



## Control head for decentralised automation of ELEMENT process valves

- Contact-free inductive valve position registration (Teach-In function)
- Coloured illuminated status display
- Integrated control air routing in the actuator
- Fieldbus interface AS interface, IO-Link or Bürkert system bus (büS)
- With ATEX II cat. 3G/D / IECEx approval

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

### Can be combined with

|   |   |
|---|---|
|   | <b>Type 2100</b> ▶<br>Pneumatically operated 2/2 way angle seat valve ELEMENT                               |
|  | <b>Type 2101</b> ▶<br>Pneumatically operated 2/2 way globe valve ELEMENT                                    |
|  | <b>Type 2103</b> ▶<br>2/2 way diaphragm valve with pneumatic stainless steel actuator (Type ELEMENT)        |
|  | <b>Type 2104</b> ▶<br>T-diaphragm valve with pneumatic actuator in stainless steel (Type ELEMENT)           |
|  | <b>Type 2105</b> ▶<br>Tank bottom diaphragm valve with pneumatic actuator in stainless steel (Type ELEMENT) |
|  | <b>Type 2106</b> ▶<br>Pneumatically operated 3/2 way seat valve ELEMENT                                     |

### Type description

The control head Type 8691 is designed for decentralized automation of ELEMENT Type 21xx pneumatic process valves. The registration of the valve position is done through a contact-free analogue sensor element, which automatically recognises and saves the valve end position through the Teach function during start-up. The integrated pilot valve controls single or double-acting actuators. As an option a communication interface, AS-Interface, IO-Link or büS (based on CANopen) can be chosen.

The design of the control head and the actuator enables an internal control air routing without external tubings. Besides the electrical position feedback, the status of the device is shown directly on the control head itself through coloured powerful LEDs, even in difficult ambient conditions.

The housing is easy to clean and features proven IP protection and chemically resistant materials for use in hygienic processing in food, beverage and pharmaceutical industries. Focused on wash down applications, the IP protection of the housing is supported by a positive pressure inside the control head. Combined with Bürkert ELEMENT actuators, the pneumatic actuating system enables spring chamber aeration that avoids actuator chamber contamination from the environment.

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## 1. General technical data

### 1.1. Control head Type 8691

| Product properties                 |   |
|------------------------------------|---|
| Dimensions                         | Detailed information can be found in chapter <a href="#">“3. Dimensions” on page 7.</a>   |
| Material                           |   |
| Body                               | PPS, stainless steel  |
| Seal                               | EPDM  |
| Cover                              | PC  |
| Operation                          |   |
| Operating keys                     | A key to operate the Teach-Function   |
| Service interface                  | Connected to PC via USB connection  |
| Configuration tool                 | Bürkert Communicator  |
| Commissioning                      |   |
| Setting valve end position         | Automatic using Teach-Function  |
| Manual operation of pilot valve    | Yes   |
| Status display                     |   |
| Display of device and valve status | High-power LEDs (colours individually adjustable)   |
| Communication                      |   |
| Fieldbus                           | AS-Interface, IO-Link   |
| Digital                            | Bürkert system bus (büS) (based on CANopen)   |
| Performance data                   |   |
| Functional overview                | Detailed information can be found in chapter <a href="#">“1.5. Functional overview Type 8691” on page 6.</a>                                |
| Position sensor                    |   |
| Analogue position sensor           | Inductive (contactless) with self-adjusting switching points (PNP) (NPN on request)   |
| Stroke range for linear actuator   |   |
| Valve spindle                      | 2.5...45 mm   |
| Electrical data                    |   |
| Operating voltage                  | 24 V DC $\pm$ 10 %<br>UL: NEC Class 2   |
| Residual ripple                    | 10 %  |
| Power consumption                  | <2 W  |
| Protection class                   | 3 acc. to DIN EN 61140  |
| Electrical connection              |   |
| Multipole version                  | M12, 8 pin resp. 4-, or 5 pin acc. to device version (see <a href="#">“4. Device/Process connections” on page 8</a> )                       |
| Cable gland version                | M16 $\times$ 1.5 (Terminal range 5...10 mm)<br>With screw terminals for cable cross sections 0.14...1.5 mm <sup>2</sup>                     |
| Pneumatic data                     |   |
| Control medium                     |   |
| Dust content                       | Neutral gases, air, quality class acc. to ISO 8573-1<br>Class 7 (<40 $\mu$ m particle size)   |
| Particle density                   | Class 5 (<10 mg/m <sup>3</sup> )  |
| Pressure dew point                 | Class 3 (<-20 °C)   |
| Oil content                        | Class X (<25 mg/m <sup>3</sup> )  |
| Air supply filter                  |   |
| Mesh size                          | Exchangeable<br>~0.1 mm   |
| Supply pressure                    | 3...7 bar <sup>1)</sup>   |
| Pilot air port                     | Threaded connection G 1/8, stainless steel  |
| Positioning system                 |   |
| Circuit function                   | Single and double-acting  |
| Air capacity                       | 250 l <sub>N</sub> /min (for aeration and ventilation) (Q <sub>Nr</sub> value acc. to definition at pressure drop from 7 to 6 bar absolute) |
| Actuator series/size               | Type 21xx, $\varnothing$ actuator 70/90/130 mm  |

