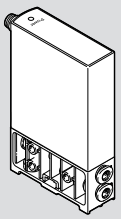
VEAB

Proportional-pressure regulator



FESTO

Festo SE & Co. KG
Ruiter Straße 82
73734 Esslingen
Deutschland
+49 711 347-0

www.festo.com

Operating instructions

8166621
2021-10f
[8166623]

8166621

1 About this document

1.1 Applicable documents

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

User documentation	
Name, type	Table of contents
H-rail mounting, VAME-P7-T	Assembly instructions
Mounting plate, VAME-P...-Y	Assembly instructions
Manifold rail, VABM-P6-15.../-P7-18...	Assembly instructions

Tab. 1: Documentation on the product

1.2 Product Labelling

– Observe the specifications on the product.

Warning Symbol

The following warning symbol can be seen on the product:

Symbol	Meaning
	If the housing is damaged (for example due to cracks), protection against dangerous voltage is no longer guaranteed. – Do not start the device. – Immediately shut down the device.

Tab. 2: Warning Symbol

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 a perfect technical condition and it is not damaged in any way.
– 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.
– Install the product so it can only be accessed by authorised persons.
– Observe additional safety instructions in chapter ➔ 7 Installation.

2.2 Intended use

The product is intended to regulate the pressure in proportion 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.

3 Additional information

– Contact the regional Festo contact if you have technical problems ➔ www.festo.com.
– Accessories and spare parts ➔ www.festo.com/catalogue.

4 Product overview

4.1 Functional principle

A built-in 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.

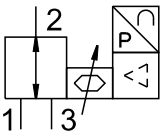
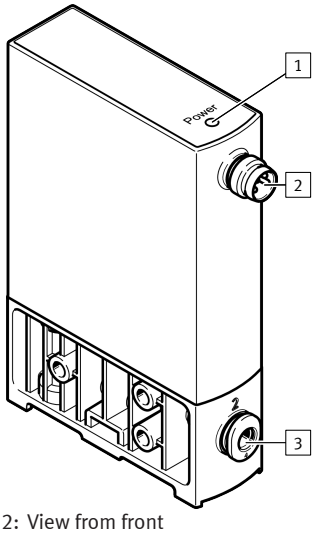


