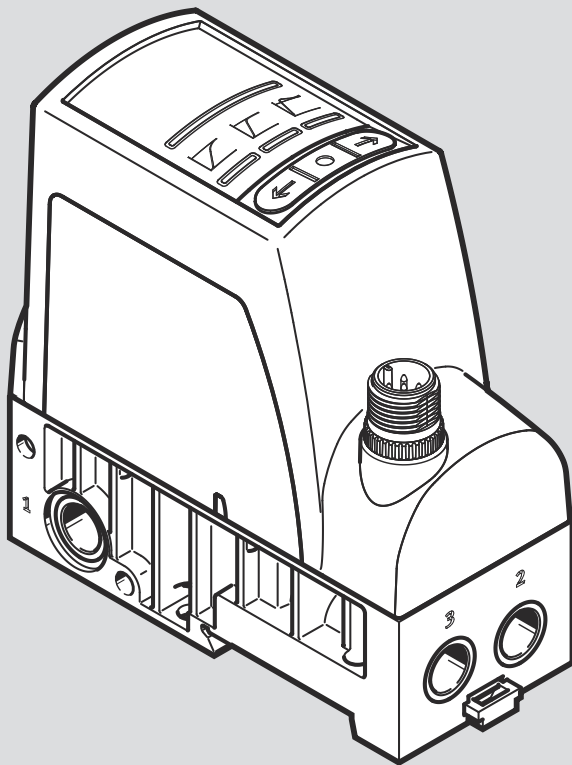


VPPI-...-A4/-V1-S1

Proportional-pressure regulator

FESTO

Operating instructions



8260638

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2026-06d
[8260640]

Original instructions

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1 Applicable documents

Document	Product	Contents
Test report ¹⁾	Proportional-pressure regulator VPPI-...-T	Determined accuracies

1) Only if the test report was selected in the configurator when ordering the product. Accessible on the Festo website by entering the product key.

Tab. 1: Applicable documents



All available documents for the product → www.festo.com/sp.

2 Safety

2.1 Safety instructions

- Only use the product in its original condition without unauthorised modifications.
- Only use the product if it is in perfect technical condition.
- Take into account the ambient conditions at the location of use.
- Before working on the product, switch off the power supply and secure it against being switched on again.
- The product may generate high frequency interference, which may require interference suppression measures in residential areas.
- Only with VPPI-...-F1A: operation permitted only with closed working volume and ducted exhaust air with exhaust flow into non-critical areas in order to minimise particle contamination.

2.2 Intended use

The proportional-pressure regulator controls the pressure proportionally to a specified setpoint value. The product is intended for use in industrial environments.

2.3 Training of qualified personnel

Work on the product may only be carried out by qualified personnel who can evaluate the work and detect dangers. The qualified personnel have skills and experience in dealing with electropneumatic (open-loop) control technology.

2.4 Warnings on the product

Symbol	Meaning
	Warning! Damage to the product can result in mechanical, electrical or thermal hazards. Protect the product from mechanical impact.

Tab. 2: Warnings on the product

2.5 UL approvals

In combination with the UL inspection mark on the product, the information in this section must also be observed in order to comply with the certification conditions of Underwriters Laboratories Inc. (UL) for USA and Canada.

UL approval information	
Product category code	QUYX7 (Canada) QUYX (USA)
File number	E322346

UL approval information	
Considered standards	UL 61010 CSA C22.2 NO. 61010-1-12, 3rd Ed.
UL mark	

Tab. 3: UL approval information

- Technical data for the product may have different values in other documents. The technical data in this document will always have priority for the UL-certified products.
- The unit must be powered by a power source that fulfils the requirements of an energy-limited circuit in accordance with IEC/EN/UL/CSA 61010-1 or a power source with limited power (LPS) in accordance with IEC/EN/UL/CSA 60950-1 or IEC/EN/UL/CSA 62368-1 or a Class 2 circuit in accordance with NEC or CEC.

3 Additional information

- For technical issues, contact the regional Festo representative
➔ www.festo.com/contact.
- Accessories and spare parts ➔ www.festo.com/catalogue.

