Digital electropneumatic positioner for integrated mounting on process control valves

- Compact stainless steel design
- Start-up with automatic TUNE function
- Contact-free position sensor
- Integrated pilot air duct in the actuator
- Digital communication IO-Link, Bürkert system bus (büS)

Product variants described in the data sheet may differ from the product presentation and description.

Can be combined with

Type 2301
Pneumatically operated 2-way Globe Control Valve

Type 2300
Pneumatically operated 2-way angle seat control valve ELEMENT

Type 2103
2/2-way diaphragm valve with pneumatic stainless steel actuator (Type ELEMENT) for decentralised automation

Type description

Compact positioner for integrated mounting on pneumatically controlled process control valves. The set-point value setting default occurs via standard signal 4 - 20 mA. A sensor element with contactless function records the valve spindle position. Simple start-up via automatic TUNE function and setting with the aid of DIP switch: sealing threshold, characteristic selection, inversion of direction, manual/automatic operating state switchover, digital input. A software interface can be used for the linearisation of the operating characteristic with the aid of a freely programmable characteristic, amongst other things. The status indicator functions using LEDs. An analogue position feedback can be optionally integrated.

DTS 1000110889 EN Version: U Status: RL (released | freigegeben | validé) printed: 09.01.2025

Table of contents

DTS 1000110889 EN Version: U Status: RL (released | freigegeben | validé) printed: 09.01.2025

1. General technical data

1.1. Digital electropneumatic positioner Type 8696

Product properties	
Dimensions	Further information can be found in chapter "4. Dimensions" on page 8.
Material	
Body	PPS, Stainless steel
Seal	EPDM
Cover	PC
Operation	
Operating keys	2
DIP switch	Integrated (only for 24 V DC version without digital communication)
Service interface	Connection with PC via USB connection
Configuration tool	Bürkert Communicator PACTware (only for 24 V DC device version with serial interface)
Commissioning	
Initialisation positioner	Automatic by X.TUNE function (automatic adjustment of the positioner)
Manual override of pilot valve	In manual mode via operating keys
Status display	
Display of device and valve status	Multicoloured LEDs
Communication	
Digital	IO-Link, Bürkert system bus (büS) (based on CANopen)
Performance data	
Position sensor	
Measuring principle	Inductive
Position detection module	Contactless analogue position sensor (wear-free)
Stroke range	
Valve spindle	3...32 mm
Electrical data	
Operating voltage	24 V DC ± 25 % UL: NEC Class 2
Residual ripple	Max. 10 %
Power consumption	≤ 3.5 W
Protection class	III according to DIN EN 61140
Electrical connection	
Multipole version	M12, 8-pin resp. 5-pin according to device version (see "5. Device/Process connections" on page 9)
Pneumatic data	
Control medium	Neutral gases, air, quality class according to ISO 8573 - 1
Dust content	Class 7 (< 40 µm particle size)
Particle density	Class 5 (< 10 mg/m³)
Pressure dew point	Class 3 (← 20 °C)
Oil content	Class X (< 25 mg/ m³)
Supply pressure	0...7 bar [1,]
Pilot air port	Threaded connection G ⅛, stainless steel
Positioning system	
Low air capacity	
Single-acting	7 l_N/min for aeration and ventilation (Q_{Nn} value according to definition at pressure drop from 7 to 6 bar abs)
Actuator series/size	Type 23xx, actuator Ø 50 mm Type 2103, actuator Ø 50 mm

DTS 1000110889 EN Version: U Status: RL (released | freigegeben | validé) printed: 09.01.2025

