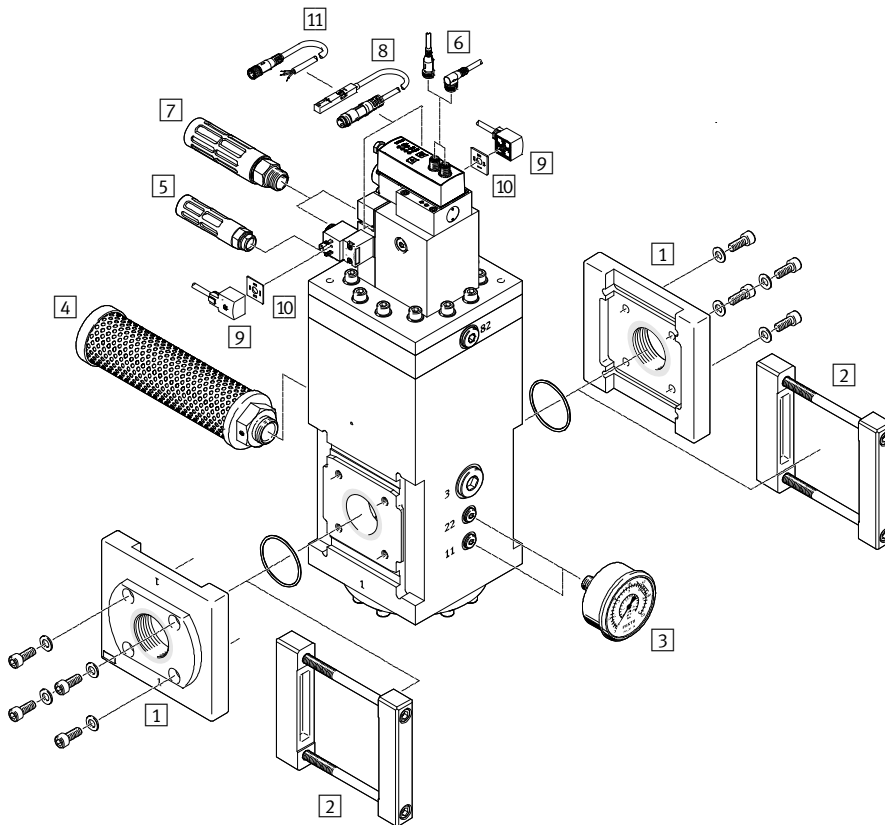
Function	Version	Type	Size	Pneumatic connection 1, 2		→ Page
				Direct	With connecting plate/flange	
Service units	<b>Electric pressure regulator</b>					
		PREL	186	–	G <sup>1</sup> / <sub>4</sub> , G <sup>1</sup> / <sub>2</sub> , G <sup>3</sup> / <sub>4</sub> , G1, G <sup>1</sup> / <sub>4</sub>	3
	<b>Shut-off valve for electric pressure regulator PREL</b>					
		PAHL	–	Mounted on electric pressure regulator PREL	–	10
	<b>Micro filter</b>					
		PFML	90	–	G <sup>1</sup> / <sub>4</sub> , G <sup>1</sup> / <sub>2</sub> , G <sup>3</sup> / <sub>4</sub> , G1, G <sup>1</sup> / <sub>4</sub>	21
			186	–	G <sup>1</sup> / <sub>4</sub> , G <sup>1</sup> / <sub>4</sub> , G <sup>1</sup> / <sub>2</sub> , G2, G <sup>2</sup> / <sub>2</sub>	
	<b>On/off valve</b>					
		PVEL	124	–	SAE flange	28
	<b>Branching module</b>					
	PMBL	90	–	G <sup>1</sup> / <sub>4</sub> , G <sup>1</sup> / <sub>2</sub> , G <sup>3</sup> / <sub>4</sub> , G1, G <sup>1</sup> / <sub>4</sub>	32	
		186	–	G <sup>1</sup> / <sub>4</sub> , G <sup>1</sup> / <sub>4</sub> , G <sup>1</sup> / <sub>2</sub> , G2, G <sup>2</sup> / <sub>2</sub>		
Valves	<b>Proportional pressure regulator</b>					
		VPPL	–	<ul style="list-style-type: none"> <li>Mounted on electric pressure regulator PREL or on shut-off valve PAHL</li> <li>G<sup>1</sup>/<sub>4</sub></li> </ul>	–	14

# Electric pressure regulators PREL, series L

Peripherals overview

## Accessories

Size 186, PREL-...-40CFX2-1 with shut-off valve PAHL



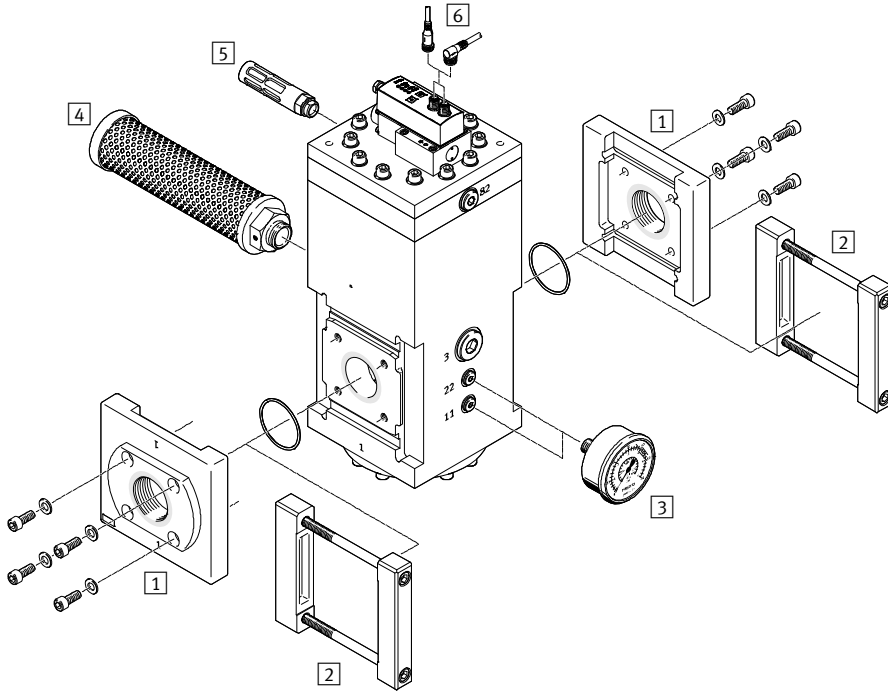
Mounting components and accessories		→ Page/Internet
1	Connecting plate PAML-CP	38
2	Module connector PAML-MK	41
3	Pressure gauge PAGL	45
4	Silencer U-G1-HD-SA	On request
5	Silencer U-1/2-B	47
6	Connecting cable NEBU-M12	47
7	Silencer (included in the scope of delivery) U-3/4-B	47
8	Proximity switch (included in the scope of delivery) SME-8	47
9	Connecting cable KMC	47
10	Illuminating seal MC-LD	47
11	Connecting cable NEBU-M8	47

# Electric pressure regulators PREL, series L

Peripherals overview

## Accessories

Size 186, PREL-...-40CFX-1 without shut-off valve PAHL



Mounting components and accessories		→ Page/Internet
1	Connecting plate PAML-CP	38
2	Module connector PAML-MK	41
3	Pressure gauge PAGL	45
4	Silencer U-G1-HD-SA	On request
5	Silencer U-1/2-B	47
6	Connecting cable NEBU-M12	47

# Electric pressure regulators PREL, series L

Type codes

PREL - 186 - HP3 - V1 - A - 40 C F X2 - 1

**Service function**

PREL	Electric pressure regulator, series L
------	---------------------------------------

**Size**

186	186 mm
-----	--------

**Pressure range**

HP3	0 ... 50 bar
-----	--------------

**Setpoint specification (input)**

V1	0 ... 10 V
A4	4 ... 20 mA

**Actual value (output)**

V	0 ... 10 V
A	4 ... 20 mA

**Pressure regulation range**

40	Up to 40 bar
----	--------------

**Regulator type**

C	Piloted
---	---------

**Regulator venting**

F	Integrated return flow function with secondary venting
---	--

**Regulator element**

X	Proportional valve
X2	Proportional valve with 2-channel exhaust

**Valve variant**

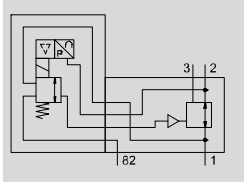
1	Variant 1
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# Electric pressure regulators PREL, series L

Technical data

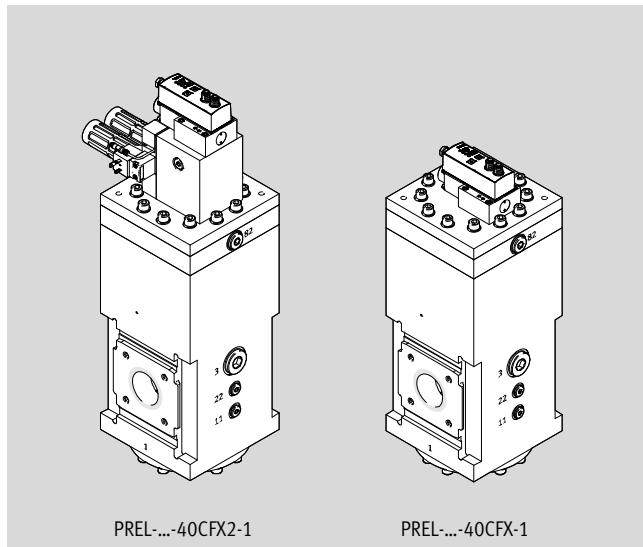
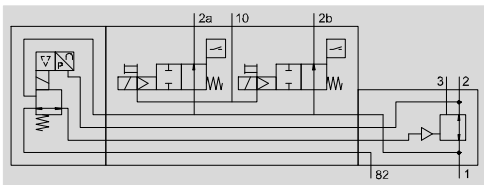
**Function**

PREL-...-40CFX-1, proportional valve



-  - Temperature range  
+5 ... +50 °C
-  - Operating pressure  
0 ... 50 bar


PREL-...-40CFX2-1, proportional valve with 2-channel exhaust



The outlet pressure of the electric pressure regulator PREL is determined by the proportional pressure regulator VPPL via an integrated pressure sensor and compared internally to the setpoint value. In case of deviations, the VPPL actuates the regulator of the PREL until the outlet pressure reaches the setpoint value. In initial position (no setpoint specification), the outlet pressure is reduced with the vent seat fully open.

The variant PREL-...-40CFX2-1 is additionally equipped with the two-channel shut-off valve PAHL. With the integrated solenoid valves and sensors and in combination with an external controller, it is used to implement the safety function "Safe venting" to with DIN EN ISO 13849-1:2008-12, performance level "d".

- Slow pressure rise from 0.6 bar/s in the case of a setpoint value specification up to 8 bar, then 4.4 bar/s
- Connection options for a pressure gauge on the front and rear side, one for the operating and outlet pressure
- Shut-off valve PAHL can be retrofitted

 **Note**  
The electric pressure regulator PREL can only be operated together with the proportional-pressure regulator VPPL. The technical data for the proportional pressure regulator VPPL can be found on page 14 and those for the shut-off valve PAHL can be found on page 10.

Safety data	
Conforms to standard	EN ISO 13849-1
Safety function	Exhausting
Performance Level (PL)	Exhausting: category 3, PL d

General technical data		
Size	186	
Type	PREL-...-40CFX2-1 with shut-off valve PAHL	PREL-...-40CFX-1 without shut-off valve PAHL
Nominal width DN	45	
Pneumatic connection 3	G1	
Pneumatic connection 11, 12	G¼	
Pneumatic connection 82	G½	
Type of actuation	Electric	
Design	Electrically adjustable pressure regulator	
Regulating function	Outlet pressure constant, with primary pressure compensation, with secondary venting	
Type of mounting	On service unit	
	Via accessories	
Mounting position	Vertical	
Pressure regulation range [bar]	0.4 ... 40	
Max. pressure hysteresis [bar]	0.1	

# Electric pressure regulators PREL, series L

Technical data

Electrical data				
Type		PREL-...-V1-A	PREL-...-V1-V	PREL-...-A4-A
Electrical connection	IN	Plug, M12, 5-pin, A-coded		
	OUT	Plug, M12, 5-pin, A-coded		
Nominal operating voltage	[V DC]	24		
Analogue input signal range	[V]	0 ... 10	0 ... 10	–
	[mA]	–	–	4 ... 20
Analogue output signal range	[V]	–	0 ... 10	–
	[mA]	4 ... 20	–	4 ... 20
Setpoint/actual values	[V]	Voltage type 0 ... 10		–
	[A]	–	–	Current type 4 ... 20

Operating and environmental conditions				
Type		PREL-...-40CFX2-1 with shut-off valve PAHL	PREL-...-40CFX-1 without shut-off valve PAHL	
Operating pressure	[bar]	0 ... 50		
Operating medium		Compressed air to ISO 8573-1:2010 [7:4:4]		
		Inert gases		
Ambient temperature	[°C]	+5 ... +50		
Temperature of medium	[°C]	+5 ... +50		
Storage temperature	[°C]	–10 ... +60		
Corrosion resistance class CRC <sup>1)</sup>		2		
CE marking (see declaration of conformity) <sup>2)</sup>		To EU Pressure Equipment Directive		
		To EC Machinery Directive	–	
Food-safe <sup>2)</sup>		See Supplementary material information		
Certification certificate		Special Equipment Type Test Certification		

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

Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.

2) Additional information [www.festo.com/sp](http://www.festo.com/sp) → Certificates.

Weight [g]		
Type	PREL-...-40CFX2-1 with shut-off valve PAHL	PREL-...-40CFX-1 without shut-off valve PAHL
Electric pressure regulator	40400	37100

Materials	
Housing	Anodised aluminium
Spring	Spring steel
Cap, bottom	Anodised aluminium
Seals	Nitrile rubber
Note on materials	RoHS compliant
	Contains paint-wetting impairment substances

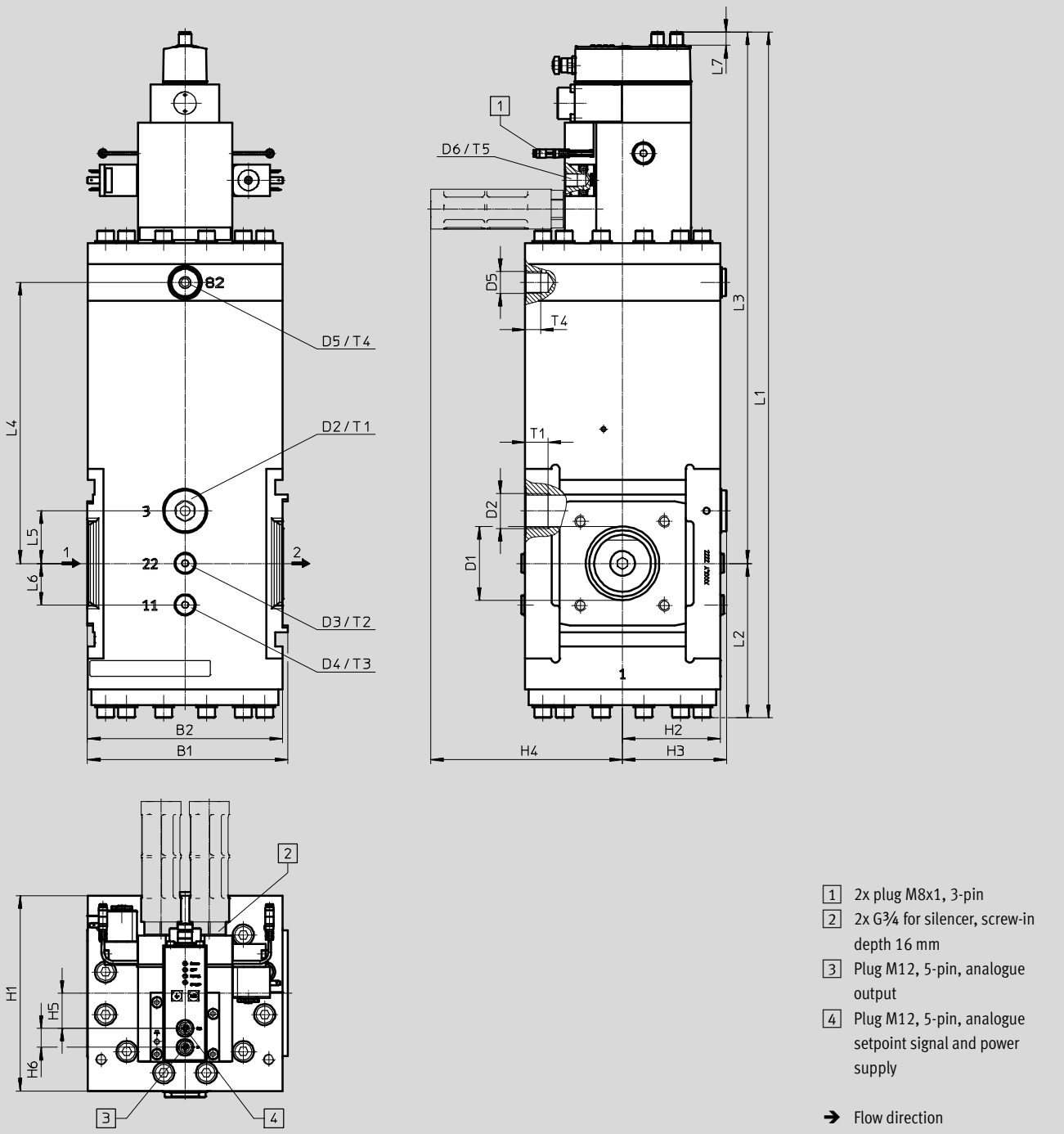
# Electric pressure regulators PREL, series L

