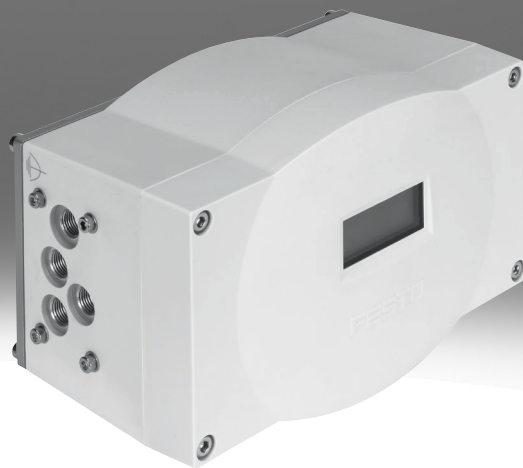


# Positioner CMSX

**FESTO**

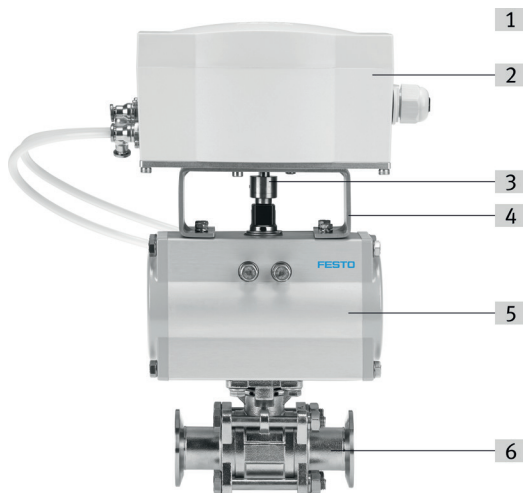


## Characteristics

### At a glance

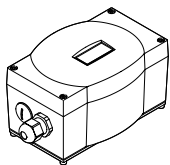
The CMSX is a digital, electropneumatic positioner. It enables simple and efficient control of the position of process valves actuated by pneumatic drives. The robust and compact positioner is suitable for mounting on drives with a mechanical interface according to VDE/VDI 3845-1 (IEC 60534-6-2). Product variants are available for single-acting or double-acting drives, different flow rates and fail-safe positions (Fail-Safe, Fail in Place). Product variants for the connection of external displacement/angle sensors enable remote position control of process valves. Operation on the unit is possible via three push-buttons on the inside of the housing and an LCD display. An automatic initialization function makes commissioning simple and robust. The setpoint is specified via 0/4 ... 20 mA current signals or 0 ... 10 V voltage signal, analog position feedback via a 4 ... 20 mA current signal. The device status is signaled via a digital alarm output. In addition, there is a configurable digital input for approaching defined positions and two configurable digital outputs for position limit value feedback. Several configurable software functions make the CMSX flexible for any task.

### Design type



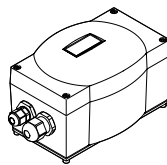
- [1] Higher-level system (PLC/IPC or external setpoint generator)
- [2] CMSX positioner
- [3] Mechanical coupling
- [4] DARQ mounting adapter
- [5] Quarter turn actuator (example: DFPD)
- [6] Process valve (example: VZBD)

#### [S] Valve positioner, displacement/angle detection integrated



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

#### [SE] Valve positioner, displacement/angle detection external



- Remote attachment with external displacement encoder

### Flow rate

Note: The exact selection of the positioner for the drive 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 drive DFPI with piston  $\varnothing \geq 100$

## Characteristics

### Safety function

Predefinable fail-safe position

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

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

[A] Opening or closing in case of breakdown

[C] Hold position in case of breakdown

## Type code

001	Series	
<b>CMSX</b>	Positioner for process automation	
002	Product version	
<b>P</b>	Primarily polymers	
003	Design type	
<b>S</b>	Valve positioner, displacement/angle detection integrated	
<b>SE</b>	Valve positioner, displacement/angle detection external	
004	Display type	
<b>C</b>	LCD, backlit	
005	Reference value	
<b>U</b>	Configurable (0...10 V/0...20 mA/4...20 mA)	

