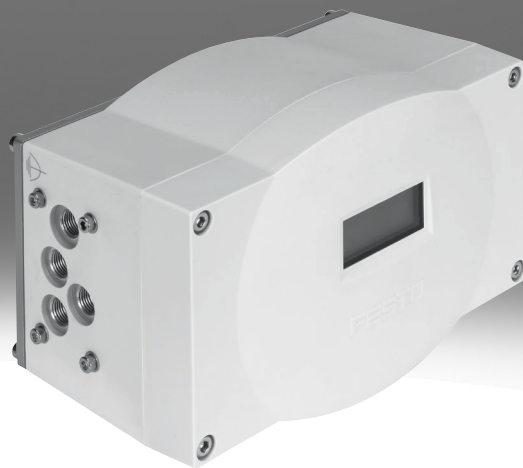


Positioner CMSX

FESTO

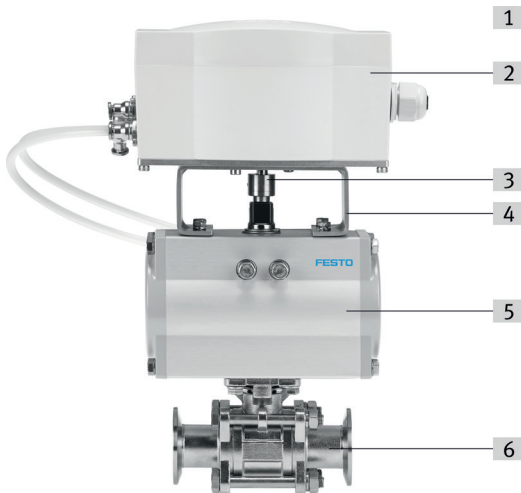


Characteristics

At a glance

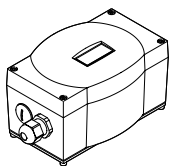
The CMSX is a digital, electropneumatic positioner that enables simple and efficient control of the position of process valves actuated by pneumatic actuators. This sturdy and compact positioner can be mounted on actuators using a mechanical interface in accordance with VDE/VDI 3845-1 (IEC 605346-2). There are product variants for single- or double-acting drives, different flow rates and fail-safe positions (fail-safe mode/opening or closing in the event of system failure, Fail in Place/holding position in the event of system failure). Product variants for the connection of external displacement/angle sensors enable remote the position of process valves to be controlled remotely. The device can be operated using three pushbuttons inside the housing and an LCD display. Commissioning is simple and robust thanks to an automatic initialisation function. The setpoint is set using 0/4 ... 20 mA current signals or 0 ... 10 V voltage signal, and the analogue position feedback using a 4 ... 20 mA current signal. The device status is indicated by a digital alarm output. In addition, a configurable digital input and two configurable digital outputs are available for feedback on the position limit value. Several configurable software functions make the CMSX flexible for any task.

Design type



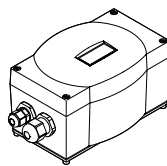
- [1] Higher-level system (PLC/IPC or external setpoint generator)
- [2] Positioner CMSX
- [3] Mechanical coupling
- [4] Mounting adapter DARQ
- [5] Quarter turn actuator (example: DFPD)
- [6] Process valve (example: VZBD)

[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 size <240
- Combinations of positioner and quarter-turn actuator DAPS with size <240

[130] 130 l/min

- Combinations of positioner and quarter-turn actuator DFPD with size >=240
- Combinations of positioner and quarter turn actuator DAPS with piston Ø >=240
- Combinations of positioner and linear actuator DFPI with piston Ø >= 100 mm

Characteristics

Safety function

Predefinable fail-safe position

In the event of a system failure, a fail-safe position (fail-safe mode/opening or closing in the event of a system failure, Fail in Place/hold position in the event of a system failure) for the process valve can be defined in advance. A system failure occurs if the operating voltage supply fails or if the setpoint specification fails.