| Approvals and certificates         |  |
|------------------------------------|--|
| Conformity                         | EMC directive 2014/30/EU   |
| Ignition protection                | II 3D Ex tc IIIC T135 °C Dc<br>II 3G Ex ec IIC T4 Gc                                     |
| UL                                 | cULus Certificate: E238179   |
| ATEX                               | II 3D Ex tc IIIC T135 °C Dc<br>II 3G Ex ec IIC T4 Gc<br>Certificate: BVS 14 ATEX E 008 X |
| IECEX                              | Ex tc IIIC T135 °C Dc<br>Ex ec IIC T4 Gc<br>Certificate: IECEX BVS 14.0009 X             |
| CCC (China Compulsory Certificate) | For devices with Ex approval   |
| Environment and installation       |  |
| Operating conditions               |  |
| <b>Ambient temperature</b>         |  |
| With pilot valve                   | -10...+55 °C   |
| Without Pilot valve                | -20...+60 °C   |
| Degree of protection               | IP65/IP67 acc. to EN 60529, 4X acc. to NEMA 250 Standard                                 |
| Operating altitude                 | Up to 2000 m above sea level   |
| Installation and mechanical data   |  |
| Installation position              | As required, preferably with actuator in upright position                                |
| Valve actuator (type, size)        | ELEMENT Type 21xx (Actuator size Ø70/90/130 mm)  |
| Adapter kit                        | Detailed information can be found in chapter <a href="#">“Adapter kits” on page 12.</a>  |

1.) The supply pressure applied must be 0.5 to 1 bar above the minimum required pilot pressure of the valve actuator.

## 1.2. With fieldbus communication: AS-Interface

| Product properties                        |   |
|---|---|
| Profile                                   | S-B.A.E (A/B-Slave, max. 62 slaves/master) certificate no. 77601 acc. to Specification V3.0<br>Master class: M3, M4<br>S-B.F.F (standard slave, max. 31 slaves/master) Master class: M0, M1, M2, M3, M4 |
| Electrical data                           |   |
| <b>Operating voltage</b>                  | 26.5...31.6 V DC, UL: NEC Class 2   |
| Via Bus cable                             | Acc. to specification   |
| Isolation from bus signal                 | On request  |
| Protection class                          | 3 acc. to DIN EN 61140  |
| Power consumption                         |   |
| Max. current consumption                  | 120 mA  |
| Current consumption in standard operation | 90 mA (acc. to current reduction; valve + 1 end position achieved)  |
| Device with external power supply         |   |
|   | External power supply (The power supply unit must contain one secured disconnection acc. to IEC 364-4-41 (PELV or SELV))  |
| Max. current consumption                  | 55 mA (acc. to current reduction ≤ 30 mA)   |
| Max. current consumption from ASI         | 55 mA   |
| Electrical connection                     | M12, 4 pin  |
| Output                                    |   |
| Contact rating                            | ≤ 1 W via AS-Interface  |
| Watchdog function                         | Integrated  |
| Input                                     |   |
| Sensor operating voltage                  | 24 V ± 10 % (via AS-Interface)  |
| Current carrying capacity                 | ≤ 50 mA short circuit proof   |
| Switching level, high                     | ≥ 10 V  |
| Input current, high                       | Limited to 6.5 mA   |
| Input current, low                        | ≤ 1.5 mA  |
| Programming data                          | See <b>operating manual</b> ▶   |