006	Position feedback	
<b>F1</b>	4...20 mA	
007	Function	
<b>D</b>	Double-acting	
<b>S</b>	Single-acting	
008	Flow rate [l/min]	
<b>50</b>	50	
<b>130</b>	130	
009	Safety function	
<b>A</b>	Opening or closing in case of breakdown	
<b>C</b>	Hold position in case of breakdown	

## Datasheet

General technical data				
Design type	Valve positioner, displacement/angle detection external		Valve positioner, displacement/angle detection integrated	
Safety function	Opening or closing in case of breakdown	Hold position in case of breakdown	Opening or closing in case of breakdown	Hold position in case of breakdown
Mode of operation	Double-acting, Single-acting	Double-acting	Double-acting, Single-acting	Double-acting
Structural design	digital, electropneumatic positioner			
Mounting position	Any			
Type of mounting	With accessories			
Design features	Safety position – pneumatic outlet 4 exhausted Safety position – pneumatic output 2 pressurized	Safety position - pneumatic outlets closed	Safety position – pneumatic outlet 4 exhausted Safety position – pneumatic output 2 pressurized	Safety position - pneumatic outlets closed
Measuring principle of linear potentiometer	Potentiometer			
Sensing range	–		0 ... 100 deg	
Display	7-segment LCD display With backlighting			
Setting options	Via display and pushbuttons			
Size of dead space	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	Valve positioner, displacement/angle detection external	Valve positioner, displacement/angle detection integrated
Nominal operating voltage DC	24 V	
DC operating voltage range	21.6 ... 26.4 V	
Max. current consumption	600 mA	
Reverse polarity protection	for operating voltage connections	
Connection resistance	≤80 kOhm	–

Electrical characteristics - analog inputs	
Design type	Valve positioner, displacement/angle detection external   Valve positioner, displacement/angle detection integrated
Analog inputs, signal range	0 - 10 V 0 - 20 mA 4 - 20 mA
Analog inputs, max. dynamic range	0 - 11 V 0 - 24 mA
Analog inputs, linearity error at 25°C	0.5%
Analog inputs, temperature coefficient	<0.02 %FS/K
Analog inputs, resolution	16 bit
Analog inputs, galvanic isolation	no

## Datasheet

**Electrical characteristics - analog outputs**

Design type	Valve positioner, displacement/angle detection external	Valve positioner, displacement/angle detection integrated
Analog outputs, overload protection	yes	
Analog outputs, signal range	4 - 20 mA	
Analog outputs, max. load resistance	≤600 Ohm	
Analog outputs, linearity error at 25°C	0.5%	
Analog outputs, temperature coefficient	<0.02 %FS/K	
Analog outputs, resolution	12 bit	
Analog outputs, reverse polarity protection	yes	
Analog outputs, short-circuit protection	yes	
Analog outputs, galvanic isolation	no	

**Electrical characteristics - digital inputs**

Design type	Valve positioner, displacement/angle detection external	Valve positioner, displacement/angle detection integrated
Input characteristics	As per IEC 61131-2, type 3	
Switching input	PNP, NPN	
Digital inputs, reverse polarity protection	yes	
Digital inputs, electrical isolation	Yes, optocoupler	

**Electrical characteristics - digital outputs**

Design type	Valve positioner, displacement/angle detection external	Valve positioner, displacement/angle detection integrated
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, potential separation	Yes, optocoupler	

## Datasheet

Electromechanics		
Design type	Valve positioner, displacement/angle detection external	Valve positioner, displacement/angle detection integrated
Electrical connection 1, function	3x digital output Analog output Analog input Digital input Power supply Load power supply	
Electrical connection 1, connection type	Terminal strip	
Electrical connection 1, connection technology	Screw terminal	
Electrical connection 1, number of pins/wires	13	
Electrical connection 1, tightening torque	0.6 Nm	
Electrical connection 1, conductor cross section	<1.5 mm <sup>2</sup>	
Electrical connection 2, function	External path/angle sensor	–
Electrical connection 2, connection type	Terminal strip	–
Electrical connection 2, number of pins/wires	3	–
Electrical connection 2, tightening torque	0.6 Nm	–
Electrical connection 2, conductor cross section	<1.5 mm <sup>2</sup>	–
Approved cable diameter	3-6.5 mm for electrical connection 2, 7-13 mm for electrical connection 1	7-13 mm for electrical connection 1
Cable fitting	M12 x 1.5 for electrical connection 2, M20 x 1.5 for electrical connection 1	M20 x 1.5 for electrical connection 1
Max. cable length	3 m for electrical connection 2, 30 m for electrical connection 1	30 m for electrical connection 1