Approvals and conformities	
Explosion protection	
Ignition protection class	II 3D Ex tc IIIC T135 °C Dc II 3G Ex ec IIC T4 Gc
ATEX	BVS 14 ATEX E 008 X II 3D Ex tc IIIC T135 °C Dc II 3G Ex ec IIC T4 Gc
IECEx	IECEx BVS 14.0009 X Ex tc IIIC T135 °C Dc Ex ec IIC T4 Gc
Further information can be found in chapter "2.4. Explosion protection" on page 6.	
North America (USA/Canada)	
UL Listed for the USA and Canada	cULus certificate: E238179 Further information can be found in chapter "2.5. North America (USA/Canada)" on page 6.
FM Explosion Protection	Increased Safety for Class I, Zone 2, AEx ec IIC T4 Gc hazardous (classified) locations, indoors and outdoors (IP54). Alternatively marked as Class I Division 2 Groups A, B, C, and D; T4. Further information can be found in chapter "2.5. North America (USA/Canada)" on page 6.
Others	
China Compulsory Certification (CCC)	The products with Ex approval are suitable for import and use for hazardous applications in China. Further information can be found in chapter "2.6. Others" on page 6.
Further information can be found in chapter "2. Approvals and conformities" on page 6.	
Environment and installation	
Operating conditions	
Ambient temperature	-10...+ 55 °C
Degree of protection	IP65/IP67 according to EN 60529, 4X according to NEMA 250 Standard
Operating altitude	Up to 2000 m above sea level
Installation and mechanical data	
Installation variant	Direct mounting
Installation position	As required, preferably with actuator in upright position
Valve actuator (type, size)	ELEMENT actuator series Type 23xx/2103, actuator size Ø 50 mm and third-party actuators
Adapter kit	Further information can be found in chapter "Adapter kits" on page 14.

1.2. Without fieldbus communication

Electrical data	
Operating voltage	24 V DC ± 25 %
Residual ripple	Max. 10 %
Protection class	III according to DIN EN 61140
Input/Output	
Digital input	1 digital input, 0...5 V = log „0", 10...30 V = log „1"
Analogue output	1 output (optional) 0/4...20 mA
Input data setpoint	
Setpoint signal	
Setpoint value setting default	4...20 mA (0...20 mA adjustable via configuration software)
Input resistance	0/4...20 mA: 75 Ω

DTS 1000110889 EN Version: U Status: RL (released | freigegeben | validé) printed: 09.01.2025

1.3. With digital communication: IO-Link

Electrical data	
IO-Link specification	V1.1
SIO mode	No
VendorID	0×0078, 120
DeviceID	See IODD file (The IODD file can be downloaded from our **website Type 8696** ▶, see Software > Device Description Files)
Transmission rate	230.4 kbit/s (COM 3)
Data storage	Yes
Cable length	Max. 20 m
Port class	A and B
Electrical connection	M12 × 1, 5-pin, A-coded
Power supply	Via IO-Link
Port Class A	
Operating voltage	24 V DC ± 25 % (according to specification)
Current consumption	Max. 150 mA
Port Class B	
Operating voltage	
System supply (Pin 1 + 3)	24 V DC ± 25 % (according to specification)
Actuator supply (Pin 2 + 5)	24 V DC ± 25 % (according to specification)
Current consumption	
System supply (Pin 1 + 3)	Max. 50 mA
Actuator supply (Pin 2 + 5)	Max. 120 mA

1.4. With digital communication: Bürkert system bus (büS)

Electrical data	
Operating voltage	18...30 V DC (according to specification)
Electrical connection	M12 × 1, 5-pin, A-coded
Current consumption	Max. 150 mA

DTS 1000110889 EN Version: U Status: RL (released | freigegeben | validé) printed: 09.01.2025

2. Approvals and conformities

2.1. General notes

- The approvals and conformities listed below must be stated when making enquiries. This is the only way to ensure that the product complies with all required specifications.
- Not all available versions can be supplied with the below mentioned approvals or conformities.

2.2. Conformity

In accordance with the Declaration of Conformity, the product is compliant with the EU Directives.

2.3. Standards

The applied standards which are used to demonstrate compliance with the EU Directives are listed in the EU-Type Examination Certificate and/or the EU Declaration of Conformity.

