

Proportional flow control valves VPCF



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Features

At a glance

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

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

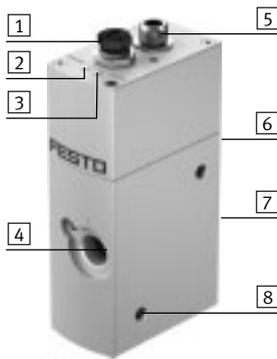
Advantages:

- 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 (closed)
- 2 "Power / Error" LED
- 3 "Status" LED
- 4 Connection: Supply air (2)
- 5 Electrical connection
- 6 Earthing connection
- 7 Connection: Compressed air (1) and exhaust air (3)
- 8 Through-hole for mounting

Function:

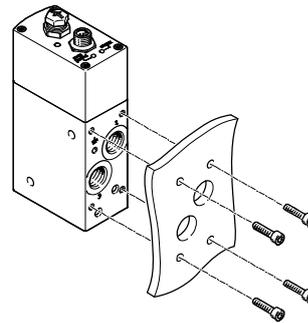
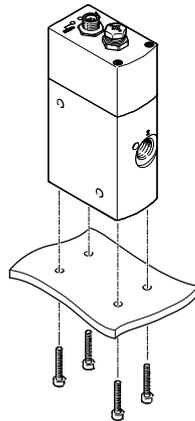
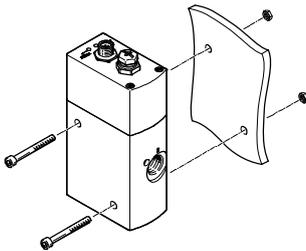
The valve regulates the flow for a connected pneumatic consumer, regardless of its flow resistance or fluctuations in the compressed air supply. The required sensors and the closed-loop control system are integrated in the valve.

