

Proportional directional control valves VPWP

FESTO



Overview

Servo-pneumatic drive technology

Positioning and Soft Stop applications as an integral component of the valve terminal CPX – the modular peripheral system for decentralised automation tasks. The modular design means that valves, digital inputs and outputs, positioning modules and end-position controllers, as appropriate for the application, can be combined in almost any way on the CPX terminal.

Benefits:

- Pneumatics and electrics – control and positioning on one platform
- Innovative positioning technology – piston rod drives, rodless drives, rotary drives
- Actuation via fieldbus
- Remote maintenance, remote diagnostics, web server, SMS and e-mail alerts are all possible via TCP/IP
- Modules can be quickly exchanged and expanded without altering the wiring

Key features

Axis controller CPX-CMAX



Free choice:
Position and force control, directly actuated or selected from one of 128 configurable position sets.
If more is needed:
The configurable record sequencing function enables simple functional sequences to be realised with the axis controller CPX-CMAX.
Everything is recognisable:
the auto-identification function identifies each participant with its device data on the controller CPX-CMAX.

Also included:
Actuation of a brake or clamping unit via the proportional directional control valve VPWP is also part of the scope of performance of the controller CPX-CMAX.
Up to 8 modules (max. 8 axes) can be operated in parallel and independently of each other.
Commissioning via FCT (Festo configuration software) or via fieldbus: no programming, only configuration.

Benefits:

- Greater flexibility
- OEM friendly – commissioning also via fieldbus
- Easy installation and fast commissioning
- Cost-effective
- You program the system in your PLC environment

End-position controllers CPX-CMPX

Datasheets → Internet: [cpx-cmpx](#)



Fast travel between the mechanical end stops of the cylinder, stopping gently and without impact in the end position.
Fast commissioning via control panel, fieldbus or handheld unit.
Improved control of standstills.
Actuation of a brake or clamping unit via the proportional directional control valve VPWP is an integral part of the controller CMPX.

Depending on the fieldbus chosen, up to 9 end-position controllers can be actuated on the CPX terminal.
All system data can be read and written via the fieldbus, including, for example, the mid-positions.

Benefits:

- Greater flexibility
- OEM friendly – commissioning also via fieldbus
- Easy installation and fast commissioning
- Cost-effective
 - Up to 30% faster cycle rates
 - Significantly reduced system vibration
- Improved work ergonomics thanks to significantly reduced noise level
- The extended diagnostics help to reduce the service time of the machine

Proportional directional control valve VPWP

Datasheets → Page 8



The 5/3-way proportional directional control valve for applications with Soft Stop and pneumatic positioning.
Fully digitalised – with integrated pressure sensors, with new diagnostic functions.
In the sizes 4, 6, 8 and 10.
Flow rate of 350, 700, 1400 and 2000 l/min.

With switching output for controlling a brake.
Colour-coded supply ports.
Pre-assembled cables guarantee error-free and fast connection to the controllers CPX-CMPX and CPX-CMAX.

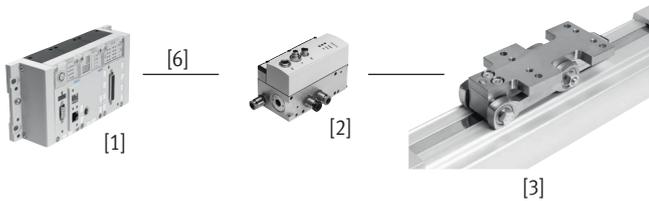
Benefits:

- Easy installation and fast commissioning
- Reduction of system downtimes thanks to the new diagnostic options
- With switching output for controlling a brake/clamping unit

Drive options

System with linear drive DDLI, DGCI

Datasheets → Internet: ddli or dgci



- [1] Controller module CPX-CMPX or CPX-CMAX
- [2] Proportional directional control valve VPWP
- [3] Linear drive DDLI, DGCI with displacement encoder
- [6] Connecting cable KVI-CP-3...

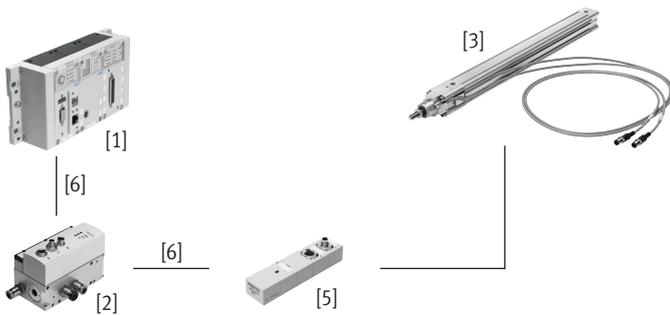
- Pneumatic rodless linear drive with displacement encoder, with or without recirculating ball bearing guide
- Displacement encoder with absolute and contactless measurement
- Diameter:
 - For DGCI: 18 ... 63 mm
 - For DDLI: 25 ... 63 mm
- Stroke: 100 ... 2000 mm in fixed lengths
- Application areas: Soft Stop and pneumatic positioning
- Loads from 1 ... 180 kg
- No sensor interface required

Benefits:

- Complete drive unit
- DDLI for easy connection to customer's guide system
- Excellent running characteristics
- For fast and accurate positioning up to 0.2 mm (only with axis controller CPX-CMAX)

System with standards-based cylinder DNCI, DDPC

Datasheets → Internet: dnci



- [1] Controller module CPX-CMPX or CPX-CMAX
- [2] Proportional directional control valve VPWP
- [3] Standards-based cylinder DNCI, DDPC with displacement encoder
- [5] Sensor interface CASM-S-D3-R7
- [6] Connecting cable KVI-CP-3...