**1.3. With digital communication: IO-Link**

| Electrical data                           |  |
|---|--|
| Electrical connection                     | M12 × 1, 4 pin   |
| IO-Link Specification                     | V1.1.2   |
| SIO-Mode                                  | Yes, optionally 2xDO (end positions), or 1xDI+ 1xDO (valve switch + an end position)   |
| VendorID                                  | 0x0078, 120  |
| DeviceID                                  | See IODD file (The IODD file can be downloaded from our <a href="#">website</a> ►, see Software > Device Description Files A.04) |
| Transmission rate                         | 230.4 kbit/s   |
| Data storage                              | Yes  |
| Max. cable length                         | 20 m   |
| Port class                                | A  |
| Power supply                              | Via IO-Link  |
| Operating voltage                         | 18...30 V DC (acc. to specification)   |
| Max. current consumption                  | 135 mA@18 V  |
| Current consumption in standard operation | 110 mA@18 V (acc. to current reduction Pilot valve + 1 end position achieved)  |
| Frame type in operation                   | TYPE_2_V   |
| Min. cycle time                           | 1 ms   |

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

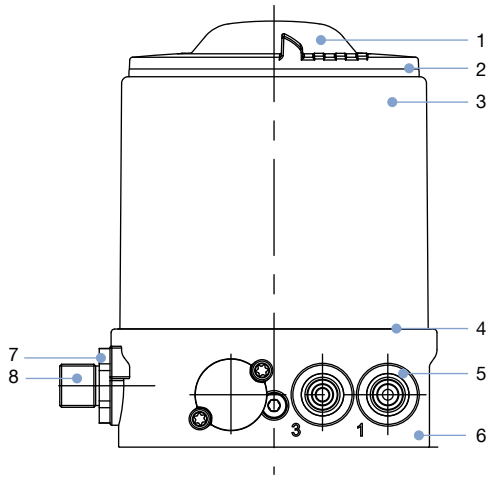
| Electrical data       |                                      |
|-----------------------|--------------------------------------|
| Operating voltage     | 18...30 V DC (acc. to Specification) |
| Electrical connection | M12 × 1, 5 pin, A-coded              |
| Current consumption   | Max. 150 mA   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