2.4. Explosion protection

Approval	Description
	Optional: Explosion protection **ATEX:** BVS 14 ATEX E 008 X II 3D Ex tc IIIC T135 °C Dc II 3G Ex ec IIC T4 Gc **IECEx:** IECEx BVS 14.0009 X Ex tc IIIC T135 °C Dc Ex ec IIC T4 Gc

2.5. North America (USA/Canada)

Approval	Description
	Optional: UL Listed for the USA and Canada The products are UL Listed for the USA and Canada according to: • UL 61010-1 (ELECTRICAL EQUIPMENT FOR MEASUREMENT, CONTROL, AND LABORATORY USE – Part 1: General Requirements) • CAN/CSA-C22.2 No. 61010-1
	Optional: FM (Factory Mutual) – Explosion Protection Increased Safety for Class I, Zone 2, AEx ec IIC T4 Gc hazardous (classified) locations, indoors and outdoors (IP54). Alternatively marked as Class I Division 2 Groups A, B, C, and D; T4.

2.6. Others

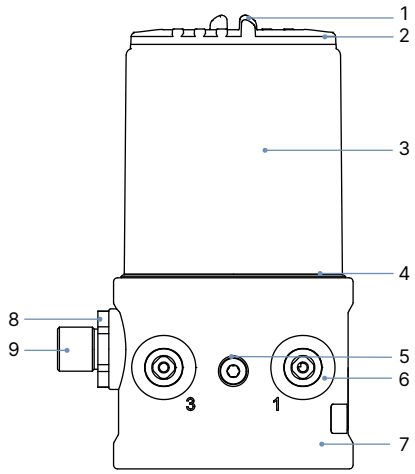
China Compulsory Certification (CCC)

Conformity	Description
	Optional: China Compulsory Certification (CCC) The products with Ex approval are suitable for import and use for hazardous applications in China.

DTS 1000110889 EN Version: U Status: RL (released | freigegeben | validé) printed: 09.01.2025

3. Materials

3.1. Material specifications



No.	Element	Material
1	Cover	PC
2	Seal	EPDM
3	Body casing	Stainless steel
4	Seal	EPDM
5	Screws	Stainless steel
6	Push-in connector Threaded ports G ⅛	POM/stainless steel Stainless steel
7	Basic housing	PPS
8	Screws	Stainless steel
9	Connector M12	Stainless steel

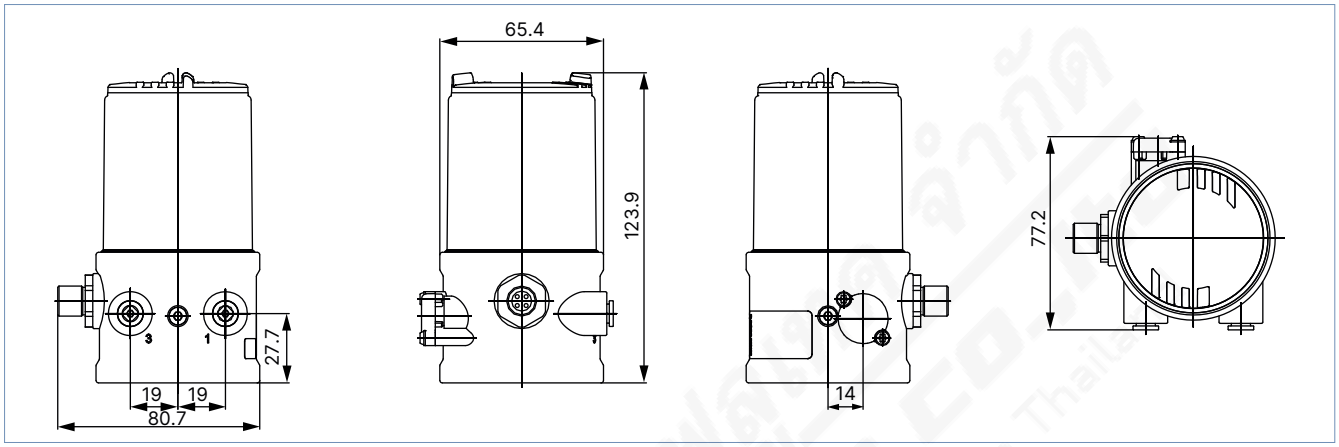
DTS 1000110889 EN Version: U Status: RL (released | freigegeben | validé) printed: 09.01.2025