Operating and environmental conditions	
Operating pressure	0.3 ... 0.8 MPa
Operating pressure	3 ... 8 bar
Operating pressure	43.5 ... 116 psi
Operating medium	Compressed air as per ISO 8573-1:2010 [7:4:4]
Information on operating and pilot media	Operation with oil lubrication not possible
Ambient temperature	-5 ... 60°C
Storage temperature	-20 ... 60°C
Relative air humidity	93%
Contamination level	3
Shock resistance	Shock test with severity level 1 as per FN 942017-5 and EN 60068-2-27 as per EN 60068-2-29
Vibration resistance	Transport application test with severity level 2 as per FN 942017-4 and EN 60068-2-6 as per EN 60068-2-6
CE marking (see declaration of conformity) <sup>1)</sup>	As per EU EMC directive As per EU RoHS directive
UKCA marking (see declaration of conformity) <sup>2)</sup> <<Position>>	To UK RoHS instructions To UK instructions for EMC
Certification	RCM compliance mark
Degree of protection	IP65

1) More information [www.festo.com/catalogue/...](http://www.festo.com/catalogue/...) → Support/Downloads2) More information [www.festo.com/catalogue/...](http://www.festo.com/catalogue/...) → Support/Downloads

## Datasheet

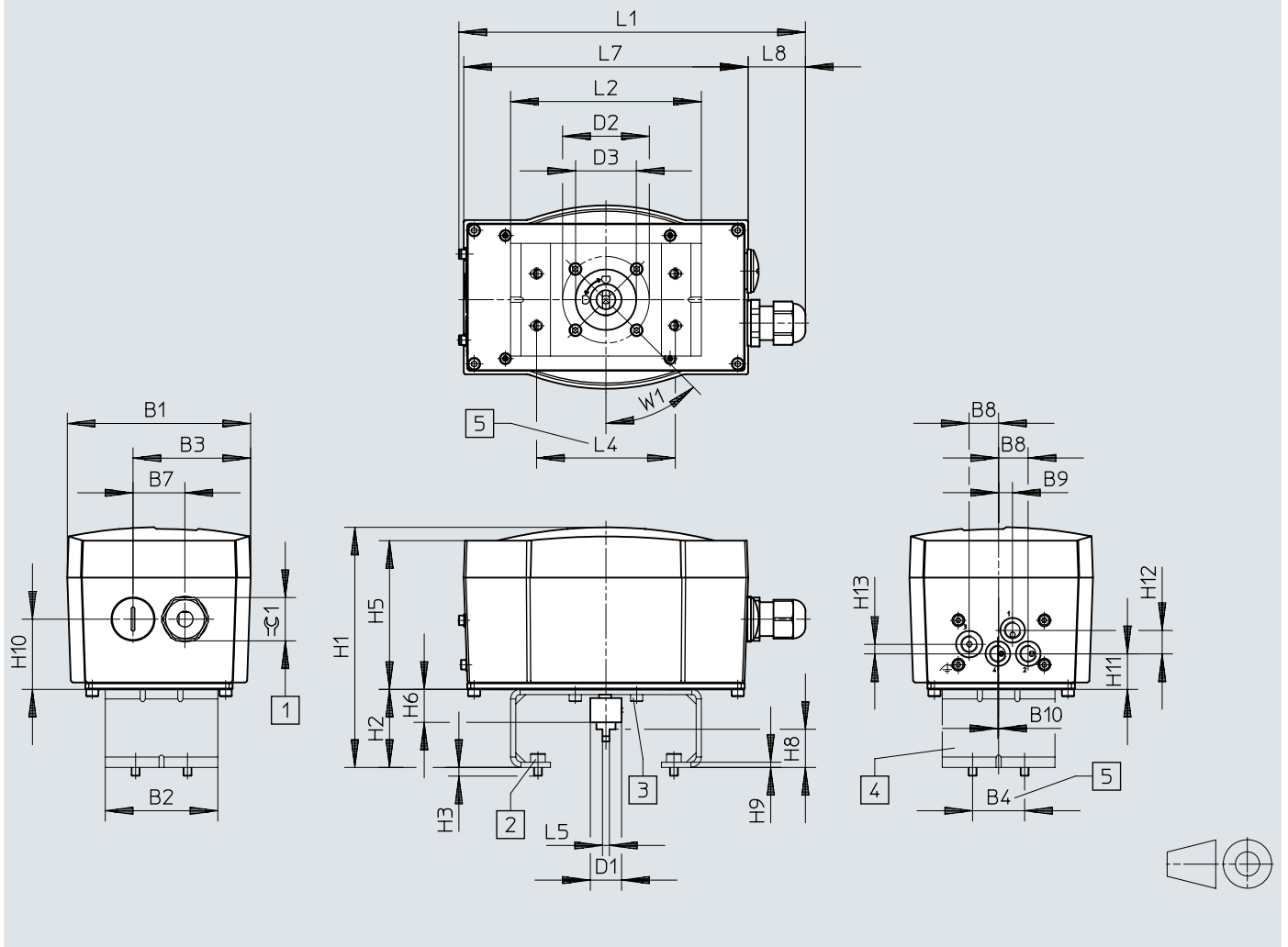
Materials		
Design type	Valve positioner, displacement/angle detection external	Valve positioner, displacement/angle detection integrated
Housing material	PC-reinforced	
Inspection window material	PC	
Base plate material	Wrought aluminum alloy, anodized	
Shaft material	High-alloy stainless steel	
Quick-coupling material	High-alloy stainless steel	
Material of screws	High-alloy stainless steel	
Seals material	NBR	
Material for cable connector	PA	
Blanking plug material	PA	
LABS (PWIS) conformity	VDMA24364-B2-L	
Note on materials	RoHS-compliant	



