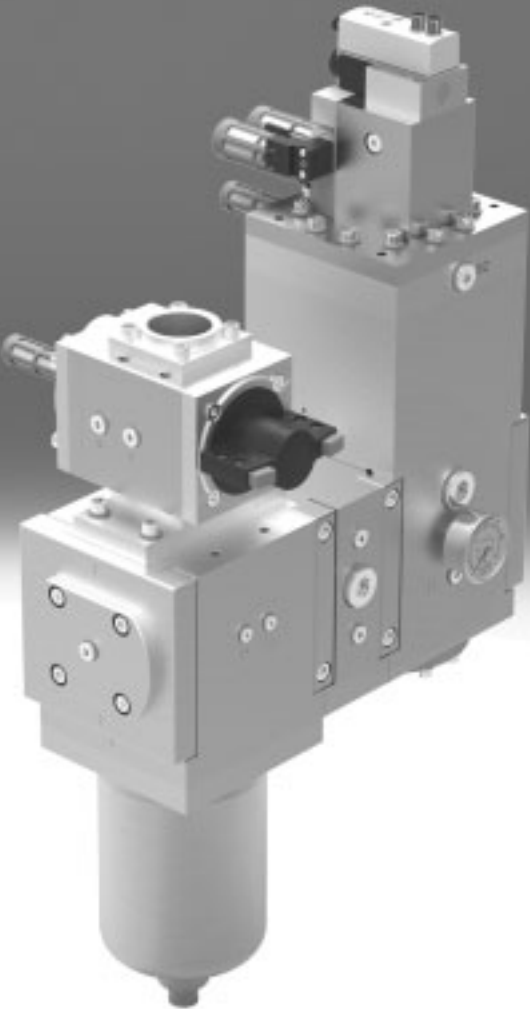
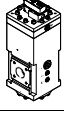

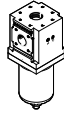





Pneumatic components for high-pressure applications



Pneumatic components for high-pressure applications, series L

Product range overview

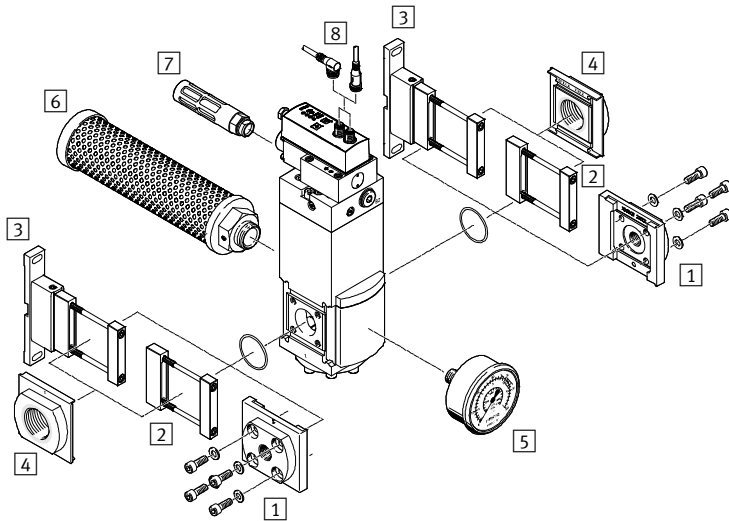
Function	Version	Type	Size	Pneumatic connection 1, 2		→ Page
				Direct	With connecting plate/flange	
Service units	Electric pressure regulator					
		PREL	90	–	G ¹ / ₄ , G ¹ / ₂ , G ³ / ₄ , G1, G1 ¹ / ₄	3
			186	–	G ¹ / ₄ , G1 ¹ / ₄ , G1 ¹ / ₂ , G2, G2 ¹ / ₂	
	Shut-off valve for electric pressure regulator PREL					
		PAHL	–	Mounted on electric pressure regulator PREL	–	14
	Micro filter					
		PFML	90	–	G ¹ / ₄ , G ¹ / ₂ , G ³ / ₄ , G1, G1 ¹ / ₄	25
			186	–	G ¹ / ₄ , G1 ¹ / ₄ , G1 ¹ / ₂ , G2, G2 ¹ / ₂	
	On/off valve					
		PVEL	124	–	SAE flange	32
Branching module						
	PMBL	90	–	G ¹ / ₄ , G ¹ / ₂ , G ³ / ₄ , G1, G1 ¹ / ₄	36	
		186	–	G ¹ / ₄ , G1 ¹ / ₄ , G1 ¹ / ₂ , G2, G2 ¹ / ₂		
Valves	Proportional pressure regulator					
		VPPL	–	<ul style="list-style-type: none"> Mounted on electric pressure regulator PREL or on shut-off valve PAHL G¹/₄ 	–	18

Electric pressure regulators PREL, series L

Peripherals overview

Accessories

Size 90



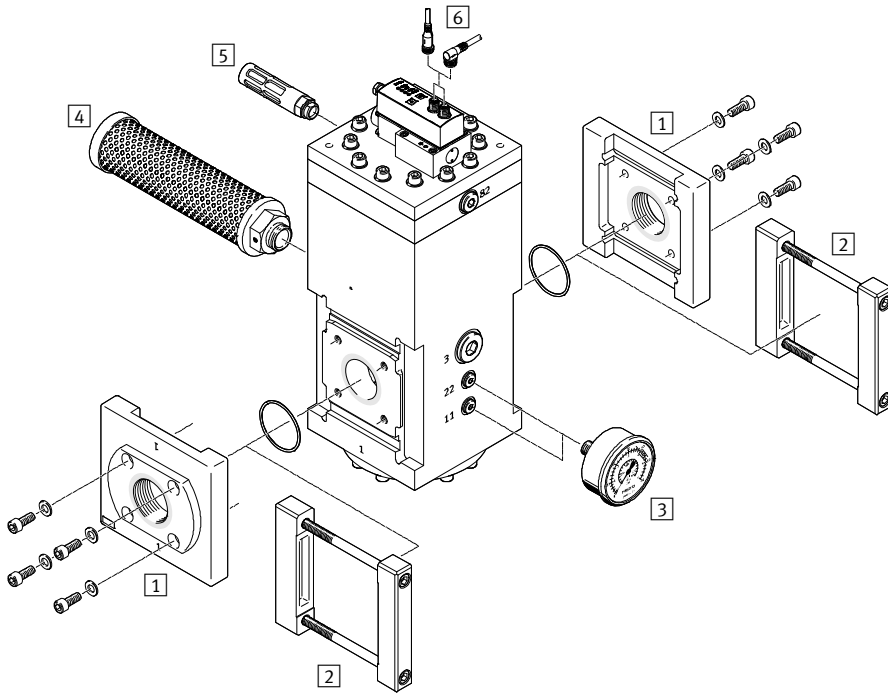
Mounting components and accessories		→ Page/Internet
1	Connecting plate PAML-CP	42
2	Module connector PAML-MK	45
3	Mounting bracket PAML-MB	47
4	Connecting plate PAML-CP-...-G114	42
5	Pressure gauge PAGL	49
6	Silencer U-G1-HD-SA	On request
7	Silencer U-3/8-B	51
8	Connecting cable NEBU-M12	51

Electric pressure regulators PREL, series L

Peripherals overview

Accessories

Size 186



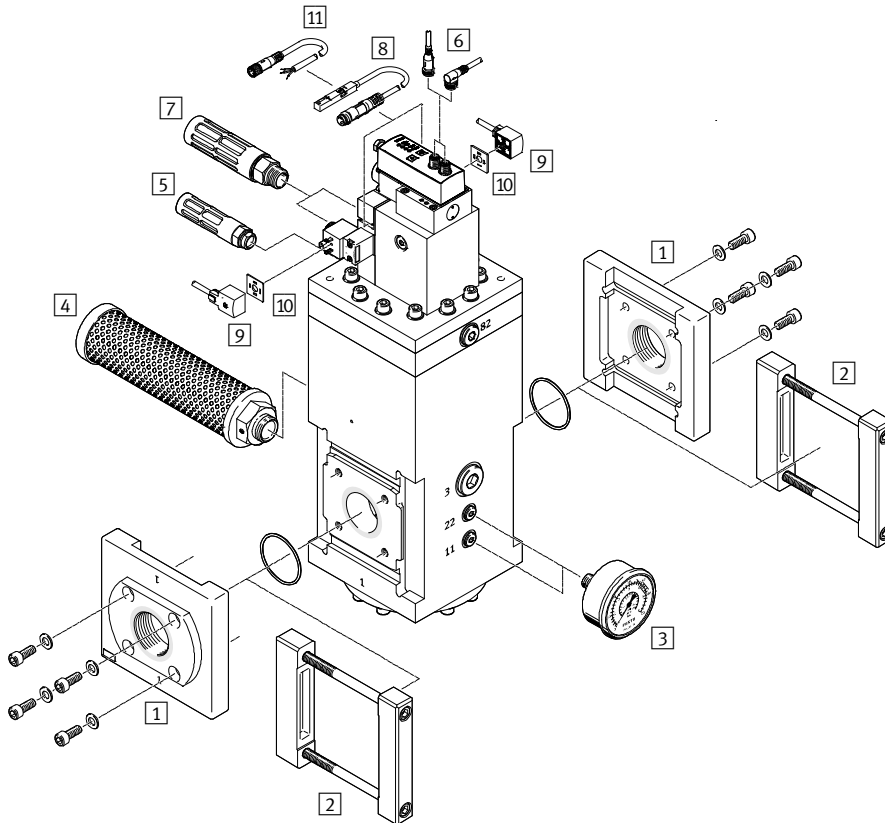
Mounting components and accessories		→ Page/Internet
1	Connecting plate PAML-CP	42
2	Module connector PAML-MK	45
3	Pressure gauge PAGL	49
4	Silencer U-G1-HD-SA	On request
5	Silencer U-1/2-B	51
6	Connecting cable NEBU-M12	51

Electric pressure regulators PREL, series L

Peripherals overview

Accessories

Size 186, with shut-off valve PAHL



Mounting components and accessories		→ Page/Internet
1	Connecting plate PAML-CP	42
2	Module connector PAML-MK	45
3	Pressure gauge PAGL	49
4	Silencer U-G1-HD-SA	On request
5	Silencer U-1/2-B	51
6	Connecting cable NEBU-M12	51
7	Silencer (included in the scope of delivery) U-3/4-B	51
8	Proximity sensor (included in the scope of delivery) SME-8	51
9	Connecting cable KMC	51
10	Illuminating seal MC-LD	51
11	Connecting cable NEBU-M8	51

Electric pressure regulators PREL, series L

Type codes

Size 90

PREL - 90 - HP3 - V1 - A - 40 C F X - S1 - 2

Service function

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

Size

90	90 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

20	Up to 20 bar
40	Up to 40 bar

Regulator type

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

Regulator venting

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

Regulator element

X	Proportional valve
---	--------------------

Overall accuracy

S1	1%
----	----

Valve variant

2	Variant 2, without external auxiliary pilot air
4	Variant 4, with external auxiliary pilot air
5	Variant 5, with external auxiliary pilot air, with 2 bar offset in setpoint input
8	Variant 8, with external auxiliary pilot air

Electric pressure regulators PREL, series L

Type codes

Size 186

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

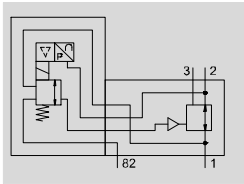
1	Variant 1, without external auxiliary pilot air
---	---



Electric pressure regulators PREL, series L

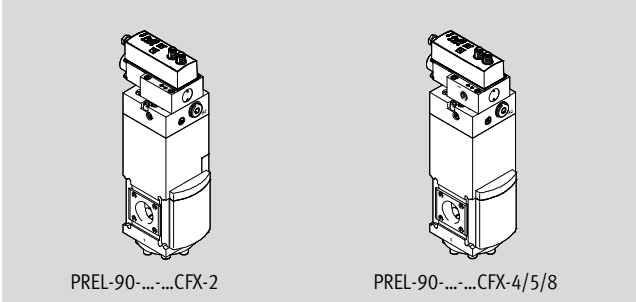
Technical data

Function

PREL-90/186-...-40CFX, proportional valve



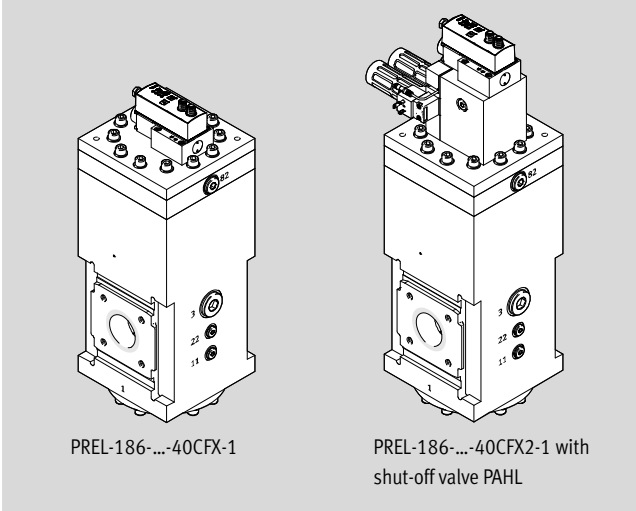
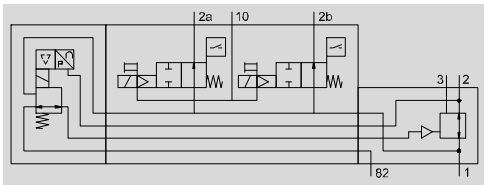
-  - Temperature range
+5 ... +50 °C
-  - Operating pressure
0 ... 50 bar



PREL-90-...-40CFX-2

PREL-90-...-40CFX-4/5/8

PREL-186-...-40CFX2, proportional valve with 2-channel exhaust



PREL-186-...-40CFX-1

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

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-186-...-40CFX2 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 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 pressure gauge on the front and the rear, one each for the operating and outlet pressure
- Shut-off valve PAHL for electric pressure regulator PREL-186 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 shut-off valve PAHL can be found from page 14 onwards, and that for the proportional pressure regulator VPPL can be found from page 18 onwards.