Technical data

**Dimensions – Size 186**

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

PREL-...-40CFX2-1 with shut-off valve PAHL



- 1 2x plug M8x1, 3-pin
  - 2 2x G $\frac{3}{4}$  for silencer, screw-in depth 16 mm
  - 3 Plug M12, 5-pin, analogue output
  - 4 Plug M12, 5-pin, analogue setpoint signal and power supply
- Flow direction

Type	B1	B2	D1	D2	D3	D4	D5	D6	H1	H2	H3	H4	H5	H6
PREL-...-40CFX2-1	191	186	70 ∅	G1	G $\frac{1}{4}$	G $\frac{1}{4}$	G $\frac{1}{2}$	G $\frac{1}{4}$	186	93	99	~183	33.5	18

Type	L1	L2	L3	L4	L5	L6	L7	T1	T2	T3	T4	T5
PREL-...-40CFX2-1	~652	~147	~505	267.5	50	39.5	~12.6	18	12	12	14	12



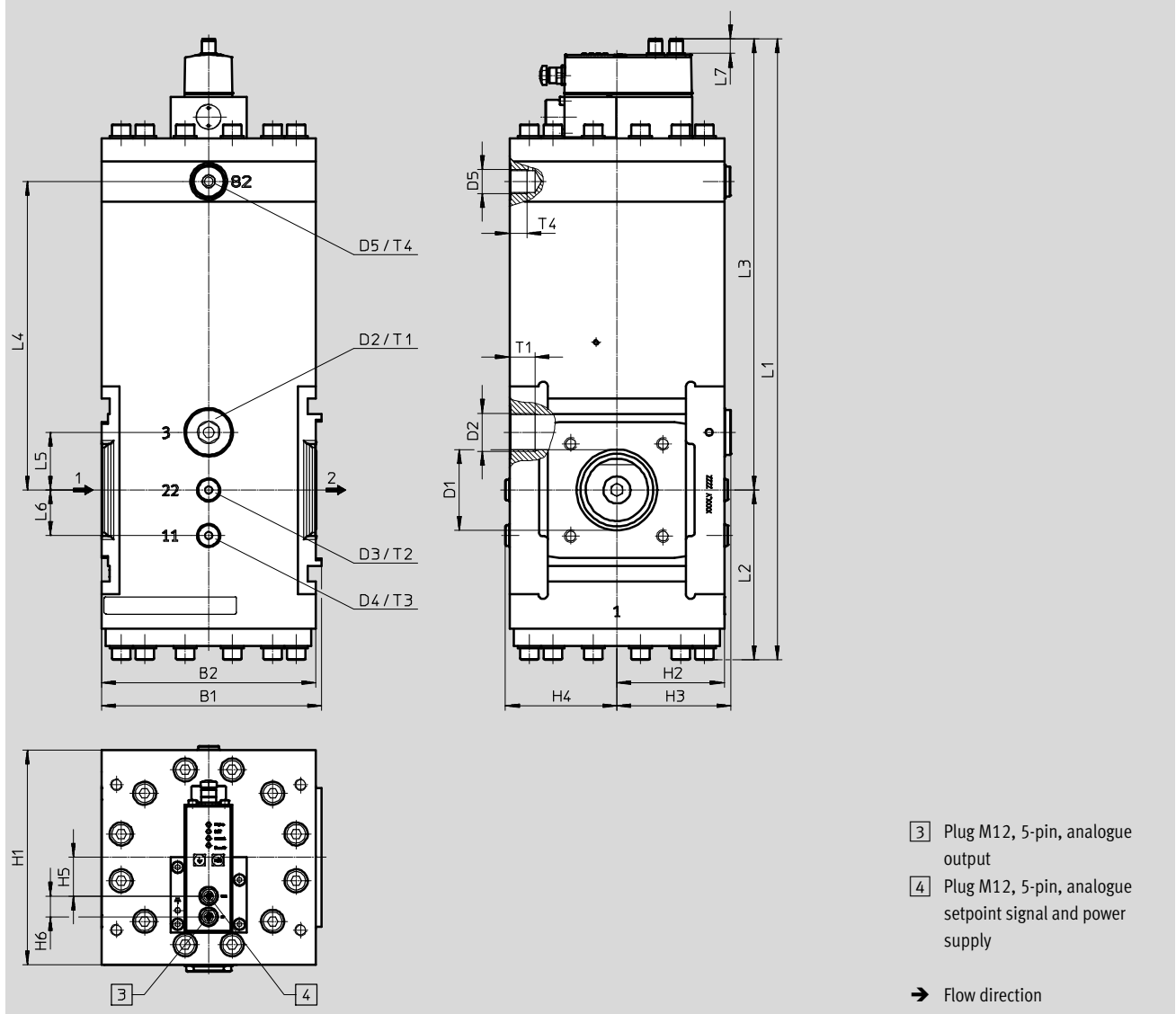
# Electric pressure regulators PREL, series L

Technical data

**Dimensions – Size 186**

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

PREL-...-40CFX-1 without shut-off valve PAHL



Type	B1	B2	D1	D2	D3	D4	D5	H1	H2	H3	H4	H5	H6
PREL-...-40CFX-1	191	186	70	G1	G¼	G¼	G½	186	93	99	96.5	33.5	18

Type	L1	L2	L3	L4	L5	L6	L7	T1	T2	T3	T4
PREL-...-40CFX-1	~537	~147	~390	267.5	50	39.5	~12.6	18	12	12	14

**Ordering data**

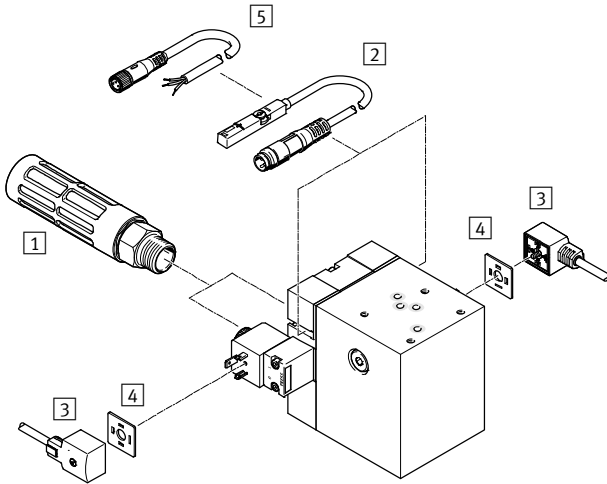
With proportional pressure regulator VPPL

Setpoint specification (input)	Actual value (output)	With shut-off valve PAHL		Without shut-off valve PAHL	
		Part No.	Type	Part No.	Type
0 ... 10 V	4 ... 20 mA	1709208	PREL-186-HP3-V1-A-40CFX2-1	1709211	PREL-186-HP3-V1-A-40CFX-1
	0 ... 10 V	1709209	PREL-186-HP3-V1-V-40CFX2-1	1709212	PREL-186-HP3-V1-V-40CFX-1
4 ... 20 mA	4 ... 20 mA	1709210	PREL-186-HP3-A4-A-40CFX2-1	1709213	PREL-186-HP3-A4-A-40CFX-1

# Shut-off valves PAHL, series L

Peripherals overview and type codes

## Accessories



### Mounting components and accessories

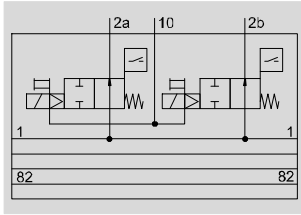
		→ Page/Internet
1	Silencer (included in the scope of delivery) U-3/4-B	47
2	Proximity switch (included in the scope of delivery) SME-8	47
3	Connecting cable KMC	47
4	Illuminating seal MC-LD	47
5	Connecting cable NEBU-M8	47

### Type codes

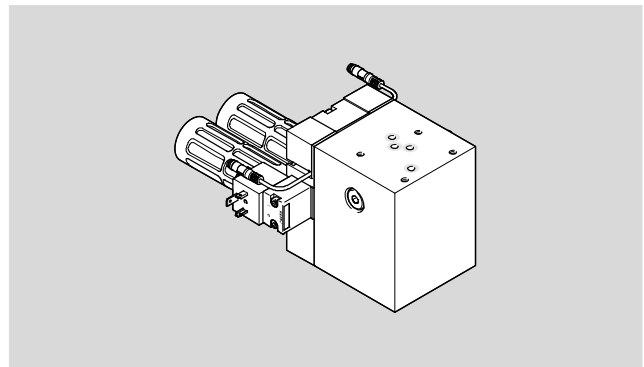
	PAHL	-	SM	-	RE
<b>Service function</b>	PAHL	Shut-off valve, series L			
<b>Product type</b>	SM	Two-channel			
<b>Designation</b>	RE	For electric pressure regulator PREL			

# Shut-off valves PAHL, series L

Technical data

**Function**


- Temperature range  
+5 ... +50 °C
- Operating pressure  
0 ... 50 bar



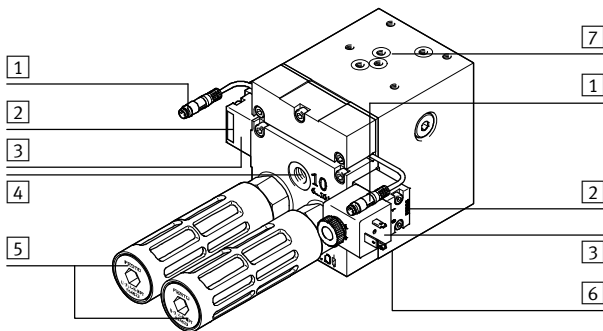
The two-channel shut-off valve PAHL is intended for shutting off the pilot air to the pneumatically piloted electric pressure regulator PREL-186. The PAHL is equipped with two 2/2-way poppet valves, which are actuated by means of pilot solenoid valves. Proximity switches are integrated for monitoring the switching position of the poppet valves. The safety function is achieved through two-channel

venting of the pilot pressure. The shut-off valve can be used in combination with the pressure regulator PREL-186 to implement the “safe venting” protective measure. The safety function can only be achieved through appropriate activation and evaluation of the sensor signals. In combination with connecting plates, the shut-off valve PAHL can

also be used for other applications, such as between the pilot valve and control chamber of a pressure regulator. A safety function can only be achieved through appropriate activation and evaluation of the sensor signals and must be checked by the operator. The valve is not suitable for safe switch-off of an inlet pressure in any application case.

The shut-off valve PAHL may only be retrofitted in the following electric pressure regulators PREL-186:

- PREL-186-HP3-V1-A-40CFX-1 (part no. 1709211)
- PREL-186-HP3-V1-V-40CFX-1 (part no. 1709212)
- PREL-186-HP3-A4-A-40CFX-1 (part no. 1709213)



- 1 Electrical connection for proximity switch (M8x1, 3-pin)
- 2 Manual override
- 3 Solenoid valve
- 4 Pneumatic connection G $\frac{3}{4}$  [10] – Auxiliary pilot air
- 5 2x Connection G $\frac{3}{4}$  [2a/2b] for silencer (included in scope of delivery)
- 6 Interface to electric pressure regulator PREL-186

- 7 Interface to proportional pressure regulator VPPL

Note  
A proportional pressure regulator VPPL with external auxiliary pilot air must not be used with the shut-off valve PAHL in any circumstances.

Safety data	
Conforms to standard	EN ISO 13849-1
Safety function	Exhausting
Performance Level (PL)	Exhausting: category 3, PL d
CCF measures	Safely keep operating pressure within the limits of the technical specifications Maintain operating voltage limits Observe compressed air quality Comply with maximum vibration and shock loads Use of approved silencer Adhere to pulse pattern at timed safety outputs Comply with pilot pressure with external pilot air supply within the limits of the technical specifications Comply with ambient temperature and temperature of medium Adhere to permissible magnetic fields
CE marking (see declaration of conformity)	To EC Machinery Directive
Shock resistance	Shock test with severity level 2 to FN 942017-5 and EN 60068-2-27
Vibration resistance	Transport application test with severity level 2 to FN 942017-4 and EN 60068-2-6

## Shut-off valves PAHL, series L

Technical data

General technical data	
Pneumatic connection 10	G $\frac{1}{4}$
Pneumatic connection 2a	G $\frac{3}{4}$
Pneumatic connection 2b	G $\frac{3}{4}$
Type of actuation	Electric
Design	Piloted piston poppet valve
Type of mounting	In-line installation
Mounting position	Any, preferably vertical
Valve function	2x 2/2 poppet valves, open, single-solenoid
Manual override (on the solenoid valve)	Detenting
	Non-detenting
Reset method	Mechanical spring
Type of piloting	Piloted
Pilot air supply port	External
Sealing principle	Soft

Electrical data	
Nominal operating voltage [V DC]	24
Switching position sensing	Normal position with sensor
Solenoid valve	
Operating voltage range [V DC]	21.6 ... 26.4
Electrical connection	To EN 175301-803, type A
Signal status display	LED
Duty cycle [%]	100
Sensor	
Operating voltage range, sensor [V DC]	10 ... 30
Sensor connection	Cable with plug M8x1, 3-pin
Switching status display sensor	LED
Switching element function	N/O contact

Operating and environmental conditions	
Operating pressure [bar]	0 ... 50
Pilot pressure [bar]	6 ... 10
Operating/pilot medium	Compressed air to ISO 8573-1:2010 [7:4:4]
	Inert gases
Ambient temperature [°C]	5 ... +50
Temperature of medium [°C]	5 ... +50
Storage temperature [°C]	-10 ... +60
Corrosion resistance class CRC <sup>1)</sup>	2
CE marking (see declaration of conformity)	To EC Machinery Directive

1) Corrosion resistance class CRC 2 to Festo standard FN 940070  
 Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.