# Dimensions

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

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



## 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-...												

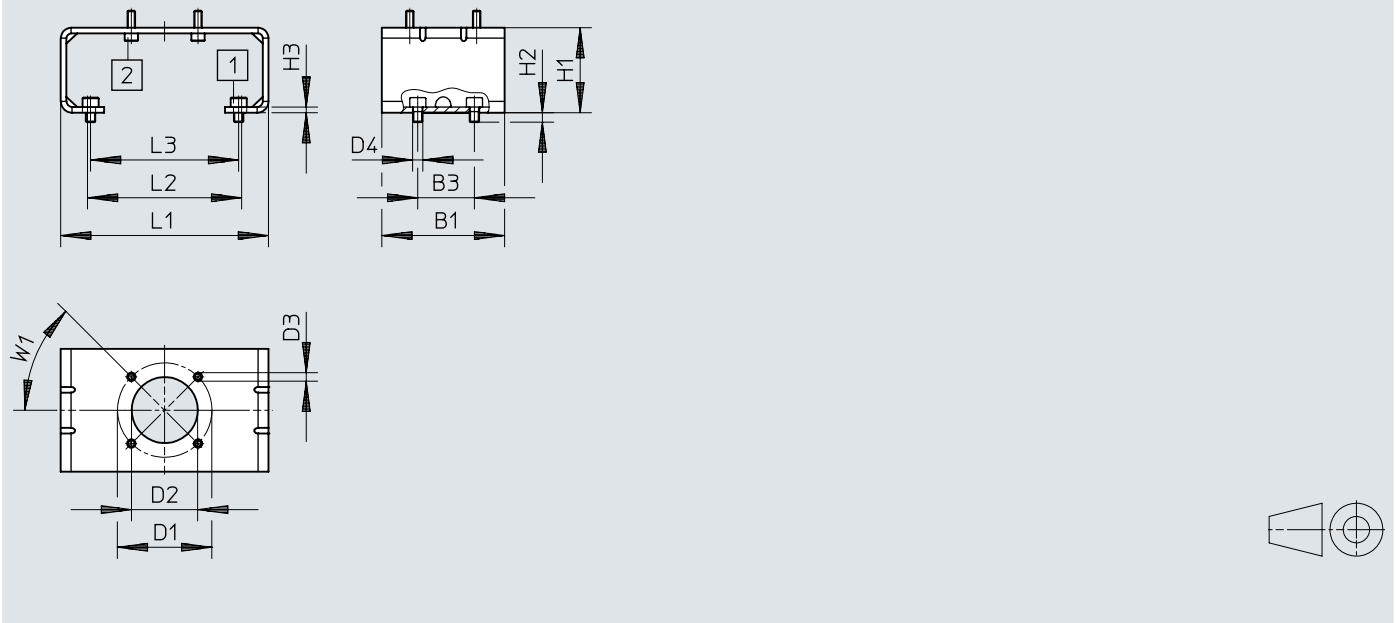
		H1	H2	H8	L2	L4 ±0,3
CMSX-P-S-C-U-F1-D-130-...	DARQ-K-P-A1-F05-20-R1	138,5	45	20	110	80
	DARQ-K-P-A1-F05-30-R1	148,5	55	30	110	80
	DARQ-K-P-A2-F05-30-R1	148,5	55	30	160	130
CMSX-P-S-C-U-F1-D-50-...	DARQ-K-P-A1-F05-20-R1	138,5	45	20	110	80
	DARQ-K-P-A1-F05-30-R1	148,5	55	30	110	80
	DARQ-K-P-A2-F05-30-R1	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 – DARQ-K-P-... mounting adapter