4 Product design

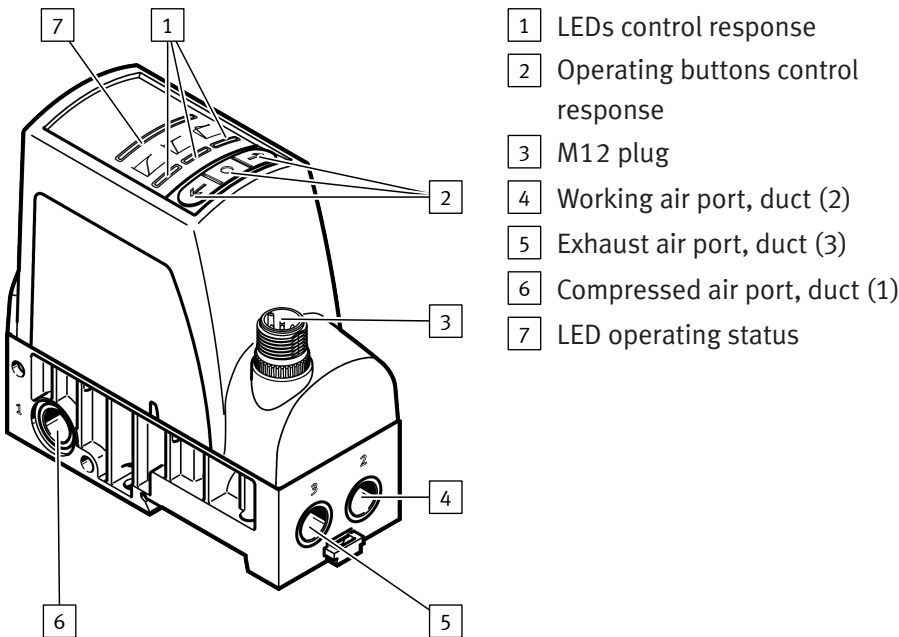


Fig. 1: Product design

5 Function

An integrated pressure sensor records the pressure at the working port and compares this value with the setpoint value. In the event of deviations between the setpoint value and actual value, the valve regulates until the outlet pressure has reached the setpoint value.

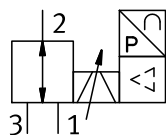


Fig. 2: Pneumatic circuit symbol

6 Mounting

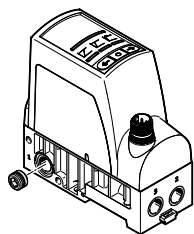
6.1 Creating pressure zones



For separating pressure zones, connect the compressed air supply to both ends of the valve manifold.

The plug screw can be left in the duct (1) of the valve for pressure zone separation. Plug screws VAME-P18-BP-G18-P5 for the duct (1) can also be ordered as accessories → www.festo.com/catalogue.

- Screw the plug screw into the duct (1) of the selected valve. Screw in the plug screw until it is flush with the surrounding surface.

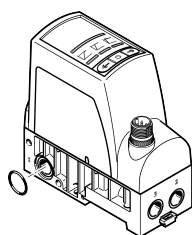


6.2 Linkage of valves

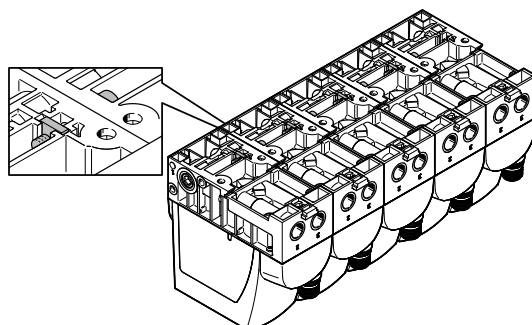
Up to 5 valves can be linked. The connecting kit VAME-P18-K-P5 is required for the linkage → www.festo.com/catalogue.

The connecting kit consists of 2 square nuts, 2 socket head screws and an O-ring.

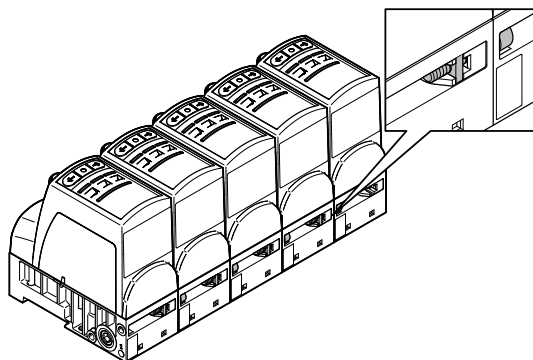
1. Remove the plug screw and sealing material from the duct (1).
2. Insert the O-ring into the duct (1) between 2 valves.



