

- Modular
- Flexible
- Versatile

Axis controllers SPC200

Key features

At a glance



SPC200 – the most unique positioning controller in the world for pneumatic and electrical positioning technology

Strength in variety

- 1 to 4 positioning axes
- 3 different pneumatic drive families
- Stepper motor axes
- Technology mix

Strength in modularity

- Two housing sizes
- 9 different plug-in cards
- Combinable as required

Multi-purpose

- Set selection for simple applications
- Start/stop operation for demanding automation tasks
- Up to 100 programs
- Subprogram technology
- Register operations and much more

Strength in flexibility

- Digital inputs/outputs
- Analogue inputs
- Profibus, Device Net, Interbus
- CPV valve terminals for pneumatic switching functions

Strength in installation

- One axis string controls
- 2 pneumatic axes
- CPV valve terminals can be connected directly to the axis string
- Pre-assembled cables
- Plugs fit only in the correct sockets

WINPISA identification

- Project archiving
- Simple commissioning
- User-friendly programming
- Comprehensive diagnostics with graphics functions

Axis controllers SPC200

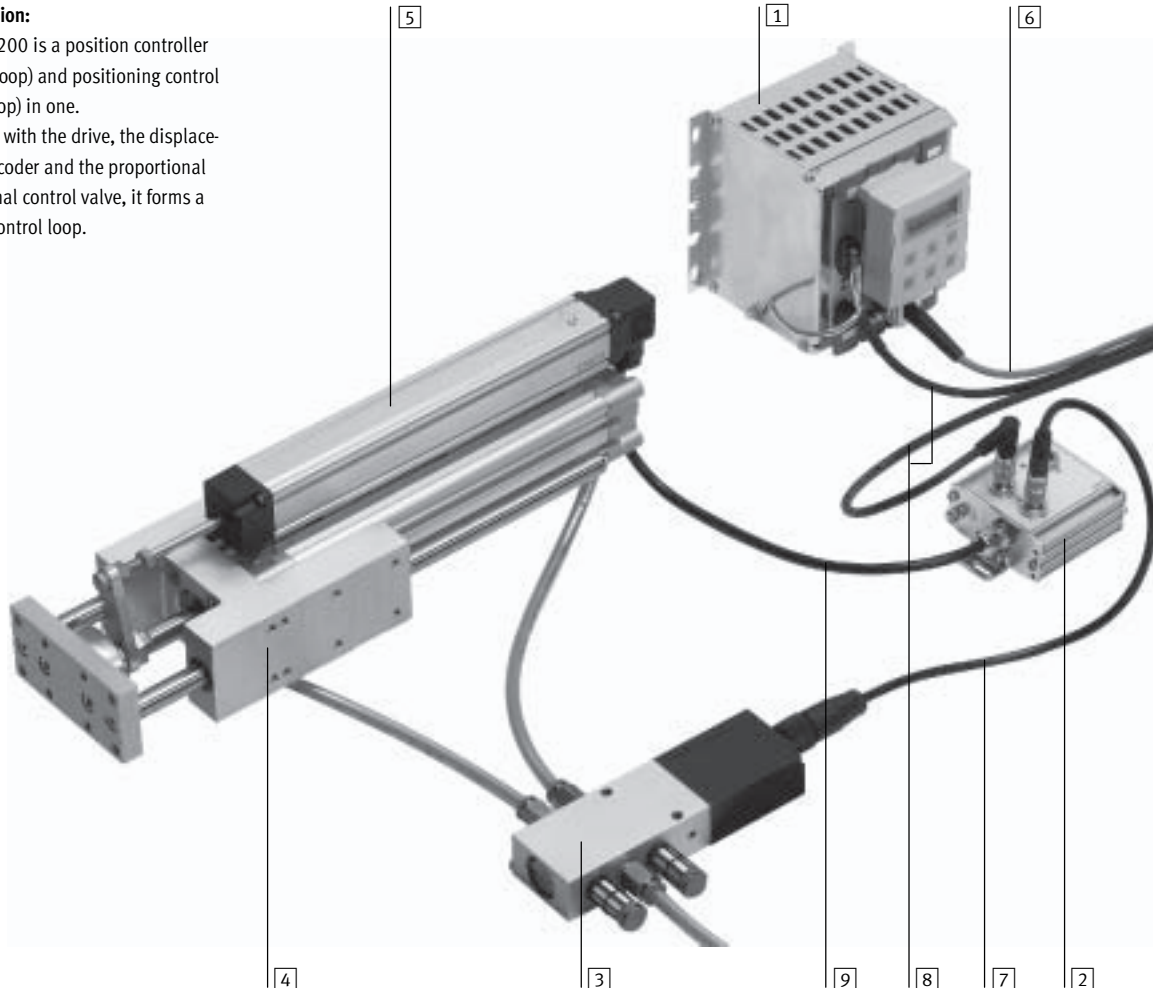
Key features



The system concept

Description:

The SPC200 is a position controller (closed loop) and positioning control (open loop) in one. Together with the drive, the displacement encoder and the proportional directional control valve, it forms a closed control loop.



Individual components	
Type	Brief description
1 SPC200-...	The axis controller with control unit, in this case designed for a pneumatic drive, is an open and closed loop and controller in one.
2 SPC-AIF-...	The axis interface forwards the measured values from the displacement encoder to the closed loop controller in the SPC200 and the control signal from the closed loop controller to the proportional directional control valve.
3 MPYE-...	The proportional directional control valve is the final control element in the control loop and controls the movement of the drive in accordance with the specification of the closed loop controller in the SPC200.
4 DNCM-... with FENG-KF	The pneumatic drive, in this case DNCM with guide unit FENG-KF, generates the movement. It is controlled by the SPC200. Further positioning drives → 5 / 1.1-2
5 MLO-...	The displacement encoder, in this case a potentiometer attached directly to the drive, is the displacement sensor in the control loop. It forwards the current position to the closed loop controller.
6 KDI-PPA-3-BU9	Programming cable, RS 232 interface, for commissioning.
7 KMPYE-AIF-...	Connecting cable that connects the proportional directional control valve with the axis interface.
8 KSPC-AIF-...	Connecting cable that connects the controller SPC200 with the axis interface.
9 -	Connecting cable that connects the displacement encoder with the axis interface. The cable is permanently attached to the axis interface.


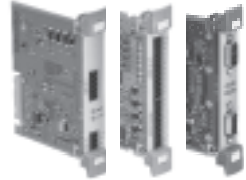




Axis controllers SPC200

Product range overview

FESTO

Servopneumatic positioning systems
Axis positioning controllers


1.3


Individual components for SPC200			
	Type	Brief description	→ Page
Basic units			
	SPC200-CPU-4	Basic unit with 4 card locations	5 / 1.3-6
	SPC200-CPU-6	Basic unit with 6 card locations	5 / 1.3-6
Plug-in cards			
	SPC200-BP	Blanking plate	5 / 1.3-7
	SPC200-PWR-AIF	Power supply unit and axis interface connection	5 / 1.3-10
	SPC200-MMI-DIAG	Diagnostics and control unit connection	5 / 1.3-11
	SPC200-DIO	Digital inputs/outputs (10I/8O)	5 / 1.3-12
	SPC200-2AI-U	Analogue setpoint specification, 2 channels, 0 ... 10 V	5 / 1.3-14
	SPC200-SCU-AIF	Sub-controller for 3rd and 4th pneumatic axes	5 / 1.3-15
	SPC200-SMX-1	Stepper motor interface	5 / 1.3-16
	SPC200-COM-PDP	Profibus-DP interface	5 / 1.3-18
	SPC200-COM-CAN	DeviceNet interface	5 / 1.3-20
SPC200-COM-IBS	Interbus interface	5 / 1.3-22	
Control unit			
	SPC200-MMI-1 SPC200-MMI-1F	Control unit for commissioning, programming and diagnostics	5 / 1.3-24
Connector modules for SPC200			
	Type	Brief description	→ Page
Axis interface			
	SPC-AIF-POT	Axis interface for analogue displacement encoder potentiometer	5 / 1.3-26
	SPC-AIF-POT-LWG		
	SPC-AIF-MTS	Axis interface for digital displacement encoder Temposonics/AIF or pneumatic linear drive with integrated displacement encoder DGPI...-...-AIF	5 / 1.3-26
	SPC-AIF-INC	Axis interface for pneumatic linear drive with integrated displacement encoder DNCI	5 / 1.3-28
Input/output module			
	SPC-FIO-2E-2A-M8	Input/output module with 2 inputs and 2 outputs	5 / 1.3-30
Power supply module			
	SPC-AIF-SUP-24V	Additional power supply for the load voltage at the axis interface for cable lengths over 16 m	5 / 1.3-32

Axis controllers SPC200

Product range overview



Basic configuration of controller packages											
Version	Brief description	Basic configuration									→ Page
		SPC200-MMI-1	SPC200-PWR-AIF	SPC200-MMI-DIAG	SPC200-DIO	SPC200-2AI-U	SPC200-SCU-AIF	SPC200-COM-PDP	SPC200-COM-IBS	SPC200-SMX-1	
SPC200/P01	For 1 or 2 pneumatic axes with control unit	■	■	■	■	-	-	-	-	-	5 / 1.3-9
SPC200/P02	For 1 or 2 pneumatic axes with control unit and 2 analogue inputs for positioning specifications	■	■	■	■	■	-	-	-	-	5 / 1.3-9
SPC200/P03	With sub-controller for 3 or 4 pneumatic axes, with control unit	■	■	■	■	-	■	-	-	-	5 / 1.3-9
SPC200/P04	With Profibus-DP interface for 1 or 2 pneumatic axes	-	■	■	-	-	-	■	-	-	5 / 1.3-9
SPC200/P05	With Profibus-DP interface for up to 4 pneumatic axes	-	■	■	-	-	■	■	-	-	5 / 1.3-9
SPC200/P06	With Interbus interface for 1 or 2 pneumatic axes	-	■	■	-	-	-	-	■	-	5 / 1.3-9
SPC200/P07	With Interbus interface for up to 4 pneumatic axes	-	■	■	-	-	■	-	■	-	5 / 1.3-9
SPC200/P08	With stepper motor interface for 1 axis and up to 2 pneumatic axes, with control unit	■	■	■	■	-	-	-	-	■	5 / 1.3-9

Expansion options for controller packages										
Version	Brief description	expandable using ...								
										