Fig. 1: Pneumatic circuit symbol

4.2 Structure

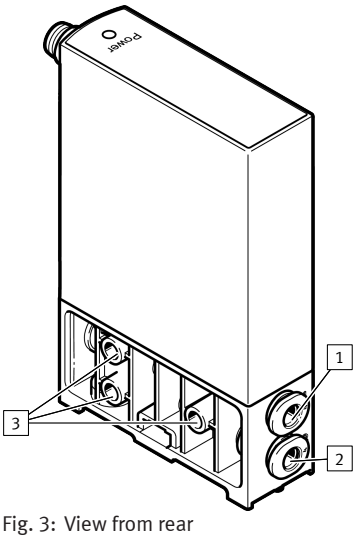
4.2.1 Product design

In-line valve



1 LED
2 Electrical connection, M8 plug
3 Working air port (2)

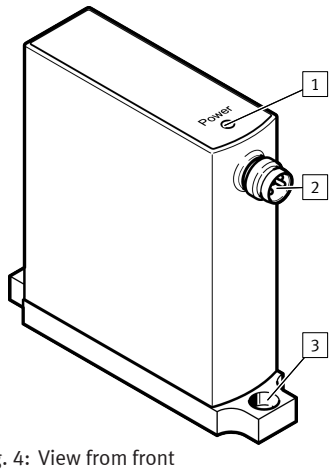
Fig. 2: View from front



1 Compressed air port (1)
2 Exhaust air port (3)
3 Through-holes (3x) for mounting the valve

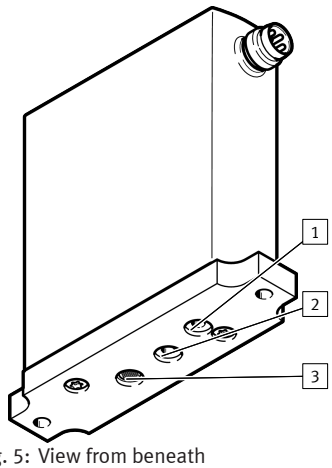
Fig. 3: View from rear

Sub-base valve



1 LED
2 Electrical connection, M8 plug
3 Through-holes (2x) for mounting the valve on the sub-base

Fig. 4: View from front



1 Working air port (2)
2 Exhaust air port (3)
3 Compressed air port (1)

Fig. 5: View from beneath

4.2.2 Product variants

Characteristic	Type code	Description
Basic function	VEAB	Piezo proportional-pressure regulator
Valve type	L	In-line valve
	B	Sub base valve
Valve function	26	2x 3/2-way valve, normally closed
Pressure range	D2	0 ... 0.2 MPa (0 ... 2 bar)
	D7	0 ... 0.1 MPa (0 ... 1 bar)
	D9	0 ... 0.6 MPa (0 ... 6 bar)
	D25	0 ... 0.5 MPa (0 ... 5 bar)
	D12	0 ... 0.02 MPa (0 ... 0.2 bar)
	D13	–0.1 ... +0.1 MPa (–1 ... +1 bar)
	D14	–0.1 ... 0 MPa (–1 ... 0 bar)
	D15	–0.05 ... +0.05 MPa (–0.5 ... +0.5 bar)
	D18	–0.1 ... +0.5 MPa (–1 ... +5 bar)
	D25	0 ... +0.5 MPa (0 ... +5 bar)
Pneumatic port	F	Flange/sub-base
	Q4	Push-in connector 4 mm
Setpoint value input	V1	Voltage variant 0 ... 10 V
	V2	Voltage variant 0 ... 5 V
	A4	Current variant 4 ... 20 mA
Actual value output	V1	Voltage variant 0 ... 10 V
	V2	Voltage variant 1 ... 5 V
	A4	Current variant 4 ... 20 mA
Nominal operating voltage	1	24 V DC
Electrical connection	R1	M8 plug, 4-pin

Tab. 3: Product variants

5 Transport and storage

- Store the product in a dry, UV- and corrosion-protected environment.
- Ensure short storage times.

6 Mechanical installation

1. Make sure there is sufficient space for the connecting cable and tubing connections.
   ↳ In this way you will prevent the connecting lines and the tubes from kinking.
2. Place the valve as close to the consumer as possible.
   ↳ This leads to improved control precision and shorter response times.

Mounting options of the valve:
- Through-hold mounting of the in-line valve through 3 lateral through-holes
- Mounting of the in-line valve to H-rails using H-rail mounting VAME-P7-T ➔ 1.1 Applicable documents
- Mounting of the in-line valve to the mounting plate VAME-P7-Y ➔ 1.1 Applicable documents
- Mounting of the sub-base valve using 2 through holes using the sub-base VABM-.... ➔ 1.1 Applicable documents

7 Installation

7.1 Pneumatic installation (in-line valve)

Valves for standard operation (overpressure)

1. Attach the tubing to the following connections:
   - Compressed air port (1)
   - Working air port (2)
2. Fit a silencer at the exhaust port (3) or provide for ducted exhaust air .

Valves for vacuum operation (reversible operation)

1. Attach the tubing to the following connections:
   - Vacuum port (3)
   - Working air port (2)
2. Mount silencer on the compressed air port (1) to protect the valve from coarse dirt particles.

Operating medium

NOTICE

Pay attention to compressed air quality.

Damage to property or loss of function from lubricated compressed air.
- Operate product only with unlubricated compressed air.
- Observe the requirements for compressed air quality ➔ Technical data.

7.2 Electrical installation

⚠ WARNING

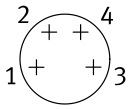
Risk of injury due to electric shock.
- For the electric power supply, use only PELV circuits that ensure a reliable electric disconnection from the mains network.
- Observe IEC 60204-1/EN 60204-1.

⚠ WARNING

Risk of Injury due to Electric Shock.

