

## Proportional flow control valve VEMD

**FESTO**



## Key features

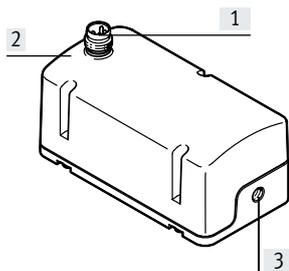
### Description

Thanks to the integrated low-noise piezo technology, minimal energy consumption and compact dimensions, the valve VEMD is perfectly suited to mobile applications.

#### Advantages:

- Very low energy consumption
- High dynamic response
- No self-heating
- Absolutely silent
- Excellent price/performance ratio
- Sturdy and durable
- Linear control response
- Small installation space
- Minimal weight

### Mode of operation



- [1] Electrical connection
- [2] Connection 1 (pressure supply connection)
- [3] Connection 2 (working connection)

The VEMD is a mass flow controller with integrated piezo actuator. The flow rate is controlled via a closed loop control circuit with integrated thermal sensor.

An analogue interface allows the setpoint value for the flow rate to be specified and the actual value to be fed back.

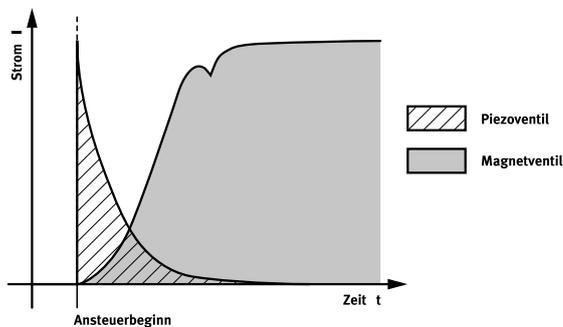
### Range of application

The proportional flow control valve VEMD is intended to be used for proportionally controlling the flow rate of air and inert gases in relation to a specified setpoint value.

The flow control valve is suitable for applications in medical technology within the bounds of the specified technical characteristics.

Additional measures may be required for applications with special requirements, such as for hygiene and sterility.

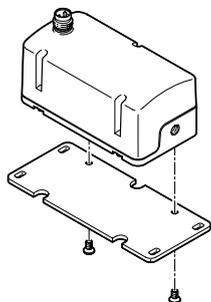
### Low energy consumption



Compared with solenoid valves, proportional valves with piezo technology require virtually no energy to maintain an active state thanks to their capacitive principle. The piezo valve operates like a capacitor: it needs current only at the start in order to charge the piezoceramics.

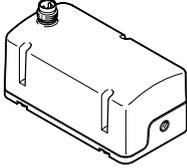
No further energy is needed to maintain its state. The valves therefore generate no heat. They consume up to 95% less energy than solenoid valves, which permanently require an electrical current

### Mounting



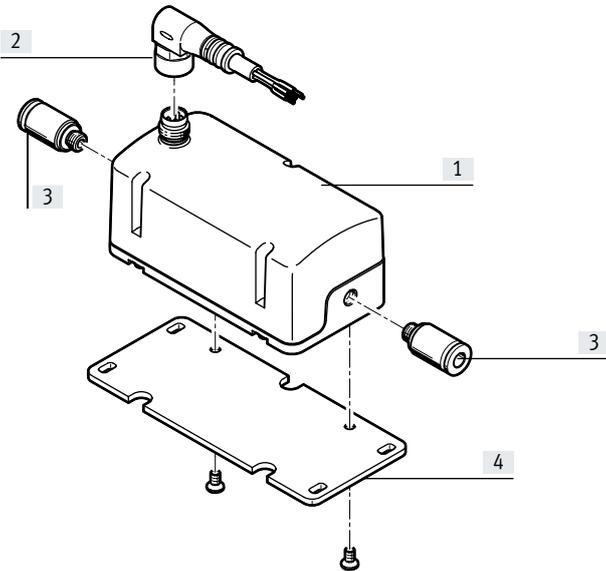
The valve VEMD is mounted on the wall mounting VAME-P14-W using two screws.

