

# Positioner CMSX



Festo Core Range  
Solves the majority of your automation tasks

With the Festo Core Range, we have selected the most important products and functions from our broad product catalogue, and added the quickest delivery.

Worldwide: Quickest delivery – wherever, whenever  
Simply good: Expected high Festo quality  
Fast: Easy and fast to select

The Core Range offers you the best value for your automation tasks.



## Key features

### Function and application

The CMSX is a digital electropneumatic positioner that enables simple and efficient control of the position of process valves actuated by pneumatic actuators. This robust and compact positioner can be mounted on actuators using a mechanical interface in accordance with VDE/VDI 3845-1 (IEC 60534-6-2). There are product variants for single or double-acting actuators, different flow rates and safety settings (fail-safe, fail in place).

In addition, there are product variants for connecting external displacement/ angular sensors to remotely control the position of process valves. Commissioning is simple and robust thanks to an automated initialisation function. For setpoint specification 0/4 ... 20 mA current signals or 0 ... 10 V voltage signal are used, and for analogue position feedback a 4 ... 20 mA current signal is used. The device status is indicated by a digital

alarm output. In addition, a configurable digital input for travel to specific positions and two configurable digital outputs provide feedback on the position limit values. Several freely configurable software functions make the CMSX a flexible solution for any task.

### Innovative

- Sturdy, highly dynamic solenoid valve technology
- No internal air consumption in the controlled state
- Straightforward commissioning thanks to automated initialisation function
- Simple and self-explanatory menu navigation

### Versatile

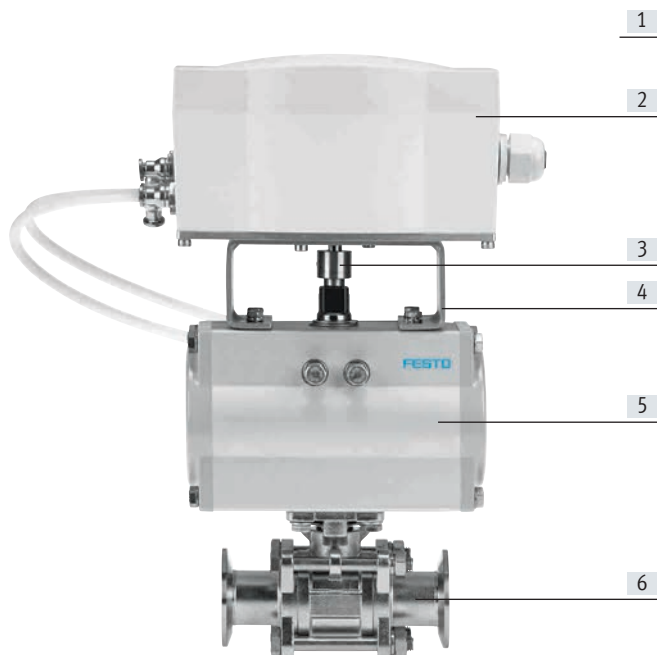
- For single- or double-acting actuators
- Fail-safe or fail-in-place safety function
- Direct connection to quarter turn actuators as per VDE/VDI 3845-1 (IEC 60534-6-2) or remote connection with external displacement encoder

### Design

- 4-conductor technology
- Operating voltage 24 V DC
- Setpoint input 0/4 ... 20 mA, 0 ... 10 V
- Position feedback 4 ... 20 mA
- 1 digital input
- 2 digital outputs
- 1 digital alarm output for feedback of the device status
- Compact polymer housing
- Standard nominal flow rate 50 l/min or 130 l/min
- Housing degree of protection IP65

## Key features

### System structure



- [1] Higher-level system (PLC/IPC or external setpoint generator)
- [2] Positioner CMSX
- [3] Mechanical coupling
- [4] Mounting adapter DARQ
- [5] Quarter turn actuator (example: DFPD)
- [6] Process valve (example: VZBD)

### Positioner/actuator combinations<sup>1)</sup>

CMSX-...	Quarter turn actuator		Linear actuator
	DFPD	DAPS	DFPI
Flow rate	Piston $\varnothing$	Piston $\varnothing$	Piston $\varnothing$
...-50-...	$\geq 160$	$\geq 180$	-
...-130-...	$\geq 240$	$\geq 240$	$\geq 100$

1) Precise selection of the positioner for the actuator is dependent on the specific application. Please consult your local Festo contact.

