

■ Control units

■ M5 Compact System

Quickstepper and Commander FSS/FSSC

Key features

FESTO



Quickstepper	Commander	
<ul style="list-style-type: none">■ Pneumatic/mechanical sequencer with 12 steps and start logic circuits■ Ready to install■ Acknowledgement-controlled motion sequences	<ul style="list-style-type: none">■ Command module for use with Quickstepper, including the most important functions for pneumatic sequencers	<p>The Quickstepper is a miniature controller with 12 switching steps. It is particularly suitable for use with the Commander. Each input X_n is assigned an output A_n. Only one output at a time is fed with compressed air, in an order corresponding to the sequence of the switching steps. The other outputs are exhausted at this time. The Quickstepper offers a safe mode of operation: each given switching step cannot begin until the preceding step has been executed and acknowledged. If the pulses fed to the input L are too short, the output A is disabled.</p>

Quickstepper and Commander FSS/FSSC

Key features

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Quickstepper FSS-12-C



Functions

- Step counter for steps 1 to 12 with upward counting function
- White pressure indicator for activated output Pn
- Blue pressure indicator for acknowledgement signal from last step to be executed (INPUT)
- Slide switch OUTPUT:
When the switch is at 0, the outputs are disabled. The control steps can be worked through manually. Only the selected step is activated. When the switch is set to 1, pressure is fed to the activated output.
- Pushbutton MAN.STEP (inching operation):
Advance to next step or selection of a switching step.
- Port MAN/P:
Port for pilot air P for operation without a Commander. This signal can also be obtained from an external preselect MAN.
- Safety:
When the port L (reset) is activated, the step indicator always advances to the last step (12). This is important when the control is at a standstill. The Quickstepper has the additional safety feature that it will switch only when a continuous signal is present at the AUTO port. When an AUTO signal is present, inching operation (step-by-step manual switching) is not possible. The OUTPUT preselect is then disabled. This ensures that no manual intervention can be made while the Quickstepper is running in the AUTOMATIC mode. Only one output at a time is fed with compressed air. All other outputs are exhausted.

Commander FSSC-12



Functions

- O position:
Visual indicator for direct reporting of initial position from system signal generator.
- Reset
Reset is active in the MAN mode. The Quickstepper is reset to step 12 in its initial position.
- START button
- Preselect AUTO/MAN
In the MAN mode, setup or inching operation is activated.
- STOP button
For a stop within the cycle. The next step is then disabled.
- Preselect for continuous/single cycle
If, while the controller is in operation, this selector switch is moved from continuous cycle to single cycle, or from continuous cycle to single cycle and back to continuous cycle, operation will stop (stop at end of cycle).



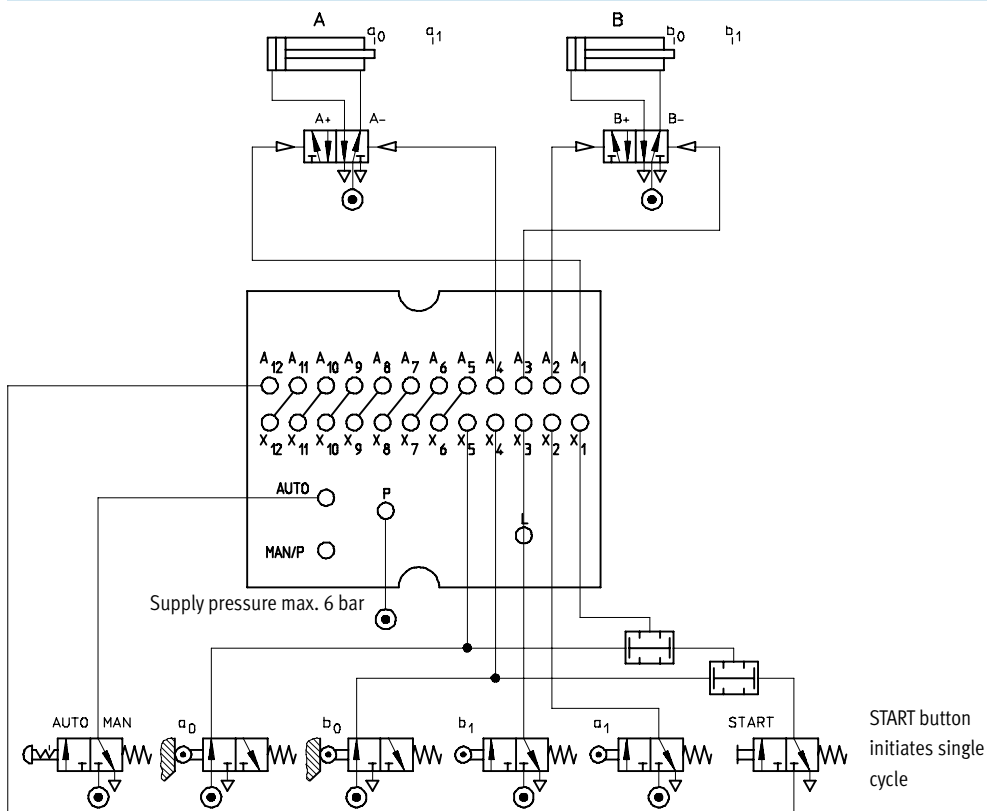
Quickstepper and Commander FSS/FSSC

Technical data

Technical data		Quickstepper FSS-12-C	Commander FSSC-12
Operating medium		5 µm filtered, unlubricated compressed air	
Constructional design		Sequencer with 12 switching steps (additive)	
Nominal size		2.5	
Inputs and outputs	[mm]	2.5	
Standard nominal flow rate	[l/min]	60	
P → An			
Operating pressure range	[bar]	2 ... 6	
Acknowledgement response pressure	[bar]	≥ 1.5	
Acknowledgement drop-off pressure	[bar]	≤ 0.5	
Acknowledgement pulse length	[ms]	min. 50	
Step frequency max.	[Hz]	12	
Temperature range	[°C]	-15 ... +60	
Pneumatic connection		Barbed fitting for plastic tubing with 3 mm standard ID P, P _{IN} , A _p : Barbed fitting for plastic tubing PU or PP with 4 mm standard ID	
Type of mounting		On mounting frame 2n or panel mounting	
Materials		Housing, sub-base: plastic; barbed fitting: brass; seals: perbunan, vulkollan	
Weight	[g]	450	450

Example of control application

Shown in initial position



Circuit diagram

- P = Compressed air supply
- L = Reset signal
- X₁-X₁₂ = Inputs
- A₁-A₁₂ = Outputs
- AUTO = Start signal
- MAN/P = Pilot air supply for operation without Commander

Quickstepper and Commander FSS/FSSC

Technical data



Circuit diagram

Rear side of Quickstepper-C

MAN/P

Port for pilot air P for operation without a Commander. This signal can also be obtained from an external preselect MAN.

Rear side of Commander

Start_{IN}

For alternative external START signal.

Note
If an external start is used, the START button on the front panel must be locked out (to disable the internal START function). This is important, since safety regulations specify that it must be possible to initiate a start from one place only.

L_{IN}

For an external reset signal. Note: The RESET button on the front panel can be locked out to disable the internal RESET function.

EMERGENCY STOP

If no signal is present or the pilot air supply fails, the outputs A1 ... A12 are disabled. They remain disabled even if an emergency stop pushbutton which has been pressed is released.

P_{IN}

Pilot pressure

Stop_{IN}

External signal for stop within cycle

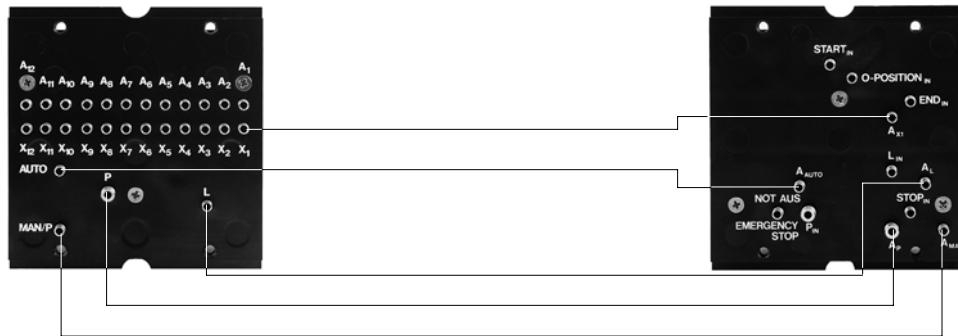
O position_{IN}

Direct common initial position

END_{IN}

External signal for stop at end of cycle

Standard connections



The Quickstepper and Commander can be replaced quickly. Tubing can be left in place.

Plug set FSS-KM-8-12

Used to bridge unused Quickstepper inputs and outputs. The blanking strip is cut to length according to the number of unused steps and pushed onto the barbed fittings. The P connection is made via a tubing connector to the lowest step which is to be bypassed. The threaded plug is always inserted at step 12.



Quickstepper and Commander FSS/FSSC

Technical data

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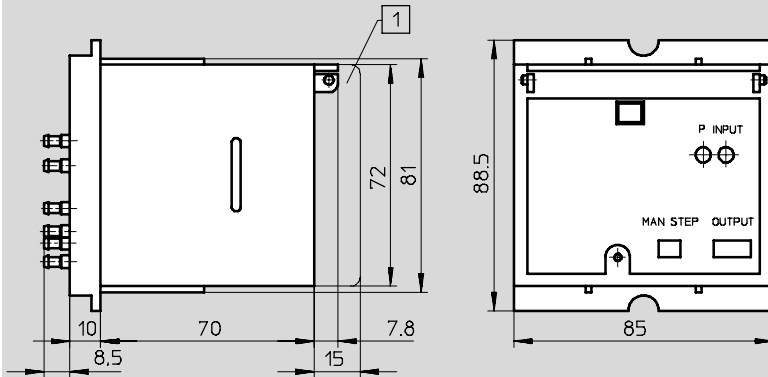
Pneumatic control systems
Controller units

