

Proportional flow control valves VPCF

FESTO



Key features

At a glance

The proportional flow control valve VPCF meets the highest requirements for dynamic response, repetition accuracy and characteristic curve linearity. Extremely short cycle times mean that unit quantities can be increased and therefore costs can be cut substantially.

Thanks to its compact size, to its compact size, easy-to-access pneumatic connections and simple actuation, the valve can be positioned flexibly and assembled virtually anywhere – even in existing applications.

Advantages:

- Long service life even in harsh environments
- High dynamic response for variable cycle times
- High repetition accuracy
- Degree of protection: IP65
- ATEX certification

Applications:

- Spray jet control in painting systems
- Laser beam enclosure
- Regulating the air flow of heaters in hot air applications

The technology in detail



- [1] Service interface (sealed)
- [2] "Power/Error" LED
- [3] "Status" LED
- [4] Port: Working air (2)
- [5] Electrical connection
- [6] Earth terminal
- [7] Port: Compressed air (1) and exhaust air (3)
- [8] Through-hole for mounting

Mode of operation:

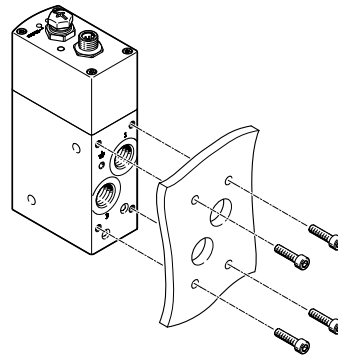
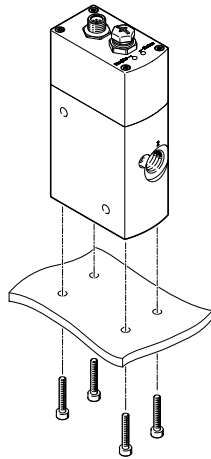
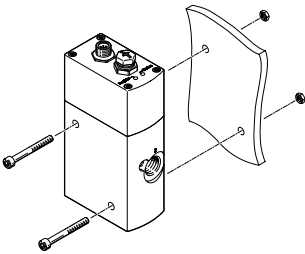
The valve regulates the flow for a connected pneumatic consumer, regardless of its flow resistance or fluctuations in the compressed air supply. The required sensors and the closed-loop control system are integrated in the valve.

The setpoint value for the flow can be specified using an analogue interface. The current actual value is also fed back in analogue format.