		SPC200-MMI-1	SPC200-DIO	SPC200-2AI-U	SPC200-SCU-AIF	SPC200-COM-PDP	SPC200-COM-IBS	SPC200-COM-CAN	SPC200-SMX-1	
SPC200/P01	For 1 or 2 pneumatic axes with control unit	-	1)	1)	1)	1)	1)	1)	1)	1)
SPC200/P02	For 1 or 2 pneumatic axes with control unit and 2 analogue inputs for positioning specifications	-	-	-	-	-	-	-	-	-
SPC200/P03	With sub-controller for 3 or 4 pneumatic axes, with control unit	-	-	-	-	-	-	-	-	-
SPC200/P04	With Profibus-DP interface for 1 or 2 pneumatic axes	2)	1)	1)	-	-	-	-	-	1)
SPC200/P05	With Profibus-DP interface for up to 4 pneumatic axes	2)	-	-	-	-	-	-	-	-
SPC200/P06	With Interbus interface for 1 or 2 pneumatic axes	2)	1)	1)	-	-	-	-	-	1)
SPC200/P07	With Interbus interface for up to 4 pneumatic axes	2)	-	-	-	-	-	-	-	-
SPC200/P08	With stepper motor interface for 1 axis and up to 2 pneumatic axes, with control unit	-	-	-	-	-	-	-	-	-

- 1) One free card location, therefore expandable with max. one card. This must be ordered separately.
Other configurations can be produced from the individual components.
- 2) Optional

Axis controllers SPC200

Technical data



Axis controller basic unit

SPC200-CPU-4

SPC200-CPU-6

Function

Basic unit for 4 or 6 function cards, contains closed loop position controller for 2 pneumatic axes and universal positioning control for 4 axes



General technical data			SPC200
Power supply			→ 5 / 1.3-10 (SPC200-PWR-AIF)
Current consumption	SPC200-CPU-4/6 incl. SPC200-PWR-AIF	[mA]	Typically 100
Processor type			Digital signal processor
Operating system			Festo OS 4.6x ¹⁾
Controller sampling time		[ms]	Typically 1.5
Control cycle		[ms]	Typically 2
Memory	Available for programs and data	[KB]	20
Data backup			Flash memory
	Backup cycles		> 100 000
No. of positioning axes	Total		4
	Pneumatic		Max. 4
	Stepper motor		Max. 3
No. of inputs/outputs	Local		Max. 40 inputs, 32 outputs ²⁾
	Per AIF string		Max. 16 inputs and 16 outputs ³⁾
	Via fieldbus		Max. 64 inputs and 64 outputs
No. of start programs			2 ⁴⁾
No. of position registers			100 per axis
Operating modes	Set selection	No. of motion sets	Max. 32 via local I/O per start program Max. 1,000 via fieldbus interface per start program
		Control signals	ENABLE, READY, STOP, RESET, RECBIT1..5, CLK_A/B, RC_A/B, ACK_A/B
	Start/stop	No. of programs	Max. 100
		Control signals	ENABLE, READY, START/RESET, STOP, MC_A/B, SYNC_IA/B, SYNC_OA/B
		Programming	NC programming to DIN 66025
		Instruction classes	Positioning instructions I/O instructions Register instructions Sequence instructions
		No. of NC sets	Max. 2,000
		No. of NC sets per program	Max. 1,000
		Nesting depth for subprograms	Max. 4

1) Status: April 2003

2) Less the used control signals of the first card

3) Either as 1 input device and 1 output device of the CP fieldbus modules or 1 input/output module SPC-FIO ...

4) At least 1 start program must be active

Axis controllers SPC200

Technical data



General technical data			SPC200
Electromagnetic compatibility	Interference emission		Tested to EN 61000-6-4 ⁵⁾
	Interference immunity		Tested to EN 61000-6-2
Vibrations/shock	Vibrations		Tested to DIN/IEC 68, parts 2-6, severity level 1
	Shock		Tested to DIN/IEC 68, parts 2-27, severity level 2
Ambient conditions	Temperature range	[°C]	-5 ... +50
	Protection class		IP20 ⁶⁾
	Relative air humidity		95% non-condensing
Weight	SPC200-CPU-4	[kg]	0.675
	SPC200-CPU-6	[kg]	0.85

5) Measured on the overall system with SPC200/P01 and SPC200/P05 for use in the industrial area

6) With fully equipped basic unit

New

Speed and acceleration values can be specified as an absolute value via the position registers.

The pneumatic drives can be operated unregulated using command M39.

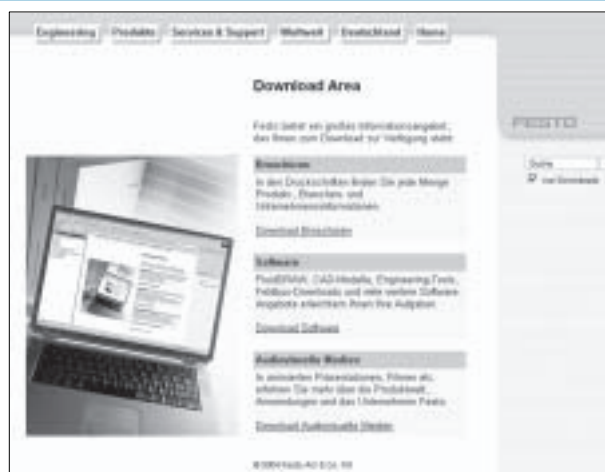
Ordering data		Part No.	Type
Axis controller basic unit	With 4 mounting locations	170 173	SPC200-CPU-4
	With 6 mounting locations	170 174	SPC200-CPU-6
Accessories	Blanking plate (plug-in card)	170 229	SPC200-BP
	Clip for H-rail assembly for SPC200	170 169	CP-TS-HS-35
User documentation	For axis controller basic unit, German	170 245	P.BE-SPC200-DE
	For axis controller basic unit, English	170 246	P.BE-SPC200-EN
	For axis controller basic unit, French	194 500	P.BE-SPC200-FR
	For axis controller basic unit, Italian	194 501	P.BE-SPC200-IT
Programming software WinPISA on CD-ROM	For Windows 95, 98, 2000, NT and XP, German ¹⁾	170 095	P.SW-WIN-PISA-CD-DE
	For Windows 95, 98, 2000, NT and XP, English ¹⁾	170 096	P.SW-WIN-PISA-CD-EN
	For Windows 95, 98, 2000, NT and XP, French ¹⁾	194 508	P.SW-WIN-PISA-CD-FR

1) Windows 3.X upon request (16 bit version)

Function modules

www.festo.com

Function modules that support communication between third-party controllers and the Profibus card of the axis controller SPC200 can be downloaded from the Download Area of the Festo website.