- Standards-based cylinder with integrated displacement encoder, conforms to DIN ISO 6432, VDMA 24 562, NF E 49 003.1 and Uni 10 290
- Displacement encoder with contactless and incremental measurement
- Diameter: 32 ... 100 mm
- Stroke: 100 ... 750 mm
- Application areas: Soft Stop and pneumatic positioning
- Mass load from 3 ... 450 kg and the matching sensor interface CASM-S-D3-R7
- Pre-assembled cables guarantee error-free and fast electrical connection

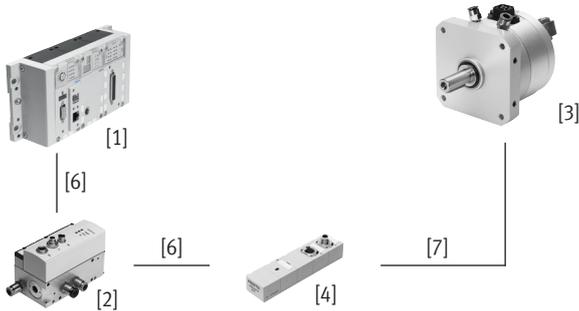
Benefits:

- Compact drive unit
- Can be used universally
- Also with guide unit
- For fast and accurate positioning up to 0.5 mm (only with axis controller CPX-CMAX)

Drive options

System with semi-rotary drive DSMI

Datasheets → Internet: dsmi



- [1] Controller module CPX-CMPX or CPX-CMAX
- [2] Proportional directional control valve VPWP
- [3] Semi-rotary drive DSMI with displacement encoder
- [4] Sensor interface CASM-S-D2-R3
- [6] Connecting cable KVI-CP-3-...
- [7] Connecting cable NEBC-P1W4-K-0.3-N-M12G5

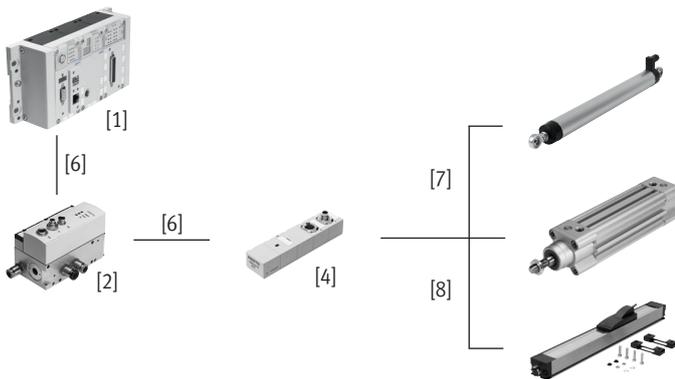
- Swivel drive DSMI with integrated displacement encoder
- Identical design to pneumatic semi-rotary drive DSM
- Absolute displacement encoder based on a potentiometer
- Swivel range from 0 ... 270°
- Size: 25, 40, 63
- Max. torque: 5 ... 40 Nm
- Application areas: Soft Stop and pneumatic positioning
- Mass moments of inertia of 15 ... 6000 kgcm² and the corresponding sensor interface CASM-S-D2-R3
- Pre-assembled cables guarantee error-free and fast connection to the proportional directional control valve VPWP

Benefits:

- Complete drive unit, compact, can be used immediately
- High angular acceleration
- With adjustable fixed stops
- For fast and accurate positioning down to ±0.2° (only with axis controller CPX-CMAX)

System with potentiometer

Datasheets → Internet: casm



- [1] Controller module CPX-CMPX or CPX-CMAX
- [2] Proportional directional control valve VPWP
- [4] Sensor interface CASM-S-D2-R3
- [6] Connecting cable KVI-CP-3-...
- [7] Connecting cable NEBC-P1W4-K-0.3-N-M12G5
- [8] Connecting cable NEBC-A1W3-K-0.4-N-M12G5

- Attachable potentiometers with absolute measurement, with high degree of protection
- With connecting rod or moment compensator
- Measuring range:
Connecting rod: 100 ... 750 mm
Moment compensator: 225 ... 2000 mm
- Pre-assembled cables guarantee error-free and fast connection to the sensor interface CASM
- Soft Stop and pneumatic positioning with cylinders-ø 25 ... 80 mm
- Loads from 1 ... 300 kg

Benefits:

- Easy installation and fast commissioning
- Cost-effective
- Can also be used in harsh operating conditions
- Variety of drives: CPX-CMPX and CPX-CMAX also support cylinders with external displacement encoder