Mounting options

Via through-holes

Via threads

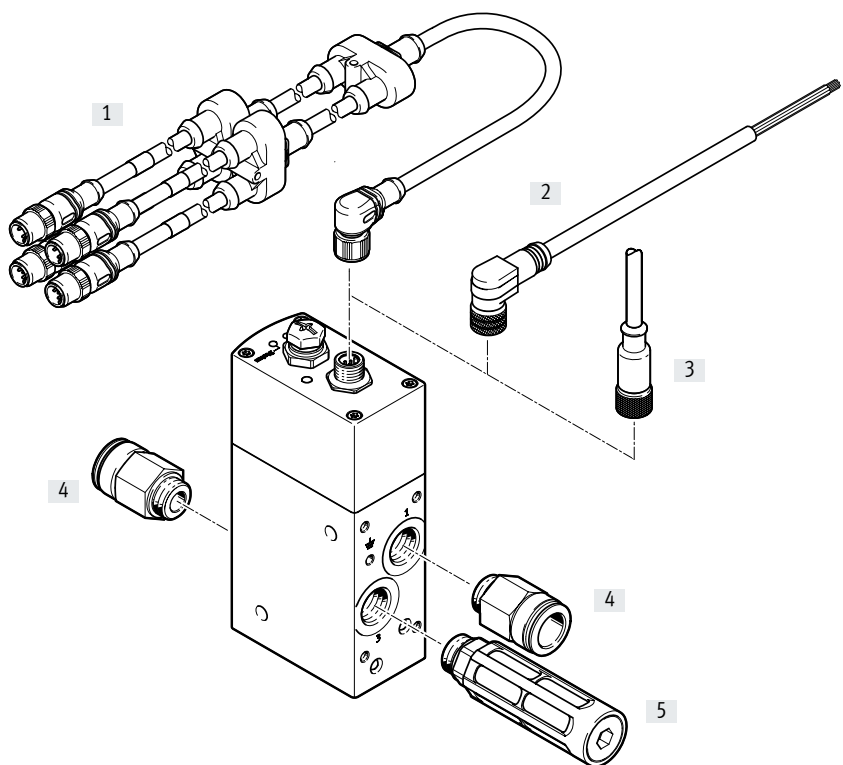


Type codes

001	Series	
VPCF	Proportional flow control valve	
002	Nominal width [mm]	
6	6	
003	Directional control valve type	
L	In-line valve	
004	Valve function	
8	3/3-way valve	
005	Pneumatic connection	
G38	G3/8	

006	Pressure range [bar]	
6	0 ... 6	
10	0 ... 10	
007	Setpoint input for individual valves	
V1	0 ... 10 V	
A4	4 ... 20 mA	
008	Display type	
E	LED	
009	EU certification	
EX2	II 3GD	

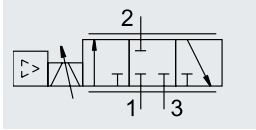
Peripherals overview






Accessories	Description	→ Page/Internet
[1] Adapters NEFV	Connecting cable for analogue/digital input/output modules from Beckhoff, e.g. EtherCAT Box output module EP41xx and EtherCAT Box input module EP31xx	10
[2] Connecting cable NEBU	For control purposes	9
[3] Connecting cable SIM	For control purposes	9
[4] Push-in fitting QS	For connecting tubing with standard O.D.	9
[5] Silencers U	For reducing noise at exhaust ports	9

Data sheet

Function




-  - Voltage
24 V DC
-  - Flow rate
20 ... 1000 l/min
-  - Pressure
1 ... 6 bar



General technical data

Type	VPCF-...-G3/8-6	VPCF-...-G3/8-10
Pneumatic connection	G3/8	
Nominal width [mm]	6	
Flow rate range [l/min]	0 ... 1000	0 ... 1500
Flow rate control range ¹⁾ [l/min]	20 ... 1000	30 ... 1500
Valve function	3-way proportional flow control valve	
Design	Piston spool with integrated sensor	
Sealing principle	Hard	
Actuation type	Electrical	
Reset method	Magnetic spring	
Type of control	Direct	
Flow direction	Non-reversible	
Type of mounting	Direct mounting via through-hole Direct mounting via thread	
Short circuit current rating	Yes	
Diagnostic function	Via LED	
Mounting position	Any	
Product weight [g]	856	
Electrical connection	8-pin M12x1 Plug A-coded	
Pressure sensors		
Repetition accuracy FS [%]	< ±0.5	
Absolute accuracy FS [%]	< 3	
Hysteresis FS [%]	< 0.8	

 **Note**

1)

For VPCF-...-6:

Control takes place as of 20 l/min. The valve switches to the exhaust position below this setpoint value.

The accuracy specifications provided are based on a flow rate control range of 50 ... 1000 l/min.

For VPCF-...-10:

Control takes place as of 30 l/min. The valve switches to the exhaust position below this setpoint value.

The accuracy specifications provided are based on a flow rate control range of 75 ... 1500 l/min.