6.1

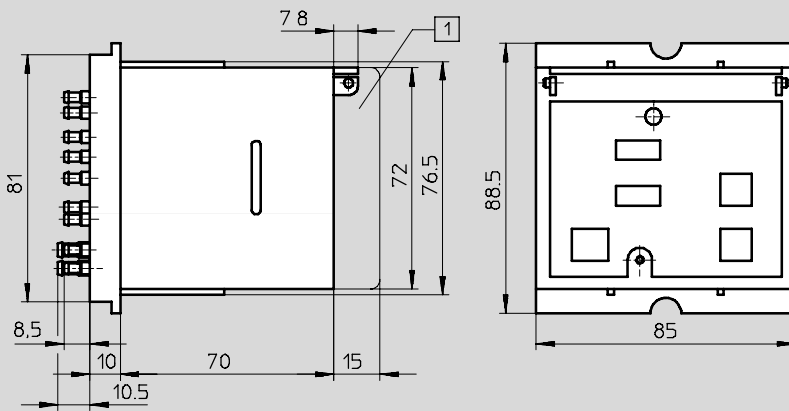
Dimensions

Download CAD data → www.festo.com/en/engineering

Quickstepper FSS-12-C

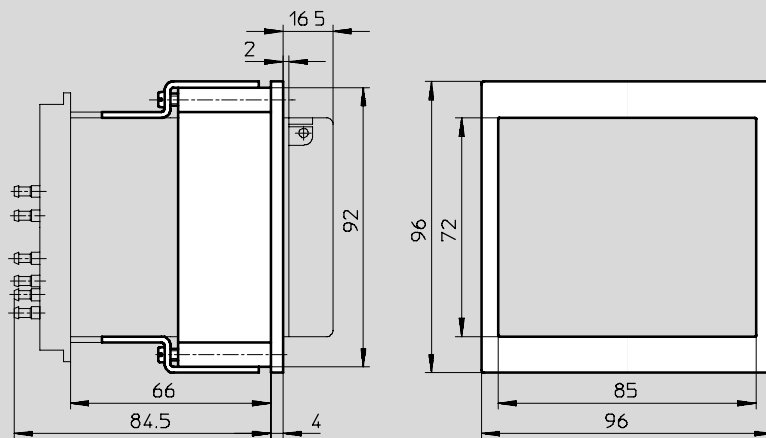


Commander FSSC-12



1 Protective cover

Frame for panel mounting FSS-F-12



Ordering data

	Part No.	Type
Quickstepper	15 609	FSS-12-C
Commander	13 985	FSSC-12

Quickstepper and Commander FSS/FSSC

Accessories

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Cover cap FSS-K-12-C



Panel frame FSS-F-12



Required front panel aperture
□ 92 mm
Panel thickness max. 13 mm

Plug set FSS-KM-8-12



Ordering data

	Weight [g]	Part No.	Type
Cover cap, lockable	40	15 701	FSS-K-12-C
Frame for panel mounting	110	11 570	FSS-F-12
Plug kit	-	13 830	FSS-KM-8-12

Control block for two-hand start ZSB

FESTO

Key features

Pneumatic control systems
Controller units

6.1



Safety component

This pneumatic start block is used where a manually-started operation, such as the triggering of compressed air cylinders, would otherwise involve danger for a machine operator, or with other devices where regulations require that machine operators have both hands clear of a danger zone when starting a machine.

A continuous signal will be present at the output A only if pressure is applied via 3/2-way pushbutton valves to the two valve inputs p1 and p2 simultaneously, within 0.2 to 0.5 seconds.

If one or both of the pushbutton valves are released, flow to the output is immediately interrupted and any cylinders or valves connected to output A are reversed. This start block is a safety component as defined by EU Machinery Directive

89/392/EU, Appendix 4, and is CE-certified. It falls within Category 1 as defined by EN 954 (only in conjunction with a pressure sequence valve such as VD-3-PK-3) and conforms to Type III A as defined by EN 574.

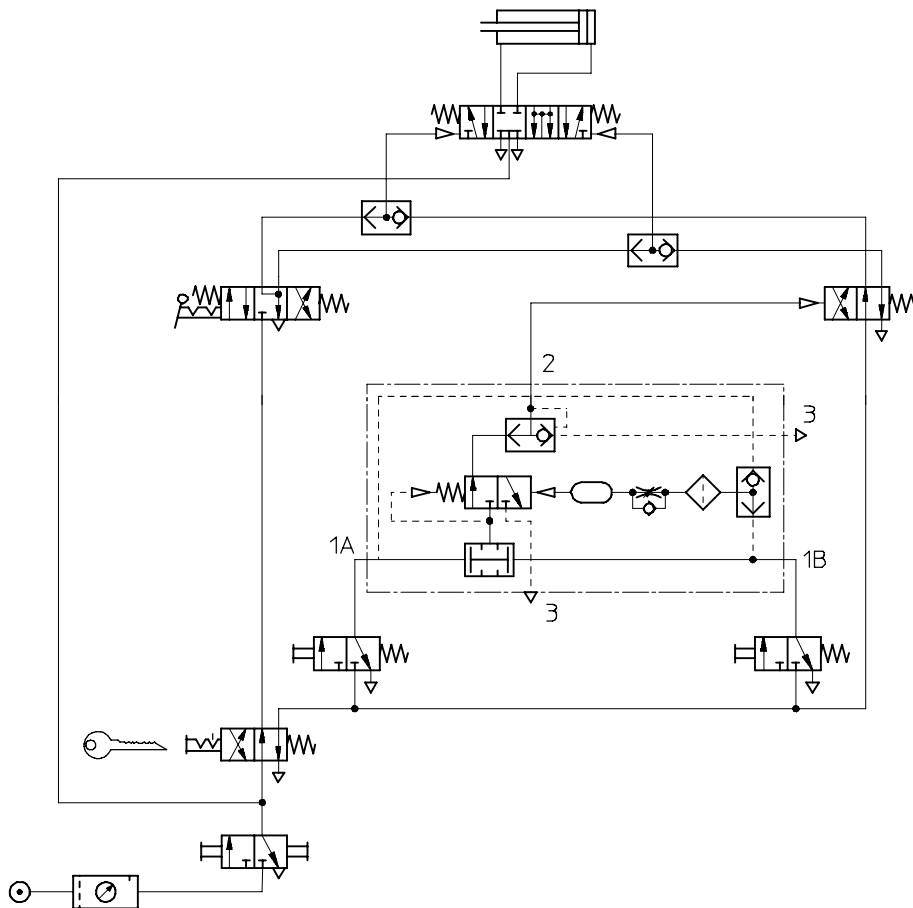
Control block for two-hand start ZSB

Technical data

Technical data	
Operating medium	Filtered compressed air, lubricated
Constructional design	Poppet valve
Nominal size [mm]	4
Standard nominal flow rate [l/min]	>50
1 ↔ 2	
Input pressure [bar]	3 ... 8
Temperature range [°C]	-10 ... +60
Pneumatic connection	G1/8
Type of mounting	Mounting thread Through-holes in housing
Mounting position	Any
Materials	Housing: anodised aluminium; seals: nitrile rubber
Weight [g]	490

Sample circuit diagram

Showing positioning and hand valves for setting operations



-  - Note

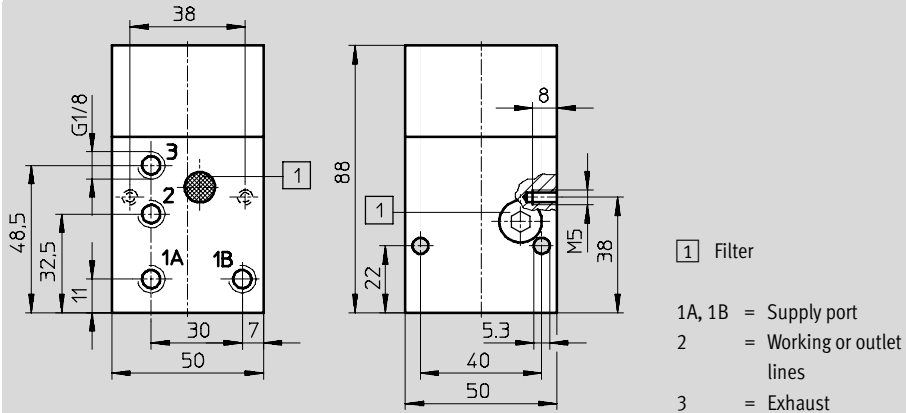
When installing the two pushbutton valves which actuate the start block, make sure that the protective function cannot easily be defeated, for example by pressing the push-button valves with the hand and elbow of the same arm. If necessary, the pushbuttons valves should be fitted with an additional guard plate.

Control block for two-hand start ZSB

Technical data



Dimensions Download CAD data → www.festo.com/en/engineering



Ordering data

Circuit symbol	Part No.	Type
	3 527	ZSB-1/8

M5 Compact System


Key features

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Pneumatic control systems
M5-Compact system

6.2

-  - Flow rate
100 l/min

- Forms the basis for compact pneumatic control systems
- M5 elements with 2n sub-bases
- Control cabinet installation
- Easy mounting
- Fast replacement of components
- Barbed fitting connection for 3 mm plastic tubing

The M5 Compact System is a complete system offering control components with all the functions required for pneumatic sequence controls. These all feature 2n sub-bases and barbed fitting connections for 3 mm plastic tubing.

For basic valves and actuators for panel mounting for use as signal components for basic functions such as START, STOP, etc.

➔ Volume 2

M5 Compact System

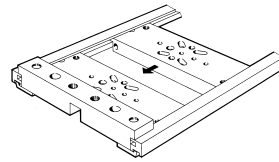
Key features



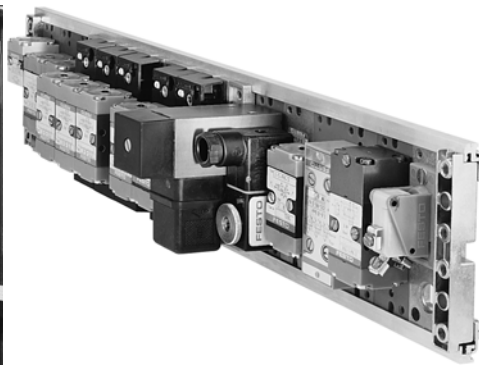
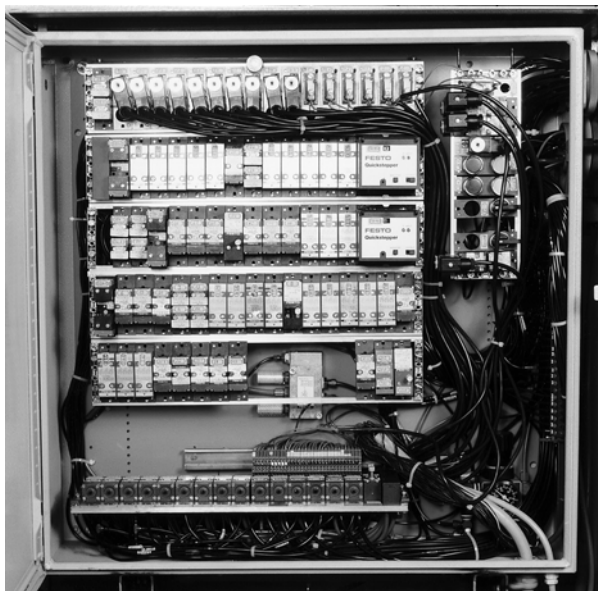
Mounting the components

Each mounting frame can be used to mount up to 16 components of the M5 Compact System using 2N sub-bases. The frames are 480 mm long and have been designed for use with 19" housings to DIN 41 488. The rails can be shortened to allow for other types of installation.

Components are attached by sliding their sub-bases or mounting plates into the guide slot of the profile rails. The sub-bases or plates are then clamped between the cross bars.



