

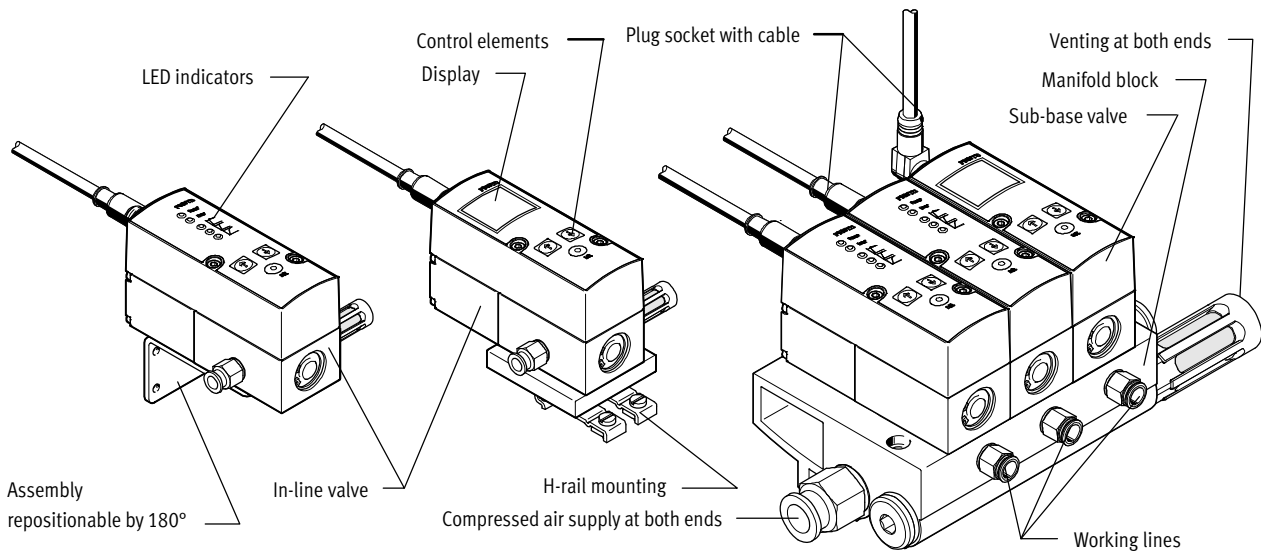
Proportional pressure regulators VPPM



Proportional pressure regulators VPPM

Key features

FESTO



Innovative

- Multi-sensor control (cascade control)
- Diagnostics
- Choice of regulation characteristics
- Temperature compensated
- High dynamic response
- High repetition accuracy
- Modular product system
- IO-Link, for direct connection to a higher-level IO-Link/I-Port master

Versatile

- Individual valves (in-line valve)
- Manifold valves (sub-base/flange valve)
- Various user interfaces
 - LED indicators
 - LCD display
 - Adjustment/selection buttons
- A choice of valves with different pressure ranges
- Pressure range can be modified on the valve
- Choice of different setpoint specifications
 - Current input
 - Voltage input

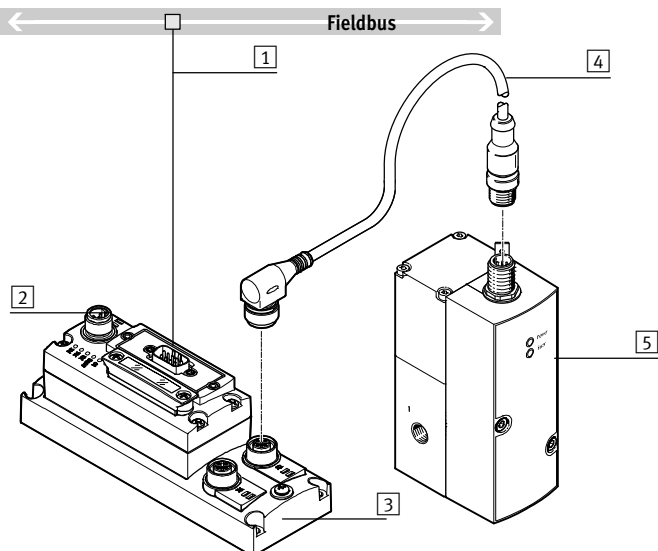
Reliable

- Integrated pressure sensor with independent output
- Open circuit monitoring
- Pressure is maintained if the controller fails

Easy to mount

- Manifold block
- H-rail mounting
- Individually via mounting bracket
- QS fittings

Overview, VPPM IO-Link



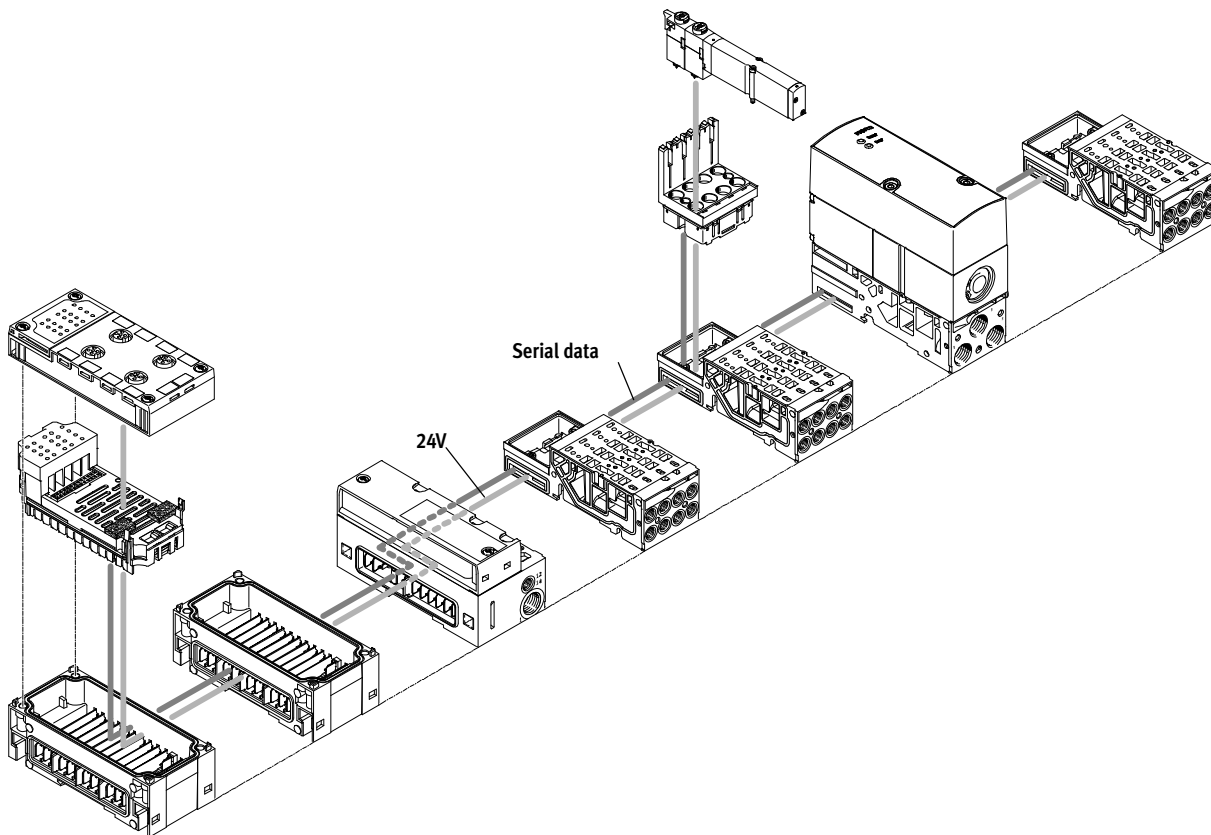
- 1 Diagnostics via fieldbus
- 2 Fieldbus node
- 3 Connecting block CAPC
- 4 Connecting cable NEBU
- 5 Proportional pressure regulator VPPM with IO-Link

Proportional pressure regulators VPPM

Key features – VPPM on valve terminal

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VPPM on the valve terminal MPA-S



Innovative

- Multi-sensor control
- Diagnostics via bus
- Choice of regulation characteristics
- High dynamic response
- 2 accuracy levels

Versatile

- For all common protocols
- As an individual pressure regulator
- As a pressure zone regulator
- Choice of 3 valves with different pressure ranges
- 3 pressure ranges (presets) can be set via the bus
- Internal or external compressed air supply possible

Reliable

- Long service life
- LED display for the operating status
- Pressure is maintained if the supply voltage fails
- Fast troubleshooting thanks to LEDs on the valves and diagnostics via fieldbus
- Ease of servicing through replaceable valves

Easy to mount

- Simple replacement of the valves
- Tested units
- Easy extension of the valve terminal

-  - Note

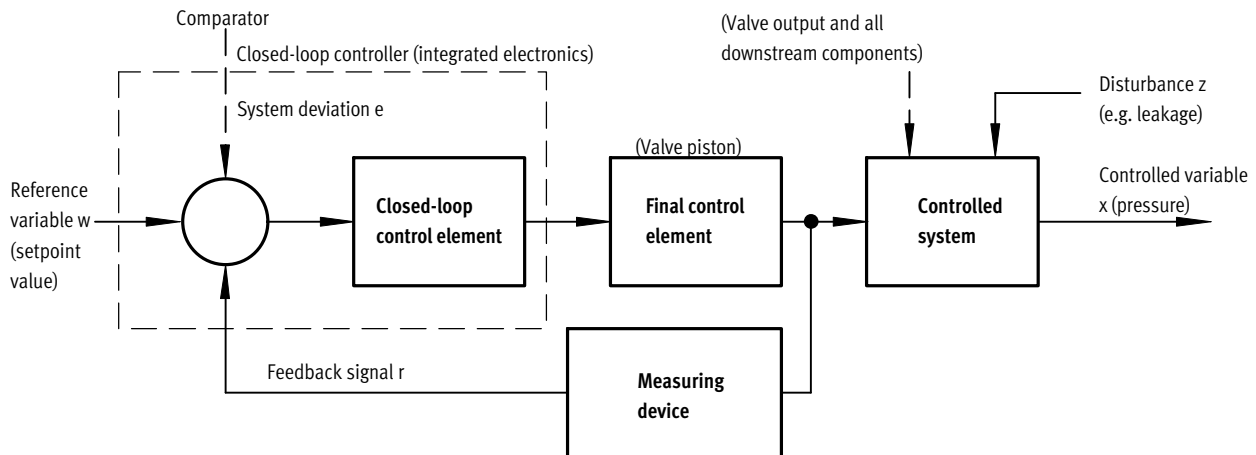
More information on the VPPM valves for MPA-S

→ [mpas](#)

Proportional pressure regulators VPPM

Key features – Control circuit

Layout of a control circuit



Layout

The figure shows a closed-loop control circuit. The reference variable w (setpoint value, e.g. 5 volts or 8 mA) initially acts on a comparator. The measuring device sends the controlled variable x value (actual value, e.g. 3 bar) to the comparator as a feedback signal r . The closed-loop control element detects the system

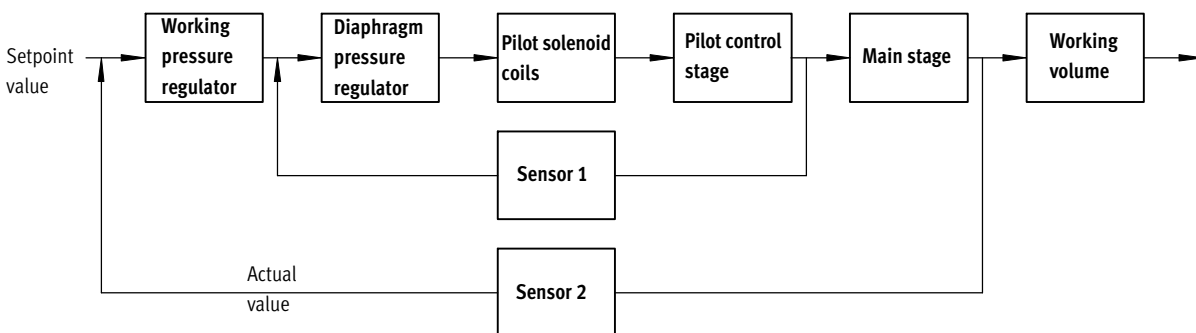
deviation e and actuates the final control element. The output of the final control element acts on the controlled system. The closed-loop control element thus attempts to compensate for the difference between the reference variable w and the controlled variable x by using the final control element.

Method of operation

This process runs continuously so changes in the reference variable are always detected. However, a system deviation will also appear if the reference variable is constant but the controlled variable changes. This happens when the flow through the valve changes in response to a switching action, a cylinder movement

or a change in load. The disturbance variable z will also cause a system deviation. An example of this is when the pressure drops in the air supply. The disturbance variable z acts on the controlled variable x unintentionally. In all cases, the regulator attempts to readjust the controlled variable x to the reference variable w .

Multi-sensor control (cascade control) of the VPPM



Cascade control

Unlike conventional direct-acting regulators, with multi-sensor control several control circuits are nested inside each other. The overall controlled

system is divided into smaller sub-controlled circuits that are easier to control for the specific task.

Control precision

Multi-sensor control significantly improves control precision and dynamic

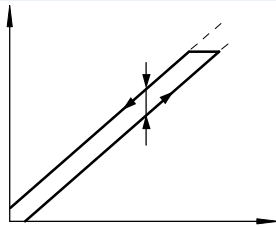
response in comparison with single-acting regulators.

Proportional pressure regulators VPPM

Key features – Control circuit

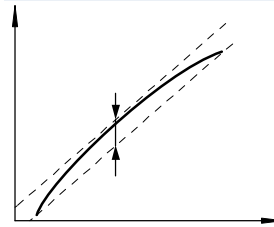
Terms related to the proportional pressure regulator

Hysteresis



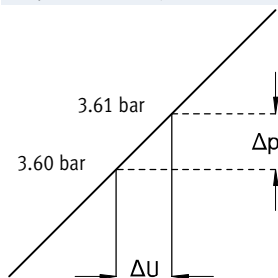
There is always a linear relationship within a certain tolerance between the setpoint value entered and the pressure output. Nevertheless it makes a difference whether the setpoint value is entered as rising or falling. The difference between the maximum deviations is referred to as hysteresis.

Linearity error



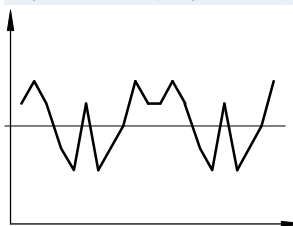
A perfectly linear progression of the control characteristic of the output pressure is theoretical. The maximum percentage deviation from this theoretical control characteristic is referred to as the linearity error. The percentage value refers to the maximum output pressure (full scale).

Response sensitivity



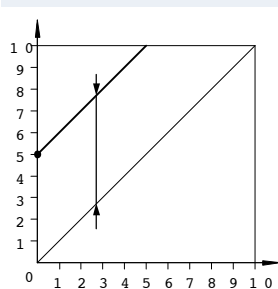
The response sensitivity of the device determines how sensitively one can change, i.e. adjust, a pressure. The smallest setpoint value difference that results in a change in the output pressure is referred to as the response sensitivity. In this case, 0.01 bar.

Repetition accuracy (reproducibility)



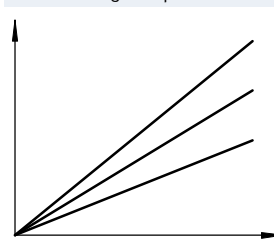
The repetition accuracy is the margin within which the fluid output variables are scattered when the same electrical input signal coming from the same direction is repeatedly adjusted. The repetition accuracy is expressed as a percentage of the maximum fluid output signal.

Zero offset



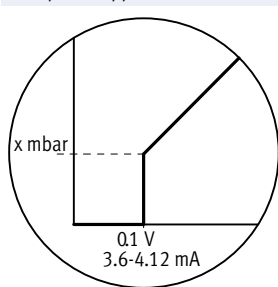
If, for example, a VPPM cannot be vented for safety reasons, the minimum pressure can be increased from the zero point. The smallest setpoint value is then assigned an output pressure of 5 bar, for example, and the largest setpoint value an output pressure of 10 bar. Zero suppression is automatically switched off if zero offsetting is used.