Safety data	
Electric pressure regulator with shut-off valve PAHL	
Conforms to standard	EN ISO 13849-1
Safety function	Exhausting
Performance Level (PL)	Exhausting: category 3, PL d

Electric pressure regulators PREL, series L

Technical data

General technical data		
Size	90	186
Nominal width DN	24	45
Pneumatic connection 3	G1	
Pneumatic connection 11, 12	G $\frac{1}{4}$	
Pneumatic connection 82	G $\frac{3}{8}$	G $\frac{1}{2}$
Actuation type	Electric	
Design	Electrically adjustable pressure regulator	
Regulator 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]	0.2 ... 18	–
	2 ... 40	–
	0.4 ... 40	
Max. pressure hysteresis [bar]	0.1	

Electrical data				
Type		PREL-...-V1-A	PREL-...-V1-V	PREL-...-A4-A
Electrical connection	IN	Plug connector, M12, 5-pin, A-coded		
	OUT	Plug connector, 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		
	Electric pressure regulator	Electric pressure regulator with 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 ¹⁾	2	
CE marking (see declaration of conformity) ²⁾	In accordance with EU Pressure Equipment Directive	
	–	To EC Machinery Directive
Suitable for use in the food industry ²⁾	See supplementary material information	
Certification	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 → Certificates.

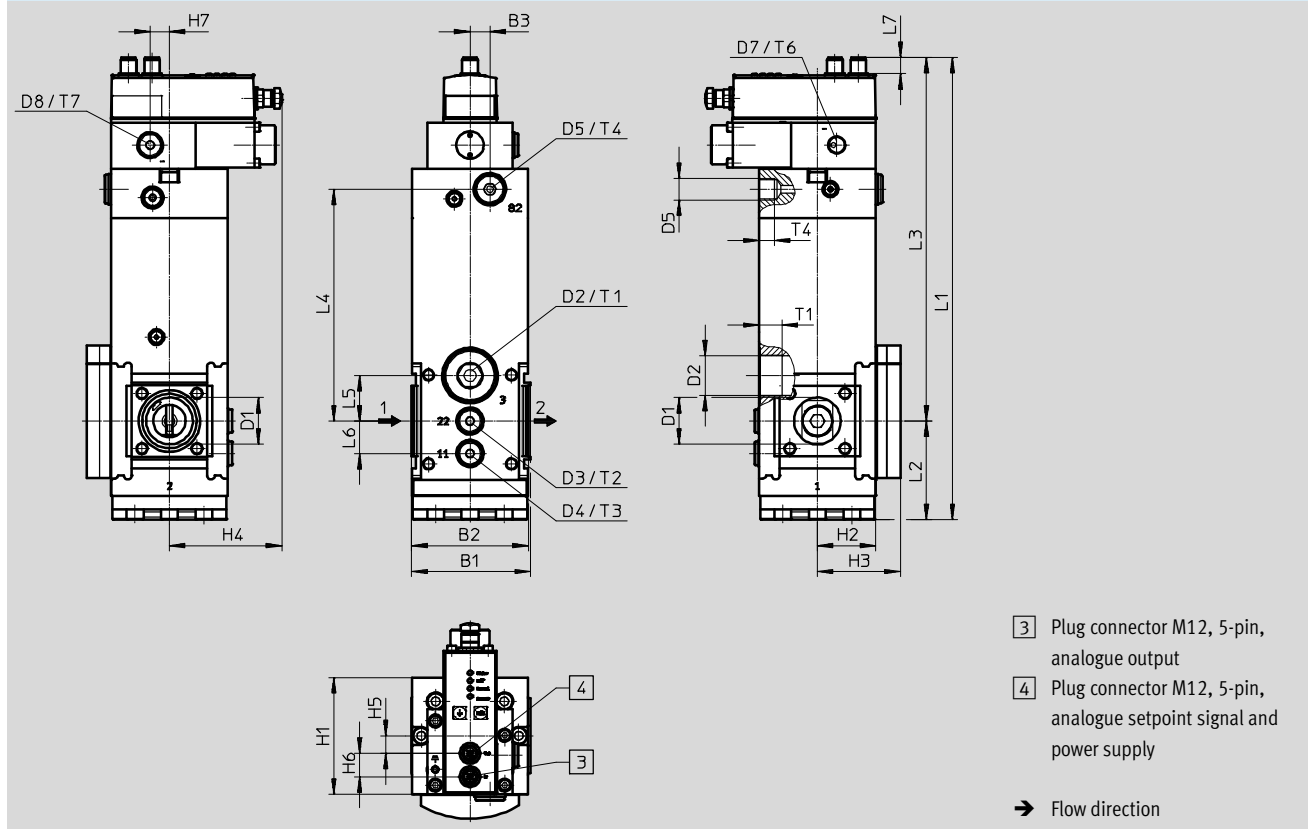
Weight [g]		
Size	90	186
Electric pressure regulator	6100	37100
Electric pressure regulator with shut-off valve PAHL	–	40400

Electric pressure regulators PREL, series L

Technical data

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

Dimensions – Size 90 Download CAD data → www.festo.com



Type	B1	B2	B3	D1	D2	D3	D4	D5	D7	D8	H1	H2	H3	H4	H5	H6	H7
PREL-90-...-CFX-...-2	91.5	90	~15.3	36	G1	G¼	G¼	G¾	-	-	90	~45	~64	~87	13.5	18	~14.9
PREL-90-...-CFX-...-4/5/8									G¼	G¼							

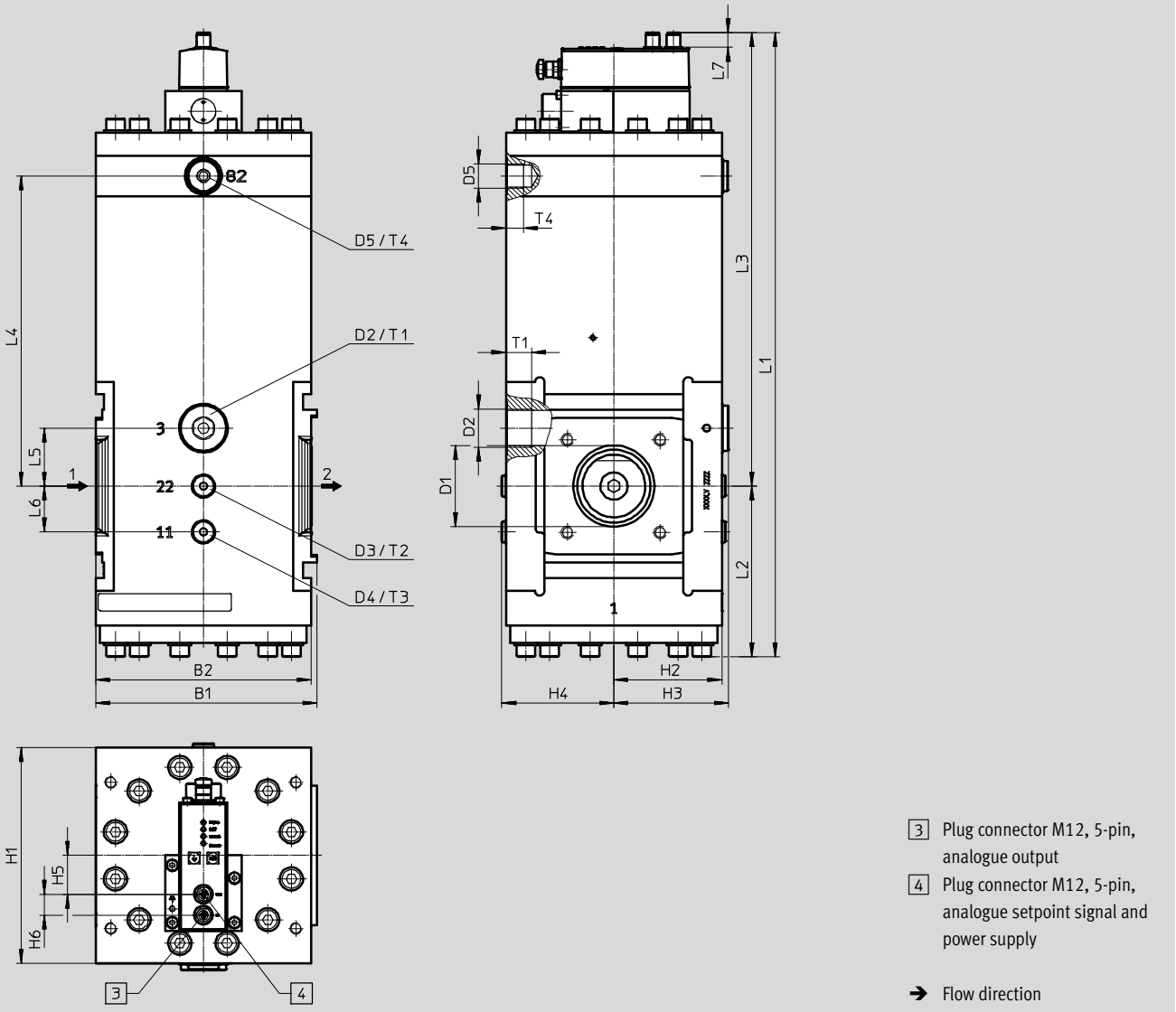
Type	L1	L2	L3	L4	L5	L6	L7	T1	T2	T3	T4	T6	T7
PREL-90-...-CFX-...-2	~355	76	~279	~179	~35	~25	~12.6	18	12	12	12	-	-
PREL-90-...-CFX-...-4/5/8												12	12

Electric pressure regulators PREL, series L

Technical data

Dimensions – Size 186

Download CAD data → www.festo.com



Type	B1	B2	D1 ∅	D2	D3	D4	D5	H1	H2	H3	H4	H5	H6
PREL-186-...-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-186-...-40CFX-1	~537	~147	~390	267.5	50	39.5	~12.6	18	12	12	14

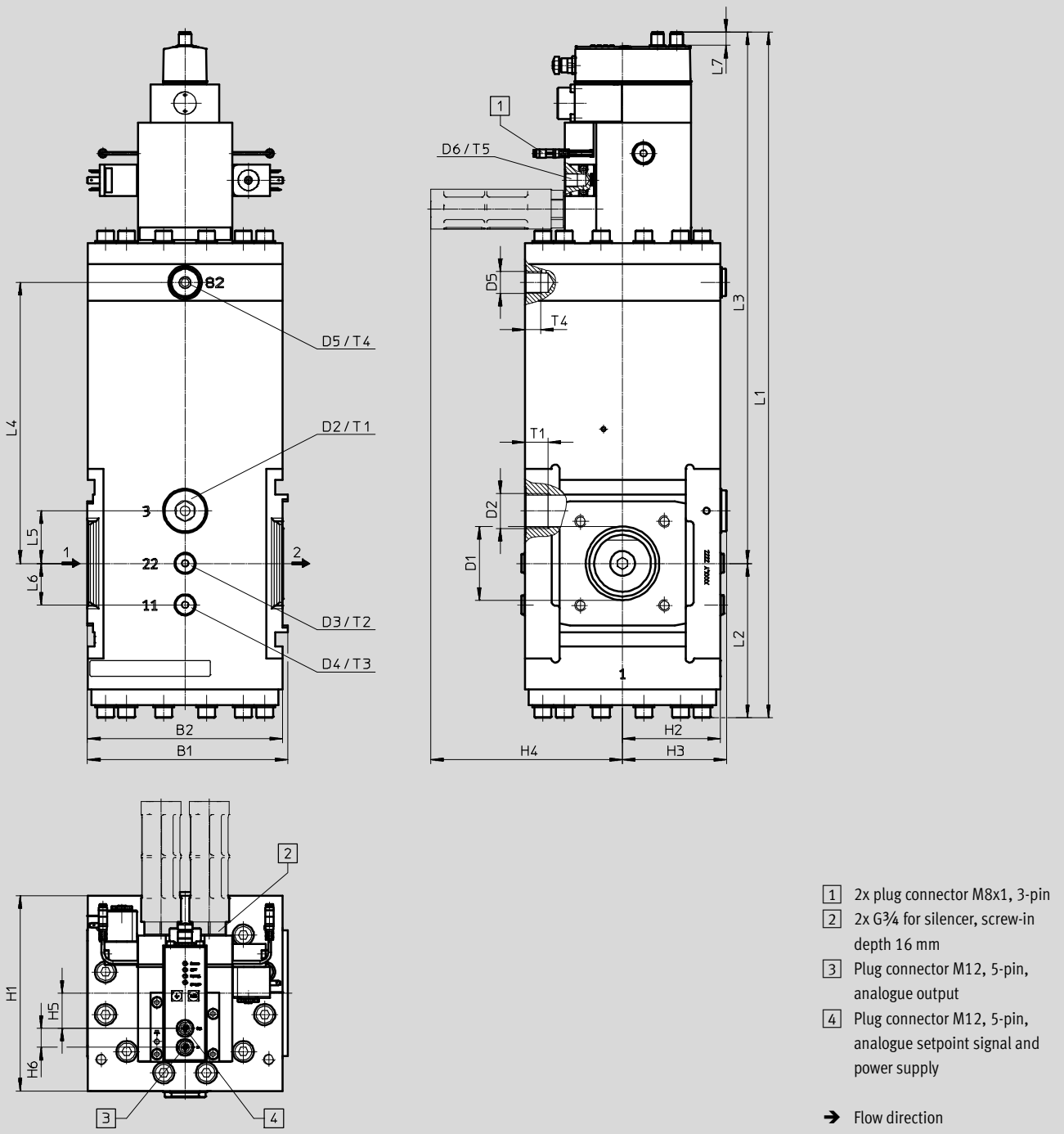
Electric pressure regulators PREL, series L

