

Proportional pressure regulators VPPI

FESTO



Key features

Special characteristics

- Three predefined regulator presets, as well as the option of a custom preset
- Low-noise
- Flexible
- Highly dynamic up to 30 Hz
- The max. frequency of 30 Hz protects the system
- Precise and stable: the powerful moving coil actuator also ensures that setpoint value changes are quick, easy and precise
- Lots of pressure ranges
- Pressure regulation range: -1 ... 12 bar
- PWM operation: the VPPI detects PWM signals generated by any machine controller and changed over automatically

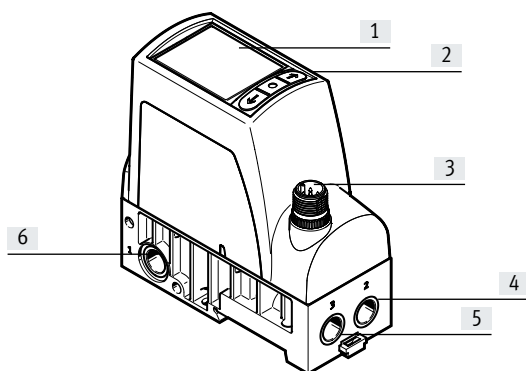
Function

The valve VPPI is a directly actuated proportional pressure regulator that uses two proportional 2/2-way valves as a basis.

The valve regulates a pneumatic pressure to an electronically defined value. This makes use of cascaded closed-loop control of pressure/travel and current.

Control is provided using an analogue current or voltage signal, or alternatively using a digital pattern (voltage version) for adjustable setpoint values, or using a PWM signal (voltage version).

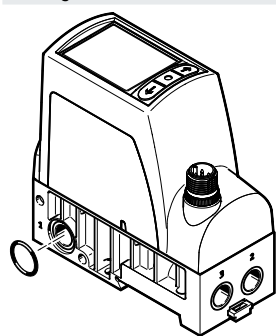
Design



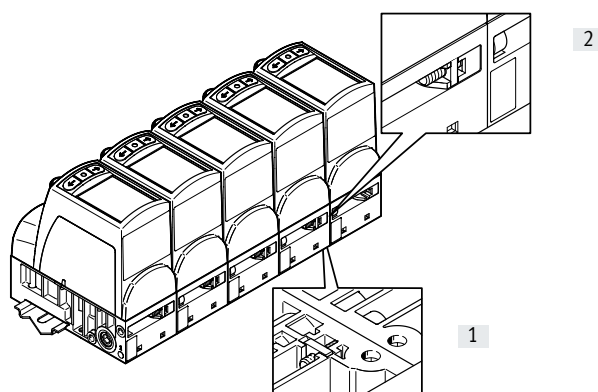
- [1] Display
- [2] Operating buttons display menu
- [3] Electrical connection, M12
- [4] Port 2, working air
- [5] Port 3, exhaust air
- [6] Port 1, compressed air

Mounting

Linking of valves



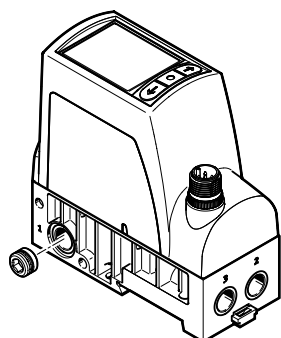
Up to five valves can be linked using connecting kit VAME-P18-K-P5. The connecting kit consists of two square nuts, two socket head screws and an O-ring.



- [1] The valves are connected on the underside using socket head screws and square nuts.
- [2] The valves are connected at the rear using socket head screws and square nuts.

Key features

Pressure zone separation

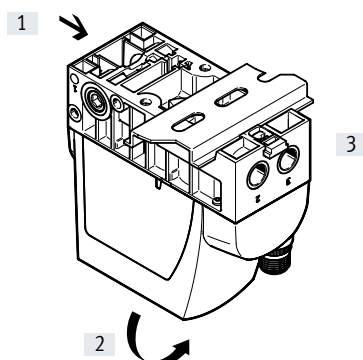


Linked valves can be divided into two pressure zones. To do this, duct 1 is closed on the corresponding side using a plug screw.

Plug screws for duct 1 can be ordered as accessories (VAME-P18-BP-G18-P5). In the case of pressure zone separation, there must be compressed air supply from both sides.