Pressure range adaptation



In the delivery condition, 100% setpoint value equals 100% fluid output signal. Pressure range adaptation or adjustment enables the fluid output variable to be matched to the setpoint value.

Zero point suppression



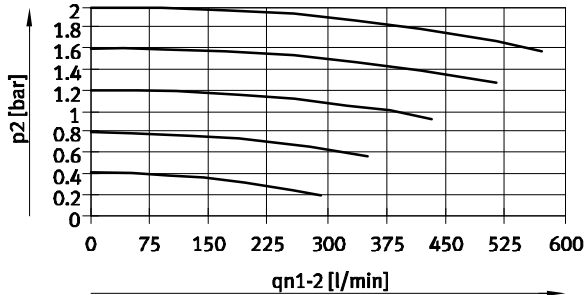
In practice there exists the possibility of residual voltage or residual current at the setpoint input of the VPPM via the setpoint generator. Zero point suppression is used so that the valve is reliably vented at a setpoint value of zero.

Proportional pressure regulators VPPM

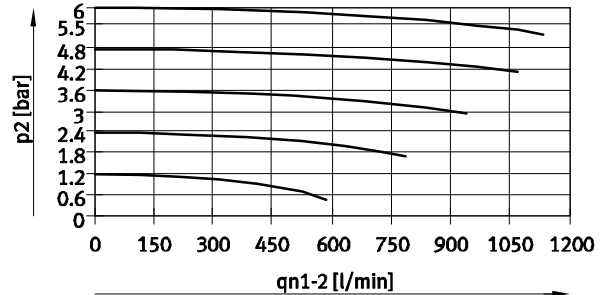
Key features – Flow rate

Flow rate q_{n1-2} from 1 → 2 as a function of output excess pressure p_2

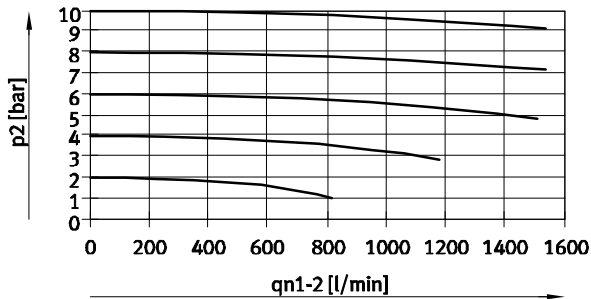
VPPM-6L/F-...-0L2H-... (2 bar)



VPPM-6L/F-...-0L6H-... (6 bar)

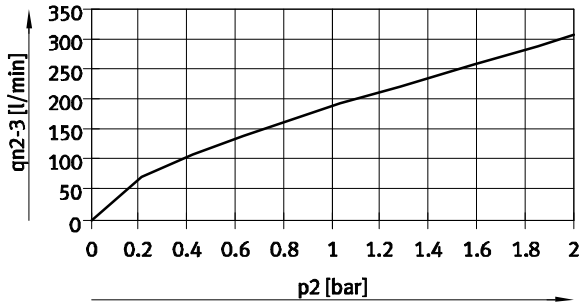


VPPM-6L/F-...-0L10H-... (10 bar)

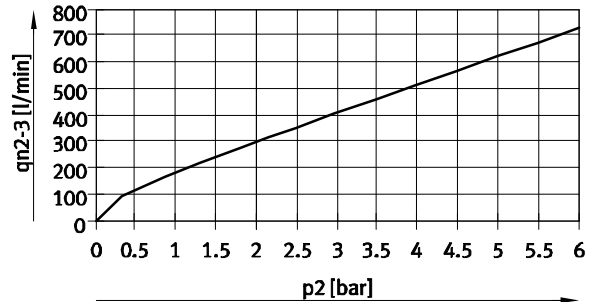


Flow rate q_{n2-3} from 2 → 3 as a function of output excess pressure p_2

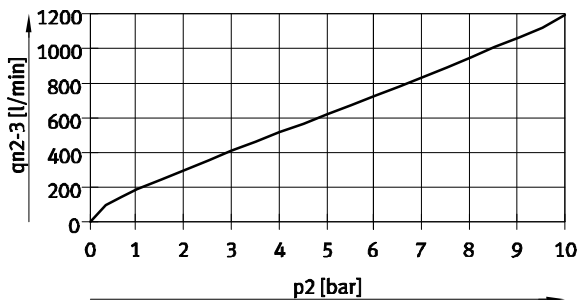
VPPM-6L/F-...-0L2H-... (2 bar)



VPPM-6L/F-...-0L6H-... (6 bar)



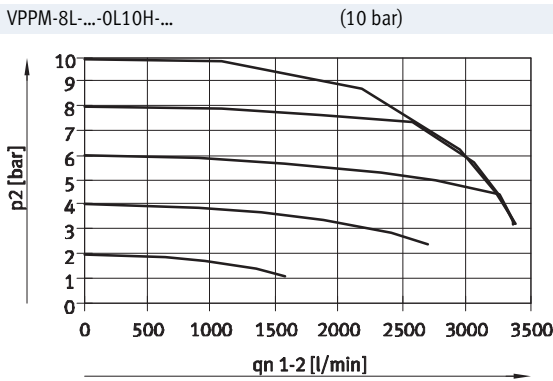
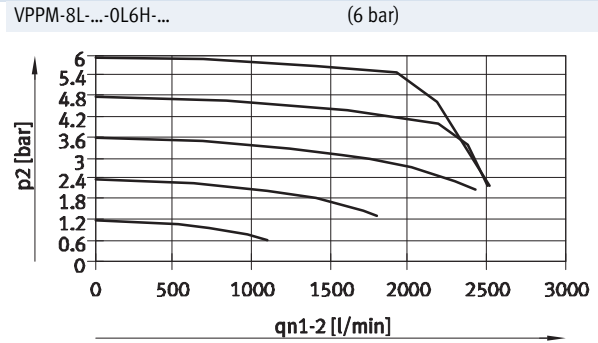
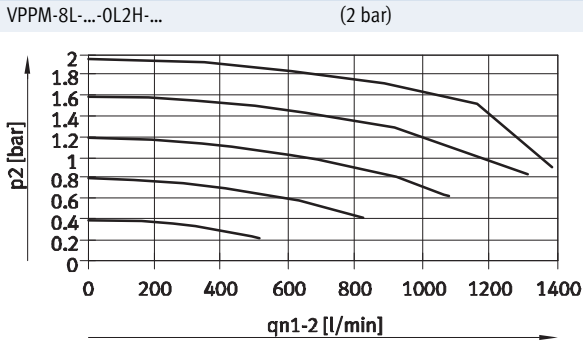
VPPM-6L/F-...-0L10H-... (10 bar)



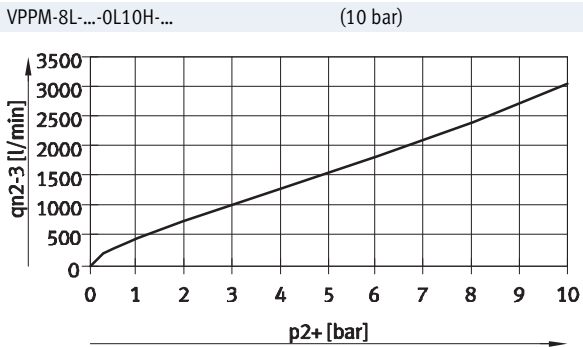
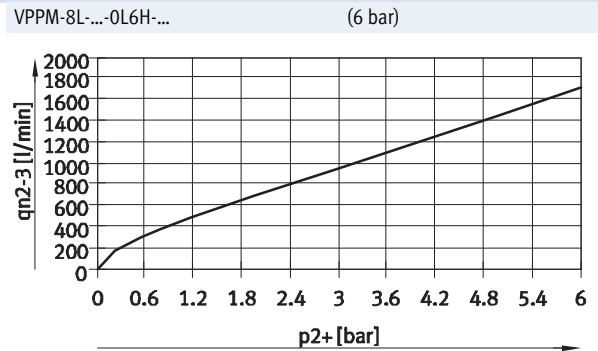
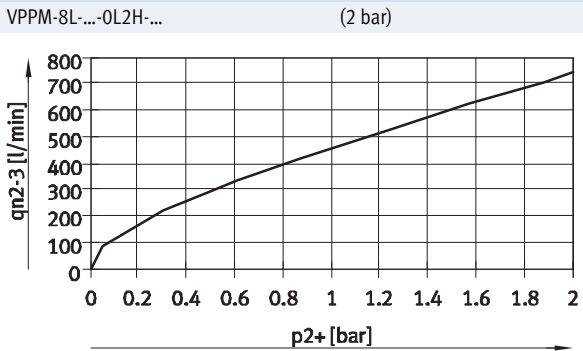
Proportional pressure regulators VPPM

Key features – Flow rate

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



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



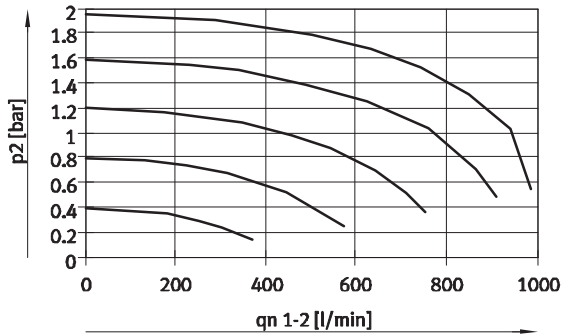
Proportional pressure regulators VPPM

Key features – Flow rate

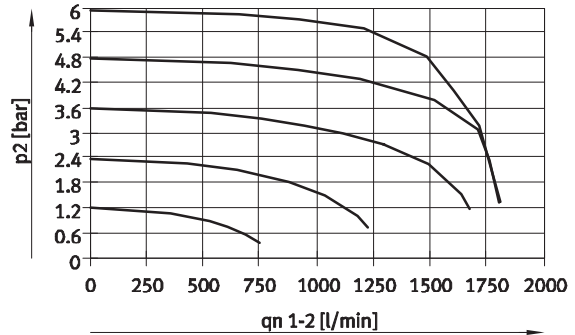


Flow rate q_n from 1 → 2 as a function of output excess pressure p_2

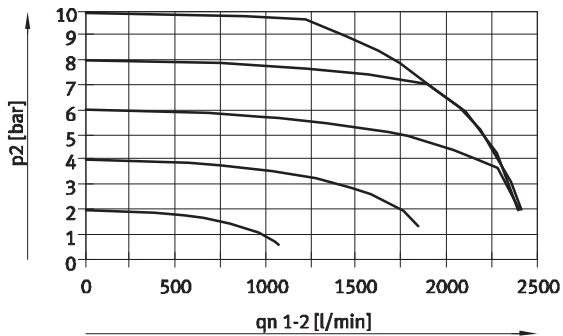
VPPM-8F/8TA-...-0L2H-... (2 bar)



VPPM-8F/8TA-...-0L6H-... (6 bar)

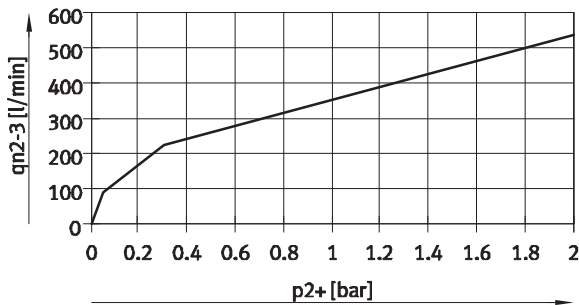


VPPM-8F/8TA-...-0L10H-... (10 bar)

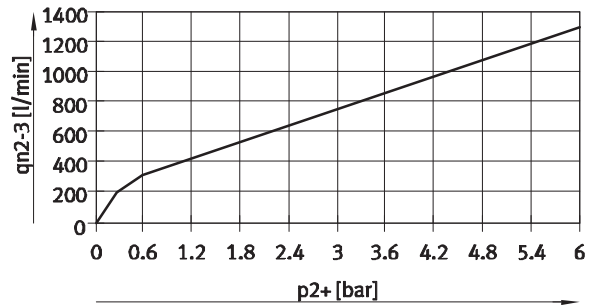


Flow rate q_n from 2 → 3 as a function of output excess pressure p_2

VPPM-8F/8TA-...-0L2H-... (2 bar)



VPPM-8F/8TA-...-0L6H-... (6 bar)



VPPM-8F/8TA-...-0L10H-... (10 bar)

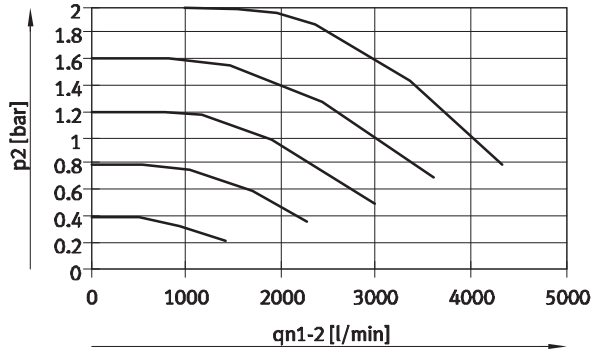


Proportional pressure regulators VPPM

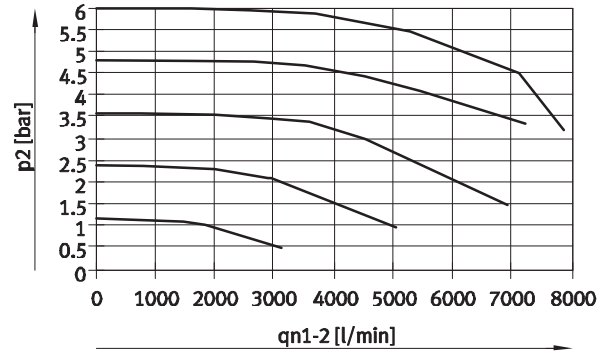
Key features – Flow rate

Flow rate q_{n1} from 1 → 2 as a function of output excess pressure p_2

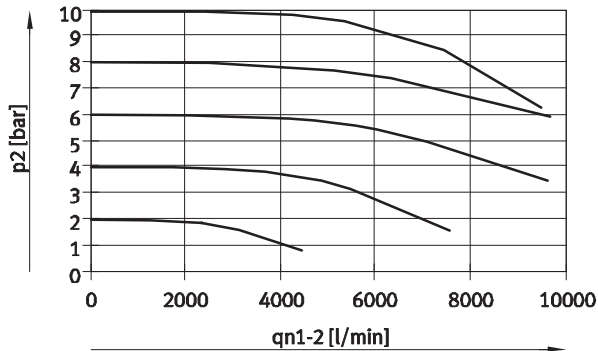
VPPM-12L-...-0L2H-... (4 bar)



VPPM-12L-...-0L6H-... (8 bar)

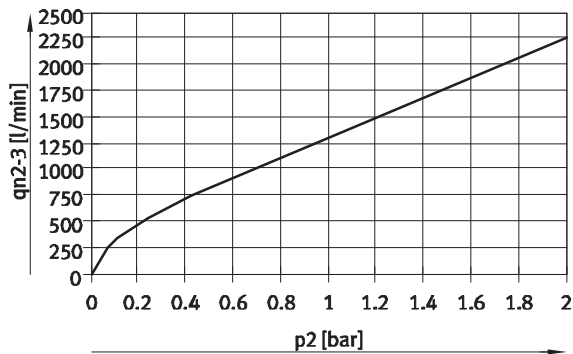


VPPM-12L-...-0L10H-... (11 bar)

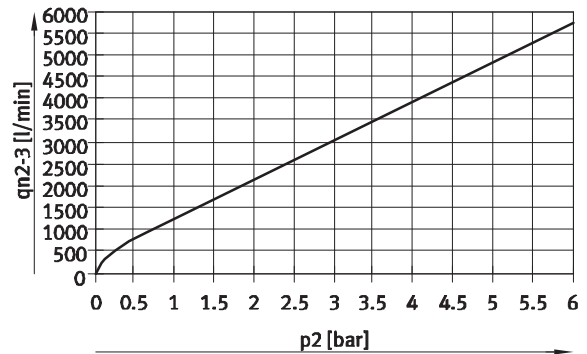


Flow rate q_{n2} from 2 → 3 as a function of output excess pressure p_2

VPPM-12L-...-0L2H-... (4 bar)