Technical data

Dimensions – Size 186

Download CAD data → www.festo.com

With shut-off valve PAHL



Type	B1	B2	D1	D2	D3	D4	D5	D6	H1	H2	H3	H4	H5	H6
PREL-186-...-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-186-...-40CFX2-1	~652	~147	~505	267.5	50	39.5	~12.6	18	12	12	14	12

Electric pressure regulators PREL, series L

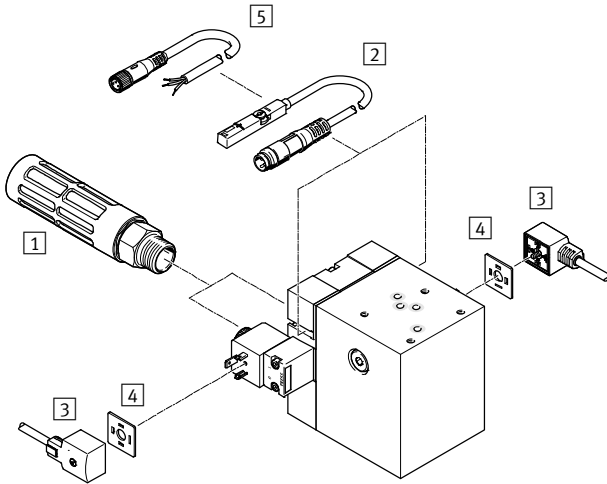
Technical data

Ordering data – Size 90				
With proportional pressure regulator VPPL				
Pressure regulation range [bar]	Setpoint specification (input)	Actual value (output)	Part No.	Type
Without external auxiliary pilot air				
0.2 ... 18	0 ... 10 V	4 ... 20 mA	1709128	PREL-90-HP3-V1-A-20CFX-S1-2
		0 ... 10 V	1709129	PREL-90-HP3-V1-V-20CFX-S1-2
	4 ... 20 mA	4 ... 20 mA	1709130	PREL-90-HP3-A4-A-20CFX-S1-2
With external auxiliary pilot air				
0.2 ... 18	0 ... 10 V	4 ... 20 mA	1709134	PREL-90-HP3-V1-A-20CFX-S1-4
		0 ... 10 V	1709135	PREL-90-HP3-V1-V-20CFX-S1-4
	4 ... 20 mA	4 ... 20 mA	1709136	PREL-90-HP3-A4-A-20CFX-S1-4
With external auxiliary pilot air, with 2 bar offset in setpoint input				
2 ... 40	0 ... 10 V	4 ... 20 mA	1709137	PREL-90-HP3-V1-A-40CFX-S1-5
With external auxiliary pilot air				
0.4 ... 40	0 ... 10 V	4 ... 20 mA	1910439	PREL-90-HP3-V1-A-40CFX-S1-8
Ordering data – Size 186				
With proportional pressure regulator VPPL				
Pressure regulation range [bar]	Setpoint specification (input)	Actual value (output)	Part No.	Type
Without external auxiliary pilot air				
0.4 ... 40	0 ... 10 V	4 ... 20 mA	1709211	PREL-186-HP3-V1-A-40CFX-1
		0 ... 10 V	1709212	PREL-186-HP3-V1-V-40CFX-1
	4 ... 20 mA	4 ... 20 mA	1709213	PREL-186-HP3-A4-A-40CFX-1
Without external auxiliary pilot air, with shut-off valve PAHL				
0.4 ... 40	0 ... 10 V	4 ... 20 mA	1709208	PREL-186-HP3-V1-A-40CFX2-1
		0 ... 10 V	1709209	PREL-186-HP3-V1-V-40CFX2-1
	4 ... 20 mA	4 ... 20 mA	1709210	PREL-186-HP3-A4-A-40CFX2-1

Shut-off valves PAHL, series L

Peripherals overview and type codes

Accessories



Mounting components and accessories

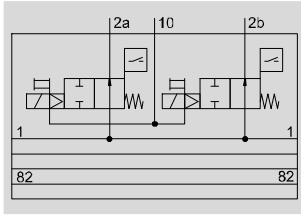
		→ Page/Internet
1	Silencer (included in the scope of delivery) U-3/4-B	51
2	Proximity switch (included in the scope of delivery) SME-8	51
3	Connecting cable KMC	51
4	Illuminating seal MC-LD	51
5	Connecting cable NEBU-M8	51

Type codes

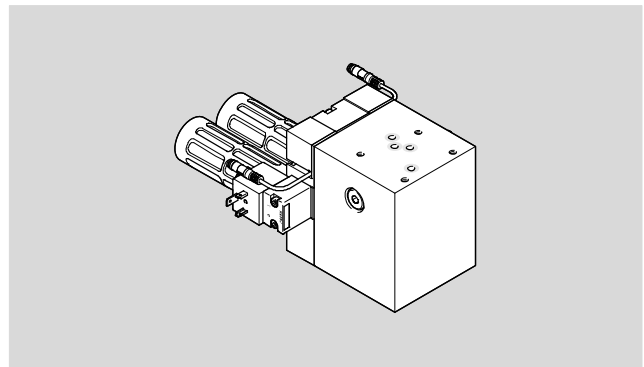
	PAHL	-	SM	-	RE
Service function					
PAHL	Shut-off valve, series L				
Product type					
SM	Two-channel				
Designation					
RE	For electric pressure regulator PREL				

Shut-off valves PAHL, series L

Technical data

Function


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



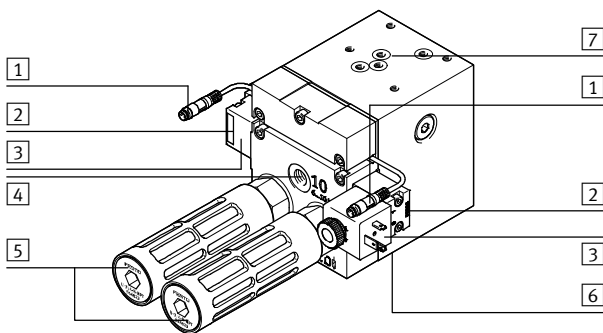
The two-channel shut-off valve PAHL is intended for shutting off the pilot air to the pneumatically piloted electric pressure regulator PREL-186. The PAHL is equipped with two 2/2-way poppet valves, which are actuated by means of pilot solenoid valves. Proximity switches are integrated for monitoring 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 ¹⁾	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

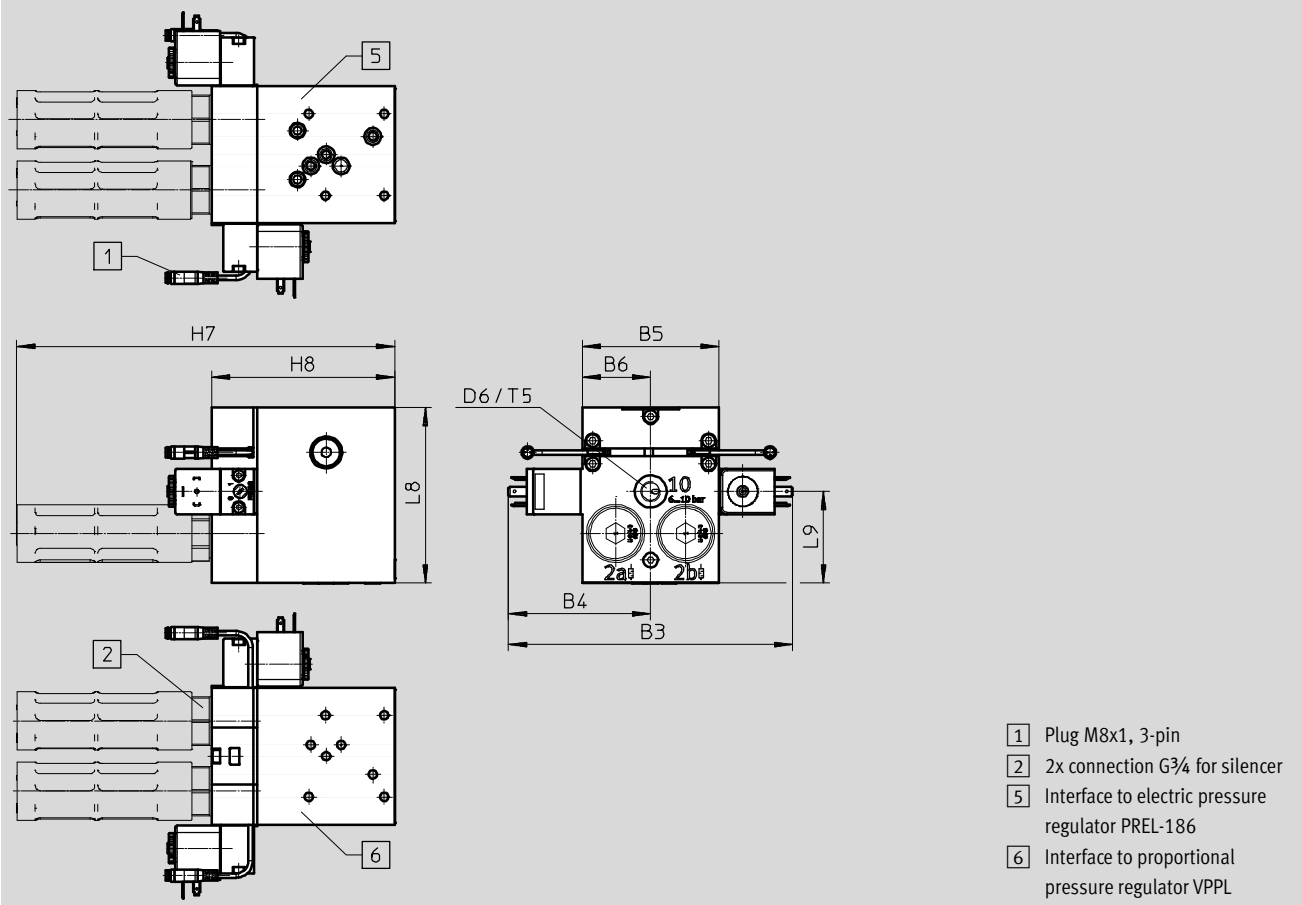
Shut-off valves PAHL, series L

Technical data

Dimensions

Download CAD data → www.festo.com

PAHL-SM-RE



- 1 Plug M8x1, 3-pin
- 2 2x connection G $\frac{3}{4}$ for silencer
- 5 Interface to electric pressure regulator PREL-186
- 6 Interface to proportional pressure regulator VPPL

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

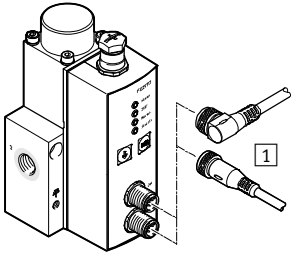
Ordering data

Type of actuation	Part No.	Type
Electrical	1709707	PAHL-SM-RE

Proportional pressure regulators VPPL, series L

Peripherals overview and type codes

Accessories



		→ Page/Internet
1	Connecting cable NEBU-M12	51

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 %
----	-----

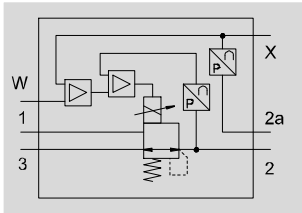
Valve variant

1 ... 20	Variant 1 ... 20
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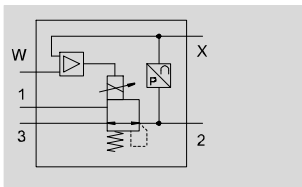
Proportional pressure regulators VPPL, series L



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 ¹⁾		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 ¹⁾		2
CE mark (see declaration of conformity) ²⁾		To EU EMC 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.