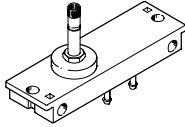
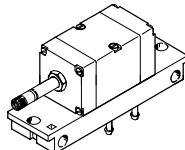
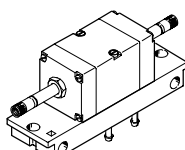
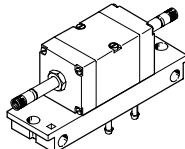
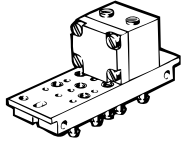
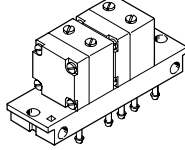
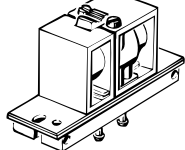
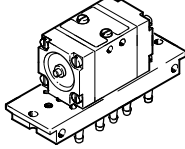
They can also be placed onto the frame and screwed down individually.



M5 Compact System

Product range overview

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Function	Version	Type	Brief description	Operating pressure [bar]	→ Page
Solenoid valves	3/2-way valves				
		MUFH-3-PK-3	Mechanical spring return for mounting frame 2N	0 ... 8	4 / 6.2-6
	5/2-way valves				
		MFH-5-PK-3	Mechanical spring return for mounting frame 2N	3 ... 8	4 / 6.2-6
		MFH-5-PK-3-L	Pneumatic spring return for mounting frame 2N	1.5 ... 8	4 / 6.2-6
	JMFH-5-PK-3	Double solenoid valve for mounting frame 2N	2 ... 8	4 / 6.2-6	
Pneumatic valves	3/2-way valves				
		VL/O-3-PK-3	Mechanical spring return for mounting frame 2N	0 ... 8	4 / 6.2-9
		VL/O-3-PK-3x2	2 pneumatic valves on one sub-base Mechanical spring return for mounting frame 2N	0 ... 8	4 / 6.2-9
		J-3-PK-3	Double pilot valve for mounting frame 2N	-0.9 ... 8	4 / 6.2-9
	5/2-way valves				
		VL-5-PK-3	Mechanical spring return for mounting frame 2N	0 ... 8	4 / 6.2-9
		J-5-PK-3	Double pilot valve for mounting frame 2N	1 ... 8	4 / 6.2-9
JD-5-PK-3		Double pilot valve with dominating signal at 14 for mounting frame 2N	1 ... 8	4 / 6.2-9	

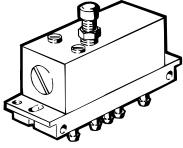
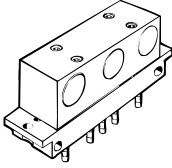
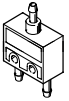
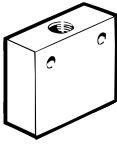
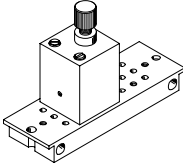
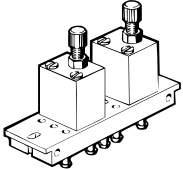
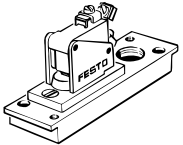
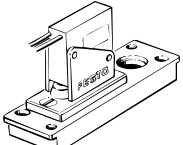
M5 Compact System

Product range overview

FESTO

Pneumatic control systems
M5-Compact system

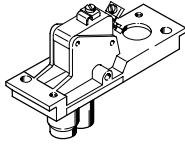
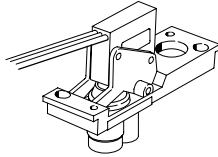
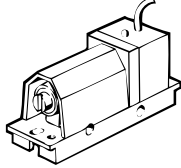
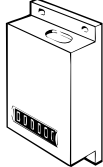
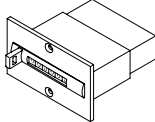
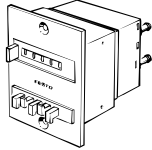
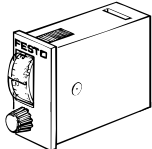
6.2

Function	Version	Type	Brief description	Operating pressure [bar]	→ Page	
Time delay valves	Time delay valves					
		VZ-3-PK-3	With switch-on delay for mounting frame 2N	0 ... 8	4 / 6.2-12	
		VZO-3-PK-3	With switch-off delay for mounting frame 2N	0 ... 8	4 / 6.2-12	
Logic components	AND/OR blocks					
		OS-PK-3-6/3	3 OR gates for mounting frame 2N	1.6 ... 8	4 / 6.2-14	
		ZK-PK-3-6/3	3 AND gates for mounting frame 2N	1.6 ... 8	4 / 6.2-14	
		OS-PK-3	OR gate	1.6 ... 8	4 / 6.2-22	
		ZK-PK-3	AND gate	1.6 ... 8	4 / 6.2-22	
		OS-1/8-B	OR gate	1 ... 10	4 / 6.2-22	
		ZK-1/8-B	AND gate	1 ... 10	4 / 6.2-22	
		OS-1/4-B	OR gate	1 ... 10	4 / 6.2-22	
	One-way flow control valves	One-way flow control valves				
			GRF-PK-3	For mounting frame 2N	0.5 ... 8	4 / 6.2-15
	GRF-PK-3x2		2 one-way flow control valves on one sub-base for mounting frame 2N	0.5 ... 8	4 / 6.2-15	
Pressure switches	Pneumatic/electrical pressure transducers					
		PE-1/8-2N	For mounting frame 2N	0 ... 8	4 / 6.2-16	
		PE-1/8-2N-SW	Splash proof design for mounting frame 2N	0 ... 8	4 / 6.2-16	

M5 Compact System

Product range overview

FESTO

Function	Version	Type	Brief description	Operating pressure [bar]	→ Page
Pressure switches	Pneumatic/electrical pressure transducers				
		VPE-1/8-2N	Vacuum switch for mounting frame 2N	-0.95 ... 0	4 / 6.2-16
		VPE-1/8-2N-SW	Vacuum switch splash proof design for mounting frame 2N	-0.95 ... 0	4 / 6.2-16
	Pneumatic/electrical differential pressure switch				
		PEN-M5	Vacuum switch for mounting frame 2N	-0.95 ... 8	4 / 6.2-19
Pneumatic counters	Adding counters				
		PZA-A-B	Base mounting	2 ... 8	4 / 6.2-24
		PZA-E-C	Panel mounting	2 ... 8	4 / 6.2-24
	Predetermining counter				
		PZV-E-C	Panel mounting	2 ... 8	4 / 6.2-24
Pneumatic timer	Pneumatic timer				
		PZVT-3-C PZVT-30-C PZVT-12-C PZVT-300-C	Clamping frame	2 ... 6	4 / 6.2-30
		PZVT-AUT	Automatic reset module	2 ... 6	4 / 6.2-30

Solenoid valves MUFH/MFH/JMFH, for mounting frame 2N

FESTO

Technical data

Pneumatic control systems
M5-Compact system

6.2

General technical data						
		3/2-way valves	5/2-way valves			
		MUFH-3-PK-3	MFH-5-PK-3	MFH-5-PK-3-L	JMFH-5-PK-3	
Constructional design		Poppet valve				
Type of mounting		Through-holes in sub-base or on mounting frame				
Operating medium		Filtered compressed air, lubricated or unlubricated				
Pneumatic connection		1, 2: 3 mm; 3: M5	Barbed fitting for 3 mm tubing			
Nominal size	[mm]	1.3	2.5			
Standard nominal flow rate 1 → 4	[l/min]	50	105			
Response time at 6 bar	On	[ms]	15	10	14	–
	Off	[ms]	22	22	22	–
	Change-over	[ms]	–	–	–	13
Materials		Housing: Anodised aluminium				
		Sub-base: Blue anodised aluminium				
		Seals: Perbunan				
Weight	[g]	120	270	270	380	

Operating and environmental conditions					
		3/2-way valves	5/2-way valves		
		MUFH-3-PK-3	MFH-5-PK-3	MFH-5-PK-3-L	JMFH-5-PK-3
Operating pressure	[bar]	0 ... 8	3 ... 8	1.5 ... 8	2 ... 8
Ambient temperature	[°C]	–5 ... +40	–5 ... +40	–5 ... +40	0 ... +40
Temperature of medium	[°C]	–10 ... +60	–10 ... +60	–10 ... +60	0 ... +60

Electrical data					
		3/2-way valves	5/2-way valves		
		MUFH-3-PK-3	MFH-5-PK-3	MFH-5-PK-3-L	JMFH-5-PK-3
D.C. voltage					
Standard voltages	[V]	12, 24	Solenoid coils		
Special voltage	[V]	12 ... 220	→ Volume 2		
A.C. voltage					
Standard voltages	[V]	24, 42, 110, 220 at 50 Hz or 50 and 60 Hz			Solenoid coils
Special voltage	[V]	12 ... 240 at 50 or 60 Hz			→ Volume 2
Power consumption					
D.C. voltage	[W]	4.5			
A.C. voltage	[VA]	Hold:	6		
		Pull:	7.5		
Duty cycle		100%			
Protection class to EN 60 529		IP65 with plug socket			

Solenoid valves MUFH/MFH/JMFH, for mounting frame 2N

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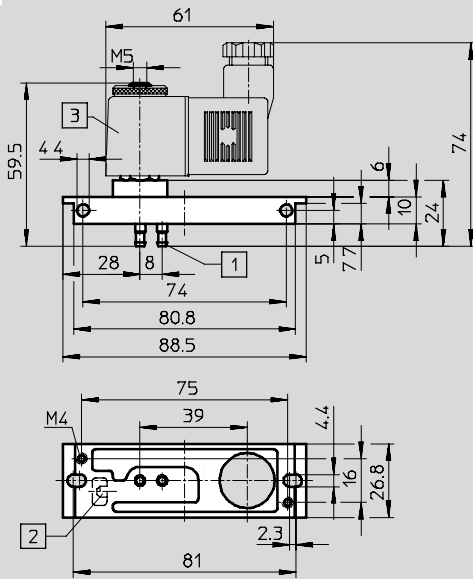
Technical data

Dimensions

Download CAD data → www.festo.com/en/engineering

3/2-way valves

MUFH-3-PK-3

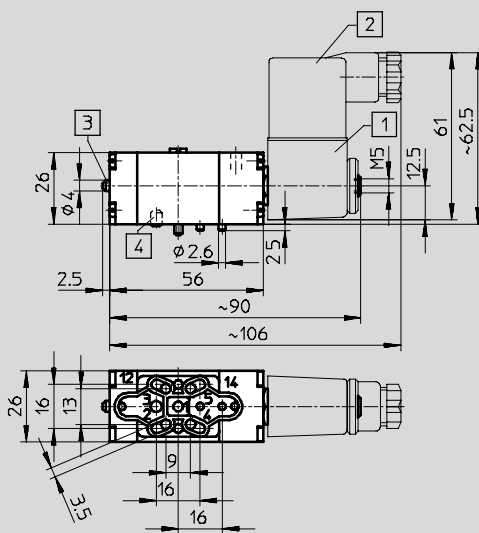


- 1 Barbed fitting for 3 mm plastic tubing
- 2 Manual override
- 3 Solenoid coil can be turned 360°

