

# Type 2100

2/2 and 2/3-way angle seat valve



## Operating Instructions

We reserve the right to make technical changes without notice.

© Bürkert Werke GmbH & Co. KG, 2008 - 2019

Operating Instructions 1903/10\_EUml 00805596 / Original DE

# CONTENTS

|          |                                                                                     |           |
|----------|-------------------------------------------------------------------------------------|-----------|
| <b>1</b> | <b>About these instructions .....</b>                                               | <b>5</b>  |
| 1.1      | Symbols .....                                                                       | 5         |
| 1.2      | Definition of terms .....                                                           | 5         |
| <b>2</b> | <b>Intended use .....</b>                                                           | <b>7</b>  |
| <b>3</b> | <b>Basic safety instructions .....</b>                                              | <b>8</b>  |
| <b>4</b> | <b>General information .....</b>                                                    | <b>10</b> |
| 4.1      | Contact address .....                                                               | 10        |
| 4.2      | Warranty .....                                                                      | 10        |
| 4.3      | Information on the Internet .....                                                   | 10        |
| <b>5</b> | <b>Product description .....</b>                                                    | <b>11</b> |
| 5.1      | Features .....                                                                      | 11        |
| 5.2      | Structure and function .....                                                        | 11        |
| 5.2.1    | Control functions .....                                                             | 12        |
| 5.2.2    | Flow direction below seat .....                                                     | 13        |
| 5.2.3    | Flow direction above the seat .....                                                 | 13        |
| 5.3      | Variant 3-position actuator .....                                                   | 13        |
| 5.3.1    | Control function variant 3-position actuator .....                                  | 14        |
| 5.4      | Device options .....                                                                | 14        |
| 5.5      | Variants .....                                                                      | 15        |
| <b>6</b> | <b>Technical data .....</b>                                                         | <b>16</b> |
| 6.1      | Conformity .....                                                                    | 16        |
| 6.2      | Standards .....                                                                     | 16        |
| 6.3      | Type label .....                                                                    | 16        |
| 6.3.1    | Designation of the actuator size .....                                              | 16        |
| 6.4      | Operating conditions .....                                                          | 17        |
| 6.4.1    | Temperature ranges .....                                                            | 17        |
| 6.4.2    | Pressure ranges 2/2-way valve .....                                                 | 17        |
| 6.4.3    | Pressure ranges 2/3-way valve .....                                                 | 21        |
| 6.5      | Flow values and characteristics 2/3-way valve .....                                 | 22        |
| 6.6      | Mechanical data .....                                                               | 28        |
| <b>7</b> | <b>Installation .....</b>                                                           | <b>29</b> |
| 7.1      | Safety instructions installation .....                                              | 29        |
| 7.2      | Preparatory work .....                                                              | 30        |
| 7.2.1    | Attach dirt trap .....                                                              | 30        |
| 7.3      | Installing valve body .....                                                         | 30        |
| 7.4      | Installing devices with welded connection .....                                     | 30        |
| 7.4.1    | Removing actuator from the valve body for devices without control unit .....        | 30        |
| 7.4.2    | Removing actuator from the valve body for devices with installed control unit ..... | 31        |
| 7.4.3    | Installing actuator on valve body .....                                             | 31        |
| 7.5      | Installing control unit .....                                                       | 32        |