Axis controllers SPC200

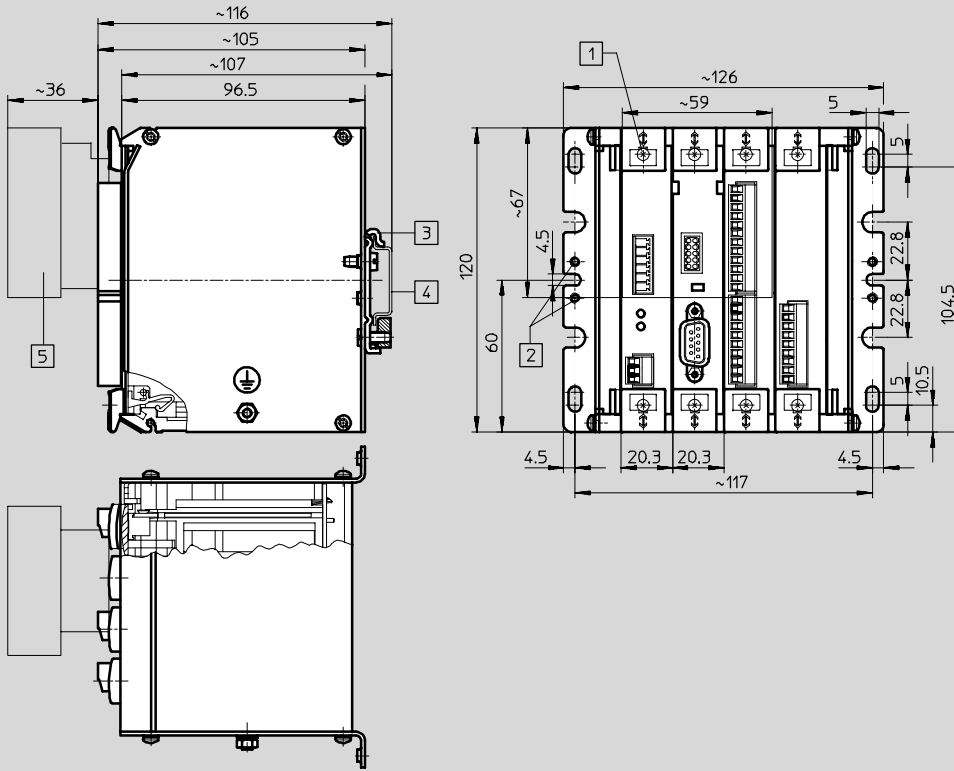
Technical data



Dimensions

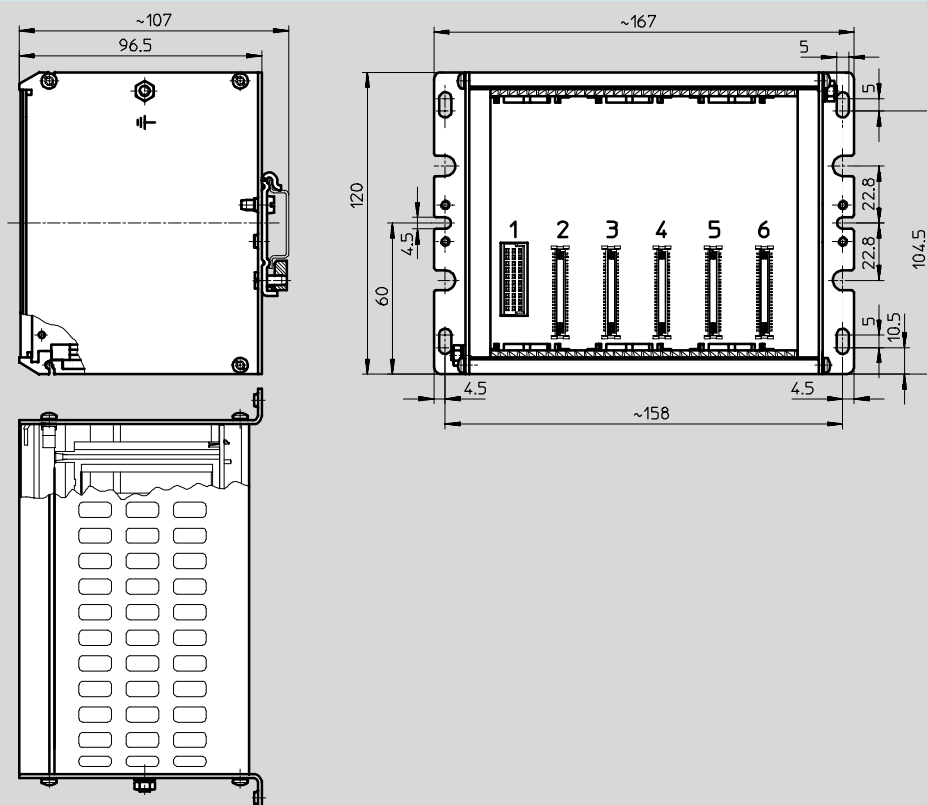
Download CAD data → www.festo.com/en/engineering

SPC200-CPU-4 (rack for 4 mounting locations) using as an example: SPC200/P02



- 1 Installation option for inscription label LBS 6x10
- 2 Mounting option for clip
- 3 Clip for rail mounting
- 4 Mounting rail
- 5 Control unit SPC200-MMI-1

SPC200-CPU-6 (rack for 6 mounting locations)

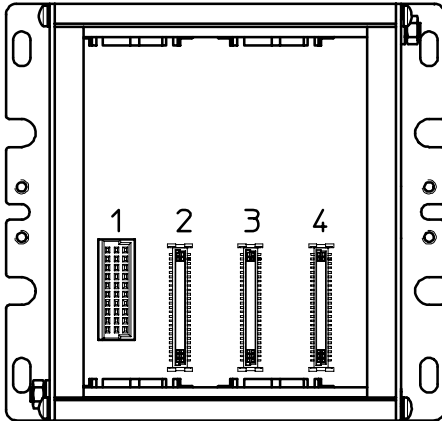


Note
The numbers 1 ... 6 represent the order of the mounting locations.

Axis controllers SPC200

Technical data

Order of the mounting locations



Controller packages	Mounting location				Control unit SPC200-MMI-1 ¹⁾	Part No.	Type
	1	2	3	4			
P01	1	2	4	9	■	170 521	SPC200/P01
P02	1	2	4	5	■	170 522	SPC200/P02
P03	1	2	4	3	■	170 523	SPC200/P03
P04	1	2	9	7	-	187 812	SPC200/P04
P05	1	2	3	7	-	187 813	SPC200/P05
P06	1	2	9	8	-	187 814	SPC200/P06
P07	1	2	3	8	-	187 815	SPC200/P07
P08	1	2	4	6	■	187 816	SPC200/P08

1) Included in the scope of delivery.

Legend			
	Type	Description	→Page
1	SPC200-PWR-AIF	Power supply	5 / 1.3-10
2	SPC200-MMI-DIAG	Serial interface	5 / 1.3-11
3	SPC200-SCU-AIF	Sub-controller	5 / 1.3-15
4	SPC200-DIO-PNP	Digital I/O	5 / 1.3-12
5	SPC200-2AI-U	Setpoint module	5 / 1.3-14
6	SPC200-SMX-1	Stepper motor interface	5 / 1.3-16
7	SPC200-COM-PDP	Profibus-DP interface	5 / 1.3-18
8	SPC200-COM-IBS	Interbus interface	5 / 1.3-22
9	SPC200-PB	Blanking plate	5 / 1.3-6

Axis controllers SPC200

Technical data



Power supply SPC200-PWR-AIF

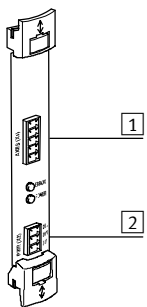
Function
Power supply and connection of the first axis string



General technical data				SPC200-PWR-AIF
Current consumption	Plug-in card	[mA]	See basic unit	
Power supply unit (PWR)	Supply	[V DC]	24 -5/+25%	
	Residual ripple	[%]	2	
	Power failure buffering for logic supply (pin 2)	[ms]	10	
	Current consumption	Load, pin 1 [mA]	Max. 5.0	
		Logic, pin 2 [mA]	Max. 4.0	
Feature	-		2 pneumatic axes	
Axis connection	Digital inputs	[max]	16 function inputs ¹⁾	
	Digital outputs	[max]	16 function outputs ¹⁾	
Electrical connections	Power supply unit		3-pin terminal strip	
	Axis connection		5-pin terminal strip	
Weight		[g]	82	
Mounting location	→ 5 / 1.3-9			1

1) Either as 1 input module and 1 output module of the CP modules or 1 input/output module SPC-FIO...

Pin allocation



- 1 Terminal strip on cable type KSPC-AIF-WD-... pre-assembled
- 2 3-pin terminal strip included in the scope of delivery. Connection cross section max. 1.5 mm²

Connecting cable → 5 / 1.3-34, no. 1

Note
The valves at the axis interfaces and the outputs of the CP modules are supplied via the 24 V load supply. They can therefore be switched off independently of the logic supply in an emergency stop situation.

1 AXES (X1)	
Pin	Function
1	CAN-LOW (brown)
2	CAN-LOW (white)
3	24 V (yellow)
4	0 V (green)
5	24 V load supply (grey)

2 PWR (X2)	
Pin	Function
1	24 V load supply (switchable)
2	24 V supply logic
3	0 V

Ordering data			
		Part No.	Type
Plug-in card	Power supply unit and axis interface connection	170 175	SPC200-PWR-AIF

Axis controllers SPC200

Technical data



Serial interface SPC200-MMI-DIAG

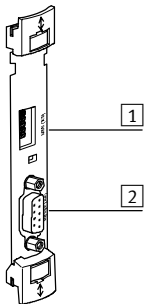
Function
Serial interface for diagnostics and programming, connection of the control unit MMI-1



General technical data			SPC200-MMI-DIAG
Current consumption	Plug-in card	[mA]	Typically 50 ¹⁾
Serial interface	Version		RS 232 C
	Electrical isolation		Yes
	Baud rate	[baud]	9,600; 19,200; 38,400; 57,600; 115,200 ²⁾
	Data	[bit]	8
	Stop bit	[bit]	1
	Parity		Even parity
	Protocol		No handshake
MMI interface	Version		Similar to RS 232 C
	Electrical isolation		No
Electrical connections	Serial interface		9-pin SUB-D, female
	MMI-1		5 double-pin row
Weight		[g]	68
Mounting location	→ 5 / 1.3-9		2

1) With control unit SPC200-MMI-1
2) The baud rate is 9,600 baud after each POWER ON

Pin allocation



- 1) Interface for control unit SPC200-MMI-1
- 2) Serial interface

Connecting cable → 5 / 1.3-34,
no. 7

2) RS232 (X4)	
Pin	Function
2	Received Data (RxD)
3	Transmitted Data (TxD)
5	Signal Ground (SNGD)

Ordering data			Part No.	Type
Plug-in card	Diagnostics and control unit connection		170 176	SPC200-MMI-DIAG

Axis controllers SPC200

Technical data

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Digital I/O module SPC200-DIO

Function
Digital input/output card (local I/O)



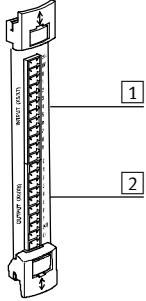
General technical data			SPC200-DIO
Current consumption	Plug-in card	[mA]	Typically 50
Digital inputs	Number		10
	Sensor supply	[A]	0.5 ¹⁾
	Current consumption	[mA]	8 (at 24 V DC/"logic 1")
	Fuse protection for sensor supply		Electronic short-circuit protection
	Delay	[ms]	5
Digital outputs	Number		8
	Supply	[V DC]	24 ±25% ²⁾
	Max. current-carrying capacity per output	[mA]	250
	Fuse protection for outputs		Electronic, all outputs
	Max. tripping current	[A]	2
	Response time	[ms]	1.5
Version	Inputs/outputs		To IEC 61131-2, positive logic (PNP)
Electrical isolation	Inputs/outputs		No/yes
Electrical connections	Inputs		12-pin terminal strip
	Outputs		10-pin terminal strip
Weight		[g]	62
Mounting location	→ 5 / 1.3-9		From 3 upwards

1) Via internal 24 V supply (pin 2 to PWR to plug-in card SPC200-PWR-AIF)
2) Supplied separately, note load data

Axis controllers SPC200

Technical data

Pin allocation



- 1 12-pin terminal strip included in the scope of delivery. Connection cross section max. 1.5 mm²
- 2 10-pin terminal strip included in the scope of delivery. Connection cross section max. 1.5 mm²



Note
Inputs and outputs on the first card are reserved for necessary functions such as start, stop, etc. Up to 7 inputs and 5 outputs are freely programmable.

On the other cards, all 10 inputs and 8 outputs are freely programmable. Up to 4 I/O cards can be inserted (in 6x rack).