5/2-way valves

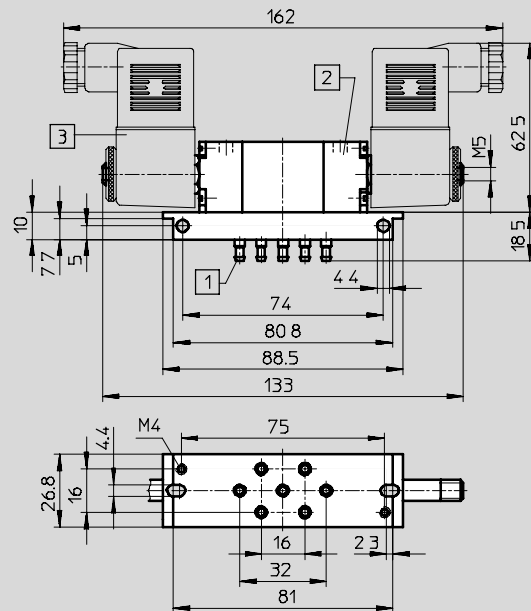
MFH-5-PK-3

MFH-5-PK-3-L



- 1 Rotatable solenoid coil
- 2 Plug can be repositioned by 180°
- 3 Manual override
- 4 Dowel pin

JMFH-5-PK-3



- 1 Barbed fitting for 3 mm plastic tubing
- 2 Manual override
- 3 Solenoid coil can be turned 360°

Pneumatic control systems
M5-Compact system

6.2

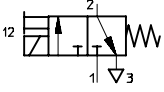
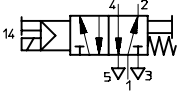
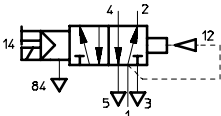
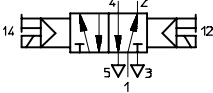
Solenoid valves MUFH/MFH/JMFH, for mounting frame 2N

FESTO

Technical data

Pneumatic control systems
M5-Compact system

6.2

Ordering data		Part No.	Type
3/2-way valves			
Solenoid valve mechanical spring return		6 705	MUFH-3-PK-3
5/2-way valves			
Solenoid valve mechanical spring return		4 448	MFH-5-PK-3
Solenoid valve pneumatic spring return		11 546	MFH-5-PK-3-L
Double solenoid valve		4 447	JMFH-5-PK-3
Accessories			
Solenoid coils and plug sockets		➔ Volume 2	

Pneumatic valves VL/J, for mounting frame 2N

Technical data

General technical data					
	3/2-way valves			5/2-way valves	
	VL/O-3-PK-3 VL/O-3-PK-3x2	J-3-PK-3	VL-5-PK-3	J-5-PK-3	JD-5-PK-3
Constructional design	Poppet valve	Piston spool valve	Poppet valve		
Type of mounting	2 through-holes in sub-base or on mounting frame				
Operating medium	Filtered compressed air, lubricated or unlubricated				
Pneumatic connection	Barbed fitting for 3 mm plastic tubing				
Nominal size [mm]	2.5				
Standard nominal flow rate 1 → 2 [l/min]	100			105	
Response time at 6 bar	On [ms]	VL 10	–	15	–
		VLO 13	–	–	–
	Off [ms]	50	–	22	–
Change-over	[ms]	–	with 10: 6	–	9
		–	with 12: 8	–	with 14: 9 with 12: 25
Materials	Housing: Die-cast zinc, plastic				
	Sub-base: Plastic, brass				
	Seals: Perbunan				
Weights [g]					
1 valve on sub-base	110	75	130	130	130
2 valves on sub-base	180	–	–	–	–

Operating and environmental conditions					
	3/2-way valves			5/2-way valves	
	VL/O-3-PK-3 VL/O-3-PK-3x2	J-3-PK-3	VL-5-PK-3	J-5-PK-3	JD-5-PK-3
Operating pressure [bar]	0 ... 8	–0.9 ... +8	0 ... 8	1 ... 8	
Pilot pressure [bar]	See graph			See graph	
Ambient temperature [°C]	–10 ... +60		–10 ... +60	0 ... +60	

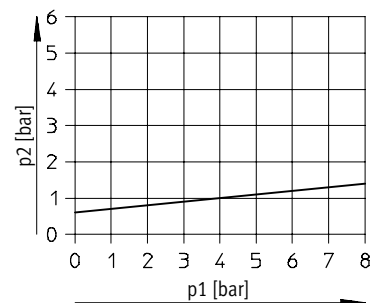
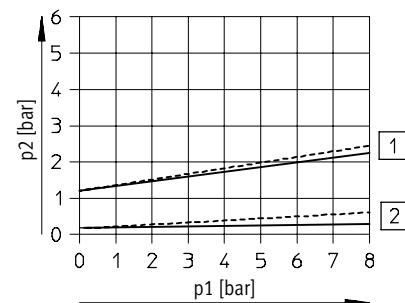
Minimum pilot pressure p2 as a function of the operating pressure p1

3/2-way valves

VL/O-3-PK-3

VL/O-3-PK-3x2

J-3-PK-3



- 1 No flow when not actuated VL
- 2 Flow when not actuated VLO

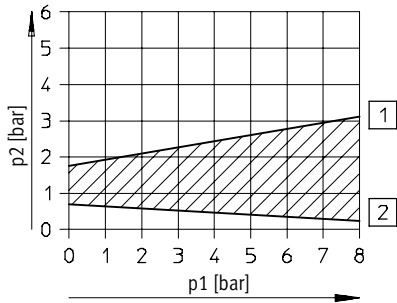
Pneumatic valves VL/J, for mounting frame 2N

Technical data

Minimum pilot pressure p2 as a function of the operating pressure p1

5/2-way valves

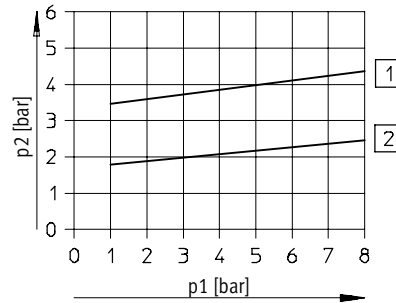
VL-5-PK-3



- 1 Switch-on pressure
- 2 Switch-off pressure

J-5-PK-3

JD-5-PK-3



- 1 JD-5-PK-3
- 2 J-5-PK-3

Dimensions

Download CAD data → www.festo.com/en/engineering

3/2-way valves

VL/O-3-PK-3

VL/O-3-PK-3x2

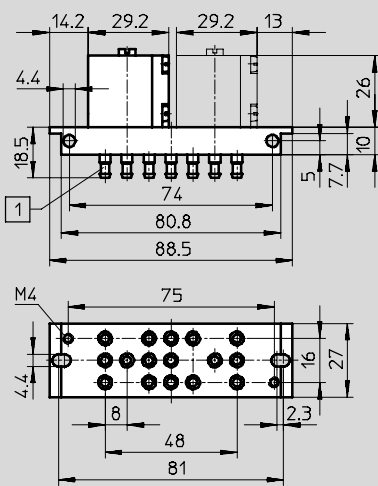
J-3-PK-3

5/2-way valves

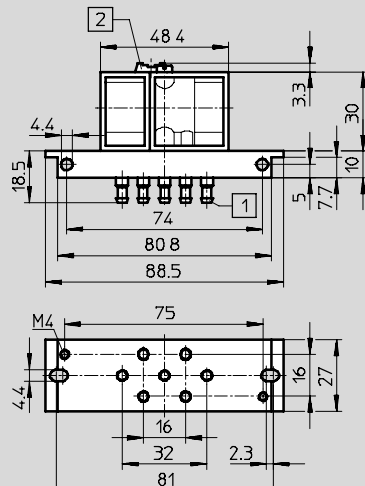
VL-5-PK-3

J-5-PK-3

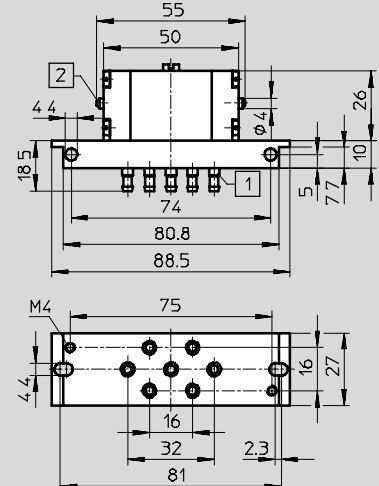
JD-5-PK-3



- 1 Barbed fitting for 3 mm plastic tubing



- 1 Barbed fitting for 3 mm plastic tubing
- 2 Manual override

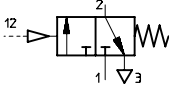
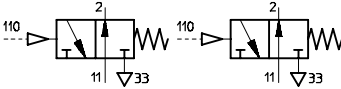
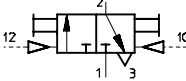
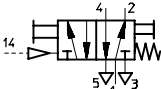
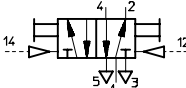
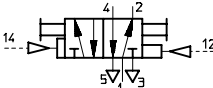


- 1 Barbed fitting for 3 mm plastic tubing
- 2 Manual override

Pneumatic valves VL/J, for mounting frame 2N

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Technical data

Ordering data		Part No.	Type
3/2-way valves			
Pneumatic valve mechanical spring return		4 233	VL/O-3-PK-3
2 pneumatic valves on one sub-base mechanical spring return		4 245	VL/O-3-PK-3x2
Double pilot valve		10 772	J-3-PK-3
5/2-way valves			
Pneumatic valve mechanical spring return		4 504	VL-5-PK-3
Double pilot valve		4 503	J-5-PK-3
Double pilot valve with dominating signal at 14		4 901	JD-5-PK-3

Pneumatic control systems
M5-Compact system

6.2

Time delay valves VZ/VZO, for mounting frame 2N



Technical data

Pneumatic control systems
M5-Compact system

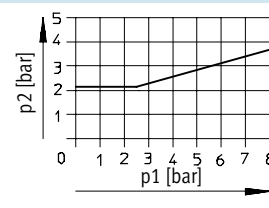
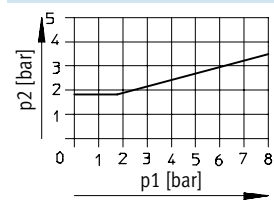
6.2

General technical data		With switch-on delay VZ-3-PK-3	With switch-off delay VZO-3-PK-3
Constructional design	Poppet valve with spring return		
Type of mounting	2 through-holes in sub-base or on mounting frame		
Operating medium	Filtered compressed air, lubricated or unlubricated		
Pneumatic connection	Barbed fitting for 3 mm plastic tubing		
Nominal size [mm]	2.5		
Standard nominal flow rate 1 → 2 [l/min]	90	65	
Adjustable time delay ¹⁾ [s]	0.25 ... 5		
Reset time [ms]	50	55	
Materials	Housing: Aluminium		
	Sub-base: Plastic, brass		
	Seals: Perbunan		
Weight [g]	150		

1) In order to achieve delay times longer than 5 s, remove the protective cover from barbed fitting 6 and connect an additional reservoir to this. An increase in reservoir size of 10 cm³ will increase the delay time by approx. 5 s. For reservoir type VZS → Volume 3.

