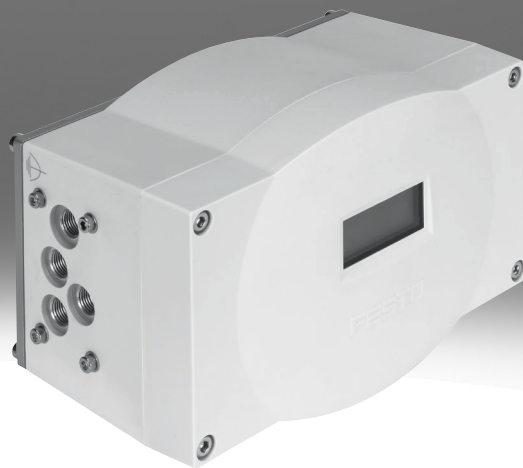


Positioner CMSX

FESTO

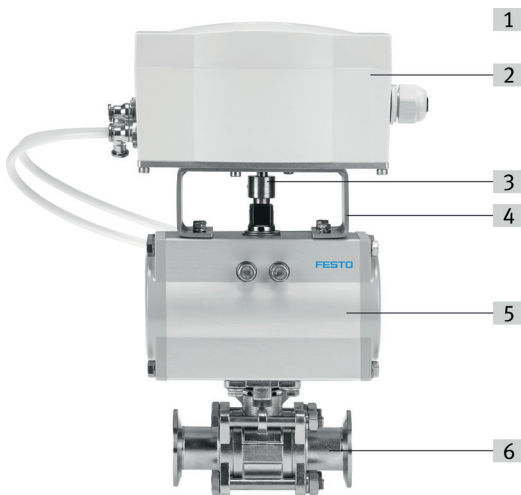


Characteristics

At a glance

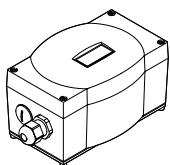
The CMSX is a digital, electropneumatic positioner. It enables the simple and efficient control of the position of process valves actuated by pneumatic actuators. The sturdy and compact positioner can be mounted on actuators with a mechanical interface to VDE/VDI 3845-1 (IEC 60534-6-2). There are product variants for single-acting or double-acting actuators, different flow rates and fail-safe positions (Fail Safe, Fail in Place). Product variants with a connection for external displacement/angle sensors enable the position of process valves to be controlled remotely. The unit can be operated using three push-buttons on the inside of the housing and an LCD display. An automatic initialisation function makes commissioning quick and easy. The setpoint is specified via 0/4 ... 20 mA current signals or 0 ... 10 V voltage signal, the analogue position feedback via a 4 ... 20 mA current signal. A digital alarm output signals the device status. In addition, there is a configurable digital input for travel to specific positions and two configurable digital outputs for feedback on the position limit value. Several configurable software functions make the CMSX flexible so it can be used for any task.

Design type



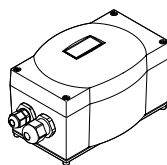
- [1] Higher-level system (PLC/IPC or external setpoint generator)
- [2] Positioner CMSX
- [3] Mechanical coupling
- [4] Mounting adapter DARQ
- [5] Quarter turn actuator (example: DFPD)
- [6] Process valve (example: VZBD)

[S] Positioner, displacement/integrated angular position detection



- Direct mounting on quarter turn actuators according to VDE/VDI 3845-1 (IEC 60534-6-2)

[SE] Positioner, displacement/external angular position detection



- Remote connection with external displacement encoder

Flow rate

Note: The precise choice of a positioner for the actuator depends on the specific application. Please contact your local Festo representative.

[50] 50 l/min

- Combinations of positioner and quarter turn actuator DFPD with piston $\varnothing \leq 160$
- Combinations of positioner and rotary actuator DAPS with piston $\varnothing \leq 180$

[130] 130 l/min

- Combinations of positioner and quarter turn actuator DFPD with piston $\varnothing \geq 240$
- Combinations of positioner and quarter turn actuator DAPS with piston $\varnothing \geq 240$
- Combinations of positioner and linear actuator DFPI with piston $\varnothing \geq 100$

Characteristics

Safety function

Predefinable fail-safe position

In case of a system failure, a fail-safe position of the process valve ([A] Fail Safe/normally closed or normally open or [C] Fail in Place/hold position) can be defined in advance.