VPPM-12L-...-0L6H-... (8 bar)



VPPM-12L-...-0L10H-... (11 bar)



Proportional pressure regulators VPPM

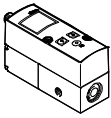
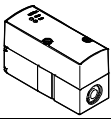
Product range overview



Function	Version	Design	Pneumatic connection 1, 2, 3	Nominal width for pressurisation/ exhaust [mm]	Pressure regulation range [bar]	Setpoint value input			→ Page/ Internet
						Voltage type 0 ... 10 V	Current type 4 ... 20 mA	Digital –	
Pressure regulators	LED operator unit (standard)								
		Piloted diaphragm valve	G1/8	6/4.5	0.02 ... 2 0.06 ... 6 0.1 ... 10	■	■	–	18
			Sub-base	6/4.5	0.02 ... 2 0.06 ... 6 0.1 ... 10	■	■	–	
				8/7	0.02 ... 2 0.06 ... 6 0.1 ... 10	■	■	–	
			G1/4	8/7	0.02 ... 2 0.06 ... 6 0.1 ... 10	■	■	–	
			G1/2	12/12	0.02 ... 2 0.06 ... 6 0.1 ... 10	■	■	–	
	LED operator unit with IO-Link								
		Piloted diaphragm valve	G1/8	6/4.5	0.02 ... 2 0.06 ... 6 0.1 ... 10	–	–	■	25
			Sub-base	6/4.5	0.02 ... 2 0.06 ... 6 0.1 ... 10	–	–	■	
				8/7	0.02 ... 2 0.06 ... 6 0.1 ... 10	–	–	■	
G1/4			8/7	0.02 ... 2 0.06 ... 6 0.1 ... 10	–	–	■		
G1/2			12/12	0.02 ... 2 0.06 ... 6 0.1 ... 10	–	–	■		

Proportional pressure regulators VPPM

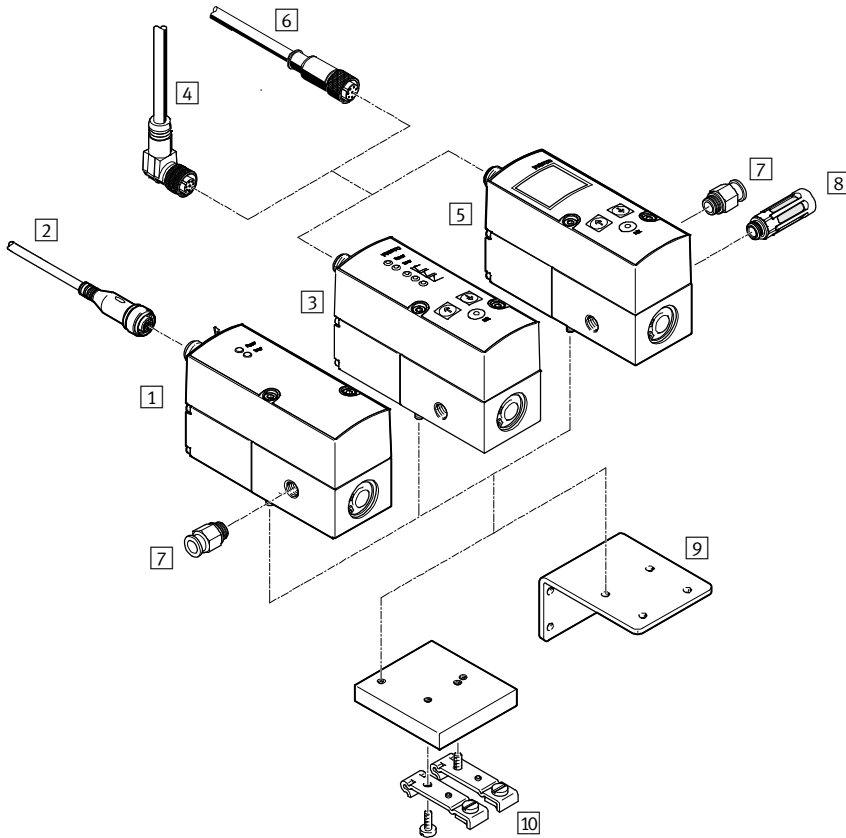
Product range overview

Function	Version	Design	Pneumatic connection 1, 2, 3	Nominal width for pressurisation/ exhaust [mm]	Pressure regulation range [bar]	Setpoint value input			→ Page/ Internet
						Voltage type 0 ... 10 V	Current type 4 ... 20 mA	Digital –	
Pressure regulators	Operator unit with LCD, pressure unit variable								
		Piloted diaphragm valve	G $\frac{1}{8}$	6/4.5	0.02 ... 2 0.06 ... 6 0.1 ... 10	■	■	–	18
			Sub-base	6/4.5	0.02 ... 2 0.06 ... 6 0.1 ... 10	■	■	–	
				8/7	0.02 ... 2 0.06 ... 6 0.1 ... 10	■	■	–	
			G $\frac{1}{4}$	8/7	0.02 ... 2 0.06 ... 6 0.1 ... 10	■	■	–	
			G $\frac{1}{2}$	12/12	0.02 ... 2 0.06 ... 6 0.1 ... 10	■	■	–	
	Operator unit with LED, for valve terminal MPA-S								
		Piloted diaphragm valve	Sub-base MPA	6/4.5, 8/7	0.02 ... 2 0.06 ... 6 0.1 ... 10	–	–	■	mpas

Proportional pressure regulators VPPM

Peripherals overview

Individual valve VPPM-6L ... , VPPM-8L ...

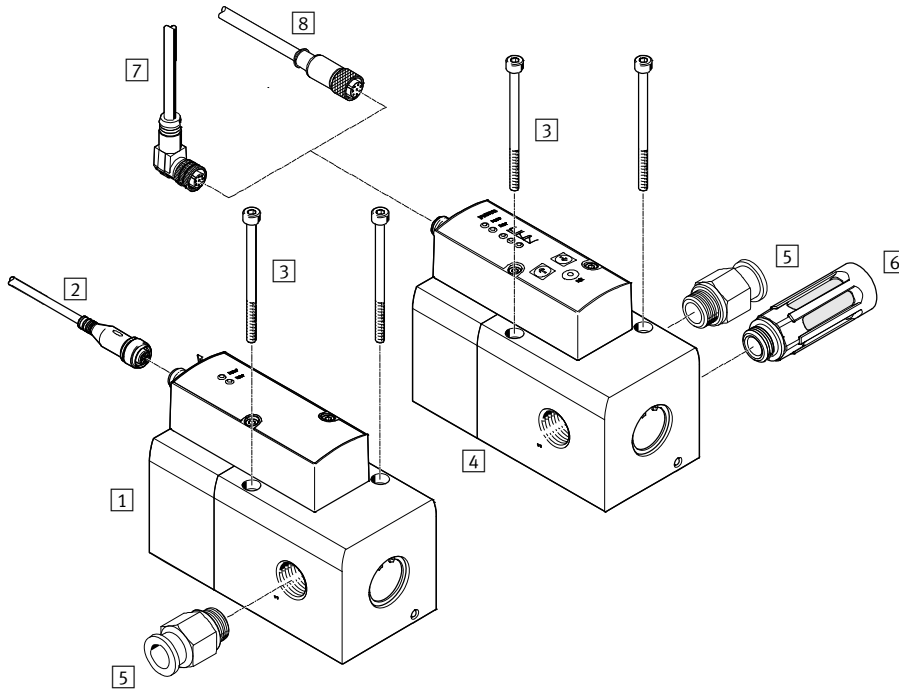


Accessories		
	Description	→ Page/Internet
1	Proportional pressure regulator VPPM Operator unit with LED, IO-Link	25
2	Connecting cable NEBU-M12G5...	40
3	Proportional pressure regulator VPPM Operator unit with LED	40
4	Angled plug socket with cable NEBU-M12W8-...	40
5	Proportional pressure regulator VPPM Operator unit with LCD	18
6	Straight plug socket with cable SIM-M12-8GD-...	18
7	Push-in fitting QS For connecting compressed air tubing with standard O.D.	qs
8	Silencer For installation in exhaust ports	u
9	Angle bracket VAME-P1-A For mounting the valve	37
10	H-rail mounting VAME-P1-T For mounting on an H-rail	35

Proportional pressure regulators VPPM

Peripherals overview

Individual valve VPPM-12L ...



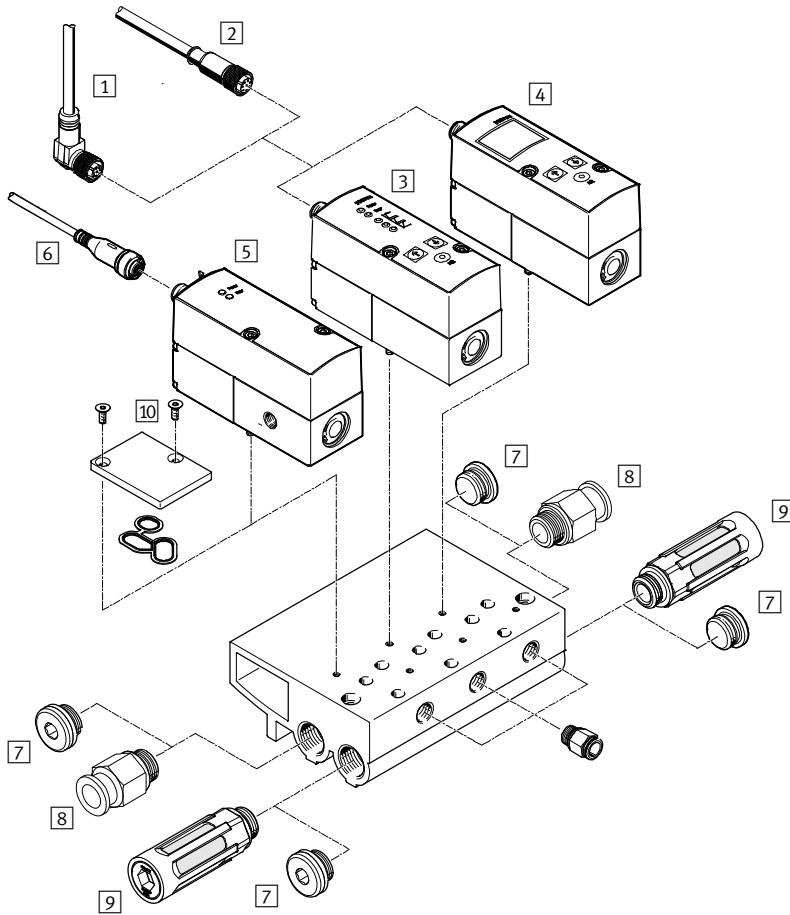
Accessories		Description	→ Page/Internet
1	Proportional pressure regulator VPPM	Operator unit with LED, IO-Link	25
2	Connecting cable NEBU-M12G5...	–	40
3	Mounting screws	–	–
4	Proportional pressure regulator VPPM	Operator unit with LED or LCD	18
5	Push-in fitting QS	For connecting compressed air tubing with standard O.D.	qs
6	Silencer	For installation in exhaust ports	u
7	Angled plug socket with cable NEBU-M12W8...	–	40
8	Straight plug socket with cable SIM-M12-8GD...	–	40

Proportional pressure regulators VPPM

Peripherals overview

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Manifold assembly with VPPM-6F ... , VPPM-8F ...

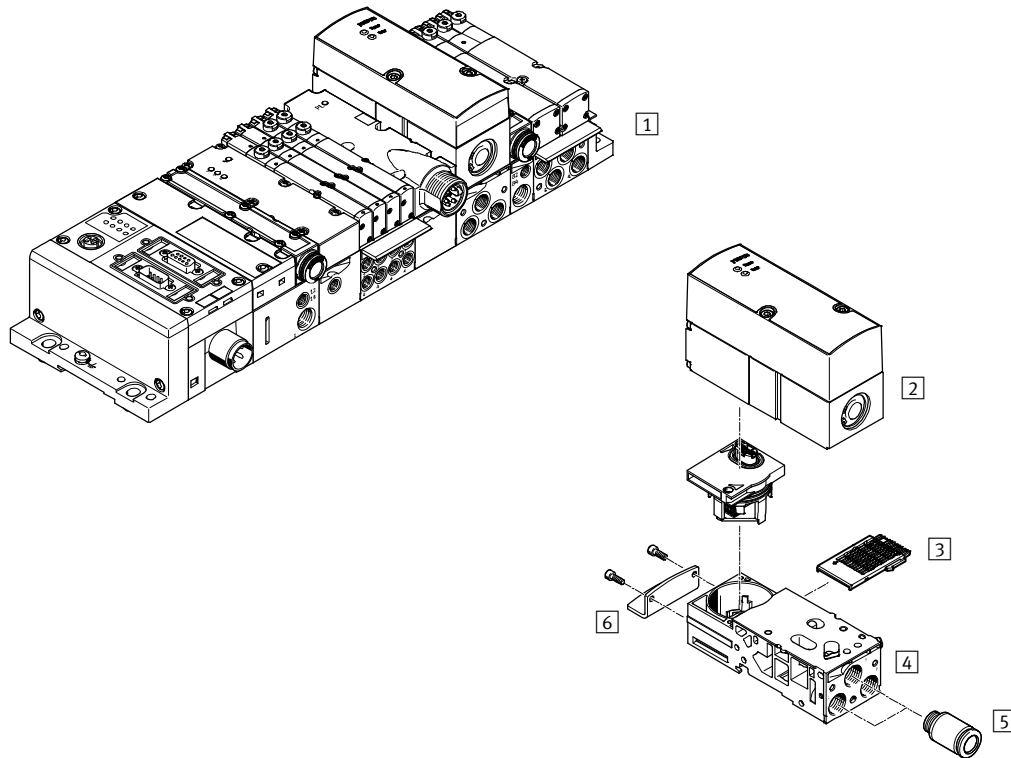


Accessories		Description	→ Page/Internet
1	Angled plug socket with cable NEBU-M12W8-...	–	40
2	Straight plug socket with cable SIM-M12-8GD-...	–	40
3	Proportional pressure regulator VPPM	Operator unit with LED	18
4	Proportional pressure regulator VPPM	Operator unit with LCD	18
5	Proportional pressure regulator VPPM	Operator unit with LED, IO-Link	25
6	Connecting cable NEBU-M12G5...	–	40
7	Blanking plug B	–	b
8	Push-in fitting QS	For connecting compressed air tubing with standard O.D.	qs
9	Silencer	For installation in exhaust ports	u
10	Cover plate VABB-P1	For vacant position; seal and countersunk screws included in the scope of delivery	36
	Manifold block VABM	–	35

Proportional pressure regulators VPPM

System overview

VPPM-6TA ... , VPPM-8TA ... for valve terminal MPA-S



Accessories		Description	→ Page/Internet
1	Valve terminal MPA-S	With fieldbus connection and VPPM	mpas
2	Proportional pressure regulator VPPM	For valve terminal MPA-S	mpas
3	Electrical interlinking module VMPA1-FB-EV-AB	For sub-base of the proportional pressure regulator	mpas
4	Sub-base VMPA-FB-AP-P1	Without electrical interlinking module or electrical module	mpas
5	Push-in fitting QS	–	qs
6	Mounting component VMPA-BG	–	mpas