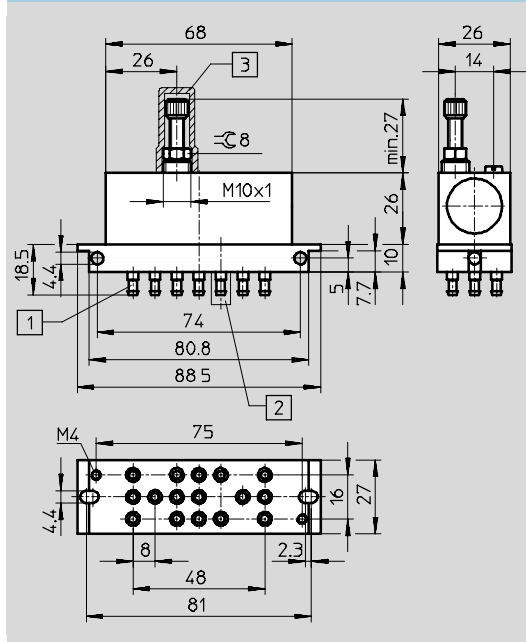
Operating and environmental conditions		
Operating pressure [bar]	0 ... 8	
Pilot pressure [bar]	See graph	
Ambient temperature [°C]	-10 ... +60	

Minimum pilot pressure p₂ as a function of the operating pressure p₁



Dimensions

Download CAD data → www.festo.com/en/engineering

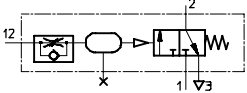
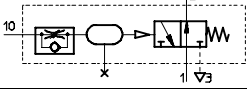


- 1 Barbed fitting for 3 mm plastic tubing
- 2 Port 6 with protective cap, for additional reservoir
- 3 Protective cover

Time delay valves VZ/VZO, for mounting frame 2N

FESTO

Technical data

Ordering data		Part No.	Type
Time delay valve with switch-on delay		5 755	VZ-3-PK-3
Time delay valve with switch-off delay		5 754	VZO-3-PK-3
Accessories			
Protective cover		6 436	GRK-M5

Pneumatic control systems
M5-Compact system

6.2

AND/OR blocks OS/ZK, for mounting frame 2N



Technical data

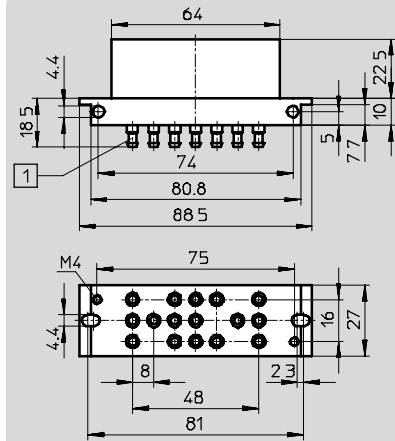
Pneumatic control systems
M5-Compact system

6.2

General technical data		
	OR block OS-PK-3-6/3	AND block ZK-PK-3-6/3
Type of mounting	2 through-holes in sub-base or on mounting frame	
Operating medium	Filtered compressed air, lubricated or unlubricated	
Pneumatic connection	[mm]	Barbed fitting for 3 mm plastic tubing
Nominal size	[mm]	2.5
Standard nominal flow rate	[l/min]	100
Materials	Housing: Plastic	
	Sub-base: Plastic	
	Seals: Perbunan	
Weight	[g]	90
		85

Operating and environmental conditions		
Operating pressure	[bar]	1.6 ... 8
Ambient temperature	[°C]	-10 ... +60

Dimensions Download CAD data → www.festo.com/en/engineering



1 Barbed fitting for 3 mm plastic tubing

Ordering data		Part No.	Type
OR block (3 OR gates)		4 232	OS-PK-3-6/3
AND block (3 AND gates)		4 204	ZK-PK-3-6/3

One-way flow control valves GRF, for mounting frame 2N

FESTO

Technical data

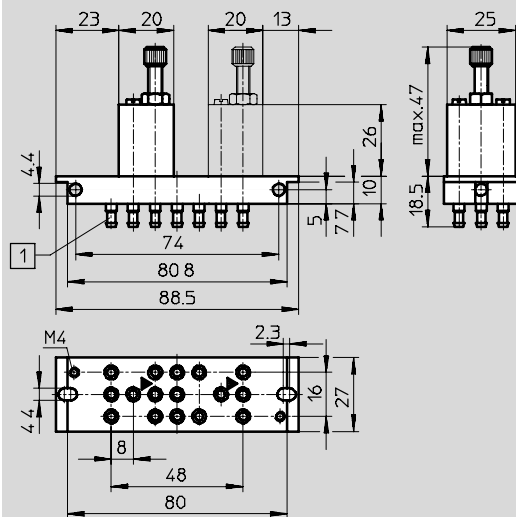
General technical data		
	GRF-PK-3	GRF-PK-3x2
Type of mounting	Through-holes in sub-base or on mounting frame	
Operating medium	Filtered compressed air, lubricated or unlubricated	
Pneumatic connection	[mm]	Barbed fitting for 3 mm plastic tubing
Nominal size [mm]		
in direction of flow control	1.5	
against the direction of flow control	2	
Standard nominal flow rate [l/min]		
in direction of flow control	0 ... 45	
against the direction of flow control	45	
Materials		
	Housing: Aluminium	
	Sub-base: Plastic	
	Seals: Perbunan	
Weight	[g]	90 145
Operating and environmental conditions		
Operating pressure	[bar]	0.5 ... 8
Ambient temperature	[°C]	-10 ... +60

Pneumatic control systems
M5-Compact system

6.2

Dimensions

Download CAD data → www.festo.com/en/engineering



1 Barbed fitting for 3 mm plastic tubing

Ordering data

	Part No.	Type
One-way flow control valve	4 565	GRF-PK-3
2 one-way flow control valves on one sub-base	4 566	GRF-PK-3x2

PE converters PE/VPE, for mounting frame 2N

FESTO

Technical data

Pneumatic control systems
M5-Compact system

6.2

General technical data				
	PE converter		Vacuum switch	
	PE-1/8-2N	PE-1/8-2N-SW	VPE-1/8-2N	VPE-1/8-2N-SW
Constructional design	Pneumatically actuated electrical micro switch to EN 60 947-5-1			
Type of mounting	On mounting frame 2N			
	Via through-holes			
Operating medium	Compressed air, filtered (lubricated or unlubricated) or vacuum			
Pneumatic connection	G1/8			
Electrical connection	Screw connector	3 separate sheathed connector wires, moulded, 0.5 m long	Screw connector	3 separate sheathed connector wires, moulded, 0.5 m long
Materials	Housing: Die-cast aluminium, polyamide			
	Diaphragm: Polyurethane			
Weight [g]	55	65	32	45

Operating and environmental conditions				
	PE converter		Vacuum switch	
	PE-1/8-2N	PE-1/8-2N-SW	VPE-1/8-2N	VPE-1/8-2N-SW
Operating pressure [bar]	0 ... 8		0 ... -0.95	
Switch-on pressure [bar]	2		-0.25 ... ±0.05	
Switch-off pressure [bar]	0.5		≤ 0.1	
Ambient temperature [°C]	-10 ... +60			0 ... +40

Electrical data				
	PE converter		Vacuum switch	
	PE-1/8-2N	PE-1/8-2N-SW	VPE-1/8-2N	VPE-1/8-2N-SW
Rated operating voltage [V AC]	250			
Rated operating voltage [V DC]	250			
Switching capacity	See separate table			
Utilisation category	AC 12/DC 12 (ohmic load)			
	AC 14/DC 13 (inductive load)			
CE symbol	In accordance with EU Directive 73/23/EU			
Protection class to EN 60 529	IP00	IP67	IP00	IP67

Test symbols for PE, VPE-1/8-2N: VDE, SEMKO, ÖVE, SEV, UL, CSA, (CEE).

Max. permissible electrical load					
D.C. voltage			A.C. voltage		
Voltage [V DC]	Resistive load [A]	Inductive load [A]	Voltage [V AC]	Resistive load [A]	Inductive load [A]
PE/VPE-1/8-2N					
12	6	6	250	6	2
24	6	6			
60	1	0.5			
110	0.5	0.2			
220	0.25	0.1			
PE/VPE-1/8-2N-SW					
15	10	10	250	5	5
30	5	3			
50	1	1			
75	0.75	0.25			
124	0.5	0.03			
250	0.25	0.02			

PE converters PE/VPE, for mounting frame 2N

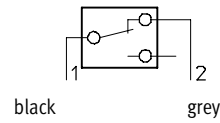
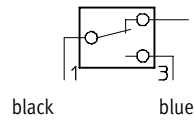
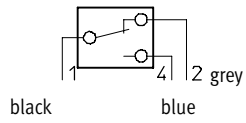
Technical data

Terminal allocation

Changeover switch

Normally open contact

Normally closed contact



Dimensions

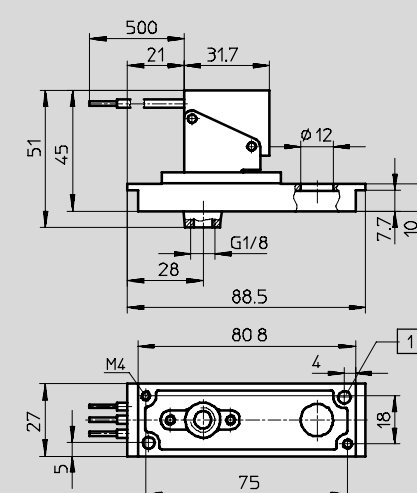
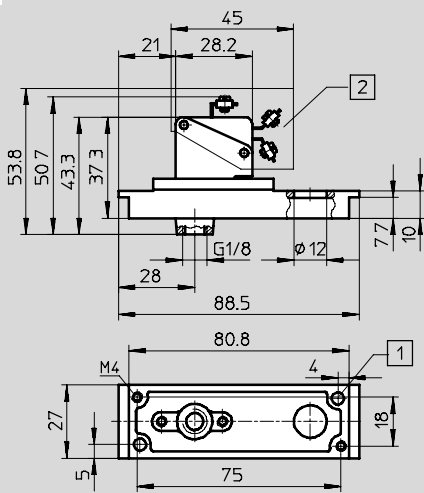
Download CAD data → www.festo.com/en/engineering

