

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

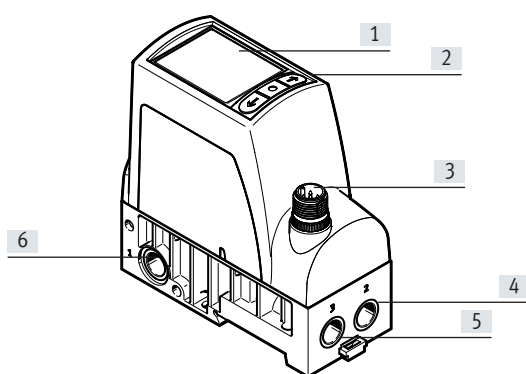
Function

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).

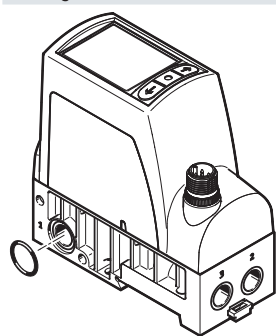
Design



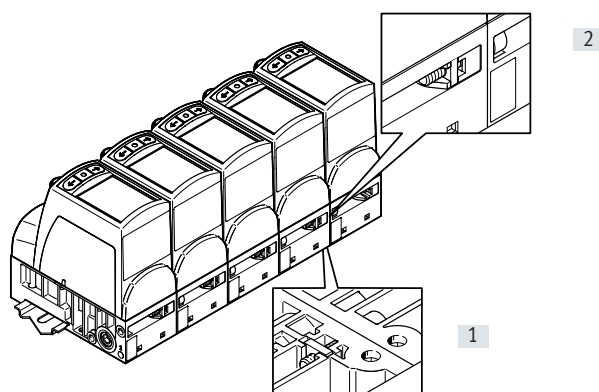
- [1] Display
- [2] Operating buttons display menu
- [3] Electrical connection, M12
- [4] Port 2, working air
- [5] Port 3, exhaust air
- [6] Port 1, compressed air

Mounting

Linking of valves



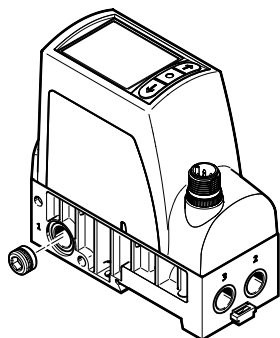
Up to five valves can be linked using connecting kit VAME-P18-K-P5. The connecting kit consists of two square nuts, two socket head screws and an O-ring.



- [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

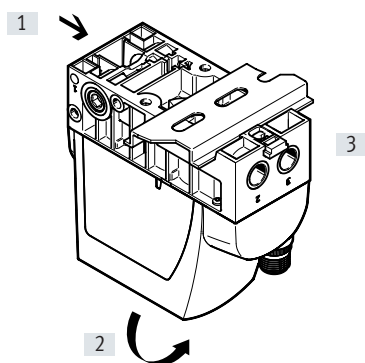


Linked valves can be divided into two pressure zones. To do this, duct 1 is closed on the corresponding side using a plug screw.

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

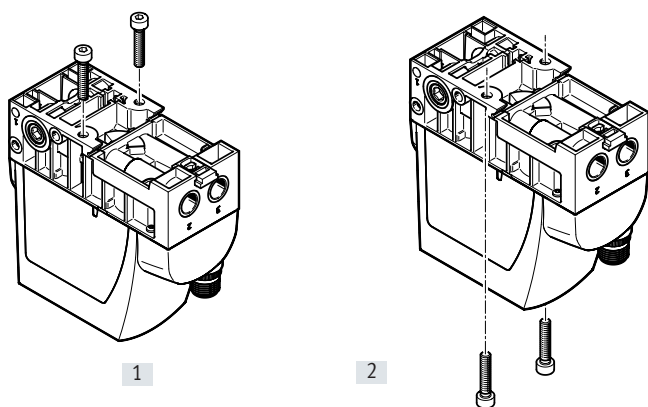
Via H-rail



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

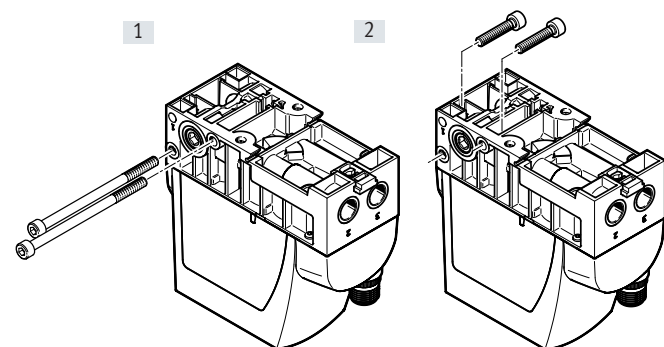


Individual mounting via the underside:

- [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.