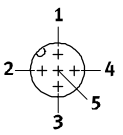
2) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com/sp → Certificates.
If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the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

Weight [g]	
Proportional pressure regulator	1100

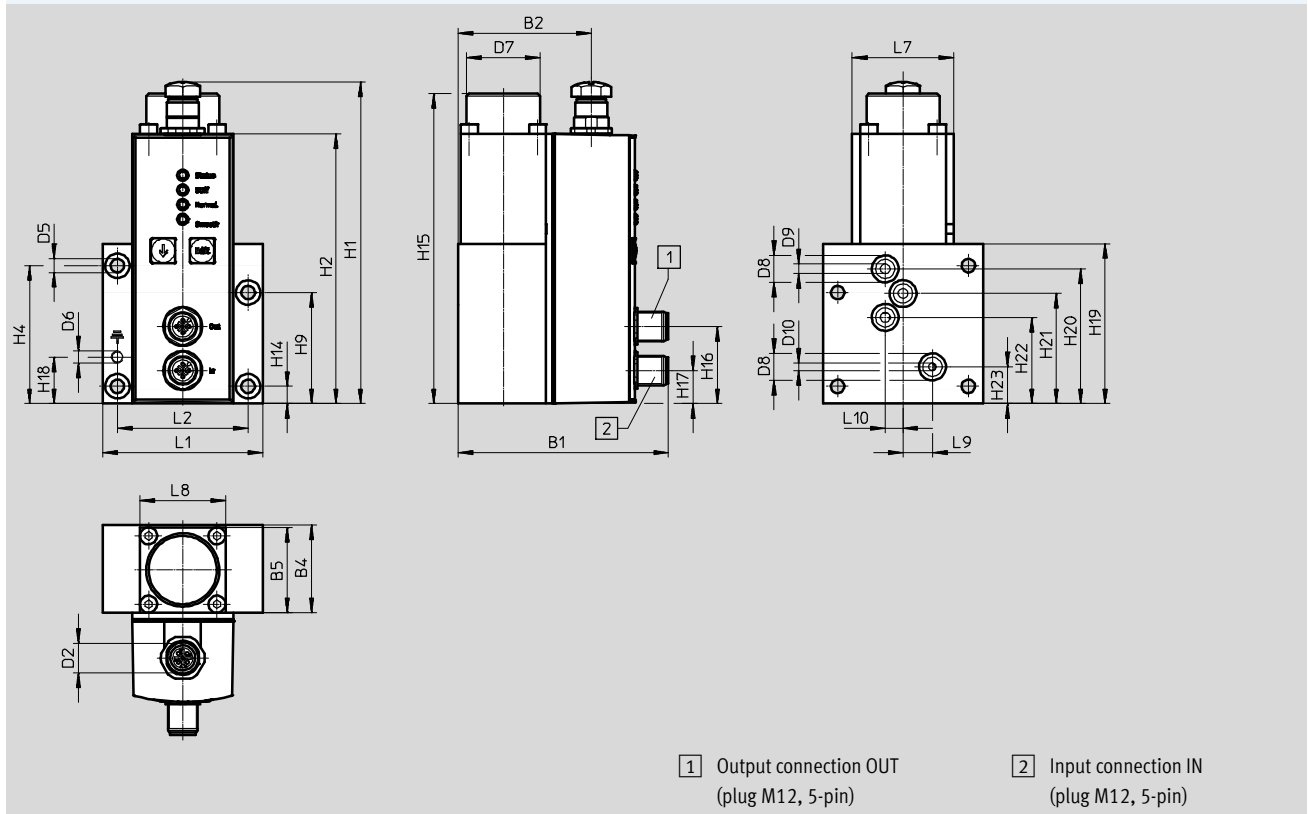
Proportional pressure regulators VPPL, series L

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



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

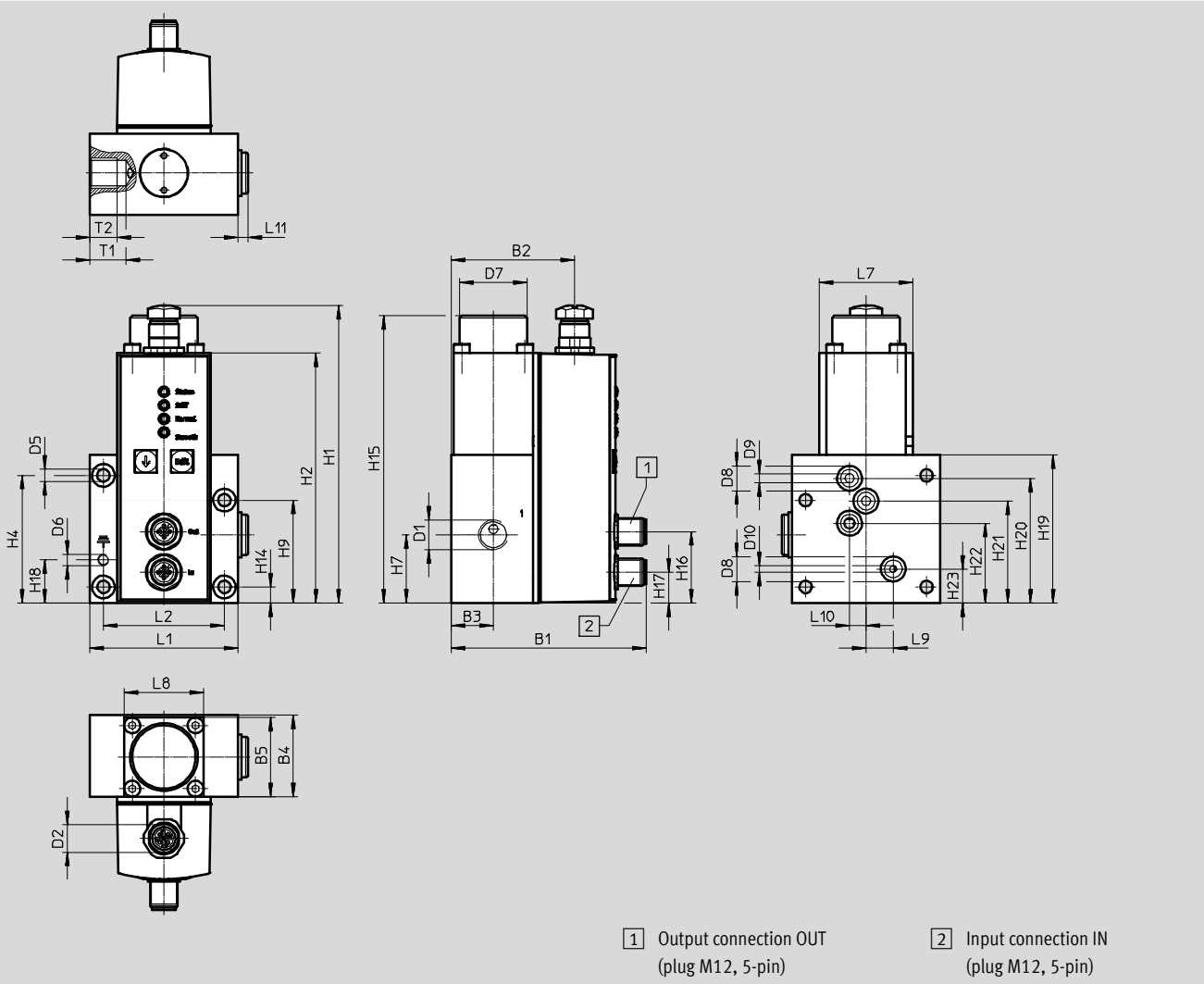
Proportional pressure regulators VPPL, series L

Technical data

Dimensions – Flanged valve with external pilot air

Download CAD data → www.festo.com

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

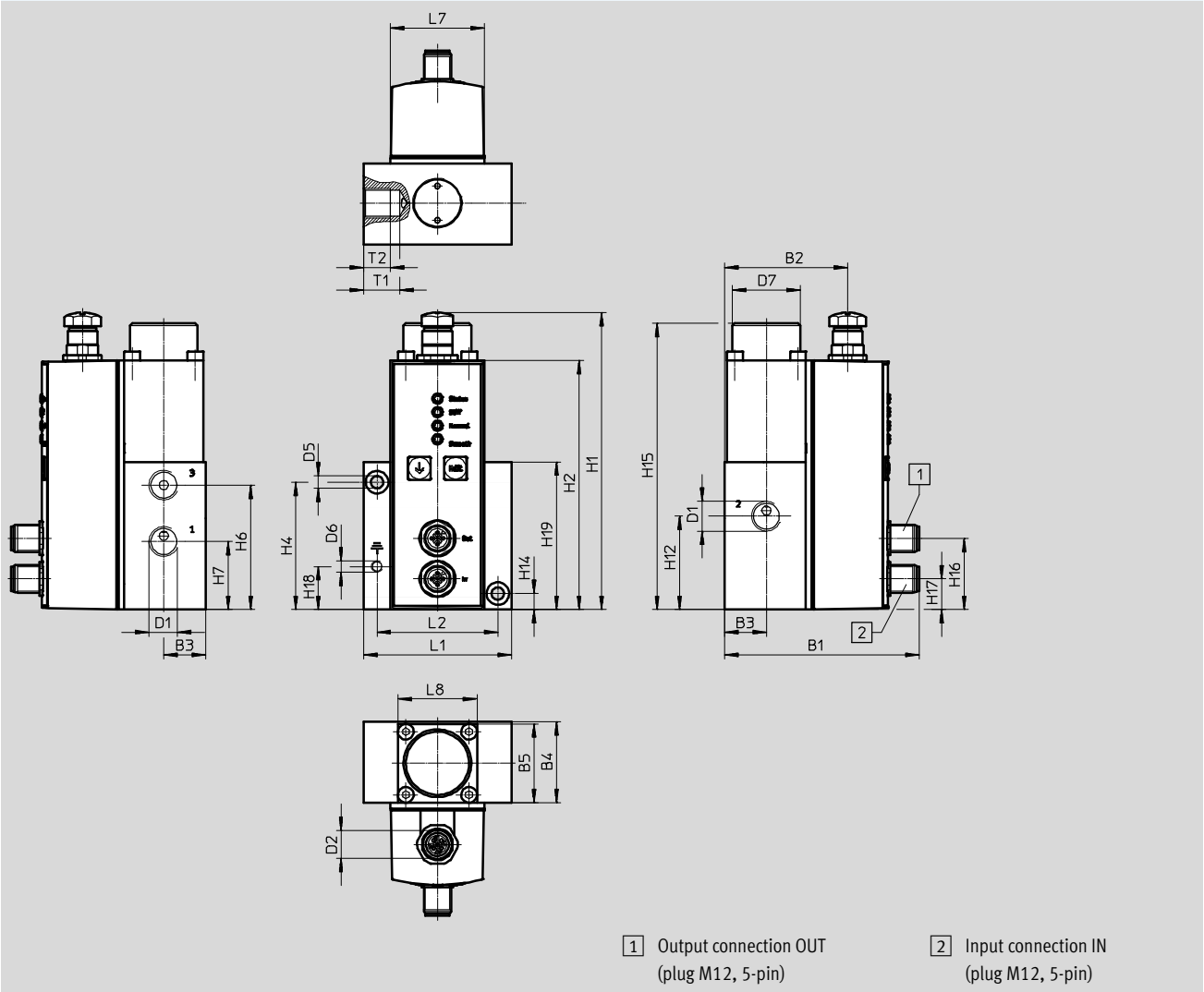
Proportional pressure regulators VPPL, series L

Technical data

Dimensions – In-line valve

Download CAD data → www.festo.com

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	\varnothing 5.5	M5	\varnothing 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

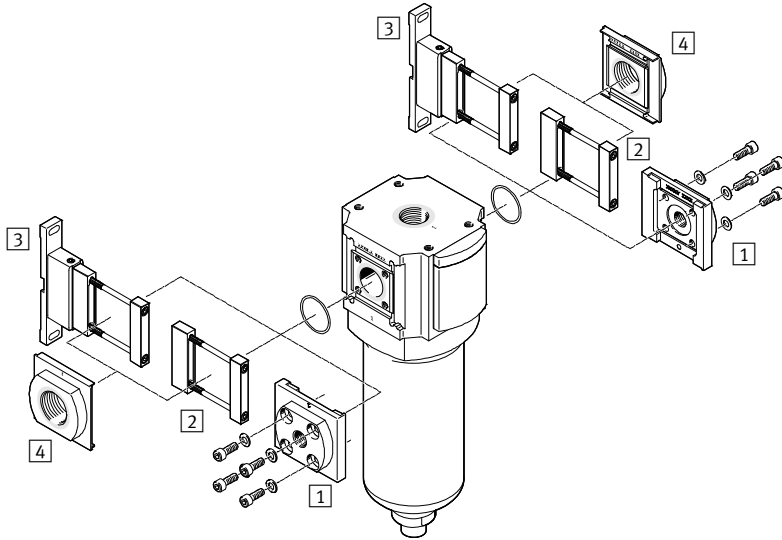
Ordering data					
Pneumatic connection 1	Pressure regulation range [bar]	Setpoint value (input)	Actual value (output)	Part No.	Type
Flanged valve					
Flange	0.2 ... 20	0 ... 10 V	4 ... 20 mA	1635984	VPPL-3Q-3-0L20H-V1-A-S1-2
			0 ... 10 V	1635987	VPPL-3Q-3-0L20H-V1-V-S1-2
		4 ... 20 mA	4 ... 20 mA	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
Flanged valve with external pilot air					
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	4 ... 20 mA	1635982
	In-line valve				
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