Drive options

System components for Soft Stop systems with end-position controller CPX-CMPX						
	Linear drive	Standards-based cylinder	Semi-rotary drive	Displacement encoder		→ page/ Internet
	DDL/DGCI	DNCI, DDPC	DSMI	MLO-LWG/-TLF	MME-MTS	
End-position controller CPX-CMPX	■	■	■	■	■	cmpx
Proportional directional control valve VPWP	■	■	■	■	■	8
Sensor interface CASM-S-D2-R3	–	–	■	■	–	casm
Sensor interface CASM-S-D3-R7	–	■	–	–	–	casm
Connecting cable KVI-CP-3-...	■	■	■	■	■	kvi
Connecting cable NEBC-P1W4-...	–	–	■	■ / –	–	nebc
Connecting cable NEBC-A1W3-...	–	–	–	– / ■	–	nebc
Connecting cable NEBP-M16W6-...	–	–	–	–	■	16

System components for pneumatic positioning systems with axis controller CPX-CMAX						
	Linear drive	Standards-based cylinder	Semi-rotary drive	Displacement encoder		→ page/ Internet
	DDL/DGCI	DNCI, DDPC	DSMI	MLO-LWG/-TLF	MME-MTS	
Axis controller CPX-CMAX	■	■	■	■	■	cmax
Proportional directional control valve VPWP	■	■	■	■	■	8
Sensor interface CASM-S-D2-R3	–	–	■	■	–	casm
Sensor interface CASM-S-D3-R7	–	■	–	–	–	casm
Connecting cable KVI-CP-3-...	■	■	■	■	■	kvi
Connecting cable NEBC-P1W4-...	–	–	■	■ / –	–	nebc
Connecting cable NEBC-A1W3-...	–	–	–	– / ■	–	nebc
Connecting cable NEBP-M16W6-...	–	–	–	–	■	16

Type codes

001	Series	
VPWP	Proportional directional control valve	

002	Nominal width [mm]	
4	4	
6	6	
8	8	
10	10	

003	Directional control valve type	
L	In-line valve	

004	Valve function	
5	5/3-way valve	

005	Pneumatic connection	
Q6	Push-in connector 6 mm	
Q8	Push-in connector 8 mm	
Q10	Push-in connector 10 mm	
Q	Without push-in fitting	