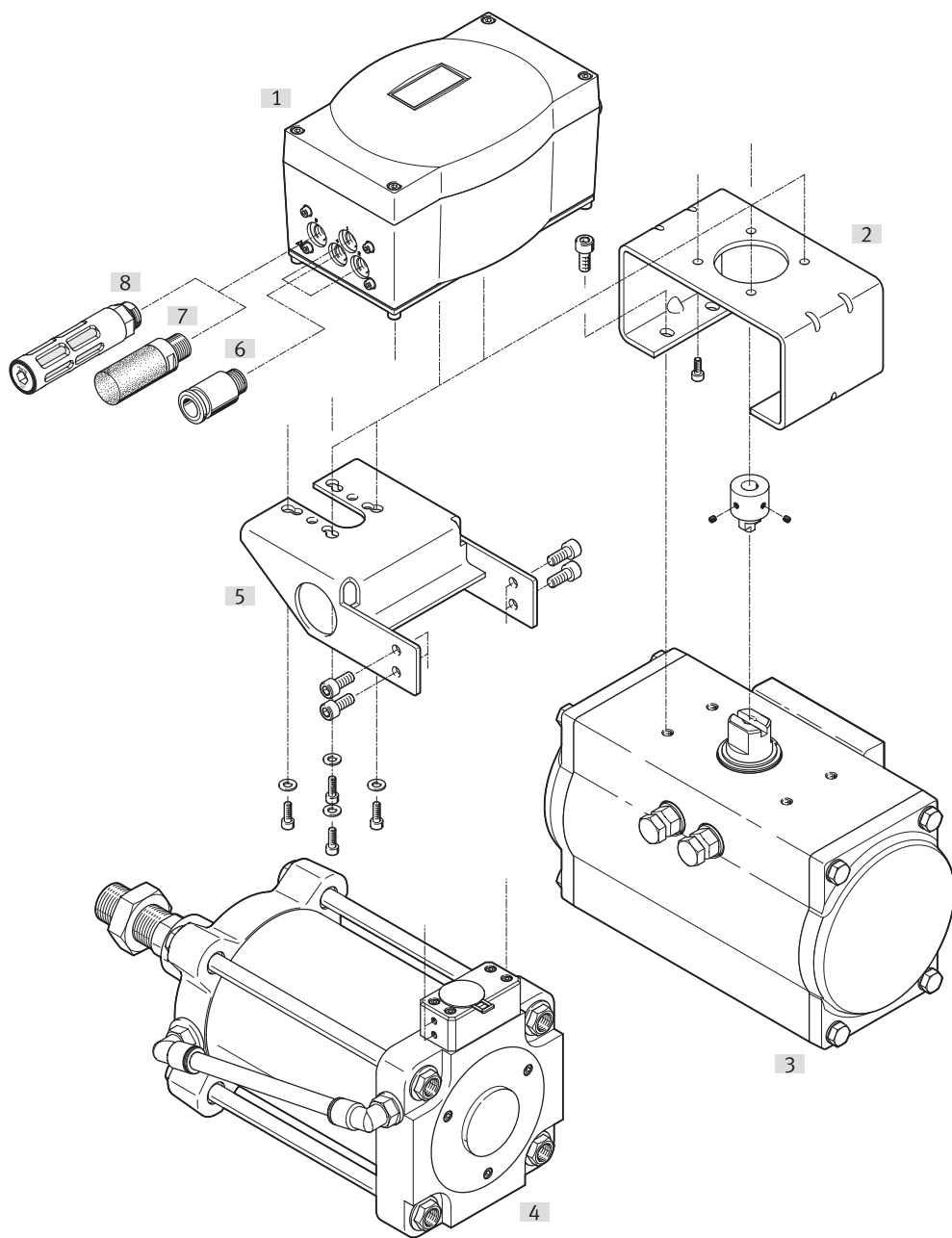
## Type codes

<b>001</b>	<b>Series</b>	
<b>CMSX</b>	Positioner for process automation	
<b>002</b>	<b>Product version</b>	
<b>P</b>	Mainly polymer	
<b>003</b>	<b>Design type</b>	
<b>S</b>	Positioner, displacement/integrated angular position detection	
<b>SE</b>	Positioner, displacement/external angular position detection	
<b>004</b>	<b>Display type</b>	
<b>C</b>	LCD, backlit	
<b>005</b>	<b>Reference value</b>	
<b>U</b>	Configurable (0...10 V/0...20 mA/4...20 mA)	
<b>006</b>	<b>Position feedback</b>	
<b>F1</b>	4...20 mA	