4. Dimensions

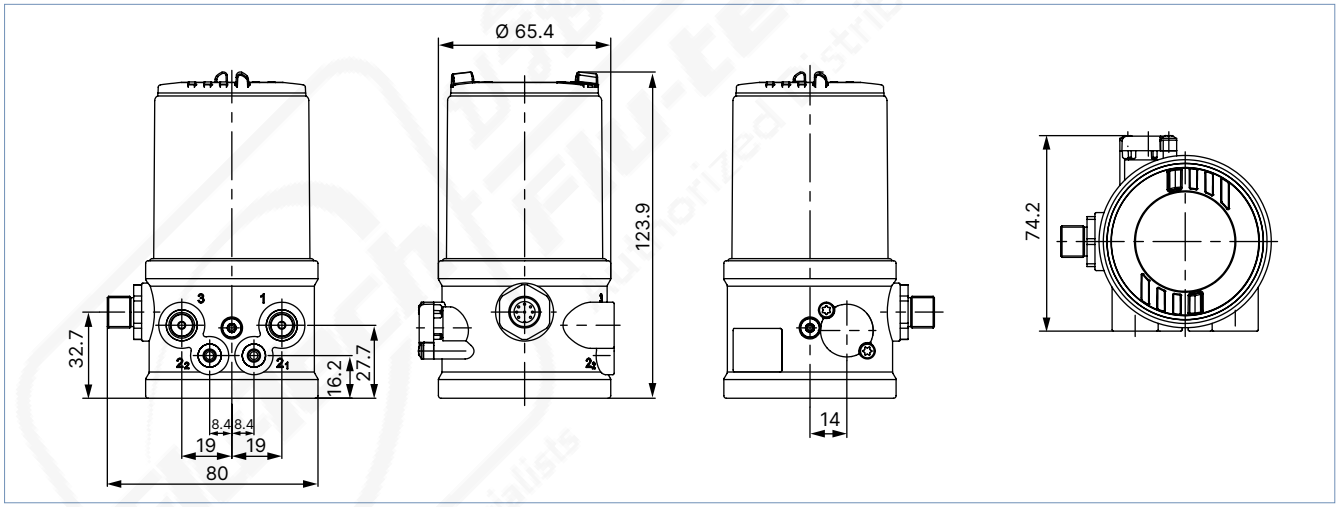
4.1. Mounting on control valve ELEMENT Type 23xx / Type 2103

Note:

- Dimensions in mm
- Internal control air supply to the actuator



4.2. Mounting on hygienic process valves of third party suppliers



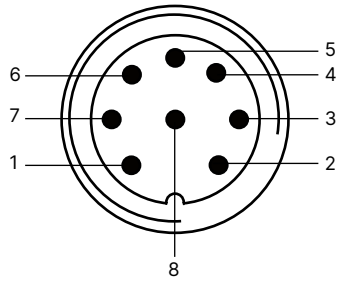
DTS 1000110889 EN Version: U Status: RL (released | freigegeben | validé) printed: 09.01.2025

5. Device/Process connections

5.1. Electrical connections

Without fieldbus communication 24 V DC

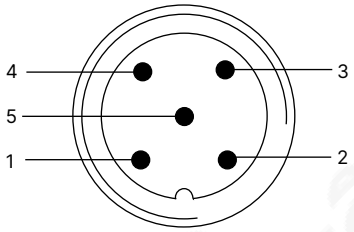
M12 circular plug, 8-pin



Pin	Pin assignment
1	Setpoint + (0/4...20 mA / 0...5/10 V)
2	Setpoint GND
3	Operating voltage GND
4	Operating voltage + 24 V DC
5	Digital input +
6	Digital input GND
7	Analogue position feedback GND
8	Analogue position feedback +