Note: System failure → Failure of the operating power supply or setpoint specification

[A] Opening or closing in the event of system failure

[C] Hold position in the event of a system failure

Type code

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

006	Position feedback
F1	4...20 mA
007	Function
D	Double-acting
S	Single-acting
008	Flow rate [l/min]
50	50
130	130
009	Safety function
A	Opening or closing in the event of system failure
C	Hold position in the event of a system failure

Datasheet

General technical data				
Design type	Positioner, displacement/integrated angular position detection		Positioner, displacement/external angular position detection	
Safety function	Opening or closing in the event of system failure	Hold position in the event of a system failure	Opening or closing in the event of system failure	Hold position in the event of a system failure
Mode of operation	Double-acting, Single-acting	Double-acting	Double-acting, Single-acting	Double-acting
Design	Digital, electropneumatic positioner			
Mounting position	optional			
Type of mounting	With accessories			
Design characteristics	Safety position – pneumatic outlet 4 exhausted Safety position – pneumatic outlet 2 pressurised	Safety position - pneumatic outlets closed	Safety position – pneumatic outlet 2 pressurised Safety position – pneumatic outlet 4 exhausted	Safety position - pneumatic outlets closed
Functional principle of measuring system	Potentiometer			
Sensing range	0 ... 100 deg		–	
Display	7-segment LCD display With backlighting			
Setting options	Via display and keys			
Size of dead zone	0.5 ... 10%			
Dimensions (W x L x H)	190 mm x 105 mm x 130 mm			
Product weight	970 g			
Standard nominal flow rate	50 l/min 130 l/min			
Pneumatic connection	G1/8			

General electrical data		
Design type	Positioner, displacement/integrated angular position detection	Positioner, displacement/external angular position detection
Nominal operating voltage DC	24 V	
Operational voltage range DC	21.6 ... 26.4 V	
Max. current consumption	600 mA	
Reverse polarity protection	For operating voltage connections	
Connection resistance	–	≤80 kOhm

Electrical characteristics - Analogue inputs		
Design type	Positioner, displacement/integrated angular position detection	Positioner, displacement/external angular position detection
digital input, signal range	0 - 10 V 0 - 20 mA 4 - 20 mA	
Analogue inputs, max. dynamic range	0 - 24 mA 0 - 11 V	
Analogue inputs, linearity error at 25 °C	0.5%	
Analogue inputs, temperature coefficient	<0.02 %FS/K	
Analogue inputs, resolution	16 bit	
Analogue inputs, electrical isolation	no	

Datasheet

Electrical characteristics - Analogue outputs

Design type	Positioner, displacement/integrated angular position detection	Positioner, displacement/external angular position detection
Analog outputs, overload protection	yes	
digital output, signal range	4 - 20 mA	
Analogue outputs, max. load impedance	≤600 Ohm	
Analogue outputs, linearity error at 25°C	0.5%	
Analogue outputs, temperature coefficient	<0.02 %FS/K	
Analogue outputs, resolution	12 bit	
Analogue outputs, reverse polarity protection	yes	
Analog outputs, short circuit current rating	yes	
Analogue outputs, galvanic isolation	no	

Electrical characteristics - Digital inputs

Design type	Positioner, displacement/integrated angular position detection	Positioner, displacement/external angular position detection
Characteristic for inputs	To IEC 61131-2, type 3	
Switching input	PNP, NPN	
Digital inputs, reverse polarity protection	yes	
Digital inputs, electrical isolation	Yes, via optocoupler	Yes, via optocoupler, Yes, optocoupler

Electrical characteristics - digital outputs

Design type	Positioner, displacement/integrated angular position detection	Positioner, displacement/external angular position detection
Switching output	3 x PNP or 3 x NPN, switchable	
Digital outputs, output current	100 mA	
Digital outputs, reverse polarity protection	yes	
Digital outputs, overload protection	yes	
Digital outputs, short circuit current rating	yes	
Digital outputs, electrical isolation	Yes, via optocoupler	