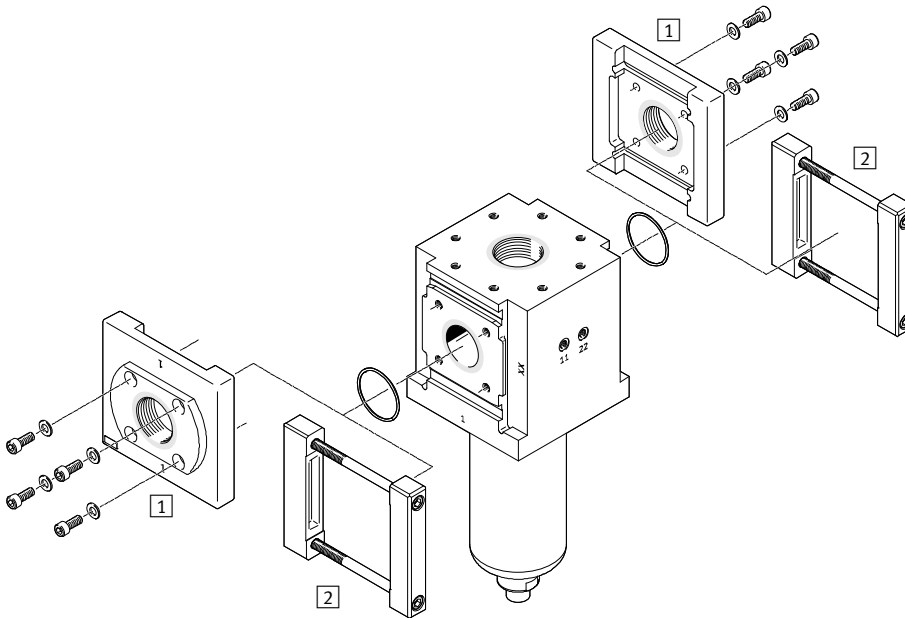
Peripherals overview

Accessories

Size 90



Size 186



Mounting components and accessories

		→ Page/Internet
1	Connecting plate PAML-CP	42
2	Module connector PAML-MK	45
3	Mounting bracket PAML-MB	47
4	Connecting plate PAML-CP-...-G114	42

Micro filter PFML, series L

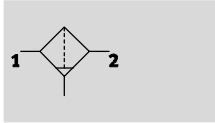
Type codes




		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										
Material of bowl											
ST	Steel										

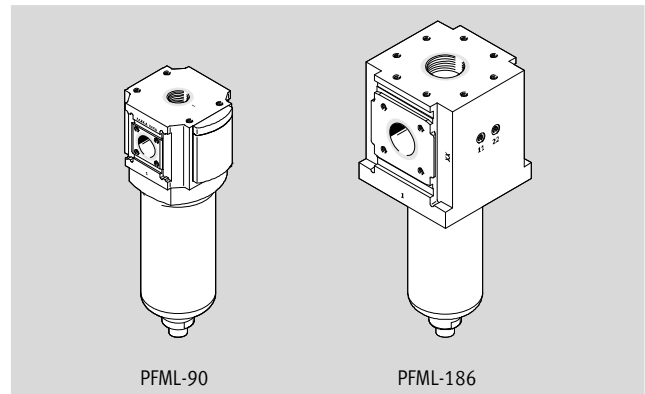
Micro filter PFML, series L

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 ¹⁾	2		
CE marking (see declaration of conformity) ²⁾	To EU Pressure Equipment Directive		
Food-safe ²⁾	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 → Certificates.

Micro filter PFML, series L

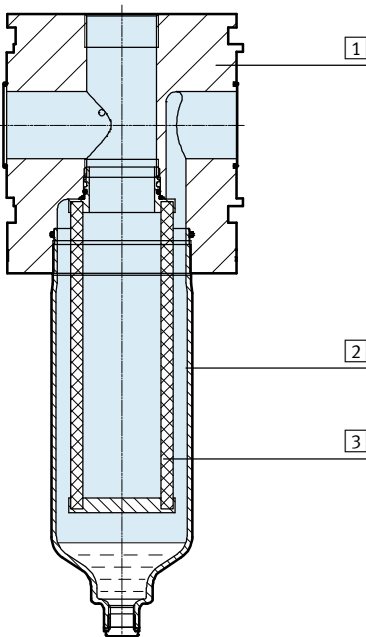
Technical data

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



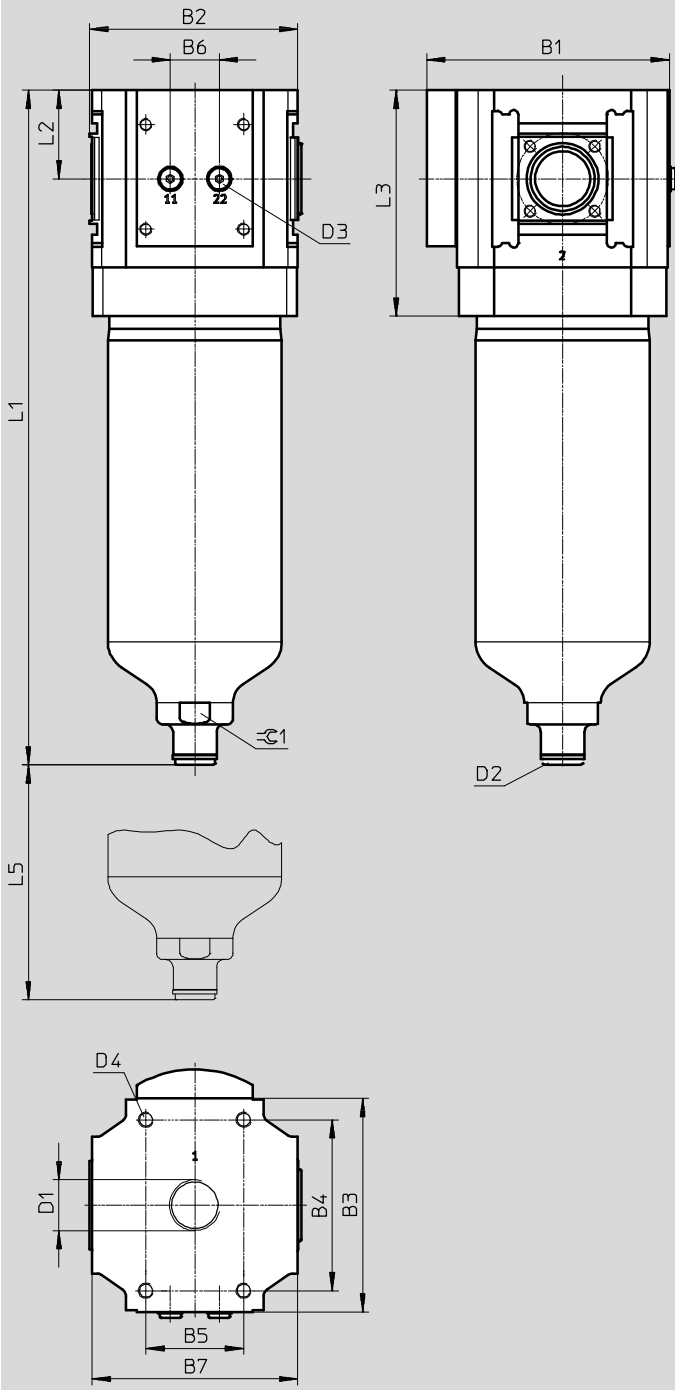
Micro filters		
[1]	Housing	Wrought aluminium alloy
[2]	Bowl	High-alloy stainless steel
[3]	Filter	Borosilicate fibre
-	Seals	Nitrile rubber
Note on materials		RoHS compliant
		Contains paint-wetting impairment substances

Micro filter PFML, series L

Technical data

Dimensions – Size 90

Download CAD data → www.festo.com



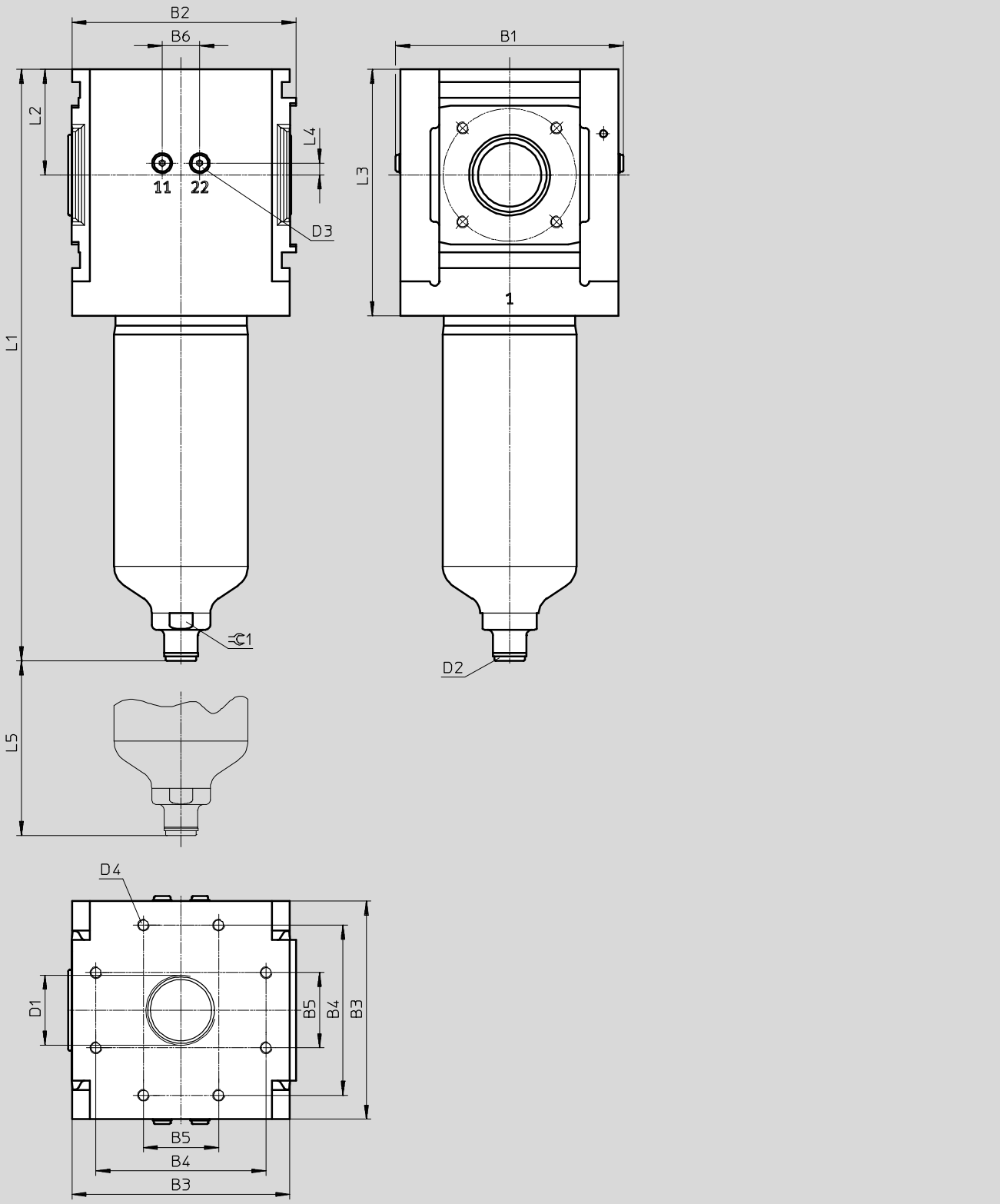
Type	B1	B2	B3	B4	B5	B6	B7	D1	D2	D3	D4	L1	L2	L3	L5	≈ 1
PFML-90-HP3-AST	159	137	140	112	64	32	135	G1	G½	G⅜	M10	442	58	148	210	Min. 46

Micro filter PFML, series L

Technical data

Dimensions – Size 186

Download CAD data → www.festo.com



Type	B1	B2	B3	B4	B5	B6	D1	D2	D3	D4	L1	L2	L3	L4	L5	≙ 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	1612487	PFML-90-HP3-AST	1364705	PFML-186-HP3-AST
High flow rate	-		1624062	PFML-186-HP3-H-AST

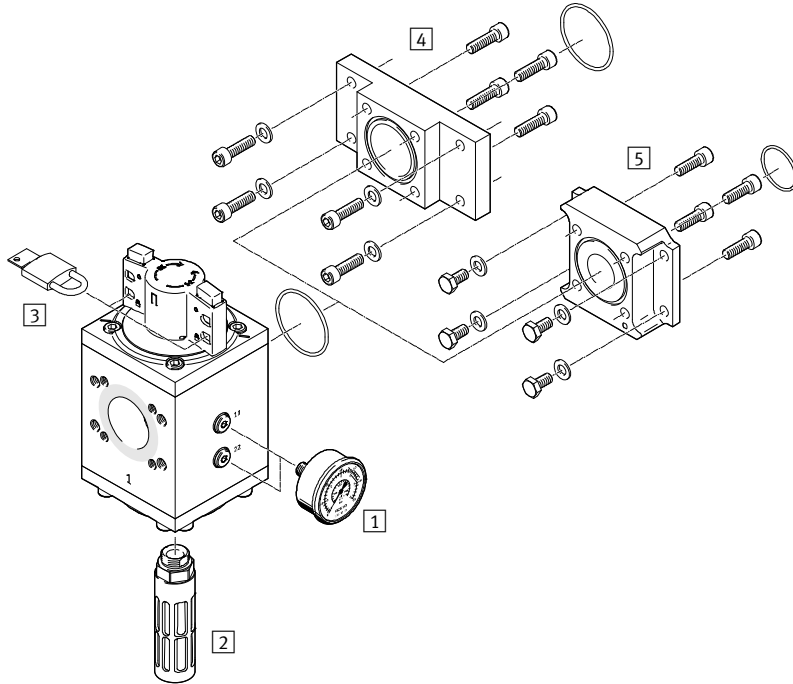
Ordering data for accessories		
Flow	Part No.	Type
Filter cartridges		
Standard	1334716	PFEL-G2-A
High flow rate	1471578	PFEL-G212-H-A

On/off valves PVEL, series L

Peripherals overview and type codes

Accessories

Size 124



Mounting components and accessories		→ Page/Internet
1	Pressure gauge PAGL	49
2	Silencer U-1/2-B	51
3	Padlock (only for PVEL-H-124-HP3) LRVS-D	51
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

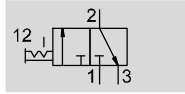
Pressure range	
HP3	0 ... 50 bar

On/off valves PVEL, series L

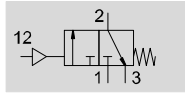
Technical data



Function

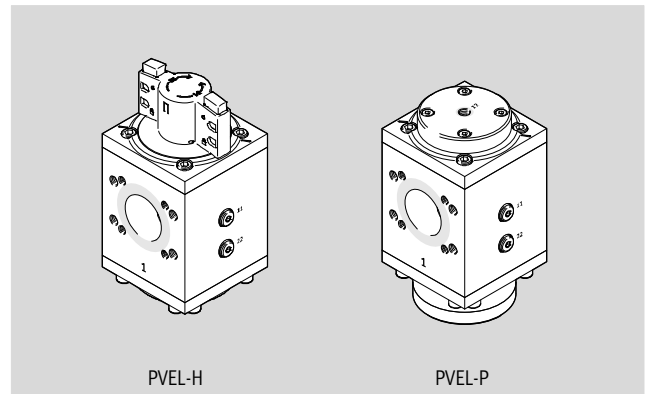
PVEL-H, manually actuated



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 ¹⁾	2	
CE marking (see declaration of conformity) ²⁾	To EU Pressure Equipment Directive	
Food-safe ²⁾	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 → Certificates.