Mounting

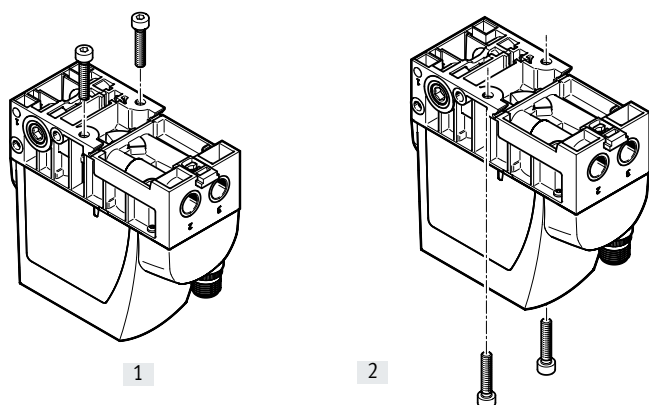
Via H-rail



The valve VPPI is hung onto the H-rail [1]. It is then pivoted onto the H-rail [2] and locked in place using the clamping element [3].

Linked valves are mounted on the H-rail in the same way. The clamping elements of the outer valves can be used to lock them in place.

Via the valve underside

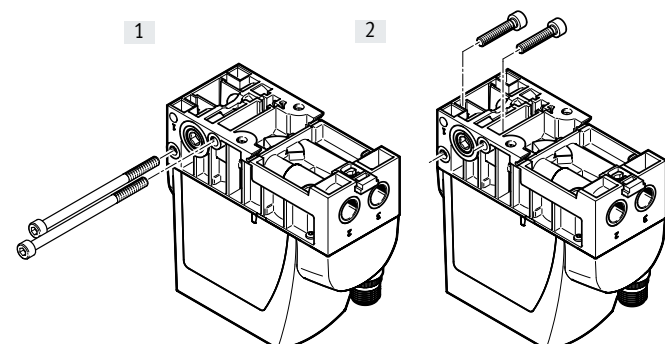


Individual mounting via the underside:

- [1] Mounting using screws M4 and square nuts
- [2] Mounting using screws M4

Linked valves are mounted on the valve underside in the same way. Only the two outermost screws are used for mounting.

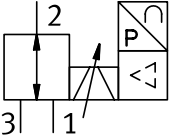
Via the side face



Individual mounting via side face:

- [1] Using through screws
- [2] Using internal screws

Product range overview

Function	Circuit symbol	Type	Valve function	Pressure regulation	Setpoint value input	
				range	Voltage type	Current type
				[bar]	0 ... 10 V	4 ... 20 mA
Proportional pressure regulator		VPPI-5L-3	<ul style="list-style-type: none">• 3-way proportional pressure regulator• Normally closed	-1 ... 0	■	■
				-1 ... 1	■	■
				0 ... 2	■	■
				0 ... 6	■	■
				0 ... 10	■	■
				0 ... 12	■	■