<b>007</b>	<b>Function</b>	
<b>D</b>	Double-acting	
<b>S</b>	Single-acting	
<b>008</b>	<b>Flow rate [l/min]</b>	
<b>50</b>	50	
<b>130</b>	130	
<b>009</b>	<b>Safety function</b>	
<b>A</b>	Opening or closing in the event of system failure <sup>1)</sup>	
<b>C</b>	Hold position in the event of a system failure <sup>1)</sup>	
<b>010</b>	<b>Generation</b>	
	2nd generation	


1) Failure of the operating voltage supply or the setpoint specification

Peripherals overview

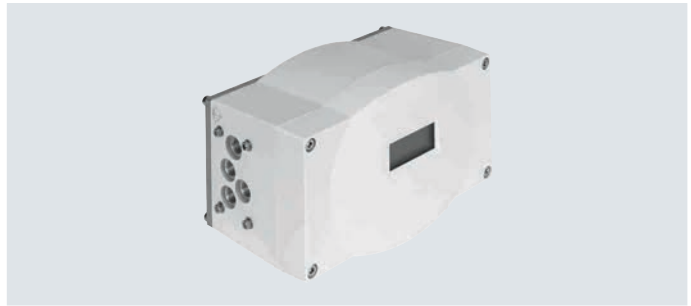


Mounting attachments and accessories		Description	→ Page/Internet
[1]	Positioner CMSX	For single- and double-acting linear or quarter turn actuators	6
[2]	Mounting adapters DARQ	For connecting positioners and actuators for process automation	14
[3]	Quarter turn actuator DFPD	Actuators for process automation	dfpd
[4]	Linear actuator DFPI	Actuators for process automation with integrated displacement encoder	dfpi
[5]	Adapter kit DADG	For direct mounting of a positioner on the actuator	15
[6]	Push-in fittings QS	A secure solution for every connection	15
[7]	Silencer UC	For reducing noise at exhaust ports	15
[8]	Silencer U	With polymer male thread	u

Data sheet

-  - Flow rate  
50 ... 130 l/min

- Product versions for fail-safe or fail-in-place safety function
- Product versions for single- or double-acting actuators



General technical data		Direct connection to quarter turn actuators with integrated displacement/angular detection CMSX-P-S-...	Remote connection with external displacement/angular detection CMSX-P-SE-...
Design	Digital electropneumatic positioner		
Mode of operation			
CMSX-P-S-C-U-F1-D-...	Double-acting		
CMSX-P-S-C-U-F1-S-...	Single-acting		
Design features			
With safety function A and double-acting mode of operation	Safety position – pneumatic output 4 exhausted	–	
	Safety position – pneumatic output 2 exhausted	–	
With safety function A and single-acting mode of operation	Safety position – pneumatic output 4 exhausted	–	
With safety function C	Safety position - pneumatic output closed	–	
Mounting position	Any		
Type of mounting	With accessories		
Measuring principle of displacement encoder	Potentiometer		
Sensing range	0 ... 100	–	
Display	7-segment LCD display With backlighting		
Setting options	Via display and keys		
Size of dead space [%]	0.5 ... 10		
Dimensions W x L x H	190 x 105 x 130 mm		
Product weight [g]	970		
<b>Pneumatic data</b>			
Standard nominal flow rate q <sub>nN</sub>			
CMSX-P-...-C-U-F1-...-50-...	[l/min]	50	
CMSX-P-...-C-U-F1-...-130-...	[l/min]	130	
Pneumatic connection	G1/8		

## Data sheet

General electrical data		Direct connection to quarter turn actuators with integrated displacement/angular detection CMSX-PS-...	Remote connection with external displacement/angular detection CMSX-P-SE-...
Nominal operating voltage DC	[V]	24	
Operating voltage range DC	[V]	21.6 ... 26.4	
Max. current consumption	[mA]	600	
Reverse polarity protection		For operating voltage connections	
Connection resistance	[kOhm]	–	≤ 80