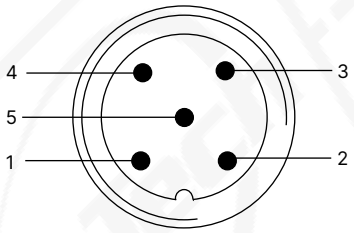
IO-Link connection

M12 circular plug, 5-pin, Port Class A



Pin	Description	Pin assignment	
1	L +	24 V DC	System supply
2	I/Q	NC	Not connected
3	L -	0 V (GND)	System supply
4	C/Q	IO-Link	Communication
5	NC	NC	Not connected

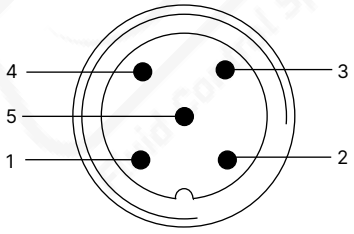
M12 circular plug, 5-pin, Port Class B



Pin	Description	Pin assignment	
1	L +	24 V DC	System supply
2	P24	24 V DC	Actuator supply
3	L -	0 V (GND)	System supply
4	C/Q	IO-Link	Communication
5	N24	0 V (GND)	Actuator supply

Bürkert system bus (büS) connection

M12 circular plug, 5-pin



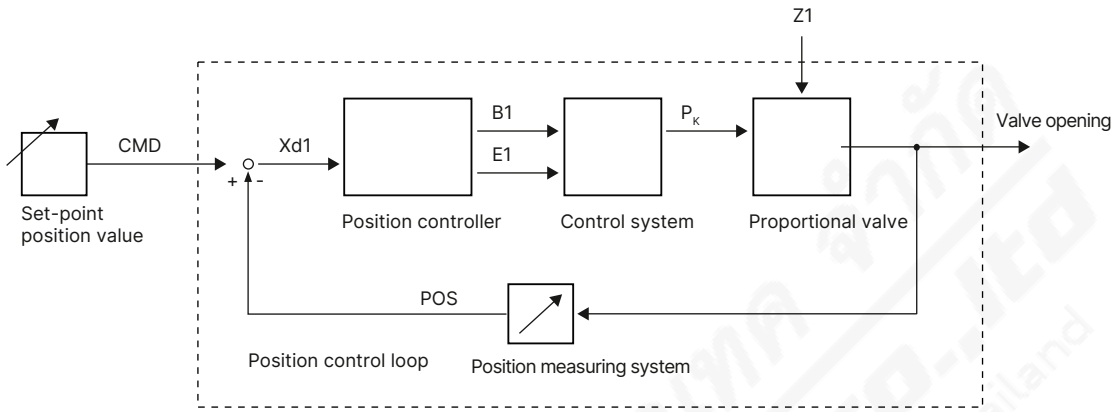
Pin	Description	Cable colour
1	CAN shielding	CAN shielding
2	+ 24 V DC ± 25 %, max. residual ripple 10 %	Red
3	GND / CAN_GND	Black
4	CAN_H	White
5	CAN_L	Blue

DTS 1000110889 EN Version: U Status: RL (released | freigegeben | validé) printed: 09.01.2025

6. Performance specifications

6.1. Signal flow diagram

Position control loop



Additional software functions of the TopControl Type 8696

TopControl BASIC functions

- Automatic commissioning of control valve system
- Digital input (safety position)
- Analogue position feedback (optional)

DIP switch activated device

- Close-tight function
- Inversion of operating direction of the setpoint signal
- Linear characteristic curves selection or customised programming (software interface)
- Manual and automatic operation