Proportional pressure regulators VPPM

Type codes

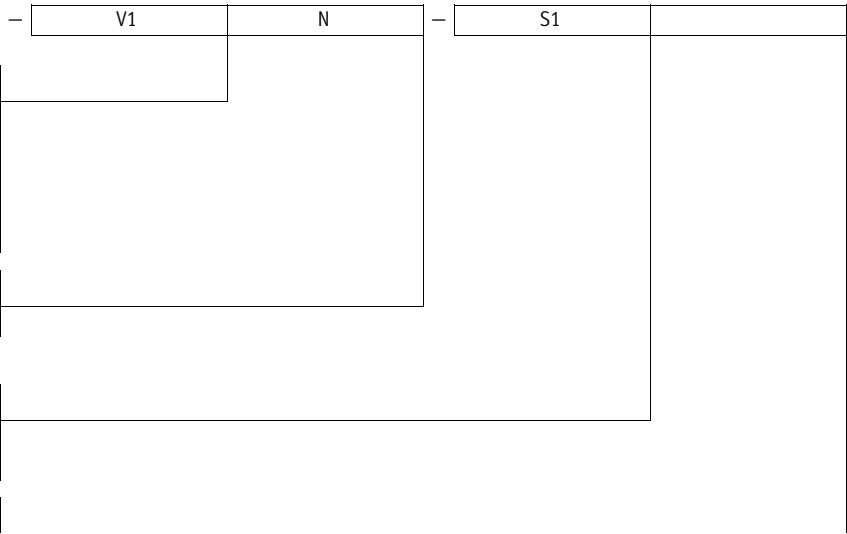
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VPPM – 6 – L – L – 1 – G18 – 0L 6H – 1L – 6H

Type	
VPPM	Modular proportional pressure regulator
Nominal diameter	
6	6 mm
8	8 mm
12	12 mm
Design	
L	In-line valve
F	Flanged valve
T	Flanged valve for valve terminal
Dynamic response class	
L	Low
Valve function	
1	3/2-way valve, normally closed
Pneumatic connection	
G18	Thread G $\frac{1}{8}$
G14	Thread G $\frac{1}{4}$
G12	Thread G $\frac{1}{2}$
F	Flange/sub-base
Lower pressure value of regulation range	
0L	0 bar
Upper pressure value of regulation range	
2H	2 bar
6H	6 bar
10H	10 bar
Alternative lower pressure value of regulation range	
...L	0 ... 9 bar
Alternative upper pressure value of regulation range	
...H	0.2 ... 10 bar

Proportional pressure regulators VPPM

Type codes



Setpoint specification for individual valve

-	For valve terminals / servo pneumatics
V1	0 ... 10 V
LK	IO-Link
A4	4 ... 20 mA

Switching output

N	Negative switching
P	Positive switching

Accuracy

-	2% (standard)
S1	1%


Operator unit


-	LED (standard)
C1	With LCD, pressure unit variable


Proportional pressure regulators VPPM

Technical data – VPPM with analogue interface

FESTO

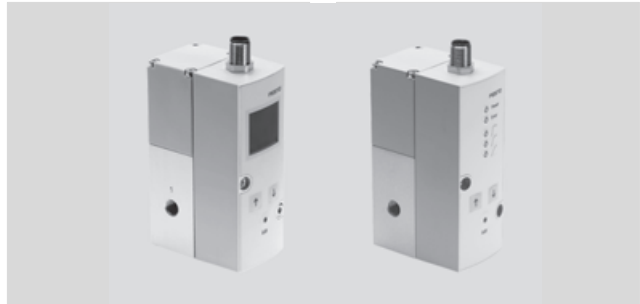
-  - Flow rate
380 ... 7000 l/min

-  - Voltage
21.6 ... 26.4 V DC

-  - Pressure regulation range
0.02 ... 10 bar


Variants

- Setpoint input as analogue voltage signal 0 ... 10 V
- Setpoint input as analogue current signal 4 ... 20 mA
- LED version
- With LCD display
- NPN or PNP switching output



General technical data							
Type			VPPM-6	VPPM-8	VPPM-12	Sub-base	
Pneumatic connection			G $\frac{1}{8}$	G $\frac{1}{4}$	G $\frac{1}{2}$	Via sub-base	
Constructional design	Pilot actuated diaphragm regulator						
Sealing principle	Soft						
Actuation type	Electric						
Type of control	Pilot actuated via 2/2-way valves						
Type of mounting	Via through-hole, via accessories						
Mounting position	Any						
Nominal diameter	Pressurisation	[mm]	6	8	12	6	8
	Exhaust	[mm]	4.5	7	12	4.5	7
Standard nominal flow rate			→ Graphs				
Product weight			400	560	2050	400	560

Electrical data						
Type			VPPM-6	VPPM-8	VPPM-12	
Electrical connection	Plug, round design, 8-pin, M12					
Operating voltage range	[V DC]		24 ± 10% = 21.6 ... 26.4			
Residual ripple	[%]		10			
Duty cycle	[%]		100			
Max. electrical power consumption	[W]		7	7	12	
Signal setpoint input	Voltage	[V DC]	0 ... 10			
	Current	[mA]	4 ... 20			
Protection against short circuit	For all electrical connections					
Protection against polarity reversal	For all electrical connections					
Protection class	IP65					

-  - Note

If the power supply cable is interrupted, output pressure is maintained unregulated.

Proportional pressure regulators VPPM

Technical data – VPPM with analogue interface

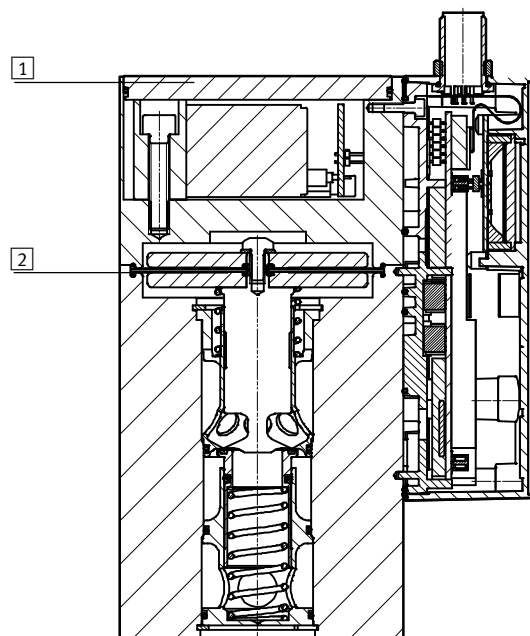
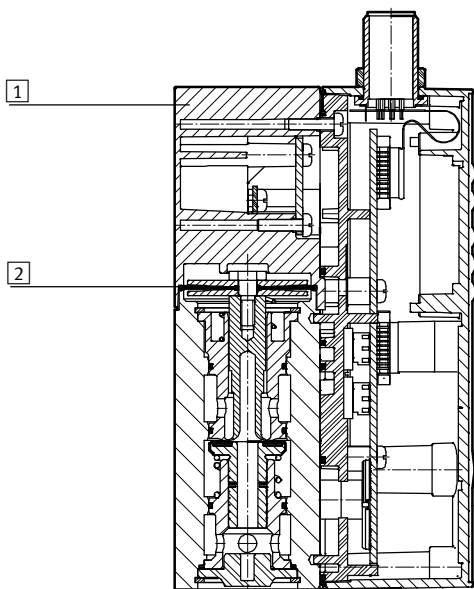
Operating and environmental conditions				
Pressure regulation range	[bar]	0.02 ... 2	0.06 ... 6	0.1 ... 10
Operating medium		Compressed air in accordance with ISO 8573-1:2010 [7:4:4] Inert gases		
Note on operating/pilot medium		Operation with lubricated medium not possible		
Supply pressure 1 ¹⁾	[bar]	0 ... 4	0 ... 8	0 ... 11
Max. hysteresis	[mbar]	10	30	50
FS (full scale) linearity error	[%]	±0.5		
FS (full scale) repetition accuracy	[%]	0.5		
Temperature coefficient	[%/K]	0.04		
Ambient temperature, operator unit LED (standard)	[°C]	0 ... 60		
Ambient temperature, operator unit with LCD	[°C]	0 ... 50		
Temperature of medium	[°C]	10 ... 50		
Note on materials		RoHS-compliant		
Corrosion resistance	[CRC]	2 ²⁾		
CE mark		To EU EMC Directive (see declaration of conformity) ³⁾		
Certification		RCM trademark c UL us - Listed (OL)		

- Supply pressure 1 should always be 1 bar greater than the maximum regulated output pressure.
- Corrosion resistance class 2 as per Festo standard 940 070
Components subject to moderate corrosion stress. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.
- For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com/sp → User documentation.
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.

Materials

Sectional view VPPM-6 ..., VPPM-8 ...

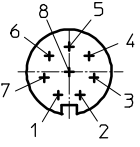
Sectional view VPPM-12 ...



1	Housing	Wrought aluminium alloy
2	Diaphragm	Nitrile rubber

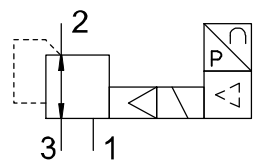
Proportional pressure regulators VPPM

Technical data – VPPM with analogue interface

Pin allocation M12, electrical connection		
	Pin	Function
	1	Digital input D1
	2	+24 V DC supply voltage
	3	Analogue input W-
	4	Analogue input W+
	5	Digital input D2
	6	Analogue output X
	7	0 V DC or GND
	8	Digital output D3

Version

Circuit symbol



- Pilot actuated diaphragm valve
- Pressure regulation range:
0.02 ... 2, 0.06 ... 6, 0.1 ... 10 bar
- Signal setpoint input:
0 ... 10 V DC, 4 ... 20 mA

Proportional pressure regulators VPPM

Technical data – VPPM with analogue interface

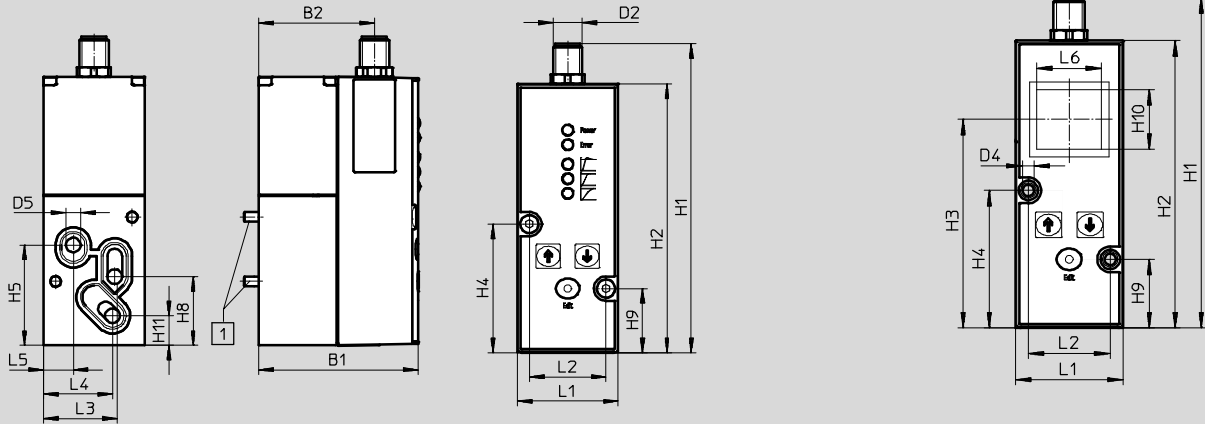


Dimensions

Download CAD data → www.festo.com

VPPM-6F, sub-base valve

With LCD



1 Socket head screw M4x65

Type	B1	B2	B3	D1	D2	D4	D5	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	H11	H12
VPPM-6F	65.4	47.5	-	-	M12	4.4	6	126.9	110.4	80.1	52.8	41.3	-	-	28.3	26.3	23	12.2	-

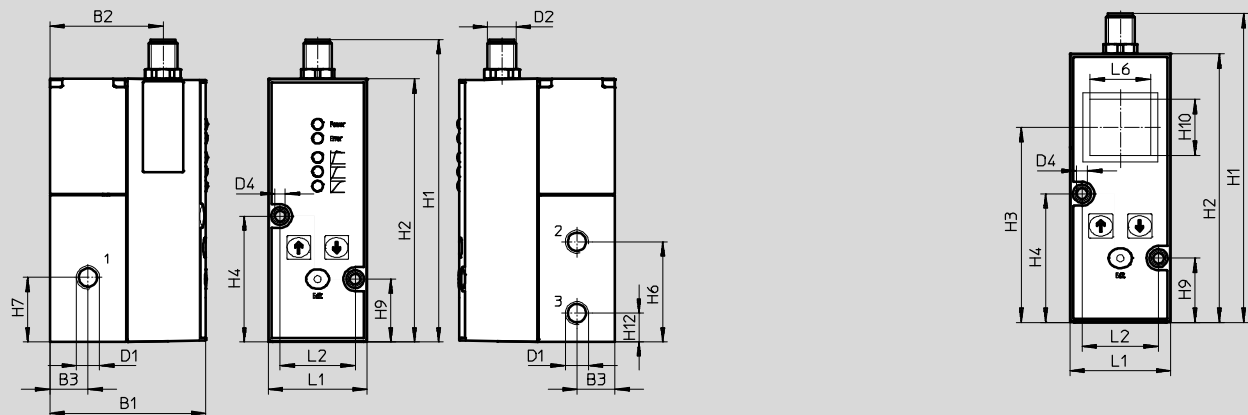
Type	L1	L2	L3	L4	L5	L6
VPPM-6F	41.5	31.5	30.3	28.4	12.3	25

Dimensions

Download CAD data → www.festo.com

VPPM-6L, pneumatic connection G1/8

With LCD



1 Socket head screw M4x65

Type	B1	B2	B3	D1	D2	D4	H1	H2	H3	H4	H6	H7	H9	H10	H12
VPPM-6L	65.5	47.5	16	G1/8	M12	4.4	126.9	110.4	80.1	52.8	42	27	26.3	23	12

Type	L1	L2	L6
VPPM-6L	41.5	31.5	25

Proportional pressure regulators VPPM

Technical data – VPPM with analogue interface

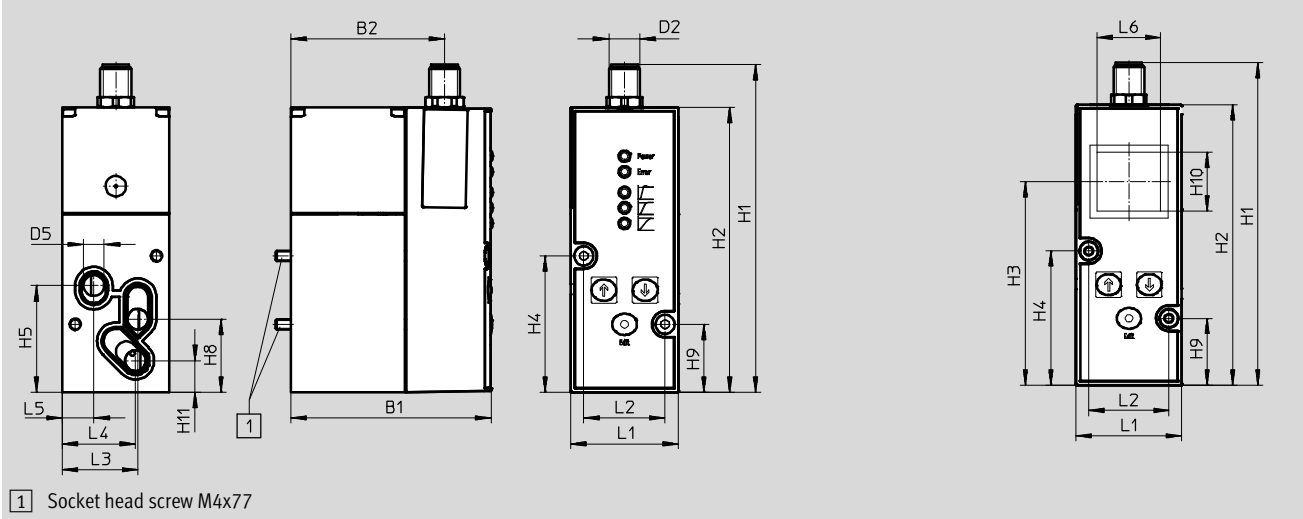


Dimensions

VPPM-8F, sub-base valve

Download CAD data → www.festo.com

With LCD



1 Socket head screw M4x77

Type	B1	B2	D2	D5 Ø	H1	H2	H3	H4	H5	H8	H9	H10	H11
VPPM-8F	77.4	59.5	M12	8	126.9	110.4	80	52.8	41.3	28.3	26.3	23	12.2

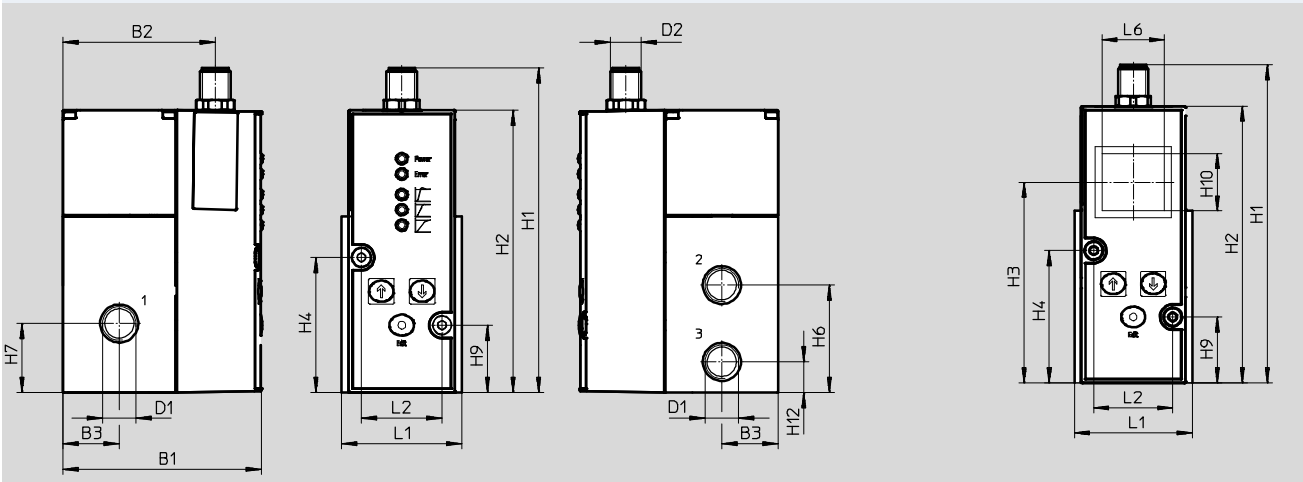
Type	L1	L2	L3	L4	L5	L6
VPPM-8F	41.5	31.5	29.3	28.4	12.3	25