Datasheet

Electromechanics		
Design type	Positioner, displacement/integrated angular position detection	Positioner, displacement/external angular position detection
Electrical connection 1, function	3x digital output Analogue output Analogue input Digital input Power supply Load power supply	
Electrical connection 1, connection type	Terminal strip	
Electrical connection 1, connector system	Screw terminal	
Electrical connection 1, number of connections/cores	13	
Electrical connection 1, tightening torque	0.6 Nm	
Electrical connection 1, conductor cross section	<1.5 mm ²	
Electrical connection 2, function	–	External path/angle sensor
Electrical connection 2, connection type	–	Terminal strip
Electrical connection 2, number of connections/cores	–	3
Electrical connection 2, tightening torque	–	0.6 Nm
Electrical connection 2, conductor cross section	–	<1.5 mm ²
Permissible cable diameter	7 - 13 mm for electrical connection 1	3 - 6.5 mm for electrical connection 2, 7 - 13 mm for electrical connection 1
Cable fitting	M20 x 1.5 for electrical connection 1	M12 x 1.5 for electrical connection 2, M20 x 1.5 for electrical connection 1
Max. cable length	30 m for electrical connection 1	3 m for electrical connection 2, 30 m for electrical connection 1

Operating and ambient conditions

Operating pressure	0.3 ... 0.8 MPa
Operating pressure	3 ... 8 bar
Operating pressure	43.5 ... 116 psi
Operating medium	Compressed air to ISO 8573-1:2010 [7:4:4]
Note on operating and pilot medium	Lubricated operation not possible
Ambient temperature	-5 ... 60°C
Storage temperature	-20 ... 60°C
Relative air humidity	93%
Pollution degree	3
Shock resistance	Shock test with severity level 1 to FN 942017-5 and EN 60068-2-27 As per EN 60068-2-29
Vibration resistance	Transport application test with severity level 2 to FN 942017-4 and EN 60068-2-6 As per EN 60068-2-6
CE mark (see declaration of conformity) ¹⁾	To EU EMC Directive In accordance with EU RoHS Directive
CE marking (see declaration of conformity) ²⁾ <Position>	To UK RoHS instructions To UK instructions for EMC
Approval	RCM trademark
Degree of protection	IP65

1) Further information www.festo.com/catalogue/... → Support/Downloads2) Further information www.festo.com/catalogue/... → Support/Downloads