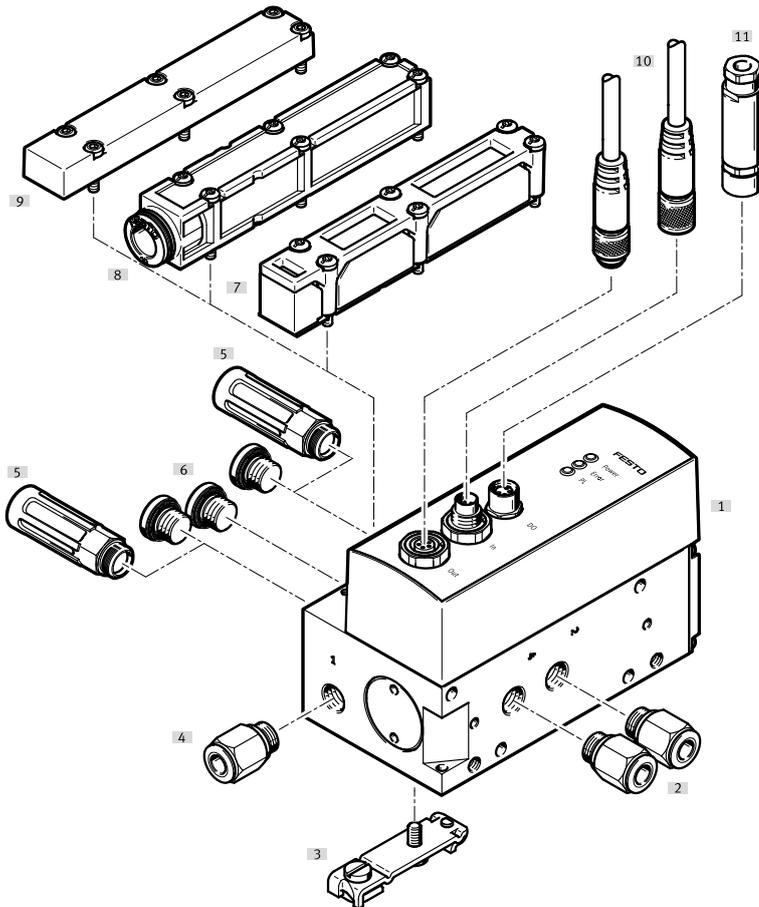
006	Pressure range [bar]	
10	0 ... 10	

007	Display type	
E	LED	

008	Exhaust	
G	Threaded connection	
D	Ducted	
F	Flat plate silencer	

009	EU certification	
EX1	II 3G	

Peripherals overview

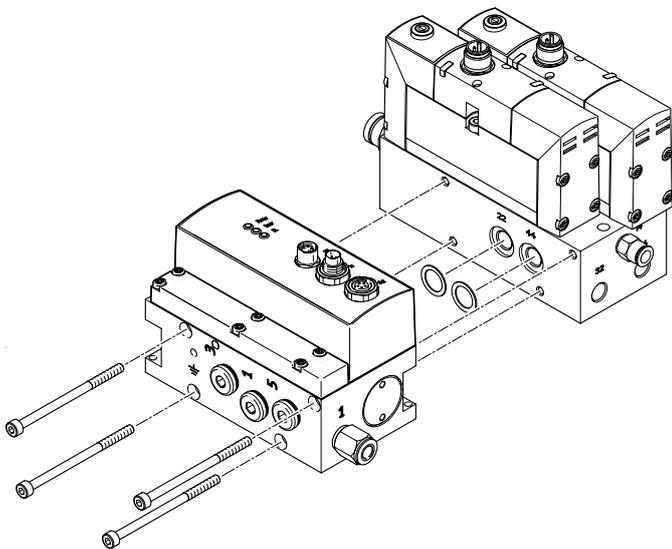


Sub-bases VABP

The sub-base VABP [23] can be used to help implement specific switch-off behaviour when switching off the valve load voltage. It is a single-channel solution for uncoupling the drive from the working valve. 4 switch-off functions are possible.

More information

→ Internet: vabp

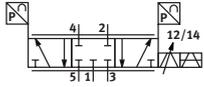


Peripherals overview

Accessories		For nominal width	Description	→ Page/Internet
[1]	Proportional directional control valve VPWP	–	–	vpwp
[2]	Push-in fitting QS	4, 6, 8	<ul style="list-style-type: none"> The ordering data in the modular product system can be used to order push-in fittings with different colour coding for easy and error-free tubing connections For connecting tubing with standard O.D. 	15
		10	<ul style="list-style-type: none"> Push-in fittings must be ordered separately For connecting tubing with standard O.D. 	15
[3]	Mounting CPASC1-BG, CPV1 0/14-VI-BG	4, 6, 8	For mounting on an H-rail	16
[4]	Push-in fitting QS	4, 6, 8	Push-in fittings for the compressed air supply can be ordered using the ordering data in the modular product system	15
[5]	Silencer U	4, 6, 8, 10	<ul style="list-style-type: none"> Silencers can be used as an alternative to the plates [15] and [16] with nominal widths 4, 6 and 8 For nominal width 10, silencers must be used for the exhaust air 	silencer
[6]	Blanking plug B	4, 6, 8	For sealing the exhaust connections on the blanking plate	blanking plug
[7]	Plate VMFA-APU	4, 6, 8	With flat plate silencer	16
[8]	Plate VMFA-AP	4, 6, 8	For ducted exhaust air	16
[9]	Cover plate VABB-P3-1	4, 6, 8	For using the connections on the blanking plate	16
[10]	Connecting cable KVI-CP-3	4, 6, 8, 10	For connecting proportional directional control valve VPWP to the end-position controller CPX-CMPX/axis controller CPX-CMAX or to the sensor interface CASM	16
[11]	Plug NECU	4, 6, 8, 10	For connecting solenoid valves to the proportional directional control valve VPWP	16

Datasheet

Function



-  - Voltage
24 V DC
-  - Flow rate
350 ... 2000 l/min
-  - Pressure
0 ... 10 bar



General technical data		4	6	8	10
Nominal width		4	6	8	10
Pneumatic connection		G1/8		G1/4	G3/8
Nominal width	[mm]	4	6	8	10
Standard nominal flow rate	[l/min]	350	700	1400	2000
Valve function		5/3 proportional directional control valve, closed			
Design		Piston spool valves with integrated pressure sensors			
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			
		Via H-rail			-
Mounting position ¹⁾		Preferably horizontal (display elements facing upwards)			
Product weight	[g]	776	776	1060	1010
Pressure sensors					
Repetition accuracy FS	[%]	< 1			
Pressure resolution	[bar]	0.01			
Linearity error FS ²⁾	[%]	< 1.5			
Diagnostics					
LED displays	Green	Nominal operating voltage			
	Red	Error			
	Yellow	Load voltage			
Device-specific diagnostics via control interface		<ul style="list-style-type: none"> • Undervoltage for operating and load voltage • Temperature monitoring • Valve is jammed • Short-circuit monitoring • Device data 			
Control interface					
Data		CAN bus with Festo protocol			
		Digital			
		Integrated terminating resistor			
Electrical connection		5-pin			
		M9			
		Plug			

1) If the proportional directional control valve moves during operation, it must be mounted at right angles to the direction of movement

2) Related to 6 bar

Datasheet

Electrical data		
Load supply		
Operating voltage range	[V DC]	18 ... 30
Nominal operating voltage	[V DC]	24
Load voltage range	[V DC]	18 ... 30
Nominal load voltage	[V DC]	24
Residual ripple	[Vss]	4
Max. current consumption (logic)	[A]	0.15
Max. current consumption (valve actuator)	[A]	1.2
Power supply requirement		PELV
Safety instructions		If the control interface is faulty, the valve moves to the blocked mid-position
Digital output (plug D0, PIN2)		
Supply voltage	[V DC]	24 (coming from load voltage)
Max. load current	[mA]	500
Characteristics		<ul style="list-style-type: none"> • Positive logic (PNP) to IEC 61131-2 • No galvanic isolation • Protected against short circuits • Reverse supply with no damage
Voltage output (plug D0, PIN4)		
Supply voltage	[V DC]	24 (coming from load voltage)
Max. load current	[mA]	500
Characteristics		<ul style="list-style-type: none"> • Positive logic (PNP) to IEC 61131-2 • No galvanic isolation • Protected against short circuits • Reverse supply with no damage