Electrical data		Direct connection to quarter turn actuators with integrated displacement/angular detection CMSX-PS-...	Remote connection with external displacement/angular detection CMSX-P-SE-...
<b>Analogue inputs</b>			
Signal range	[V]	0 ... 10	
	[mA]	0 ... 20	
	[mA]	4 ... 20	
Analogue inputs, max. dynamic range	[V]	0 ... 11	
	[mA]	0 ... 24	
Linearity error at 25°C	[%]	0.5	
Temperature coefficient	[%FS/K]	< 0.02	
Resolution	[bit]	16	
Overload protection		Yes	
Galvanic isolation		No	
<b>Analogue outputs</b>			
Signal range	[mA]	4 ... 20	
Max. load resistance	[ohm]	≤ 600	
Linearity error at 25°C	[%]	0.5	
Temperature coefficient	[%FS/K]	< 0.02	
Resolution	[bit]	12	
Reverse polarity protection		Yes	
Overload protection		Yes	
Short circuit current rating		Yes	
Galvanic isolation		No	
<b>Digital inputs</b>			
Input characteristics		To IEC 61131-2, type 3	
Switching input		PNP	
		NPN	
Reverse polarity protection		Yes	
Electrical isolation		Yes, via optocoupler	
<b>Digital outputs</b>			
Switching output		3x PNP or 3x NPN, switchable	
Output current	[mA]	100	
Reverse polarity protection		Yes	
Overload protection		Yes	
Short circuit current rating		Yes	
Electrical isolation		Yes, via optocoupler	

## Data sheet

<b>Electromechanical systems</b>		Direct connection to quarter turn actuators with integrated displacement/angular detection CMSX-P-S-...	Remote connection with external displacement/angular detection CMSX-P-SE-...
<b>Electrical connection 1</b>			
Function	Power supply		
	Power supply load		
	Analogue input		
	Analogue output		
	3x digital output		
	2x digital input		
Connection type	Terminal strip		
Connection technology	Screw terminal		
Number of pins/wires	13		
Electrical connection 1, tightening torque [Nm]	0.6		
Conductor cross section [mm <sup>2</sup> ]	< 1.5		
<b>Electrical connection 2</b>			
Function	–	External path/angle sensor	
Connection type	–	Terminal strip	
Connection technology	–	Screw terminal	
Number of pins/wires	–	3	
Electrical connection 2, tightening torque [Nm]	–	0.6	
Conductor cross section [mm <sup>2</sup> ]	–	< 1.5	
Cable connector	M20x1.5 for electrical connection 1		
	–	M12x1.5 for electrical connection 2	
Permissible cable diameter	7 ... 13 mm electr. connection 1		
	–	3 ... 6.5 mm electr. connection 2	
Max. cable length	30 m for electrical connection 1		
	–	3 m for electrical connection 2	



## Data sheet

Operating and environmental conditions		
Operating pressure	[MPa]	0.3 ... 0.8
	[bar]	3 ... 8
	[psi]	43.5 ... 116
Operating medium		Compressed air to ISO 8573-1:2010 [7:4:4]
Note on the operating/pilot medium		Lubricated operation not possible
Ambient temperature	[°C]	-5 ... +60
Storage temperature	[°C]	-20 ... +60
Relative humidity	[%]	93
Contamination level		3
Corrosion resistance class CRC <sup>1)</sup>		2 - Moderate corrosion stress
Shock resistance		Shock test with severity level 1 to FN 942017-5 and EN 60068-2-27
		To EN 60068-2-29
Vibration resistance		Transport application test with severity level 2 to FN 942017-4 and EN 60068-2-6
		To EN 60068-2-6
CE marking (see declaration of conformity) <sup>2)</sup>		To EU EMC Directive <sup>3)</sup>
		To EU RoHS Directive
UKCA marking (see declaration of conformity) <sup>2)</sup>		To UK EMC regulations
		To UK RoHS regulations
Certification		RCM compliance mark
Degree of protection		IP65

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

Moderate corrosion stress. Indoor application where condensation is allowed to occur. External visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment.

2) Additional information is available at [www.festo.com/sp](http://www.festo.com/sp) → Certificates.

3) For information about the area of use, see the EC declaration of conformity at: [www.festo.com/sp](http://www.festo.com/sp) → Certificates.

If the devices are subject to usage restrictions in residential, commercial or light-industrial environments, further measures for the reduction of the emitted interference may be necessary.