Dimensions

VPPM-8L, pneumatic connection G1/4

Download CAD data → www.festo.com

With LCD



Type	B1	B2	B3	D1	D2	H1	H2	H3	H4	H6	H7	H9	H10	H12
VPPM-8L	77.4	59.5	22	G1/4	M12	126.9	110.4	80	52.8	42	27	26.3	23	12

Type	L1	L2	L6
VPPM-8L	47	31.5	25

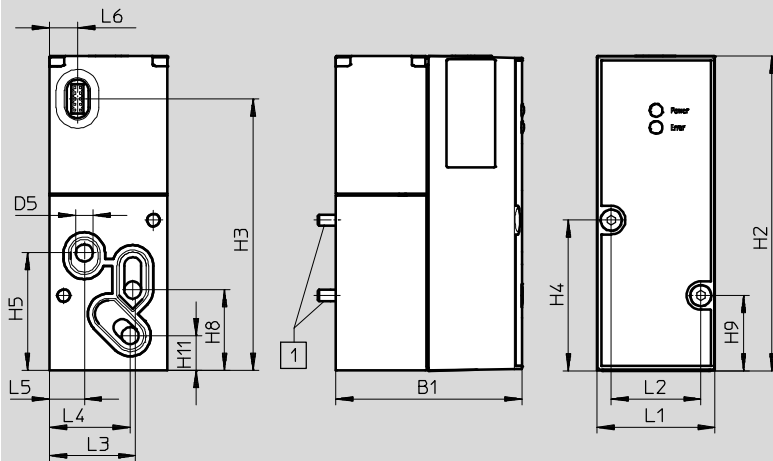
Proportional pressure regulators VPPM

Technical data – VPPM with analogue interface

Dimensions

Download CAD data → www.festo.com

VPPM-6TA, sub-base valve



1 Socket head screw M4x55

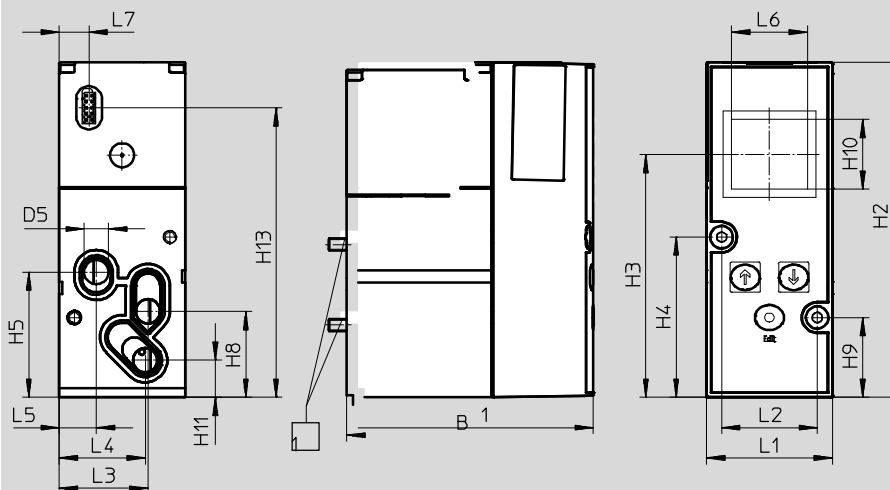
Type	B1	D5 Ø	H2	H3	H4	H5	H8	H9	H11
VPPM-6TA	55.1	6	110.4	95.5	52.8	41.3	28.3	26.3	12.2

Type	L1	L2	L3	L4	L5	L6
VPPM-6TA	41.5	31.5	30.3	28.4	12.3	9.9

Dimensions

Download CAD data → www.festo.com

VPPM-8TA, sub-base valve with LCD



1 Socket head screw M4x77

Type	B1	B2	B3	D1	D2	D5 Ø	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	H11	H12	H13
VPPM-8TA	77.4	-	-	-	-	8	-	110.4	80	52.8	41.3	-	-	28.3	26.3	23	12.2	-	95.5

Type	L1	L2	L3	L4	L5	L6	L7
VPPM-8TA	41.5	31.5	29.3	28.4	12.3	25	9.9

Proportional pressure regulators VPPM

Technical data – VPPM with analogue interface

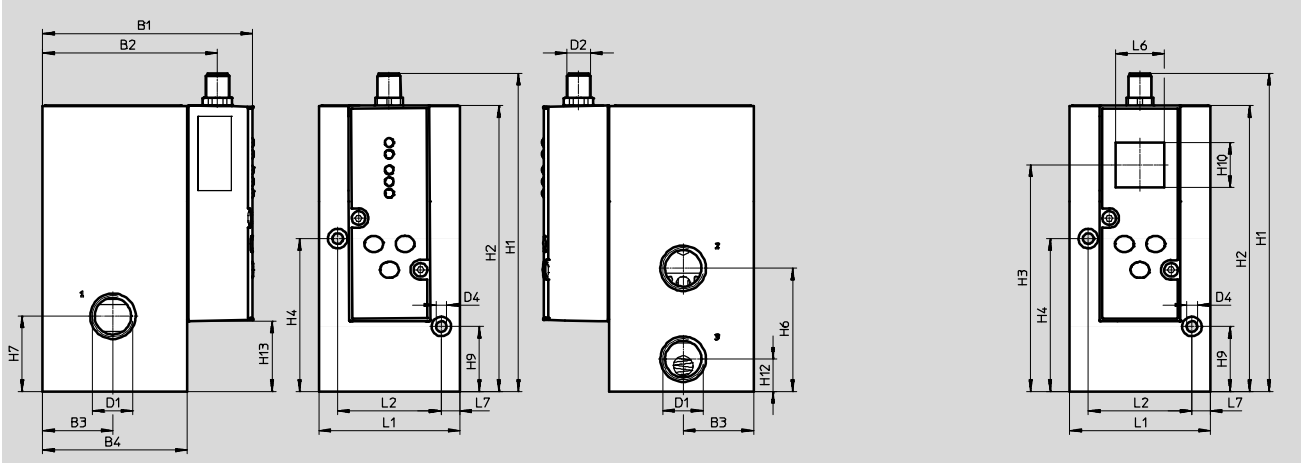


Dimensions

Download CAD data → www.festo.com

VPPM-12L, pneumatic connection G1/2

With LCD






Type	B1	B2	B3	B4	D1 Ø	D2	D4 Ø	H1	H2	H3	H4	H6	H7	H9	H10	H12	H13
VPPM-12L	107.4	89.5	36	74	G1/2	M12	5.5	162.8	146.3	116	78.2	63	38.5	33.2	23	16.5	35.9

Type	L1	L2	L6	L7
VPPM-12L	72	53	25	9.5

Proportional pressure regulators VPPM, IO-Link


Technical data – VPPM with IO-Link interface

-  Flow rate
380 ... 7000 l/min
 -  Voltage
18 ... 30 V DC
 -  Pressure regulation range
0.02 ... 10 bar
- Digital setpoint and actual value transfer
 - For connection to an I/O-Link/I-Port master
 - LED version
 - Comparator output (digital)



General technical data							
Type	VPPM-6		VPPM-8		VPPM-12		Sub-base
Pneumatic connection	G ¹ / ₈		G ¹ / ₄		G ¹ / ₂		Via sub-base
Valve function	3-way proportional pressure regulator						
Design	Piloted diaphragm regulator						
Type of display	LED						
Sealing principle	Soft						
Actuation type	Electric						
Type of control	Piloted						
Reset method	Mechanical spring						
Type of mounting	Via through-hole, via accessories						
Mounting position	Any						
Nominal width	Pressurisation	[mm]	6	8	12	6	8
	Exhaust	[mm]	4.5	7	12	4.5	7
Standard nominal flow rate	[l/min.]	→ Graphs					
Product weight	[g]	400	560	2050	400	560	
IO-Link	Protocol	IO-Link, I-Port					
	Protocol version	Device V1.1					
	Port type	A					
	Process data width OUT	[byte]	2				
	Process data width IN	[byte]	2				
Communication mode	COM1	[kBaud]	4.8				
	COM2	[kBaud]	38.4				
	COM3	[kBaud]	230.4				
IO-Link	Minimum cycle time	[ms]	0.5				
Material	Housing	Wrought aluminium alloy					

Electrical data			
Type	VPPM-6	VPPM-8	VPPM-12
Electrical connection	M12 plug connector, 5-pin		
Operating voltage range	[V DC]	18 ... 30	
Max. current consumption	[mA]	300	500
Max. electrical power consumption	[W]	7	12
Protection against short circuit	For all electrical connections		
Protection against incorrect polarity	For all electrical connections		
Residual ripple	[%]	10	
Duty cycle	[%]	100	
Degree of protection	IP65		

-  Note
Output pressure remains unregulated if the power supply cable is interrupted.

Proportional pressure regulators VPPM, IO-Link

Technical data – VPPM with IO-Link interface



Operating and environmental conditions				
Pressure regulation range	[bar]	0.02 ... 2	0.06 ... 6	0.1 ... 10
Operating medium		Compressed air in accordance with ISO 8573-1:2010 [7:4:4] Inert gases		
Note on operating/pilot medium		Operation with lubricated medium not possible		
Supply pressure 1 ¹⁾	[bar]	0 ... 4	0 ... 8	0 ... 11
Max. hysteresis	[mbar]	10	30	50
FS (full scale) linearity error	[%]	±0.5		
FS (full scale) repetition accuracy	[%]	0.5		
Temperature coefficient	[%/K]	0.04		
Ambient temperature	[°C]	0 ... 60		
Temperature of medium	[°C]	10 ... 50		
Note on materials		RoHS-compliant		
Corrosion resistance	[CRC]	2 ²⁾		
CE mark		To EU EMC Directive (see declaration of conformity) ³⁾		
Certification		RCM trademark c UL us - Listed (OL)		

1) Supply pressure 1 should always be 1 bar greater than the maximum regulated output pressure.

2) Corrosion resistance class 2 as per Festo standard 940 070

Components subject to moderate corrosion stress. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

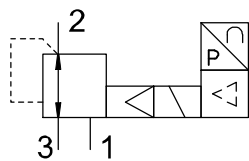
3) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com/sp → User documentation.

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.

Pin allocation of IO-Link interface			
	Pin	Allocation	Function
	1	24 V DC (U _{EL/SEN})	Operating voltage supply (PS)
	2	n.c.	Not connected
	3	0 V DC (U _{EL/SEN})	Operating voltage supply (PS)
	4	C/Q I-PORT	Data communication
	5	n.c.	Not connected
	–	FE	Functional earth

Version

Circuit symbol



- Pilot actuated diaphragm valve
- Pressure regulation range:
0.02 ... 2, 0.06 ... 6, 0.1 ... 10 bar
- Signal setpoint input:
0 ... 10 V DC, 4 ... 20 mA

Proportional pressure regulators VPPM, IO-Link

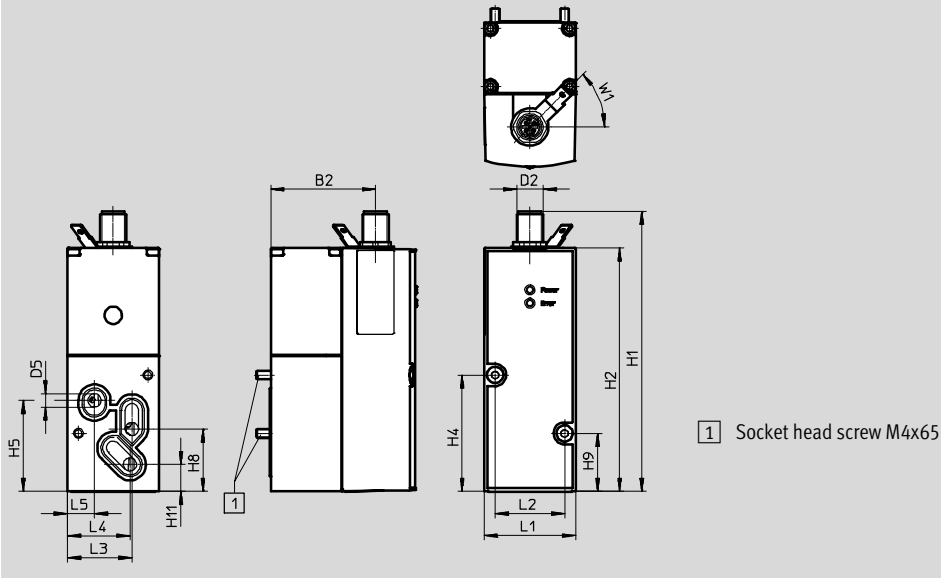
Technical data – VPPM with IO-Link interface

FESTO

Dimensions

Download CAD data → www.festo.com

VPPM-6F, sub-base valve



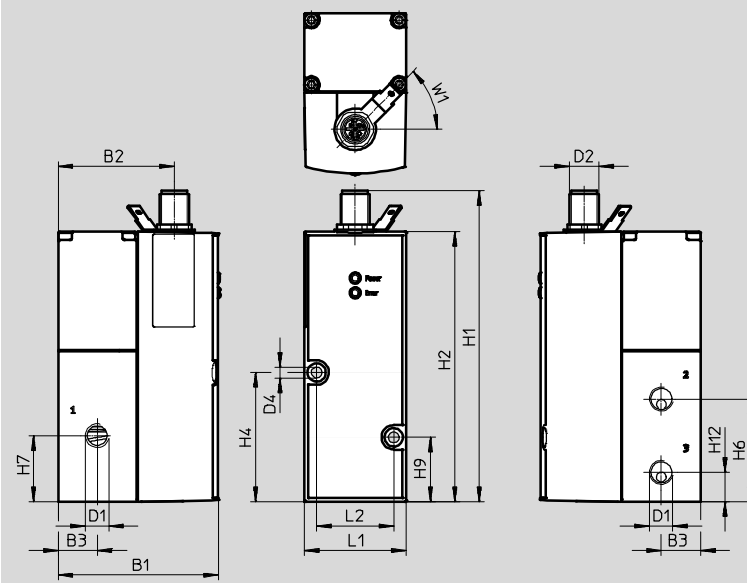
Type	B1	B2	D2 ∅	D5 ∅	H1	H2	H4	H5	H8	H9	H11
VPPM-6F	65.5	47.5	M12	6	126.9	110.4	52.8	41.3	28.3	26.3	12.2