Type codes

001	Series	
VPPI	Proportional-pressure regulator	

002	Nominal width [mm]	
5	5	

003	Directional control valve type	
L	In-line valve	

004	Valve function	
4	3/3-way valve, normally open	
3	3/3-way valve, normally closed	

005	Pneumatic connection	
G18	G1/8	

006	Lower pressure value of control range	
...L		
0L	0 bar	
1V	-1 bar	

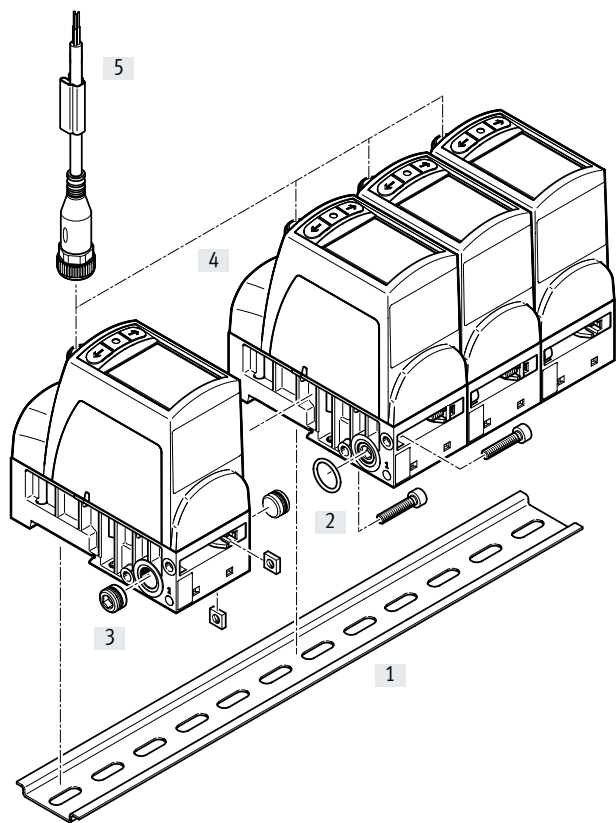
007	Upper pressure value of control range	
...H		
0H		
10H	10 bar	
12H	12 bar	
1H	1 bar	
2H	2 bar	
6H	6 bar	

008	Setpoint input for individual valves	
A4	4 ... 20 mA	
V1	0 ... 10 V	

009	Overall accuracy	
S1	1 %	


010	Operator unit/interface	
D	Display	
	None	


Peripherals overview




Accessories			
Type/order code	Description		→ Page/Internet
[1] NRH-35-2000	DIN mounting rail, for a maximum of five proportional pressure regulators		14
[2] VAME-P18-K-P5	Connecting kit, enables linking of several proportional pressure regulators using a common compressed air supply		13
[3] B	Blanking plug		14
[4] VPPI	Proportional pressure regulator		13
[5] NEBU-M12W5	Connecting cable		13

Data sheet

 - Flow rate
150 ... 1630 l/min

 - Voltage
20.4 ... 27.6 V DC

 - Pressure regulation range
-1 ... 0 bar
-1 ... 1 bar
0 ... 2 bar
0 ... 6 bar
0 ... 10 bar
0 ... 12 bar



General technical data		±1 bar	1 bar	2 bar	6 bar	10 bar	12 bar
Valve function		3-way proportional pressure regulator					
Design		Poppet valve with spring return					
Reset method		Mechanical spring					
Dimensions W x L x H		42.2 x 95.3 x 94.3 mm					
Display type		LED					
	With display (-...D-...)	TFT colour					
Safety instructions		Safety position VPPI, normally closed					
Display size	With display (-...D-...)	1.77"					
Display resolution		128x160 pixels					
Nominal size pressurisation/exhaust	[mm]	5					
Pneumatic port 1		G1/8					
Pneumatic port 2		G1/8					
Pneumatic port 3		G1/8					
Standard nominal flow rate qnN 1-2	[l/min]	-	150	375	900	1400	1630
Standard nominal flow rate qnN 2-3	[l/min]	20	20	210	480	750	850
Sealing principle		Soft					
Flow direction		Non-reversible					
Actuation type		Electric					
Type of control		Direct					
Type of mounting		Via through-hole for M4 screw, via H-rail					
Mounting position		Any					
Degree of protection		IP65					
Corrosion resistance class ¹⁾		2					
Product weight	[g]	365					
	With display (-...D-...)	370					
Max. tightening torque of fitting	[Nm]	8.5					
Note regarding use		The product is suitable for industrial purposes only. In residential areas, measures for radio interference suppression may have to be taken.					

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

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

Data sheet

Electrical data			
Operating voltage range	[V DC]	20.4 ... 27.6	
Nominal operating voltage	[V DC]	24	
Nominal current	[A]	0.15	
Max. current consumption	[mA]	525	
Max. electrical power consumption	[W]	14.5	
Reverse polarity protection		For all electrical connections	
Short circuit current rating		For all electrical connections	
Max. cable length	[m]	30	
Electrical connection 1			
Function		Actual value output	
		Setpoint input	
		Power supply	
Connection type		Plug	
Connection technology		M12x1, A-coded to EN 61076-2-101	
Number of pins/wires		5	
Tightening torque	[Nm]	1.5	
Setpoint input			
Setpoint value input	Voltage type (-V1-...)	[V]	0 ... 10/PMW signal/ digital ¹⁾
	Current type (-A4-...)	[mA]	4 ... 20
Input resistance	Voltage type (-V1-...)	[kOhm]	100
	Current type (-A4-...)	[kOhm]	0.3
Actual value output			
Switching output ¹⁾		Push-pull	
Max. output current (switching output) ¹⁾	[mA]	25	
Analogue output signal range	Voltage type (-V1-...)	[V]	0 ... 10
	Current type (-A4-...)	[mA]	4 ... 20
Max. load resistance of current output	Current type (-A4-...)	[Ohm]	500
Min. load resistance of voltage output	Voltage type (-V1-...)	[Ohm]	2000
Accuracy of analogue output in FS	[%]	1	

1) Only in combination with display variant VPPI-...V...-...D-...