1 Input (X5/X7)			
Pin	Function	Start/stop operation	Set selection
1	24 V	Supply (for switch/sensor)	
2	0 V		
3	I0.0	Freely programmable	RECBIT1
4	I0.1	Freely programmable	RECBIT2
5	I0.2	Freely programmable	RECBIT3
6	I0.3	Freely programmable	RECBIT4
7	I0.4	Freely programmable	RECBIT5
8	I0.5	(SYNC_IN/B) ¹⁾	CLK_B
9	I0.6	(SYNC_IN/B) ¹⁾	CLK_A
10	I0.7	STOP	STOP
11	I0.8	START/RESET ²⁾	RESET ²⁾
12	I0.9	ENABLE	ENABLE

2 Output (X2)			
Pin	Function	Start/stop operation	Set selection
1	Q0.0	Freely programmable	–
2	Q0.1	Freely programmable	–
3	Q0.2	Freely programmable	–
4	Q0.3	MC_B	RC_B
5	Q0.4	MC_A	RC_A
6	Q0.5	(SYNC_OUT/B) ¹⁾	ACK_B
7	Q0.6	(SYNC_OUT/A) ¹⁾	ACK_A
8	Q0.7	READY	READY
9	24 V	Supply (load supply for outputs)	
10	0 V		

1) Freely programmable, if not used
2) Reset (program reset) only in combination with 0 signal at stop input

Ordering data			
		Part No.	Type
Plug-in card	Digital inputs/outputs (10I/8O)	170 179	SPC200-DIO

Axis controllers SPC200

Technical data



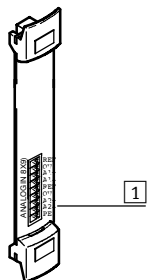
Setpoint module SPC200-2AI-U

Function
Analogue input card




General technical data			SPC200-2AI-U
Current consumption	Plug-in card	[mA]	Typically 10
Analogue inputs	Number		2
	Input voltage	[V DC]	0 ... 10
	Input filter, low pass	[Hz]	16
	Resolution	[bit]	12
	Non-linearity		3 LSB
	Max. amplification error	[%]	0.2
	Max. offset error	[mV]	1.5
	Absolute accuracy	[%]	< 0.3
	Input resistance	[kΩ]	> 200
Reference voltage		[V DC]	10
	Absolute accuracy	[%]	0.4
	Max. current	[mA]	8
Electrical connection			9-pin terminal strip
Weight		[g]	55
Mounting location	→ 5 / 1.3-9		From 3 upwards

Pin allocation



1 9-pin terminal strip included in the scope of delivery.
Connection cross section max. 1.5 mm²

 Note

Max. 2 plug-in cards can be used for position specifications for up to 4 axes.
The allocation of the channel to an axis is programmable.

Only one axis can be allocated to each channel.
Offset and scaling of the setpoint specifications are also separately programmable for each channel.

1 Analogue IN (X9)

Pin	Function
1	Reference voltage 10 V _{REF}
2	0 V
3	A1+; signal (+) for channel 1
4	A1-; signal (-) for channel 1
5	Reference voltage 10 V _{REF}
6	0 V
7	A2+; signal (+) for channel 2
8	A2-; signal (-) for channel 2
9	PE

Ordering data

		Part No.	Type
Plug-in card	Analogue setpoint specification, 2 channels, 0 ... 10 V	170 177	SPC200-2AI-U

Axis controllers SPC200

Technical data



Sub-controller SPC200-SCU-AIF

Function

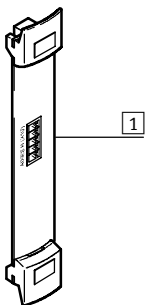
Contains the position controllers for 2 further pneumatic axes and connection for the second axis string



General technical data			
			SPC200-SCU-AIF
Current consumption	Plug-in card	[mA]	Typically 100
Axis connection	2nd string		3rd and 4th pneumatic axes
	Digital inputs	[max]	16 function I/O ¹⁾
	Digital outputs	[max]	16 function I/O ¹⁾
Electrical connection	Axis connection		5-pin terminal strip
Weight		[g]	80
Mounting location → 5 / 1.3-9			From 3 upwards

1) Either as 1 input module and 1 output module of the CP modules or 1 input/output module SPC-FIO-...

Pin allocation



1 Terminal strip on cable type KSPC-AIF-1-WD-... pre-assembled

Connecting cable → 5 / 1.3-34, no. 1

1 AXES B (X10)	
Pin	Function
1	CAN-LOW (brown)
2	CAN-LOW (white)
3	24 V (yellow)
4	0 V (green)
5	24 V load supply (grey)

Ordering data			
		Part No.	Type
Plug-in card	Sub-controller for 3rd and 4th pneumatic axes	178 311	SPC200-SCU-AIF

Axis controllers SPC200

Technical data



Stepper motor interface SPC200-SMX-1

Function

Stepper motor interface with clock/
direction interface and all necessary
sensor inputs



General technical data				SPC200-SMX-1	
Current consumption		Plug-in card	[mA]	Typically 80	
Stepper motor interface	Inputs	+ READY	[V DC]	24 ¹⁾	
		- READY		Connect via relay contact	
		Switching current	[mA]	Typically 8	
	Outputs	PULSE, DIRECTION, ENABLE, F/H STEP			
		Version			Push-pull to RS 485/RS 422 ²⁾
		Max. line length	[m]		50
Step frequency			[Hz]	80 ... 40,000	
Frequency ramp			[kHz/s]	Max. 500	
Programmable travel			[mm]	0 ... 9,999.99	
Resolution			[steps/mm]	0.01000 ... 9,999.99999	
Sensors	Digital inputs	Number		3	
		Version		To IEC 61131-2, positive logic (PNP)	
		Voltage	[V DC]	24 ±15% ³⁾	
		Input current	[mA]	Typically 8	
Electrical connections		Stepper motor		15-pin SUB-D, female	
		Sensors		5-pin terminal strip	
Weight			[g]	69	
Mounting location	→ 5 / 1.3-9			From 3 upwards	

1) Connected internally with 24 V of the sensor supply (pin 4)

2) As point to point connection

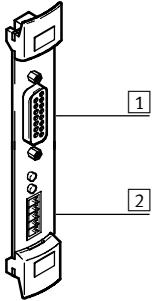
3) Note voltage range of the sensors used

Axis controllers SPC200

Technical data



Pin allocation



- 1 15-pin SUB-D socket for connection of the stepper motor controller
- 2 5-pin terminal strip included in the scope of delivery. Connection cross section max. 1.5 mm²

Connecting cable → 5 / 1.3-35, no. 8



Note

With the plug-in card SPC200-SMX-1 the SPC200 can control a stepper motor axis. Max. 3 cards SPC200-SMX-1 can be used to control stepper motor axes.

1 Amplifier (X30)	
Pin	Function
1	+ PULSE (pulse)
2	+ DIRECT. (direction)
3	+ ENABLE (gate/enable)
4	Unused
5	+ F/H STEP switching (full/half step)
6	- F/H STEP switching (full/half step)
7	Unused
8	+ READY (readiness)
9	- PULSE (pulse)
10	- DIRECT. (direction)
11	- ENABLE (gate/enable)
12	Unused
13	Unused
14	Unused
15	- READY (readiness)

2 End and reference switches	
Pin	Function
1	LIM+
2	REF
3	LIM-
4	24V
5	0V

Ordering data			
		Part No.	Type
Plug-in card	Stepper motor interface	175 731	SPC200-SMX-1
User documentation	For stepper motor interface, German	188 894	P.BE-SPC200-SMX-1-DE
	For stepper motor interface, English	188 895	P.BE-SPC200-SMX-1-EN
	For stepper motor interface, French	194 506	P.BE-SPC200-SMX-1-FR
	For stepper motor interface, Italian	194 507	P.BE-SPC200-SMX-1-IT

Axis controllers SPC200

Technical data



Profibus-DP interface SPC200-COM-PDP

Function

Profibus interface of the SPC200 as slave to a Profibus network



General technical data			SPC200-COM-PDP	
Current consumption	Plug-in card	[mA]	Typically 50	
Profibus	Version		RS 485	
	Electrical isolation		Yes	
	Type of transmission		Serial asynchronous, half-duplex	
	Protocols		Profibus-DP (standard slave), to DIN 19245, 1 – 4, EN 50170 Vol. 2	
	Addressing range of the fieldbus interface		0 ... 125	
	Max. address volume	Outputs	[Byte]	32
		Inputs	[Byte]	32
	Baud rate		[kBit/s]	9.6 – 12,000 ¹⁾
	Line length		[km]	23.8 ²⁾
Max. load capacity		[mA]	100 ³⁾	
Configuration support for the fieldbus interface			GSD file	
Electrical connection	Profibus		9-pin SUB-D, female	
Weight		[g]	80	
Mounting location → 5 / 1.3-9			From 3 upwards ⁴⁾	

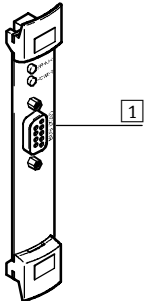
- 1) Automatic baud rate detection
- 2) Line length dependent on baud rate and type of cable
- 3) Supply voltage positive (PV5), pin 6
- 4) When using the control unit MMI-1 as of location 4

Axis controllers SPC200

Technical data



Pin allocation



- 1 9-pin plug usable acc. to Profibus standard, type FBS-SUB-9-WS-PB-K
→ Table below



New

Position data can be read and written directly via Profibus (as of firmware release 2.0)

1 Bus (X20)

Pin	Function
1	PE
2	Unused
3	RxD/TxD-P
4	CNTR-P
5	DGND
6	UP
7	Unused
8	RxD/TxD-N
9	Unused

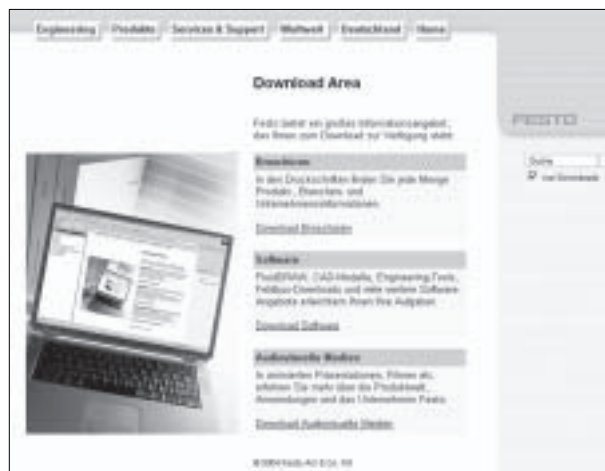
Ordering data

		Part No.	Type
Plug-in card	Profibus-DP interface	170 224	SPC200-COM-PDP
Accessories	Connector plug	533 780	FBS-SUB-9-WS-PB-K
User documentation	For Profibus-DP interface, German	188 892	P.BE-SPC200-COM-PDP-DE
	For Profibus-DP interface, English	188 893	P.BE-SPC200-COM-PDP-EN
	For Profibus-DP interface, French	194 502	P.BE-SPC200-COM-PDP-FR
	For Profibus-DP interface, Italian	194 503	P.BE-SPC200-COM-PDP-IT

Function modules

→ www.festo.com

Function modules that support communication between third-party controllers and the Profibus card of the axis controller SPC200 can be downloaded from the Download Area of the Festo website.