Data sheet

Electrical data		
Operating voltage range	[V DC]	20.4 ... 30
Nominal operating voltage	[V DC]	24
Residual ripple	[%]	5
Max. current consumption	[A]	1.2
Current consumption ¹⁾	[mA]	150
Max. power consumption	[W]	36
Switching output		PNP
Switching input		PNP
Current carrying capacity per output	[mA]	100
Duty cycle	[%]	100
Signal range of the analogue output / input	[mA]	4 ... 20
	[V]	0 ... 10
Reverse polarity protection		For operating voltage

1) With load-free outputs

Operating and environmental conditions		
Type	VPCF...-G3/8-6	VPCF...-G3/8-10
Operating medium	Compressed air to ISO 8573-1:2010 [6:4:4]	
Note on the operating/pilot medium	Lubricated operation not possible, max. particle size 5 µm	
Operating pressure	[mPa]	0.1 ... 0.6
	[bar]	1 ... 6
		0.1 ... 1
		1 ... 10
Ambient temperature	[°C]	0 ... 50
Temperature of medium	[°C]	15 ... 35
Degree of protection ¹⁾	IP65	
Corrosion resistance class CRC ²⁾	1	
CE marking (see declaration of conformity) ³⁾	To EU EMC Directive	
	To EU Explosion Protection Directive (ATEX)	
	To EU RoHS Directive	
UKCA marking (see declaration of conformity) ³⁾	To UK instructions for EMC	
	To UK EX instructions	
	To UK RoHS instructions	
Vibration resistance	Severity level 2 as per FN 942017-4 (based on DIN EN 60068-2-6)	
Shock resistance	Severity level 2 as per FN 942017-5 (based on DIN EN 60068-2-27)	
Certification	RCM compliance mark	

1) In assembled state with plug, connecting cable, cover cap and pneumatic connections

2) Additional information: www.festo.com/x/topic/kbk

3) Additional information: www.festo.com/catalogue/vpcf → Support/Downloads

ATEX		
ATEX category gas		II 3G
Type of ignition protection for gas		Ex nA IIC T5 X Gc
ATEX category for dust		II 3D
Type of ignition protection for dust		Ex tc IIIC T60°C X Dc
Explosion-proof ambient temperature	[°C]	0°C ≤ Ta ≤ +50°C
CE marking (see declaration of conformity) ¹⁾		To EU Explosion Protection Directive (ATEX)

1) Additional information: www.festo.com/sp → Certificates.

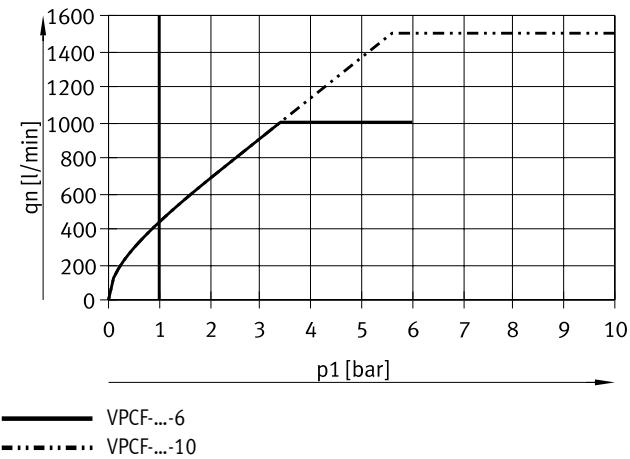
Data sheet

Materials

Proportional flow control valve

Seals	FPM, HNBR
Housing	Anodised wrought aluminium alloy
Note on materials	RoHS-compliant