Operating and environmental conditions			
Medium		Compressed air to ISO 8573-1:2010 [7:4:4]	
		Inert gases	
Note on the medium		Operation with lubricated medium not possible	
Temperature of medium	[°C]	0 ... 50	
Ambient temperature	[°C]	0 ... 50	
Storage temperature	[°C]	- 20 ... 70	
Climatic category		3K3 to EN 60721	
Nominal altitude of use	[m above sea level]	< 3000	
Sound power level LwA	[dB(A)]	62.5	
Sound power level at a distance of 1 m	[dB(A)]	51.9	
Linearity full scale	[%]	0.9	
Hysteresis full scale	[%]	0.4	
Reproducibility full scale	[%]	0.4	
Overall accuracy full scale	[%]	1.1	
Temperature coefficient K	[%]	0.02	
Total leakage	[l/h]	5	
Certification		RCM compliance mark	
KC mark		KC EMC	
CE marking (see declaration of conformity)		To EU EMC Directive ¹⁾	
		To EU RoHS directive	
Vibration resistance		Transport application test with severity level 2 to FN 942017-4 and EN 60068-2-6	
		Shock test with severity level 2 to FN 942017-5 and EN 60068-2-27	

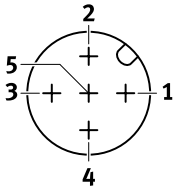
1) For information about the area of use, see the EC declaration of conformity at: www.festo.com/sp → Certificates.

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

Data sheet

Operating and environmental conditions		±1 bar	1 bar	2 bar	6 bar	10 bar	12 bar
Operating pressure	[bar]	0 ... 2	1 ... 2	2 ... 4	6 ... 8	10 ... 12	12 ... 13
Pressure regulation range	[bar]	-1 ... 0	-1 ... 1	0 ... 2	0 ... 6	0 ... 10	0 ... 12
	[MPa]	-0.1 ... 0	-0.1 ... 0.1	0 ... 0.2	0 ... 0.6	0 ... 1	0 ... 1.2
Input pressure 1	[bar]	0 ... 6	0 ... 6	0 ... 6	0 ... 13	0 ... 13	0 ... 13
	[MPa]	0 ... 0.6	0 ... 0.6	0 ... 0.6	0 ... 1.3	0 ... 1.3	0 ... 1.3
Input pressure 3	[bar]	-1	-1	-	-	-	-
	[MPa]	-0.1	-0.1	-	-	-	-
Burst pressure	[bar]	40	40	40	40	40	40

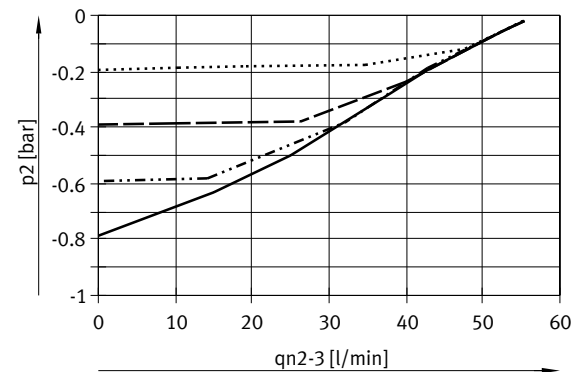
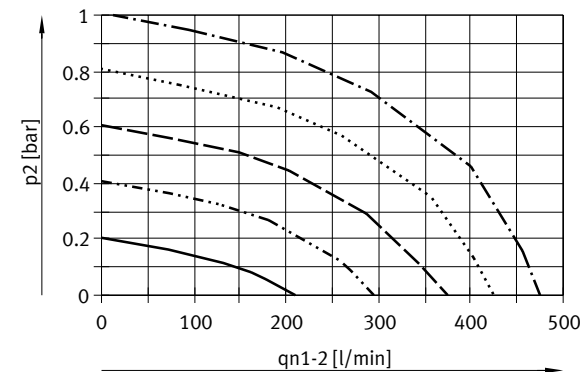
Information on materials	
Note on materials	RoHS-compliant
Housing material	PA-reinforced
Seals material	HNBR
	PTFE