Weight [g]	
Shut-off valve	3500

Materials	
Housing	Anodised aluminium
Note on materials	RoHS compliant
	Contains paint-wetting impairment substances

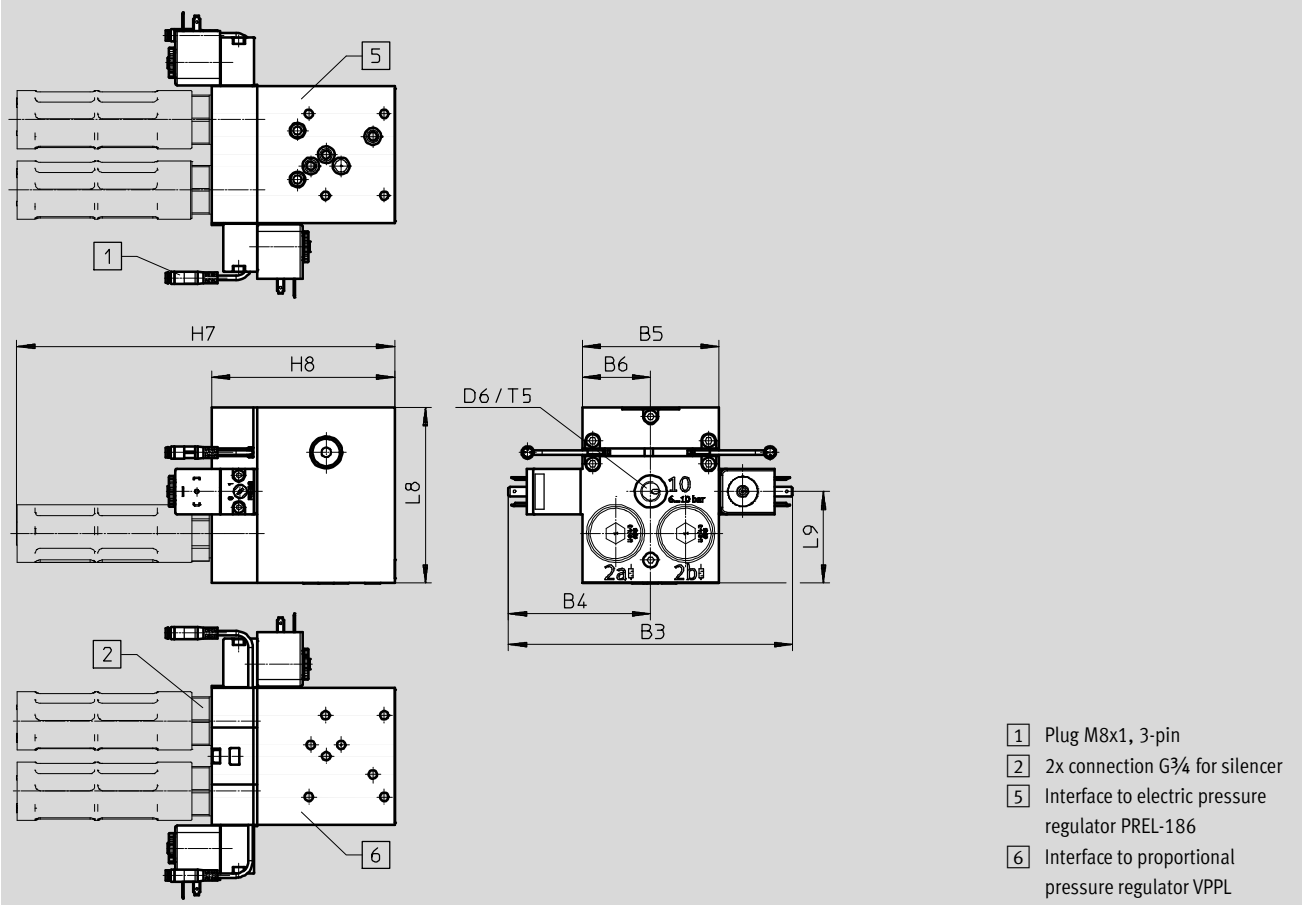
# Shut-off valves PAHL, series L

Technical data

**Dimensions**

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

PAHL-SM-RE



Type	B3	B4	B5	B6	D6	H7	H8	L8	L9	T5
PAHL-SM-RE	~186	~94	~90	~45	G $\frac{1}{4}$	~248	120	115	60	12

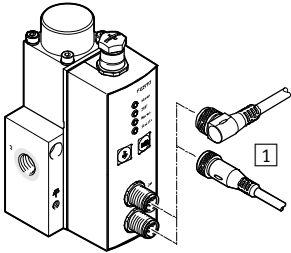
**Ordering data**

Type of actuation	Part No.	Type
Electrical	<b>1709707</b>	<b>PAHL-SM-RE</b>

# Proportional pressure regulators VPPL, series L

Peripherals overview and type codes

## Accessories



		→ Page/Internet
1	Connecting cable NEBU-M12	47

## Type codes

VPPL - 3 Q - 3 - - OL 40H - V1 - V - S1 - 1

### Type

VPPL	Proportional pressure regulator for electric pressure regulator PREL, series L
------	--

### Nominal width

3	3 mm
---	------

### Design

Q	Flanged valve
L	In-line valve

### Valve function

3	3/3-way valve, closed
---	-----------------------

### Pneumatic connection

-	Flange
G14	ISO thread G1/4
Z	Flange/thread combination for connection 1 (external pilot air)

### Lower pressure value of control range

0L	0 bar
2L	2 bar

### Upper pressure value of control range

20H	20 bar
40H	40 bar

### Setpoint value (input), valve

A4	4 ... 20 mA
V1	0 ... 10 V

### Actual value (output), valve

A	4 ... 20 mA
V	0 ... 10 V

### Accuracy

S1	1 %
----	-----

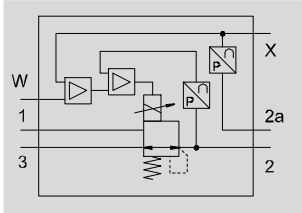
### Valve variant

1 ... 20	Variant 1 ... 20
----------	------------------

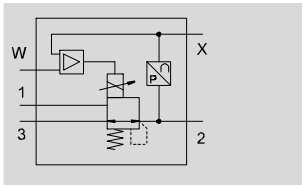
# Proportional pressure regulators VPPL, series L



Technical data

Function  
Flanged valve



In-line valve



-  Temperature range  
+5 ... +50 °C
-  Operating pressure  
0 ... 50 bar



The outlet pressure of the electric pressure regulator PREL is determined by the proportional pressure regulator VPPL via an integrated pressure sensor and compared internally to the setpoint value. In case of deviations, the VPPL actuates the regulator of the PREL until the outlet pressure reaches the setpoint value. In initial position

(no setpoint specification), the outlet pressure is reduced with the vent seat fully open.

The proportional pressure regulator VPPL is available in three versions:

- Flanged valve VPPL-3Q-3
- Flanged valve with external pilot air supply VPPL-3Q-3-Z
- In-line valve VPPL-3L-3

-  Note

The flanged valve with and without external pilot air supply can only be operated together with the electric pressure regulator PREL.

-  Safety instructions

Safety position for VPPL: if the power supply cable is interrupted, the outlet pressure drops to 0 bar.

General technical data							
Design	Flanged valve VPPL-3Q-3		Flanged valve with external pilot air supply VPPL-3Q-3-Z			In-line valve VPPL-3L-3	
Type	-0L20H	-0L40H	-0L20H	-0L40H	-2L40H	-G14-0L20H	-G14-0L40H
Nominal size [mm]	2.5						
pressurisation/exhaust							
Pneumatic connection 1	Flange	Flange	Flange, G $\frac{1}{4}$	Flange, G $\frac{1}{4}$	Flange, G $\frac{1}{4}$	G $\frac{1}{4}$	G $\frac{1}{4}$
Pneumatic connection 2, 3	Flange	Flange	Flange	Flange	Flange	G $\frac{1}{4}$	G $\frac{1}{4}$
Type of actuation	Electric						
Design	Directly actuated piston regulator						
Type of mounting	With through-hole						
Mounting position	Any, preferably vertical						
Pressure regulation range [bar]	0.2 ... 20	0.4 ... 40	0.2 ... 20	0.4 ... 40	2 ... 40	0.2 ... 20	0.4 ... 40
Max. pressure hysteresis [bar]	0.1	0.3	0.1	0.3	0.3	0.1	0.3
Valve function	3-way proportional pressure regulator, closed						
Exhaust air function	No flow control						
Reset method	Mechanical spring						
Type of piloting	Direct						
Sealing principle	Soft						

Flow rate characteristics	
Standard nominal flow rate $q_{N1}$ [l/min]	
In main flow direction 1 $\rightarrow$ 2	300
C value [l/s*bar]	
In main flow direction 1 $\rightarrow$ 2	0.8
b value	
In main flow direction 1 $\rightarrow$ 2	0.25

1) Measured at  $p_1 = 6$  bar and  $p_2 = 5$  bar,  $\Delta p = 1$  bar

# Proportional pressure regulators VPPL, series L

Technical data

Electrical data		VPPL-...-V1-A	VPPL-...-V1-V	VPPL-...-A4-A
Electrical connection	IN	Plug, M12, 5-pin, A-coded		
	OUT	Plug, M12, 5-pin, A-coded		
Electrical connection, diagnostic interface <sup>1)</sup>		Socket, M12, 5-pin, A-coded		
Operating voltage range	[V DC]	21.6 ... 27.6		
Analogue input signal range	[V]	0 ... 10	0 ... 10	–
	[mA]	–	–	4 ... 20
Analogue output signal range	[V]	–	0 ... 10	–
	[mA]	4 ... 20	–	4 ... 20
Setpoint/actual values	[V]	Voltage type 0 ... 10		–
	[A]	–	–	Current type 4 ... 20
Degree of protection		IP65		
Duty cycle	[%]	100		
Switching time off	[ms]	550		
Switching time on	[ms]	300		
Protection against incorrect polarity		For all electrical connections		
Protection against short circuit		No		
Display type		LED display		
Max. electrical power consumption	[W]	26.7		
Residual ripple	[%]	10		

1) Diagnostics interface covered with a tamper-proof cap, for use only by Festo service staff.

Accuracy		VPPL-...-0L20H	VPPL-...-0L40H
Linearity error	[% FS]	±0.5	±1
Temperature coefficient	[%/K]	0.04	
Repetition accuracy	[% FS]	±0.5	±1

Operating and environmental conditions	
Operating pressure	[bar] 0 ... 50
Operating medium	Compressed air to ISO 8573-1:2010 [7:4:4]
	Inert gases
Note on operating/pilot medium Lubricated operation not possible	
Ambient temperature	[°C] +5 ... +50
Temperature of medium	[°C] +5 ... +50
Storage temperature	[°C] –10 ... +60
Corrosion resistance class CRC <sup>1)</sup> 2	
CE mark To EU EMC Directive	
(see declaration of conformity) <sup>2)</sup>	

1) Corrosion resistance class CRC 2 to Festo standard FN 940070  
Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.

2) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: [www.festo.com/sp](http://www.festo.com/sp) → Certificates.  
If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.

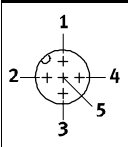
Weight [g]	
Proportional pressure regulator	1100



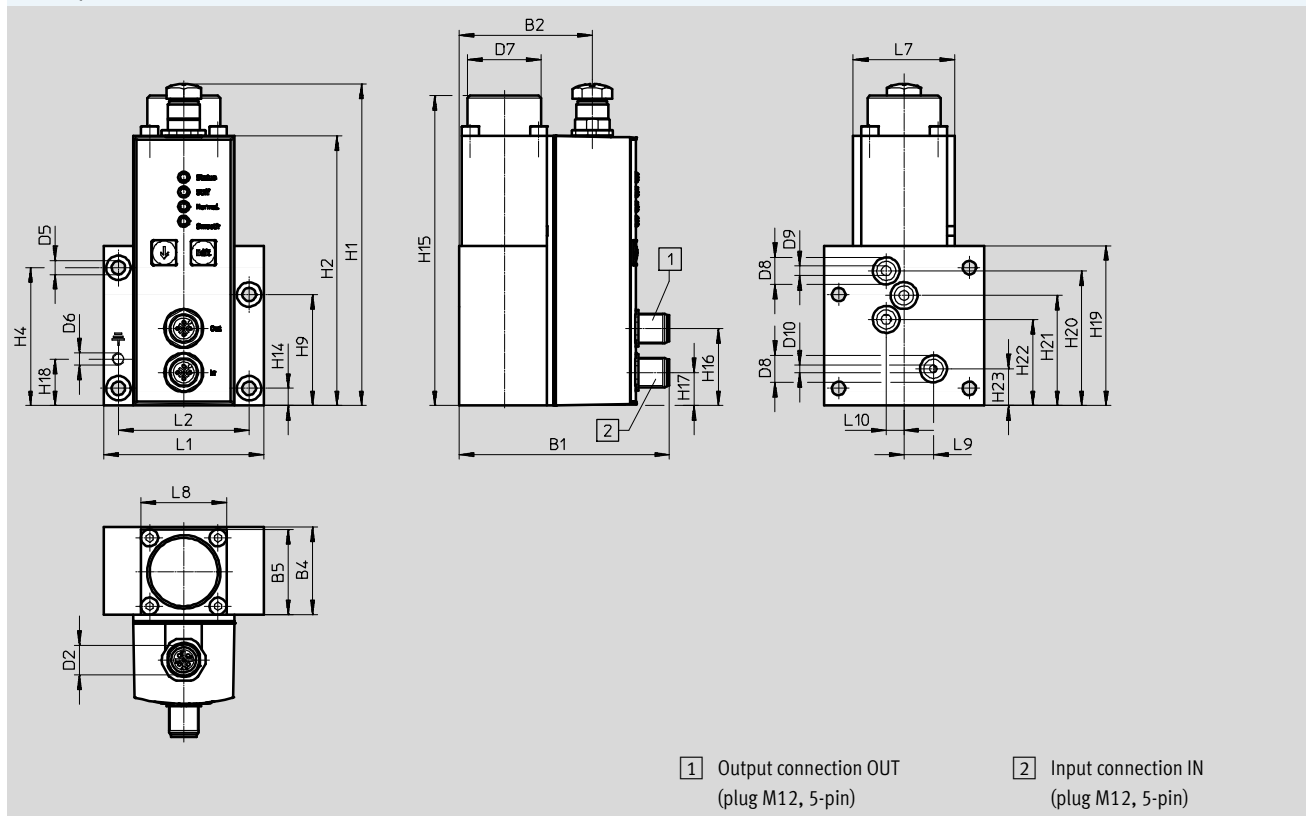
# Proportional pressure regulators VPPL, series L

Technical data

Materials	
Housing	Anodised wrought aluminium alloy
Note on materials	RoHS compliant
	Contains paint-wetting impairment substances

Pin allocation			
Plug connector M12, 5-pin, A-coded	Pin	Output connection OUT Actual value	Input connection IN Setpoint value/power supply
	1	Not assigned	24 V DC
	2	Analogue OUT+ (actual value)	Analogue IN+ (setpoint value)
	3	Not assigned	0 V
	4	Analogue OUT- (actual value)	Analogue IN- (setpoint value)
	5	Functional earth	Functional earth

**Dimensions – Flanged valve** Download CAD data → [www.festo.com](http://www.festo.com)



Type	B1	B2	B4	B5	D2	D5	D6	D7	D8	D9	D10
VPPL-3Q-3	86.1	54.5	36	35	M12	5.5	M5	30	11	4	3

Type	H1	H2	H4	H9	H14	H15	H16	H17	H18	H19
VPPL-3Q-3	131.7	110.5	56.5	45.5	7.1	127	31.6	13.6	19.1	65.5

Type	H20	H21	H22	H23	L1	L2	L7	L8	L9	L10
VPPL-3Q-3	55.2	45.1	35.3	15.05	65.5	53.5	41.5	35	12.05	7.3

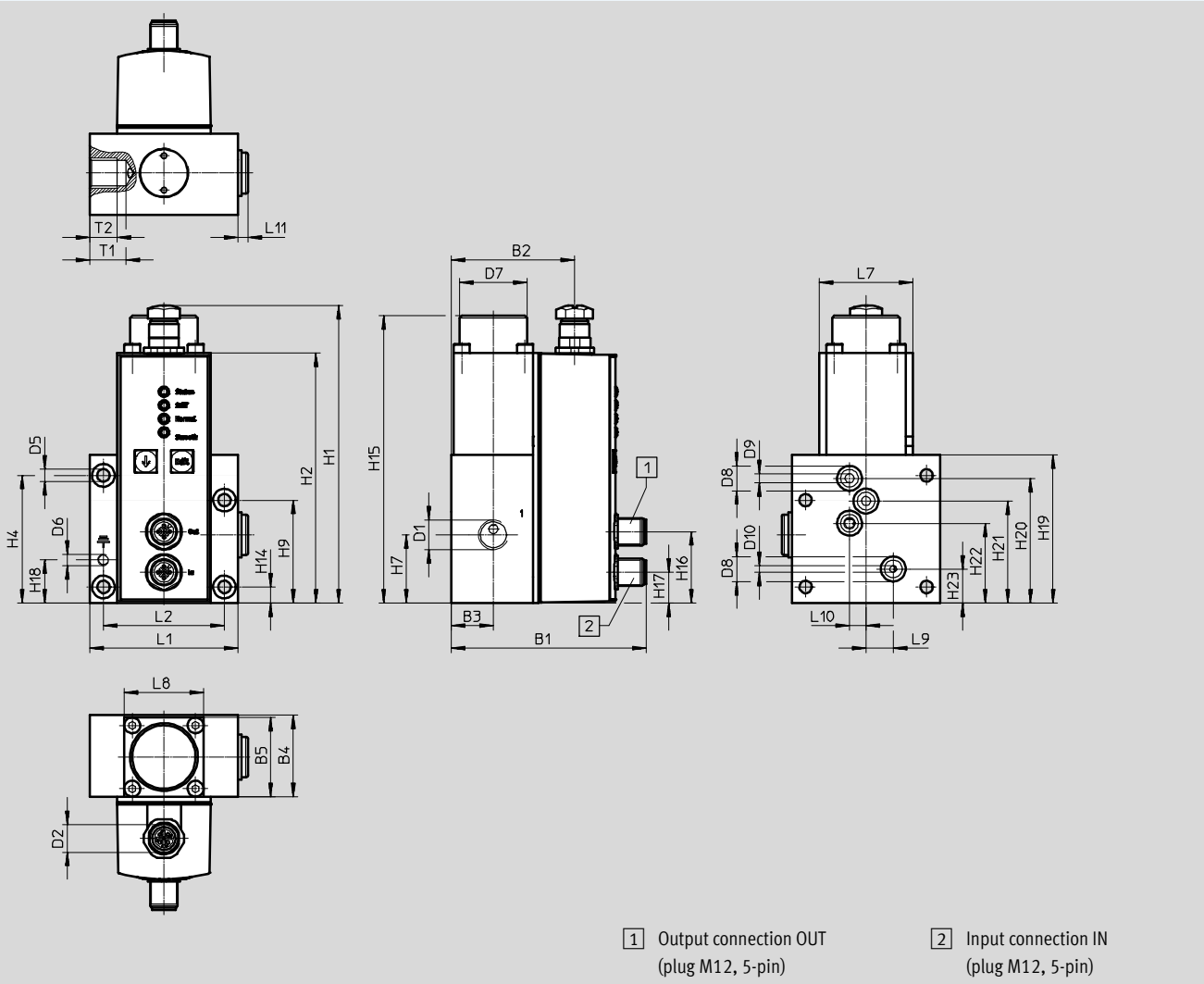
# Proportional pressure regulators VPPL, series L