3. Connect the valves on the bottom using socket head screws and square nuts. Tightening torque: 1.2 ± 0.2 Nm



4. Connect the valves at the rear using socket head screws and square nuts.
Tightening torque: $1.2 \pm 0.2 \text{ Nm}$



6.3 Mounting

6.3.1 Mounting via bottom of valve

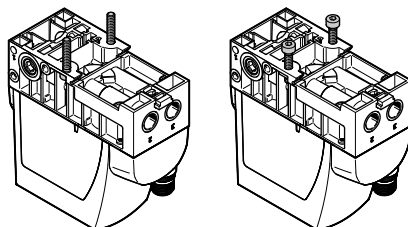


Fig. 3: Mounting via bottom of valve with M4 screws/M4 screws and square nuts

6.3.2 Mounting via valve side surface

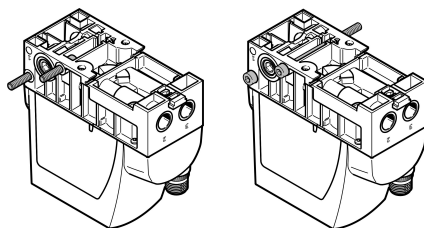


Fig. 4: Mounting via side with internal M4 screws/M4 through screws

6.3.3 Mounting on DIN rail

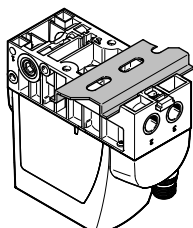


Fig. 5: Single valve

7 Installation

7.1 Installation, pneumatic

Valves for standard operation

1. Attach the tubing to the ports:
 - Compressed air (1)
 - Working air (2)
2. Fit a silencer at the exhaust pressure (3) or install ducted exhaust air.

**Valves VPPI-...-1V...H-...
for vacuum operation or
combined vacuum and
standard operation**

1. Attach the tubing to the ports:
 - Vacuum (3)
 - Working air (2)
2. Connect a compressed air supply to port (1) or mount a silencer to protect the valve from coarse dirt particles.

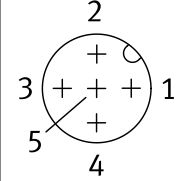
7.2 Installation, electrical

⚠ WARNING

Risk of Injury due to Electric Shock.

- For the electric power supply, use only PELV circuits that ensure a reliable electric disconnection from the mains network.
- Observe IEC 60204-1/EN 60204-1.
- The unit must be powered by a power source that fulfils the requirements of an energy-limited circuit in accordance with IEC 61010-1/EN 61010-1.

1. If a screened cable is used: earth the screen at the cable end away from the valve.
2. Do not crush, kink or stretch electrical connecting cables during installation.
3. Tighten the electrical connecting cable on the M12 plug. Tightening torque: maximum 0.3 Nm

Connection	Pin	Allocation	Wire colour ¹⁾ NEBU-M12.../NEBA-M12...
	1	+ 24 V DC	BN
	2	Setpoint value (-)	WH
	3	GND	BU
	4	Setpoint value (+)/PWM	BK
	5	Actual value output – based on pin 2 "setpoint value (-)" for type VPPI-...-V1-... – based on pin 3 "GND" for VPPI-...-A4-...	GY

1) Colour code in accordance with IEC 60757:2021-06

Tab. 4: Pin allocation for M12 plug, 5-pin, A-coded

8 Commissioning

Requirements:

- The valve must be assembled.
 - The pneumatic and electrical installation must be complete and tested.
1. Check operating conditions and critical limits → 13 Technical data.
 2. Switch on the power supply.
 3. Switch on the compressed air supply.
 4. If necessary, adjust the control response of the valve.

Control response

The control response of the valve can be set with the operating buttons on the top of the valve → Fig. 1. The symbols above the operating buttons represent the control response of the valve.

Setting the control response

1. Press and hold middle key for 3 s.
2. Select the control response with the arrow keys.
 - ⇒ The LED under the symbol of the selected control response lights.
3. Confirm the control response with the middle key.