## 1.5. Functional overview Type 8691

| Function  | Version |         |                             |                        |                 |
|---|---------|---------|-----------------------------|------------------------|-----------------|
|   | 24 V    | IO-Link | AS-Interface Standard-Slave | AS-Interface A/B-Slave | büS/<br>CANopen |
| <b>Basic functions</b>  |         |         |                             |                        |                 |
| Teach-Function position sensor  | x       | x       | x                           | x                      | x               |
| Manual override pilot valve (mechanical)  | x       | x       | x                           | x                      | x               |
| Manual override pilot valve (electrical)  |         | x       |                             |                        | x               |
| Position feedback valve OPEN/CLOSED   | x       | x       | x                           | x                      | x               |
| Feedback signal current valve position (intermediate position)                      |         | x       |                             |                        |                 |
| Optical position feedback/status display high-performance LEDs                      | x       | x       | x                           | x                      | x               |
| Inversion of LED colours (colour of optical feedback)                               | x       | x       | x                           | x                      | x               |
| Selection of LED display mode   |         | x       |                             |                        | x               |
| Diagnostic LEDs   |         | x       | x                           | x                      | x               |
| Selection or deactivation of the optical display                                    |         | x       |                             |                        | x               |
| Date storage function   |         | x       |                             |                        |                 |
| Locating function   |         | x       |                             |                        | x               |
| büS communication interface (Burkert System Bus)                                    |         |         |                             |                        | x               |
| büS service interface (PC-Tool Bürkert Communicator)                                |         | x       |                             |                        | x               |
| <b>Diagnosis</b>  |         |         |                             |                        |                 |
| Process valve switching cycles counter with definable limit value                   |         | x       |                             |                        | x               |
| Pilot valve switching cycles counter  |         | x       |                             |                        | x               |
| Operating hours counter with definable limit value                                  |         | x       |                             |                        | x               |
| Process valve counter for opening/closing timeout                                   |         | x       |                             |                        | x               |
| Travel accumulator with definable limit value                                       |         | x       |                             |                        | x               |
| Active diagnostic messages (feedback when limit values are exceeded)                |         | x       |                             |                        | x               |
| Diagnosis reset command (to reset counter values)                                   |         | x       |                             |                        | x               |
| Error feedback signal position sensor   |         | x       | x                           | x                      | x               |
| Self-monitoring control head with automatic error message                           |         | x       |                             |                        | x               |
| Feedback Teach error  | x       | x       | x                           | x                      | x               |
| Feedback over-temperature   |         | x       |                             |                        | x               |
| Feedback communication error  |         | x       | x                           | x                      | x               |
| Feedback for opening/closing timeout  |         | x       |                             |                        | x               |
| Tolerance for switching time overrun  |         | x       |                             |                        | x               |
| Error detection if the setpoint position is not reached (end positions not reached) |         | x       |                             |                        | x               |
| Tolerance band of end position detection  |         | x       |                             |                        |                 |
| Detection of under-voltage and over-voltage of the power supply                     |         | x       |                             |                        | x               |
| Log function for error cases  |         | x       |                             |                        | x               |
| <b>Parameterization</b>   |         |         |                             |                        |                 |
| Enable/disable safety position in case of setpoint or bus error                     |         | x       |                             |                        | x               |
| Selecting and setting the SIO mode  |         | x       |                             |                        |                 |
| Selection of digital outputs (end positions) PNP, NPN                               | x       | x       |                             |                        |                 |
| Selection of digital outputs (end positions) PNP, NPN, PP                           |         | x       |                             |                        |                 |
| Deactivation of local operation (Lock function)                                     |         | x       |                             |                        | x               |
| Reset function (reset to factory setting)   |         | x       |                             |                        | x               |