Pin allocation, electrical connection			
	Pin	Allocation	
		Analogue	Alternative (digital input)
	1	+ 24 V DC	+ 24 V DC
	2	Setpoint value (-)	DI1
	3	GND	GND
	4	Setpoint value (+)/PWM	DI0
		Actual value output • Related to pin 2 "Setpoint value (-)" for type VPPI- ... -V1- • Related to pin 3 "GND" for VPPI- ... -A4-...	DI2

Data sheet

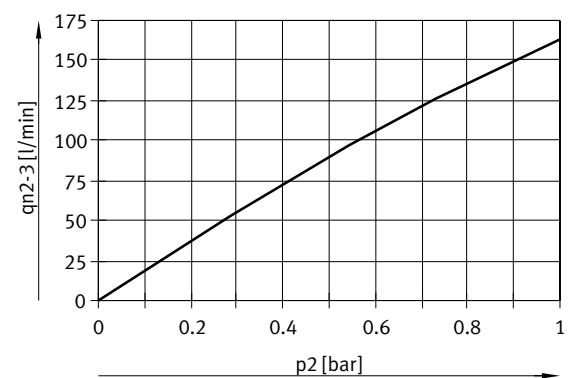
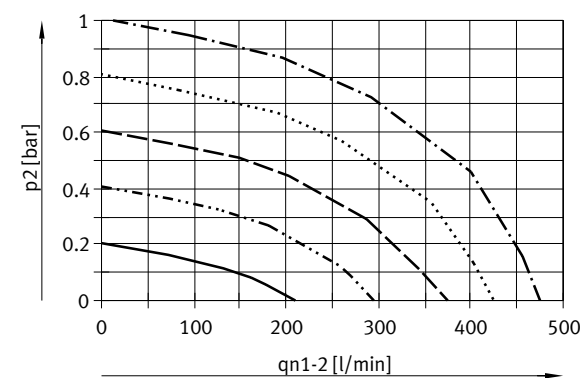
Flow rate q_n from 1 > 2 as a function of output pressure p_2
 ± 1 bar

Flow rate q_n from 2 > 3 as a function of output pressure p_2
 ± 1 bar



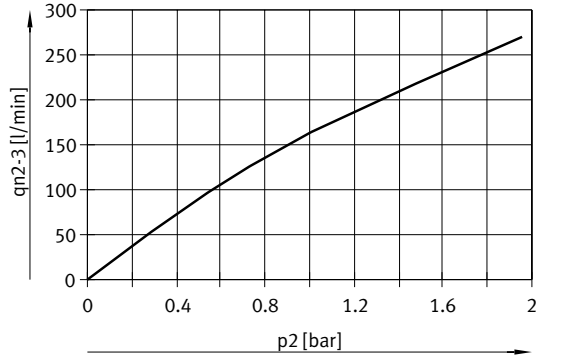
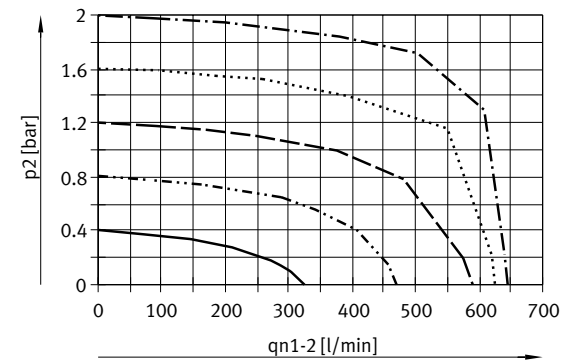
Flow rate q_n from 1 > 2 as a function of output pressure p_2
1 bar