Type	L1	L2	L3	L4	L5	W1 ± 5°
VPPM-6F	41.5	31.5	30.3	28.4	12.3	45°

Dimensions

Download CAD data → www.festo.com

VPPM-6L, pneumatic connection G1/8



Type	B1	B2	B3	D1 ∅	D2 ∅	D4 ∅	H1	H2	H4	H6	H7	H9	H12
VPPM-6L	65.5	47.5	16	G1/8	M12	4.4	126.9	110.4	52.8	42	27	26.3	12

Type	L1	L2	W1 ± 5°
VPPM-6L	41.5	31.5	45°

Proportional pressure regulators VPPM, IO-Link

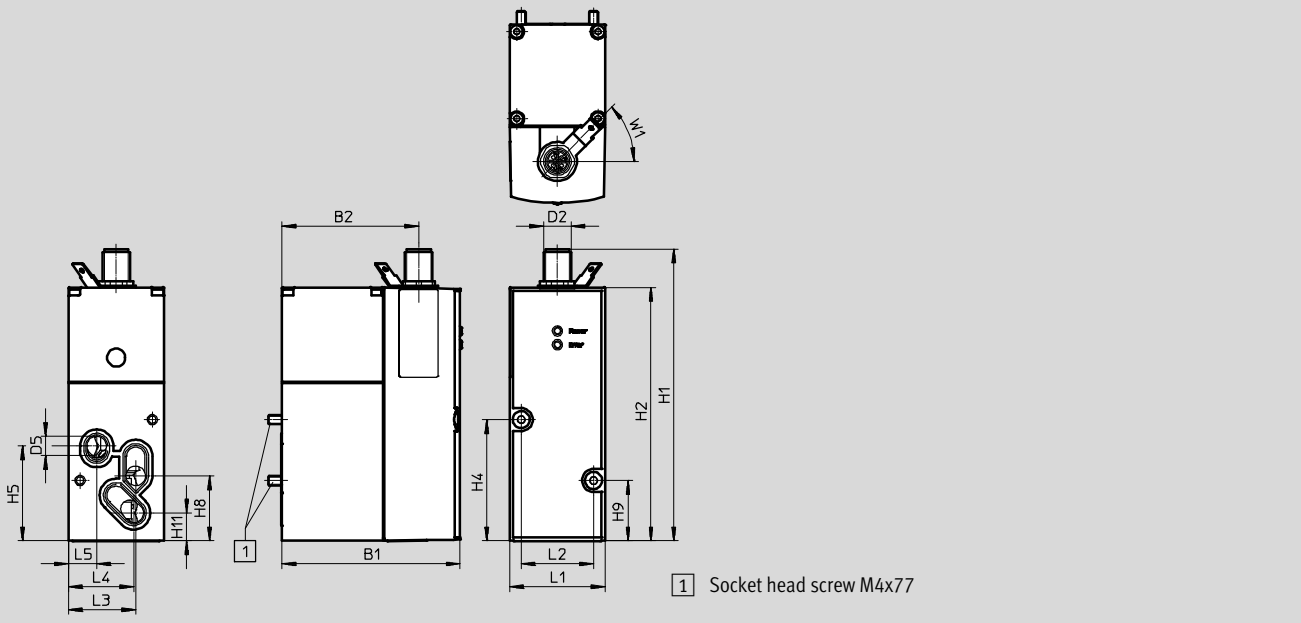
Technical data – VPPM with IO-Link interface

FESTO

Dimensions

Download CAD data → www.festo.com

VPPM-8F, sub-base valve



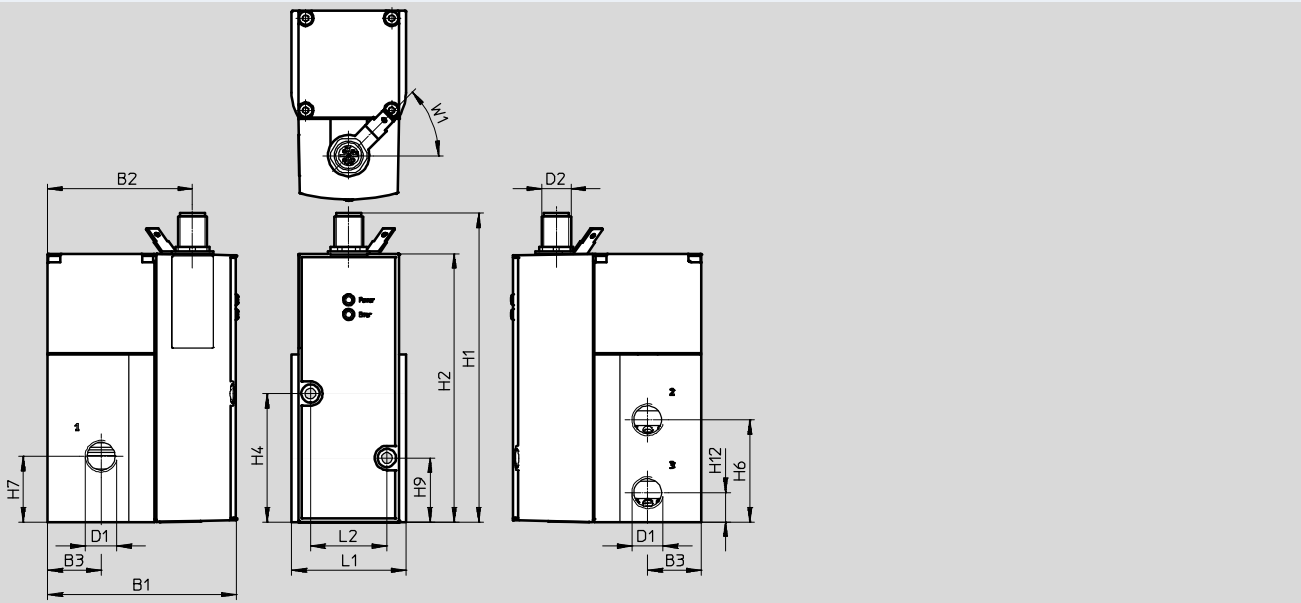
Type	B1	B2	D2	D5 Ø	H1	H2	H4	H5	H8	H9	H11
VPPM-8F	77.4	59.5	M12	8	126.9	110.4	52.8	41.3	28.3	26.3	12.2

Type	L1	L2	L3	L4	L5	W1 ± 5°
VPPM-8F	41.5	31.5	29.3	28.4	12.3	45°

Dimensions

Download CAD data → www.festo.com

VPPM-8L, pneumatic connection G1/4



Type	B1	B2	B3	D1	D2	H1	H2	H4	H6	H7	H9	H12
VPPM-8L	77.4	59.5	22	G1/4	M12	126.9	110.4	52.8	42	27	26.3	12

Type	L1	L2	W1 ± 5°
VPPM-8L	47	31.5	45°

Proportional pressure regulators VPPM, IO-Link

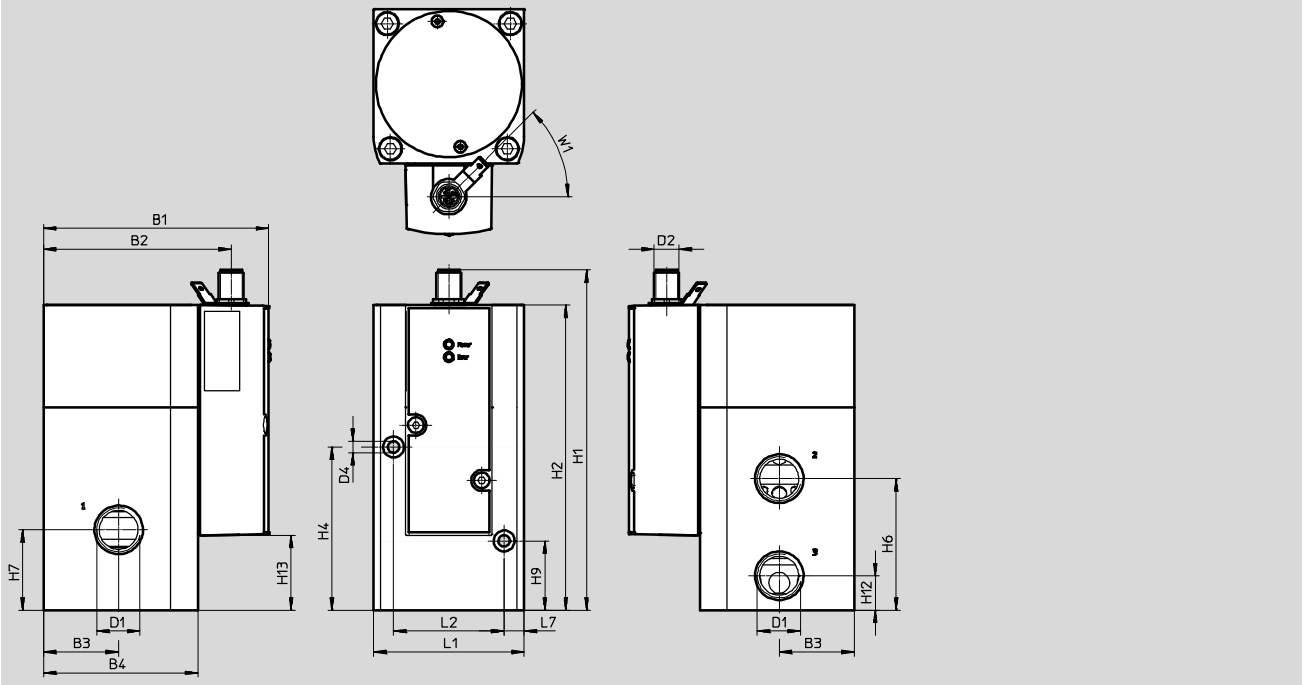
Technical data – VPPM with IO-Link interface



Dimensions

Download CAD data → www.festo.com

VPPM-12L, pneumatic connection G1/2



Type	B1	B2	B3	B4	D1	D2	D4 Ø	H1	H2	H4	H6	H7	H9	H12	H13
VPPM-12L	107.4	89.5	36	74	G1/2	M12	4.4	162.8	146.3	78.2	63	38.5	33.2	16.5	35.9

Type	L1	L2	L7	W1 ±5°
VPPM-12L	72	53	9.5	45°

Proportional pressure regulators VPPM

FESTO

Technical data

Ordering data					
VPPM with analogue interface	Pneumatic connection 1, 2, 3	Pressure regulation range [bar]	Part No.	Type	
Voltage type 0 ... 10 V					
Overall accuracy 2%	G $\frac{1}{8}$	0.02 ... 2	542233	VPPM-6L-L-1-G18-0L2H-V1N	
		0.06 ... 6	542234	VPPM-6L-L-1-G18-0L6H-V1N	
			554043	VPPM-6L-L-1-G18-0L6H-V1P	
			558337	VPPM-6L-L-1-G18-0L6H-V1P-C1	
		0.1 ... 10	575125	VPPM-6L-L-1-G18-0L10H-V1P-C1	
			542235	VPPM-6L-L-1-G18-0L10H-V1N	
	554044		VPPM-6L-L-1-G18-0L10H-V1P		
	Sub-base	0.02 ... 2	542245	VPPM-6F-L-1-F-0L2H-V1N	
		0.06 ... 6	542246	VPPM-6F-L-1-F-0L6H-V1N	
			558339	VPPM-6F-L-1-F-0L6H-V1P-C1	
			558347	VPPM-6F-L-1-F-0L6H-V1N-C1	
		571285	VPPM-8F-L-1-F-0L6H-V1P		
	0.1 ... 10	542247	VPPM-6F-L-1-F-0L10H-V1N		
	G $\frac{1}{4}$	0.06 ... 6	571296	VPPM-8L-L-1-G14-0L6H-V1P	
	Overall accuracy 1%	G $\frac{1}{8}$	0.02 ... 2	542227	VPPM-6L-L-1-G18-0L2H-V1N-S1
			0.06 ... 6	542228	VPPM-6L-L-1-G18-0L6H-V1N-S1
554039				VPPM-6L-L-1-G18-0L6H-V1P-S1	
571448				VPPM-6L-L-1-G18-0L6H-V1N-S1C1	
575121				VPPM-6L-L-1-G18-0L6H-V1P-S1C1	
0.1 ... 10			542229	VPPM-6L-L-1-G18-0L10H-V1N-S1	
			554040	VPPM-6L-L-1-G18-0L10H-V1P-S1	
			558335	VPPM-6L-L-1-G18-0L10H-V1P-S1C1	
			558345	VPPM-6L-L-1-G18-0L10H-V1N-S1C1	
		Sub-base	0.02 ... 2	542239	VPPM-6F-L-1-F-0L2H-V1N-S1
0.06 ... 6			542240	VPPM-6F-L-1-F-0L6H-V1N-S1	
			571286	VPPM-8F-L-1-F-0L6H-V1P-S1	
571287			VPPM-8F-L-1-F-0L6H-V1P-S1C1		
0.1 ... 10		542241	VPPM-6F-L-1-F-0L10H-V1N-S1		
G $\frac{1}{4}$		0.1 ... 10	571291	VPPM-8L-L-1-G14-0L10H-V1N-S1	
			571292	VPPM-8L-L-1-G14-0L10H-V1P-S1	
			571293	VPPM-8L-L-1-G14-0L10H-V1P-S1C1	
		0.06 ... 6	571294	VPPM-8L-L-1-G14-0L6H-V1N-S1	
			571295	VPPM-8L-L-1-G14-0L6H-V1N-S1C1	
			571297	VPPM-8L-L-1-G14-0L6H-V1P-S1	
			571298	VPPM-8L-L-1-G14-0L6H-V1P-S1C	
G $\frac{1}{2}$		0.1 ... 10	575235	VPPM-12L-L-1-G12-0L10H-V1N-S1	
			575236	VPPM-12L-L-1-G12-0L10H-V1P-S1	
			575237	VPPM-12L-L-1-G12-0L10H-V1P-S1C1	
	0.06 ... 6	575238	VPPM-12L-L-1-G12-0L6H-V1N-S1		
		575239	VPPM-12L-L-1-G12-0L6H-V1N-S1C1		
		575240	VPPM-12L-L-1-G12-0L6H-V1P-S1		
		575241	VPPM-12L-L-1-G12-0L6H-V1P-S1C1		