On/off valves PVEL, series L

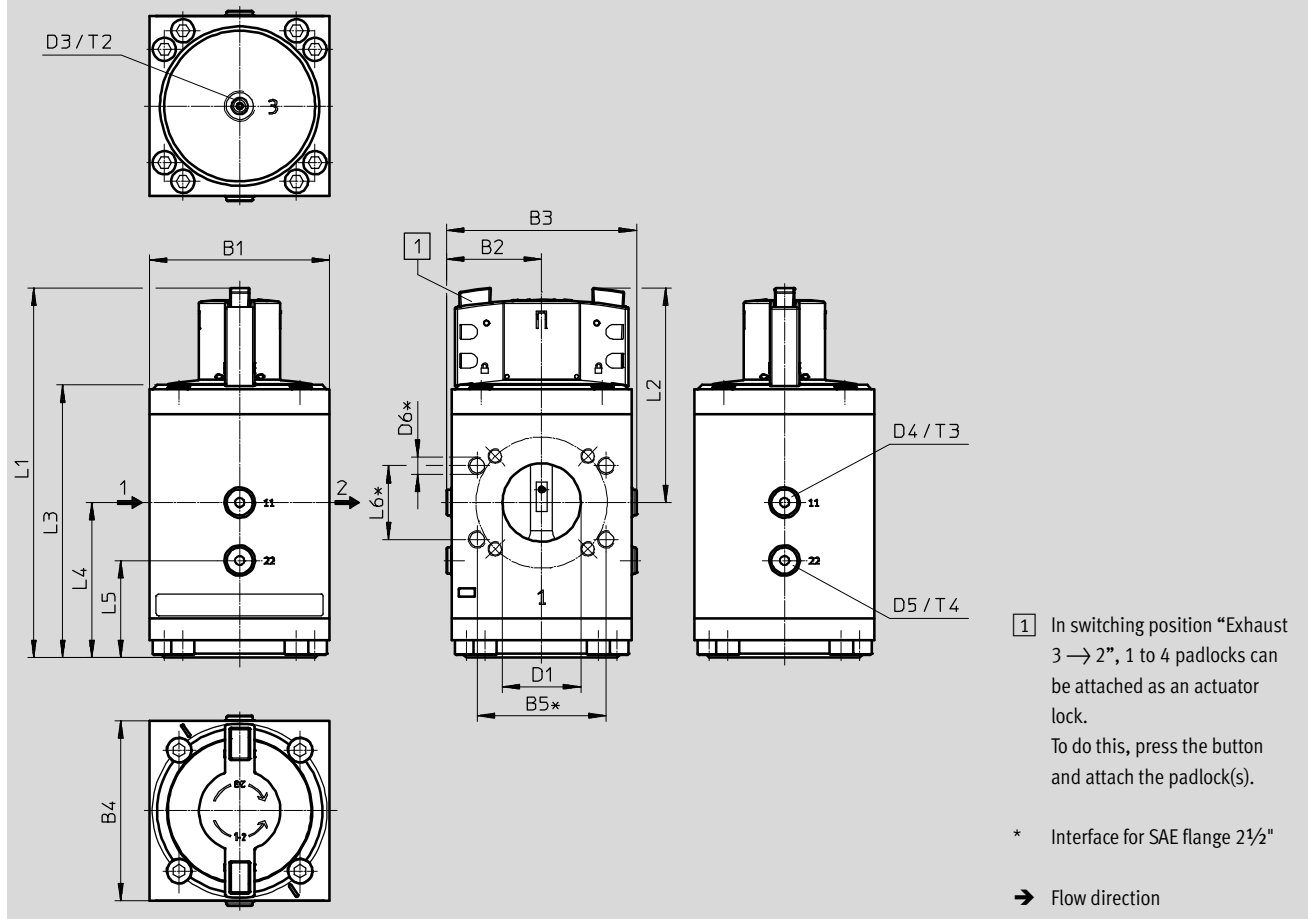
Technical data

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

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

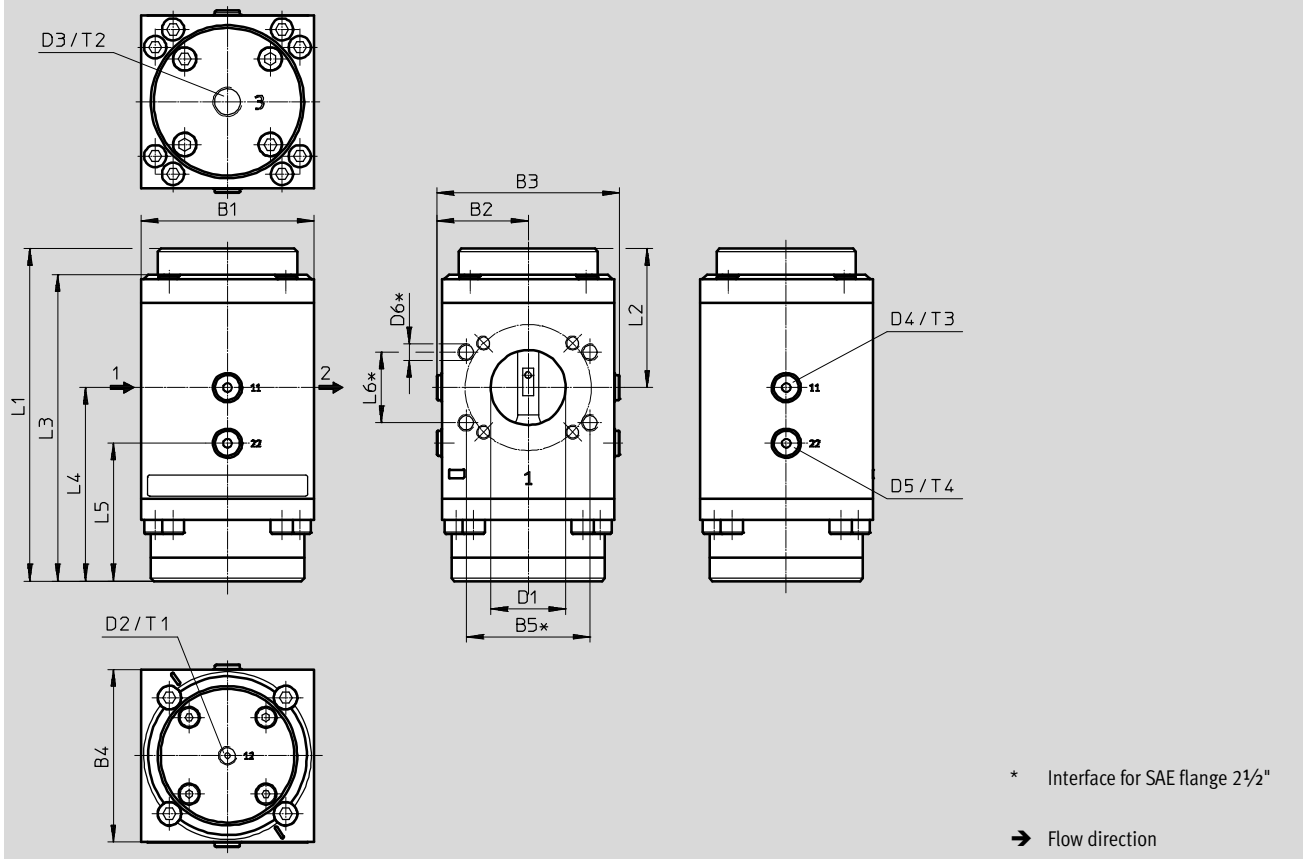
On/off valves PVEL, series L

Technical data

Dimensions – Size 124

Download CAD data → www.festo.com

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

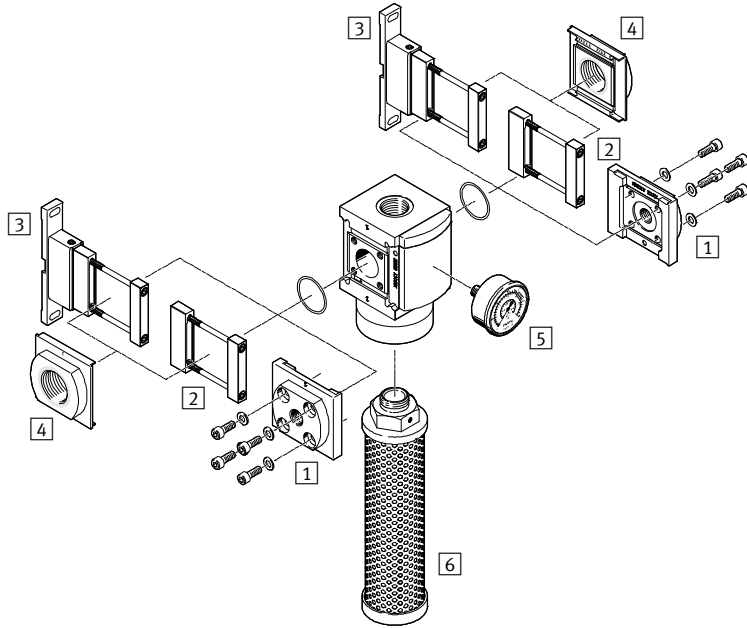
Type of actuation	Part No.	Type
Manual	1629207	PVEL-H-124-HP3
Pneumatic	1629205	PVEL-P-124-HP3

Branching modules PMBL, series L

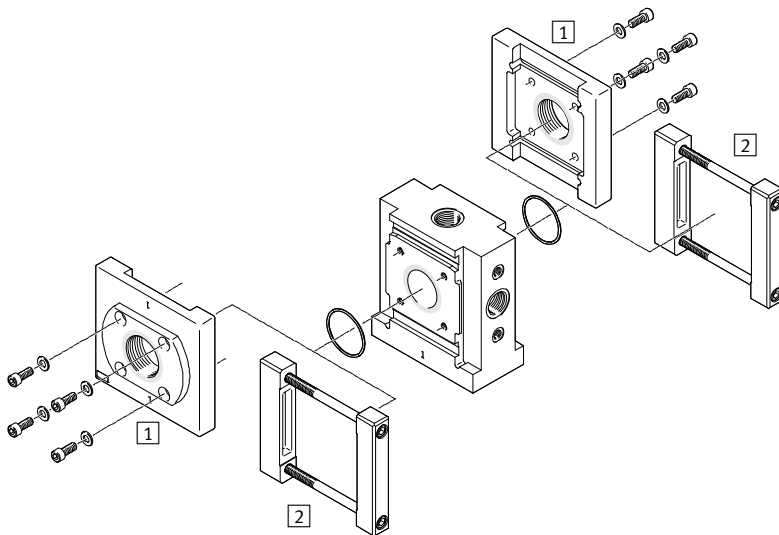
Peripherals overview

Accessories

Size 90



Size 186



Mounting components and accessories

		→ Page/Internet
1	Connecting plate PAML-CP	42
2	Module connector PAML-MK	45
3	Mounting bracket PAML-MB	47
4	Connecting plate PAML-CP-...-G114	42
5	Pressure gauge PAGL	49
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

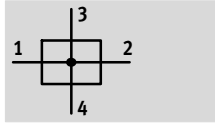
Width (size 186 mm only)

H	Half width
---	------------

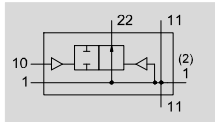
Branching modules PMBL, series L



Technical data

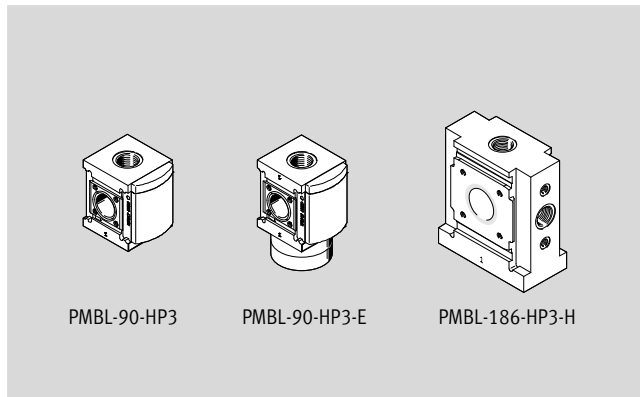
Function
Standard



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



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



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 ¹⁾	2		
CE marking (see declaration of conformity) ²⁾	To EU Pressure Equipment Directive		
Food-safe ²⁾	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 → 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 → 2	49000	49000	117240
In exhaust direction 2 → 3	–	13000	–