Technical data

Dimensions – Flanged valve with external pilot air

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

VPPL-3Q-3-Z



Type	B1	B2	B3	B4	B5	D1	D2	D5	D6	D7	D8	D9	D10
VPPL-3Q-3-Z	86.1	54.5	18.5	36	35	G $\frac{1}{4}$	M12	5.5	M5	30	11	4	3

Type	H1	H2	H4	H7	H9	H14	H15	H16	H17	H18	H19	H20
VPPL-3Q-3-Z	131.7	110.5	56.5	30.2	45.5	7.1	127	31.6	13.6	19.1	65.5	55.2

Type	H21	H22	H23	L1	L2	L7	L8	L9	L10	L11	T1	T2
VPPL-3Q-3-Z	45.1	35.3	15.05	65.5	53.5	41.5	35	12.05	7.3	4.5	16	12

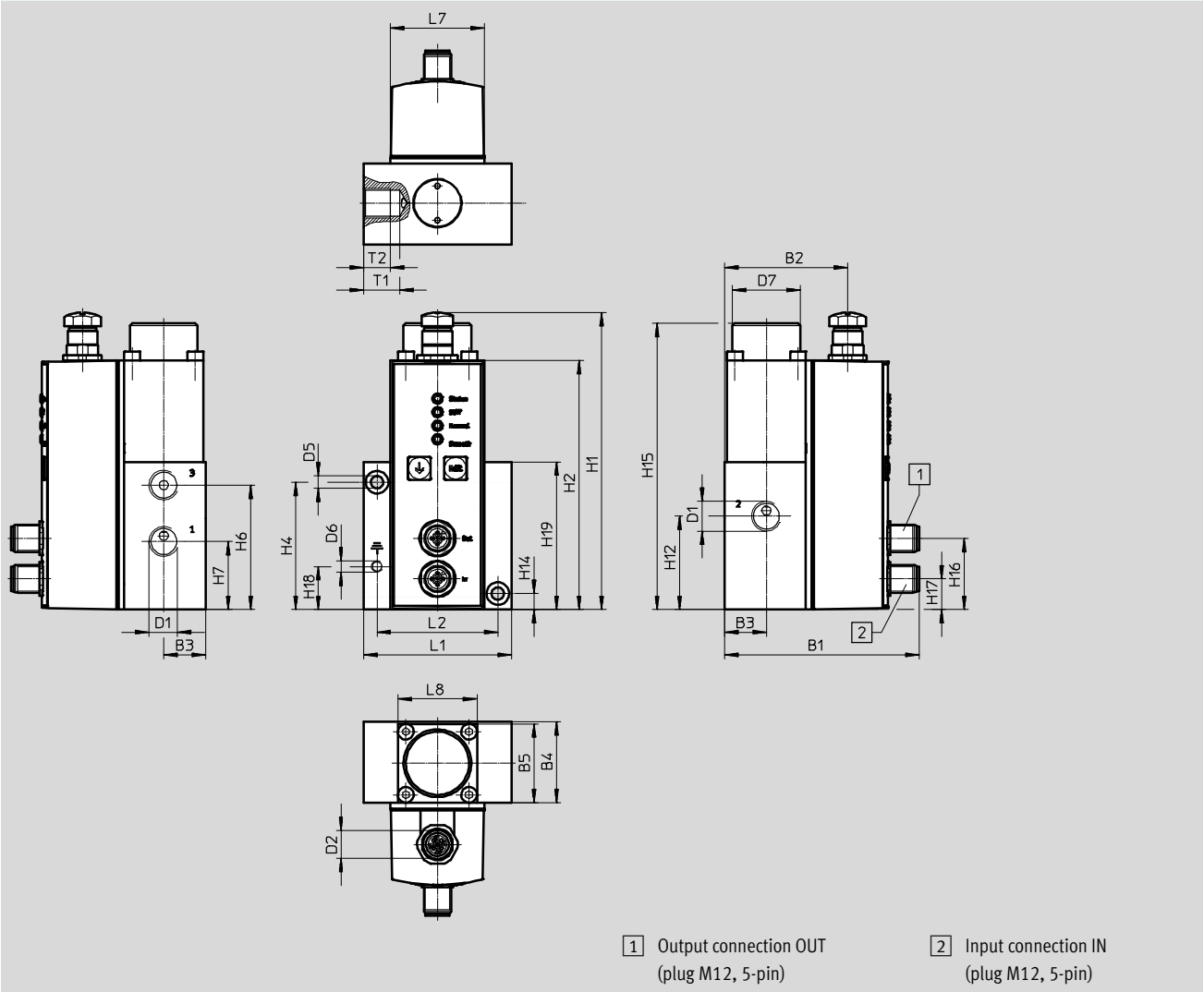
# Proportional pressure regulators VPPL, series L

Technical data

Dimensions – In-line valve

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

VPPL-3L-3-G14



Type	B1	B2	B3	B4	B5	D1	D2	D5	D6	D7
VPPL-3L-3-G14	86.1	54.5	18.5	36	35	G $\frac{1}{4}$	M12	5.5	M5	30

Type	H1	H2	H4	H6	H7	H12	H14	H15	H16
VPPL-3L-3-G14	131.7	110.5	56.5	55.2	30.2	41.4	7.1	127	31.6

Type	H17	H18	H19	L1	L2	L7	L8	T1	T2
VPPL-3L-3-G14	13.6	19.1	65.5	65.5	53.5	41.5	35	16	12

# Proportional pressure regulators VPPL, series L

Technical data

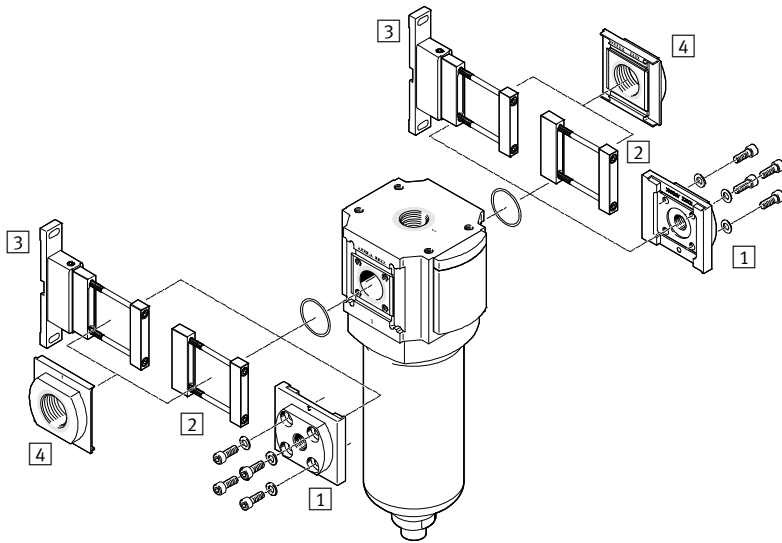
Ordering data					
Pneumatic connection 1	Pressure regulation range [bar]	Setpoint value (input)	Actual value (output)	Part No.	Type
<b>Flanged valve</b>					
Flange	0.2 ... 20	0 ... 10 V	4 ... 20 mA	1635984	VPPL-3Q-3-0L20H-V1-A-S1-2
			0 ... 10 V	1635987	VPPL-3Q-3-0L20H-V1-V-S1-2
		4 ... 20 mA	4 ... 20 mA	1635990	VPPL-3Q-3-0L20H-A4-A-S1-2
	0.4 ... 40	0 ... 10 V	4 ... 20 mA	1635973	VPPL-3Q-3-0L40H-V1-A-S1-1
			0 ... 10 V	1635978	VPPL-3Q-3-0L40H-V1-V-S1-1
		4 ... 20 mA	4 ... 20 mA	1635981	VPPL-3Q-3-0L40H-A4-A-S1-1
<b>Flanged valve with external pilot air</b>					
Flange, G $\frac{1}{4}$	0.2 ... 20	0 ... 10 V	4 ... 20 mA	1635975	VPPL-3Q-3-Z-0L20H-V1-A-S1-4
			0 ... 10 V	1635988	VPPL-3Q-3-Z-0L20H-V1-V-S1-4
		4 ... 20 mA	4 ... 20 mA	1635991	VPPL-3Q-3-Z-0L20H-A4-A-S1-4
	0.4 ... 40	0 ... 10 V	4 ... 20 mA	1910709	VPPL-3Q-3-Z-0L40H-V1-A-S1-8
			2 ... 40	0 ... 10 V	1635982
		4 ... 20 mA	4 ... 20 mA		
<b>In-line valve</b>					
G $\frac{1}{4}$	0.2 ... 20	0 ... 10 V	4 ... 20 mA	1635986	VPPL-3L-3-G14-0L20H-V1-A-S1-6
			0 ... 10 V	1635989	VPPL-3L-3-G14-0L20H-V1-V-S1-6
		4 ... 20 mA	4 ... 20 mA	1635992	VPPL-3L-3-G14-0L20H-A4-A-S1-6
	0.4 ... 40	0 ... 10 V	4 ... 20 mA	1635977	VPPL-3L-3-G14-0L40H-V1-A-S1-7
			0 ... 10 V	1635980	VPPL-3L-3-G14-0L40H-V1-V-S1-7
		4 ... 20 mA	4 ... 20 mA	1635983	VPPL-3L-3-G14-0L40H-A4-A-S1-7

# Micro filter PFML, series L

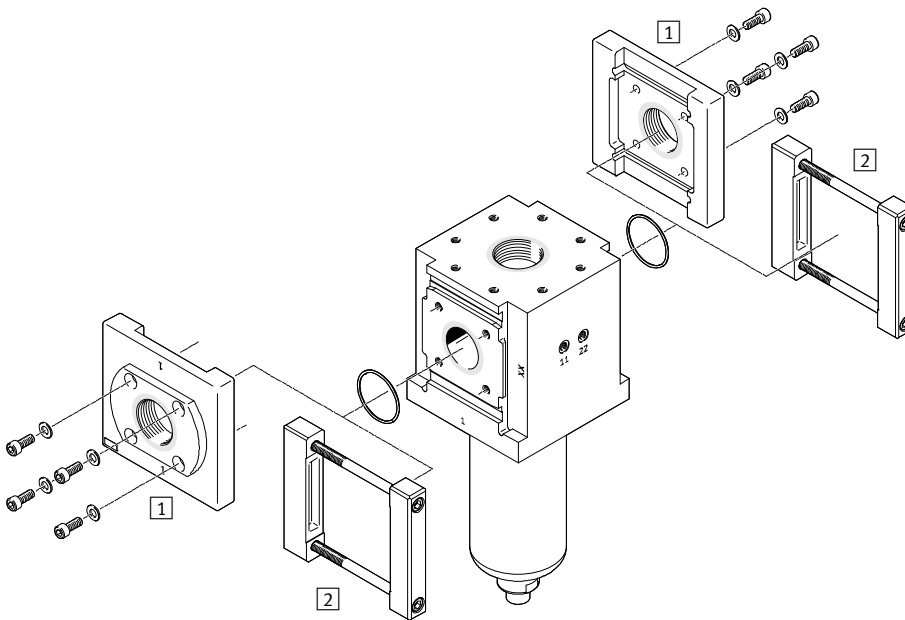
Peripherals overview

## Accessories

Size 90



Size 186



### Mounting components and accessories

		→ Page/Internet
1	Connecting plate PAML-CP	38
2	Module connector PAML-MK	41
3	Mounting bracket PAML-MB	43
4	Connecting plate PAML-CP-...-G114	38

# Micro filter PFML, series L

Type codes

PFML - 90 - HP3 - - A ST

**Service function**

PFML	Micro filter, series L
------	------------------------

**Size**

90	90 mm
186	186 mm

**Pressure range**

HP3	0 ... 50 bar
-----	--------------

**Flow range**

	Standard
H	High flow rate (size 186 only)

**Grade of filtration**

A	0.01 µm
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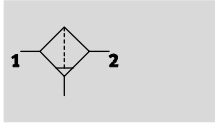
**Material of bowl**




ST	Steel
----	-------

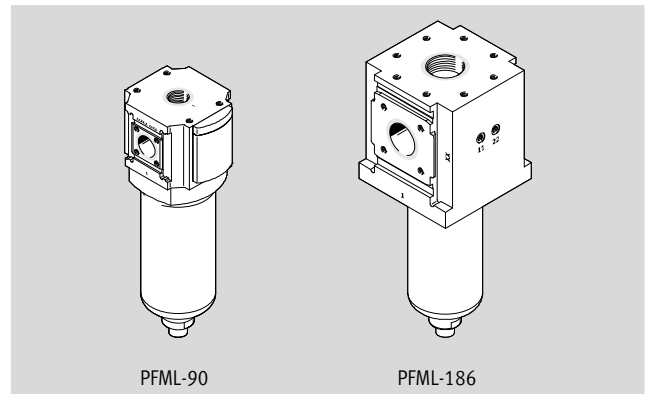
# Micro filter PFML, series L

Technical data

Function  
Manual condensate drain



-  - Flow rate  
3406 ... 138233 l/min
-  - Temperature range  
+5 ... +60 °C
-  - Operating pressure  
0 ... 50 bar



Micro filter with filter cartridges made from thermally fused microfine borosilicate and stable polyester fibres. Direction of flow through the filter cartridges is from the inside to the outside.

Condensate drain via connecting thread G½ on the underside of the filter bowl, differential pressure sensing via two connecting threads G¼ each on the front and rear side.

Alternative pneumatic connection 1 on the upper side of the housing via an internal thread.

On/off valves PVEL can be connected to the alternative connection 1 on the upper side of the micro filter via double nipples or directly using special connection plates.

General technical data			
Size	90	186	
Type	PFML-90-HP3-AST	PFML-186-HP3-AST	PFML-186-HP3-H-AST
Design	Fibre filter		
Type of mounting	In-line installation		
Mounting position	Vertical ±5°		
Grade of filtration [µm]	0.01		
Filter efficiency [%]	99.99998		
Air quality class at the outlet port	Compressed air to ISO 8573-1:2010 [1:4:2]		
Condensate drain	Manual		
Max. condensate volume [cm³]	200	400	
Volume	3	6.7	

Operating and environmental conditions			
Size	90	186	
Type	PFML-90-HP3-AST	PFML-186-HP3-AST	PFML-186-HP3-H-AST
Operating pressure [bar]	0 ... 50		
Operating medium	Compressed air to ISO 8573-1:2010 [2:4:4]		
		Inert gases	
Note on operating/pilot medium	Lubricated operation not possible		
Ambient temperature [°C]	+5 ... +60		
Temperature of medium [°C]	+5 ... +60		
Storage temperature [°C]	-10 ... +60		
Corrosion resistance class CRC <sup>1)</sup>	2		
CE marking (see declaration of conformity) <sup>2)</sup>	To EU Pressure Equipment Directive		
Food-safe <sup>2)</sup>	See Supplementary material information		

1) Corrosion resistance class CRC 2 to Festo standard FN 940070  
Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.

2) Additional information [www.festo.com/sp](http://www.festo.com/sp) → Certificates.