If the housing is damaged (for example due to cracks), protection against dangerous voltage is no longer guaranteed.
- Do not start the device.
- Immediately shut down the device.

1. If a screened cable is used: earth the shield at the cable end away from the valve.
2. Install electrical connecting cable without squeezing, kinking or stretching.
3. Screw electrical connecting cable onto the M8 plug connector. Tightening torque: maximum 0.3 Nm

Connection	Pin	Allocation	Wire colour[1] NEBU-M8...
	1	+ 24 V DC	BN
	2	Setpoint value (+)	WH
	3	GND	BU
	4	Actual value (+)	BK

1) According to IEC 757

Tab. 4: Pin allocation for M8 plug, 4-pin

8 Commissioning

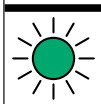
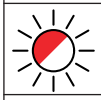
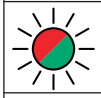
1. Check the operating conditions and limit values ➔ Technical data.
2. Switch on compressed air supply.
3. Check pneumatic connection points for tightness.
4. Connect valve to a setpoint signal.
5. Switch on operating voltage.

9 Cleaning

1. Switch off the following energy sources to clean the outside:
   - Compressed air
   - Operating voltage
2. Clean the outside of the product with a soft cloth. Do not use aggressive cleaning agents.

10 Malfunctions

10.1 Diagnostics

LED display	Status and meaning
	LED lights up green: – The operating voltage is present and within the permissible range. – There is no error. – The setpoint value signal is in the permissible range (0 ... 10.8 V or 2.5 ... 20.5 mA).
	LED flashes red: – The operating voltage is above the permissible range (> 29 V).
	LED flashes alternately red and green: – The setpoint value signal is above the permissible range (>10.8 V or > 20.5 mA). – The setpoint value signal is below the permissible range (< 2.5 mA).
	LED is off: – No operating voltage applied. – The operating voltage is below the permissible range (< 19 V).

Tab. 5: LED

10.2 Fault clearance

Fault description	Cause	Remedy
Valve does not react.	Operating voltage not applied	Check operating voltage connection.
	No setpoint voltage	Check controller and connection.
	Compressed air supply not present/insufficient	Check compressed air supply.
Flow rate is too low.	Restriction of the flow cross section due to connection technology (swivel fittings).	Use alternative connection technology.
Pressure remains constant despite modified setpoint specification.	Supply cable breakage; the last outlet pressure set is maintained but not regulated. Slow pressure drop due to leakage.	Replace supply cable.
Setpoint value is not reached.	Inlet pressure p1 is too low.	Increase inlet pressure p1. Maintain permissible maximum operating pressure ➔ 12 Technical data.

Tab. 6

11 Dismounting

1. Switch off setpoint voltage.
2. Switch off operating voltage.
3. Switch off compressed air supply.
4. Remove electrical connecting cables.
5. Remove compressed air lines.
6. Dismantle the product.