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

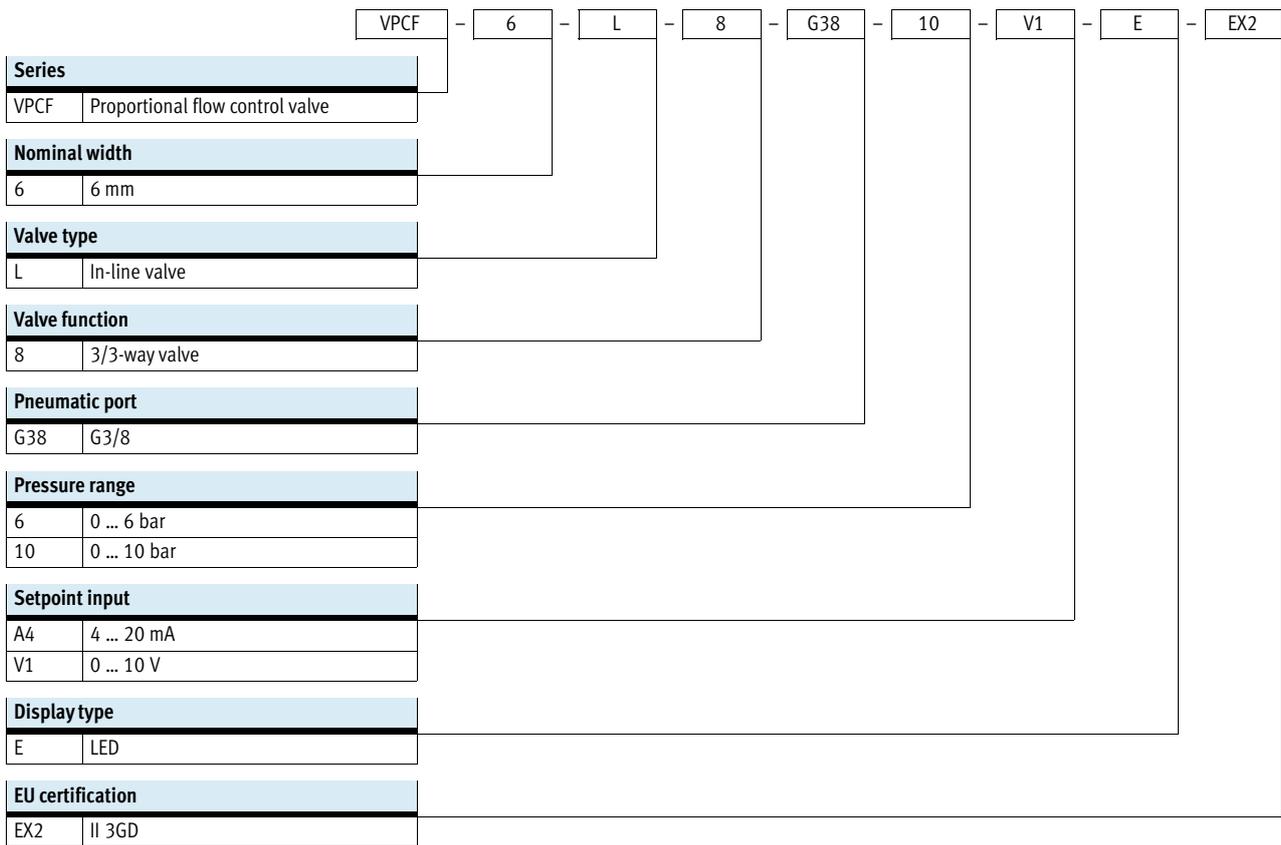
Via through-holes

Via threads



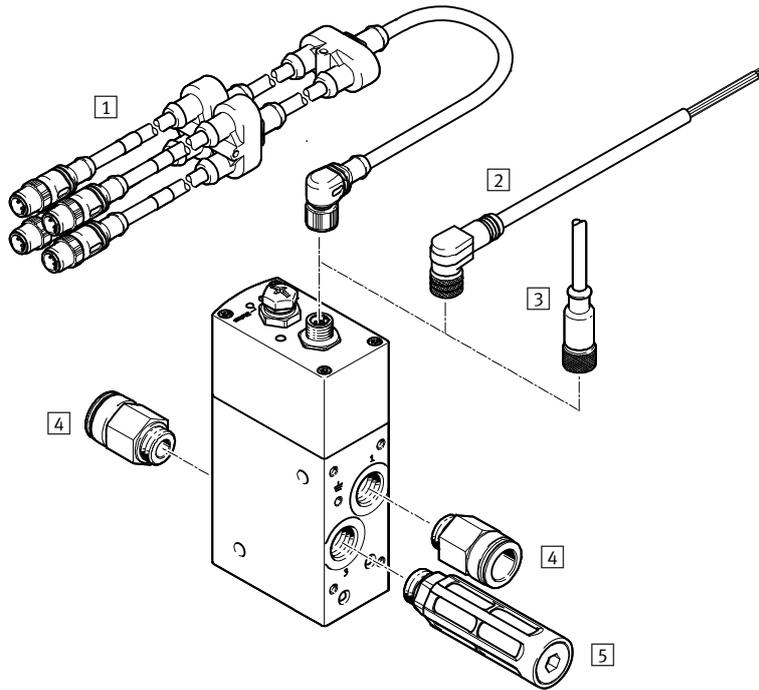
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Type codes



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Peripherals overview

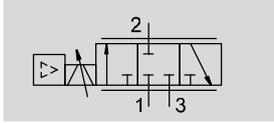


Accessories		
	Description	→ Page/Internet
1	Adapter NEV Connecting cable for analogue / digital input / output modules from Beckhoff, e.g. EtherCat Box output module EP41xx and EtherCat Box input module EP31xx	10
2	Connecting cable NEBU For control purposes	9
3	Connecting cable SIM For control purposes	9
4	Push-in fitting QS For connecting compressed air tubing with standard outside diameters	9
5	Silencer U For reducing noise at exhaust ports	9

Proportional flow control valves VPCF

Technical data

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 port	G3/8	
Nominal width [mm]	6	
Flow range [l/min.]	0 ... 1000	0 ... 1500
Flow 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	
Type of control	Electrical	
Type of reset	Magnetic spring	
Type of control	Direct	
Direction of flow	Non-reversible	
Type of mounting	Direct mounting via through-holes Direct mounting via threads	
Protection against short circuit	Yes	
Diagnostic function	Via LED	
Installation 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 venting position below this setpoint value.

Specified accuracy information refers to the flow control range of 50 ... 1000 l/min.