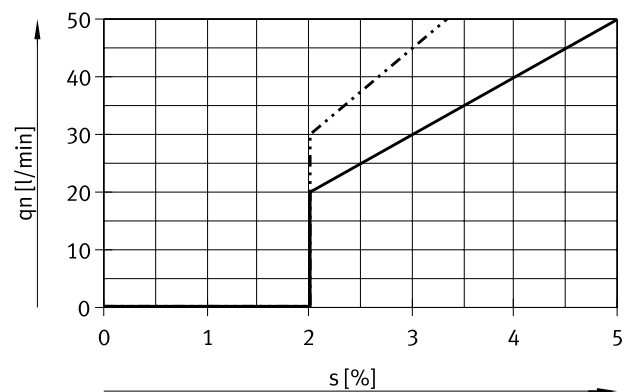
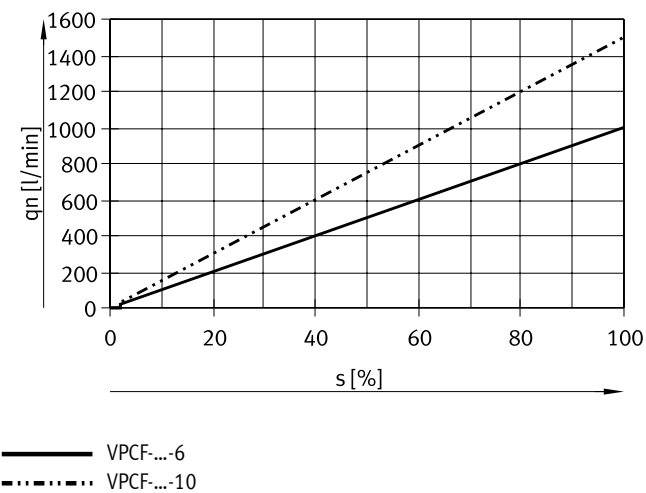
Max. possible flow q_n as a function of input pressure p_1