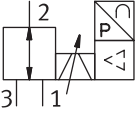
Via the side face



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 | |

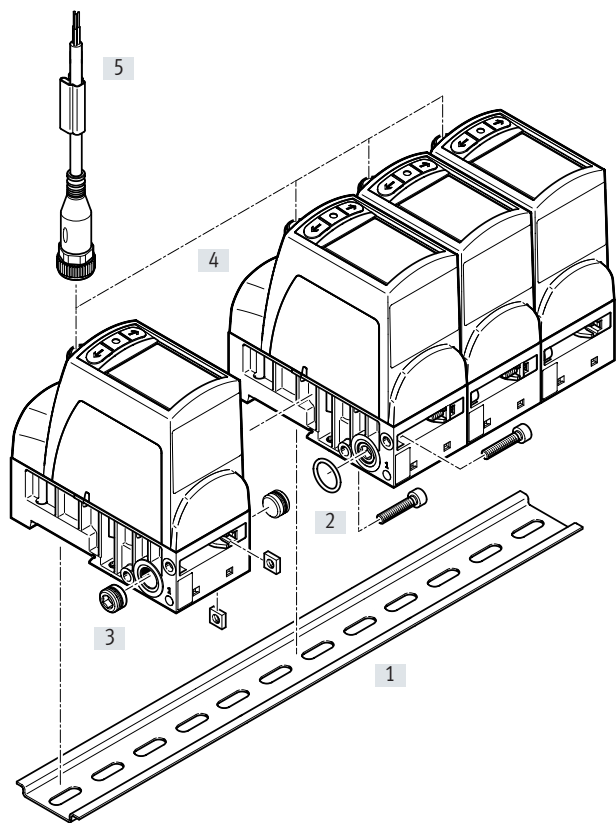
| | | |
|------|---------------------------------------|--|
| 007 | Upper pressure value of control range | |
| ...H | | |
| 0H | | |
| 10H | 10 bar | |
| 12H | 12 bar | |
| 1H | 1 bar | |
| 2H | 2 bar | |
| 6H | 6 bar | |

| | | |
|-----|--------------------------------------|--|
| 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 |  | Pressure regulation range |
| | 150 ... 1630 l/min | | -1 ... 0 bar |
|  | Voltage | | -1 ... 1 bar |
| | 21.6 ... 27.6 V DC | | 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] | 21.6 ... 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 | |

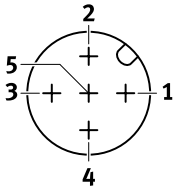
1) For information about the area of use, see the EC declaration of conformity at: www.festo.com/catalogue/... → Support/Downloads.

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.