# Micro filter PFML, series L

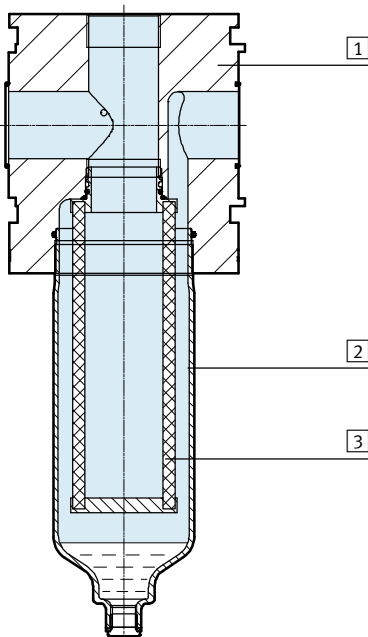
Technical data

Standard flow rate $q_n$ [l/min]				
Size		90	186	
Type		PFML-90-HP3-AST	PFML-186-HP3-AST	PFML-186-HP3-H-AST
Max. standard flow rate $q_{n \max}$ for air quality class	At $p_1 = 6$ bar	10220	10220	18980
	At $p_1 = 20$ bar	30683	30683	56983
	At $p_1 = 25$ bar	37916	37916	70416
	At $p_1 = 30$ bar	45266	45266	84066
	At $p_1 = 35$ bar	52500	52500	97500
	At $p_1 = 40$ bar	59850	59850	111150
	At $p_1 = 45$ bar	67083	67083	124583
Min. standard flow rate $q_{n \min}$ for air quality class	At $p_1 = 6$ bar	3406	3406	6326
	At $p_1 = 20$ bar	10227	10227	18994
	At $p_1 = 25$ bar	12638	12638	23472
	At $p_1 = 30$ bar	15088	15088	28022
	At $p_1 = 35$ bar	17500	17500	32500
	At $p_1 = 40$ bar	19950	19950	37050
	At $p_1 = 45$ bar	22361	22361	41527
	At $p_1 = 50$ bar	24811	24811	46077

Weight [g]				
Size		90	186	
Type		PFML-90-HP3-AST	PFML-186-HP3-AST	PFML-186-HP3-H-AST
Micro filters		7700	17900	21000

## Materials

Sectional view



Micro filters		
[1]	Housing	Wrought aluminium alloy
[2]	Bowl	High-alloy stainless steel
[3]	Filter	Borosilicate fibre
-	Seals	Nitrile rubber
Note on materials		RoHS compliant
		Contains paint-wetting impairment substances

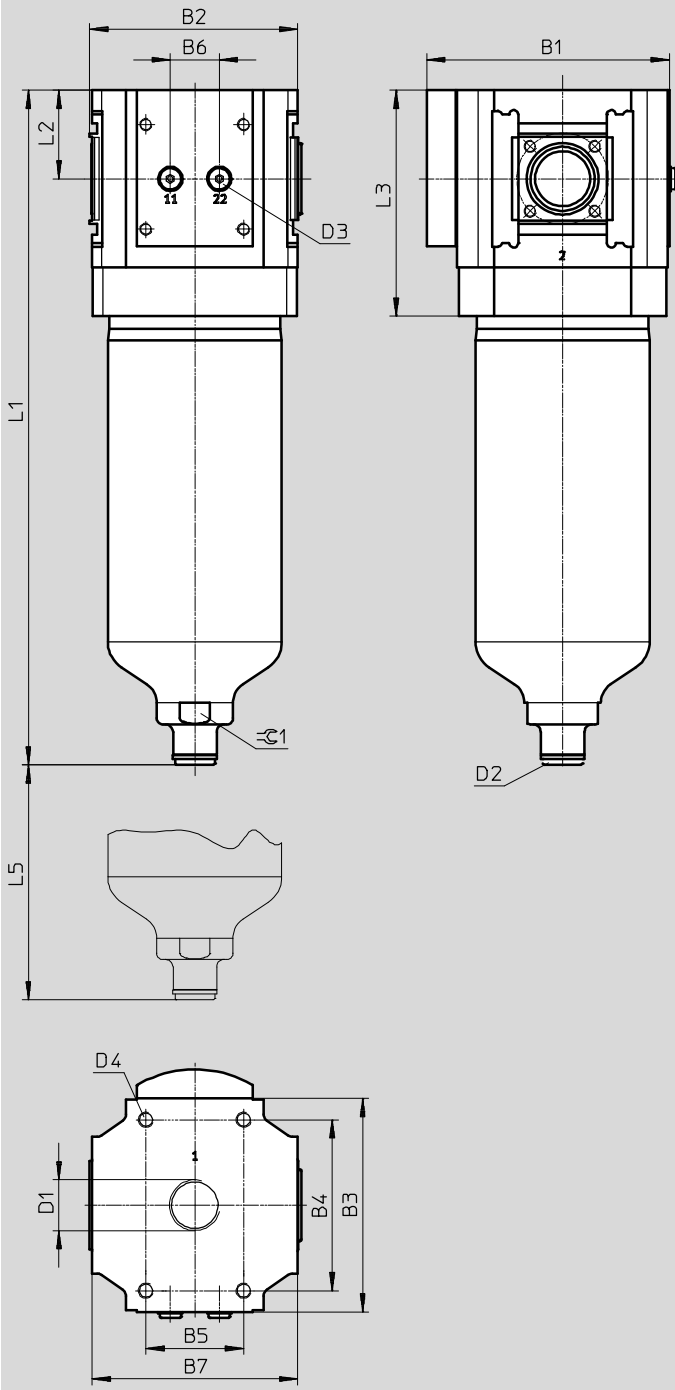


# Micro filter PFML, series L

Technical data

Dimensions – Size 90

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



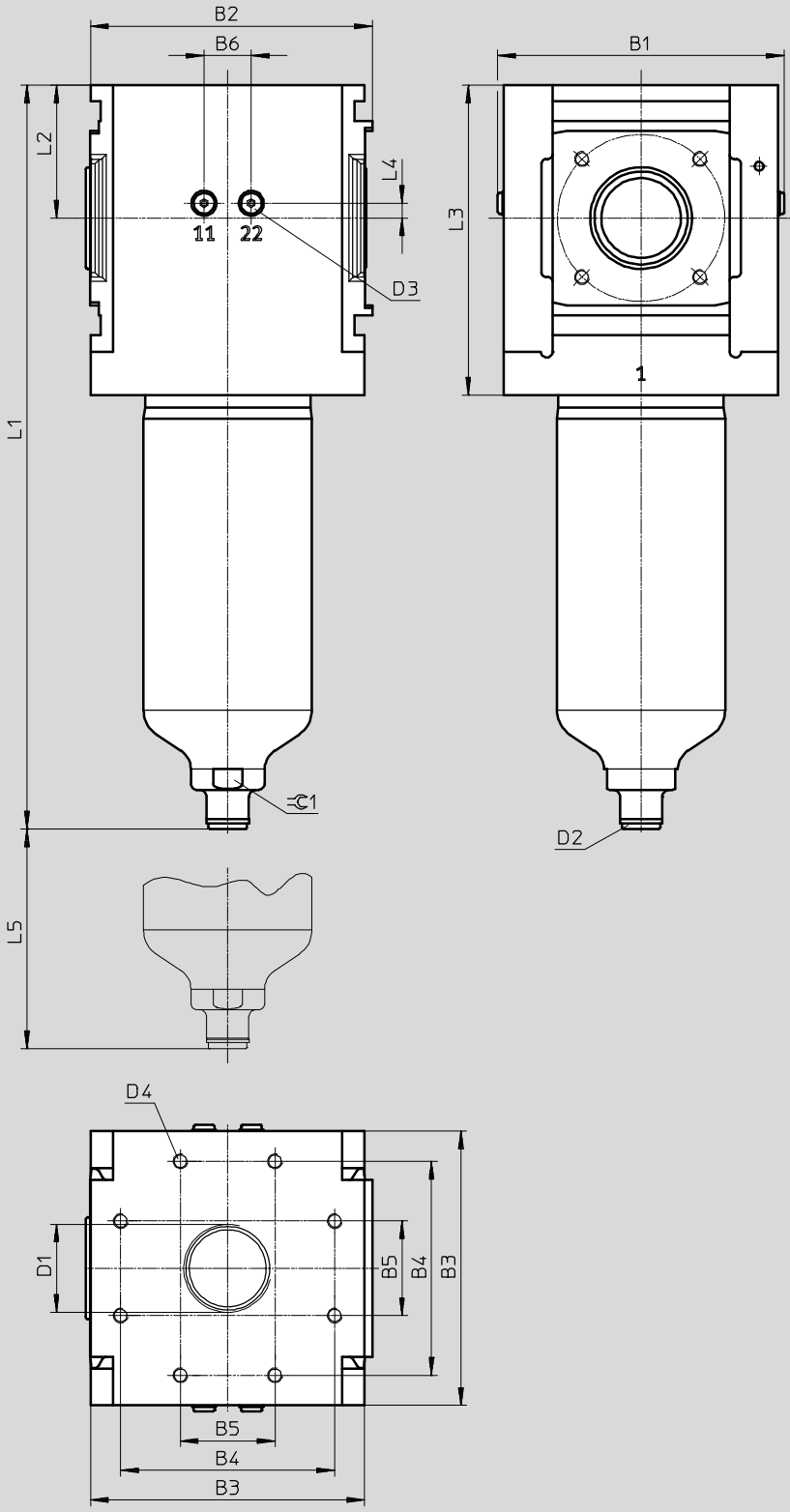
Type	B1	B2	B3	B4	B5	B6	B7	D1	D2	D3	D4	L1	L2	L3	L5	±0.1
PFML-90-HP3-AST	159	137	140	112	64	32	135	G1	G½	G⅜	M10	442	58	148	210	Min. 46

# Micro filter PFML, series L

Technical data

Dimensions – Size 186

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



Type	B1	B2	B3	B4	B5	B6	D1	D2	D3	D4	L1	L2	L3	L4	L5 Min.	≈ 1
PFML-186-HP3-AST	194	191	186	145	64	32	G2	G½	G¼	M10	504	90	210	10	210	46
PFML-186-HP3-H-AST											522		236		200	

## Micro filter PFML, series L

Technical data

Ordering data				
Flow	Size 90		Size 186	
	Part No.	Type	Part No.	Type
Standard	<b>1612487</b>	<b>PFML-90-HP3-AST</b>	<b>1364705</b>	<b>PFML-186-HP3-AST</b>
High flow rate	-		<b>1624062</b>	<b>PFML-186-HP3-H-AST</b>

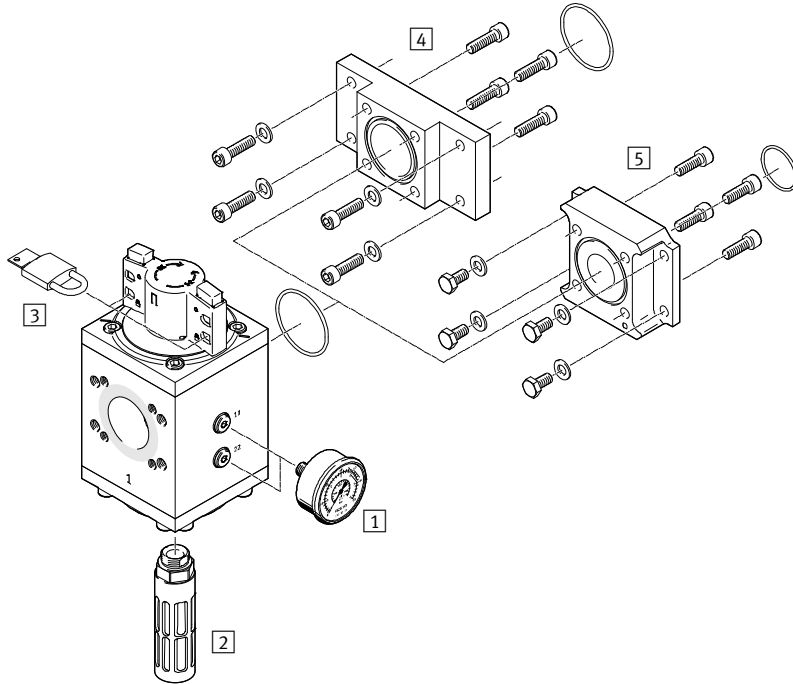
Ordering data for accessories		
Flow	Part No.	Type
Filter cartridges		
Standard	<b>1334716</b>	<b>PFEL-G2-A</b>
High flow rate	<b>1471578</b>	<b>PFEL-G212-H-A</b>

# On/off valves PVEL, series L

Peripherals overview and type codes

**Accessories**

Size 124



Mounting components and accessories		→ Page/Internet
1	Pressure gauge PAGL	45
2	Silencer U-1/2-B	47
3	Padlock (only for PVEL-H-124-HP3) LRVS-D	47
4	Connecting plate kit (for alternative connection on the upper side of the micro filter PFML-186) PAML-CP-186-HP3-E1	On request
5	Connecting plate assembly (for alternative connection on the upper side of the micro filter PFML-90) PAML-CP-90-HP3-E1	On request

**Type codes**

PVEL - H - 124 - HP3

Service function	
PVEL	On/off valve, series L

Type of actuation	
H	Manually actuated
P	Pneumatically actuated

Size	
124	124 mm

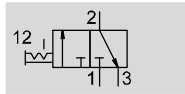
Pressure range	
HP3	0 ... 50 bar

# On/off valves PVEL, series L

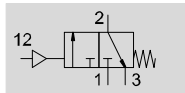
Technical data



## Function

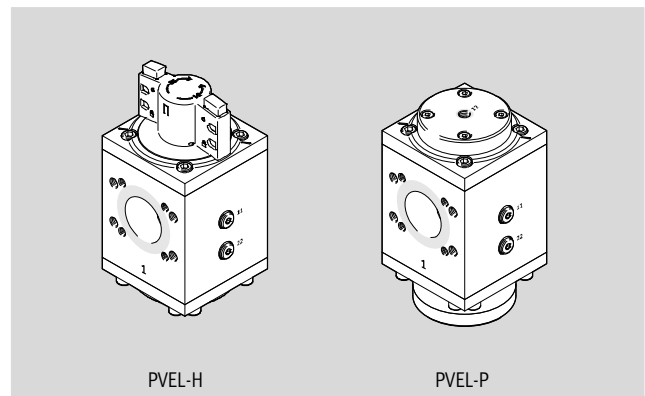
PVEL-H, manually actuated



PVEL-P, pneumatically actuated



-  Temperature range  
-10 ... +60 °C
-  Operating pressure  
0 ... 50 bar



The PVEL-H has a detenting intermediate position which enables slow pressurisation (slow start) of the system. A marking on the top cover indicates the position of the rotating dial for the

slow start. In the closed state, the PVEL-H can be locked using up to 4 padlocks. The PVEL-P is switched by an external

pneumatic signal and has a throttle point on the inside. A slow switch-on can be achieved by restricting the pilot air build-up.

- Connection options for pressure gauge on the front and rear side, one each for the operating and outlet pressure
- Interface for SAE flange 2 1/2"

General technical data		
Type	PVEL-H	PVEL-P
Nominal width DN	54	
Pneumatic connection 3	G 1/2	
Pilot air port 12	–	G 1/4
Type of actuation	Manual	Pneumatic
Design	Piston spool	
Type of mounting	In-line installation	
Mounting position	Any	
Actuator lock	Rotating dial with detent, can be locked using accessories	–
Valve function	3/2-way valve, bistable	3/2-way valve, closed, monostable
Exhaust function	No flow control	
Type of reset	Forced	Mechanical spring
Type of piloting	Direct	
Pilot air supply port	–	External
Sealing principle	Soft	

Operating and environmental conditions		
Type	PVEL-H	PVEL-P
Operating pressure [bar]	0 ... 50	
Pilot pressure [bar]	–	9 ... 50
Operating medium	Compressed air to ISO 8573-1:2010 [7:4:4] Inert gases	
Note on operating/pilot medium	Lubricated operation possible (in which case lubricated operation will always be required)	
Ambient temperature [°C]	-10 ... +60	
Temperature of medium [°C]	-10 ... +60	
Storage temperature [°C]	-10 ... +60	
Corrosion resistance class CRC <sup>1)</sup>	2	
CE marking (see declaration of conformity) <sup>2)</sup>	To EU Pressure Equipment Directive	
Food-safe <sup>2)</sup>	See Supplementary material information	

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

Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.

2) Additional information [www.festo.com/sp](http://www.festo.com/sp) → Certificates.