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



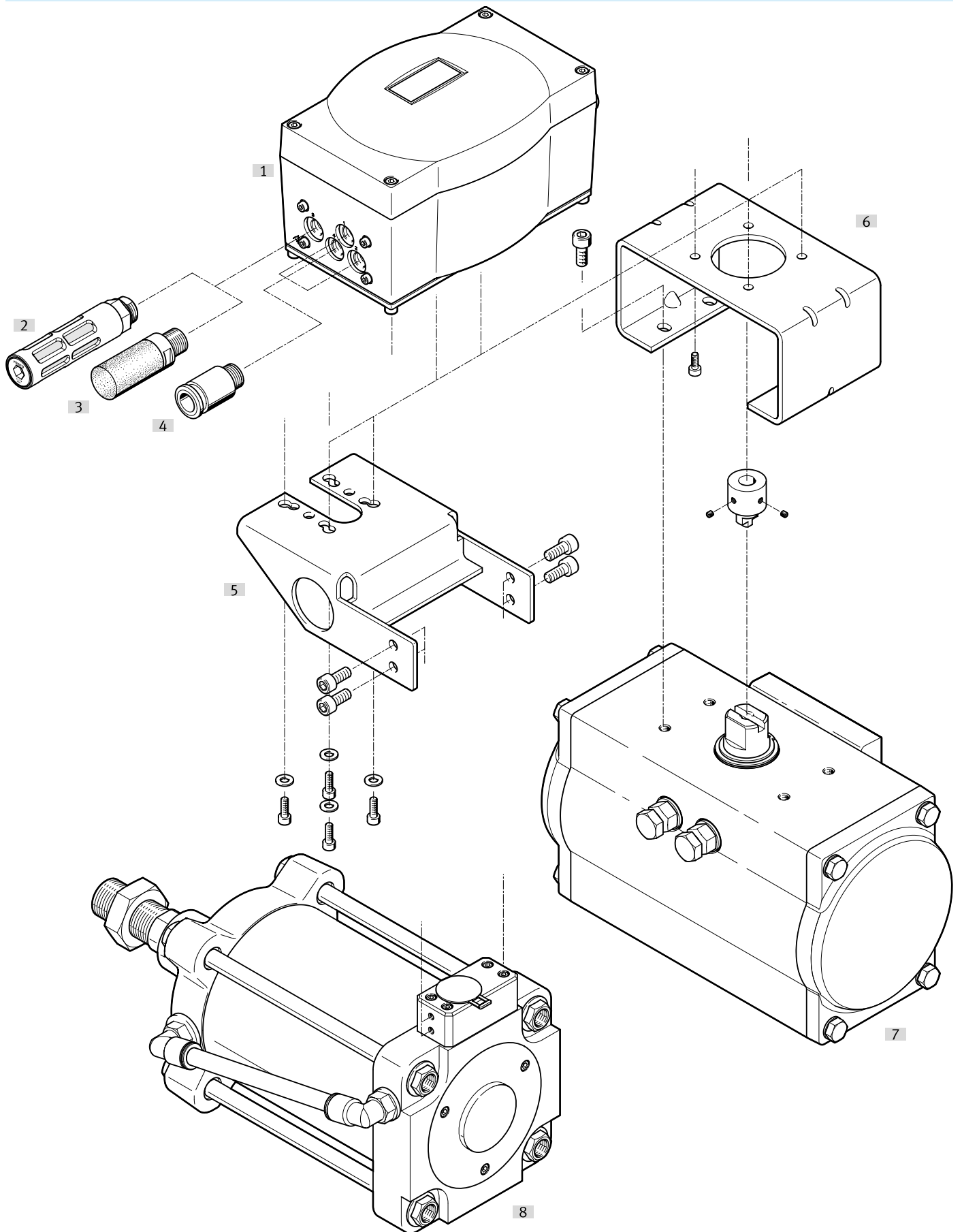
	B1	B3	D1 ø	D2 ø	D3 ø	D4 ø	H1	H2	H3	L1	L2	L3	W1
DARQ-K-P-A1-F05-20-R1	65	30	50	35	4,5	5,4	45	5	3	110	81,6	78,4	45°
DARQ-K-P-A1-F05-30-R1							55						
DARQ-K-P-A2-F05-30-R1							55						