For VPCF-...-10:

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

Specified accuracy information refers to the flow control range of 75 ... 1500 l/min.

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Technical data

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
Protection against polarity reversal		For operating voltage

1) In the case of unloaded 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 / control medium	Lubricated operation not possible, max. particle size 5 µm	
Operating pressure	[bar]	1 ... 6
Ambient temperature	[°C]	0 ... 50
Temperature of medium	[°C]	15 ... 35
Degree of protection ¹⁾		IP65
Corrosion resistance class CRC ²⁾		1
CE mark (see declaration of conformity ⁴⁾)	To EU EMC Directive ³⁾	
	To EU Explosion Protection Directive (ATEX)	
Vibration resistance	Severity level 2 to FN 942017-4 (based on DIN EN 60068-2-6)	
Shock resistance	Severity level 2 to FN 942017-5 (based on DIN EN 60068-2-27)	
Certification	RCM	

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

2) Corrosion resistance class CRC 1 to Festo standard FN 940070

Low corrosion stress. For dry indoor applications or transport and storage protection. Also applies to parts behind covers, in the non-visible interior area, and parts which are covered in the application (e.g. drive trunnions).

3) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com/sp → Certificates.

If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.

4) Additional information www.festo.com/sp → Certificates.

ATEX	
ATEX category for 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 ambient temperature	[°C]
	0 °C ≤ Ta ≤ +50 °C
CE mark (see declaration of conformity ¹⁾)	To EU Explosion Protection Directive (ATEX)

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

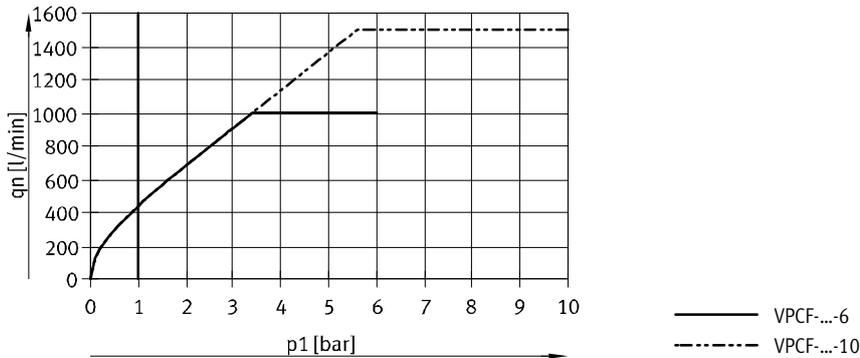
Proportional flow control valves VPCF

Technical data

Materials

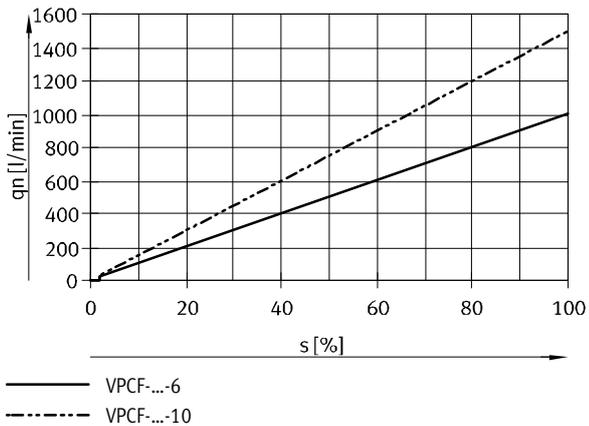
Proportional flow control valve	
Seals	FPM, HNBR
Housing	Anodised wrought aluminium alloy
Note on materials	RoHS compliant