Flow rate q_n from 2 > 3 as a function of output pressure p_2
1 bar



Flow rate q_n from 1 > 2 as a function of output pressure p_2
2 bar

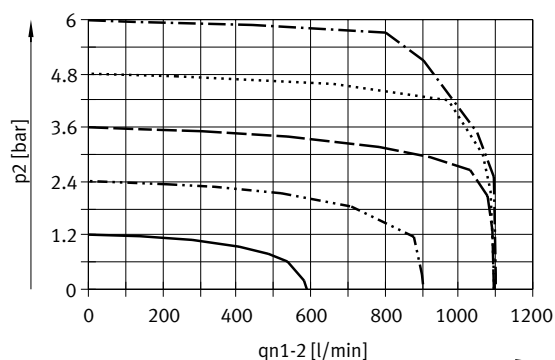
Flow rate q_n from 2 > 3 as a function of output pressure p_2
2 bar



Data sheet

Flow rate q_n from 1 > 2 as a function of output pressure p_2

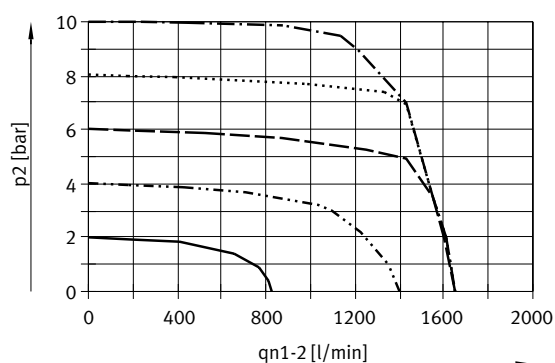
6 bar

Flow rate q_n from 2 > 3 as a function of output pressure p_2

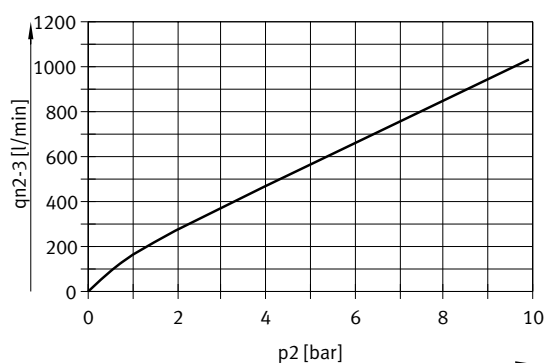
6 bar

Flow rate q_n from 1 > 2 as a function of output pressure p_2

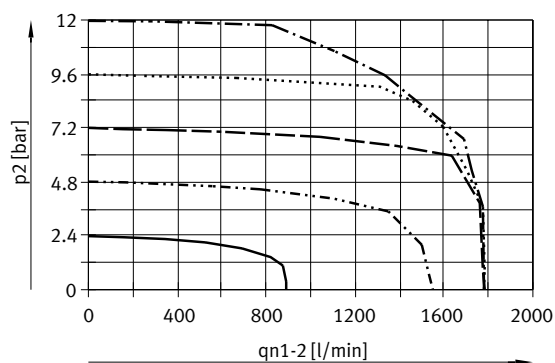
10 bar

Flow rate q_n from 2 > 3 as a function of output pressure p_2

10 bar

Flow rate q_n from 1 > 2 as a function of output pressure p_2

12 bar

Flow rate q_n from 2 > 3 as a function of output pressure p_2

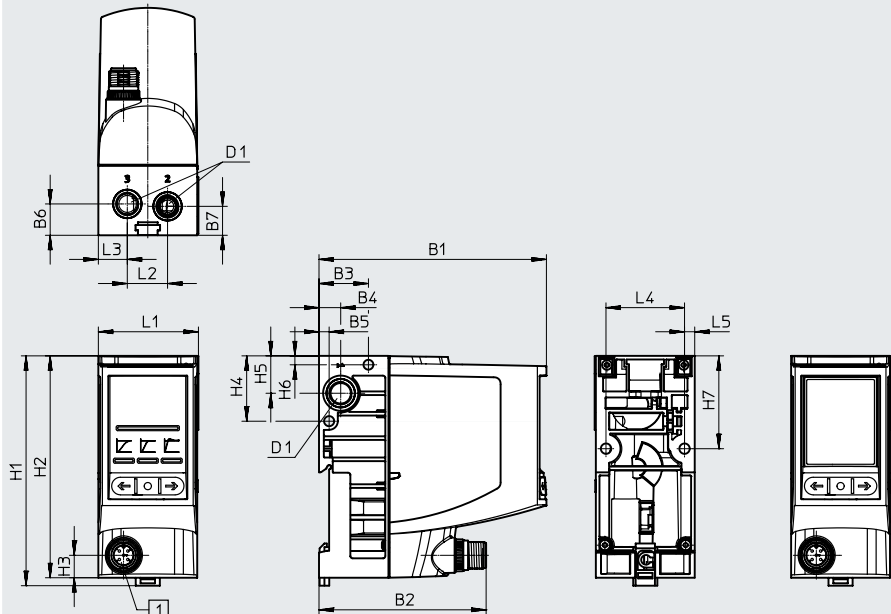
12 bar



Data sheet

Dimensions Download CAD data → www.festo.com

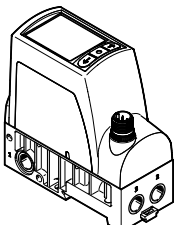
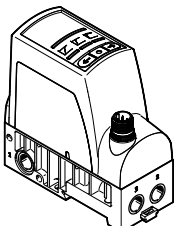

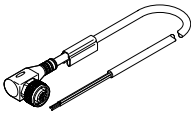

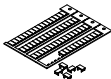

[1] M12x1, A-coded to EN 61076-2-101





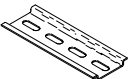
Type	B1	B2	B3	B4	B5	B6	B7	D1	H1	H2	H3	H4	H5	H6	H7
VPPI	94.3	69.3	20.5	9	4.2	13	12	G1/8	95.3	92	9.3	27.1	15.5	3.7	38.5

Type	L1		L2		L3		L4		L5	
VPPI	41.2		16.7		12		32.6		4.2	

Accessories

Ordering data					
	Pressure regulation range [bar]	Description		Part no.	Type
Proportional pressure regulator					
With display					
	-1 ... 1	Normally closed	Voltage type 0 ... 10 V	8104673	VPPI-5L-3-G18-1V1H-V1-S1D