## 2. Materials

### 2.1. Material specifications



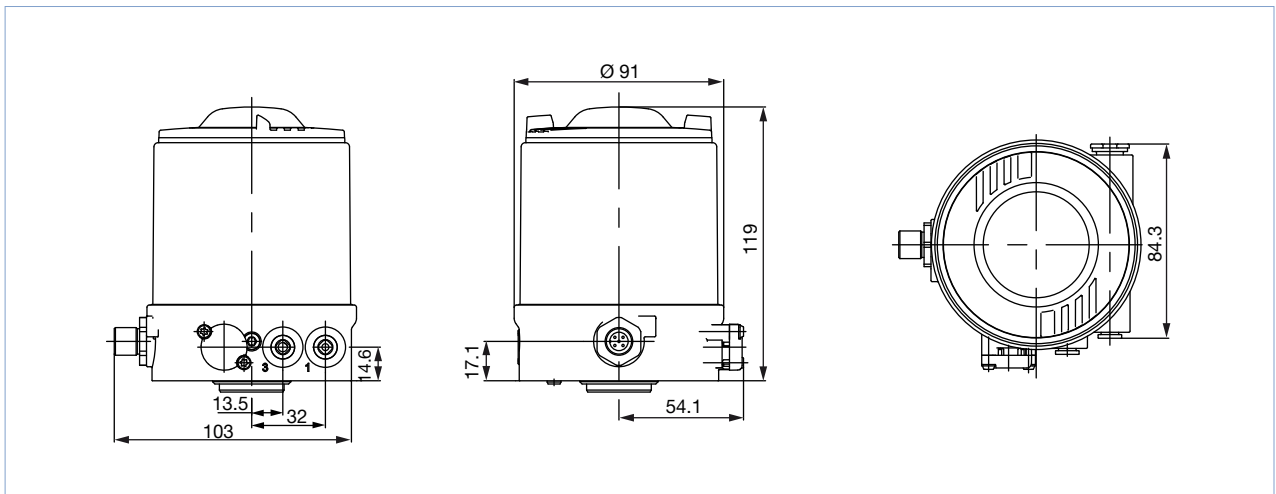
| No. | Element                                   | Material                               |
|-----|---|--|
| 1   | Cover                                     | PC                                     |
| 2   | Seal                                      | EPDM                                   |
| 3   | Outer casing                              | Stainless steel                        |
| 4   | Seal                                      | EPDM                                   |
| 5   | Push-in connector<br>Threaded ports G 1/8 | POM/Stainless steel<br>Stainless steel |
| 6   | Basic housing                             | PPS                                    |
| 7   | Screws                                    | Stainless steel                        |
| 8   | Plug connector M12                        | Stainless steel                        |

## 3. Dimensions

### 3.1. Mounting on process valve ELEMENT Type 21xx

**Note:**

Dimensions in mm

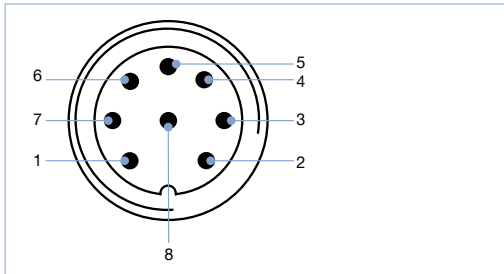


## 4. Device/Process connections

### 4.1. Electrical connections

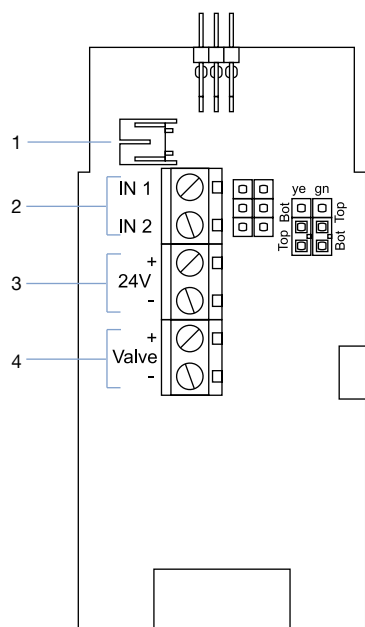
Without fieldbus communication 24 V DC

Circular plug M12, 8 pin



| Pin | Description         | Pin assignment |
|-----|---------------------|----------------|
| 1   | Limit switches 1    | IN 1/TOP       |
| 2   | Limit switches 2    | IN 2/BOTTOM    |
| 3   | Operating voltage   | GND            |
| 4   | Operating voltage + | 24 V DC        |
| 5   | Valve control +     | Valve +        |
| 6   | Valve control -     | Valve          |
| 7   | -                   | Not assigned   |
| 8   | -                   | Not assigned   |