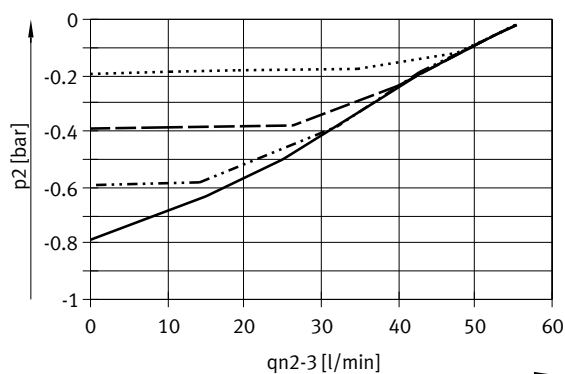
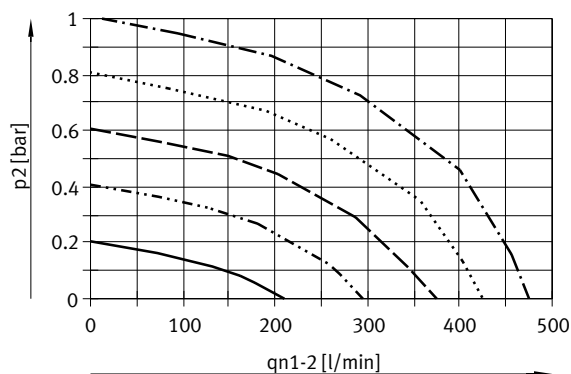
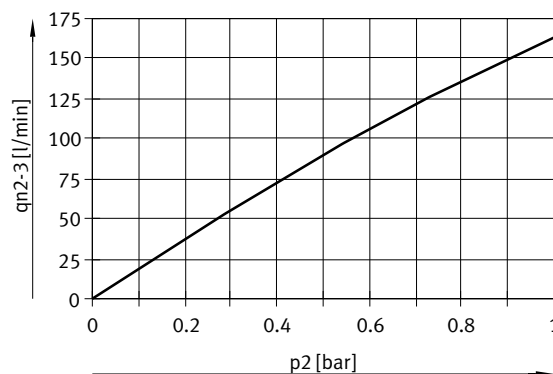
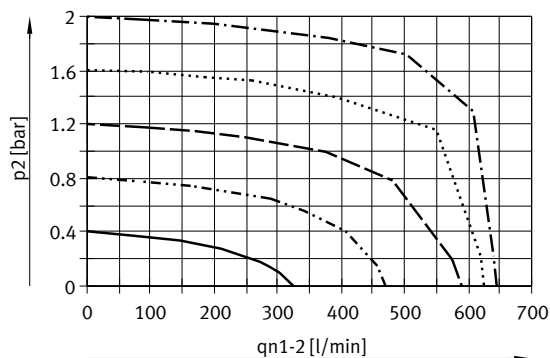
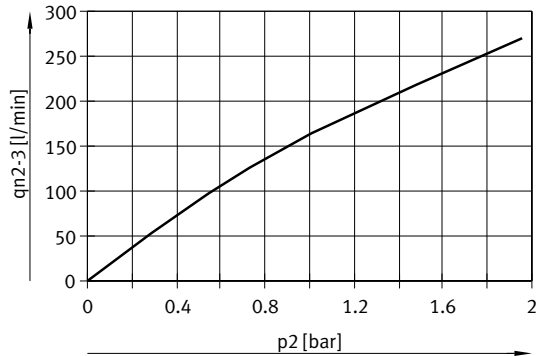
Data sheet

| 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 | [MPa] | -0.1 ... 0 | -0.1 ... 0.1 | 0 ... 0.2 | 0 ... 0.6 | 0 ... 1 | 0 ... 1.2 |
| | [bar] | -1 ... 0 | -1 ... 1 | 0 ... 2 | 0 ... 6 | 0 ... 10 | 0 ... 12 |
| Input pressure 1 | [MPa] | 0 ... 0.6 | 0 ... 0.6 | 0 ... 0.6 | 0 ... 1.3 | 0 ... 1.3 | 0 ... 1.3 |
| | [bar] | 0 ... 6 | 0 ... 6 | 0 ... 6 | 0 ... 13 | 0 ... 13 | 0 ... 13 |
| Input pressure 3 | [MPa] | - 0.1 | - 0.1 | - | - | - | - |
| | [bar] | -1 | -1 | - | - | - | - |
| Burst pressure | [bar] | 40 | 40 | 40 | 40 | 40 | 40 |