Symbol	Application recommendation	
	VPPI-5L-...	VPPI-1.8L-...
	Designed for flow rate applications.	
	Default preset for all applications. Optimised for closed volumes from 100 ml to approx. 750 ml.	Default preset for all applications. Optimised for closed volumes up to 100 ml.
	Optimised for closed volumes ≥ 750 ml. Less suitable for volumes < 500 ml.	Optimised for closed volumes from 100 ml.

Tab. 5: Control response

9 Cleaning

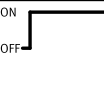
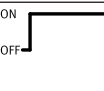
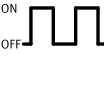
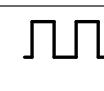
Clean the product with a clean and soft cloth.

For use with reduced particle emission:

- Remove abraded particles and soil from the product:
 - Prior to initial commissioning
 - Regularly during operation

10 Diagnostics

The following table describes the diagnostics with the LED operating status [7].

LED	Meaning	Action
 Green light	 – The operating voltage is present and within the permissible range. – Setpoint signal lies within the permissible range (0 ... 10.8 V or 2.5 ... 20.5 mA).	–
 Red light	 – Input pressure p1 is too low. – Setpoint value not reached.	– Increase input pressure p1. Maintain permissible maximum operating pressure.
 Flashing red	 – Supply voltage is too high.	– Reduce supply voltage.
 Flashing red and green Ratio 1:1	 – Analogue setpoint value is too high. – Cable break at setpoint input.	– Correct setpoint value. – Replace supply cable.

LED	Meaning	Action
 Flashing red and green Ratio 1:5	– Temperature is critical. – Power reduction active.	– Reduce ambient temperature or temperature of medium. – Ensure sufficient compressed air supply.
 Off	– No operating voltage. – The operating voltage is below the permissible range (< 20.4 V).	– Increase supply voltage.

Tab. 6: LED operating status

11 Fault clearance

Fault description	Cause	Remedy
Valve does not respond.	Operating voltage not applied.	Check the operating voltage connection.
	No setpoint voltage.	Check the controller and connection.
	Working temperature is too high. Valve is in temperature shut-off.	Switch off the valve, let it cool down and restart. Reduce ambient temperature and / or temperature of medium.
Valve normally open: The working pressure at (2) falls to the level at (3) (ambient pressure or vacuum).	Cable break setpoint input	Check connection to setpoint generator. Replace electrical connecting cable.
Valve normally closed: The working pressure at (2) deviates upwards or downwards from the setpoint value (working pressure is neither pressurised nor exhausted).	Cable break setpoint input	Check connection to setpoint generator. Replace electrical connecting cable.
Setpoint value not reached.	Input pressure at (1) is too low.	Increase input pressure at (1). Maintain permissible maximum operating pressure → 13 Technical data.

Tab. 7: Fault clearance

12 Disassembly

1. Specify setpoint value 0 bar (0 MPa).
2. Switch off compressed air supply.
3. Switch off operating voltage.
4. Disconnect electrical connecting cables.
5. Disconnect compressed air lines.
6. Disassemble product.

13 Technical data

13.1 Technical data, general



An individual test report is created for products of the variant VPPI-...-T. This test report can be found in the Support Portal (FoX) by entering the Product Key www.festo.com/sp.

VPPI-...-A4/V1-S1	
Certificates, declaration of conformity	➔ www.festo.com/sp
Valve function	3-way proportional-pressure regulator
Mounting position	Any
Product weight [g]	370
Ambient temperature [°C]	0 ... + 50
Storage temperature [°C]	−20 ... +70
Temperature of medium [°C]	0 ... + 50
Degree of protection	IP65 Not applicable to UL
Operating medium	Compressed air to ISO 8573-1:2010 [7:4:4] Inert gases
Information on the operating medium	Lubricated operation not possible
Climate class in accordance with EN 60721	3k3
Nominal operating altitude	< 3000 m above MSL
Materials	
Seals	HNBR
Housing	PA-reinforced