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

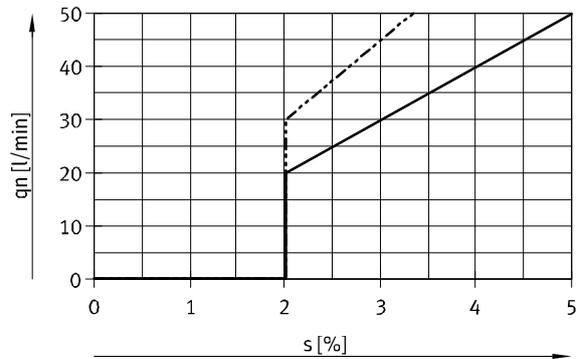


Flow q_n as a function of setpoint value s

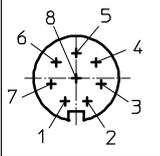
Overall characteristic curve



Detail of setpoint value s 0 ... 5%



Pin allocation

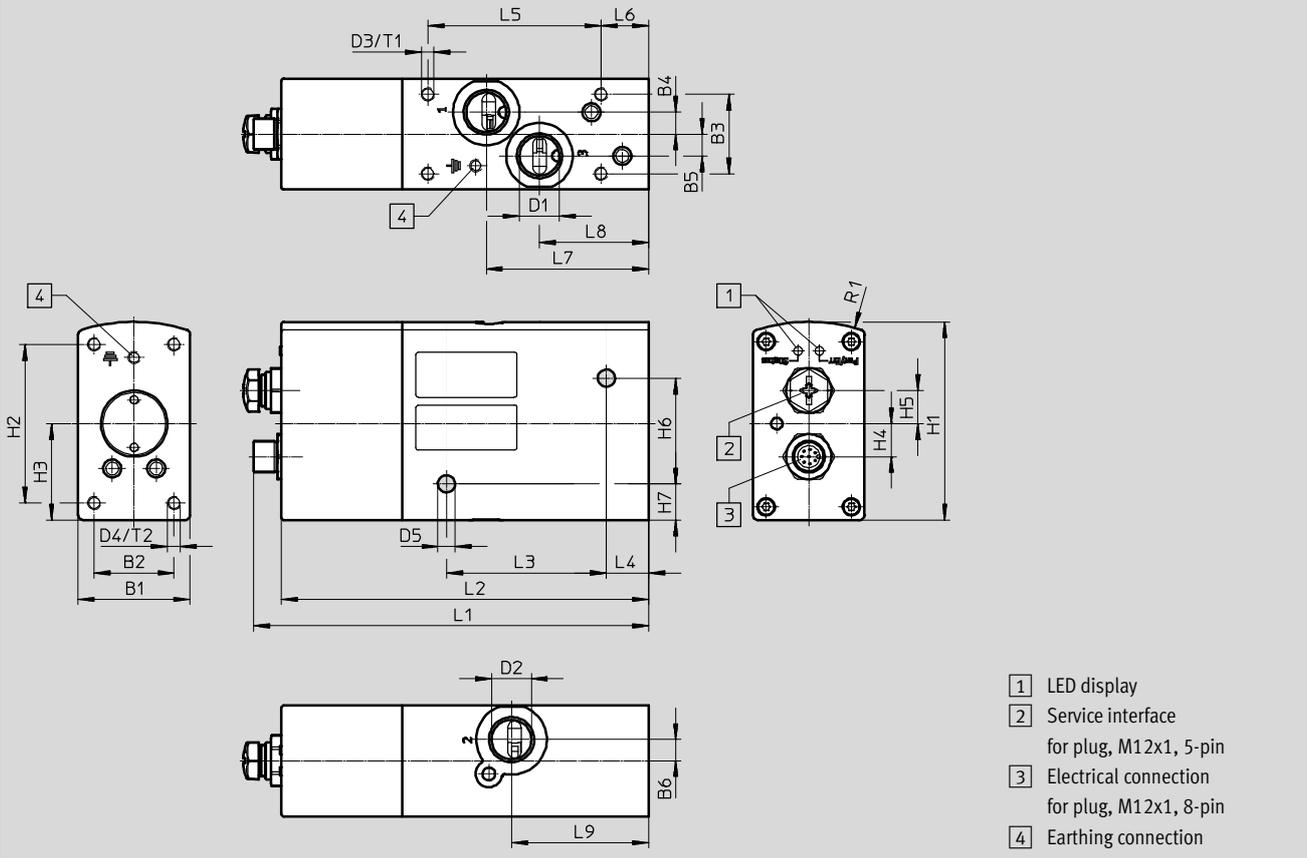
	Pin	Signal	Function
	1	Digital In	Enabled
	2	24 V	
	3	Analogue In-	Flow setpoint value -
	4	Analogue In+	Flow setpoint value +
	5	Digital Out 2	Status optimised operating area
	6	Analogue Out	Flow actual value (Pin 6 and 7)
	7	0 V	
	8	Digital Out 1	Error status
	PE	Screening shield	