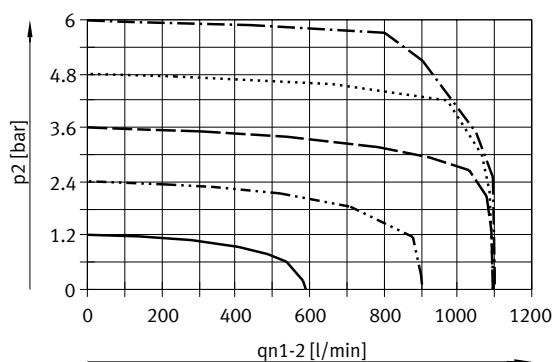
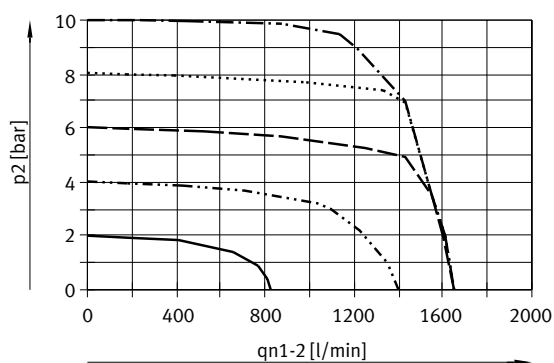
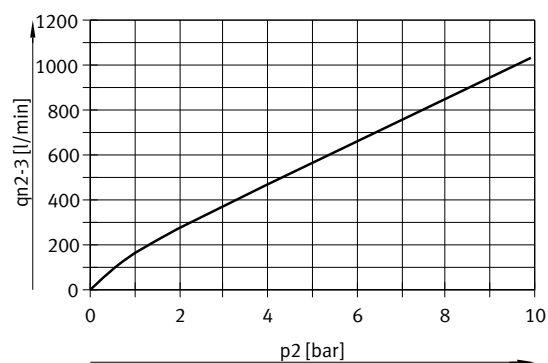
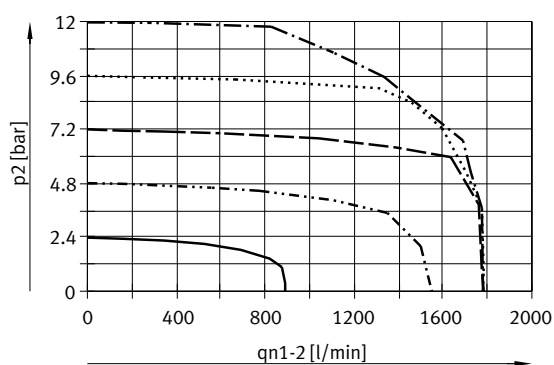
| Information on materials | |
|--------------------------|----------------|
| Note on materials | RoHS-compliant |
| Housing material | PA-reinforced |
| Seals material | HNBR |
| | PTFE |