Communication software with activatable and parameter driven functions

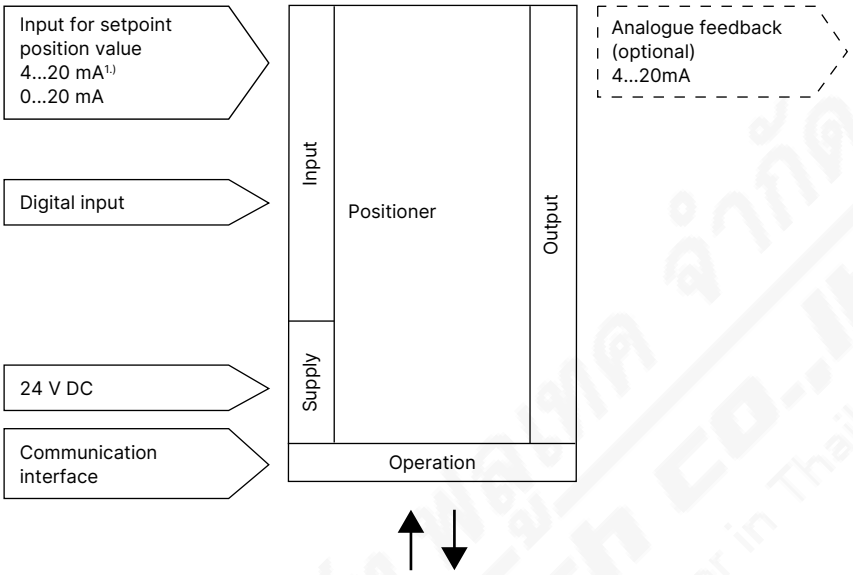
- Customised programming transmission characteristics
- Choices of setpoint signal
- Range splitting setpoint signal
- Limitation of stroke range
- Limitation of the actuating speed
- Safety position
- Signal fault detection

DTS 1000110889 EN Version: U Status: RL (released | freigegeben | validé) printed: 09.01.2025

6.2. Interface diagram

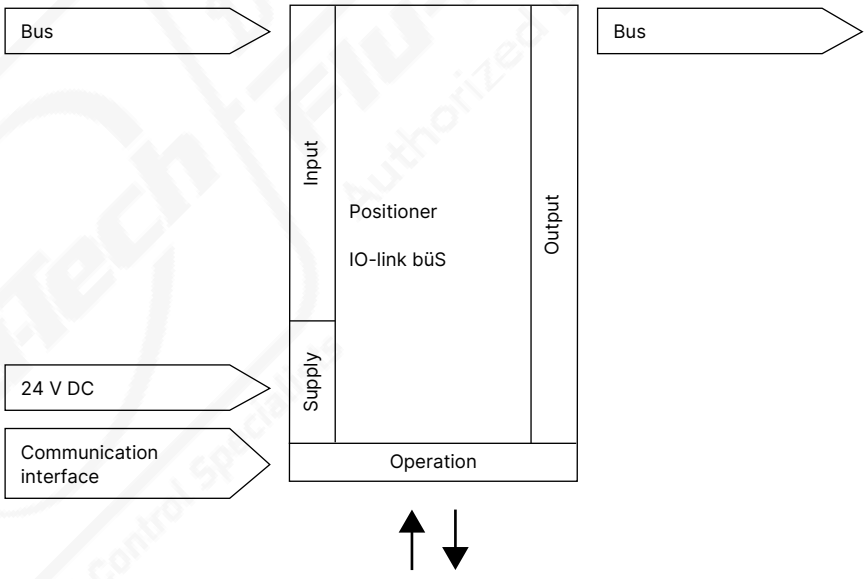
TopControl Positioner BASIC

Without fieldbus communication 24 V DC



1.) Default setting

Version with fieldbus communication AS-Interface, IO-Link and Bürkert system bus (büS)



DTS 1000110889 EN Version: U Status: RL (released | freigegeben | validé) printed: 09.01.2025

7. Product installation

7.1. Combination options with pneumatic ELEMENT process valves

Note:
A **TopControl control valve system** consists of a **BASIC positioner Type 8691** and an **ELEMENT control valve Type 23xx** resp. **Type 2103,** actuator size 50 mm.

The following information is required to select a complete system:

- **Article no.** of the desired **positioners TopControl BASIC,** see **data sheet Type 8696**
- **Article no.** of the desired **control valve Type 23xx/2103,** see **data sheet Type 2301 ▸, Type 2300 ▸** and **Type 2103 ▸**

You order two components and receive a completely assembled and certified valve.