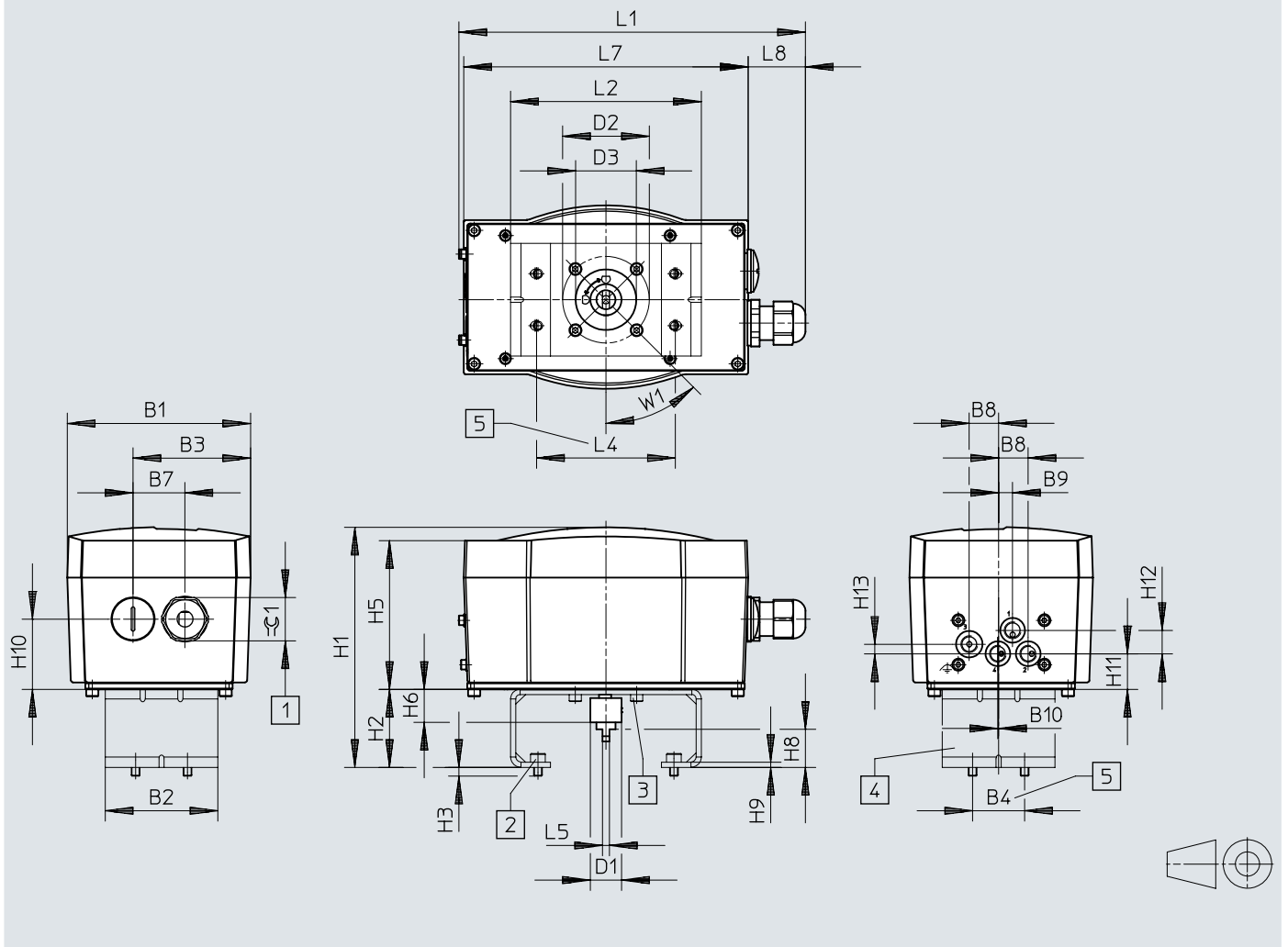
Datasheet

Materials		
Design type	Positioner, displacement/integrated angular position detection	Positioner, displacement/external angular position detection
Material housing	PC-reinforced	
Material screen	PC	
Material base plate	Wrought aluminium alloy, anodised	
Material shaft	High-alloy stainless steel	
Material coupling	High-alloy stainless steel	
Material screws	High-alloy stainless steel	
Material seals	NBR	
Material cable gland	PA	
Material blanking plug	PA	
LABS (PWIS) conformity	VDMA24364-B2-L	
Note on materials	RoHS-compliant	

Dimensions

Dimensions – Direct mounting on quarter turn actuators according to VDE/
VDI 3845-1 (IEC 60534-6-2)

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Dimensions

	B1	B2	B3	B4	B7	B8	B9	B10	D1 ∅	D2 ∅	D3 ∅	H3
CMSX-P-S-C-U-F1-D-130-...	105,8	65	67,9	30	30	17	8	0,5	18	50	35	5
CMSX-P-S-C-U-F1-D-50-...												
CMSX-P-S-C-U-F1-S-50-...												
CMSX-P-S-C-U-F1-S-130-...												