# On/off valves PVEL, series L

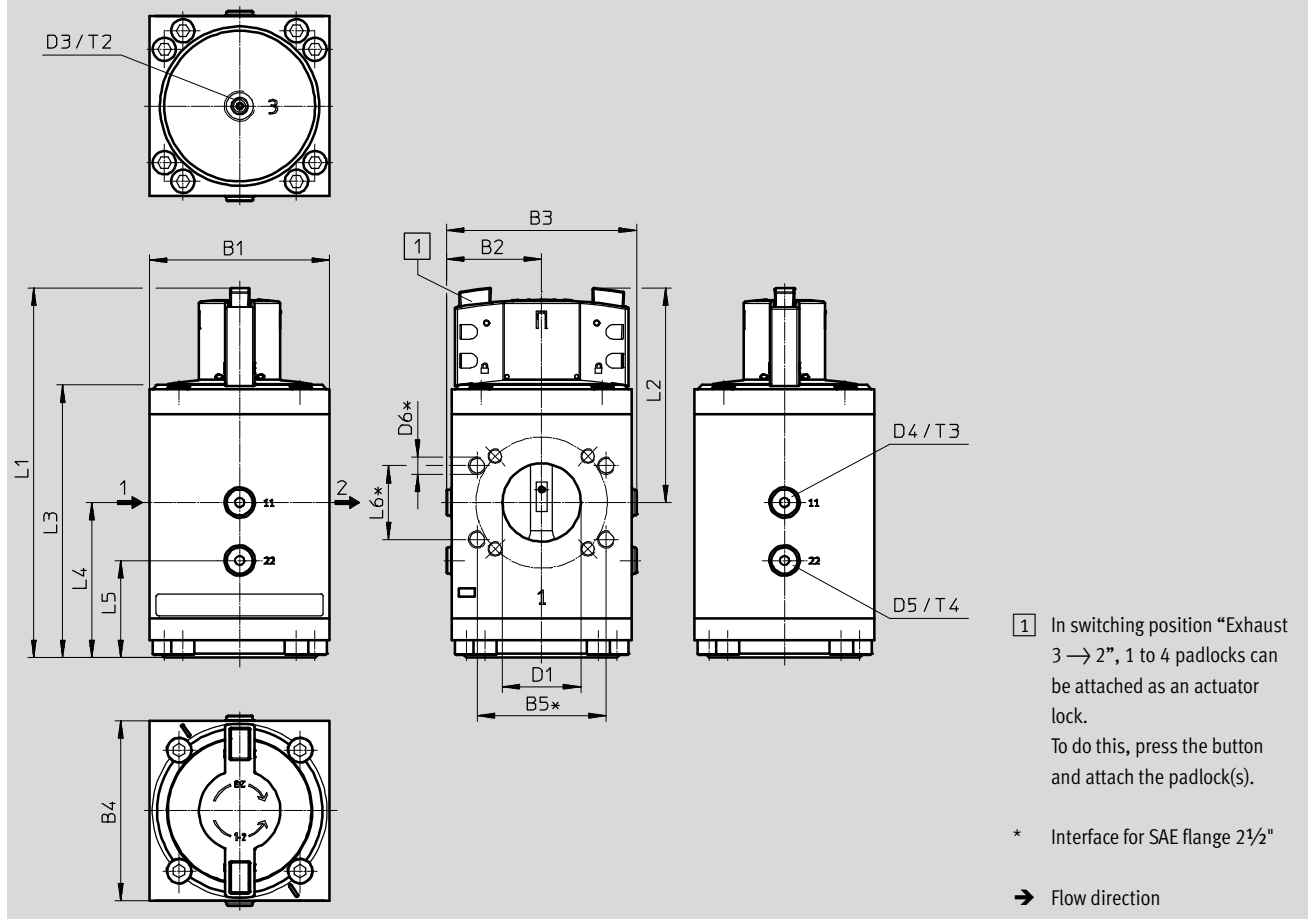
Technical data

Weight [g]		
Type	PVEL-H	PVEL-P
On/off valve	5900	6900

Materials	
Housing	Wrought aluminium alloy
Piston spool	Wrought aluminium alloy
Rotating dial	POM
Seals	NBR
	PE
Note on materials	RoHS compliant
	Contains paint-wetting impairment substances

Dimensions – Size 124 Download CAD data → [www.festo.com](http://www.festo.com)

PVEL-H



**1** In switching position “Exhaust 3 → 2”, 1 to 4 padlocks can be attached as an actuator lock. To do this, press the button and attach the padlock(s).

\* Interface for SAE flange 2½"

→ Flow direction

Type	B1	B2	B3	B4	B5	D1 ∅	D3	D4	D5	D6
PVEL-H	124	65.5	131	124	88.9	54	G½	G¼	G¼	M12x18

Type	L1	L2	L3	L4	L5	L6	T2	T3	T4
PVEL-H	~255	148	188	107	67	50.8	14	12	12

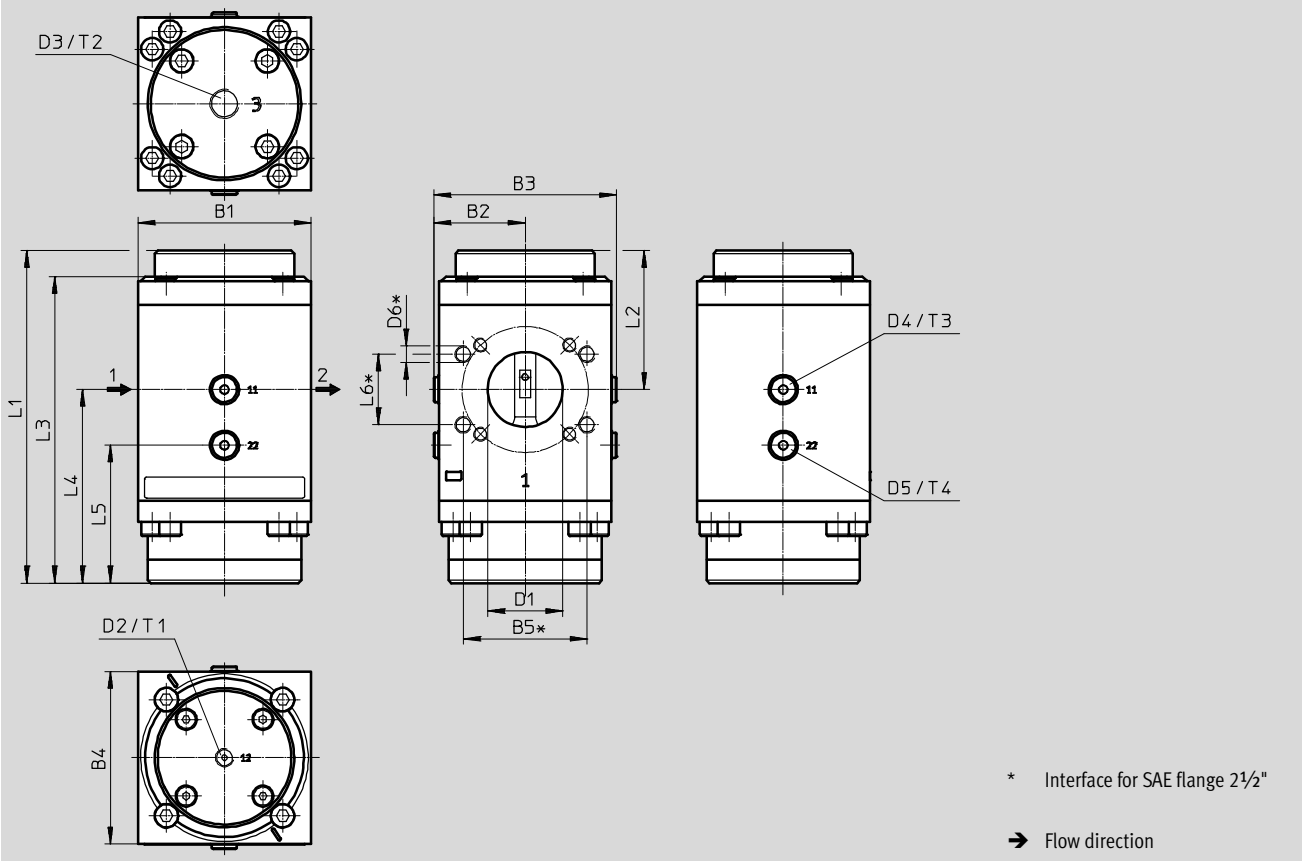
# On/off valves PVEL, series L

Technical data

**Dimensions – Size 124**

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

PVEL-P



Type	B1	B2	B3	B4	B5	D1	D2	D3	D4	D5	D6
PVEL-P	124	65.5	131	124	88.9	54 ∅	G1/4	G1/2	G1/4	G1/4	M12x18

Type	L1	L2	L3	L4	L5	L6	T1	T2	T3	T4
PVEL-P	~239	100	220	139	99	50.8	12	17	12	12

**Ordering data**

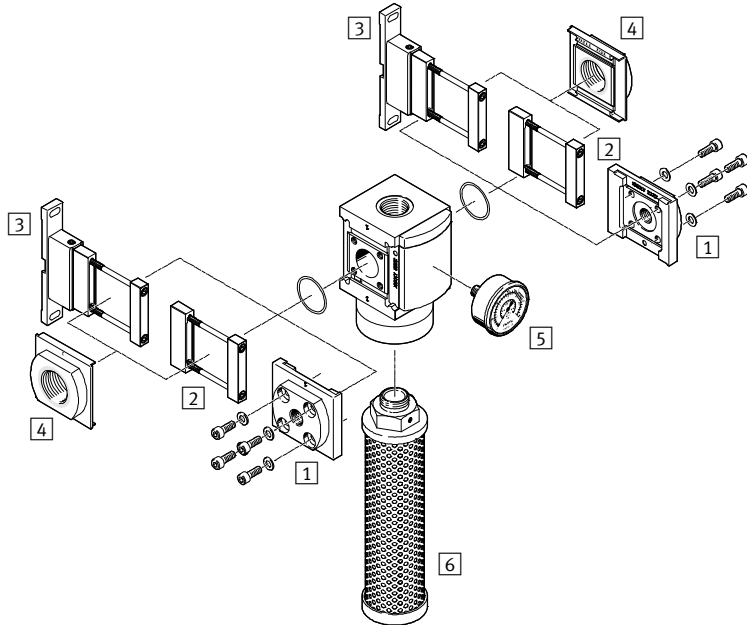
Type of actuation	Part No.	Type
Manual	1629207	PVEL-H-124-HP3
Pneumatic	1629205	PVEL-P-124-HP3

# Branching modules PMBL, series L

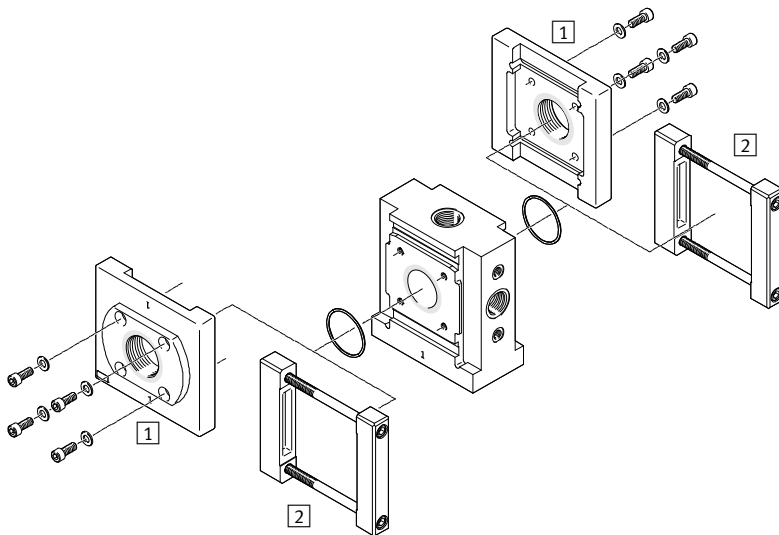
Peripherals overview

## Accessories

Size 90



Size 186



### Mounting components and accessories

		→ Page/Internet
1	Connecting plate PAML-CP	38
2	Module connector PAML-MK	41
3	Mounting bracket PAML-MB	43
4	Connecting plate PAML-CP-...-G114	38
5	Pressure gauge PAGL	45
6	Silencer (for PMBL-90-HP3-E only) U-G1-HD-SA	On request



## Branching modules PMBL, series L

Type codes

PMBL - 90 - HP3 - [ ] - [ ]

**Service function**

PMBL	Branching module, series L
------	----------------------------

**Size**

90	90 mm
186	186 mm

**Pressure range**

HP3	0 ... 50 bar
-----	--------------

**Exhaust function (size 90 mm only)**

	No exhaust function
E	Exhaust function

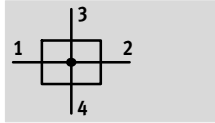
**Width (size 186 mm only)**



H	Half width
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# Branching modules PMBL, series L

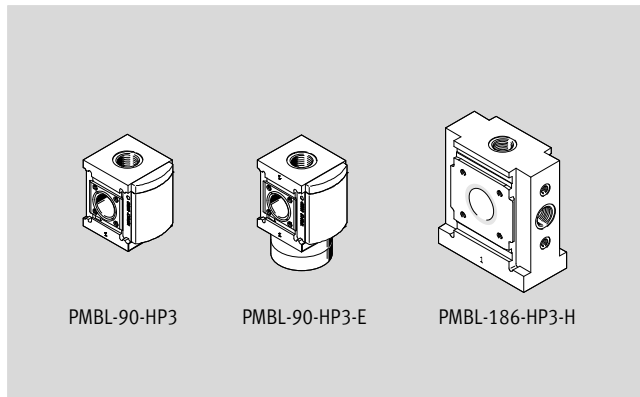
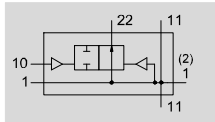
Technical data

Function  
Standard



-  - Temperature range  
+5 ... +60 °C
-  - Operating pressure  
0 ... 50 bar

With exhaust function  
(PFML-90-HP3-E)



PMBL-90-HP3

PMBL-90-HP3-E

PMBL-186-HP3-H

- Compressed air distributor with various connections
- Can be used as an intermediate distributor for varying compressed air qualities
- Attachment facility for auxiliary modules

**Outlets PMBL-90-HP3**

- Female thread G1 at top and bottom
- Female thread G $\frac{1}{4}$  at the rear and front (rear cover plate), sealed with blanking plug

**Outlets PMBL-90-HP3-E**

- Female thread G1 at top, rear and bottom (exhaust port)
- Female thread G $\frac{1}{4}$  at the front (rear cover plate), sealed with blanking plug

**Outlets PMBL-186-HP3-H**

- Female thread G1 at top, bottom and front
- Female thread G $\frac{1}{4}$  at front (2x) and rear

General technical data			
Size	90		186
Type	PMBL-90-HP3	PMBL-90-HP3-E	PMBL-186-HP3-H
Nominal width DN	36	36	54
Pneumatic connection 3, 4	G1	-	G1
Pneumatic connection 11	-	G1	-
Pilot air port, exhaust function 10	-	G $\frac{1}{4}$	-
Silencer connection, exhaust function 22	-	G1	-
Design	Branching module	Branching module with exhaust function via integrated 2/2-way valve	Branching module
Type of mounting	In-line installation		
Mounting position	Any		

Operating and environmental conditions			
Size	90		186
Type	PMBL-90-HP3	PMBL-90-HP3-E	PMBL-186-HP3-H
Operating pressure [bar]	0 ... 50		
Pilot pressure [bar]	-	0 ... 50	-
Operating medium	Compressed air to ISO 8573-1:2010 [-:-:-]	Compressed air to ISO 8573-1:2010 [7:4:4]	Compressed air to ISO 8573-1:2010 [-:-:-]
Note on operating/pilot medium	Lubricated operation not possible		
Ambient temperature [°C]	+5 ... +60		
Temperature of medium [°C]	+5 ... +60		
Storage temperature [°C]	-10 ... +60		
Corrosion resistance class CRC <sup>1)</sup>	2		
CE marking (see declaration of conformity) <sup>2)</sup>	To EU Pressure Equipment Directive		
Food-safe <sup>2)</sup>	See Supplementary material information		

1) Corrosion resistance class CRC 2 to Festo standard FN 940070  
Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.

2) Additional information [www.festo.com/sp](http://www.festo.com/sp) → Certificates.