Example of decentralised automation of On/Off ELEMENT valve systems

Positioner BASIC	Pneumatic process control valves			
				
Type 8696	**Type 2301 ▸** Globe valve	**Type 2300 ▸** Angle seat valve	**Type 2103 ▸** Diaphragm valve	**Hygienic process valve (third-party)**
	On/Off ELEMENT valve system			
				
Type 8802-GD-N Control valve system ELEMENT 2301 + 8696	**Type 8802-YG-N** Control valve system ELEMENT 2300 + 8696	**Type 8801-DF-N** Control valve system ELEMENT 2103 + 8696	**Mounting on third-party actuators** [1.]	

1.) See data sheet **Adaptations for third-party actuators Type KK01 ▸** or contact the appropriate Bürkert sales office.

DTS 1000110889 EN Version: U Status: RL (released | freigegeben | validé) printed: 09.01.2025

8. Ordering information

8.1. Bürkert eShop

Bürkert eShop – Easy ordering and quick delivery

You want to find your desired Bürkert product or spare part quickly and order directly? Our online shop is available for you 24/7. Sign up and enjoy all the benefits.

Order online now

8.2. Bürkert product filter

Bürkert product filter – Get quickly to the right product

You want to select products comfortably based on your technical requirements?
Use the Bürkert product filter and find suitable articles for your application quickly and easily.

Try out our product filter

8.3. Ordering chart

Note:

- The adapter kits must be ordered separately, see "Adapter kits" on page 14.
- All standard versions are UL-approved.
- Other versions are available on request.

Circuit function Pilot valve system	Electrical connection	Communication	Feedback signal	Digital input	Pilot air ports Threaded connection	Article no.	
Actuator series ELEMENT Type 23xx/2103 with actuator size Ø 50 mm (internal control air routing)						**Standard**	**ATEX II Cat. 3G/D, IECEx, CCC[1.)]**
Single-acting	M12 plug connector	Without fieldbus communication	–	Yes	G ⅛	326436	20037912
			Analogue	Yes	G ⅛	326437	20037914
		IO-Link Port Class A	Digital	–	G ⅛	20032474	20032476
		IO-Link Port Class B	Digital	–	G ⅛	326447	o. r.
		Bürkert system bus (büS)	Digital	–	G ⅛	326445	o. r.
Mounting on external drives (external control air routing)							
Single-acting	M12 plug connector	Without fieldbus communication	–	Yes	G ⅛	326434	20037915
			Analogue	Yes	G ⅛	326435	20037917
		IO-Link Port Class A	Digital	–	G ⅛	20032473	20032475
		IO-Link Port Class B	Digital	–	G ⅛	326446	o. r.
		Bürkert system bus (büS)	Digital	–	G ⅛	326444	o. r.

o. r. = on request

1.) CCC (China Compulsory Certificate) for device versions with Ex approval

DTS 1000110889 EN Version: U Status: RL (released | freigegeben | validé) printed: 09.01.2025

8.4. Ordering chart accessories

Standard accessories

Note:
Must be ordered separately.

Description	Article no.
M12 circular socket with cable, 8-pin, cable length: 5 m, for input and output signals	919267
Silencer G ⅛	780779
Silencer 6 mm, PE, push-in connection	902662
USB büS interface set 2 (Type 8923) for connection to the Bürkert Communicator software: including büS stick, connection cable to M12 plug, M12 connection cable on micro USB for the büS service interface and Y distributor, cable length: 0.7 m	772551
büS cable extension, M12, cable length: 1 m	772404
büS cable extension, M12, cable length: 3 m	772405
büS cable extension, M12, cable length: 5 m	772406
büS cable extension, M12, cable length: 10 m	772407
Sensor puck (spare part)	677245
Software Bürkert Communicator	**Type 8920** ▸

Adapter kits

Note:
Must be ordered separately.

Adapter kits for third-party actuators can be found in the **data sheet Adaptation for third-party actuators Type KK01** ▸ or contact the appropriate Bürkert sales office.

Description	Actuator size	Control function	Article no.
Attachment kit for Type 21xx/23xx actuator series	Ø 50 mm	Universal	679918

DTS 1000110889 EN Version: U Status: RL (released | freigegeben | validé) printed: 09.01.2025