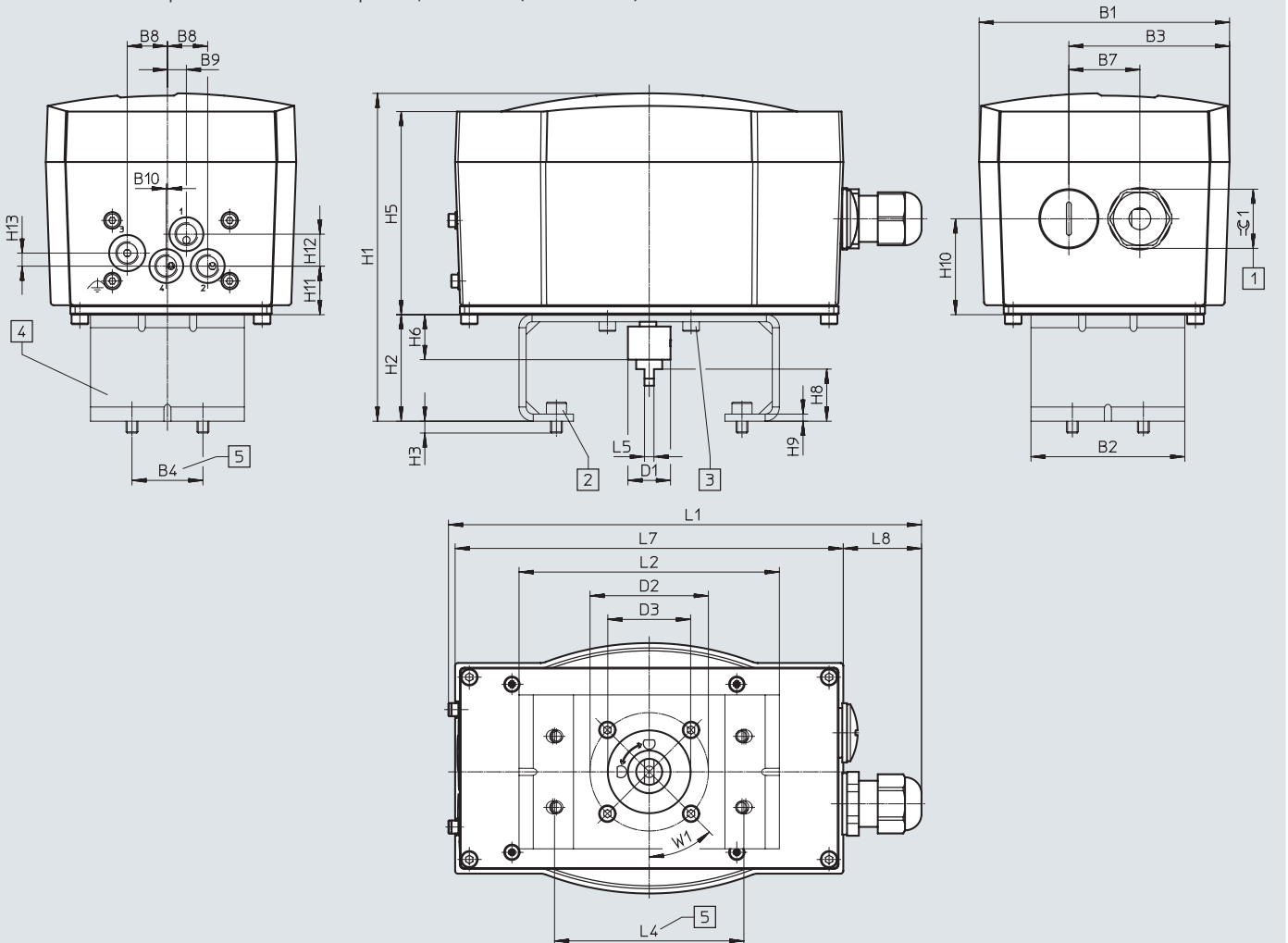
Materials	Direct connection to quarter turn actuators with integrated displacement/angular detection CMSX-P-S-...		Remote connection with external displacement/angular detection CMSX-P-SE-...	
Housing	Reinforced PC			
Inspection window	PC			
Base plate	Anodised wrought aluminium alloy			
Shaft	High-alloy stainless steel			
Coupling	High-alloy stainless steel			
Screws	High-alloy stainless steel			
Seals	NBR			
Cable connector	PA			
Blanking plug	PA		-	
PWIS conformity	VDMA24364-B2-L			
Note on materials	RoHS-compliant			

Data sheet

Dimensions

Download CAD data → [www.festo.com](http://www.festo.com)

Direct connection to quarter turn actuators as per VDE/VDI 3845-1 (IEC 60534-6-2)



- [1] Cable connector M20x1.5
- [4] Mounting adapter DARQ

- [2] Screw DIN 912 M5x16 (4x)
- [5] Flange hole pattern F05 to ISO 5211

- [3] Screw DIN 912 M4x12 (4x)

Type	B1	B2	B3	B4	B7	B8	B9	B10	D1 ∅	D2 ∅	D3 ∅	H3	H5
CMSX-P-S-C-U-F1-D-130-...	105.8	65	67.9	30	30	17	8	0.5	18	50	35	5	85.8
CMSX-P-S-C-U-F1-D-50-...													
CMSX-P-S-C-U-F1-S-50-...													
CMSX-P-S-C-U-F1-S-130-...													