## Ordering data

Ordering data						
	Safety function	Standard nominal flow rate	Function	Part no.	Type	
	Opening or closing in case of breakdown	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 case of breakdown	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 overview

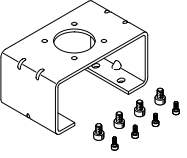
## Peripherals overview

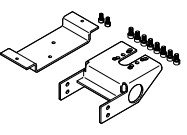



## Peripherals overview


Accessories		→ Page/Internet
Type/order code	Description	
[1] Positioner CMSX	For single-acting and double-acting linear and rotary actuators	cmsx
[2] Muffler U	With polymer, external thread	u
[3] Muffler UC	For noise reduction at exhaust ports	16
[4] Push-in fittings QS	The secure solution for every connection	16
[5] Adapter kit DADG	For direct mounting of a positioner on the drive	dadg
[6] Mounting adapters DARQ	For connection of positioners and actuators for process automation	darq
[7] Linear actuator DFPI	Drives for process automation with integrated displacement encoder	dfpi
[8] Quarter turn actuator DFDP	Drives 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 standard 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 drive DFPI...-E-NB3P	3179433	DADG-AK-F6-A2

Push-in fitting						
	Pneumatic connection 1	Nominal width	Pneumatic connection 2	Pack size	Part no.	Type
	External thread G1/8	2.6 mm	for pneumatic tubing outside diameter 4 mm	10	★ 186106	QS-G1/8-4-I
				100	133008	QS-G1/8-4-I-100
		4.2 mm	for pneumatic tubing outside diameter 6 mm	10	★ 186107	QS-G1/8-6-I
				100	133009	QS-G1/8-6-I-100
		5.3 mm	for pneumatic tubing outside diameter 8 mm	10	★ 186109	QS-G1/8-8-I
					★ 153012	QS-1/8-4-I
	External thread R1/8	2.6 mm	for pneumatic tubing outside diameter 4 mm	100	133191	QS-1/8-4-I-100
					★ 153013	QS-1/8-6-I
		4.2 mm	for pneumatic tubing outside diameter 6 mm	100	133186	QS-1/8-6-I-100
	5.3 mm	for pneumatic tubing outside diameter 8 mm	50	133187	QS-1/8-8-I-50	

Silencer				
	Noise level	Pack size	Part no.	Type
	59 dB(A)	1	★ 161419	UC-1/8
		50	534219	UC-1/8-50
	74 dB(A)		★ 2307	U-1/8
		50	534222	U-1/8-50