PE converter

PE-1/8-2N

PE-1/8-2N-SW

splash proof design



- 1 For M4 thread
- 2 Protective cap SPE-B

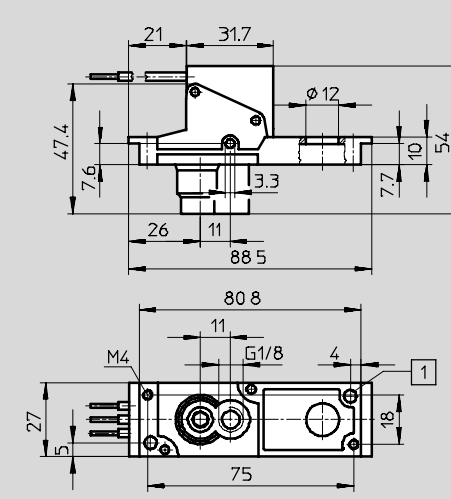
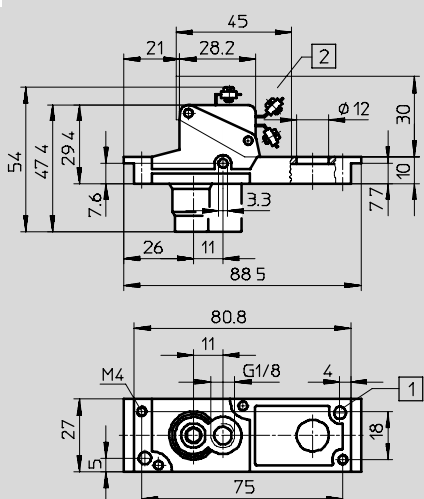
- 1 For M4 thread

Vacuum switch

VPE-1/8-2N

VPE-1/8-2N-SW

splash proof design



- 1 For M4 thread
- 2 Protective cap SPE-B

- 1 For M4 thread

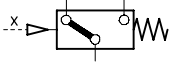
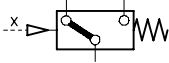
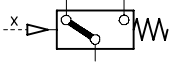
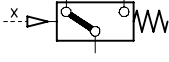
PE converters PE/VPE, for mounting frame 2N

FESTO

Technical data

Pneumatic control systems
M5-Compact system

6.2

Ordering data		Part No.	Type
PE converter		7 860	PE-1/8-2N
PE converter splash proof design		7 862	PE-1/8-2N-SW
Vacuum switch		12 594	VPE-1/8-2N
Vacuum switch splash proof design		12 595	VPE-1/8-2N-SW
Accessories			
Protective cap for protection against accidental contact		165 614	SPE-B

PE converters PEN-M5, for mounting frame 2N

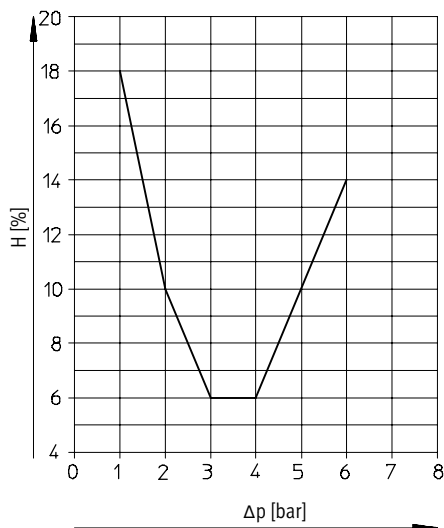
Technical data

General technical data	
Constructional design	Pneumatic/electrical differential pressure switch
Type of mounting	On mounting frame 2N Via through-holes
Operating medium	Compressed air, filtered (lubricated or unlubricated) or vacuum
Pneumatic connection	M5
Electrical connection	2.5 m cable 3x0.14 mm ²
Switch output	Contactless switching output (normally open function)
Max. switching frequency [Hz]	70
Materials	Housing: Die-cast zinc
Note on material	Free of copper, PTFE and silicone
Weight [g]	240

Operating and environmental conditions	
Operating pressure [bar]	-0.95 ... +8 bar
Threshold value setting range [bar]	-0.8 ... +8 bar
Ambient temperature [bar]	-20 ... +60 °C

Electrical data	
Operating voltage range [V DC]	12 ... 30
Switching status display	Yes
Adjustable hysteresis	→ Graph 4 / 6.2-19
Max. output current [mA]	350
Protection against short circuit	Yes
Protection against polarity reversal	Yes
CE symbol	In accordance with EU Directive 89/336/EU
Protection class to EN 60 529	IP67

Hysteresis H as a function of the differential pressure Δp



PE converters PEN-M5, for mounting frame 2N

Technical data



Dimensions Download CAD data → www.festo.com/en/engineering

1 Connecting cable 3x0.14 mm², 2.5 m long
 2 Light emitting diode (LED)
 3 Pressure adjustment screw

Colour coding:
 BN = Positive terminal
 BU = Negative terminal
 BK = Load output
 The switch is polarity-safe

Ordering data		Part No.	Type
PE converter		8625	PEN-M5
Accessories			
Mounting bracket for mounting sub-bases on the frame		11 571	NRW-9/1,5-B
Socket head screw (2 included in scope of delivery)		204 021	DIN 84-M4X12-4.8

AND/OR blocks OS/ZK

Key features



OS-PK-3
ZK-PK-3



OS-1/8-B
ZK-1/8-B



OS-1/4-B

Flow rate
120 ... 1170 l/min

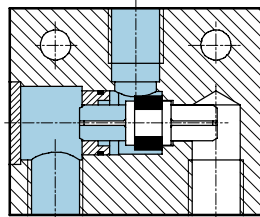
- Barbed fitting for 3 mm tubing
- G1/8, G1/4
- OR function
- AND function

OR function

The OR gate has two inputs (X and Y) and one output (A). The valve automatically blocks the input which is not pressurised. If both inputs are pressurised simultaneously at different levels, the higher pressure is fed to the output A.

An OR valve (or shuttle valve) is used to allow a function to be executed from either of 2 different places. An output signal is present whenever at least one of 2 signal inputs is activated.

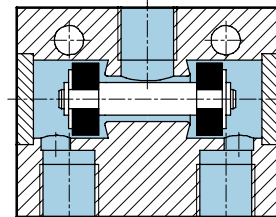
OS-1/4-B



AND function

The AND gate has two inputs (X and Y) and one output (A), which is pressurised only as long as pressure is present at both inputs. If different pressures are present at the inputs, the lower pressure is fed to output A. An AND valve (or dual-pressure valve) is used in cases where at least 2 signals are required to be present before a function is executed. A signal is present at output A only when both signal inputs are activated.

ZK-1/8-B



AND/OR blocks OS/ZK

Technical data

General technical data						
Type	OR gate			AND gate		
	OS-PK-3	OS-1/8-B	OS-1/4-B	ZK-PK-3	ZK-1/8-B	
Type of mounting	2 through-holes in housing					
Operating medium	Filtered compressed air, lubricated or unlubricated					
Pneumatic connection	Barbed fitting for 3 mm tubing	G1/8	G1/4	Barbed fitting for 3 mm tubing	G1/8	
Nominal size [mm]	2.4	4	6.5	2.4	4.5	
Standard nominal flow rate [l/min]	120	500	1170	120	500	
Weight [g]	10	45	110	10	45	
Materials	Housing	Plastic, brass	Blue anodised aluminium	Blue anodised aluminium	Plastic, brass	Blue anodised aluminium
	Seals	Nitrile rubber			Nitrile rubber	
Note on material	Free of copper, PTFE and silicone → Ordering data				-	

Operating and environmental conditions						
Type	OR gate			AND gate		
	OS-PK-3	OS-1/8-B	OS-1/4-B	ZK-PK-3	ZK-1/8-B	
Operating pressure [bar]	1.6 ... 8	1 ... 10		1.6 ... 8	1 ... 10	
Ambient temperature [°C]	-10 ... +60			0 ... +60		

Dimensions Download CAD data → www.festo.com/en/engineering

<p>OS-PK-3 ZK-PK-3</p>	<p>OS-1/8-B ZK-1/8-B</p>	<p>OS-1/4-B</p>
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1) Barbed fitting for 3 mm plastic tubing

Ordering data		Connection	Part No.	Type
OR gate		Barbed fitting for 3 mm tubing	6 684	OS-PK-3
		G1/8	6 681	OS-1/8-B
			165 694	OS-1/8-B-CT ¹⁾
		G1/4	6 682	OS-1/4-B
			165 693	OS-1/4-B-CT ¹⁾
AND gate		Barbed fitting for 3 mm tubing	6 685	ZK-PK-3
		G1/8	6 680	ZK-1/8-B

1) Free of copper, PTFE and silicone

Counters PZA/PZV

Key features

FESTO

Pneumatic control systems
M5-Compact system

6.2



Adding counter

- Surface mounting
- Panel mounting

Adding counters have 6-digit displays and count upwards, i.e. incoming signals are added. When the counter is reset, 000 000 appears.

A pneumatic signal increments the counter by a half step, and the first half of the digit appears. After completion of the signal, the second half-step increment occurs and the digit becomes fully visible.

The counter can be reset manually by means of a button. It can also be reset by means of a pneumatic signal. A counting signal may not arrive or be present during the resetting procedure.

Predetermining counter

- Subtracting counting mode
- Manual and pneumatic reset
- Protective cover

Predetermining counters count pneumatic signals backwards from a preset number. When zero is reached, the counter generates a pneumatic output signal. This output signal persists until the counter is reset. The counter is preset by pressing the reset button and simultaneously keying in the preset value. This value is retained when the counter is reset.

Counters PZA/PZV

Technical data

General technical data				
Type	Adding counter			Predetermining counter
	PZA-A-B	PZA-E-C	PZV-E-C	
Constructional design	Mechanical counter with pneumatic drive			
Type of mounting	3 through-holes in housing	Panel mounting		
Operating medium	Compressed air, filtered, unlubricated			
Pneumatic connection	M5			
Display ¹⁾	6-digit	6-digit	5-digit	
Reset	Pushbutton or pneumatic signal			
Response pressure				
Drive	[bar]	0.6 ±0.2	> 0.8	0.6 ±0.2
Reset	[bar]	0.6 ±0.2	2	–
Drop-off pressure				
Drive	[bar]	0.2 ±0.1	< 0.15	0.2 ±0.1
Reset	[bar]	0.15 ±0.1	< 0.15	0.15 ±0.1
Min. pulse length				
Drive	[ms]	10	8	10
Reset	[ms]	180	150	180
Min. pause period				
Drive	[ms]	15	10	15
Reset	[ms]	50	50	50
Materials				
	Housing: Plastic			
	Seals: Chloroprene			
Weight	[g]	155	70	150

1) Digit size 4.5 mm

Operating and environmental conditions				
Type	Adding counter			Predetermining counter
	PZA-A-B	PZA-E-C	PZV-E-C	
Operating pressure	[bar]	2 ... 8		
Min. reset pressure	[bar]	2	–	–
Ambient temperature	[°C]	–10 ... +60	0 ... +60	

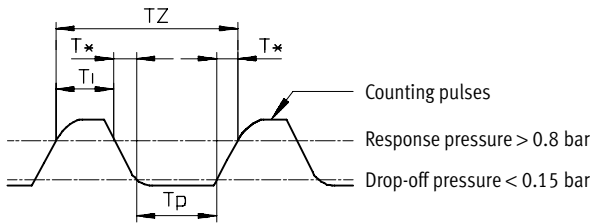
Counters PZA/PZV

Technical data



Counting rate

Adding counter PZA-E-C



$$\text{Max. pulse rate} = \frac{1}{TZ}$$

$$TZ = T_i + T_p + T^*$$

$$TZ = T_i + T^*$$

T_i = Min. pulse length

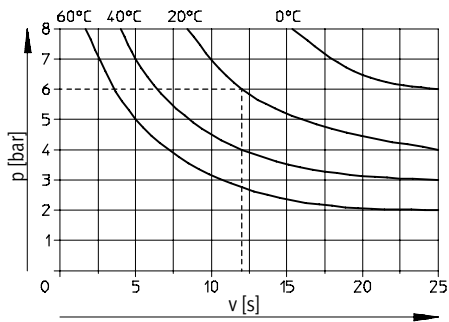
T_p = Min. pulse duration

TZ = Time for counting pulse

T^* = Depends on pressure and tubing length (values must be determined empirically)

Counting speed v as a function of the operating pressure p

Predetermining counter PZV-E-C



Intermittent operation

The counter operates non-continuously. The counting rate is constant right down to zero contact (high rate possible). A reset then follows.