# Branching modules PMBL, series L

Technical data

Flow rate characteristics			
Size	90		186
Type	PMBL-90-HP3	PMBL-90-HP3-E	PMBL-186-HP3-H
Standard nominal flow rate $q_{nN^1}$ [l/min]			
In main flow direction 1 $\rightarrow$ 2	49000	49000	117240
In exhaust direction 2 $\rightarrow$ 3	-	13000	-

1) Measured at  $p_1 = 6$  bar and  $p_2 = 5$  bar,  $\Delta p = 1$  bar

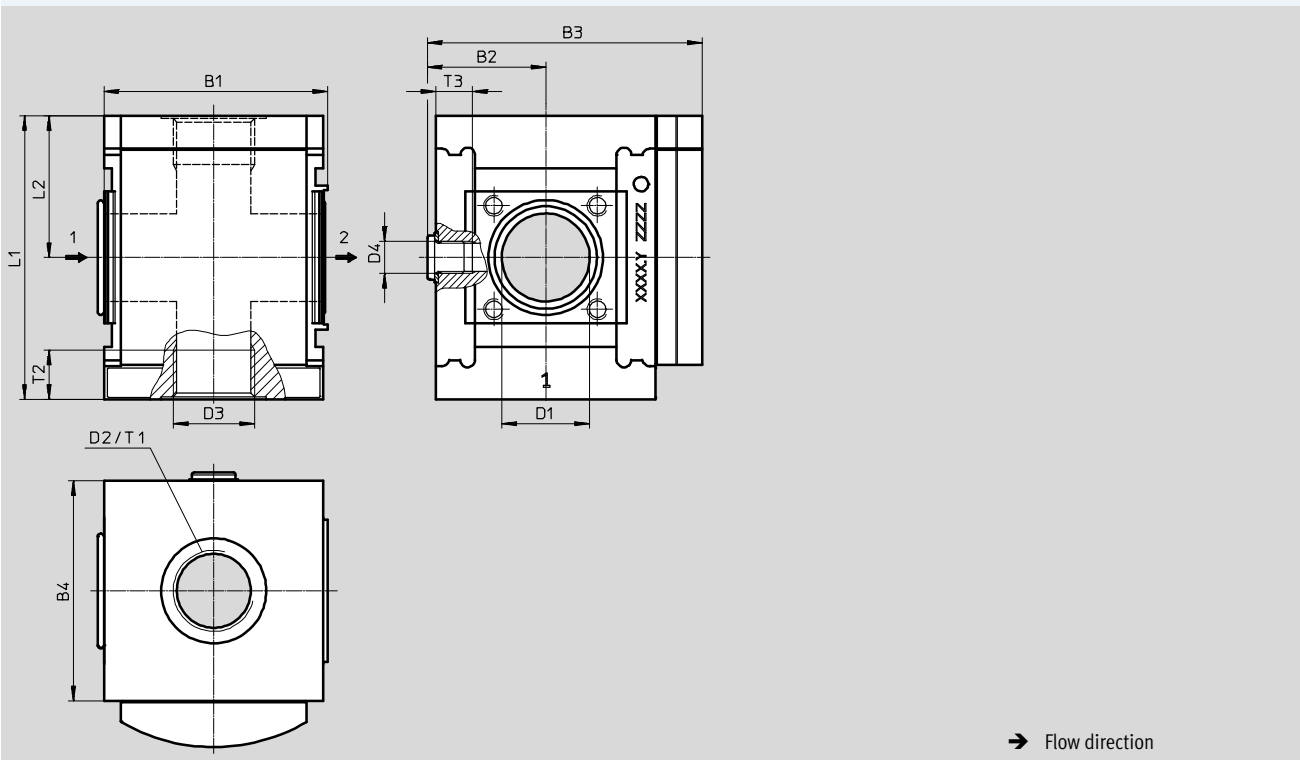
Weight [g]			
Size	90		186
Type	PMBL-90-HP3	PMBL-90-HP3-E	PMBL-186-HP3-H
Branching module	2000	2600	7500

Materials			
Size	90		186
Type	PMBL-90-HP3	PMBL-90-HP3-E	PMBL-186-HP3-H
Housing	Wrought aluminium alloy		
Seals	NBR		
	-	PE	-
Note on materials	RoHS compliant		
	Contains paint-wetting impairment substances		

## Dimensions – Size 90

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

PMBL-90-HP3



Type	B1	B2	B3	B4	D1 ∅	D2	D3	D4	L1	L2	T1	T2	T3
PMBL-90-HP3	~92	~49	~113	90	36	G1	G1	G¼	116	58	20	20	15

# Branching modules PMBL, series L

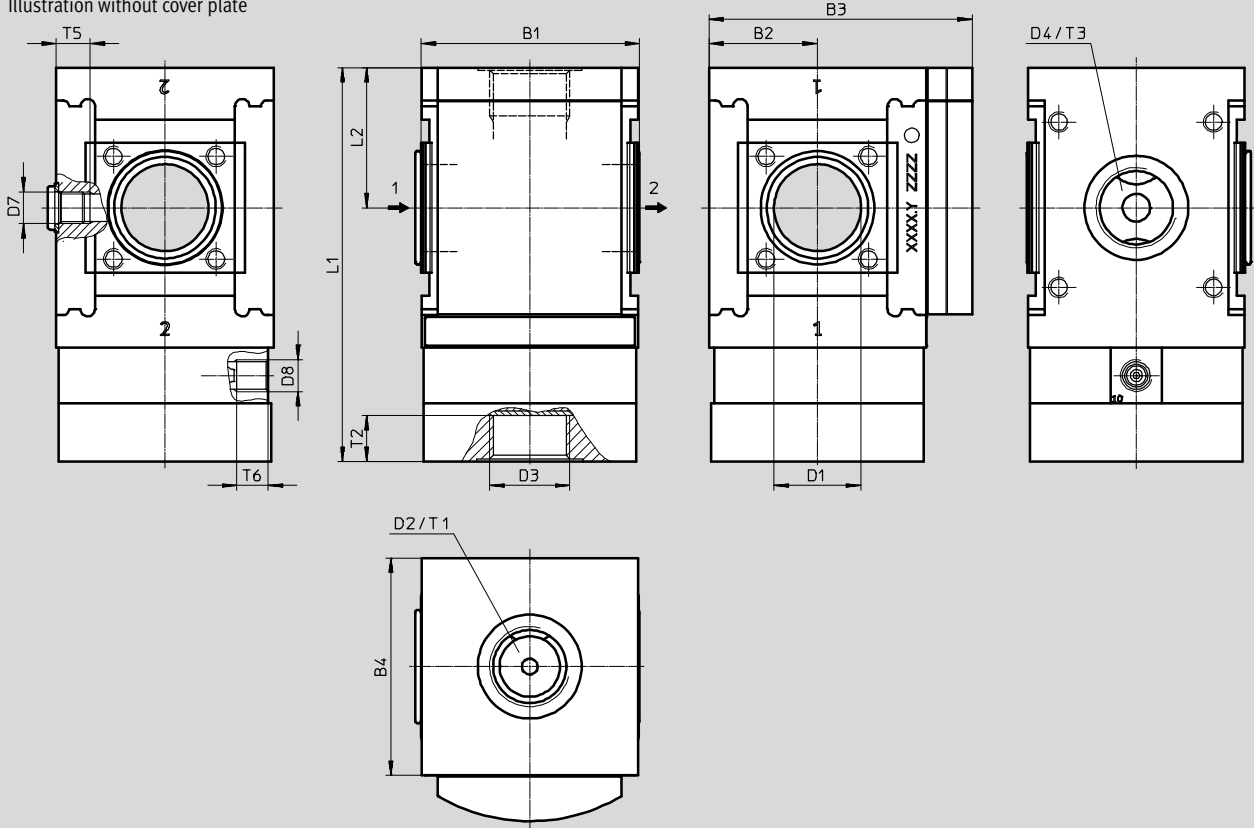
Technical data

**Dimensions – Size 90**

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

PMBL-90-HP3-E

Illustration without cover plate



→ Flow direction

Type	B1	B2	B3	B4	D1 ∅	D2	D3	D4	D7	D8	L1	L2	T1	T2	T3	T5	T6
PMBL-90-HP3-E	90	45	109	90	36	G1	G1	G1	G <sup>1</sup> / <sub>4</sub>	G <sup>1</sup> / <sub>4</sub>	163	58	20	19	20	14	13

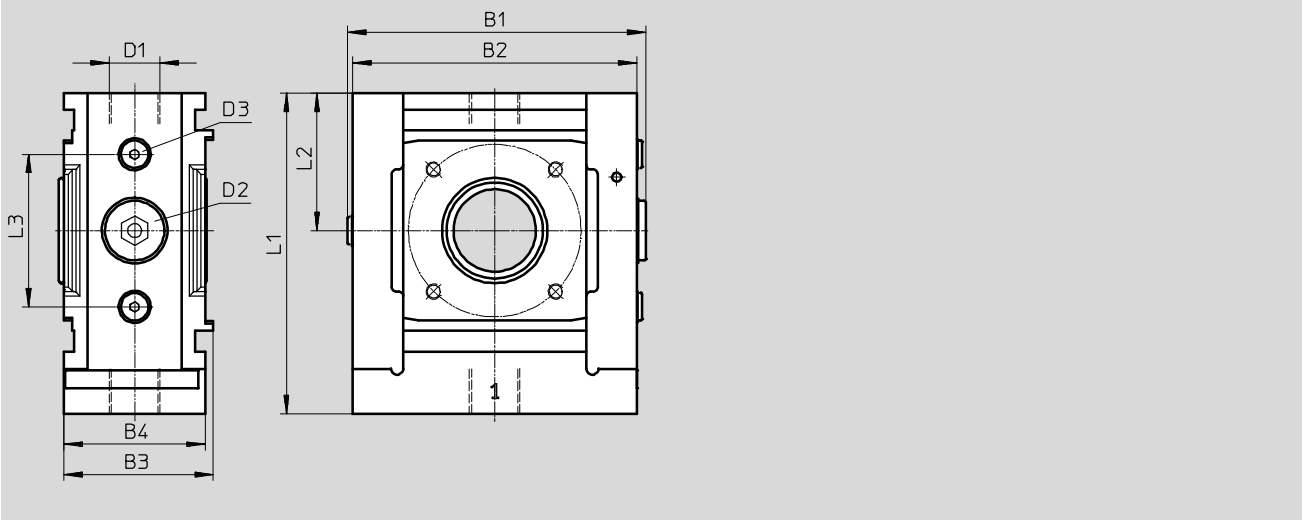
# Branching modules PMBL, series L

Technical data

**Dimensions – Size 186**

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

PMBL-186-HP3-H



Type	B1	B2	B3	B4	D1	D2	D3	L1	L2	L3
PMBL-186-HP3-H	196	186	98	93	G1	G1	G1/4	210	90	100



**Ordering data**

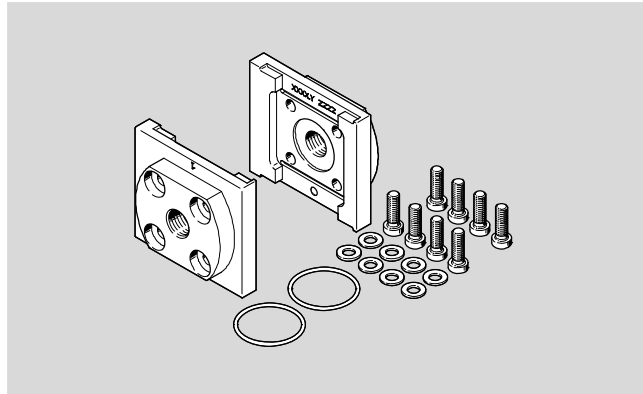
Function	Size 90		Size 186	
	Part No.	Type	Part No.	Type
Standard	1401366	PMBL-90-HP3	1609073	PMBL-186-HP3-H
With exhaust function	2663892	PMBL-90-HP3-E	-	-

# Pneumatic components for high-pressure applications, series L

Accessories

**Connecting plate PAML-CP**  
with internal thread for connecting fittings/pipes

-  - Temperature range  
+5 ... +60 °C
-  - Operating pressure  
0 ... 50 bar



General technical data										
Size	90					186				
Nominal width DN	36					54				
Pneumatic connection 1, 2	G1/4	G1/2	G3/4	G1	G1 1/4	G1/4	G1 1/4	G1 1/2	G2	G2 1/2

Operating and environmental conditions	
Operating pressure [bar]	0 ... 50
Operating medium	Compressed air to ISO 8573-1:2010 [---:--]
Ambient temperature [°C]	+5 ... +60
Temperature of medium [°C]	+5 ... +60
Storage temperature [°C]	-10 ... +60
Corrosion resistance class CRC <sup>1)</sup>	2
CE marking (see declaration of conformity) <sup>2)</sup>	To EU Pressure Equipment Directive
Food-safe <sup>2)</sup>	See Supplementary material information

1) Corrosion resistance class CRC 2 to Festo standard FN 940070  
Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.

2) Additional information [www.festo.com/sp](http://www.festo.com/sp) → Certificates.

Materials	
Connecting plate	Wrought aluminium alloy
Screws	Stainless steel
Seals	Nitrile rubber
Note on materials	RoHS compliant

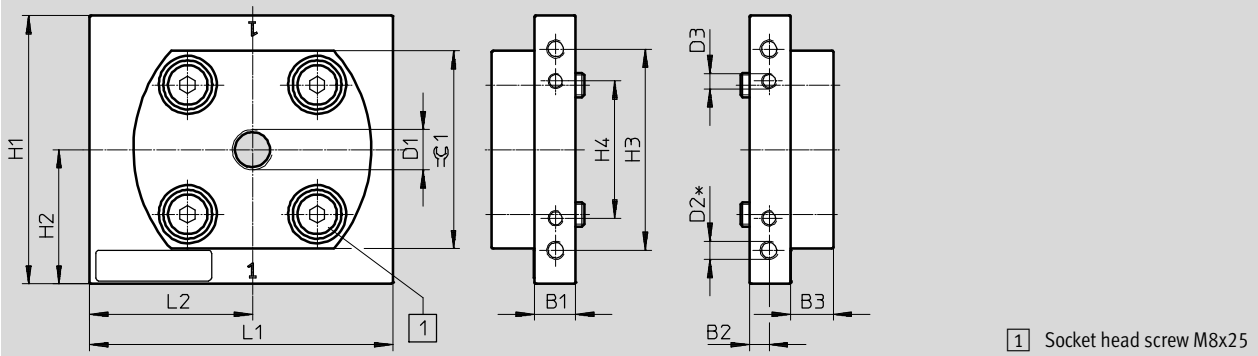
# Pneumatic components for high-pressure applications, series L

Accessories

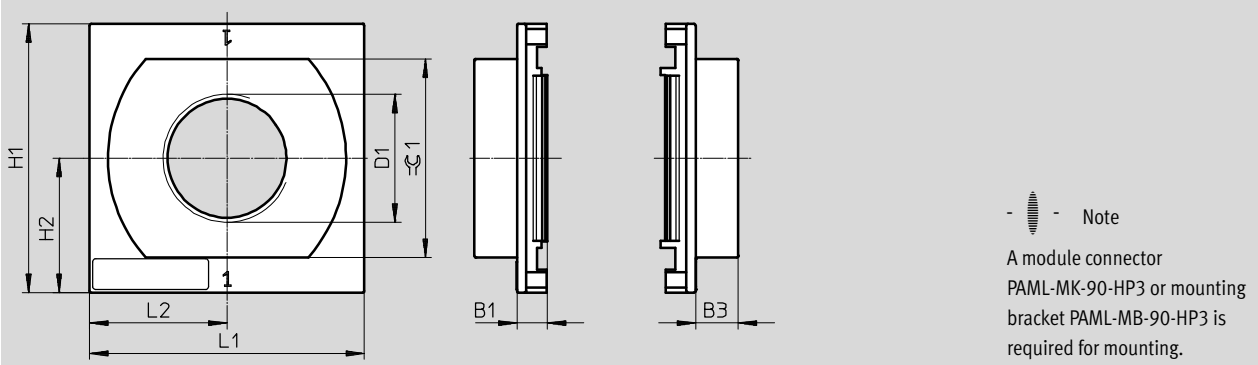
## Dimensions – Size 90

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

PAML-CP-90-HP3-G14/G12/G34/G1



PAML-CP-90-HP3-G114



Type	B1	B2	B3	D1	D2 <sup>1)</sup>	D3	H1	H2	H3	H4	L1	L2	±0.1
PAML-CP-90-HP3-G14	13.5	6.5	14	G1/4	M6x10	M5x9	88	44	66	45	~99	~53	65
PAML-CP-90-HP3-G12				G1/2									
PAML-CP-90-HP3-G34				G3/4									
PAML-CP-90-HP3-G1				G1									
PAML-CP-90-HP3-G114	10	-		G1 1/4	-				-	-	90	45	

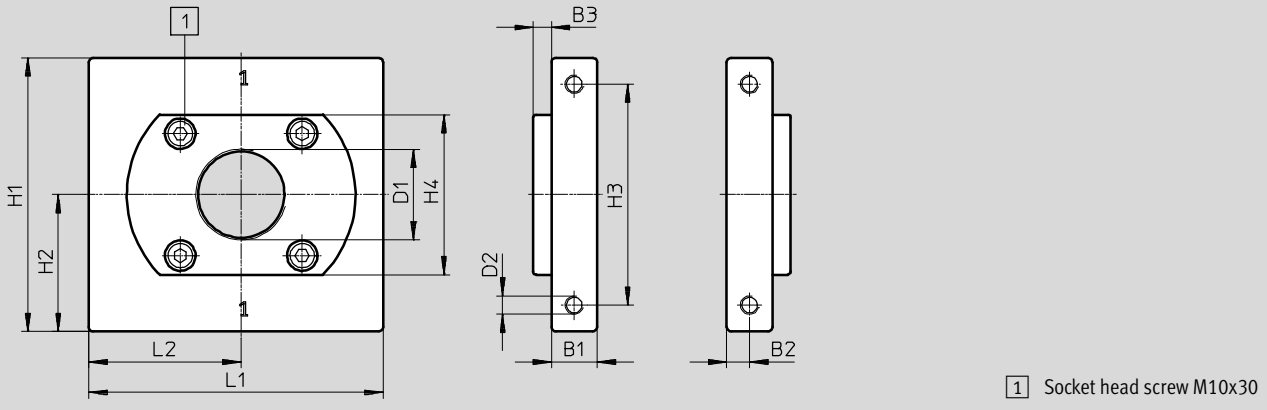
1) Thread for mounting the service unit on a wall without mounting bracket

# Pneumatic components for high-pressure applications, series L

Accessories

**Dimensions – Size 186**

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



Type	B1	B2	B3	D1	D2	H1	H2	H3	H4	L1	L2
PAML-CP-186-HP3-G14	30	15	12	G1¼	M12	180	90	145	105	193	100
PAML-CP-186-HP3-G114				G1¼							
PAML-CP-186-HP3-G112				G1½							
PAML-CP-186-HP3-G2				G2							
PAML-CP-186-HP3-G212			G2½	25							

Ordering data			
Size	Pneumatic connection	Weight [g]	Part No. Type
90	G¼	800	1651540 PAML-CP-90-HP3-G14
	G½	770	1651541 PAML-CP-90-HP3-G12
	G¾	750	1651542 PAML-CP-90-HP3-G34
	G1	730	1651543 PAML-CP-90-HP3-G1
	G1¼	500	1448978 PAML-CP-90-HP3-G114
186	G¼	4700	1629300 PAML-CP-186-HP3-G14
	G1¼	4600	1629296 PAML-CP-186-HP3-G114
	G1½	4500	1629297 PAML-CP-186-HP3-G112
	G2	4400	1629298 PAML-CP-186-HP3-G2
	G2½	4900	1629299 PAML-CP-186-HP3-G212





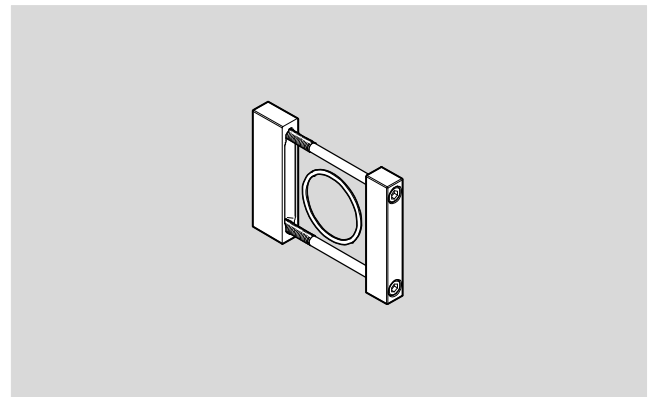
# Pneumatic components for high-pressure applications, series L

Accessories

## Module connector PAML-MK

For connecting individual service units to form service unit combinations

-  - Temperature range  
+5 ... +60 °C
-  - Operating pressure  
0 ... 50 bar



General technical data		
Size	90	186
Nominal width DN	36	54

Operating and environmental conditions		
Operating pressure [bar]	0 ... 50	
Operating medium	Compressed air to ISO 8573-1:2010 [-:-:-]	
Ambient temperature [°C]	+5 ... +60	
Temperature of medium [°C]	+5 ... +60	
Storage temperature [°C]	-10 ... +60	
Corrosion resistance class CRC <sup>1)</sup>	2	
CE marking (see declaration of conformity) <sup>2)</sup>	To EU Pressure Equipment Directive	
Food-safe <sup>2)</sup>	See Supplementary material information	

- 1) Corrosion resistance class CRC 2 to Festo standard FN 940070  
Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.
- 2) Additional information [www.festo.com/sp](http://www.festo.com/sp) → Certificates.