Tab. 8: Technical data, general

Vibration resistance/shock resistance (in accordance with IEC 60068)	
Note	Explanation of the severity levels (SL) ➔ Tab. 10 Type of severity level (SL)
Vibration (part 2-6)	Single valve mounted with screws: SL2
	Single valve on DIN rail: SL1
	Linkage of maximum 3 valves with lateral screw fastening: SL2
	Linkage of maximum 5 valves with lateral screw fastening: SL1
Shock (part 2-27)	Single valve mounted with screws: SL2
	Single valve on DIN rail: SL1
	Linkage of maximum 3 valves with lateral screw fastening: SL2
	Linkage of maximum 5 valves with lateral screw fastening: SL1

Tab. 9: Operating and ambient conditions

Type of severity level (SL)					
Vibration load					
Frequency range [Hz]		Acceleration [m/s²]		Deflection [mm]	
SL1	SL2	SL1	SL2	SL1	SL2

Type of severity level (SL)					
2 ... 8	2 ... 8	–	–	±3.5	±3.5
8 ... 27	8 ... 27	10	10	–	–
27 ... 58	27 ... 60	–	–	±0.15	±0.35
58 ... 160	60 ... 160	20	50	–	–
160 ... 200	160 ... 200	10	10	–	–
Shock load					
Acceleration [m/s²]		Duration [ms]		Shocks per direction	
SL1	SL2	SL1	SL2	SL1	SL2
±150	±300	11	11	5	5
Continuous shock load					
Acceleration [m/s²]		Duration [ms]		Shocks per direction	
±150		6		1000	

Tab. 10: Type of severity level (SL)

Cable break detection

The sensor detects a cable break at currents < 2 mA.

Cable break detection		
Valve variant	Setting 'Input min'	Cable break detection
VPPI-...-A4	≥ 2 mA	Cable break detection active. At analogue input values below 2 mA the 'Cable break' error is displayed and the valve moves to the normal position.
VPPI-...-V1	< 500 mV	Cable break detection inactive.

Tab. 11: Cable break detection

Zero point suppression		
Valve variant	Setting 'Pressure min'	Response with setpoint value < 0.7 % Full scale
VPPI-...-...L...H	0 MPa	Exhaust to 0 bar and keep the exhaust open.
VPPI-...-1V1H	–0.1 MPa	Valve moves to normal position.
VPPI-...-1V0H	–	Active control at 'Pressure max'.

Tab. 12: Zero point suppression

Setpoint values < 0.7% Full scale above the minimum input value ('Input min') are interpreted as the lowest input value in order to suppress noise at the input signal → Fig. 6. Depending on the valve variant and the minimum input pressure, there may be a special response in this area → Tab. 12 Zero point suppression.