Operating and environmental conditions				
Nominal width	4	6	8	10
Operating medium	Compressed air according to ISO 8573-1:2010 [6:4:4]			
Note on the operating/pilot medium	Lubricated operation not possible			
Operating pressure	[bar]	0 ... 10		
Nominal operating pressure	[bar]	6		
Operating pressure for positioning/Soft Stop	[bar]	4 ... 8		
Ambient temperature	[°C]	0 ... 50		
Temperature of medium	[°C]	0 ... 50		
Storage temperature	[°C]	-20 ... +70		
CE marking (see declaration of conformity)	To EU EMC Directive			
Degree of protection ¹⁾	IP65			
Vibration resistance to DIN/IEC 68 Part 2-6	For wall mounting: tested according to severity level 2			
	For DIN rail mounting: tested to severity level 1			–
Permanent shock resistance according to DIN/IEC 68 Part 2-27	For wall mounting: tested according to severity level 2			
	For DIN rail mounting: tested to severity level 1			–
Corrosion resistance class CRC ²⁾	1			
Certification	RCM			

1) In assembled state, with plug, at nominal pressure and with tubing connected

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

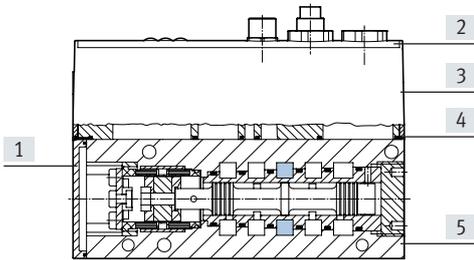
Low corrosion stress. Dry indoor applications or transport and storage protection. Also applies to parts behind covers, in the non-visible interior area, or parts that are covered in the application (e.g. drive trunnions).

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

Datasheet

Materials

Sectional view

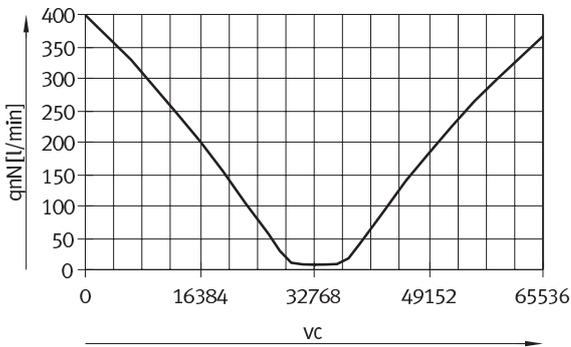


Proportional directional control valve

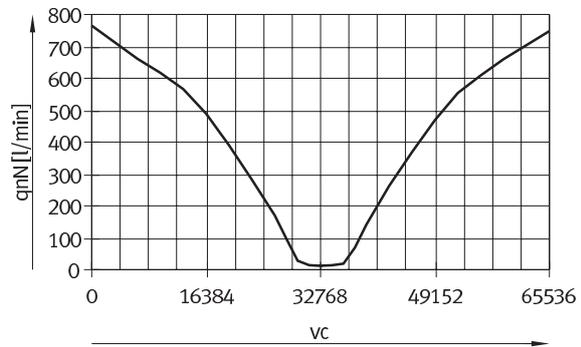
[1]	Cover	Reinforced polyamide
[2]	Labelling foil	Polyester
[3]	Electronics housing	Reinforced polyamide
[4]	Seals	NBR
[5]	Valve housing	Wrought aluminium alloy, anodised
-	Note on materials	RoHS-compliant