Proportional pressure regulators VPPM

Technical data

Ordering data					
VPPM with analogue interface	Pneumatic connection 1, 2, 3	Pressure regulation range [bar]	Part No.	Type	
Current type 4 ... 20 mA					
Overall accuracy 2%	G ¹ / ₈	0.02 ... 2	542236	VPPM-6L-L-1-G18-0L2H-A4N	
			542237	VPPM-6L-L-1-G18-0L6H-A4N	
		0.06 ... 6	554045	VPPM-6L-L-1-G18-0L6H-A4P	
			558338	VPPM-6L-L-1-G18-0L6H-A4P-C1	
			542238	VPPM-6L-L-1-G18-0L10H-A4N	
			554046	VPPM-6L-L-1-G18-0L10H-A4P	
	Sub-base	0.02 ... 2	542248	VPPM-6F-L-1-F-0L2H-A4N	
			542249	VPPM-6F-L-1-F-0L6H-A4N	
		0.06 ... 6	558340	VPPM-6F-L-1-F-0L6H-A4P-C1	
			571282	VPPM-8F-L-1-F-0L6H-A4P	
	0.1 ... 10	542250	VPPM-6F-L-1-F-0L10H-A4N		
		571299	VPPM-8L-L-1-G14-0L6H-A4P		
	Overall accuracy 1%	G ¹ / ₈	0.02 ... 2	542230	VPPM-6L-L-1-G18-0L2H-A4N-S1
				542231	VPPM-6L-L-1-G18-0L6H-A4N-S1
			0.06 ... 6	554041	VPPM-6L-L-1-G18-0L6H-A4P-S1
				575128	VPPM-6L-L-1-G18-0L6H-A4P-S1C1
542232				VPPM-6L-L-1-G18-0L10H-A4N-S1	
554042				VPPM-6L-L-1-G18-0L10H-A4P-S1	
Sub-base			0.02 ... 2	542242	VPPM-6F-L-1-F-0L2H-A4N-S1
				542243	VPPM-6F-L-1-F-0L6H-A4N-S1
			0.06 ... 6	571283	VPPM-8F-L-1-F-0L6H-A4P-S1
				571284	VPPM-8F-L-1-F-0L6H-A4P-S1C1
0.1 ... 10			542244	VPPM-6F-L-1-F-0L10H-A4N-S1	
			571288	VPPM-8L-L-1-G14-0L10H-A4N-S1	
G ¹ / ₄		0.1 ... 10	571289	VPPM-8L-L-1-G14-0L10H-A4P-S1	
			571290	VPPM-8L-L-1-G14-0L10H-A4P-S1C1	
			571302	VPPM-8L-L-1-G14-0L6H-A4N-S1	
		0.06 ... 6	571303	VPPM-8L-L-1-G14-0L6H-A4N-S1C1	
			571300	VPPM-8L-L-1-G14-0L6H-A4P-S1	
			571301	VPPM-8L-L-1-G14-0L6H-A4P-S1C1	
			575232	VPPM-12L-L-1-G12-0L10H-A4N-S1	
			575233	VPPM-12L-L-1-G12-0L10H-A4P-S1	
G ¹ / ₂		0.1 ... 10	575234	VPPM-12L-L-1-G12-0L10H-A4P-S1C1	
			575242	VPPM-12L-L-1-G12-0L6H-A4P-S1	
			575243	VPPM-12L-L-1-G12-0L6H-A4P-S1C1	
		0.06 ... 6	575244	VPPM-12L-L-1-G12-0L6H-A4N-S1	
575245	VPPM-12L-L-1-G12-0L6H-A4N-S1C1				
For valve terminal					
Overall accuracy 2%	Via valve terminal	0.02 ... 2	542220	VPPM-6TA-L-1-F-0L2H	
			572410	VPPM-8TA-L-1-F-0L2H-C1	
		0.06 ... 6	542221	VPPM-6TA-L-1-F-0L6H	
			572411	VPPM-8TA-L-1-F-0L6H-C1	
		0.02 ... 10	542222	VPPM-6TA-L-1-F-0L10H	
			572412	VPPM-8TA-L-1-F-0L10H-C1	
Overall accuracy 1%	Via valve terminal	0.02 ... 2	542217	VPPM-6TA-L-1-F-0L2H-S1	
			572407	VPPM-8TA-L-1-F-0L2H-S1C1	
		0.06 ... 6	542218	VPPM-6TA-L-1-F-0L6H-S1	
			572408	VPPM-8TA-L-1-F-0L6H-S1C1	
		0.02 ... 10	542219	VPPM-6TA-L-1-F-0L10H-S1	
			572409	VPPM-8TA-L-1-F-0L10H-S1C1	

Proportional pressure regulators VPPM



Technical data

Ordering data				
VPPM with IO-Link interface	Pneumatic connection 1, 2, 3	Pressure regulation range [bar]	Part No.	Type
Overall accuracy 1%	G $\frac{1}{8}$	0.02 ... 2	8024258	VPPM-6L-L-1-G18-0L2H-LK-S1
		0.06 ... 6	8024259	VPPM-6L-L-1-G18-0L6H-LK-S1
		0.1 ... 10	8024260	VPPM-6L-L-1-G18-0L10H-LK-S1
	Sub-base	0.02 ... 2	8031107	VPPM-6F-L-1-F-0L2H-LK-S1
		0.06 ... 6	8031108	VPPM-6F-L-1-F-0L6H-LK-S1
		0.1 ... 10	8031109	VPPM-6F-L-1-F-0L10H-LK-S1
	G $\frac{1}{4}$	0.02 ... 2	8024261	VPPM-8L-L-1-G14-0L2H-LK-S1
		0.06 ... 6	8024262	VPPM-8L-L-1-G14-0L6H-LK-S1
		0.1 ... 10	8024263	VPPM-8L-L-1-G14-0L10H-LK-S1
	Sub-base	0.02 ... 2	8031110	VPPM-8F-L-1-F-0L2H-LK-S1
		0.06 ... 6	8031111	VPPM-8F-L-1-F-0L6H-LK-S1
		0.1 ... 10	8031112	VPPM-8F-L-1-F-0L10H-LK-S1
	G $\frac{1}{2}$	0.02 ... 2	8024264	VPPM-12L-L-1-G12-0L2H-LK-S1
		0.06 ... 6	8024265	VPPM-12L-L-1-G12-0L6H-LK-S1
		0.1 ... 10	8024266	VPPM-12L-L-1-G12-0L10H-LK-S1

Proportional pressure regulators VPPM

Ordering data – Modular products

M Mandatory data →

Module No.	Design	Nominal diameter	Valve type	Dynamic response	Valve mode	Type of connection
543432	VPPM	6	L F T	L	1	G18 F F
543433		8	L F T			G14 F F
543435		12	L			G12
Order example						
543432	VPPM	- 6	F	- L	- 1	- F

Ordering table		Size	Condi- tions	Code	Enter code
		6			
M	Module No.	543432			
	Design	Modular pressure regulator		VPPM	VPPM
	Nominal diameter	6		-6	
		8		-8	
		12	1	-12	
	Valve type	In-line	2	L	
		Flanged valve	3	F	
		Flanged valve for valve terminal	4	T	
	Dynamic response	Low dynamic response (pilot-actuated, soft-sealing)		-L	-L
	Valve mode	3/2-way valve, normally closed		-1	-1
	Type of connection	G $\frac{1}{8}$ thread		-G18	
		G $\frac{1}{4}$ thread		-G14	
		G $\frac{1}{2}$ thread		-G12	
		Flange/sub-base		-F	

1 12 Only with valve type L (In-Line)

2 L Only with connection type G18, G14, G12 (G $\frac{1}{8}$, G $\frac{1}{4}$, G $\frac{1}{2}$ thread)

3 F Only with connection type F (flange/sub-base)

4 T Only with connection type F (flange/sub-base)

Order code

543432	VPPM	- 6		- L	- 1	-	
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Proportional pressure regulators VPPM

Ordering data – Modular products



Mandatory data					Options	
Pressure regulation range	Alternative lower pressure regulation range	Alternative upper pressure regulation range	Setpoint specification	Switching output	Overall accuracy	Operator unit
0L2H 0L6H 0L10H	0.1 ... 10L	0.1 ... 10H	V1 A4 LK	P N	S1	C1
-	6.5L	7.1H	- A4	P	- S1	C1

Ordering table						
Size	6			Condi- tions	Code	Enter code
Mandatory data	Pressure regulation range	0 ... 2 bar			-0L2H	
		0 ... 6 bar			-0L6H	
		0 ... 10 bar			-0L10H	
	Alternative lower pressure regulation range	0.1 ... 10 bar		[4]	-...L	
	Alternative upper pressure regulation range	0.1 ... 10 bar		[5]	...H	
	Setpoint specification	Voltage (standard 0 ... 10 V)			-V1	
		IO-Link			-LK	
Current (standard 4 ... 20 mA)			-A4			
Switching output	Positive switching			P		
	Negative switching			N		
Options	Overall accuracy	1%			-S1	
	Operator unit	With LCD, pressure unit variable			C1	

[4] ...L Not with pressure regulation range (0L2H, 0L6H, 0L10H).
Must always be less than alternative upper pressure regulation range H

[5] ...H Not with pressure regulation range (0L2H, 0L6H, 0L10H).
Must always be greater than alternative lower pressure regulation range L

Transfer order code

- - -

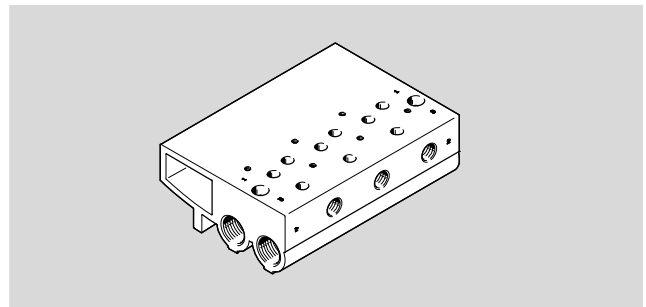
Proportional pressure regulators VPPM

Accessories

FESTO

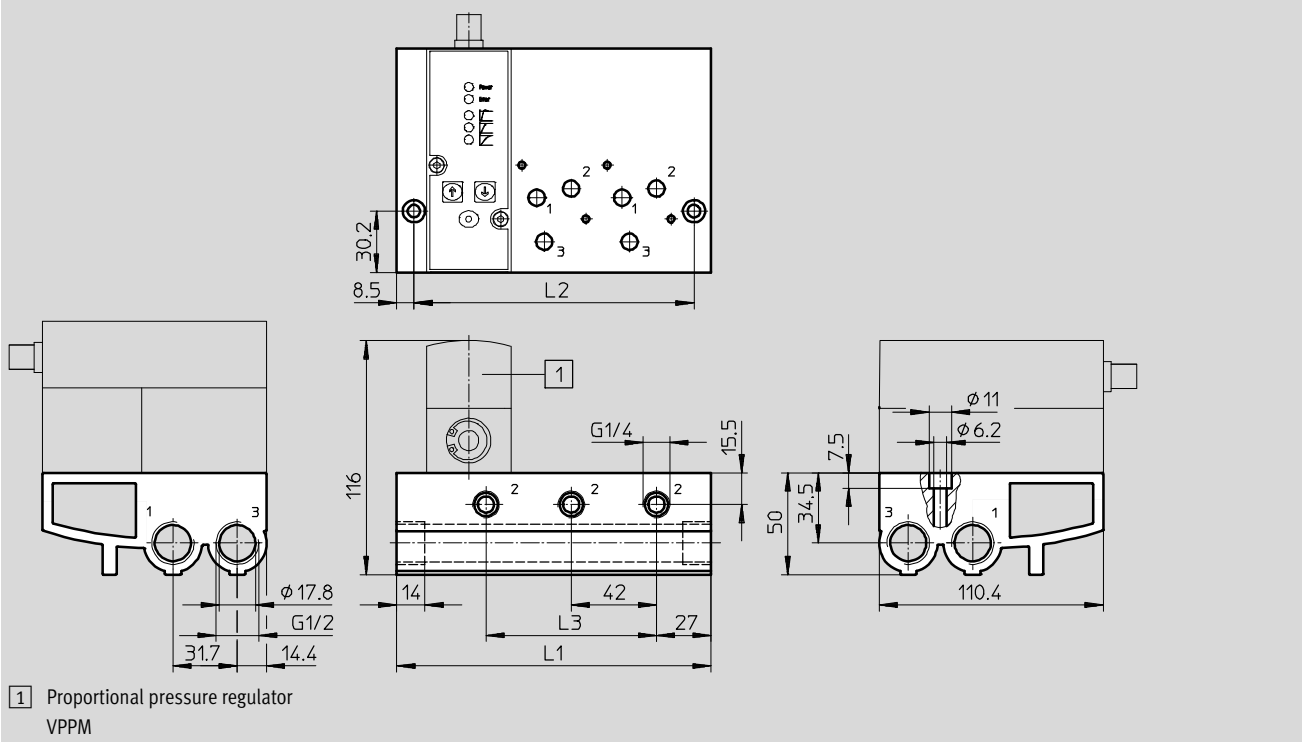
Sub-base
VABM-P1

Material:
Wrought aluminium alloy



Dimensions

Download CAD data → www.festo.com



Dimensions and ordering data

Valve positions	L1	L2	L3	Weight [g]	CRC ¹⁾	Part No.	Type
2	113	96	42	900	2	542252	VABM-P1-SF-G14-2-P3
3	155	138	84	1,230	2	542253	VABM-P1-SF-G14-3-P3
4	197	180	126	1,565	2	542254	VABM-P1-SF-G14-4-P3

1) Corrosion resistance class 2 as per Festo standard 940 070
Components subject to moderate corrosion stress. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

-  - Note

Flanged valves VPPM-6F... and VPPM-8F... must be used in combination with the manifold block VABM-P1-....

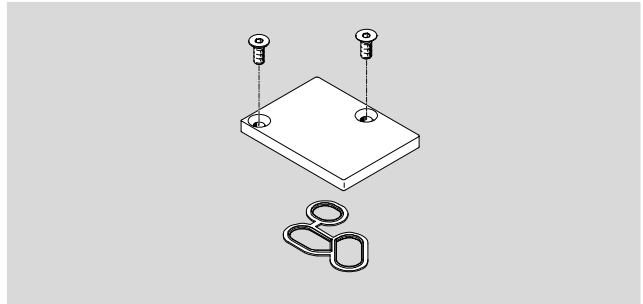
Proportional pressure regulators VPPM

Accessories

FESTO

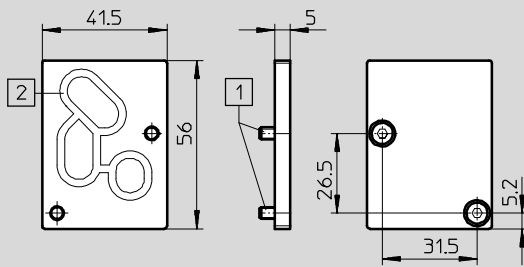
Blanking plate
VABB-P1

Material:
Wrought aluminium alloy, NBR, steel



Dimensions

Download CAD data → www.festo.com



1 Countersunk screw M4x10

2 Seal VMPA- ...

Ordering data

Weight [g]	CRC	Part No.	Type
35	1 ¹⁾	558350	VABB-P1

1) Corrosion resistance class 1 as per Festo standard 940 070
Components requiring low corrosion resistance. Transport and storage protection. Parts that do not have primarily decorative surface requirements, e.g. in internal areas that are not visible or behind covers.

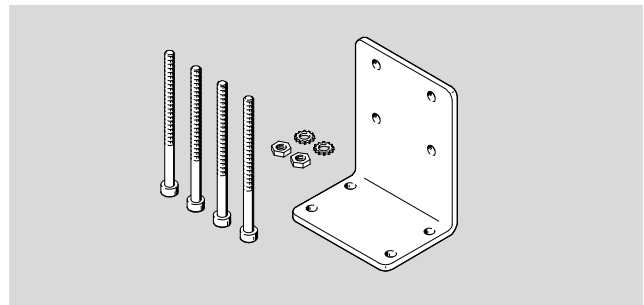
Proportional pressure regulators VPPM

Accessories

FESTO

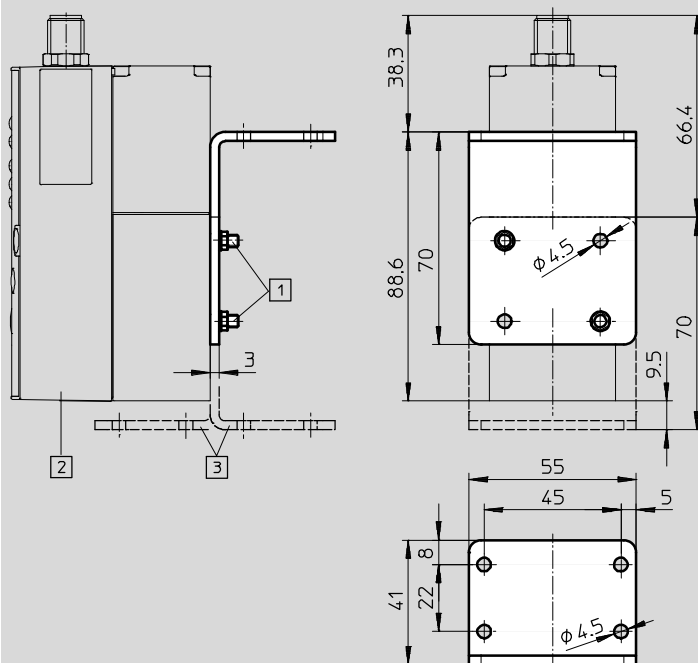
Mounting bracket
VAME-P1-A

Material:
Wrought aluminium alloy, steel



Dimensions

Download CAD data → www.festo.com



1) Socket head screw M4

2) Proportional pressure regulator VPPM

3) Mounting bracket can be reversed if required

Ordering data

Weight [g]	CRC	Part No.	Type
71	1 ¹⁾	542251	VAME-P1-A

1) Corrosion resistance class 1 as per Festo standard 940 070

Components requiring low corrosion resistance. Transport and storage protection. Parts that do not have primarily decorative surface requirements, e.g. in internal areas that are not visible or behind covers.