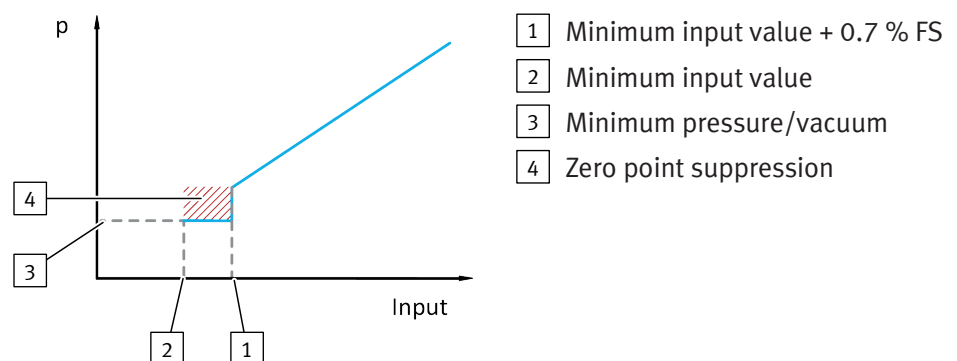


Fig. 6: Zero point suppression

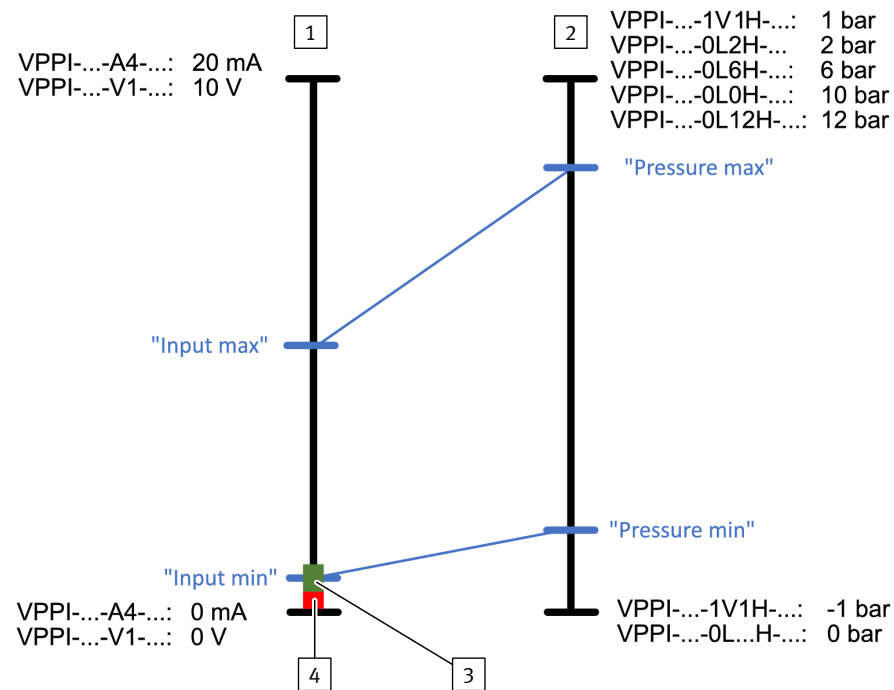


Fig. 7: Valve variants for excess pressure and vacuum/excess pressure

- 1 Analogue setpoint value
- 2 Target pressure
- 3 Zero shutdown
- 4 Cable break

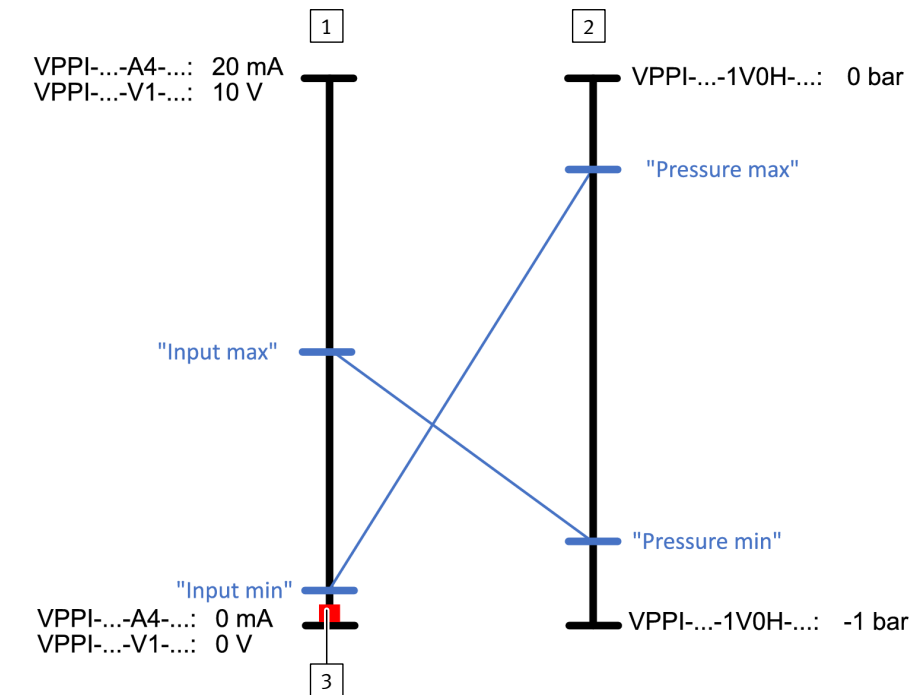


Fig. 8: Valve variants for vacuum

- 1 Analogue setpoint value
- 2 Target pressure
- 3 Cable break

VPPI-	5 ¹⁾	1.8 ¹⁾
Linearity	0.9% FS (full scale)	0.5% FS (full scale)
Hysteresis	0.4 % FS	0.2 % FS
Reproducibility	0.4 % FS	0.2 % FS

VPPI-	5¹⁾	1.8¹⁾
Overall accuracy	1.1 % FS	0.6 % FS
Temperature coefficient	0.02 %/K	

1) Maximum deviation, characteristic values determined at room temperature in accordance with ISO 10094. The linearity refers to the ideal characteristic curve.