12 Technical data

Property		Specification/value
Design		Proportional-pressure regulator
Mounting position		any
Operating medium		Compressed air in accordance with ISO 8573-1:2010 [7:4:4]
		inert gases
Information on the operating medium		lubricated operation not possible
CE marking (Declaration of conformity www.festo.com/sp)		in accordance with EU EMC Directive[1)]
Degree of protection		IP65 (fully installed)
Climate class in accordance with EN 60721		3K3
Nominal operating voltage	[V DC]	24
Operating voltage range	[V DC]	19 … 29
permissible residual ripple of the operating voltage	[%]	10
maximum current consumption	[mA]	80
maximum permissible signal line length	[m]	30
Input pressure 1 (vacuum in port 3)		
VEAB-...-D13-...	[MPa]	0 ... 0.2
	[bar]	0 ... 2
VEAB-...-D14-...	[MPa]	–0.1
	[bar]	–1
VEAB-...-D15-...	[MPa]	0 ... 0.2
	[bar]	0 ... 2
VEAB-...-D18-...	[MPa]	0 ... 0.55
	[bar]	0 ... 5.5
Input pressure 1 in port 1		
VEAB-...-D2-...	[MPa]	0 … 0.4
	[bar]	0 … 4
VEAB-...-D7-...	[MPa]	0 … 0.3
	[bar]	0 … 3
VEAB-...-D9-...	[MPa]	0 … 0.65
	[bar]	0 … 6.5
VEAB-...-D12-...	[MPa]	0 … 0.1
	[bar]	0 … 1
VEAB-...-D25-...	[MPa]	0 … 0.55
	[bar]	0 … 5.5
Pressure control range		
VEAB-...-D2-...	[MPa]	0.001 … 0.2
	[bar]	0.01 … 2
VEAB-...-D7-...	[MPa]	0.0005 ... 0.1
	[bar]	0.005 ... 1
VEAB-...-D9-...	[MPa]	0.003 ... 0.6
	[bar]	0.03 ... 6
VEAB-...-D12-...	[MPa]	0.0001 ... 0.02
	[bar]	0.001 ... 0.2
VEAB-...-D13-...	[MPa]	–0.1 ... +0.1
	[bar]	–1 ... +1
VEAB-...-D14-...	[MPa]	–0.1 ... –0.0005
	[bar]	–1 ... –0.005
VEAB-...-D15-...	[MPa]	–0.05 ... +0.05
	[bar]	–0.5 ... +0.5
VEAB-...-D18-...	[MPa]	–0.1 ... +0.5
	[bar]	–1 ... +5
VEAB-...-D25-...	[MPa]	0.0025 ... 0.5
	[bar]	0.025 ... 5
permissible temperature range		
Environment	[°C]	0 … +50
Medium	[°C]	+5 … +50 (non-condensing)
Storage	[°C]	–20 … +70
Setpoint value: analogue input		
VEAB-...-A4-...	[mA]	4 … 20
VEAB-...-V1-...	[V]	0 … 10
VEAB-...-V2-...	[V]	0 … 5
Setpoint value: input resistance		
VEAB-...-A4-...	[Ω]	250
VEAB-...-V1-...	[kΩ]	10
VEAB-...-V2-...	[kΩ]	10
Actual value: analogue output		
VEAB-...-A4-...	[mA]	4 … 20
VEAB-...-V1-...	[V]	0 … 10
VEAB-...-V2-...	[V]	1 … 5
Vibration resistance/shock resistance (in accordance with IEC 60068)		
Note		Explanation of the severity levels (SL) ➔ Tab. 9 Type of severity level (SL)
Vibration (part 2 - 6)		
Mounting via through-holes		SL2
Mounting on H-rail, mounting plate, manifold rail		SL1
Shock (part 2 – 27)		
Mounting via through-holes		SL2
Mounting on H-rail, mounting plate, manifold rail		SL1
Continuous shock (part 2 – 27)		
Mounting via through-holes		SL1
Mounting on H-rail, mounting plate, manifold rail		SL1
Materials		
Housing		PA, PAMX
Screws		Heat-treated steel Galvanised steel
Seals		NBR
Adapter plate		Wrought aluminium alloy
Weight		
Sub base valve weight	[g]	approx. 70
In-line valve weight	[g]	approx. 70

1) The product is intended for use in industrial environments. Outside industrial environments, e.g. in commercial and residential/mixed-use areas, it may be necessary to take measures to suppress radio interference.

Tab. 7: General technical data

Closed-loop systems characteristics[1)]	
Linearity	< 0.5% FS (full scale)
Hysteresis	< 0.25/0.5 (/pressure range -D12-) % FS
Reproducibility	± 0.4% FS
Total accuracy	≤ 0.75/0.8 (/pressure range -D12-) % FS
Temperature coefficient	0.05%/K

1) Characteristic values determined at room temperature in accordance with ISO 10094. Linearity refers to the ideal characteristic curve.

Tab. 8: Closed-loop systems characteristics

Type of severity level (SL)					
Vibration load					
Frequency range [Hz]		Acceleration [m/s²]		Deflection [mm]	
SL1	SL2	SL1	SG2	SL1	SL2
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	–	–

Type of severity level (SL)					
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. 9: Type of severity level (SL)