[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 4 exhausted Safety position – pneumatic outlet 2 pressurised	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 (standardised to DIN 1343)	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	
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

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

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

Electrical characteristics - digital outputs

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 environmental 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	5 - 95%, Non-condensing
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
UKCA marking (see declaration of conformity) ²⁾	To UK instructions for EMC To UK RoHS instructions
Approval	RCM trademark
Degree of protection	IP65

1) More information www.festo.com/catalogue/cmsx → Downloads2) More information www.festo.com/catalogue/cmsx → Downloads

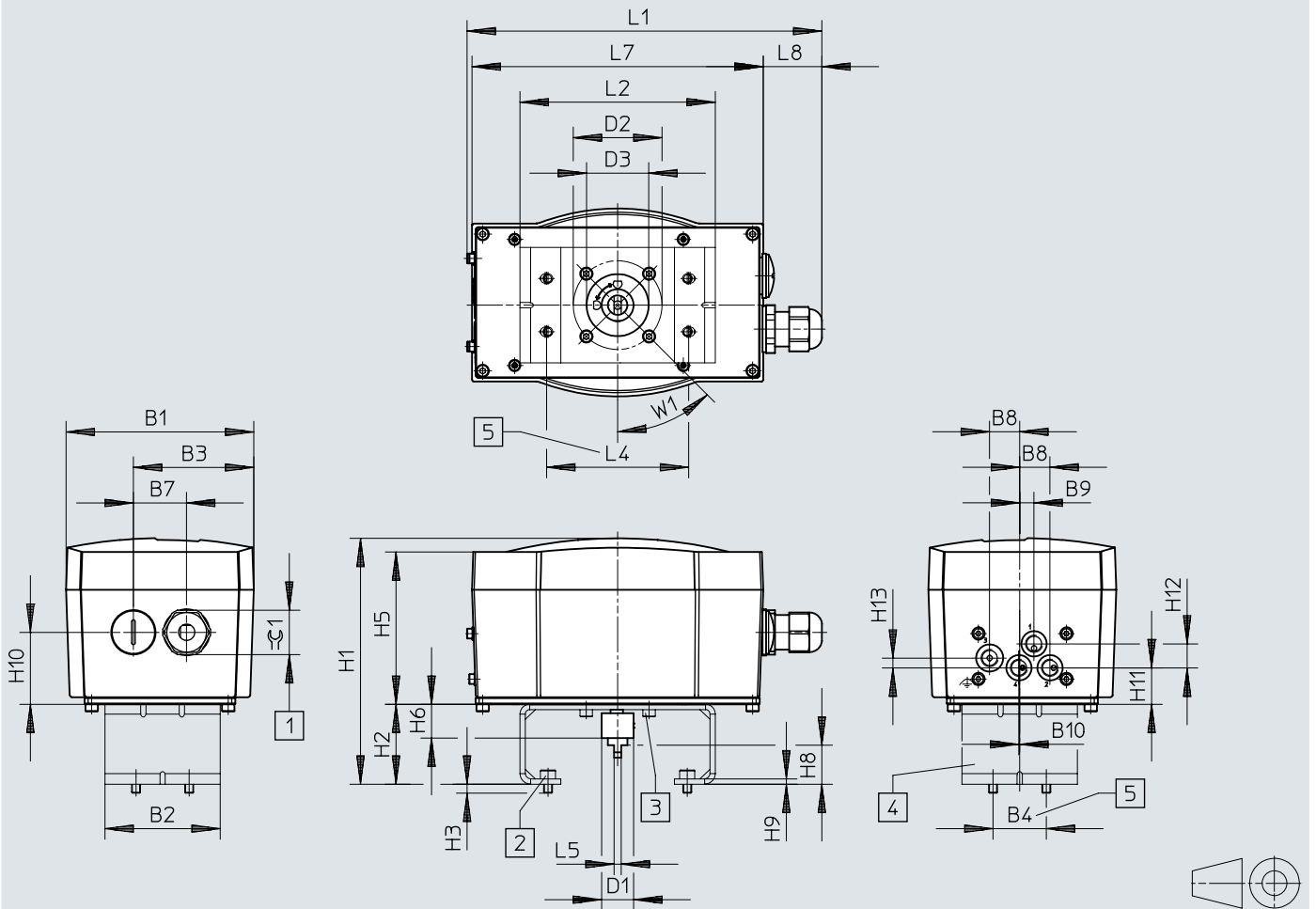
Datasheet

Materials	
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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- [1] Cable connector M20x1.5
- [2] Screw DIN 912 M5x16 (4x)
- [3] Screw DIN 912 M4x12 (4x)
- [4] Mounting adapter DARQ
- [5] To VDI/VDE 3845

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-...												