Tab. 13: Characteristic values of closed-loop control technology

13.2 Technical data, pneumatic

VPPI-...-		1V0H ¹⁾	1V1H	0L2H	0L6H	0L10H	0L12H
Input pressure at (1) ²⁾							
VPPI-1.8L-...-	[MPa] [bar]	0 ... 0.4 0 ... 4	0 ... 0.4 0 ... 4	0 ... 0.4 0 ... 4	0 ... 0.8 0 ... 8	—	—
VPPI-5L-...-	[MPa] [bar]	0 ... 0.6 0 ... 6	0 ... 0.6 0 ... 6	0 ... 0.6 0 ... 6	0 ... 1.3 0 ... 13	0 ... 1.3 0 ... 13	0 ... 1.3 0 ... 13
Operating pressure at (1) ³⁾	[MPa] [bar]	0 ... 0.2 0 ... 2	0.1 ... 0.2 1 ... 2	0.2 ... 0.4 2 ... 4	0.6 ... 0.8 6 ... 8	1.0 ... 1.2 10 ... 12	1.2 ... 1.3 12 ... 13
Input pressure on (3) Vacuum	[MPa] [bar]	−0.1 ... 0 −1 ... 0	−0.1 ... 0 −1 ... 0	—	—	—	—
Operating pressure on (3)	[MPa] [bar]	−0.1 ... 0 −1 ... 0	−0.1 ... 0 −1 ... 0	—	—	—	—
Pressure regulation range ⁴⁾ an (2)	[MPa] [bar]	−0.1 ... 0 −1 ... 0	−0.1 ... +0.1 −1 ... +1	0 ... 0.2 0 ... 2	0 ... 0.6 0 ... 6	0 ... 1.0 0 ... 10	0 ... 1.2 0 ... 12

1) For the VPPI-...-1V0H-... variants, 0% setpoint value 0 bar and 100% setpoint value -1 bar.

2) The valve can be operated with an input pressure within the specified range. It must be noted here that the specified control quality is only fulfilled with a permanent supply within the operating pressure range and that the control pressure can reach the maximum available input pressure.

3) The specified control quality is only achieved if there is a permanent operating pressure supply at the valve within the specified range.

4) Active control only takes place from a setpoint value of 1% FS, below this the valve is in zero point suppression.

Tab. 14: Technical data, pneumatic

13.3 Technical data, electrical

Electrical characteristic values		
Nominal operating voltage	[V DC]	24
Operating voltage range	[V DC]	21.6 ... 27.6
Nominal current	[mA]	150
Current consumption	[mA]	≤ 525
Permissible signal line length	[m]	≤ 30
Setpoint input		
Setpoint value input		
VPPI-...-V1-...	[V]	0 ... 10
VPPI-...-A4-...	[mA]	4 ... 20
PWM input voltage		
VPPI-...-V1-	24 V DC (type 1 in accordance with DIN EN 61131)	
PWM input frequency		
VPPI-...-V1-...	[Hz]	200 ... 800
Input resistance		
VPPI-...-V1-...	[kΩ]	100
VPPI-...-A4-...	[kΩ]	0.3

Electrical characteristic values		
Actual value output		
Output current	[mA]	≤ 25
Analogue output		
VPPI-...-V1-...	[V]	0 ... 10
VPPI-...-A4-...	[mA]	4 ... 20

Tab. 15: Electrical characteristic values

13.4 Technical data for UL certification

VPPI		
Installation site		For indoor use only. Suitable for use in moist environments.
Pollution degree		2
Relative humidity	[%]	0 ... 85
Maximum fluid temperature/ambient	[°C] [°F]	0 ... +50 32 ... +122
Operating voltage range	[V DC]	21.6 ... 27.6
Max. current consumption	[mA]	525
Max. installation height	[m]	3000
Overvoltage category		II
Protection class		III SELV/PELV

Tab. 16: Technical data UL

Festo SE & Co. KG

Ruiter Straße 82
73734 Esslingen
Germany

Phone: +49 711 347-0
www.festo.com