Flow rate q_{nN} as a function of control variable

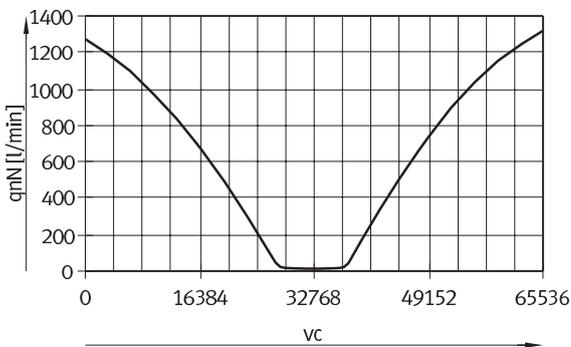
Nominal diameter 4



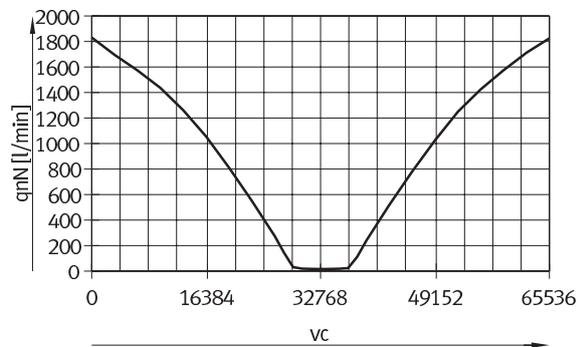
Nominal diameter 6



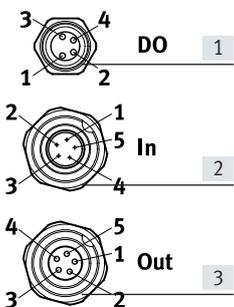
Nominal diameter 8



Nominal diameter 10



Pin allocation



[1] DO, 4-pin M8 socket	
Pin	Function
1	-
2	Digital output
3	0 V
4	24 V voltage output
-	
-	

[2] IN, 5-pin M9 plug	
Pin	Function
1	24 V operating voltage
4	24 V load voltage
3	0 V
4	CAN_H
5	CAN_L
-	FE
-	

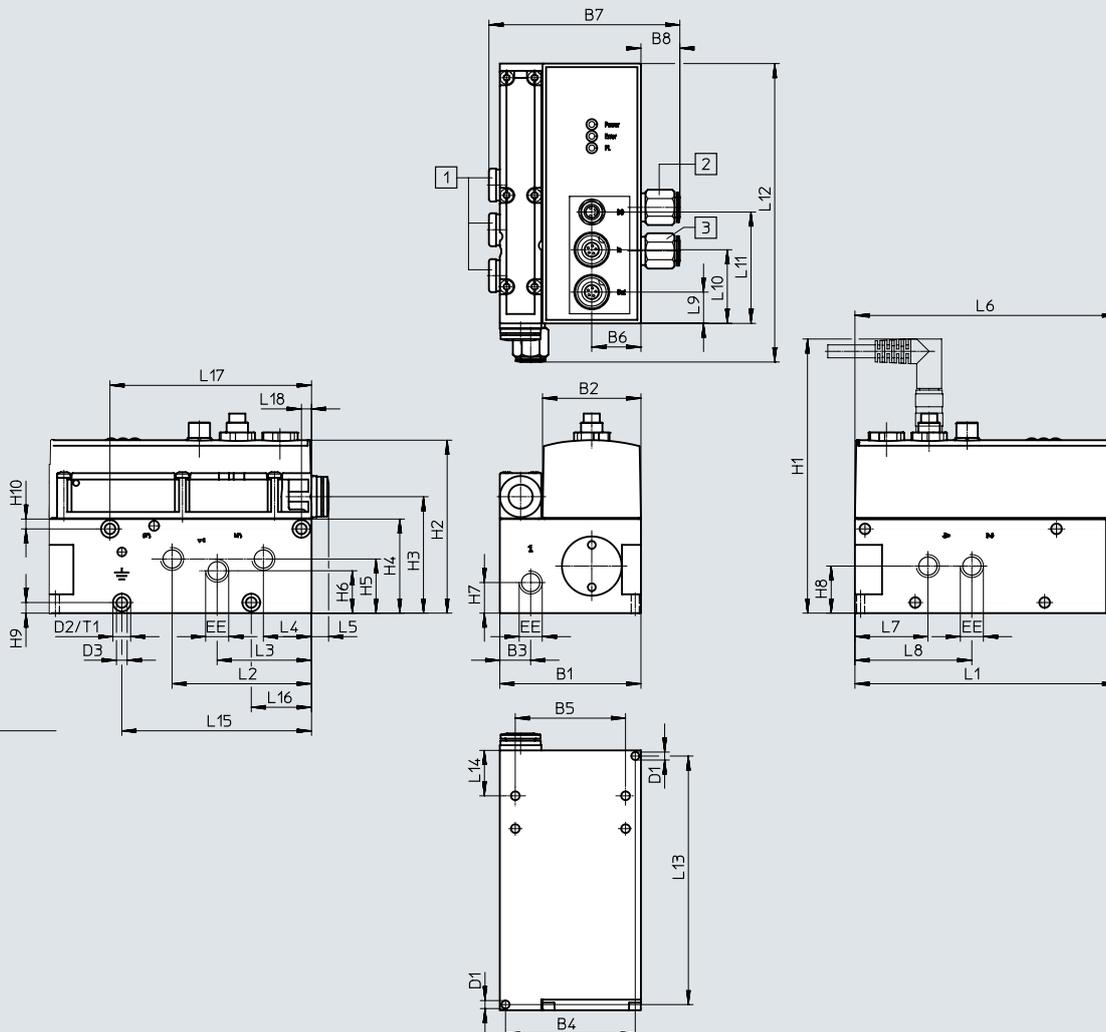
[3] OUT, 5-pin M9 socket	
Pin	Function
1	24 V operating voltage
2	24 V load voltage
3	0 V
4	CAN_H
5	CAN_L
-	FE
-	

Datasheet

Dimensions

Download CAD data → www.festo.com

Nominal width 4, 6, 8



- [1] The ports 1, 3, 5 are sealed with the order code D (ducted exhaust air) and F (flat plate silencer).
- [2] With order code Q6, Q8, Q10 (pneumatic connection), the fitting has a blue releasing ring.
- [3] With order code Q6, Q8, Q10 (pneumatic connection), the fitting has a black releasing ring.