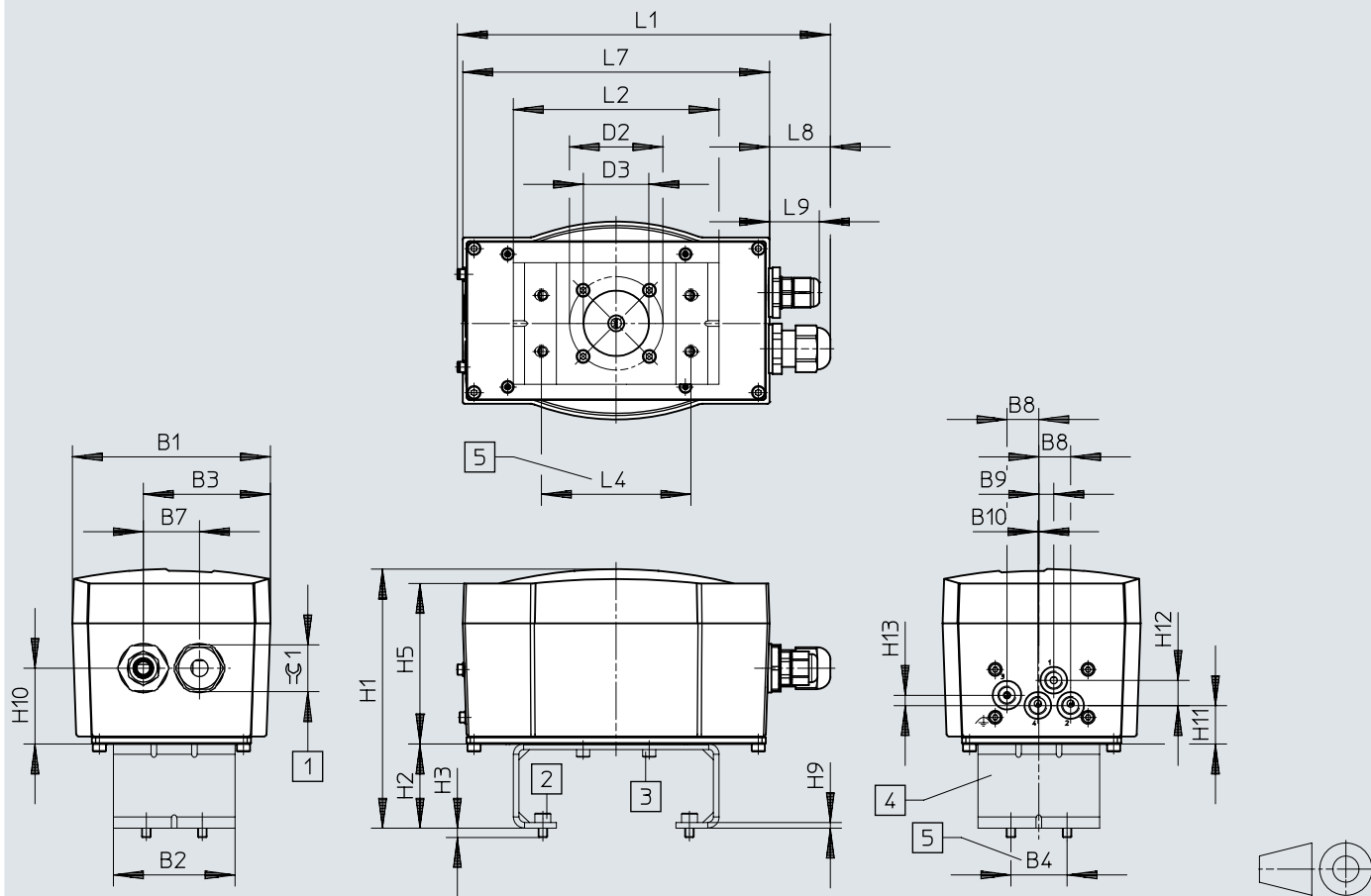
	H5	H6	H9	H10	H11	H12	L1	L5	L7	L8	W1	≙ 1
CMSX-P-S-C-U-F1-D-130-...	85,8	19	40,5	20,5	13,5	5,5	200	4	164	32,5	45°	25
CMSX-P-S-C-U-F1-D-50-...												
CMSX-P-S-C-U-F1-S-50-...												
CMSX-P-S-C-U-F1-S-130-...												