|           |                                                                              |           |
|-----------|------------------------------------------------------------------------------|-----------|
| 7.6       | Turning actuator .....                                                       | 32        |
| 7.6.1     | Turning the actuator, devices with hexagon nut.....                          | 32        |
| 7.6.2     | Turning actuator, devices without hexagon head.....                          | 33        |
| 7.7       | Connecting device pneumatically .....                                        | 35        |
| 7.7.1     | Connecting control medium .....                                              | 35        |
| <b>8</b>  | <b>Start-up.....</b>                                                         | <b>37</b> |
| 8.1       | Set middle position on 3-position actuator .....                             | 37        |
| <b>9</b>  | <b>Deinstallation .....</b>                                                  | <b>39</b> |
| <b>10</b> | <b>Maintenance .....</b>                                                     | <b>40</b> |
| 10.1      | Safety instructions maintenance .....                                        | 40        |
| 10.2      | Maintenance work .....                                                       | 40        |
| 10.2.1    | Actuator .....                                                               | 40        |
| 10.2.2    | Wearing parts.....                                                           | 40        |
| 10.2.3    | Visual inspection.....                                                       | 41        |
| 10.2.4    | Cleaning.....                                                                | 41        |
| 10.3      | Changing the valve set .....                                                 | 41        |
| 10.3.1    | Removing actuator from the valve body for devices without control unit ..... | 42        |
| 10.3.2    | Changing the valve set .....                                                 | 43        |
| 10.3.3    | Installing actuator on valve body .....                                      | 43        |
| 10.4      | Changing the packing gland.....                                              | 44        |
| 10.4.1    | Removing actuator from the valve body for devices without control unit ..... | 45        |
| 10.4.2    | Removing swivel plate .....                                                  | 45        |
| 10.4.3    | Changing packing gland .....                                                 | 46        |
| 10.4.4    | Installing swivel plate .....                                                | 48        |
| 10.4.5    | Installing actuator on valve body .....                                      | 48        |
| <b>11</b> | <b>Faults .....</b>                                                          | <b>50</b> |
| <b>12</b> | <b>Replacement parts, accessories .....</b>                                  | <b>51</b> |
| 12.1      | Replacement part set .....                                                   | 51        |
| 12.2      | Installation tools.....                                                      | 52        |
| <b>13</b> | <b>Transportation, storage, disposal.....</b>                                | <b>53</b> |

# 1 ABOUT THESE INSTRUCTIONS

The operating instructions describe the entire life cycle of the device.

→ Keep these instructions ready to hand at the operation site.



**Important safety information.**

- ▶ Carefully read these instructions.
- ▶ Observe in particular the safety instructions, intended use and operating conditions.
- ▶ Persons, who work on the device, must read and understand these instructions.

## 1.1 Symbols



### **DANGER!**

Warns of an immediate danger.

- ▶ Failure to observe the warning will result in fatal or serious injuries.



### **WARNING!**

Warns of a potentially dangerous situation.

- ▶ Failure to observe the warning may result in serious or fatal injuries.



### **CAUTION!**

Warns of a possible danger.

- ▶ Failure to observe the warning may result in moderate or minor injuries.

### **ATTENTION!**

Warns of damage to property.

- ▶ Failure to observe the warning may result in damage to the device or system.



Indicates important additional information, tips and recommendations.



Refers to information in these instructions or in other documentation.

- ▶ Designates an instruction for risk prevention.

→ Designates a procedure which you must carry out.

✓ Indicates a result.

## 1.2 Definition of terms

In these instructions the term "device" denotes the following device types:

Angle seat valve Type 2100

The abbreviation "Ex" used in these instructions always stands for "potentially explosive atmosphere".

The term “büS” (Bürkert system bus) used in this manual refers to the communication bus developed by Bürkert, based on the CANopen protocol.

## 2 INTENDED USE



The angle seat valve Type 2100 is designed to control the flow rate of media. The permitted media are listed in the "Technical data [▶ 16]".

- ▶ Use the device for its intended purpose only. Non-intended use of the device may be dangerous to people, nearby equipment and the environment.
- ▶ Correct transportation, correct storage as well as correct installation, commissioning, operation and maintenance are essential for reliable and problem-free operation.
- ▶ When using the device, observe the permitted data, operating conditions and application conditions. This information can be found in the contractual documents, the operating instructions and on the type label.
- ▶ Use the device only in conjunction with third-party devices and components recommended and authorized by Bürkert.
- ▶ In potentially explosive atmospheres, only use devices approved for use in those areas. These devices are labeled with a separate Ex type label. For such use, note the information provided on the separate Ex type label and the additional explosion-related information or separate explosion-related operating instructions.
- ▶ Protect device from environmental influences (e.g. radiation, air humidity, fumes). If you have any questions, contact your Bürkert sales department.

### 3 BASIC SAFETY INSTRUCTIONS

These safety instructions do not take into account any unforeseen circumstances and events which occur during installation, operation and maintenance.

The operator is responsible for observing the location-specific safety regulations, also with reference to the personnel.