Nominal width	B1	B2	B3	B4	B5	B6	B7		B8		D1	D2	D3	EE	
							Q6	Q8	Q6	Q8	∅	H13	H13		
4	59.5	41.5	13	54.7	46.5	20.75	80.4	85.6	16.4	21.6	3.4	7.5	4.5	G1/8	
6							85.6	85.6	21.6	21.6		8			
8	69.5			64.5	56.5		98.6	98.6	24.1	24.1					G1/4

Nominal width	H1 ¹⁾	H2	H3 ²⁾	H4	H5	H6	H7	H8	H9	H10	L1	L2	L3	L4
									0.1	0.1				
4	approx. 12 0/116	73.5	50	40	23	18	13	20	5	4.7	110.4	58.8	39.8	20.3
6														
8	approx. 12 8/124	81.5	58	48	28	22	15.5	24		5	122.3	67.6	45.2	22.8

Nominal width	L5 ²⁾	L6	L7	L8	L9	L10	L11	L12	L13	L14	L15	L16	L17	L18	T1
											0.1	0.1	0.1	0.1	
4	7.2	110.4	30.8	49.3	13.3	31.3	47.3	132	105.6	19.3	80	25.4	85	4.75	4.4
6															
8	–		34	56.4				146.5	117.3	22.5	93	28.5	93	5	

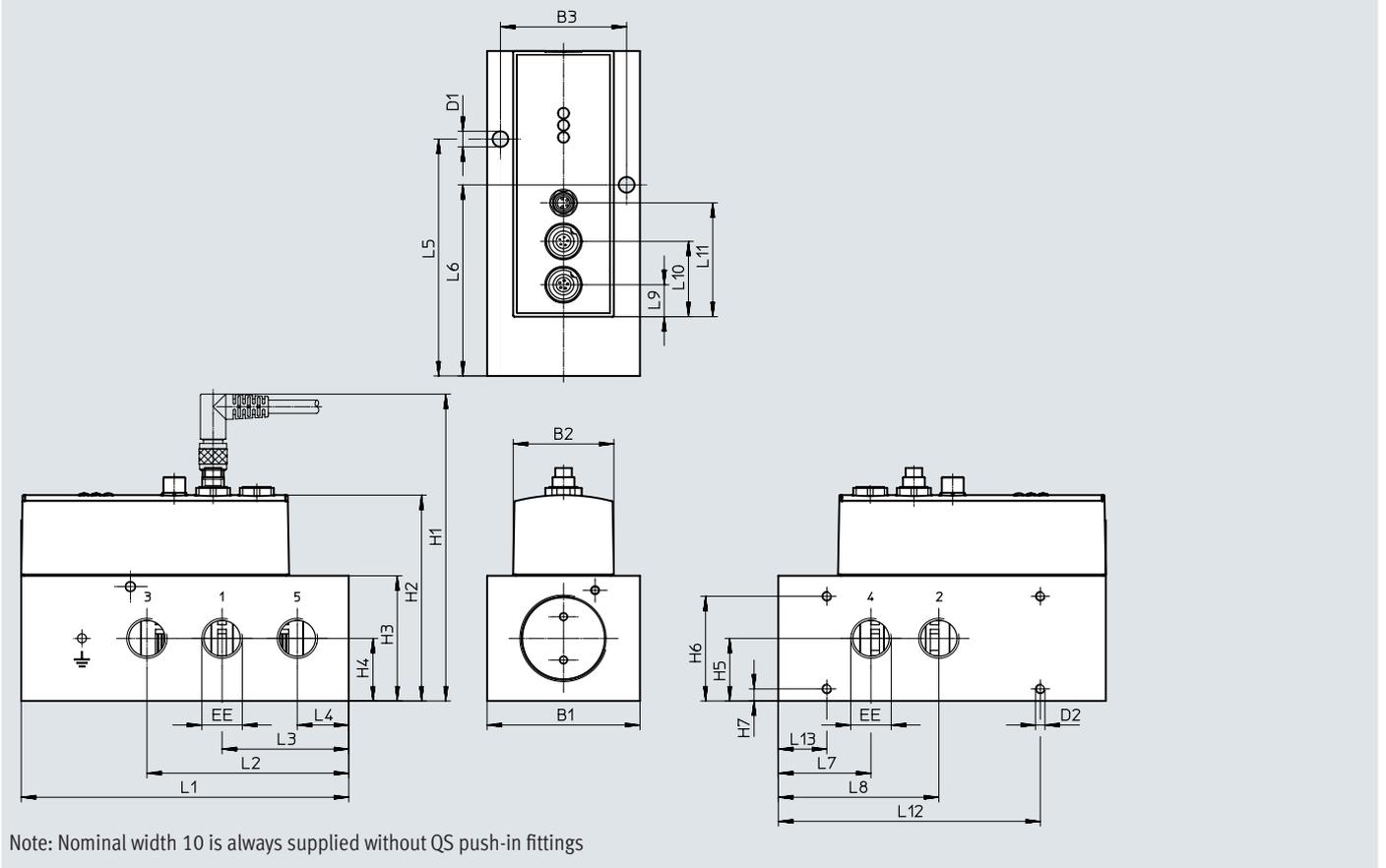
1) Angled plug/straight plug
 2) Only with variant D