## Product range overview

Function	Description	Nominal operating voltage	Setpoint value	Flow rate control range	Operating pressure	
		[V DC]	[V]	[L <sub>n</sub> /min]	[bar]	
Proportional flow control valve		Mass flow controller, 2-way valve, normally closed	24	0.2 ... 10	0 ... 20	0 ... 2.5
			12			

## Peripherals overview

## VEMD on mounting plate



Designation	Brief description	→ Page/Internet
[1] Proportional flow control valve VEMD	–	10
[2] Connecting cable NEBU	–	10
[3] Push-in fitting QSM/NPQM	For connecting tubing with standard outside diameters	10
[4] Mounting plate VAME-P14	For mounting the valve	10

## Type codes

001	Series	
VEMD	Proportional flow control valve	

002	Directional control valve type	
L	In-line valve	

003	Valve function	
6	2/2-way valve, normally closed	

004	Nominal width [mm]	
1.4	1.4	

005	Flow rate range	
20	20 l/min	
14	14 l/m	

006	Pressure range [bar]	
D21	0 ... 2.5	

007	Pneumatic connection	
M5	M5	

008	Nominal operating voltage	
1	24 V DC	
5	12 V DC	

009	Electrical connection	
R1	Individual connector M8, 4-pin	
LS1	PCB plug, 4-pin	

010	Setpoint input for individual valves	
V1	0 ... 10 V	
V4	0.2 ... 10 V	

## Data sheet

-  Flow rate control range  
0 ... 20 l<sub>n</sub>/min
-  Voltage  
12, 24 V DC
-  Operating pressure  
0 ... 2.5 bar



## General technical data

Valve function		2-way proportional flow control valve
Flow rate control range <sup>1)</sup>	[l <sub>n</sub> /min]	0 ... 20
Dimensions W x L x H	[mm]	37x70x31
Nominal width	[mm]	1.4
Pneumatic connection 1, 2		Female thread M5
Type of mounting		Direct mounting via thread
Mounting position		Any
Flow direction		Non-reversible
Product weight	[g]	92

1) The flow rate is calibrated at the factory to the physical standard conditions in accordance with DIN 1343 (1013 mbar, 0 °C)

## Electrical data

	VEMD-L-6-14-20-D21-M5-1-R1-V4	VEMD-L-6-14-20-D21-M5-5-R1-V4
Electrical connection	Plug M8x1, 4-pin, to EN 60947-5-2	
Nominal operating voltage	[V DC] 24	12
Operating voltage range	[V DC] 22 ... 26.4	11.1 ... 13.2
Analogue input signal range	[V] 0.2 ... 10	
Analogue output signal range	[V] 0.2 ... 10	
Setpoint value	[V] 0.2 ... 10	
Max. electrical power consumption	[W] 1	
Max. current consumption	[mA] 40	65
Duty cycle	[%] 100	
Reverse polarity protection	For operating voltage connections	
Degree of protection	IP40, in any mounting position	
	IP51, in horizontal mounting position	

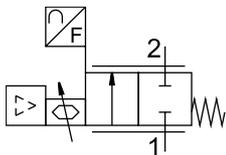
## Data sheet

Operating and environmental conditions		
Operating pressure	[bar]	0 ... 2.5
Overload pressure	[bar]	6
Burst pressure	[bar]	10
Medium		<ul style="list-style-type: none"> <li>• Oxygen (oxygen applications to IEC 60601-1 only on request)</li> <li>• Compressed air to ISO 8573-1:2010 [6:4:4]</li> <li>• Inert gases</li> <li>• Nitrogen</li> </ul>
Note on the medium		Operation with lubricated medium not possible
Ambient conditions		Not suitable for use in an environment enriched with oxygen to IEC 60601-1
Special characteristics		Oxygen-compatible to DIN EN 1797
Accuracy of flow rate	[%]	± (4% o.m.v. + 1.25% FS)
Repetition accuracy FS	[%]	1
Hysteresis FS	[%]	2.5
Linearity error FS	[%]	2
Temperature coefficient K	[%]	0.1
Ambient temperature	[°C]	0 ... 50
Temperature of medium	[°C]	5 ... 40
Storage temperature	[°C]	- 20 ... 70
Certification		RCM
CE marking (see declaration of conformity)		To EU EMC Directive <sup>1)</sup>

- 1) For information about the area of use, see the EC declaration of conformity at: [www.festo.com/sp](http://www.festo.com/sp) → Certificates.  
If the devices are subject to usage restrictions in residential, commercial or light-industrial environments, further measures for the reduction of the emitted interference may be necessary.