| 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 |

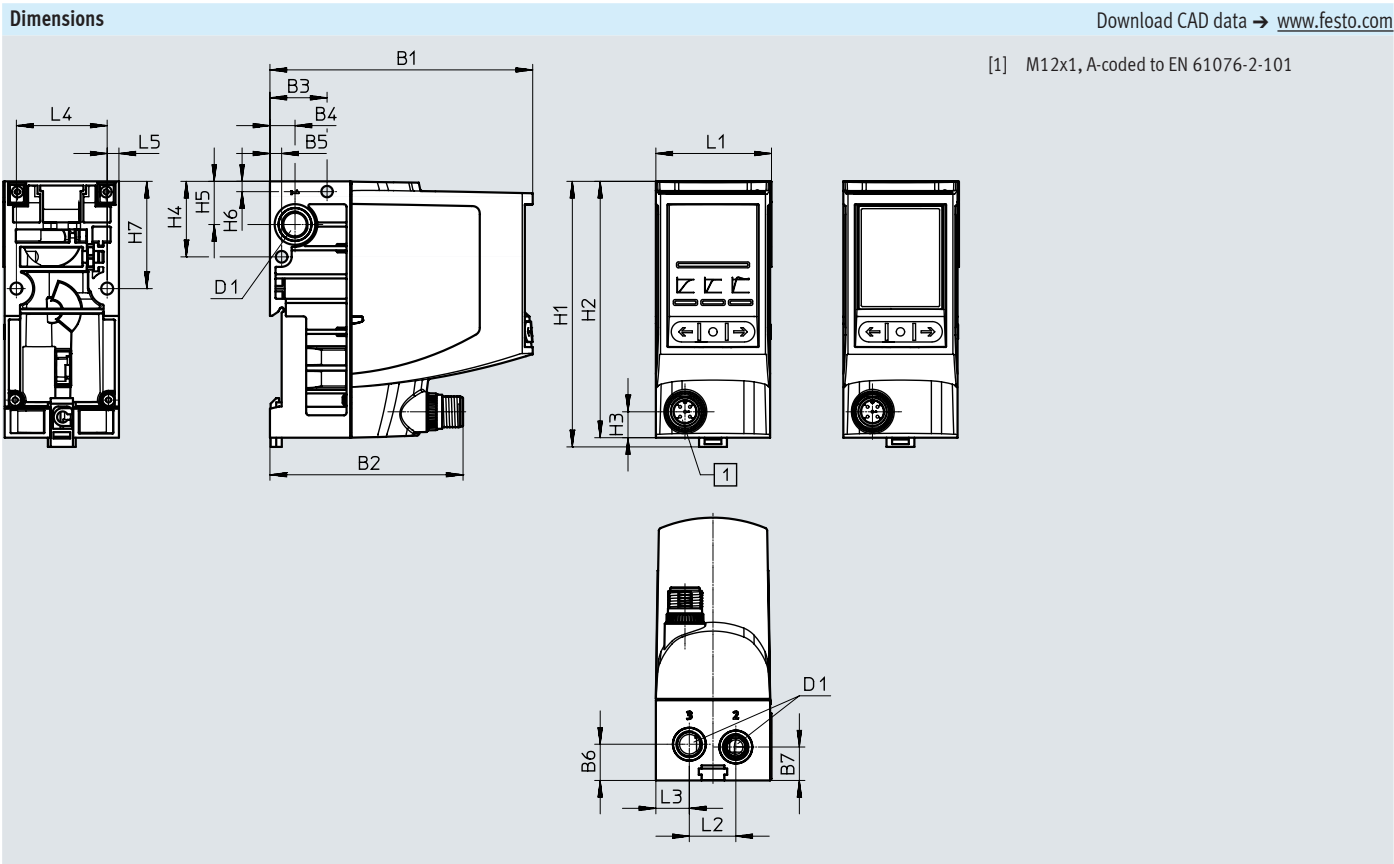
Data sheet

Flow rate q_n for valves with pressure regulation range $-1 \dots 0$ bar and flow rate q_n for valves with pressure regulation range $-1 \dots +1$ barFlow direction $2 \rightarrow 3$; as a function of output pressure p_2 **Flow rate q_n for valves with pressure regulation range $-1 \dots +1$ bar**Flow direction $1 \rightarrow 2$; as a function of output pressure p_2 Flow direction $2 \rightarrow 3$; as a function of output pressure p_2 **Flow rate q_n for valves with pressure regulation range $0 \dots 2$ bar**Flow direction $1 \rightarrow 2$; as a function of output pressure p_2 Flow direction $2 \rightarrow 3$; as a function of output pressure p_2 

Data sheet

Flow rate q_n for valves with pressure regulation range 0 ... 6 barFlow direction 1 > 2; as a function of output pressure p_2 Flow direction 2 > 3; as a function of output pressure p_2 **Flow rate q_n for valves with pressure regulation range 0 ... 10 bar**Flow direction 1 > 2; as a function of output pressure p_2 Flow direction 2 > 3; as a function of output pressure p_2 **Flow rate q_n for valves with pressure regulation range 0 ... 12 bar**Flow direction 1 > 2; as a function of output pressure p_2 Flow direction 2 > 3; as a function of output pressure p_2 

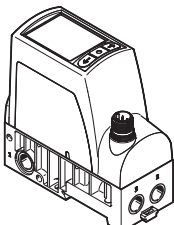
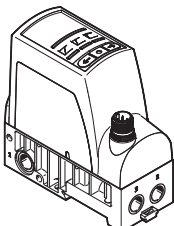

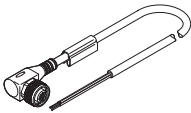

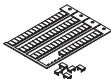

Data sheet






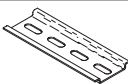
| Type | B1 | B2 | B3 | B4 | B5 | B6 | B7 | D1 | H1 | H2 | H3 | H4 | H5 | H6 | H7 |
|------|------|------|------|----|-----|----|----|------|------|----|-----|------|------|-----|------|
| VPPI | 94.3 | 69.3 | 20.5 | 9 | 4.2 | 13 | 12 | G1/8 | 95.3 | 92 | 9.3 | 27.1 | 15.5 | 3.7 | 38.5 |

| 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 | | | | | |
| Data sheets → Internet: nebu | | | | | |
|  | 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 | | | | | |
| Data sheets → Internet: vmpal | | | | | |
|  | 10 pieces | | 561115 | VMPAL-ST-AP-20 | |
| Inscription label | | | | | |
| Data sheets → Internet: vmpal | | | | | |
|  | 64 inscription labels | | 18576 | IBS-6X10 | |
| Connecting kit | | | | | |
| Data sheets → Internet: nebu | | | | | |
|  | 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 | | | | | |
|  | For thread G1/8 | 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 | |
| | | 10 pieces | 8108271 | VAME-P18-BP-G18-P10 | |
| Silencer | | | | | |
| Data sheets → Internet: uc | | | | | |
|  | For reducing noise at exhaust ports | For thread G1/8 | 1 piece | 2307 | U-1/8 |
| | | | 50 pieces | 534222 | U-1/8-50 |
| | | | 1 piece | 161419 | UC-1/8 |
| | | | 50 pieces | 534219 | UC-1/8-50 |
| DIN mounting rail | | | | | |
| Data sheets → Internet: nrh | | | | | |
|  | For H-rail mounting | | 35430 | NRH-35-2000 | |

Festo - Your Partner in Automation



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