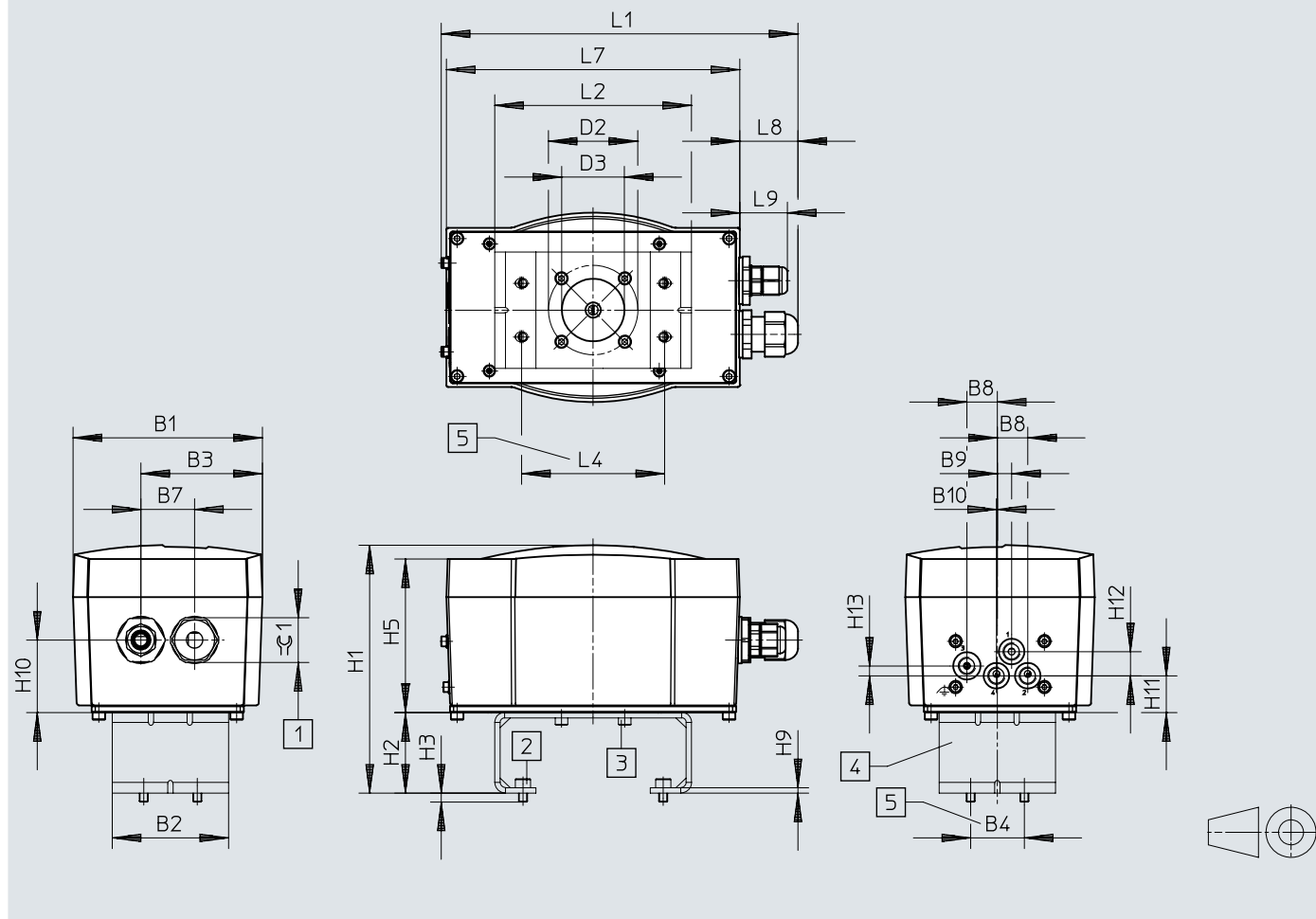
	H5	H6	H9	H10	H11	H12	L1	L5	L7	L8	W1	≙ 1
CMSX-P-S-C-U-F1-D-130-...	85,8	19	40,5	20,5	13,5	5,5	200	4	164	32,5	45°	25
CMSX-P-S-C-U-F1-D-50-...												
CMSX-P-S-C-U-F1-S-50-...												
CMSX-P-S-C-U-F1-S-130-...												