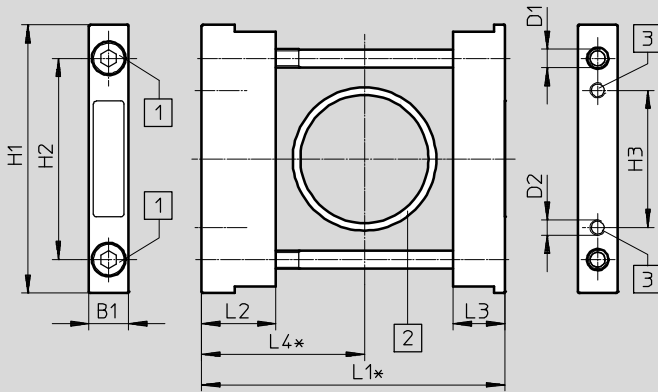
Materials	
Module connector	Wrought aluminium alloy
Screws	Stainless steel
Seals	Nitrile rubber
Note on materials	RoHS compliant

# Pneumatic components for high-pressure applications, series L

Accessories

## Dimensions – Size 90

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



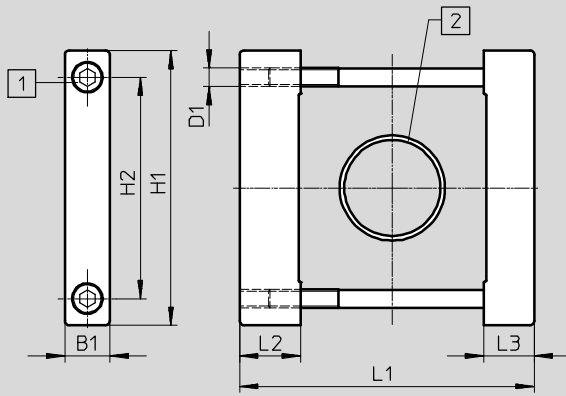
- 1 Socket head screw M6x85
- 2 O-ring, 42x2.5
- 3 Thread for mounting the service unit on a wall

Type	B1	D1	D2	H1	H2	H3	L1 <sup>1)</sup>	L2	L3	L4 <sup>1)</sup>
PAML-MK-90-HP3	13	M6	M5x9	88	66	45	99	24.4	17	~53

1) Dimension in mounted state

## Dimensions – Size 186

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



- 1 Socket head screw M12x160
- 2 O-ring, 63x3

Type	B1	D1	H1	H2	L1 <sup>1)</sup>	L2	L3
PAML-MK-186-HP3	29.5	M12	180	145	193	40	33

1) Dimension in mounted state

## Ordering data

Size	Weight [g]	Part No.	Type
90	150	1367005	PAML-MK-90-HP3
186	1300	1629377	PAML-MK-186-HP3



## Pneumatic components for high-pressure applications, series L

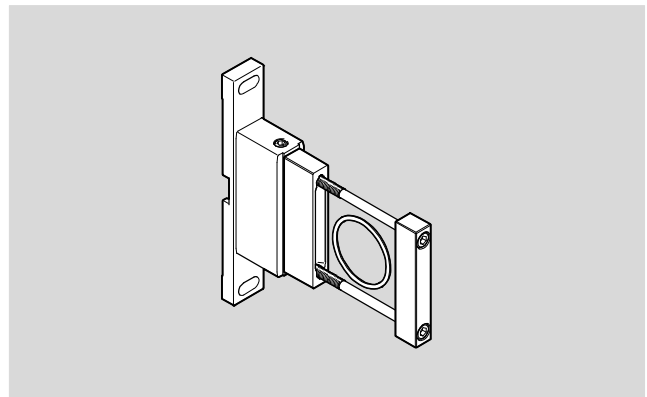
Accessories

### Mounting bracket PAML-MB

For mounting service unit combinations on a wall and for connecting individual service units to form service unit combinations

- Quick to mount and dismount

-  - Temperature range  
+5 ... +60 °C
-  - Operating pressure  
0 ... 50 bar



General technical data	
Size	90
Nominal width DN	36

Operating and environmental conditions	
Operating pressure [bar]	0 ... 50
Operating medium	Compressed air to ISO 8573-1:2010 [-:-:-]
Ambient temperature [°C]	+5 ... +60
Temperature of medium [°C]	+5 ... +60
Storage temperature [°C]	-10 ... +60
Corrosion resistance class CRC <sup>1)</sup>	2
CE marking (see declaration of conformity) <sup>2)</sup>	To EU Pressure Equipment Directive
Food-safe <sup>2)</sup>	See Supplementary material information

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

Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.

2) Additional information [www.festo.com/sp](http://www.festo.com/sp) → Certificates.

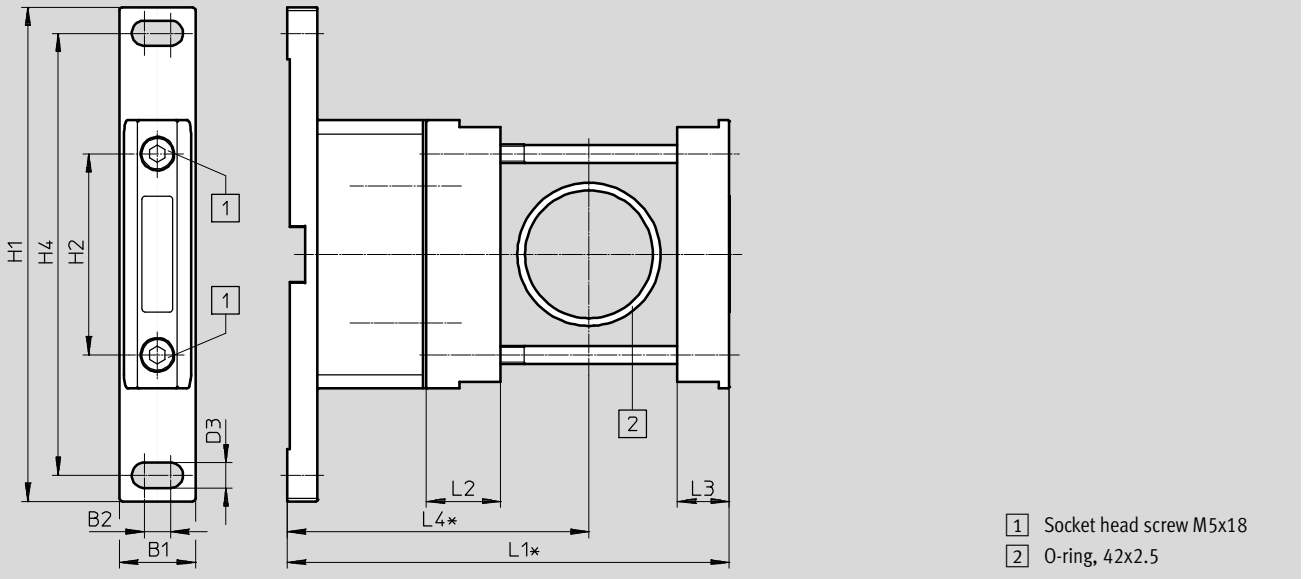
Materials	
Bracket	Wrought aluminium alloy
Module connector	Wrought aluminium alloy
Screws	Stainless steel
Seals	Nitrile rubber
Note on materials	RoHS compliant

# Pneumatic components for high-pressure applications, series L

Accessories

**Dimensions – Size 90**

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



Type	B1	B2	D3	H1	H2	H4	L1 <sup>1)</sup>	L2	L3	L4 <sup>1)</sup>
PAML-MB-90-HP3	25	8.5	8.3	162	66	145	~145	24.4	17	~99

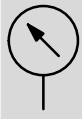
1) Dimension in mounted state



Ordering data			
Size	Weight [g]	Part No.	Type
90	300	<b>1367323</b>	<b>PAML-MB-90-HP3</b>

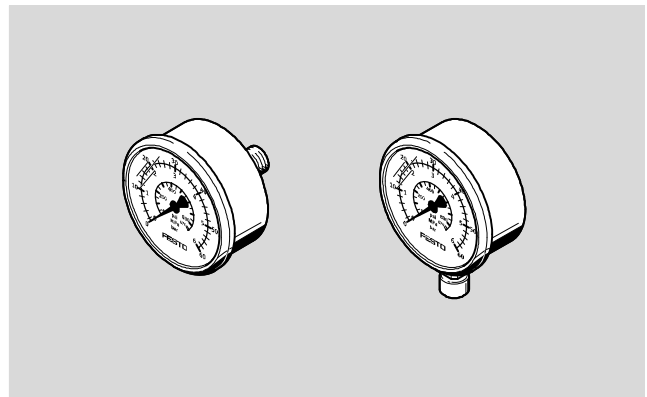
# Pneumatic components for high-pressure applications, series L

Accessories

## Pressure gauge PAGL



-  - Temperature range  
0 ... +60 °C
-  - Operating pressure  
0 ... 60 bar



Technical data	
Nominal size	63
Pneumatic connection	G $\frac{1}{4}$
Operating medium	Inert gases Neutral liquids
Note on operating/pilot medium	No oxygen No acetylene
Design	Bourdon tube pressure gauge
Conforms to standard	EN 837-1
Type of mounting	In-line installation
Connection position	Centred, rear side Radial underneath
Ambient temperature [°C]	0 ... +60
Temperature of medium [°C]	0 ... +60
Storage temperature [°C]	-40 ... +70
Measurement accuracy class	1.6
Continuous load factor	0.75
Intermittent load factor	0.66
Degree of protection	IP65
Weight [g]	80

Materials	
Nominal size	63
Pneumatic connection	G $\frac{1}{4}$
Housing	Steel (colour: silver)
Inspection window	PS
Threaded plug/ Materials in contact with the medium	Brass
Note on materials	RoHS compliant

# Pneumatic components for high-pressure applications, series L

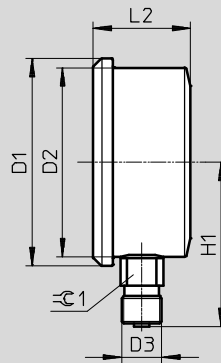
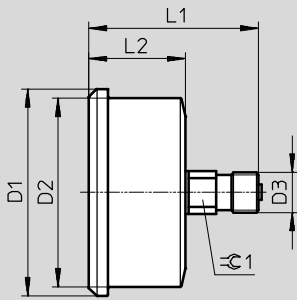
Accessories

**Dimensions**

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

PAGL-HP3-63-60-G14

PAGL-HP3-63-60-G14-RC




Type	D1 Ø	D2 Ø	D3	H1 ±0.5	L1 ±0.5	L2 ±0.5	±1
PAGL-HP3-63-60-G14	68	62	G¼	-	56	32	14
PAGL-HP3-63-60-G14-RC				54	-		

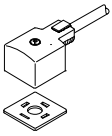
**Ordering data**


Nominal size	Pneumatic connection	Operating pressure	Indicating range		Connection position	Part No.	Type
			Outer scale	Inner scale			
63	G¼	0 ... 60 bar	0 ... 60 bar and 0 ... 6 MPa	0 ... 870 psi	Centred, rear side	<b>1166938</b>	<b>PAGL-HP3-63-60-G14</b>
					Radial underneath	<b>1908519</b>	<b>PAGL-HP3-63-60-G14-RC</b>

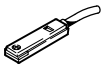
# Pneumatic components for high-pressure applications, series L



Accessories

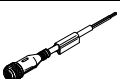
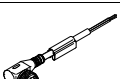
Ordering data – Silencers U			Technical data → Internet: u	
	Description	Pneumatic connection	Part No.	Type
	For PREL	G $\frac{1}{2}$	<b>6844</b>	<b>U-<math>\frac{1}{2}</math>-B</b>
	For PAHL	G $\frac{3}{4}$	<b>6845</b>	<b>U-<math>\frac{3}{4}</math>-B</b>
	For PVEL	G1	<b>151990</b>	<b>U-1-B</b>

Ordering data – Connecting cables KMC						Technical data → Internet: kmc	
	Description	Operating voltage	Electrical connection	Switching status indication	Cable length [m]	Part No.	Type
	for PAHL	24 V DC	3-pin	LED	2.5	<b>30931</b>	<b>KMC-1-24DC-2,5-LED</b>
					5	<b>30933</b>	<b>KMC-1-24DC-5-LED</b>
					10	<b>193459</b>	<b>KMC-1-24-10-LED</b>

Ordering data – Illuminating seal MC-LD			Technical data → Internet: mc	
	Description	Operating voltage range	Part No.	Type
	For connecting cable KMC	12 ... 24 V DC	<b>19145</b>	<b>MC-LD-12-24DC</b>

Ordering data – Proximity sensor SME-8						Technical data → Internet: sme-8	
	Description	Electrical connection	Operating voltage range	Switching element function	Switching output	Cable length [m]	Part No. Type
	for PAHL	Cable with plug M8x1, 3-pin	12 ... 30 V DC	N/O contact	Contacting, bipolar	0.3	<b>150857</b> <b>SME-8-S-LED-24</b>

Ordering data – Connecting cable NEBU-M8				Technical data → Internet: nebu	
	Electrical connection	Number of wires	Cable length [m]	Part No.	Type
	M8x1, straight socket	3	2.5	<b>541333</b>	<b>NEBU-M8G3-K-2.5-LE3</b>
			5	<b>541334</b>	<b>NEBU-M8G3-K-5-LE3</b>
			10	<b>541332</b>	<b>NEBU-M8G3-K-10-LE3</b>
	M8x1, angled socket	3	2.5	<b>541338</b>	<b>NEBU-M8W3-K-2.5-LE3</b>
			5	<b>541341</b>	<b>NEBU-M8W3-K-5-LE3</b>
			10	<b>541335</b>	<b>NEBU-M8W3-K-10-LE3</b>

Ordering data – Connecting cable NEBU-M12				Technical data → Internet: nebu	
	Electrical connection	Number of wires	Cable length [m]	Part No.	Type
	M12x1, straight socket	5	2.5	<b>541330</b>	<b>NEBU-M12G5-K-2.5-LE5</b>
			5	<b>541331</b>	<b>NEBU-M12G5-K-5-LE5</b>
			10	<b>554038</b>	<b>NEBU-M12G5-K-10-LE5</b>
	M12x1, angled socket	5	2.5	<b>567843</b>	<b>NEBU-M12W5-K-2.5-LE5</b>
			5	<b>567844</b>	<b>NEBU-M12W5-K-5-LE5</b>

Ordering data – Padlock LRVS-D		
	Weight [g]	Part No. Type
	120	<b>193786</b> <b>LRVS-D</b>