Axis controllers SPC200

Technical data



DeviceNet interface SPC200-COM-CAN

Function

DeviceNet interface of the SPC200 as slave to a DeviceNet network



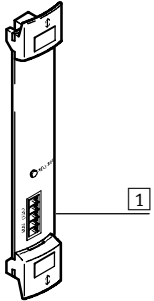
General technical data			SPC200-COM-CAN	
Current consumption	Plug-in card	[mA]	Typically 50	
DeviceNet bus	Version		Physical layer (layer 1) to ISO/DIS 11898 Standard highspeed to 1Mbit Data Link layer (layer 2) to CAN specifications V2.0	
	Electrical isolation		Yes	
	Protocols		DeviceNet, release 2.0	
	Addressing range of the fieldbus interface		0 ... 63	
	Max. address volume	Outputs	[Byte]	8
		Inputs	[Byte]	8
	Baud rate		[kBit/s]	125, 250, 500
Pin allocation			CIA DR-303-1	
Configuration support for the fieldbus interface			EDS file	
Electrical connection	CAN		5-pin terminal strip	
Weight		[g]	80	
Mounting location	→ 5 / 1.3-9		From 3 upwards	

Axis controllers SPC200

Technical data



Pin allocation



- 1 5-pin terminal strip included in the scope of delivery.
Connection cross section max. 1.5 mm²



New

The card SPC200-COM-CAN facilitates the connection of the SPC200 to DeviceNet.
The operating modes that are available via digital I/Os are emulated.

1 Bus (X20)

Pin	Function
1	0 V bus interface/logic (CAN_GND)
2	Data - (CAN_L)
3	Screen (CAN_SHLD)
4	Data + (CAN_H)
5	24 V DC bus interface/logic (CAN_V+)

Ordering data

		Part No.	Type
Plug-in card	DeviceNet interface	194 017	SPC200-COM-CAN
User documentation	For DeviceNet interface, German	196 607	P.BE-SPC200-COM-CANDN-DE
	For DeviceNet interface, English	196 608	P.BE-SPC200-COM-CANDN-EN
	For DeviceNet interface, French	196 611	P.BE-SPC200-COM-CANDN-FR
	For DeviceNet interface, Italian	196 610	P.BE-SPC200-COM-CANDN-IT

Axis controllers SPC200

Technical data



Interbus interface SPC200-COM-IBS

Function
Interbus interface of the SPC200 to an
Interbus network



General technical data			SPC200-COM-IBS
Current consumption	Plug-in card	[mA]	Typically 70
Interbus	Version		RS 422
	Electrical isolation		Yes
	Type of transmission		Serial asynchronous, full-duplex
	Protocols		Remote bus
	Max. no. of process data bits	Outputs	64
		Inputs	64
	Baud rate	[kBit/s]	500
	Line length, overall system	[km]	12.8
	Between 2 remote bus stations	[m]	400
Configuration support for the fieldbus interface			Icons for CMD software
Electrical connection	Input		9-pin SUB-D, male
	Output		9-pin SUB-D, female
Weight		[g]	80
Mounting location → 5 / 1.3-9			From 3 upwards ¹⁾

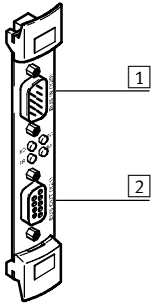
1) When using the control unit MMI-1 as of location 4

Axis controllers SPC200

Technical data



Pin allocation



1 + 2 Cable with plug acc. to Interbus standard



Note
The card SPC200-COM-IBS facilitates the connection of the SPC200 to Interbus.
The operating modes that are available via I/Os are emulated.

1 IN (X20)	
Pin	Function
–	Housing/screen
1	D0
2	DI
3	Load
4	Unused
5	Unused
6	/D0
7	/DI
8	Unused
9	Unused

2 OUT (X21)	
Pin	Function
–	Housing/screen
1	D0
2	DI
3	Load
4	Unused
5	VCC
6	/D0
7	/DI
8	Unused
9	RBST

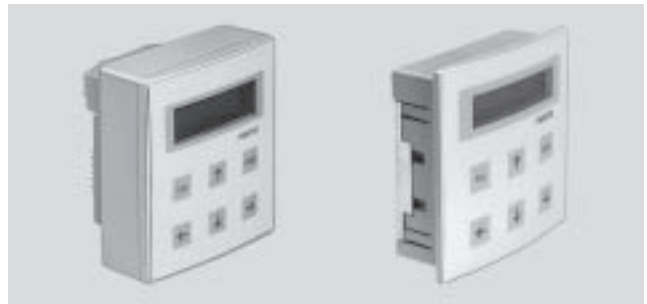
Ordering data		
		Part No. Type
Plug-in card	Interbus interface	170 225 SPC200-COM-IBS
User documentation	For Interbus interface, German	188 890 P.BE-SPC200-COM-IBS-DE
	For Interbus interface, English	188 891 P.BE-SPC200-COM-IBS-EN
	For Interbus interface, French	194 504 P.BE-SPC200-COM-IBS-FR
	For Interbus interface, Italian	194 505 P.BE-SPC200-COM-IBS-IT

Axis controllers SPC200

Data sheet



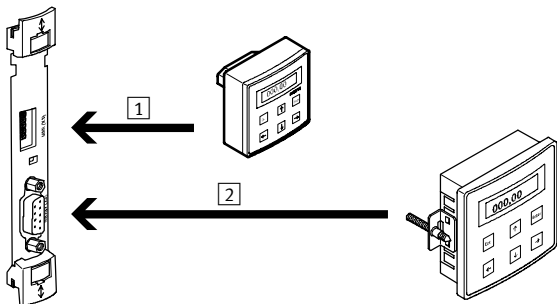
Control unit
SPC200-MMI-1
SPC200-MMI-1F



General technical data			SPC200-MMI-1	SPC200-MMI-1F
Display			LCD display, 2 x 16 characters	
Operation			Touch-sensitive keypad with 6 keys	
Power supply		[V DC]	5 ¹⁾	24
Current consumption		[mA]	30 ²⁾	50
Interface			3)	RS 232 C
Electrical isolation			No	Yes
Electrical connections	Interface		10-pin row	9-pin SUB-D, male
	Power supply		10-pin row	3-pin terminal strip
Ambient conditions	Temperature range	[°C]	-5 ... +50	0 ... +50
	Protection class to IEC 60529		IP20	IP65 ⁴⁾
Weight		[g]	90	225

- 1) Is supplied directly via the plug-in card SPC200-MMI-DIAG
- 2) Referred to 24 V supply of the SPC200-PVR card
- 3) Similar to RS 232
- 4) Built in at front, IP20 at rear

Pin allocation



- 1) Plug-in direct
- 2) For front panel mounting; connection via connecting cable type KDI-PPA-3-BU9

Connecting cable → 5 / 1.3-34, no. 7

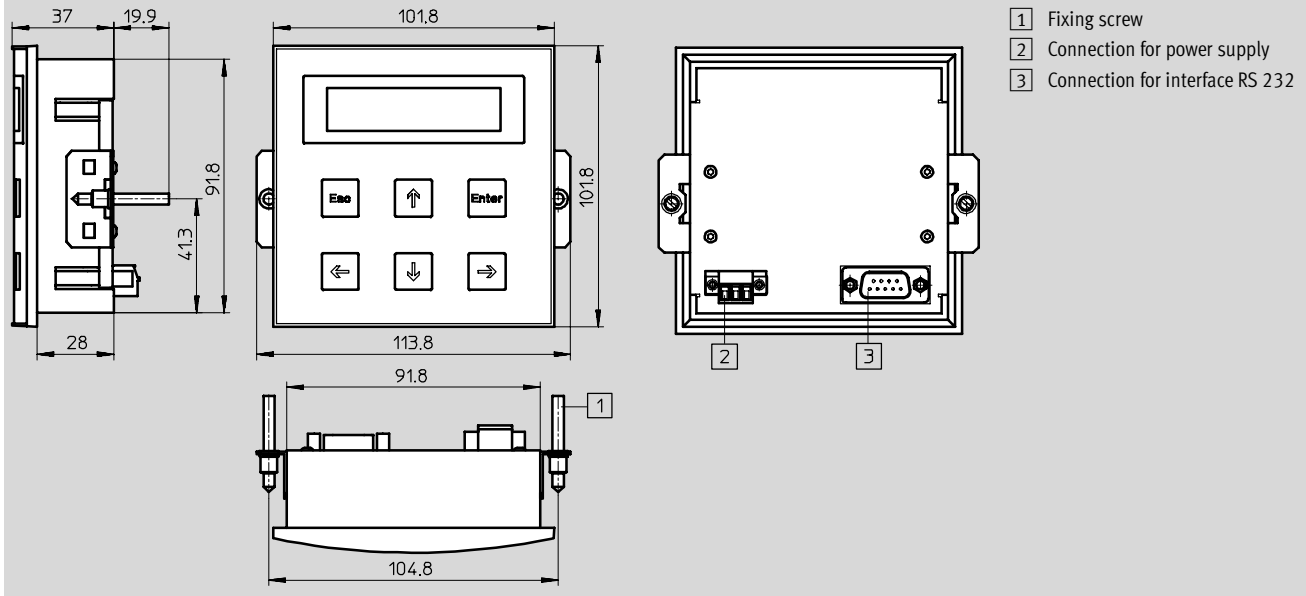
Axis controllers SPC200

Technical data



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

SPC200-MMI-1F



Ordering data		Part No.	Type
Control unit	For commissioning, programming and diagnostics	170 226	SPC200-MMI-1
		194 018	SPC200-MMI-1F