		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

Download CAD data www.festo.com



- [1] Cable connector M20x1.5
- [2] Screw DIN 912 M5x16 (4x)
- [3] Screw DIN 912 M4x12 (4x)
- [4] Mounting adapter DARQ
- [5] To VDI/VDE 3845

	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

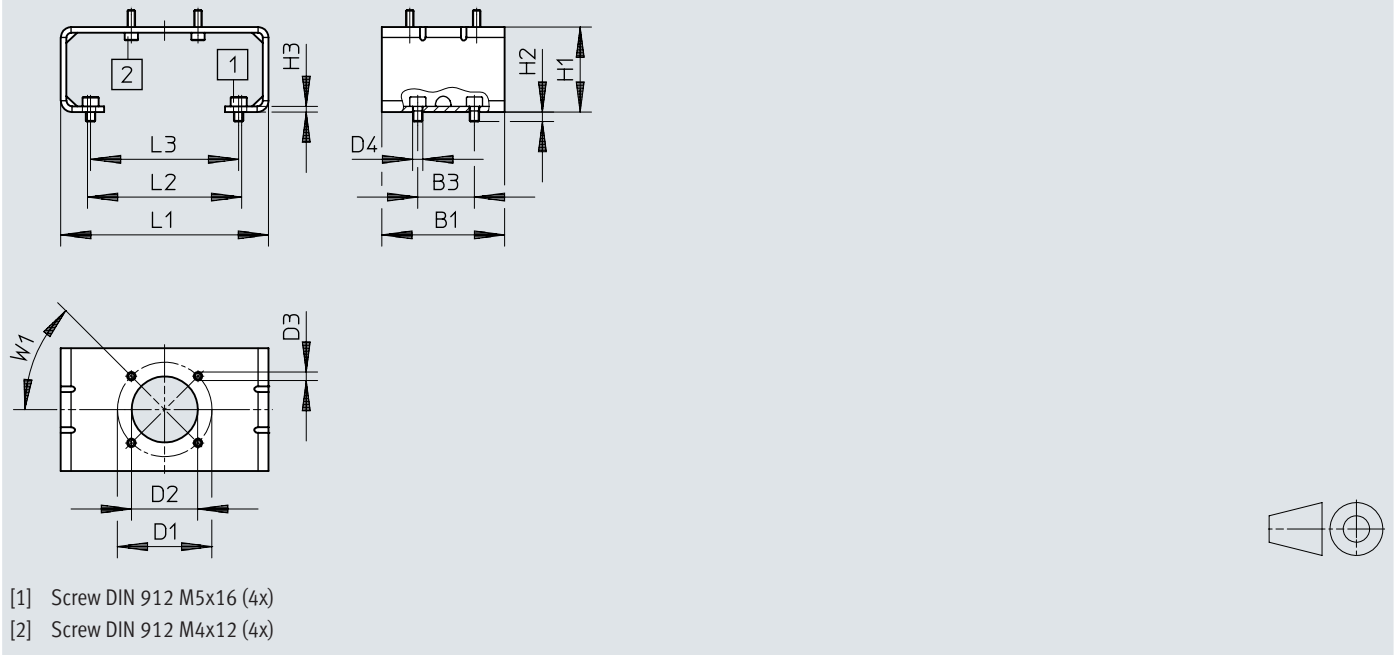
	H5	H9	H10	H11	H12	H13	L1	L7	L8	L9	±0.1
CMSX-P-SE-C-U-F1-D-...	85,8	3	40,5	20,5	13,5	5,5	200	164	32,5	25,6	25