		H1	H2	H8	L2	L4 ±0,3
CMSX-P-S-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-P-S-C-U-F1-D-50-...	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-P-S-C-U-F1-S-50-...	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-P-S-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	80
	DARQ-K-P-A2-F05-30-R1	148,5	55	30	160	130

Dimensions

Dimensions – Remote attachment with external displacement encoder

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	B1	B2	B3	B4	B7	B8	B9	B10	D2 ∅	D3 ∅	D4 ∅	H3
CMSX-P-SE-C-U-F1-D-...	105,8	65	67,9	30	30	17	8	0,5	50	35	5,4	5

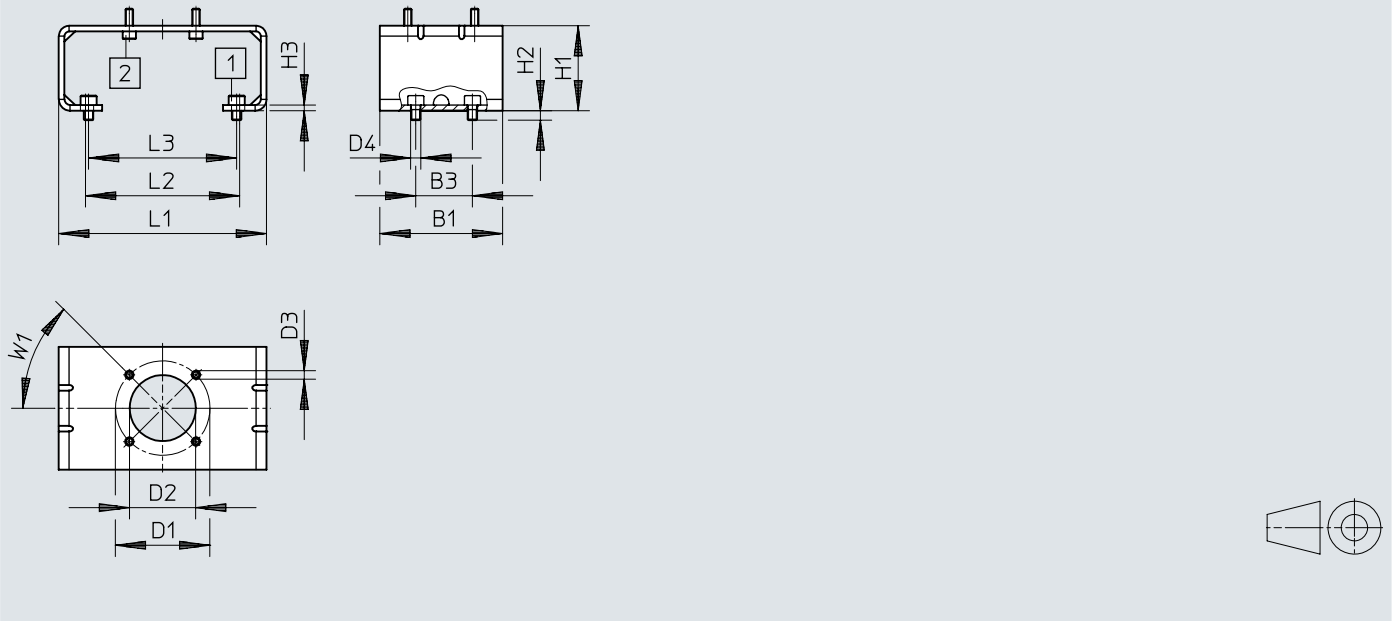
	H5	H9	H10	H11	H12	H13	L1	L7	L8	L9	⊕ 1
CMSX-P-SE-C-U-F1-D-...	85,8	3	40,5	20,5	13,5	5,5	200	164	32,5	25,6	25

	H1	H2	L2	L4 ±0,3
CMSX-P-SE-C-U-F1-D-...				
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

Dimensions


Dimensions – Mounting adapter DARQ-K-P-...