Materials	
Seals	EPDM, NBR
Housing	Reinforced PA
Note on materials	RoHS-compliant Contains paint-wetting impairment substances

## Circuit symbol



2-way valve, normally closed

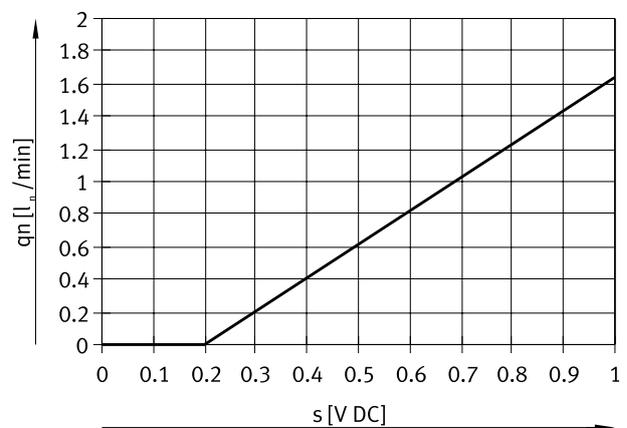
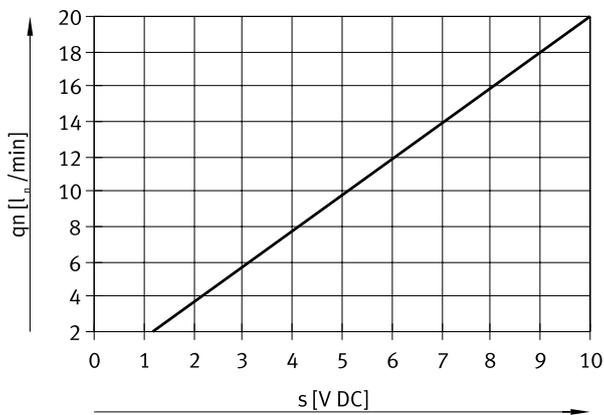
Pin allocation			
	Pin	Function	
		VEMD-L-6-14-20-D21-M5-1-R1-V4	VEMD-L-6-14-20-D21-M5-5-R1-V4
	1	+24 V DC supply voltage	+12 V DC supply voltage
	2	+ Setpoint value 0.2 ... 10 V	
	3	GND	
	4	+ Actual value 0.2 ... 10 V	

Data sheet

Flow rate  $q_n$  as a function of setpoint value  $s$

Complete range of values

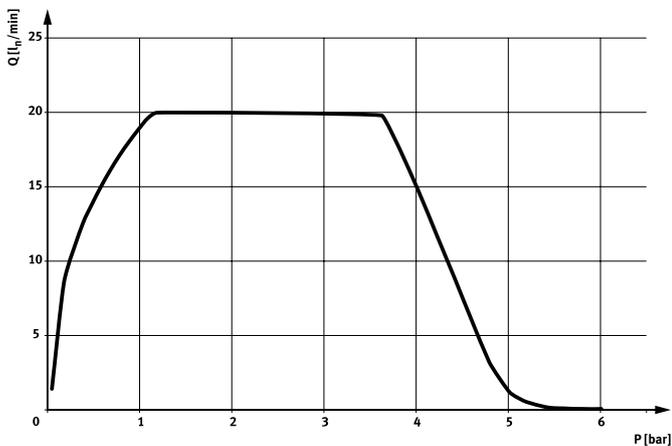
Detail area



Formula for calculating the setpoint value  $s$  as a function of the required nominal flow rate

$$s = \frac{9,8 \cdot (q_n + 4 \div 9,8)}{20}$$

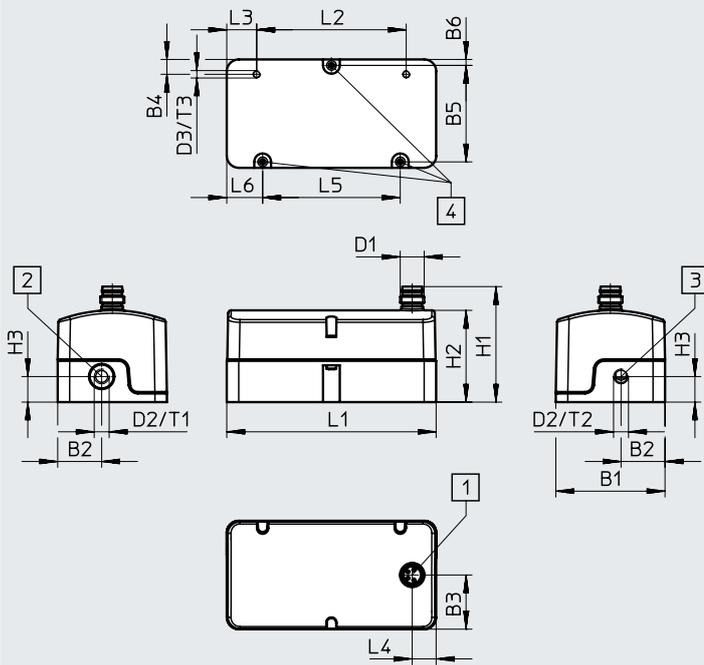
Maximum flow rate plotted against operating pressure, at room temperature