Flow rate q_n as a function of setpoint value s

Overall characteristic curve

Detail of setpoint value s 0 ... 5%



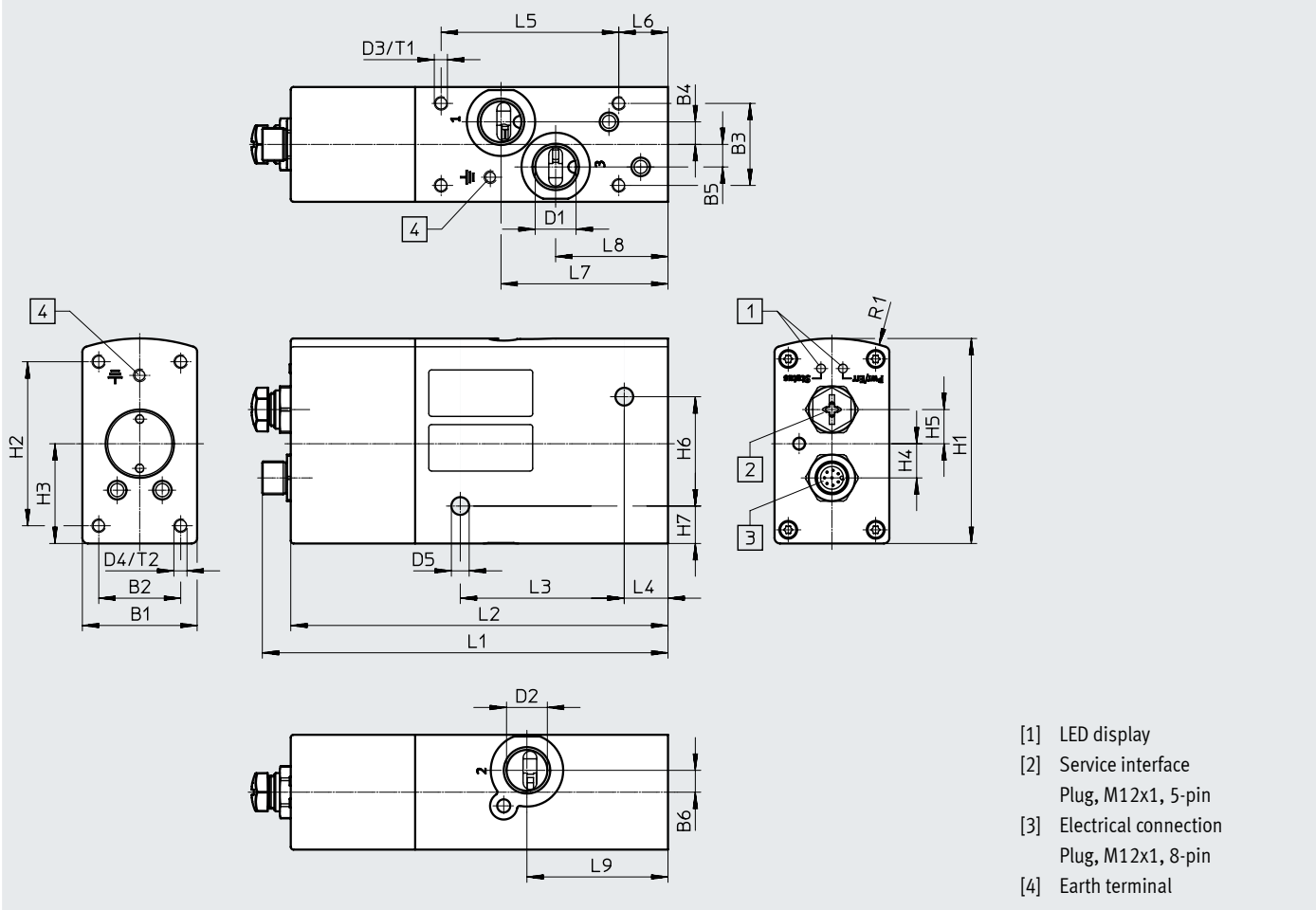
Pin allocation

	Pin	Signal	Function
	1	Digital In	Release
	2	24 V	
	3	Analogue In-	Flow rate setpoint value -
	4	Analogue In+	Flow rate setpoint value +
	5	Digital Out 2	Status optimal operating range
	6	Analogue Out	Flow rate actual value (PIN 6 and 7)
	7	0 V	
	8	Digital Out 1	Error status
	PE	Shielding	

Data sheet

Dimensions

Download CAD data → www.festo.com



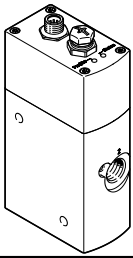


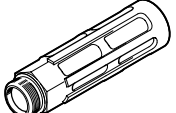
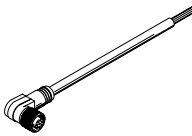
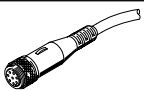
- [1] LED display
- [2] Service interface
Plug, M12x1, 5-pin
- [3] Electrical connection
Plug, M12x1, 8-pin
- [4] Earth terminal

Type	B1	B2	B3	B4	B5	B6	D1	D2	D3	D4
VPCF-...	42	30	30	8.3	8.3	8	G3/8	G3/8	M5	M5

Type	D5	H1	H2	H3	H4	H5	H6	H7	L1	L2
VPCF-...	∅ 6.5	75	60	36.5	12.5	12.5	40	13.7	148.4	138

Type	L3	L4	L5	L6	L7	L8	L9	R1	T1	T2
VPCF-...	60	16	65	18	61.1	41.1	51.6	65	10	10

Ordering data and accessories

Ordering data				
	Operating pressure	Setpoint input	Part no.	Type
	1 ... 6	4 ... 20 mA	8041713	VPCF-6-L-8-G38-6-A4-E-EX2
		0 ... 10 V	8041714	VPCF-6-L-8-G38-6-V1-E-EX2
	1 ... 10	4 ... 20 mA	8041715	VPCF-6-L-8-G38-10-A4-E-EX2
		0 ... 10 V	8041716	VPCF-6-L-8-G38-10-V1-E-EX2
Ordering data – Accessories				
	Description	Cable length [m]	Part no.	Type
Safety clip NEAU¹⁾				
	<ul style="list-style-type: none"> Protects "equipment that is not intrinsically safe" against simple disconnection ATEX category: Gas: II 3G / Dust: II 3D 	–	548068	NEAU-M12-GD
Push-in fitting QS				
	For connecting tubing with standard O.D.	–	186347	QS-G3/8-16
Silencer U				
	For reducing noise at exhaust ports	–	6843	U-3/8-B
Connecting cable NEBU, angled¹⁾				
	For control purposes	2	542256	NEBU-M12W8-K-2-N-LE8
		5	542257	NEBU-M12W8-K-5-N-LE8
Connecting cable SIM, straight¹⁾				
	For control purposes	2	525616	SIM-M12-8GD-2-PU
		5	525618	SIM-M12-8GD-5-PU

1) Suitable for ATEX

**Note**

Because of the design, the setpoint value 0 V/4 mA results in a low internal air consumption. This can be avoided by inserting a valve upstream in the supply cable.