	0 ... 6	Normally closed	Voltage type 0 ... 10 V	8104665	VPPI-5L-3-G18-0L6H-V1-S1D
			Current type 4 ... 20 mA	8104667	VPPI-5L-3-G18-0L6H-A4-S1D
	0 ... 10	Normally closed	Voltage type 0 ... 10 V	8104669	VPPI-5L-3-G18-0L10H-V1-S1D
			Current type 4 ... 20 mA	8104670	VPPI-5L-3-G18-0L10H-A4-S1D
	0 ... 12	Normally closed	Voltage type 0 ... 10 V	8104672	VPPI-5L-3-G18-0L12H-V1-S1D
Without display					
	0 ... 6	Normally closed	Voltage type 0 ... 10 V	8104664	VPPI-5L-3-G18-0L6H-V1-S1
	0 ... 10		Voltage type 0 ... 10 V	8104668	VPPI-5L-3-G18-0L10H-V1-S1
Ordering data					
	Description			Part no.	Type
Connecting cable					
	Straight socket, M12x1, A-coded		2.5 m	541330	NEBU-M12G5-K-2.5-LE5
			5 m	541331	NEBU-M12G5-K-5-LE5
	Angled socket, M12x1, A-coded		2.5 m	567843	NEBU-M12W5-K-2.5-LE5
			5 m	567844	NEBU-M12W5-K-5-LE5
Inscription label holder					
	10 pieces			561115	VMPAL-ST-AP-20
Inscription label					
	64 inscription labels			18576	IBS-6X10
Connecting kit					
	Connecting kit, for linking several proportional pressure regulators using a common compressed air supply			8108270	VAME-P18-K-P5

Accessories

Ordering data		Description	Part no.	Type
Blanking plug			Data sheets → Internet: b	
	10 pieces		3568	B-1/8-10
	100 pieces		534213	B-1/8-100
Plug screw			Data sheets → Internet: vame	
	For duct 1 of the valve for pressure zone separation, 5 pieces		8108292	VAME-P18-BP-G18-P5
	For duct 1 of the valve for pressure zone separation, 10 pieces		8108271	VAME-P18-BP-G18-P10
DIN mounting rail			Data sheets → Internet: nrh	
	For H-rail mounting		35430	NRH-35-2000