Data sheet

Dimensions

Download CAD data → [www.festo.com](http://www.festo.com)



- [1] Connecting plug, 4-pin
- [2] Pressure supply connection 1
- [3] Working connection 2
- [4] Mounting point through-holes with 2.2 mm diameter

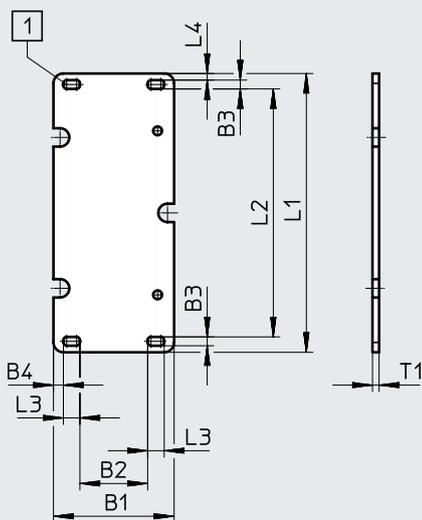
Type	B1	B2	B3	B4	B5	B6	D1	D2	D3
VEMD	36.5	14.7	18.3	5	32.5	2	M8x1	M5	M2.5

Type	H1	H2	H3	L1	L2	L3	L4	L5	L6	T1	T2	T3
VEMD	38.9	30.9	8.6	70	50	10	8	46	12	8	5	5

Dimensions

Download CAD data → [www.festo.com](http://www.festo.com)

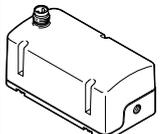
Wall mounting

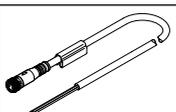


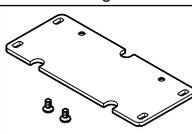
- [1] Mounting recess

Type	B1	B2	B3	B4	L1	L2	L3	L4	T1
VAME-P14-W	36.5	20.5	2.7	3	85	75.6	5	2	2

## Accessories

Ordering data		Description	Operating pressure [bar]	Nominal operating voltage [V DC]	Part no.	Type
Proportional flow control valve						
	Mass flow controller, 2-way valve, normally closed	0 ... 2.5	24		<b>8086472</b>	<b>VEMD-L-6-14-20-D21-M5-1-R1-V4</b>
			12		<b>8086473</b>	<b>VEMD-L-6-14-20-D21-M5-5-R1-V4</b>

Ordering data		Description	Part no.	Type
Connecting cable				
Data sheets → Internet: nebu				
	Straight socket, M8x1, 4-pin Open end, 4-wire		2.5 m	<b>541342</b> <b>NEBU-M8G4-K-2.5-LE4</b>
			5 m	<b>541343</b> <b>NEBU-M8G4-K-5-LE4</b>
	Angled socket, M8x1, 4-pin, Open end, 4-wire		2.5 m	<b>541344</b> <b>NEBU-M8W4-K-2.5-LE4</b>
	Straight socket, M8x1, 4-pin Straight plug M8x1, 4-pin		2.5 m	<b>554035</b> <b>NEBU-M8G4-K-2.5-M8G4</b>
			5 m	<b>541345</b> <b>NEBU-M8W4-K-5-LE4</b>

Wall mounting		Part no.	Type
	For mounting the valve	<b>5225721</b>	<b>VAME-P14-W</b>

Push-in fitting, male thread M5					
	With internal hexagon	Metal version	For tubing O.D. 4 mm	<b>558657</b>	<b>NPQM-DK-M5-Q4-P10</b>
			For tubing O.D. 6 mm	<b>558658</b>	<b>NPQM-DK-M5-Q6-P10</b>
		Polymer version	For tubing O.D. 3 mm	<b>153313</b>	<b>QSM-M5-3-I</b>
			For tubing O.D. 4 mm	<b>153315</b>	<b>QSM-M5-4-I</b>
			For tubing O.D. 6 mm	<b>153317</b>	<b>QSM-M5-6-I</b>
	With external hexagon	Metal version	For tubing O.D. 3 mm	<b>153302</b>	<b>QSM-M5-3</b>
			For tubing O.D. 4 mm	<b>153304</b>	<b>QSM-M5-4</b>
			For tubing O.D. 6 mm	<b>153306</b>	<b>QSM-M5-6</b>