-  - Note

In-line valves VPPM-6L-... and VPPM-8L-... must be used in combination with the bracket VAME-P1-A.

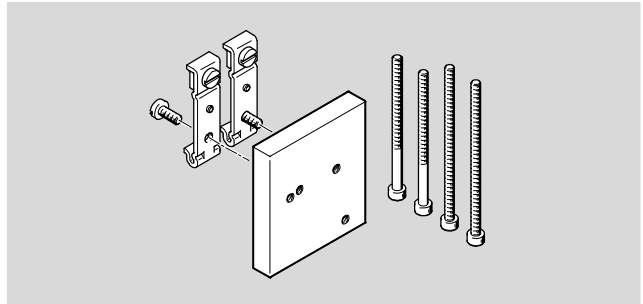
Proportional pressure regulators VPPM

Accessories

FESTO

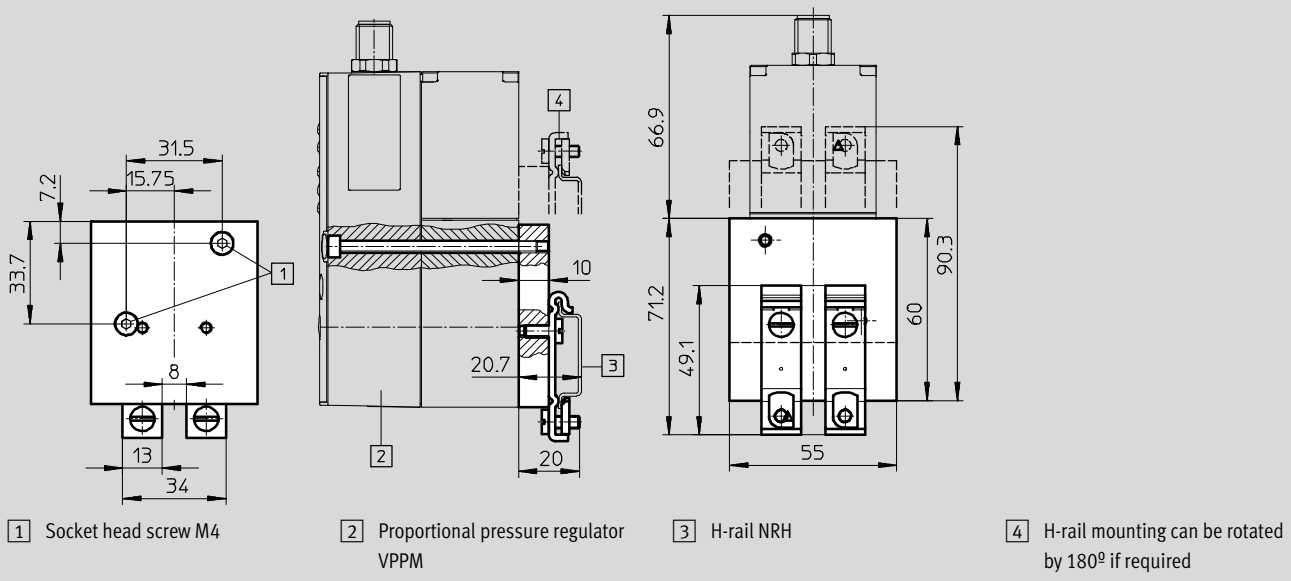
H-rail mounting
VAME-P1-T

Material:
Wrought aluminium alloy, steel



Dimensions

Download CAD data → www.festo.com



Ordering data

Weight [g]	CRC	Part No.	Type
150	1 ¹⁾	542255	VAME-P1-T

1) Corrosion resistance class 1 as per Festo standard 940 070

Components requiring low corrosion resistance. Transport and storage protection. Parts that do not have primarily decorative surface requirements, e.g. in internal areas that are not visible or behind covers.

- Note

In-line valves VPPM-6L-... and VPPM-8L-... must be used in combination with the H-rail VAME-P1-T.

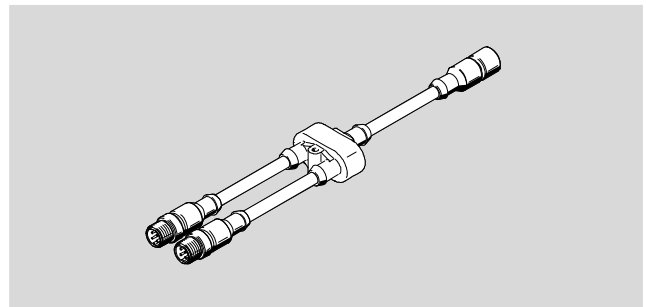
Proportional pressure regulators VPPM

Accessories

FESTO

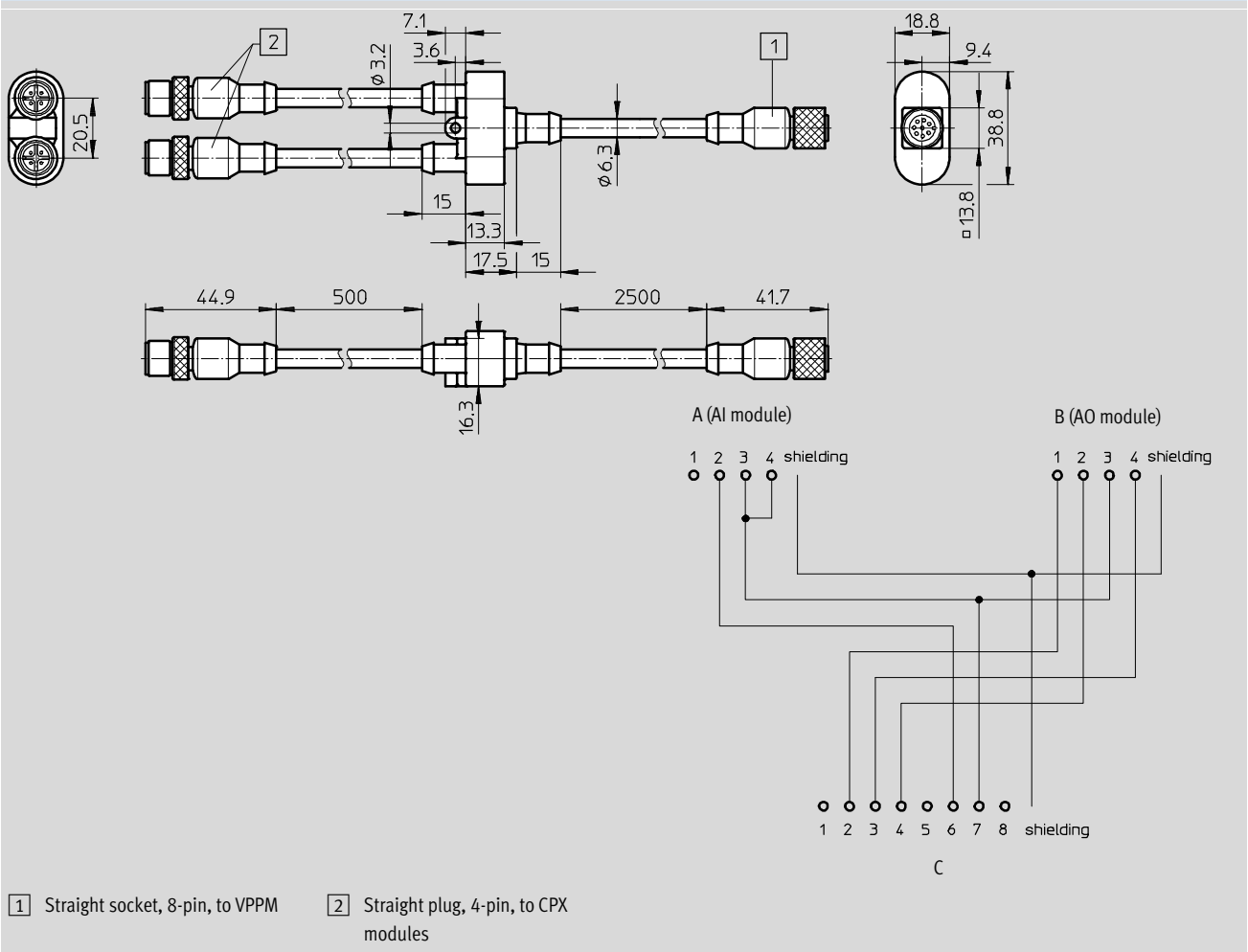
Plug socket with cable
NEBV-M12G8-KD-3-M12G4

For connecting the VPPM with the analogue input and output modules of the controller CPX.



Dimensions and pin allocation

Download CAD data → www.festo.com



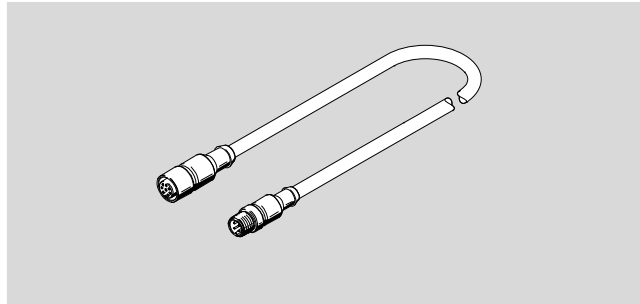
Proportional pressure regulators VPPM

Accessories



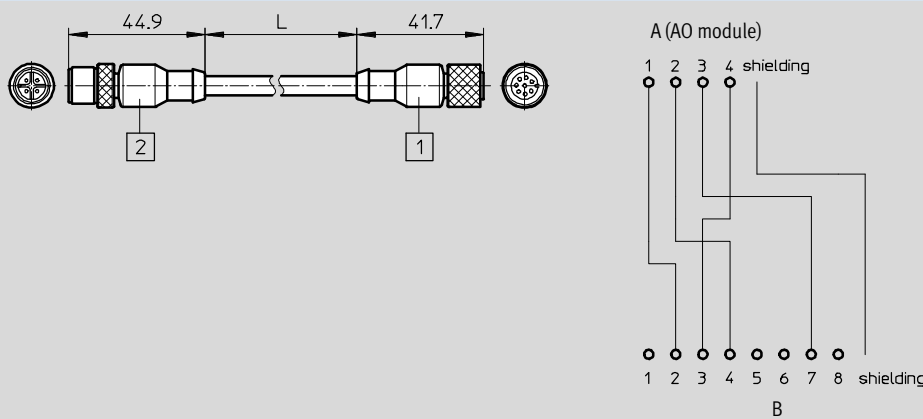
Plug socket with cable NEBV-M12G8-K-5-M12G4

For connecting the VPPM with the analogue output modules of the controller CPX.



Dimensions and pin allocation

Download CAD data → www.festo.com

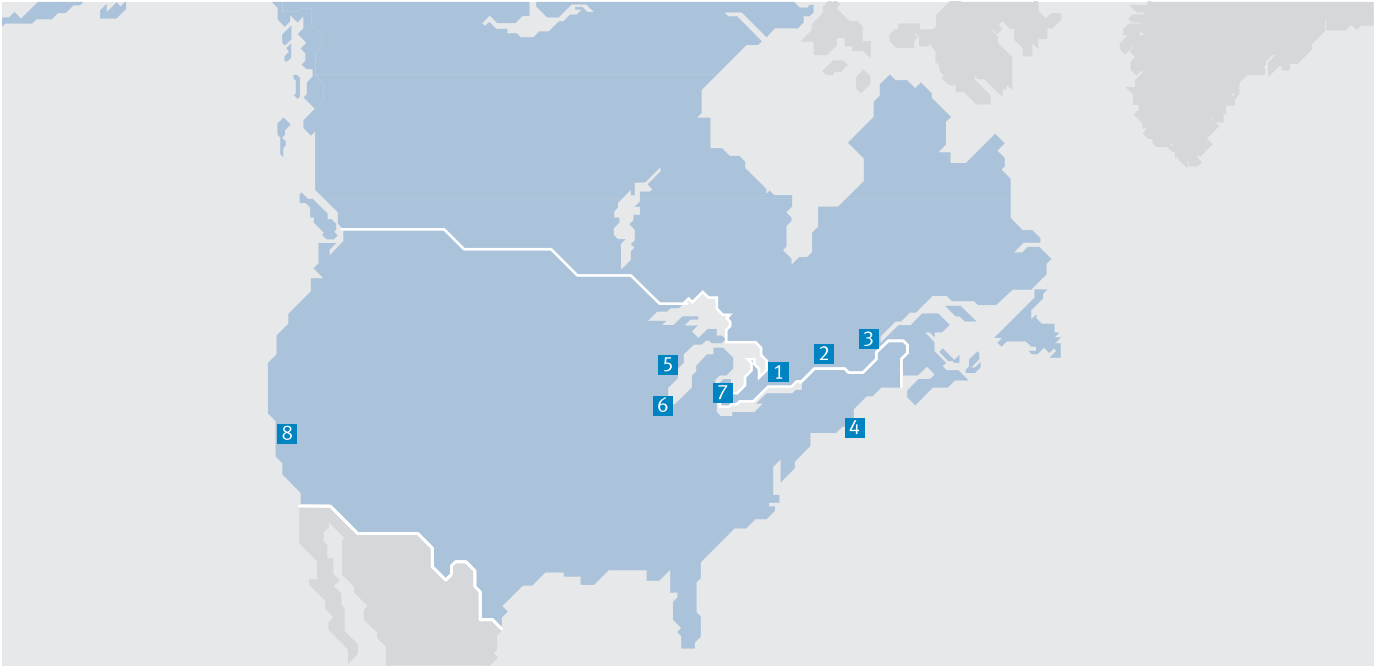


Type	2	1	L1
NEBV-M12G8-K-2-M12G4	Straight socket, M12, 8-pin to VPPM	Straight plug, M12, 4-pin to CPX module	2 m
NEBV-M12G8-K-5-M12G4			5 m

Ordering data			
	Description	Part No.	Type
Connecting cable Technical data → Internet: connecting cable			
	Straight socket, 8-pin, M12	2 m	525616 SIM-M12-8GD-2-PU
		5 m	525618 SIM-M12-8GD-5-PU
		10 m	570008 SIM-M12-8GD-10-PU
	Angled socket, 8-pin, M12	2 m	542256 NEBU-M12W8-K-2-N-LE8
		5 m	542257 NEBU-M12W8-K-5-N-LE8
		10 m	570007 NEBU-M12W8-K-10-N-LE8
	One straight socket, 8-pin, and one straight plug, 4-pin	2 m	553575 NEBV-M12G8-K-2-M12G4
		5 m	553576 NEBV-M12G8-K-5-M12G4
	One straight socket, 8-pin, and two straight plugs, 4-pin	547888	NEBV-M12G8-KD-3-M12G4
Setpoint module Technical data → Internet: mpz			
	Generation of 6+1 analogue setpoint values	546224	MPZ-1-24DC-SGH-6-SW5

Ordering data IO-Link			
	Description	Part No.	Type
Connecting cable Technical data → Internet: connecting cable			
	Straight socket, 5-pin, M12x1, protection class IP65, IP68, IP69K	5 m	574321 NEBU-M12G5-E-5-Q8N-M12G5
		7.5 m	574322 NEBU-M12G5-E-7.5-Q8N-M12G5
		10 m	574323 NEBU-M12G5-E-10-Q8N-M12G5

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