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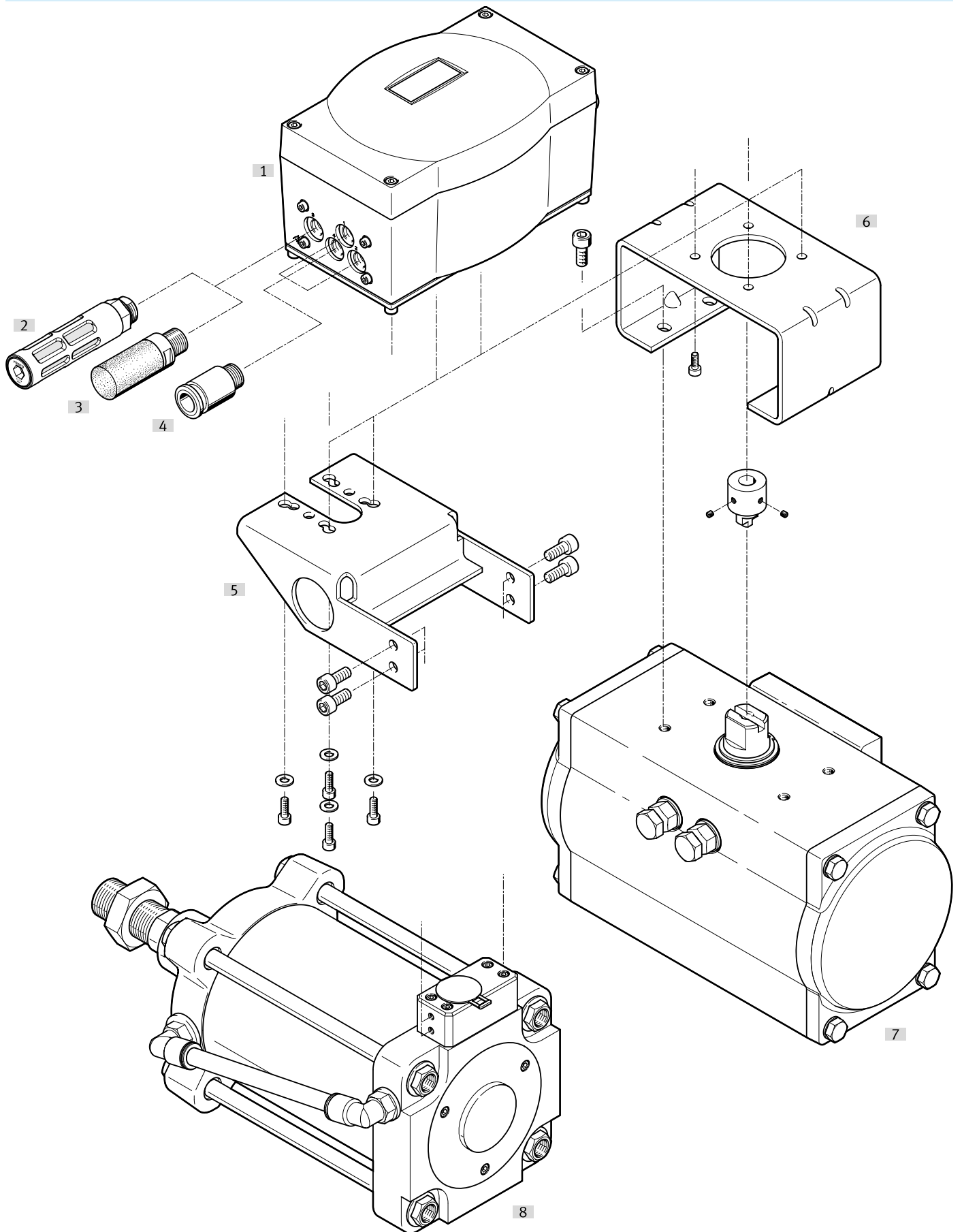
	B1	B3	D1 ø	D2 ø	D3 ø	D4 ø	H1	H2	H3	L1	L2	L3	W1
DARQ-K-P-A1-F05-20-R1	65	30	50	35	4,5	5,4	45	5	3	110	81,6	78,4	45°
DARQ-K-P-A1-F05-30-R1							55						
DARQ-K-P-A2-F05-30-R1							55						