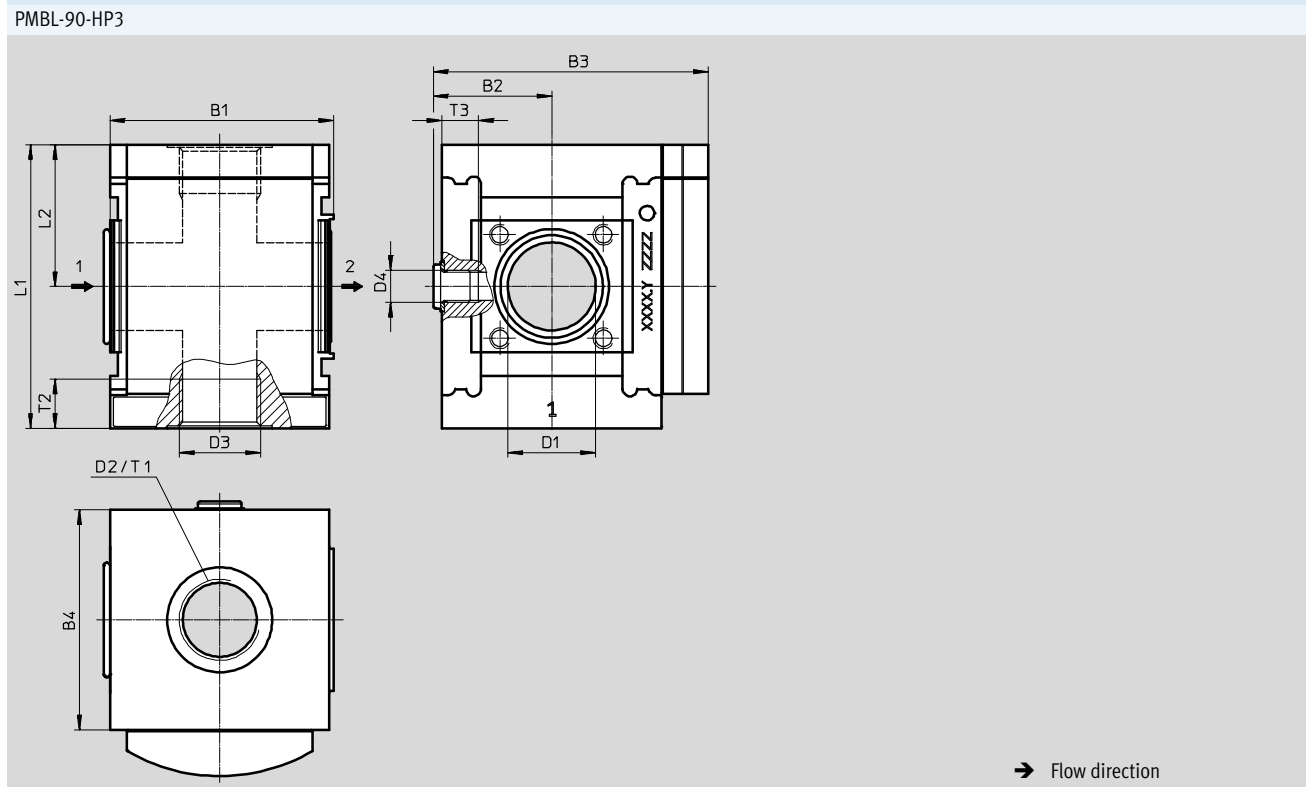
1) Measured at $p_1 = 6$ bar and $p_2 = 5$ bar, $\Delta p = 1$ bar

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



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

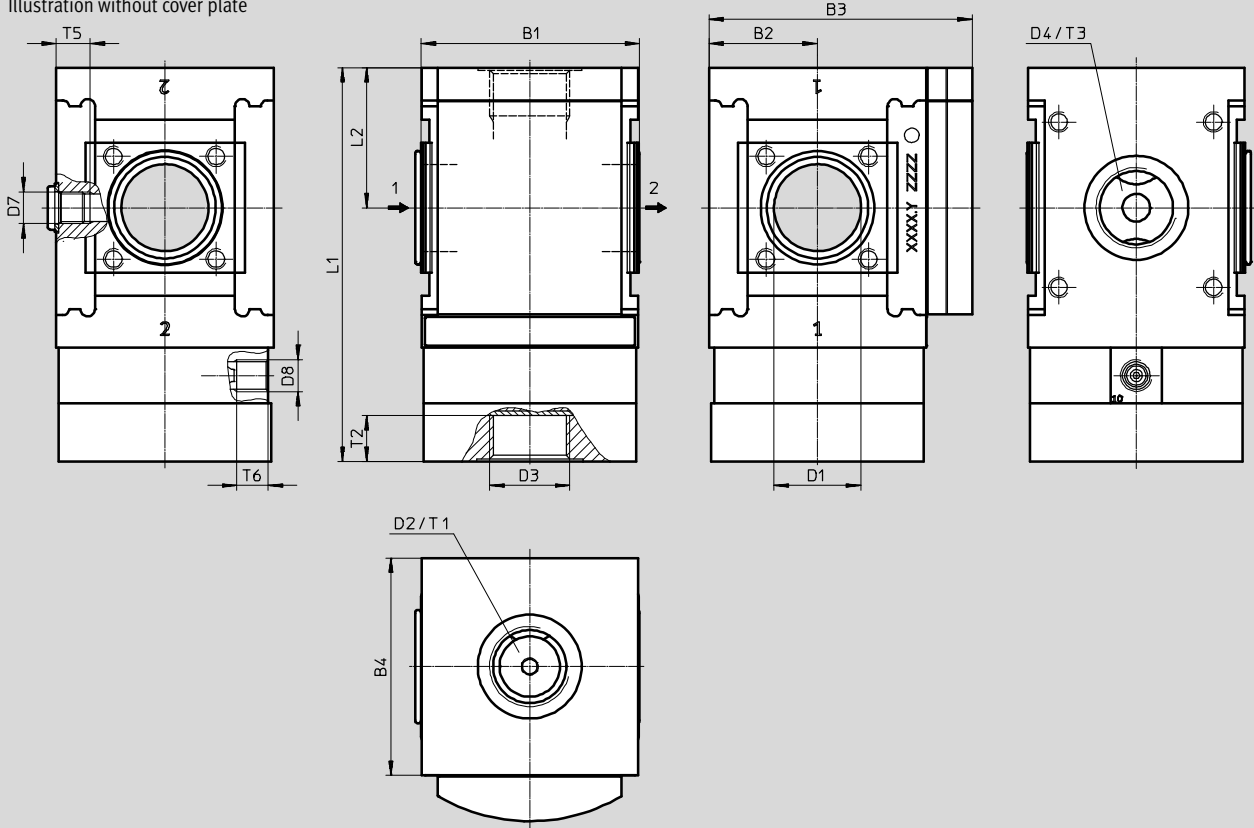
Technical data

Dimensions – Size 90

Download CAD data → www.festo.com

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 ¹ / ₄	G ¹ / ₄	163	58	20	19	20	14	13

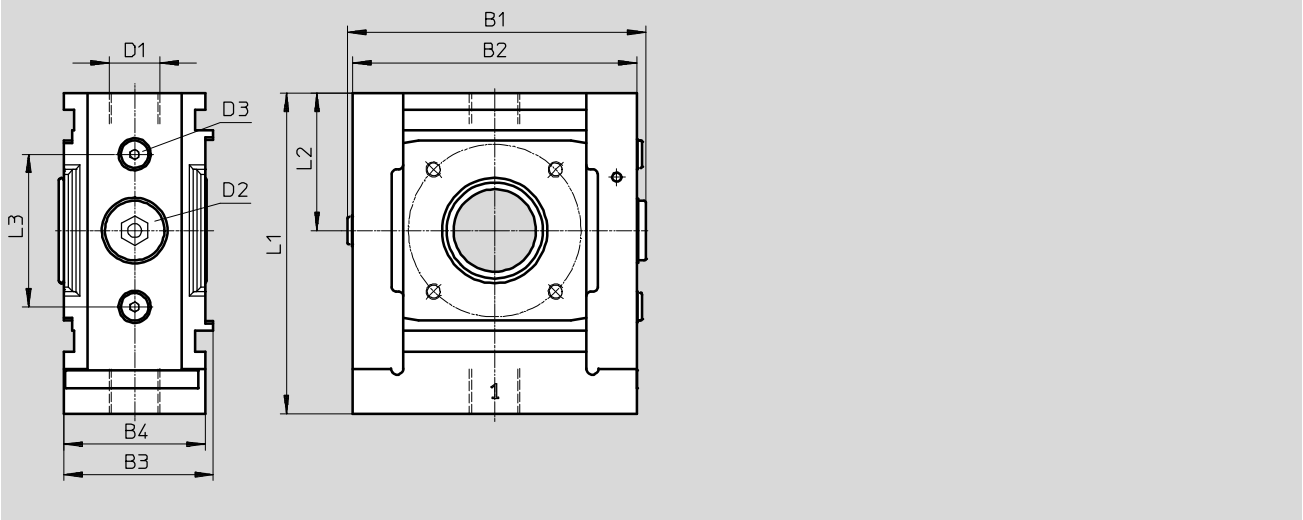
Branching modules PMBL, series L

Technical data

Dimensions – Size 186

Download CAD data → 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

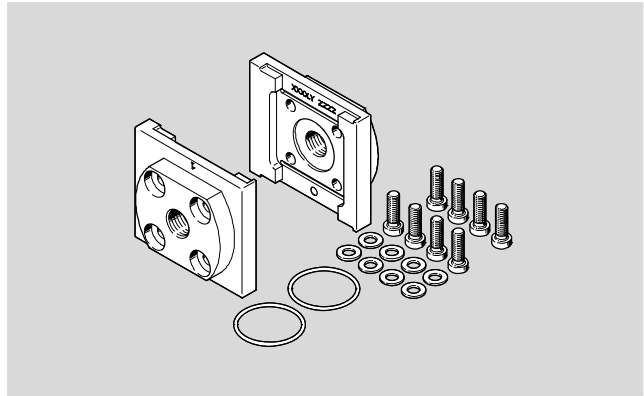
Function	Size 90		Size 186	
	Part No.	Type	Part No.	Type
Standard	1401366	PMBL-90-HP3	1609073	PMBL-186-HP3-H
With exhaust function	2663892	PMBL-90-HP3-E	-	-

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 ¹⁾	2
CE marking (see declaration of conformity) ²⁾	To EU Pressure Equipment Directive
Food-safe ²⁾	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 → Certificates.

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

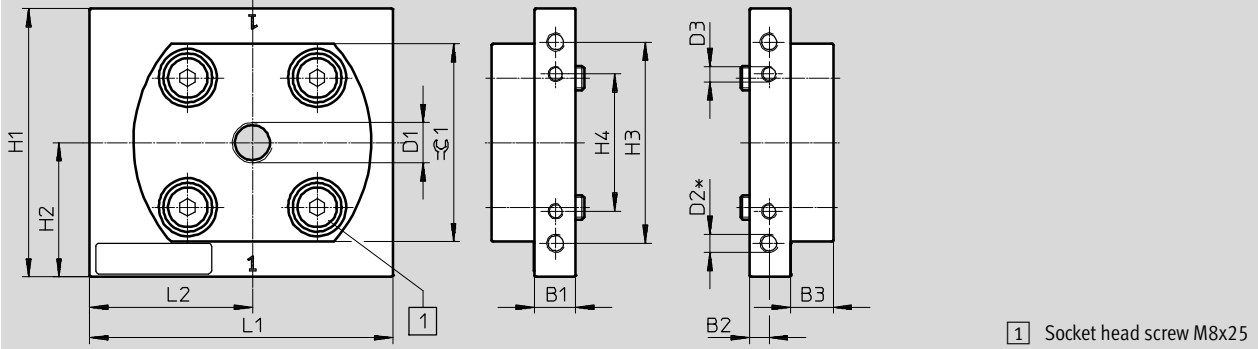
Pneumatic components for high-pressure applications, series L

Accessories

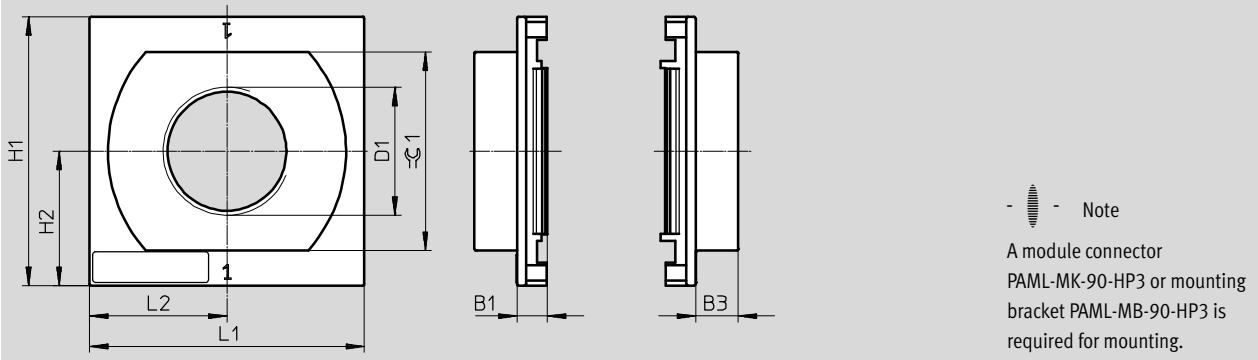
Dimensions – Size 90

Download CAD data → www.festo.com

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



PAML-CP-90-HP3-G114



Type	B1	B2	B3	D1	D2 ¹⁾	D3	H1	H2	H3	H4	L1	L2	≈ 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	-	