Type	H6	H9	H10	H11	H12	L1	L5	L7	L8	W1	≈ 1
CMSX-P-S-C-U-F1-D-130-...	19	40.5	20.5	13.5	5.5	200	4	164	32.5	45°	25
CMSX-P-S-C-U-F1-D-50-...											
CMSX-P-S-C-U-F1-S-50-...											
CMSX-P-S-C-U-F1-S-130-...											

## Data sheet

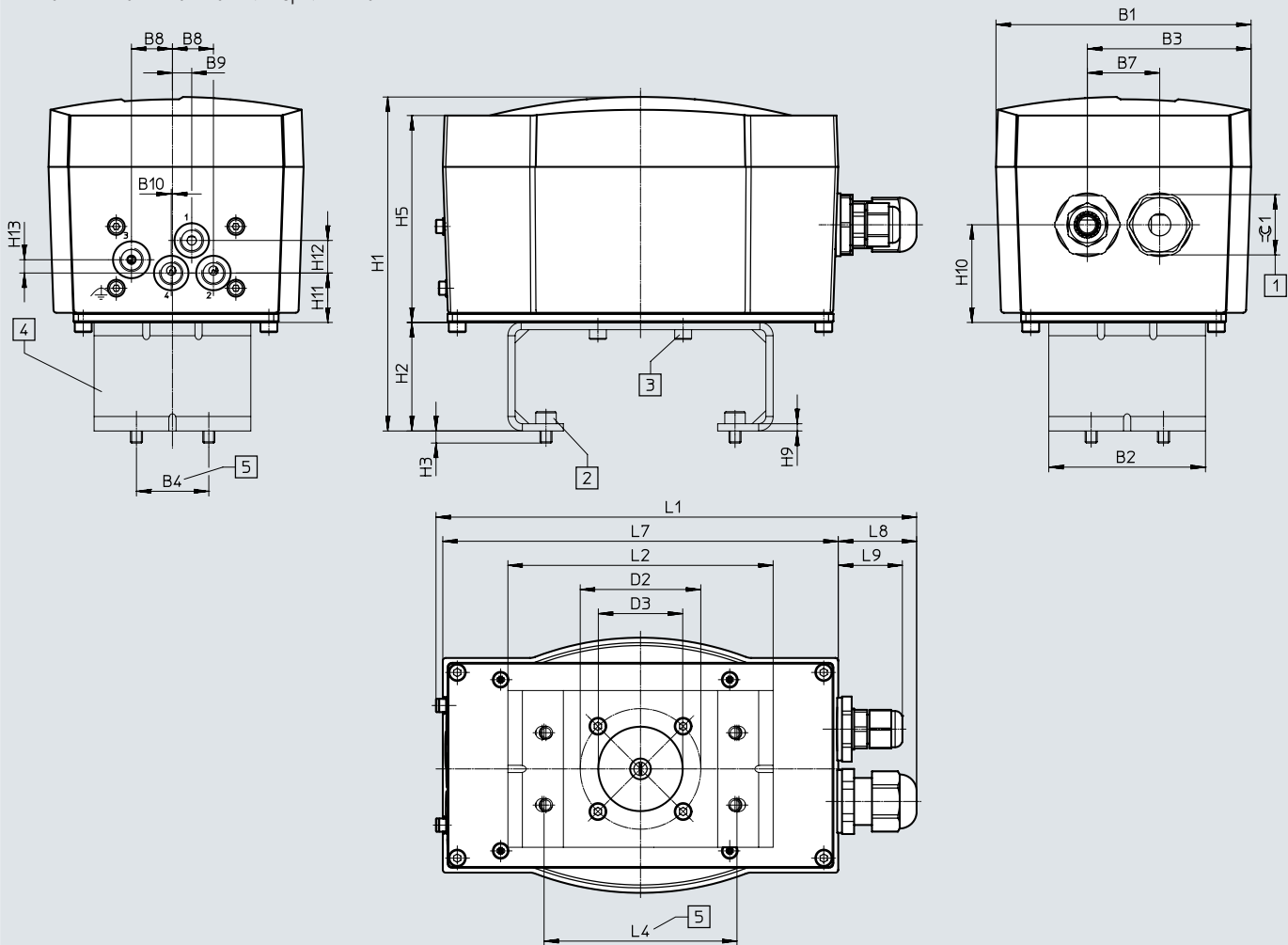
Positioner	Mounting adapters → page 14	H1	H2	H8	L2	L4 ±0.3
CMSX-PS-C-U-F1-D-130-...	DARQ-K-P-A1-F05-20-R1	138.5	45	20	110	80
	DARQ-K-P-A1-F05-30-R1	148.5	55	30	110	80
	DARQ-K-P-A2-F05-30-R1	148.5	55	30	160	130
CMSX-PS-C-U-F1-D-50-...	DARQ-K-P-A1-F05-20-R1	138.5	45	20	110	130
	DARQ-K-P-A1-F05-30-R1	148.5	55	30	110	80
	DARQ-K-P-A2-F05-30-R1	148.5	55	30	160	80
CMSX-PS-C-U-F1-S-50-...	DARQ-K-P-A1-F05-20-R1	138.5	45	20	110	130
	DARQ-K-P-A1-F05-30-R1	148.5	55	30	110	130
	DARQ-K-P-A2-F05-30-R1	148.5	55	30	160	80
CMSX-PS-C-U-F1-S-130-...	DARQ-K-P-A1-F05-20-R1	138.5	45	20	110	80
	DARQ-K-P-A1-F05-30-R1	148.5	55	30	110	130
	DARQ-K-P-A2-F05-30-R1	148.5	55	30	160	130