Continuous operation

The counter operates continuously at a constant rate. The interval between 2 counting signals is longer than the required reset time.

Counters PZA/PZV

Technical data

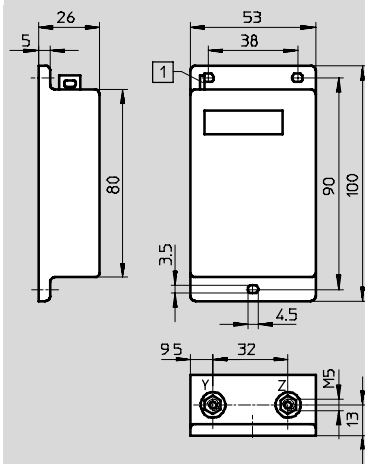
FESTO

Dimensions

Download CAD data → www.festo.com/en/engineering

Adding counter

Surface mounting PZA-A-B

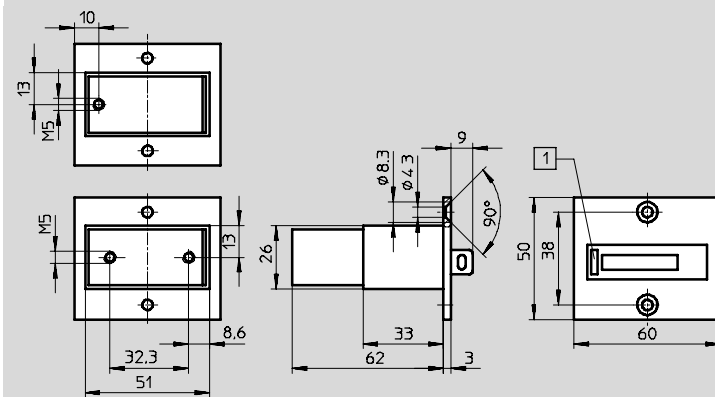


1 Reset button

Z = Counting signal

Y = Reset signal

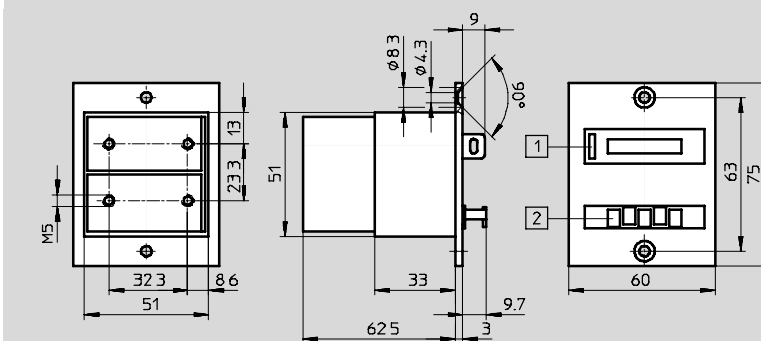
Panel mounting PZA-E-C



1 Reset button

Predetermining counter

Surface mounting PZA-E-C



1 Reset button

2 Preselect buttons

The preset number is restored using the reset button or by a pneumatic signal to the reset port.

- Note

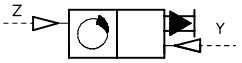
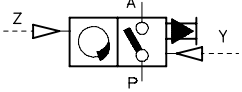
The output signal must not be used to reset the counter. No counting

signal may arrive or be present during the resetting procedure.

Counters PZA/PZV

Technical data

FESTO

Ordering data			Part No.	Type
Adding counter	Surface mounting		14 992	PZA-A-B
	Panel mounting		8 606	PZA-E-C
Predetermining counter	Surface mounting		15 608	PZV-E-C

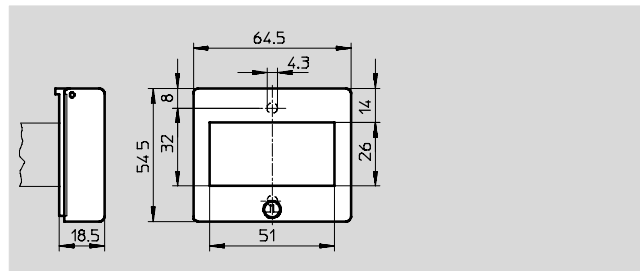
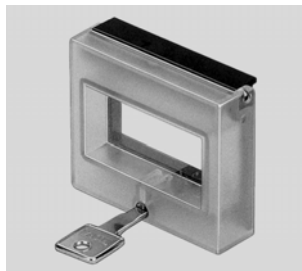
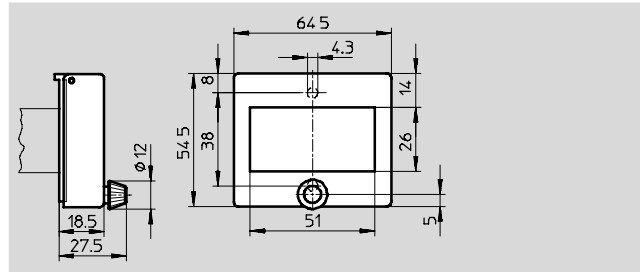
Counters PZA/PZV

Accessories

FESTO

Protective cover with rotary knob PZ-SK-1 with lock PZ-SS-1

Protective cover for adding counter to protect against entry of dirt and water on the front panel

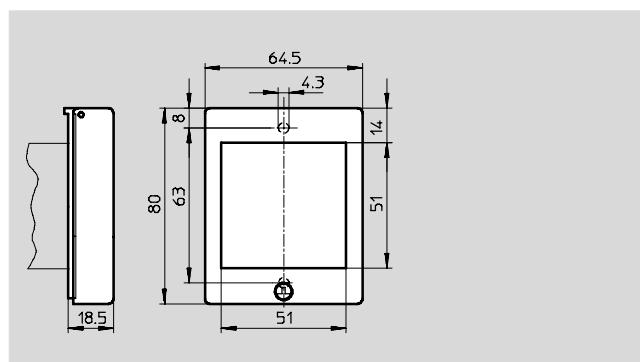
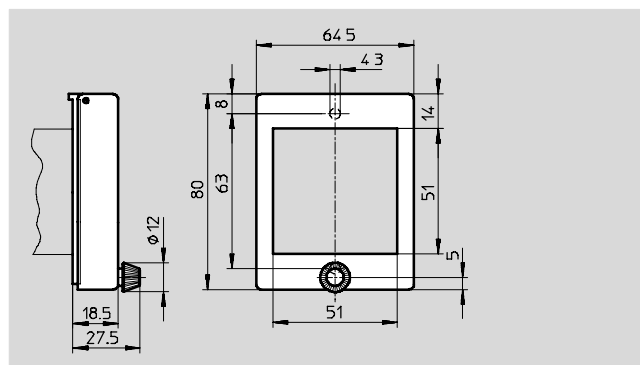


Ordering data

	Part No.	Type
Protective cover with rotary knob	14 662	PZ-SK-1
Protective cover with lock	13 965	PZ-SS-1

Protective cover with rotary knob PZ-SK-2 with lock PZ-SS-2

Protective cover for predetermining counter to protect against entry of dirt and water on the front panel



Ordering data

	Part No.	Type
Protective cover with rotary knob	14 663	PZ-SK-2
Protective cover with lock	13 966	PZ-SS-2

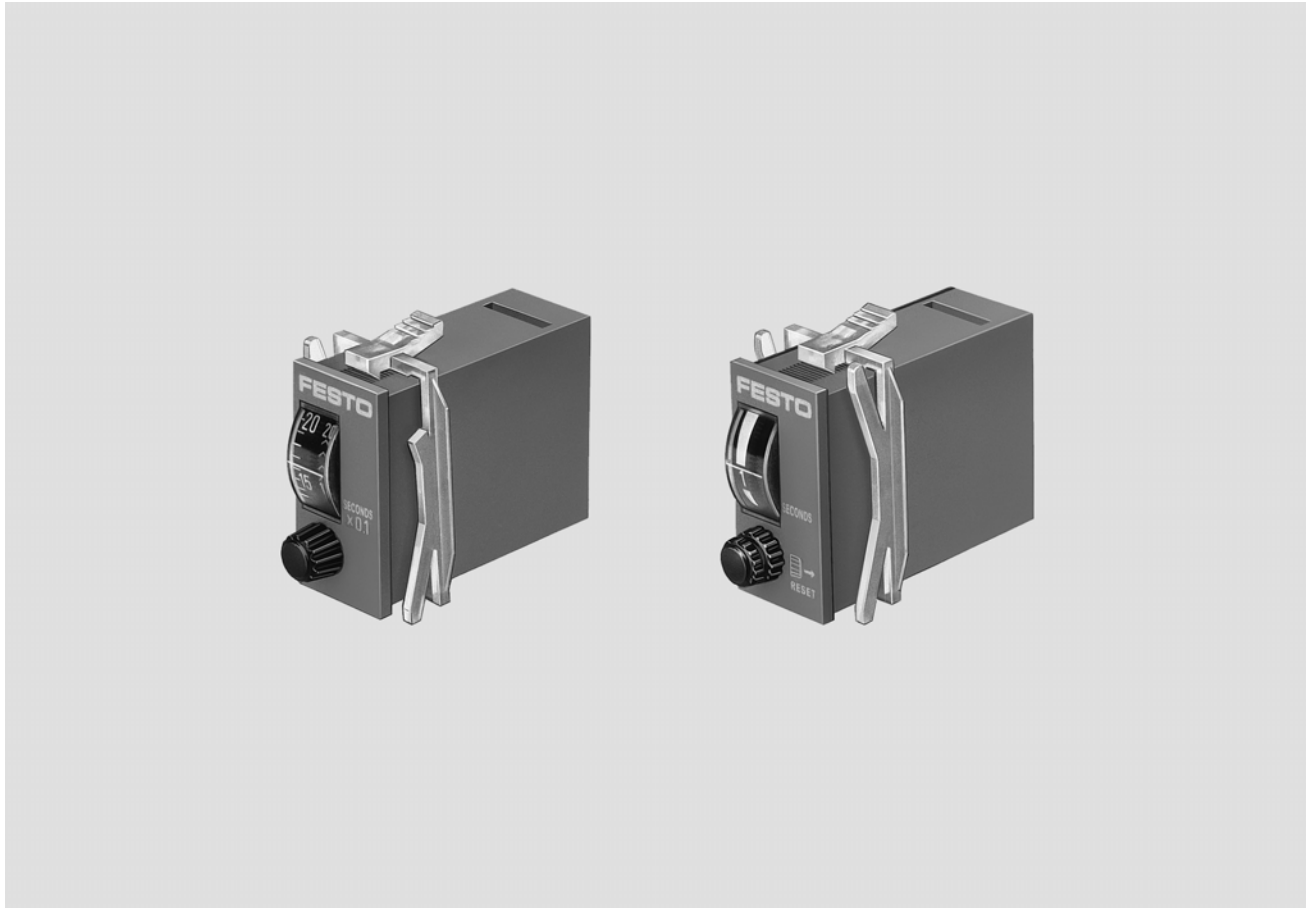
Timers PZVT

Key features

FESTO

Pneumatic control systems
M5-Compact system

6.2



- Adjustable delay times
 - 0.2 ... 3 s
 - 2 ... 30 s
 - 8 ... 120 s
 - 20 ... 300 s

- Panel mounting
 - G-rail to EN 50 035
 - H-rail to EN 60715
- Protective cover

Pneumatic timer PZVT

The timer switches input pressure applied to port 1 through to port 2 after the preset delay time has expired.