Datasheet

Dimensions

Download CAD data → www.festo.com

Nominal diameter 10

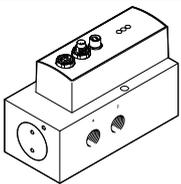


Note: Nominal width 10 is always supplied without QS push-in fittings

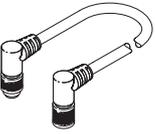
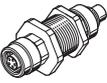
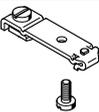
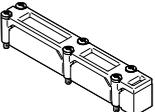
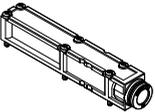
Nominal width	B1	B2	B3	D1	D2	EE	H1	H2	
10	63	41.5	52	6.5	M4x10	G3/8	124	82	
Nominal width	H3	H4	H5	H6	H7	L1	L2	L3	L4
10	48.5	24.25	24.25	0.1	0.1	135	83.2	52.2	21.2
Nominal width	L5	L6	L7	L8	L9	L10	L11	L12	L13
10	98.4	79.4	38.2	66.2	13.3	31.3	47.3	0.1	0.1

Ordering data – Modular product system

Ordering table						
Nominal width	4	6	8	Conditions	Code	Enter code
Module no.	550170	550171	550172			
Series	Proportional directional control valve				VPWP	VPWP
Nominal width	4	–	–		-4	
	–	6	–		-6	
	–	–	8		-8	
Valve type	In-line valve				-L	-L
Valve function	5/3-way valve				-5	-5
Pneumatic connection	Push-in fitting 6 mm	–	–		-Q6	
	Push-in fitting 8 mm	–	–		-Q8	
	–	–	Push-in fitting 10 mm		-Q10	
	Thread without screw connection				-Q	
	G1/8	G1/8	G1/4			
Pressure range	0 ... 10 bar				-10	-10
Display type	Only LED				-E	-E
Exhausting	Ducted exhaust air				-D	
	QSIKS-10	QSIKS-10	QSIKS-10			
	Flat plate silencer				-F	
	Thread without screw connection				-G	
	G1/8	G1/8	G1/4			
EU certification	II 3G				-EX1	

Ordering data		
Nominal diameter 10	Part no.	Type
	1552544	VPWP-10-L-5-Q-10-E-G-EX1

Accessories

Ordering data – Connecting cables and plugs				
	Description	Cable length [m]	Part no.	Type
Connection between axis controller CPX-CMAX/end-position controller CPX-CMPX and proportional directional control valve VPWP or between proportional directional control valve VPWP and sensor interface CASM				
	Angled plug and angled socket	0.25	540327	KVI-CP-3-WS-WD-0.25
		0.5	540328	KVI-CP-3-WS-WD-0.5
		2	540329	KVI-CP-3-WS-WD-2
		5	540330	KVI-CP-3-WS-WD-5
		8	540331	KVI-CP-3-WS-WD-8
	Straight plug and straight socket	2	540332	KVI-CP-3-GS-GD-2
5		540333	KVI-CP-3-GS-GD-5	
8		540334	KVI-CP-3-GS-GD-8	
	Connecting component for cabinet through feed	–	543252	KVI-CP-3-SSD
Connection between displacement encoder MME-MTS and proportional directional control valve VPWP				
	For displacement encoder MME-MTS	2	575898	NEBP-M16W6-K-2-M9W5
Plug				
	<ul style="list-style-type: none"> • Insulation displacement connector • For connecting a solenoid valve to the proportional directional control valve VPWP 	–	562025	NECU-S-M8G4-HX
	<ul style="list-style-type: none"> • Screw terminal • For connecting a solenoid valve to the proportional directional control valve VPWP 	–	8162299	NECB-S-M8G4-C2
Ordering data – Mountings				
	Description	Part no.	Type	
	For nominal width 4 and 6	527392	CPASC1-BG-NRH	
	For nominal width 8	162556	CPV1 0/14-VI-BG-NRH-35	
Ordering data – Exhaust variants				
	Description	Part no.	Type	
	Plate with flat plate silencer, for nominal width 4, 6, 8	533374	VMPA-APU	
	Plate for ducted exhaust air for nominal width 4, 6, 8	533375	VMPA-AP	
	Cover plate, for using the connections on the valve block directly, e.g. for silencers for nominal width 4, 6, 8	563896	VABB-P3-1	

Accessories

Ordering data – Push-in fittings			
	Nominal width	Part no.	Type
	Port 2 and 4		
	4	186096	QS-G1/8-6
	4, 6	186098	QS-G1/8-8
	8	186101	QS-G1/4-10
	10	186103	QS-G3/8-12
	Port 1		
	4, 6	186098	QS-G1/8-8
	8	186101	QS-G1/4-10
	10	186103	QS-G3/8-12