### Cable gland



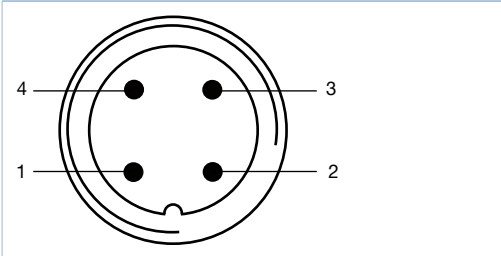
### Input signal

| Pin | Pin assignment                               |
|-----|--|
| 1   | Valve connection                             |
| 2   | Connecting terminals<br>End positions        |
| 3   | Connecting terminals<br>Supply 24 V DC       |
| 4   | Connecting terminals<br>Valve (input signal) |



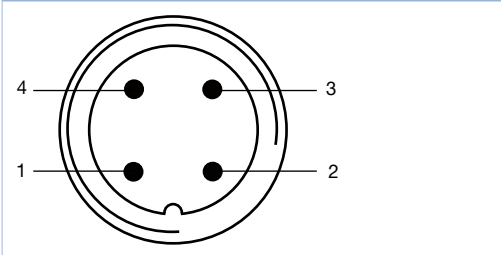
**AS-Interface connection**

**M12 circular plug, 4 pin, without external power supply**



| Pin | Description   | Pin assignment           |
|-----|---------------|--------------------------|
| 1   | Bus +         | Bus cable AS-Interface + |
| 2   | NC (optional) | Not assigned             |
| 3   | Bus -         | Bus cable AS-Interface - |
| 4   | NC (optional) | Not assigned             |

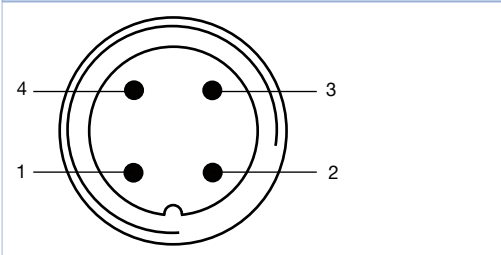
**M12 circular plug, 4 pin, with external power supply (on request)**



| Pin | Description       | Pin assignment           |
|-----|-------------------|--------------------------|
| 1   | Bus +             | Bus cable AS-Interface + |
| 2   | GND (optional)    | External power supply    |
| 3   | Bus -             | Bus cable AS-Interface - |
| 4   | 24 V + (optional) | External power supply    |

**IO-Link connection**

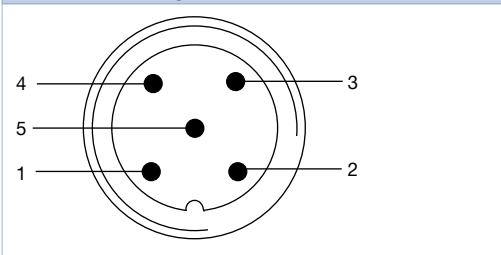
**M12 circular plug, 4 pin**



| Pin | Description | Pin assignment |          |
|-----|-------------|----------------|----------|
|     |             | IO-Link Mode   | SIO-Mode |
| 1   | L +         | 24 V DC        |          |
| 2   | I/Q         | Not assigned   | DI or DO |
| 3   | L -         | 0 V (GND)      |          |
| 4   | Q/C         | IO-Link        | DI or DO |

**Bürkert system bus (būS) connection**

**M12 circular plug, 5 pin**



| Pin                                       | Description     | Cable colour |
|---|-----------------|--------------|
| <b>Supply voltage: 18...30 V DC (būS)</b> |                 |              |
| 2   | V+              | Red          |
| 3   | V-              | Black        |
| <b>Data lines</b>                         |                 |              |
| 1   | Drain/Shielding | -            |
| 4   | CAN_H           | White        |
| 5   | CAN_L           | Blue         |