Servopneumatic positioning systems
Axis positioning controllers

1.3

Axis controllers SPC200

Technical data



Axis interface

SPC-AIF-POT

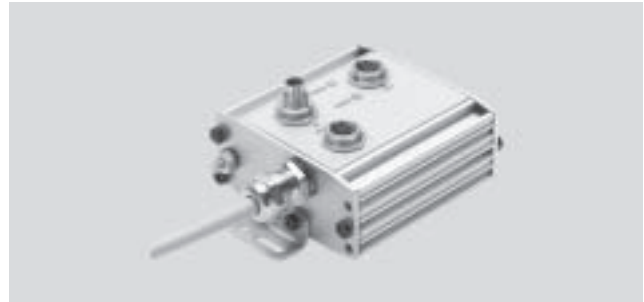
SPC-AIF-POT-LWG

SPC-AIF-MTS

Function

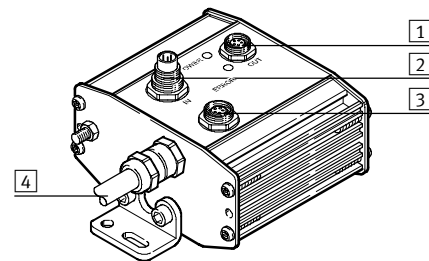
Connection of the proportional valve and the displacement encoder of a pneumatic axis to the SPC200.

Routing of the axis connection to the second axis interface or to a CP module



General technical data		SPC-AIF-POT	SPC-AIF-POT-LWG	SPC-AIF-MTS
Current consumption	Axis interface [mA]	100	100	200
	Prop. directional control valve, max. [A]	1.1		
Electrical connections	AIF IN	5-pin M9, male		
	AIF OUT	5-pin M9, female		
	Prop. directional control valve	7-pin M9, male		
	Displ. encoder cable length [m]	0.3		
	Plug	Type A DIN 43650	4-pin square plug	6-pin round connector DIN 45322
Ambient conditions	Temperature range [°C]	0 ... +50		
	Protection class to IEC 60529	IP65		
Weight	[g]	300		

Pin allocation



Connecting cable → 5 / 1.3-34,
no. 2/no. 3/no. 5

1 AIF OUT	
Pin	Function
1	24 V (yellow)
2	24 V load supply (grey)
3	0 V (green)
4	CAN-HIGH (white)
5	CAN-LOW (brown)
PE	Screen

2 AIF IN	
Pin	Function
1	24 V (yellow)
2	24 V load supply (grey)
3	0 V (green)
4	CAN-HIGH (white)
5	CAN-LOW (brown)
PE	Screen

3 Proportional directional control valve	
Pin	Function
1	+24 V
2	0 V
3	0 V
4	Setpoint value
5	GND
6	Unused
7	+24 V
PE	Screen

4 Displacement encoder type POT	
Pin	Function
1	+10 V (green)
2	Signal (white)
3	GND (brown)
PE	PE (yellow)

4 Displacement encoder type LWG	
Pin	Function
1	+10 V (green)
2	Signal (white)
3	GND (brown)
PE	PE (yellow)

4 Displacement encoder type MTS	
Pin	Function
1	Can LOW (white)
2	Can HIGH (yellow)
3	Unused
4	Unused
5	+24 V (green)
6	0 V (brown)
PE	Screen

Axis controllers SPC200

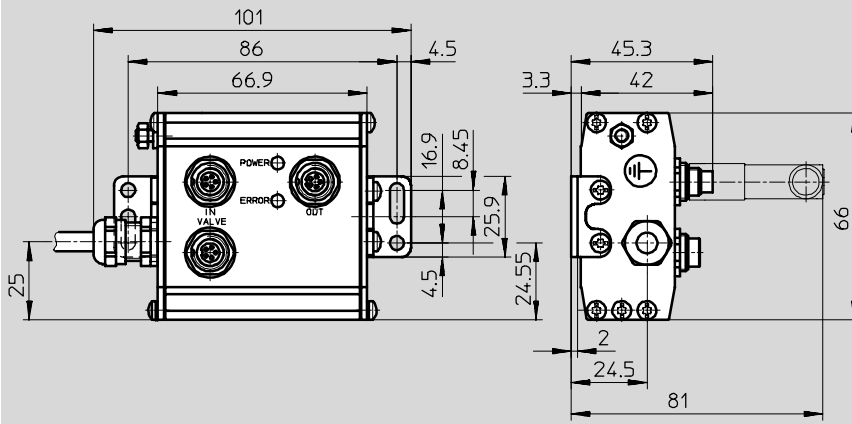
Technical data



Dimensions

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

SPC-AIF-POT/-LWG/-MTS



Ordering data

		Part No.	Type
Axis interface	For analogue displacement encoder	170 228	SPC-AIF-POT
		527 496	SPC-AIF-POT-LWG
	For digital displacement encoder	170 231	SPC-AIF-MTS
Accessories	Terminating resistor for AIF string	175 403	KABS-M9-R100 ¹⁾

1) One contained in SPC200/POX

Axis controllers SPC200

Technical data



Axis interface SPC-AIF-INC

Function

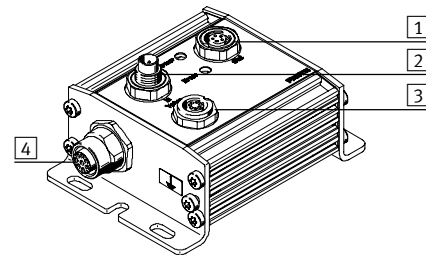
Connection of the proportional valve and the displacement encoder of a pneumatic axis to the SPC200.

Routing of the axis connection to the second axis interface or to a CP module



General technical data			SPC-AIF-INC
Current consumption	Axis interface	[mA]	60
	Prop. directional control valve, max.	[A]	1.1
Electrical connections	AIF IN		5-pin M9, male
	AIF OUT		5-pin M9, female
	Prop. directional control valve		7-pin M9, male
	Displacement encoder		8-pin M12, female
Ambient conditions	Temperature range	[°C]	0 ... +50
	Protection class to IEC 60529		IP65
Weight		[g]	240

Pin allocation



Connecting cable → 5 / 1.3-34,
no. 2/no. 3/no. 5

1 AIF OUT	
Pin	Function
1	24 V (yellow)
2	24 V load supply (grey)
3	0 V (green)
4	CAN-HIGH (white)
5	CAN-LOW (brown)
PE	Screen

2 AIF IN	
Pin	Function
1	24 V (yellow)
2	24 V load supply (grey)
3	0 V (green)
4	CAN-HIGH (white)
5	CAN-LOW (brown)
PE	Screen

3 Proportional directional control valve	
Pin	Function
1	+24 V
2	0 V
3	0 V
4	Setpoint value
5	GND
6	Unused
7	+24 V
PE	Screen

4 Displacement encoder type INC	
Pin	Function
1	5 V
2	GND
3	sin+
4	sin-
5	cos-
6	cos+
7	Screen
8	-

Axis controllers SPC200

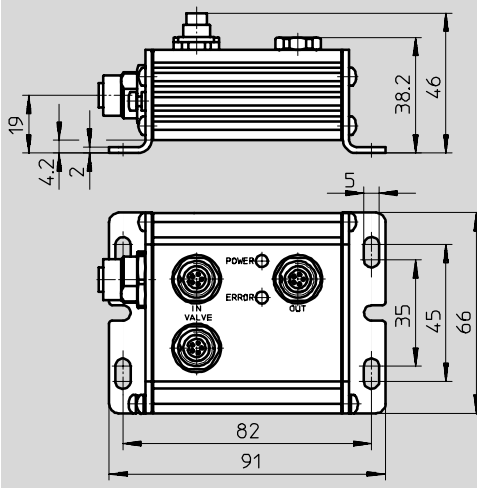
Technical data



Dimensions

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SPC-AIF-INC



Ordering data

		Part No.	Type
Axis interface	For digital displacement encoder	537 320	SPC-AIF-INC
Accessories	Terminating resistor for AIF string	175 403	KABS-M9-R100 ¹⁾

1) One contained in SPC200/POX

Axis controllers SPC200

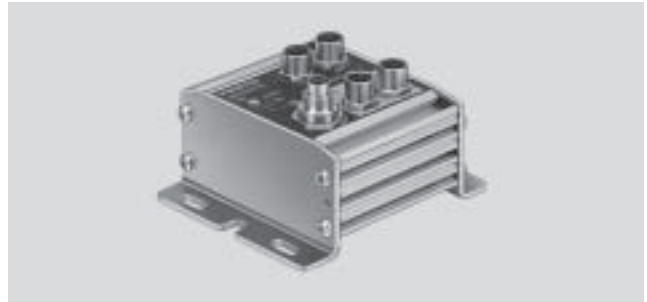
Technical data

FESTO

Input/output module SPC-FIO-2E/2A-M8

Function

Connection of 2 inputs and outputs
via the axis connection



General technical data			SPC-FIO-2E/2A-M8
Current consumption	Module	[mA]	Typically 50
Digital inputs	Number		2
	Supply	[V DC]	24 ¹⁾
	Current consumption	[A]	Max 0.5 ²⁾
	Fuse protection for sensor supply		Electronic short-circuit protection
Digital outputs	Number		2
	Supply	[V DC]	24 ³⁾
	Max. current-carrying capacity per output	[mA]	250
	Fuse protection for outputs		Electronic, all outputs
	Max. tripping current	[mA]	500
Version	Inputs/outputs		To IEC 61131-2, positive logic (PNP)
Electrical isolation	Inputs/outputs		No
Electrical connections	Inputs		3-pin M8, female
	Outputs		3-pin M8, female
	Axis connection		5-pin M9, male
Ambient conditions	Temperature range	[°C]	0 ... +50
	Protection class to DIN 60 529		IP65
Weight		[g]	266

1) Connected via the internal 24 V logic supply of the SPC200

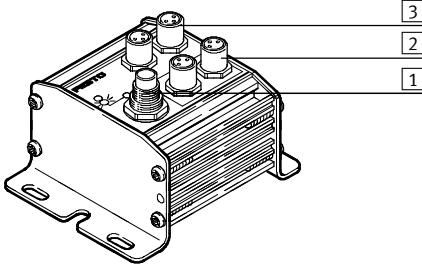
2) All inputs together

3) From load supply of the axis connection


Axis controllers SPC200

Technical data

Pin allocation



Connecting cable → 5 / 1.3-34,
no. 3

 Note
Integrated terminating resistor.