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Technical data

Dimensions

Download CAD data → www.festo.com



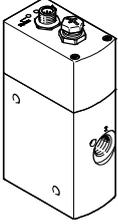
Type	B1	B2	B3	B4	B5	B6	D1	D2	D3	D4
VPCF-...	42	30	30	8.3	8.3	8	G $\frac{3}{8}$	G $\frac{3}{8}$	M5	M5

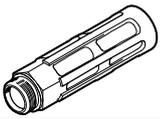
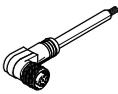
Type	D5	H1	H2	H3	H4	H5	H6	H7	L1	L2
VPCF-...	6.5	75	60	36.5	12.5	12.5	40	13.7	148.4	138

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

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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 compressed air tubing with standard outside diameters	–	186347	QS-G$\frac{3}{8}$-16
Silencer U				
	For reducing noise at exhaust ports	–	6843	U-$\frac{3}{8}$-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.

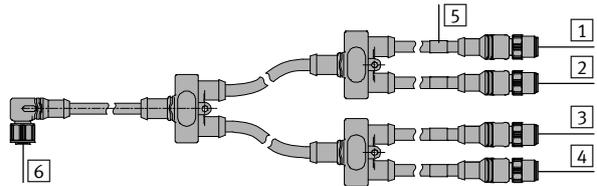
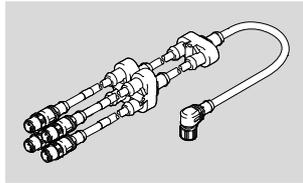
Valve with ATEX certification: Part No. 535902 Type: MFH-3-1/2-S-EX Flow rate: 3,700 l/min ATEX category: II 2G/II 2D	Coil with ATEX certification Part No. 535619 Type: MSFG-24DC-M-EX ATEX category: II 2G/II 2D
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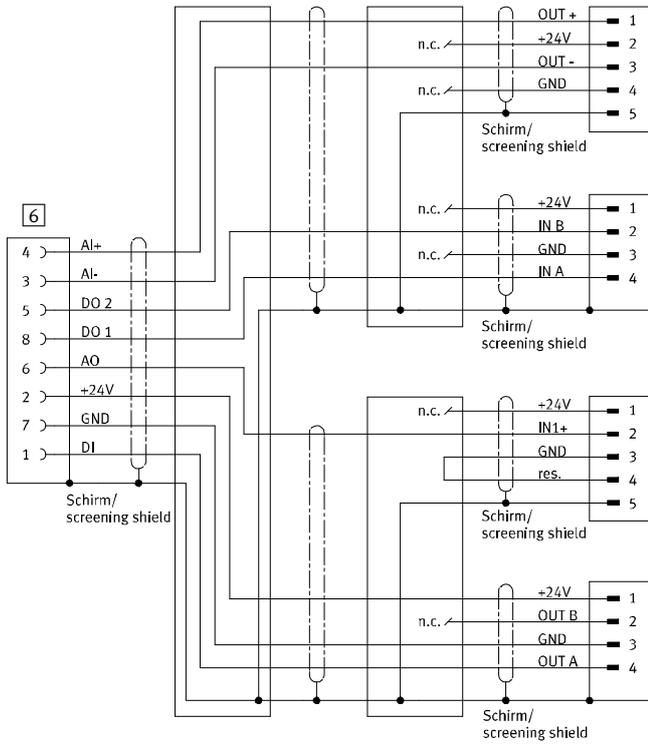
Accessories

Adapter NEFV

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



Pin allocation



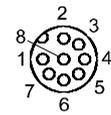
1 GN¹⁾

2 WH¹⁾

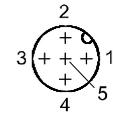
3 YE¹⁾

4 RD¹⁾

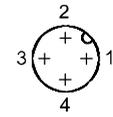
M12x1 socket [6]



M12x1 plug [1]/[3]



M12x1 plug [2]/[4]



1) Colours of the 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