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## 5. Product installation

### 5.1. Combination options with pneumatic process valves

**Note:**

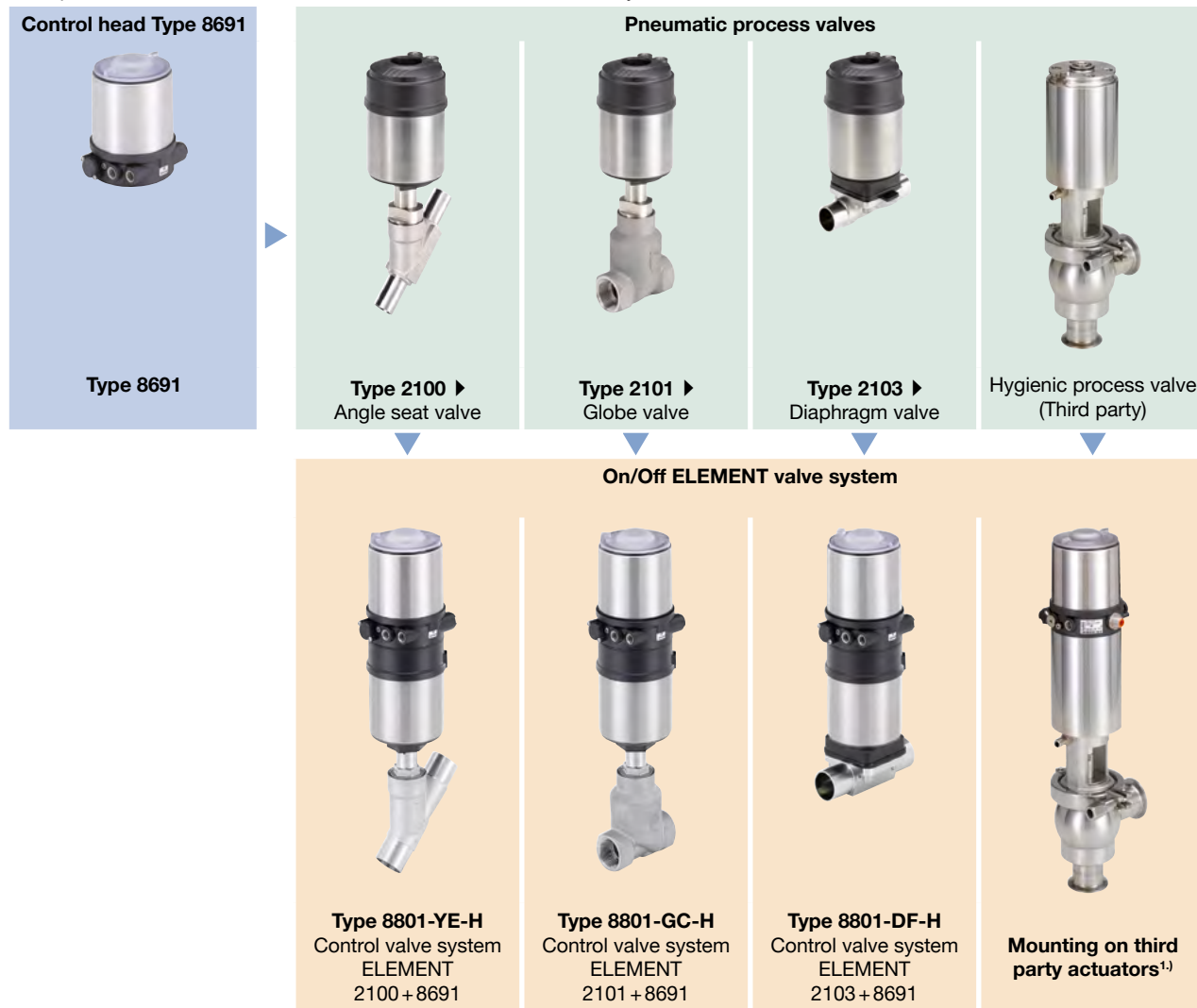
A TopControl control valve system consists of a **control head, Type 8691**, and an **ELEMENT process valve, Type 21xx**.

The following information is required to select a complete system:

- **Article no.** of the desired control head, **Type 8691**
- **Article no.** of the selected process valve, **Type 21xx** (see separate datasheet **Type 2100 ▶, 2101 ▶ and 2103 ▶**)

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

Example of for decentralized automation of On/Off ELEMENT valve systems



1.) See data sheet **adaptations for third-party actuators, KK01 ▶** or contact the appropriate Bürkert sales office.