1 Axis interface string AIF (X1)

Pin	Function
1	24 V
2	24 V load supply
3	0 V
4	CAN-HIGH
5	CAN-LOW

2 INPUT

Pin	Function
1	24 V
2	Input
3	0 V

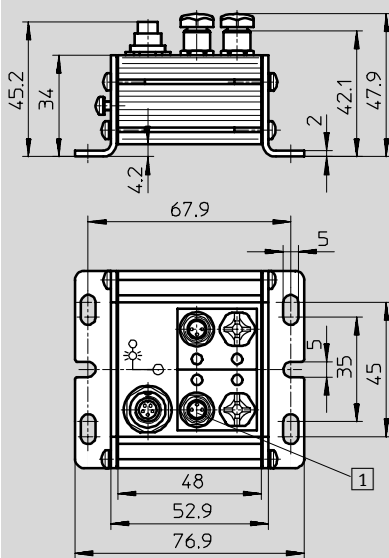
3 OUTPUT

Pin	Function
1	Output
2	Unused
3	0 V

Dimensions

SPC-FIO-2E/2A-M8

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



1 Plug M8

Ordering data

		Part No.	Type
Input/output module	Function I/O module with 2 inputs and 2 outputs	170 232	SPC-FIO-2E/2A-M8
Accessories	Connector plug	192 009	SEA-3GS-M8-S
	Extension cable	165 610	KM8-M8-GSGD-2,5

Axis controllers SPC200

Technical data



Power supply module SPC-AIF-SUP-24V

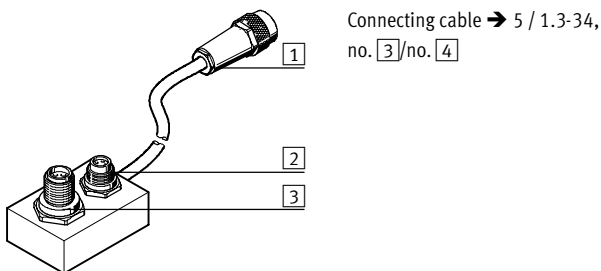
Function

Additional power supply for the load voltage at the axis interface string, for cable lengths over 16 m



General technical data		SPC-AIF-SUP-24V
Electrical connections	AIF IN	5-pin M9, male
	AIF OUT	5-pin M9, female
	Cable length	[m] 0.2
	For load voltage	5-pin M12, male
	Voltage	[V DC] 24 -5/+25%
	Current	[A] 3
Ambient conditions	Temperature range	[°C] 0 ... +50
	Protection class to DIN 60 529	IP65
Weight	[g]	150

Pin allocation



1 AIF OUT	
Pin	Function
1	24 V (yellow)
2	24 V load supply of 3
3	0 V (green)
4	CAN-HIGH (white)
5	CAN-LOW (brown)
PE	Screen

2 AIF IN	
Pin	Function
1	24 V (yellow)
2	Unused
3	0 V (green)
4	CAN-HIGH (white)
5	CAN-LOW (brown)
PE	Screen

3 Load supply	
Pin	Function
1	Unused
2	24 V load
3	0 V
4	Unused

Axis controllers SPC200

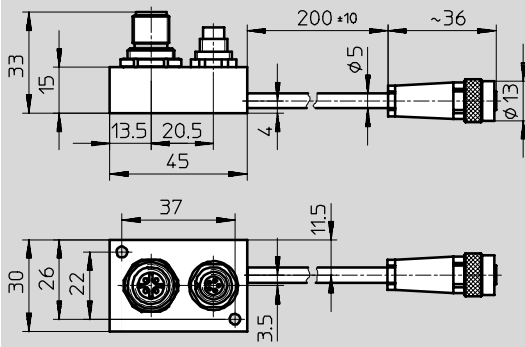
Technical data



Dimensions

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SPC-FIO-2E/2A-M8



Ordering data

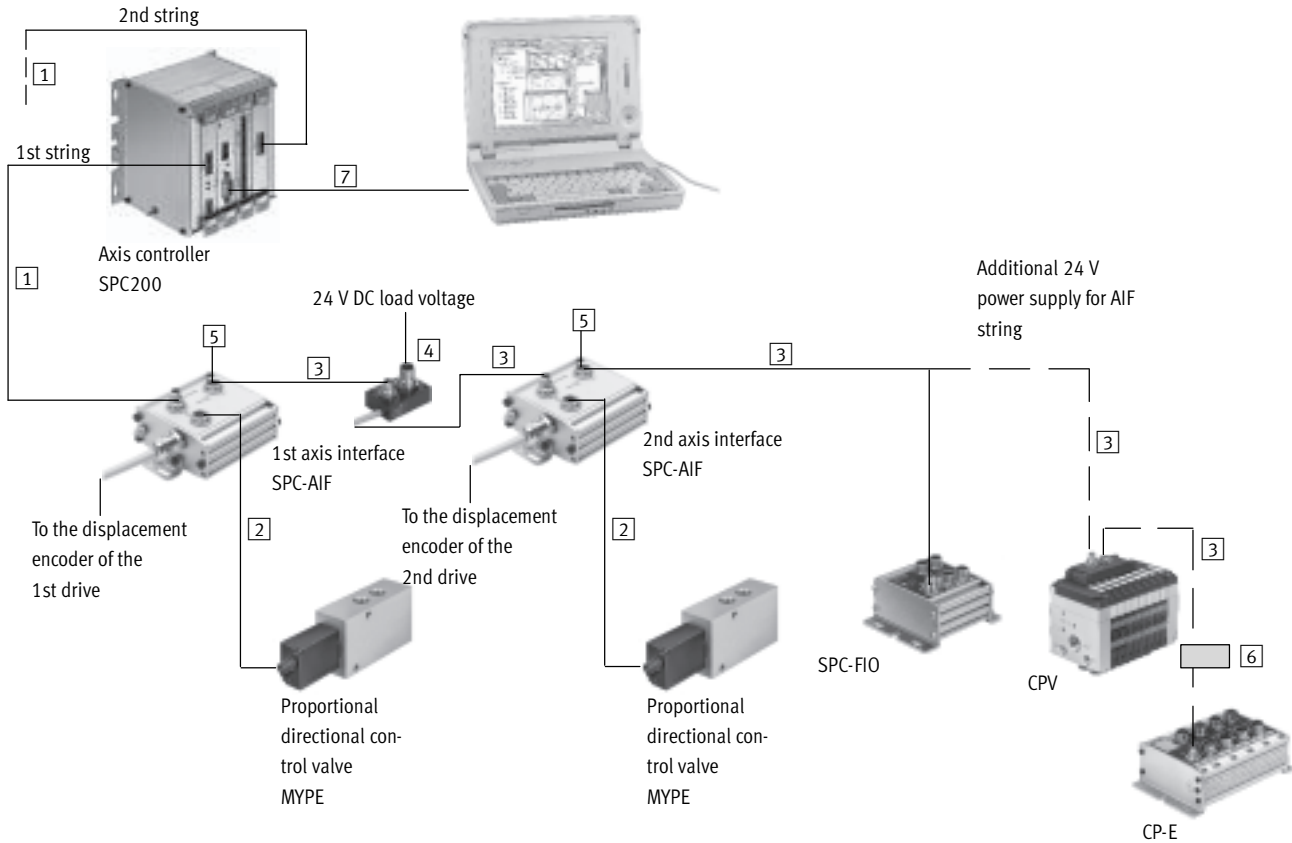
		Part No.	Type
Power supply module	Additional power supply for the load voltage	171 182	SPC-AIF-SUP-24V