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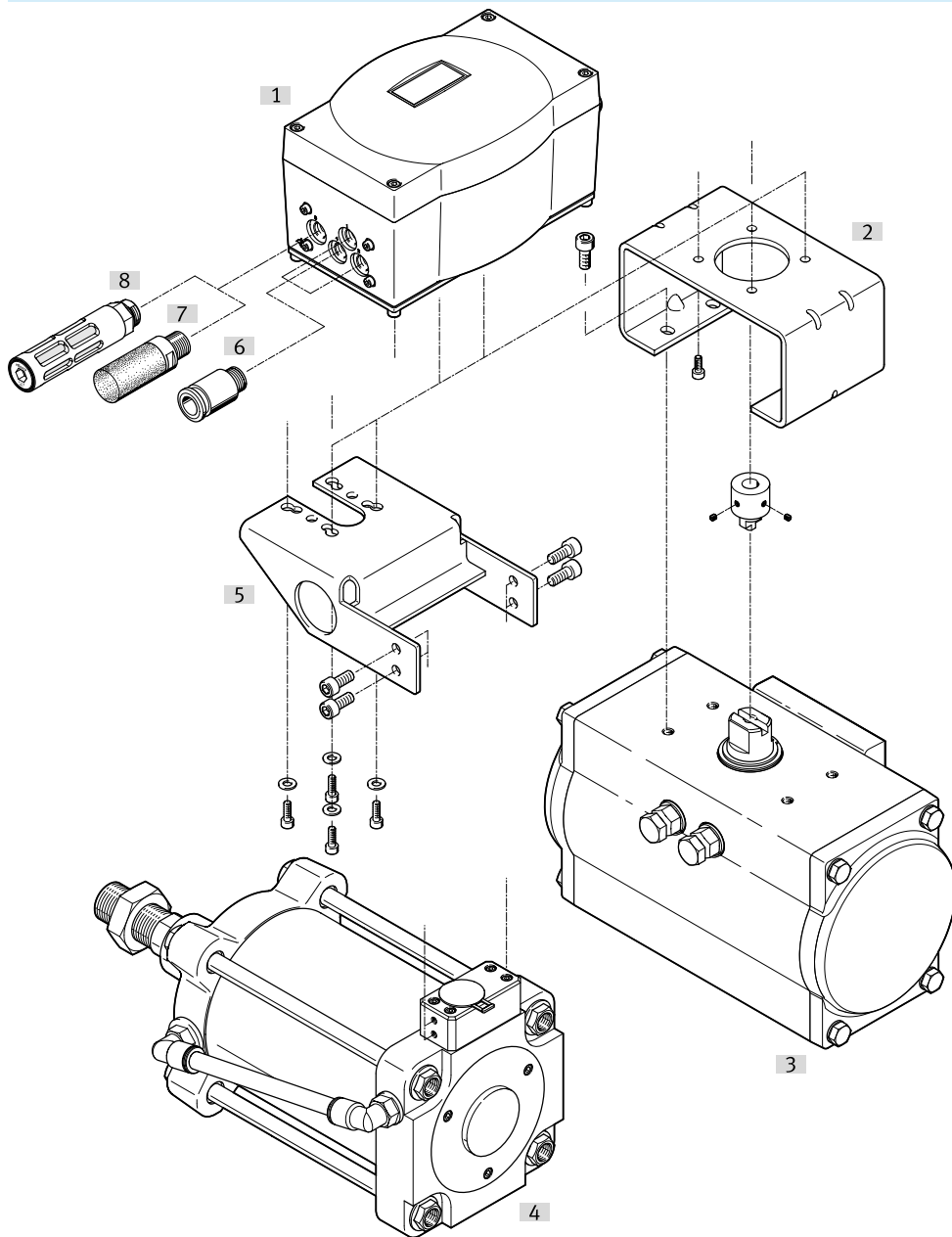
	B1	B3	D1 ø	D2 ø	D3 ø	D4 ø	H1	H2	H3	L1	L2	L3	W1
DARQ-K-P-A1-F05-20-R1	65	30	50	35	4,5	5,4	45	5	3	110	81,6	78,4	45°
DARQ-K-P-A1-F05-30-R1							55						
DARQ-K-P-A2-F05-30-R1							55						

Ordering data

Ordering data						
	Safety function	Standard nominal flow rate (standardised to DIN 1343)	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

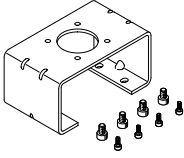
Peripherals

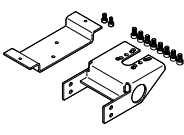
Peripherals overview





Accessories			→ Link
Type/order code	Description		
[1] Positioner CMSX	For single-acting and double-acting linear and rotary actuators		cmsx
[2] Mounting adapters DARQ	For connecting positioners and actuators for process automation		darq
[3] Linear actuator DFPI	Actuators for process automation with integrated displacement encoder		dfpi
[4] Quarter turn actuator DFPD	Actuators for process automation		dfpd
[5] Adapter kit DADG	For directly mounting a positioner on the actuator		dadg
[6] Push-in fittings QS	The safe solution for every connection		15
[7] Silencer UC	For noise reduction at exhaust ports		15
[8] Silencer U	With polymer, male thread		u

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	133012	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
		4.2 mm	For tubing outside diameter of 6 mm	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)		★ 2307	U-1/8
		50	534222	U-1/8-50