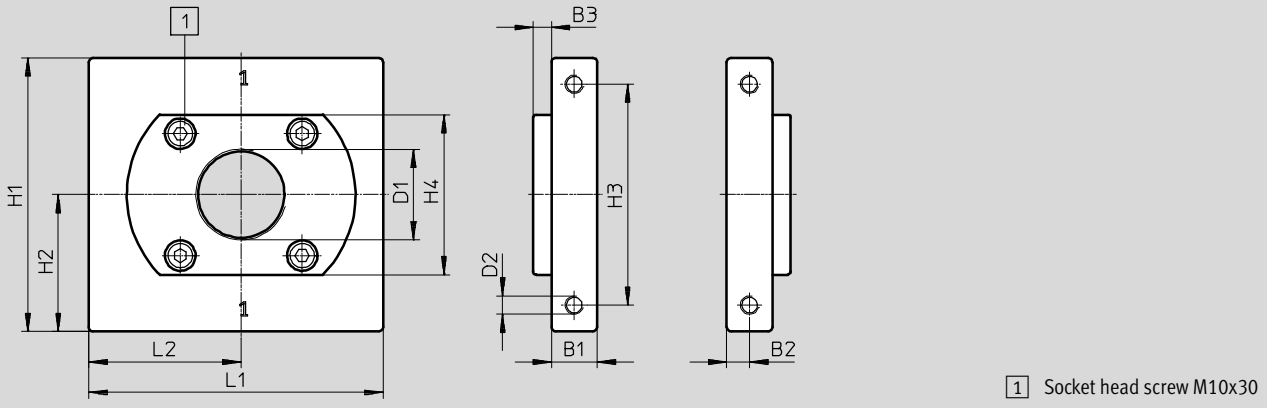
1) Thread for mounting the service unit on a wall without mounting bracket

Pneumatic components for high-pressure applications, series L

Accessories

Dimensions – Size 186

Download CAD data → www.festo.com



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			25	G2½							



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

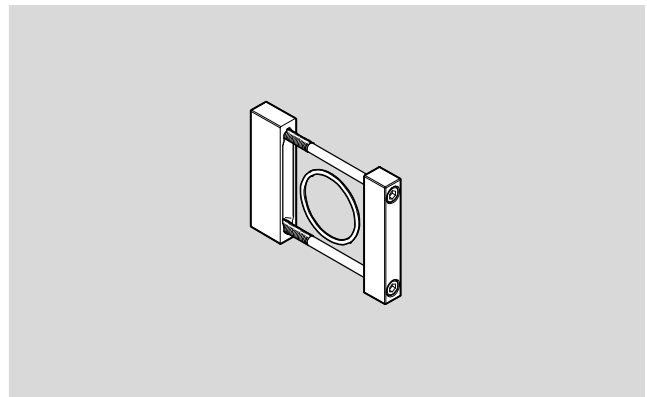
Pneumatic components for high-pressure applications, series L

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 ¹⁾	2	
CE marking (see declaration of conformity) ²⁾	To EU Pressure Equipment Directive	
Food-safe ²⁾	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 → Certificates.

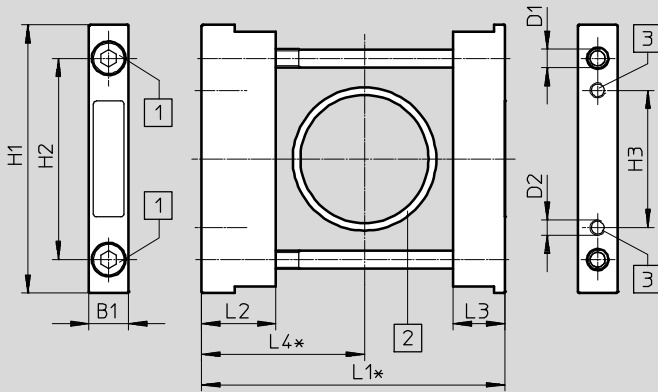
Materials	
Module connector	Wrought aluminium alloy
Screws	Stainless steel
Seals	Nitrile rubber
Note on materials	RoHS compliant

Pneumatic components for high-pressure applications, series L

Accessories

Dimensions – Size 90

Download CAD data → www.festo.com



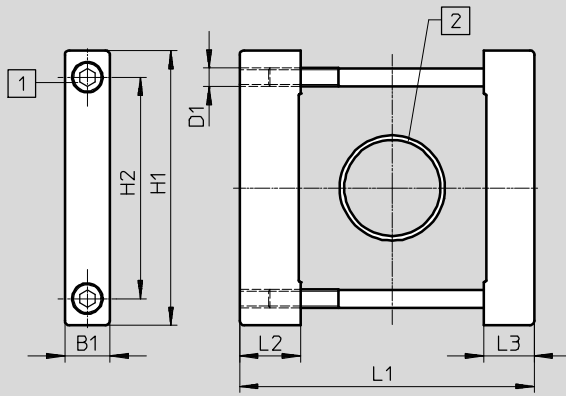
- 1 Socket head screw M6x85
- 2 O-ring, 42x2.5
- 3 Thread for mounting the service unit on a wall

Type	B1	D1	D2	H1	H2	H3	L1 ¹⁾	L2	L3	L4 ¹⁾
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



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

Type	B1	D1	H1	H2	L1 ¹⁾	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

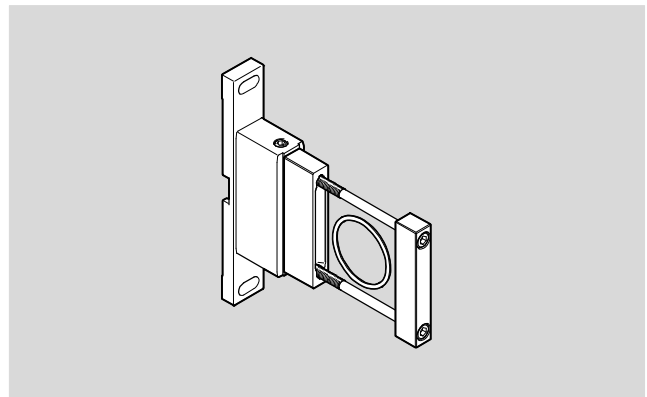
Accessories

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 ¹⁾	2
CE marking (see declaration of conformity) ²⁾	To EU Pressure Equipment Directive
Food-safe ²⁾	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 → Certificates.

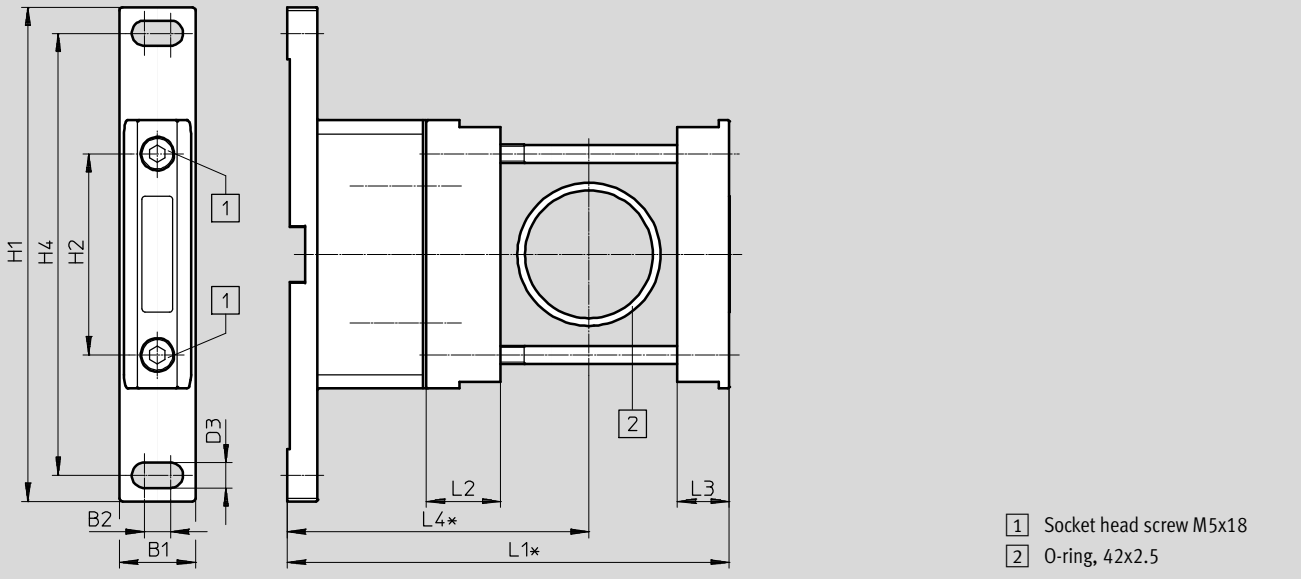
Materials	
Bracket	Wrought aluminium alloy
Module connector	Wrought aluminium alloy
Screws	Stainless steel
Seals	Nitrile rubber
Note on materials	RoHS compliant

Pneumatic components for high-pressure applications, series L

Accessories

Dimensions – Size 90

Download CAD data → www.festo.com



Type	B1	B2	D3	H1	H2	H4	L1 ¹⁾	L2	L3	L4 ¹⁾
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	1367323	PAML-MB-90-HP3

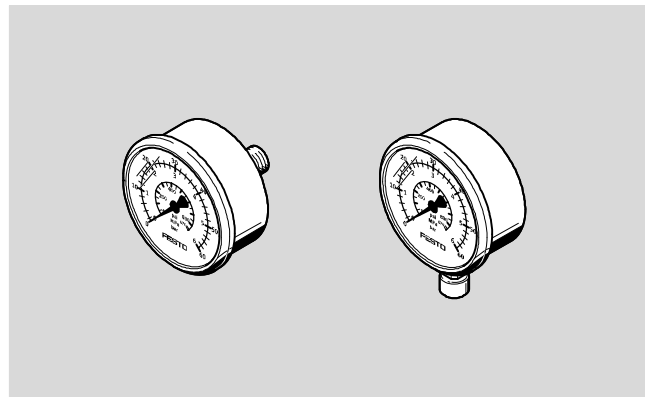
Pneumatic components for high-pressure applications, series L

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

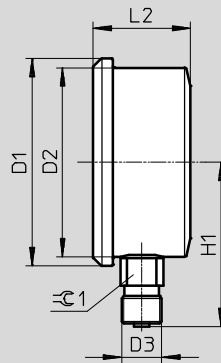
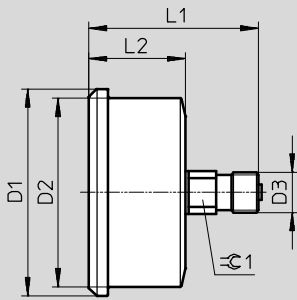
Accessories

Dimensions

Download CAD data → www.festo.com

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	-		

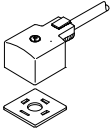
Ordering data


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	1166938	PAGL-HP3-63-60-G14
					Radial underneath	1908519	PAGL-HP3-63-60-G14-RC

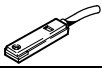
Pneumatic components for high-pressure applications, series L



Accessories

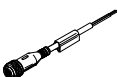
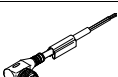
Ordering data – Silencers U			Technical data → Internet: u	
	Description	Pneumatic connection	Part No.	Type
	For PREL-90	G $\frac{3}{8}$	6843	U-$\frac{3}{8}$-B
	For PREL-186	G $\frac{1}{2}$	6844	U-$\frac{1}{2}$-B
	For PAHL	G $\frac{3}{4}$	6845	U-$\frac{3}{4}$-B
	For PVEL	G1	151990	U-1-B


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	30931	KMC-1-24DC-2,5-LED
					5	30933	KMC-1-24DC-5-LED
					10	193459	KMC-1-24-10-LED

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	19145	MC-LD-12-24DC

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	150857 SME-8-S-LED-24

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	541333	NEBU-M8G3-K-2.5-LE3
			5	541334	NEBU-M8G3-K-5-LE3
			10	541332	NEBU-M8G3-K-10-LE3
	M8x1, angled socket	3	2.5	541338	NEBU-M8W3-K-2.5-LE3
			5	541341	NEBU-M8W3-K-5-LE3
			10	541335	NEBU-M8W3-K-10-LE3

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	541330	NEBU-M12G5-K-2.5-LE5
			5	541331	NEBU-M12G5-K-5-LE5
			10	554038	NEBU-M12G5-K-10-LE5
	M12x1, angled socket	5	2.5	567843	NEBU-M12W5-K-2.5-LE5
			5	567844	NEBU-M12W5-K-5-LE5

Ordering data – Padlock LRV5-D		
	Weight [g]	Part No. Type
	120	193786 LRV5-D