Data sheet

Dimensions

Download CAD data → [www.festo.com](http://www.festo.com)

Remote connection with external displacement encoder



- [1] Cable connector M20x1.5
- [4] Mounting adapter DARQ

- [2] Screw DIN 912 M5x16 (4x)
- [5] Flange hole pattern F05 to ISO 5211

- [3] Screw DIN 912 M4x12 (4x)






Type	B1	B2	B3	B4	B7	B8	B9	B10	D2 ∅	D3 ∅	D4 ∅	H3
CMSX-P-SE-C-U-F1-....	105.8	65	67.9	30	30	17	8	0.5	50	35	5.4	5

Type	H5	H9	H10	H11	H12	H13	L1	L7	L8	L9	⊙ 1
CMSX-P-SE-C-U-F1-....	85.8	3	40.5	20.5	13.5	5.5	200	164	32.5	25.6	25

Positioner	Mounting adapters → page 14	H1	H2	L2	L4 ±0.3
CMSX-P-SE-C-U-F1-....	DARQ-K-P-A1-F05-20-R1	138.5	45	110	80
	DARQ-K-P-A1-F05-30-R1	148.5	55	110	80
	DARQ-K-P-A2-F05-30-R1	148.5	55	160	130

## Data sheet

## ★ Core product range

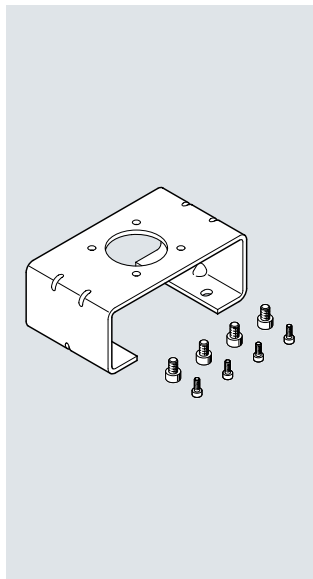
Ordering data					
	Safety position	Standard nominal flow rate [l/min]	Function	Part no.	Type
<b>Direct connection to quarter turn actuators as per VDE/VDI 3845-1 (IEC 60534-6-2)</b>					
	Can be set to open or close in the event of system failure <sup>1)</sup>	50	Double-acting	★ 3929313	CMSX-P-S-C-U-F1-D-50-A
		50	Single-acting	★ 3929370	CMSX-P-S-C-U-F1-S-50-A
<b>Remote connection with external displacement encoder</b>					
	Can be set to open or close in the event of system failure <sup>1)</sup>	130	Double-acting	★ 3929539	CMSX-P-SE-C-U-F1-D-130-A
<b>Ordering data</b>					
	Safety position	Standard nominal flow rate [l/min]	Function	Part no.	Type
<b>Direct connection to quarter turn actuators as per VDE/VDI 3845-1 (IEC 60534-6-2)</b>					
	Can be set to open or close in the event of system failure <sup>1)</sup>	130	Double-acting	3929312	CMSX-P-S-C-U-F1-D-130-A
		130	Single-acting	3929369	CMSX-P-S-C-U-F1-S-130-A
	Maintain position in the event of system failure <sup>1)</sup>	130	Double-acting	3929314	CMSX-P-S-C-U-F1-D-130-C
		50	Double-acting	3929315	CMSX-P-S-C-U-F1-D-50-C
<b>Remote connection with external displacement encoder</b>					
	Maintain position in the event of system failure <sup>1)</sup>	130	Double-acting	3929540	CMSX-P-SE-C-U-F1-D-130-C
	Can be set to open or close in the event of system failure <sup>1)</sup>	130	Single-acting	8171509	CMSX-P-SE-C-U-F1-S-130-A
	Maintain position in the event of system failure <sup>1)</sup>	50	Double-acting	8171508	CMSX-P-SE-C-U-F1-D-50-C
	Can be set to open or close in the event of system failure <sup>1)</sup>	50	Double-acting	8171507	CMSX-P-SE-C-U-F1-D-50-A
	Can be set to open or close in the event of system failure <sup>1)</sup>	50	Single-acting	8171510	CMSX-P-SE-C-U-F1-S-50-A