Ordering data

Ordering data						
	Safety function	Standard nominal flow rate	Function	Part no.	Type	
	Opening or closing in the event of system failure	50 l/min	Double-acting	★ 3929313	CMSX-P-S-C-U-F1-D-50-A	
				8171507	CMSX-P-SE-C-U-F1-D-50-A	
			Single-acting	8171510	CMSX-P-SE-C-U-F1-S-50-A	
			★ 3929370	CMSX-P-S-C-U-F1-S-50-A		
		130 l/min	Double-acting	★ 3929539	CMSX-P-SE-C-U-F1-D-130-A	
				3929312	CMSX-P-S-C-U-F1-D-130-A	
	Single-acting		8171509	CMSX-P-SE-C-U-F1-S-130-A		
	Hold position in the event of a system failure	50 l/min	Double-acting		3929369	CMSX-P-S-C-U-F1-S-130-A
					3929315	CMSX-P-S-C-U-F1-D-50-C
					8171508	CMSX-P-SE-C-U-F1-D-50-C
		130 l/min			3929314	CMSX-P-S-C-U-F1-D-130-C
					3929540	CMSX-P-SE-C-U-F1-D-130-C

Peripherals

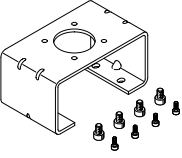
Peripherals overview

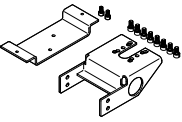



Peripherals


Accessories		→ Page/Internet
Type/order code	Description	
[1] Positioner CMSX	For single-acting and double-acting linear and rotary actuators	cmsx
[2] Silencer U	With polymer, male thread	u
[3] Silencer UC	For noise reduction at exhaust ports	16
[4] Push-in fittings QS	The safe solution for every connection	16
[5] Adapter kit DADG	For directly mounting a positioner on the actuator	dadg
[6] Mounting adapters DARQ	For connecting positioners and actuators for process automation	darq
[7] Linear actuator DFPI	Actuators for process automation with integrated displacement encoder	dfpi
[8] Quarter turn actuator DFPD	Actuators for process automation	dfpd

Accessories

Mounting adapter					
	Size	Description	Product weight	Part no.	Type
	AA 1 to VDI/VDE 3845	Mounting adapter for mounting on standards-based actuators according to VDI/VDE 3845	350 g	★ 2197135	DARQ-K-P-A1-F05-20-R1
	AA 2 to VDI/VDE 3845		380 g	★ 2197136	DARQ-K-P-A1-F05-30-R1
	AA 3 to VDI/VDE 3845		460 g	2197137	DARQ-K-P-A2-F05-30-R1

Adapter kit			
	Description	Part no.	Type
	Adapter kit for linear actuator DFPI-...-E-NB3P	3179433	DADG-AK-F6-A2

Push-in fitting						
	Pneumatic connection, port 1	Nominal size	Pneumatic connection, port 2	Size of pack	Part no.	Type
	Male thread G1/8	2.6 mm	For tubing outside diameter of 4 mm	10	★ 186106	QS-G1/8-4-I
				100	133008	QS-G1/8-4-I-100
		4.2 mm	For tubing outside diameter of 6 mm	10	★ 186107	QS-G1/8-6-I
	100			133009	QS-G1/8-6-I-100	
	5.3 mm	For tubing outside diameter of 8 mm	10	★ 186109	QS-G1/8-8-I	
			100	153012	QS-1/8-4-I	
	Male thread R1/8	2.6 mm	For tubing outside diameter of 4 mm	100	133191	QS-1/8-4-I-100
				10	★ 153013	QS-1/8-6-I
		100	133186	QS-1/8-6-I-100		
5.3 mm	For tubing outside diameter of 8 mm	50	133187	QS-1/8-8-I-50		

Silencer				
	Sound pressure level	Size of pack	Part no.	Type
	59 dB(A)	1	★ 161419	UC-1/8
		50	534219	UC-1/8-50
	74 dB(A)	1	★ 2307	U-1/8
		50	534222	U-1/8-50