## 6. Ordering information

### 6.1. Bürkert eShop – Easy ordering and quick delivery



#### Bürkert eShop – Easy ordering and fast 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.

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### 6.2. 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.

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### 6.3. Ordering chart

**Note:**

Standard versions are UL approved (UL approval IO-Link and büS - Bürkert system bus (büS) in preparation)

| Communication  | Electrical connection                                       | Circuit function<br>Pilot valve<br>system | Pilot air ports<br>Threaded ports | Article no. |   |
|--|---|---|-----------------------------------|-------------|---|
|  |   |   |                                   | Standard    | ATEX II<br>Cat. 3G/D,<br>IECEX,<br>CCC <sup>1.)</sup> |
| AS-Interface<br>Slave profile: S-B.A.E<br>(A/B-Slave, max. 62<br>Slaves) | M12 circular plug connector                                 | Single-acting                             | G 1/8                             | 227254      | 264988  |
|  |   | Double-acting                             | G 1/8                             | 227240      | 264975  |
|  | M12 circular plug connector/<br>Flat cable clip/80 cm cable | Single-acting                             | G 1/8                             | 227258      | 264990  |
|  |   | Double-acting                             | G 1/8                             | 227244      | 264977  |
| IO-Link  | M12 circular plug connector                                 | Single-acting                             | G 1/8                             | 307371      | 321927  |
|  |   | Double-acting                             | G 1/8                             | 307368      | 321925  |
| Bürkert system bus (büS)   | M12 circular plug connector                                 | Single-acting                             | G 1/8                             | 307375      | 321931  |
|  |   | Double-acting                             | G 1/8                             | 307373      | 321929  |
|  |   | Without                                   | G 1/8                             | 307379      | 321935  |
| Without fieldbus commu-<br>nication                                      | M12 circular plug connector                                 | Single-acting                             | G 1/8                             | 227262      | 264992  |
|  |   | Double-acting                             | G 1/8                             | 227248      | 264979  |
|  |   | Without                                   | G 1/8                             | 246211      | 264972  |
|  | Cable gland   | Single-acting                             | G 1/8                             | 227260      | 264991  |
|  |   | Double-acting                             | G 1/8                             | 227246      | 264978  |
|  |   | Without                                   | G 1/8                             | 264943      | 264971  |

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

#### Further versions on request

|  |                                  |
|--|----------------------------------|
|  | <b>Additional</b><br>büS/CANopen |
|--|----------------------------------|

### 6.4. Ordering chart accessories

#### Standard accessories

| Description   | Article no. |
|---|-------------|
| M12 socket, 8 pin with 5 m cable for input and output signals   | 919267      |
| ASI flat cable clamp with M12 stainless steel socket (spare part)   | 799646      |
| USB büS interface set (büS stick + connection cable to M12 plug + connection cable M12 to micro USB for the büS service interface) for connection with PC tool Bürkert Communicator | 772551      |
| büS cable extension M12, length 1 m   | 772404      |
| büS cable extension M12, length 3 m   | 772405      |
| büS cable extension M12, length 5 m   | 772406      |
| büS cable extension M12, length 10 m  | 772407      |
| Silencer G 1/8  | 780779      |
| Sensor Puck (spare part)  | 682240      |
| Software Bürkert Communicator   | <b>LINK</b> |

#### Adapter kits

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

| Description                               | Actuator size  | Control function | Article no. |
|---|----------------|------------------|-------------|
| Adapter kit for actuator series Type 21xx | Ø 70/90/130 mm | Universal        | 679917      |

# Bürkert – Close to You

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please visit us at  
[www.burkert.com](http://www.burkert.com)

DTS 1000110599 EN Version: AB Status: RL (released | freigegeben | validé) printed: 12.05.2022