1) Failure of the operating voltage supply or the setpoint specification

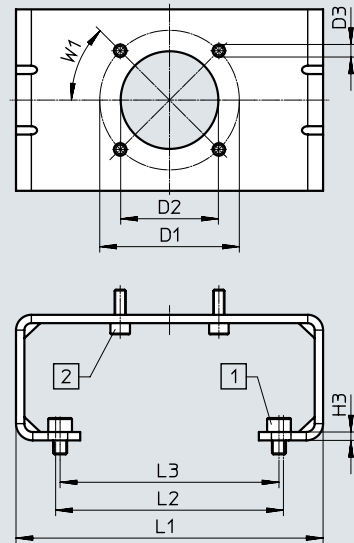
## Accessories

### Mounting adapter DARQ-K-P-...

- Mounting adapter for mounting on standard actuators to VDI/VDE 3845
- Mounting screws included in the scope of delivery
- Material:  
High-alloy stainless steel
- Contains paint-wetting impairment substances, RoHS-compliant



- [1] Screw DIN 912 M5x16 (4x)
- [2] Screw DIN 912 M4x12 (4x)



### Dimensions and ordering data

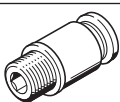
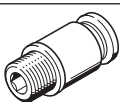
B1	B3	D1	D2	D3	D4	H1	H2	H3	L1	L2	L3	W1	CRC <sup>1)</sup>	Weight [g]	Part no.	Type		
		∅	∅	∅	∅													
65	30	50	35	4.5	5.4	45	5	3	110	81.6	78.4	45°	2	350	★ 2197135	DARQ-K-P-A1-F05-20-R1		
						55			160					131.6	128.4	380	★ 2197136	DARQ-K-P-A1-F05-30-R1
						55			460					2197137	DARQ-K-P-A2-F05-30-R1			

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

Moderate corrosion stress. Indoor applications in which condensation can occur. External visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment.

## Accessories

Ordering data – Adapter kit				Data sheets → Internet: dadg	
	Description	For ø	Part no.	Type	
	For direct mounting of an external positioner on the actuator DFPI-...-E-NB3...	100 ... 320 mm	<b>3179433</b>	<b>DADG-AK-F6-A2</b>	

Ordering data – Push-in fitting						Data sheets → Internet: qs	
	Connection	Nominal width [mm]	Tubing O.D. [mm]	PU <sup>1)</sup>	Part no.	Type	
<b>R thread</b>							
	R1/8	2.6	4	10	★ <b>153012</b>	<b>QS-1/8-4-I</b>	
				100	<b>133191</b>	<b>QS-1/8-4-I-100</b>	
		4.2	6	10	★ <b>153013</b>	<b>QS-1/8-6-I</b>	
				100	<b>133186</b>	<b>QS-1/8-6-I-100</b>	
		5.3	8	50	<b>133187</b>	<b>QS-1/8-8-I-50</b>	
<b>G thread with sealing ring</b>							
	G1/8	2.6	4	10	★ <b>186106</b>	<b>QS-G1/8-4-I</b>	
				100	<b>133008</b>	<b>QS-G1/8-4-I-100</b>	
		4.2	6	10	★ <b>186107</b>	<b>QS-G1/8-6-I</b>	
				100	<b>133009</b>	<b>QS-G1/8-6-I-100</b>	
		5.3	8	10	★ <b>186109</b>	<b>QS-G1/8-8-I</b>	

1) Packaging unit

Ordering data – Silencers				Data sheets → Internet: silencer	
	Description	PU <sup>1)</sup>	Part no.	Type	
	Version PE	1	<b>161419</b>	<b>UC-1/8</b>	
		50	<b>534219</b>	<b>UC-1/8-50</b>	

1) Packaging unit

# Festo - Your Partner in Automation



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