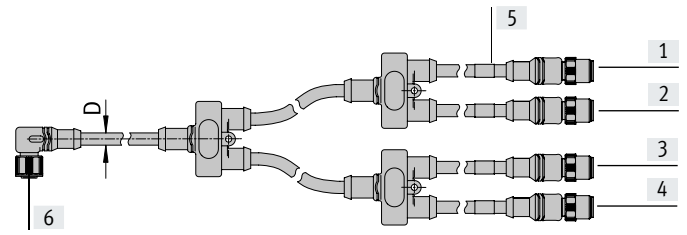
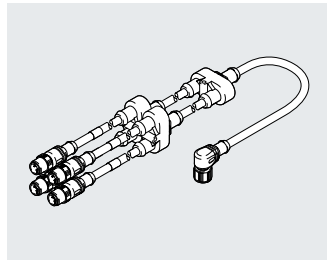
Valve with ATEX certification:
Part no. 535902
Type: MFH-3-1/2-S-EX
Flow rate: 3700 l/min
ATEX category: II 2G/II 2D

Coil with ATEX certification
Part no. 535619
Type: MSFG-24DC-M-EX
ATEX category: II 2G/II 2D

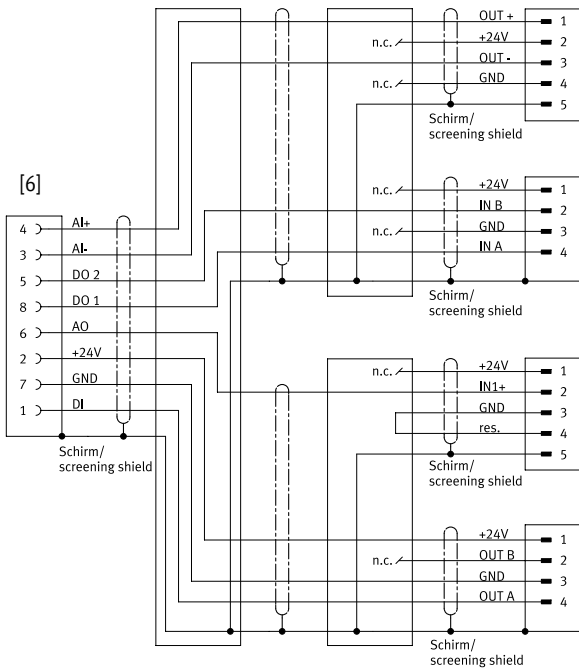
Accessories

Adapter NEFV

Connecting cable for analogue/digital input/output modules from Beckhoff.



Pin allocation

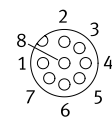


[1] GN¹⁾

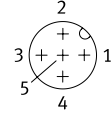
[2] WH¹⁾

[3] YE¹⁾

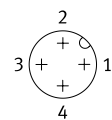
[4] RD¹⁾



Socket M12x1 [6]



Plug M12x1 [1] / [3]



Plug M12x1 [2] / [4]

1) Colours of rings [5]

GN = Green

WH = White

YE = Yellow

RD = Red

Ordering data

Degree of protection	Ambient temperature [°C]	Cable length [m]	Part no.	Type ¹⁾
IP65, IP67	-5 ... +80	0.6	4787544	NEFV-V12-M12W8-0.6-M12QG5

1) Suitable for ATEX