Automatic reset module PZVT-AUT

The reset module is used to automatically reset timers of type PZVT-...-SEC at the end of a preset time and to generate an output signal of defined duration for control system purposes. The timer can be reset manually by pulling the setting knob on the reset module. This allows the simple creation of pneumatic timer controls with automatically repeating time intervals.

Timers PZVT

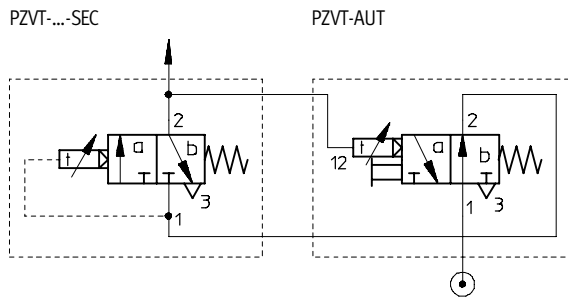
Technical data

FESTO

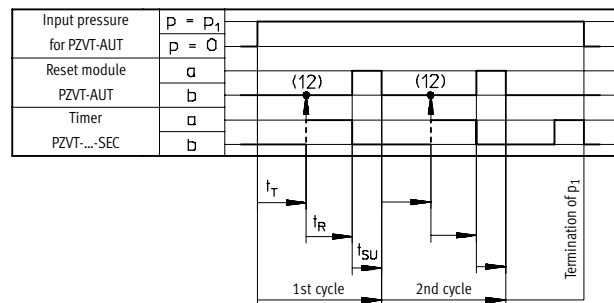
General technical data						
Type	Timer				Reset module	
	PZVT-3-SEC	PZVT-30-SEC	PZVT-120-SEC	PZVT-300-SEC	PZVT-AUT	
Constructional design	Mechanical sequence counter with pneumatic drive					
Type of mounting	Panel mounting					
Operating medium	Filtered compressed air (unlubricated) ($\leq 40 \mu\text{m}$)					
Pneumatic connection	M5					
Standard nominal flow rate	[l/min]	50				
Adjustable delay times	[s]	0.2 ... 3	2 ... 30	8 ... 120	20 ... 300	0.2 ... 2
Repetition accuracy	[ms]	± 0.1	± 0.3	± 1.2	± 3	± 0.3
Setting accuracy	[ms]	± 0.3	± 0.6	± 3	± 6	-
Pause period for reset	[ms]	≥ 200				
Protection class to EN 60 529	IP40 with protective cover and panel frame					
Weight	[g]	45			50	
Materials	Housing: Polymer					

Operating and environmental conditions					
Type	PZVT-3-SEC	PZVT-30-SEC	PZVT-120-SEC	PZVT-300-SEC	PZVT-AUT
Operating pressure	[bar]	2 ... 6			
Switch-on pressure	[bar]	≥ 1.6			
Switch-off pressure	[bar]	≤ 0.1			
Ambient temperature	[°C]	-10 ... +60			

Example of application



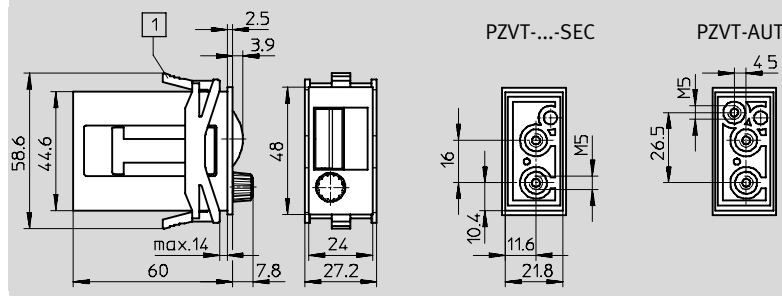
- 1 = Supply port
- 2 = Working or outlet line
- 3 = Exhausts
- 12 = Pilot line



- t_T = Time preset range for timer type PZVT-...-SEC
- t_R = Switching delay time for reset module PZVT-AUT (0.2 ... 2 s)
- t_{SU} = Signal interruption period for reset module PZVT-AUT (≥ 300 ms)

Dimensions

Download CAD data → www.festo.com/en/engineering



1 Clamping frame included in scope of delivery

Timers PZVT

Technical data

FESTO

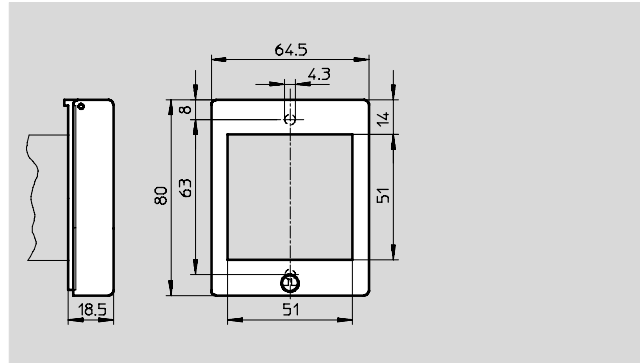
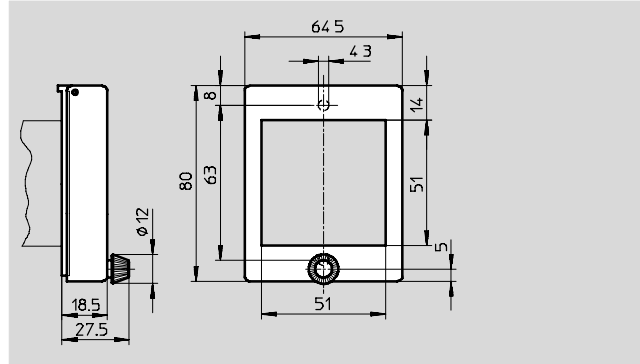
Ordering data			Part No.	Type
Timer	0.2 ... 3 s		158 495	PZVT-3-SEC
	2 ... 30 s		150 238	PZVT-30-SEC
	8 ... 120 s		177 616	PZVT-120-SEC
	20 ... 300 s		150 239	PZVT-300-SEC
Reset module	0.2 ... 2 s		158 496	PZVT-AUT

Timers PZVT

Accessories

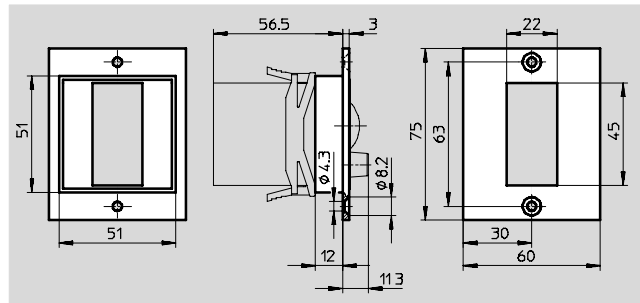
Protective cover with rotary knob PZ-SK-2 with lock PZ-SS-2

Protective cover for timers to protect against entry of dirt and water on the front panel



Ordering data		
	Part No.	Type
Protective cover with rotary knob	14 663	PZ-SK-2
Protective cover with lock	13 966	PZ-SS-2

Panel frame PZVT-FR for panel mounting



Ordering data		
	Part No.	Type
Panel frame	150 241	PZVT-FR

Timers PZVT

Accessories

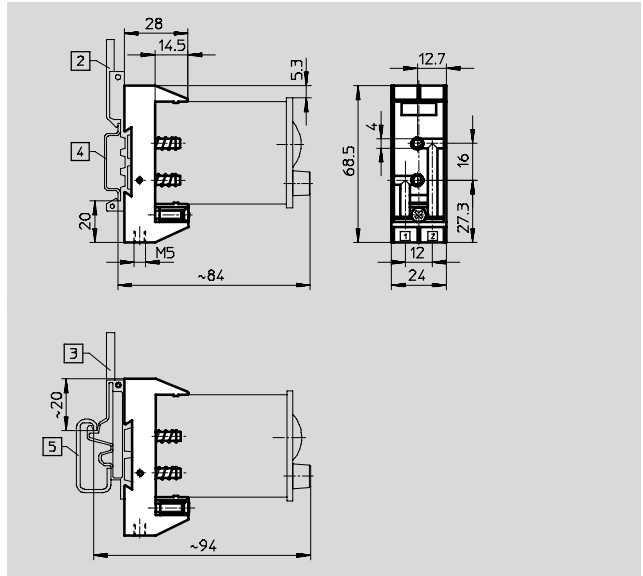


Base PZVT-S-DIN

for mounting on G-rail to EN 50 035
or H-rail on EN 60715



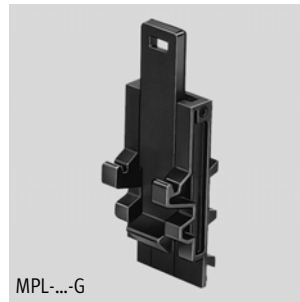
- 2 Mounting plate
MPL-MUS/PZ-H
- 3 Mounting plate
MPL-MUS/PZ-G
- 4 H-rail to EN 60715
- 5 G-rail to EN 50 035



Ordering data		
	Part No.	Type
Base	150 240	PZVT-S-DIN

Mounting plate MPL-MUS/PZ-G
for G-rail to EN 50 035

Mounting plate MPL-MUS/PZ-H
for H-rail to EN 60715



Ordering data		
	Part No.	Type
Mounting plate for G-rail	19 134	MPL-MUS/PZ-G
Mounting plate for H-rail	19 135	MPL-MUS/PZ-H