Axis controllers SPC200

Accessories



Cables – Pneumatic drives



Servopneumatic positioning systems
Axis positioning controllers

1.3

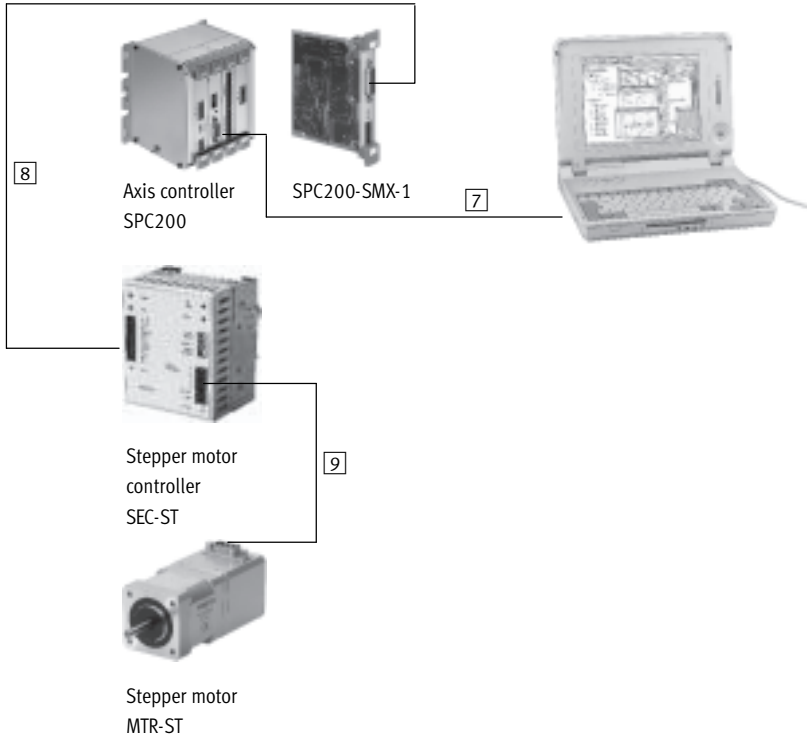
No.	Length [m]	Suitable for chain link trunking	Brief description	Part No.	Type
1	5	–	Connecting cable for axis controller/interface ¹⁾	170 236	KSPC-AIF-1-WD-5
1	8	–	Connecting cable for axis controller/interface ¹⁾	170 237	KSPC-AIF-1-WD-8
2	0.3	–	Connecting cable for axis interface/valve	170 239	KMPYE-AIF-1-GS-GD-0,3
2	2	–	Connecting cable for axis interface/valve	170 238	KMPYE-AIF-1-GS-GD-2
3	2	■	Connecting cable for axis interface/function I/O ¹⁾	170 234	KVI-CP-2-GS-GD-2
3	5	■	Connecting cable for axis interface/function I/O ¹⁾	170 235	KVI-CP-2-GS-GD-5
3	8	■	Connecting cable for axis interface/function I/O ¹⁾	165 616	KVI-CP-2-GS-GD-8
4	–	–	Additional 24 V power supply for AIF string ²⁾	171 182	SPC-AIF-SUP-24 V
5	–	–	Terminating resistor for AIF string ³⁾	175 403	KABS-M9-R100
6	–	–	Terminating resistor for use with CP input modules	171 184	KZW-M9-R100
7	3	–	Programming cable	151 915	KDI-PPA-3-BU9

- 1) The total length of the lines must not exceed 30 m.
- 2) Recommended where the total length of connecting cable is over 16 m.
- 3) Must be connected at the last axis interface in the chain.
(Contained in the controller package SPC200/POX.)

Axis controllers SPC200

Accessories

Cables – Electrical stepper motors



No.	Length [m]	Suitable for chain link trunking	Brief description	Part No.	Type
7	3	–	Programming cable	151 915	KDI-PPA-3-BU9
8	1.5	–	Control cable SPC200-SMX-1/motor controller SEC-ST	530 077	KSPC-SECST-1,5
9	5	■	Motor cable	530 071	KMTR-ST-5

Axis controllers SPC200

Instructions for use



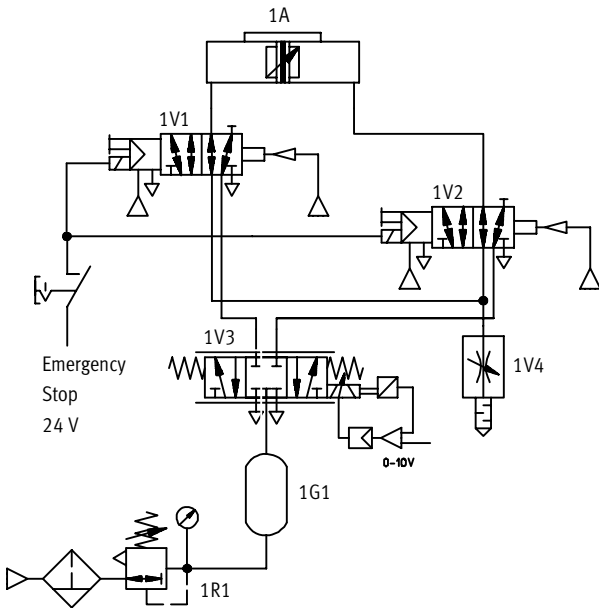
Pneumatic emergency stop circuit

A pneumatic emergency stop circuit is recommended in order to ensure that the system is shut down safely in the event of malfunctions. Choose

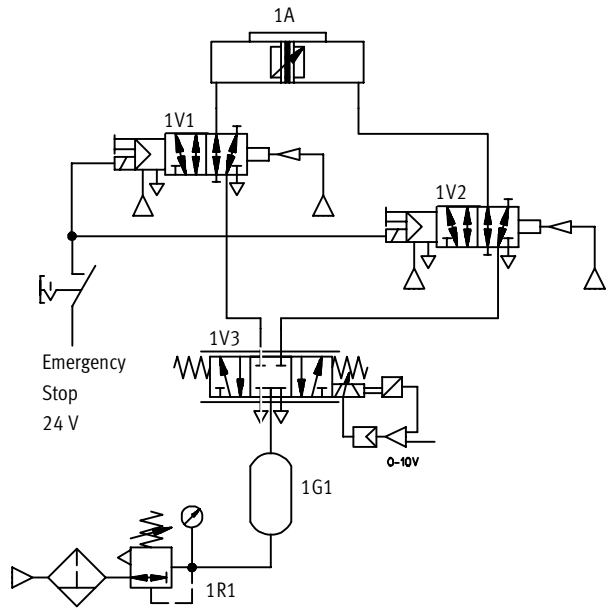
between the following alternatives based on the design and operating characteristics of your system:

- Drive pressureless upon emergency stop
- Drive clamped upon emergency stop
- Drive moves while throttled to the left end position upon emergency stop.

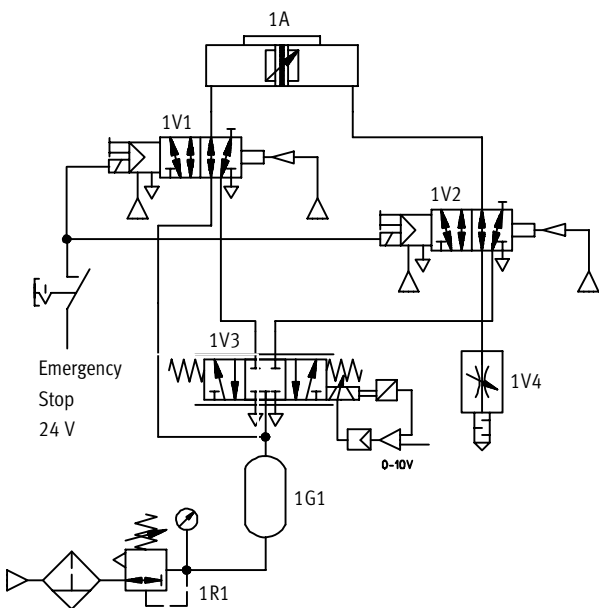
Variant 1: Drive pressureless upon emergency stop



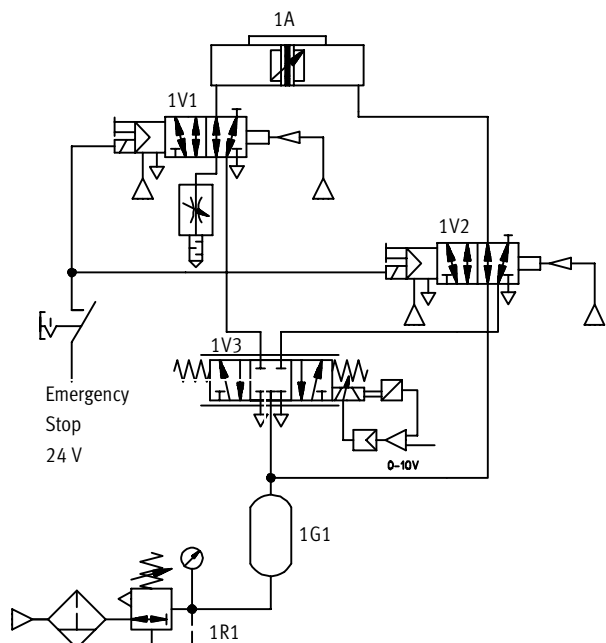
Variant 2: Drive clamped upon emergency stop



Variant 3: Drive moves while throttled to the right end position upon emergency stop



Variant 4: Drive moves while throttled to the left end position upon emergency stop



Axis controllers SPC200

Instructions for use



Components for emergency stop circuits		
Product designation	Requirements	Recommendation/type
1V1, 1V2	5/2-way valve – with pneumatic spring return – with auxiliary pilot air – with reversible flow direction – flow rate coordinated to the proportional directional control valve used (1V3)	With CPE10-... and CPE14-...: – Type CPE...-M1BH-5LS-... With CPE18-... and CPE24-...: – Type CPE...-M1B-5LS-...
1V3	Proportional directional control valve MPYE-... – flow coordinated to the drive used (1A)	Type MPYE-5-...-010B
1V4	One-way flow control valve for exhaust air with silencer – defines the speed at which the drive is moved to the desired end position, adjustable – must be mounted in the vicinity of the valves (1V1, 1V2)	One-way flow control valve for exhaust air Type GRLA-...-B Silencer Type U-...
1R1	Filter regulator – with 5 µm filter cartridge – standard nominal flow rate coordinated to the air flow requirement of the connected drive	Type LFR-...-D-5M-...
1G1	Air reservoir (optional)	Type CRVZS-...

Coordinated combinations					
Components	Proportional directional control valve MPYE-...				
	M5	1/8-LF	1/8-HF	1/4	3/8
One-way flow control valve for exhaust air GRLA-...-B	M5	1/8	1/8	1/4	3/8
5/2-way valve CPE-...	CPE10-...	CPE14-...	CPE18-...	CPE24-...	CPE24-...
Filter regulator LFR-...-...-MINI	1/8	1/4	–	–	–
Filter regulator LFR-...-...-MIDI	–	–	1/4	1/2	–
Filter regulator LFR-...-...-MAXI	–	–	–	–	1/2