#### **DANGER!**

**Risk of injury from high pressure and discharge of medium.**

- ▶ Before working on the device or system, switch off the pressure. Vent or drain lines.



#### **DANGER!**

**Electric shock due to installed electrical component.**

- ▶ Before working on the device or system, switch off the power supply. Secure against reactivation.
- ▶ Observe the applicable accident prevention and safety regulations for electrical devices.



#### **WARNING!**

**Risk of injury when opening the actuator.**

The actuator contains a spring under tension. When the actuator is opened, the spring will jump out and may cause injuries.

- ▶ Do not open the actuator.



#### **WARNING!**

**Risk of injury due to moving parts.**

- ▶ Do not reach into openings in the device.
- ▶ Operate 3-position actuator with transparent cap only.



#### **WARNING!**

**Danger of burns and risk of fire.**

Quickly switching actuators or hot medium may cause the surface of the device to become hot.

- ▶ Only touch the device while wearing protective gloves.
- ▶ Keep the device away from highly flammable substances and media.



#### **WARNING!**

**Danger due to loud noises.**

Depending on the usage conditions, the device may generate loud noises. Detailed information on the probability of loud noises is available from the respective sales department.

- ▶ Wear hearing protection when in the vicinity of the device.



#### **WARNING!**

**Discharge of medium if packing gland worn.**

- ▶ If media are hazardous, safeguard the environment around the discharge point.



To prevent injuries, observe the following:

- ▶ Secure device or plant to prevent unintentional activation.
- ▶ Only trained technicians may perform installation and maintenance work.
- ▶ Perform installation and maintenance with suitable tools only.
- ▶ Transport, install and remove heavy device only with the aid of a second person and using suitable tools.
- ▶ Following interruption of the process, ensure that the process is restarted in a controlled manner.  
Observe sequence:
  1. Apply electrical or pneumatic supply.
  2. Charge with medium.
- ▶ Do not make any changes to the device and do not subject it to mechanical stress.
- ▶ Feed only those media, which are listed in the chapter "Technical data", into the medium ports.
- ▶ Operate the device only in perfect state and in consideration of the operating instructions.
- ▶ For applications planning and operation of the device, observe the plant-specific safety regulations.
- ▶ Observe the general rules of technology.
- ▶ The plant owner is responsible for the safe operation and handling of the plant.



To protect the environment, observe the following:

- ▶ The pilot exhaust air of the device may be contaminated by lubricants.

## **4 GENERAL INFORMATION**

### **4.1 Contact address**

#### **Germany**

Bürkert Fluid Control Systems

Sales Center

Christian-Bürkert-Str. 13–17

D-74653 Ingelfingen

Phone: + 49 (0) 7940 - 10 91 111

Fax: + 49 (0) 7940 - 10 91 448

E-mail: [info@burkert.com](mailto:info@burkert.com)

#### **International**

The contact addresses can be found on the back pages of the printed Quickstart. Also on the Internet at:

<http://www.burkert.com>

### **4.2 Warranty**

A precondition for the warranty is that the device is used as intended in consideration of the specified usage conditions.

### **4.3 Information on the Internet**

Operating instructions and data sheets for the Bürkert products can be found on the Internet at:

<https://www.burkert.com/en>

## 5 PRODUCT DESCRIPTION

The device is specially optimised for decentralised process automation and meets all the relevant requirements, even under difficult usage conditions.

Its design enables the easy integration of automation modules in all extension stages, whether they are electrical/optical position feedback, pneumatic control units, or even an integrated fieldbus interface. Long service life and high tightness are achieved by the tried and tested self-adjusting packing gland. The system, consisting of valve and automation module is distinguished by a compact and sleek design, integrated pilot air ducts, a high chemical resistance, the degrees of protection IP65 or IP67 as well as the NEMA protection class 4X.

The device uses neutral gases or air to control the flow rate of liquid or gaseous media, such as water, alcohol, oil, fuel, saline solution, lye, organic solvent or vapour.

### 5.1 Features

- Body made of stainless steel with threaded connection, clamp connection or welded connection
- Easy integration of automation modules
- Actuator can be rotated steplessly by 360°
- High chemical resistance
- High flow values through flow rate-optimised valve body made of stainless steel
- High seat tightness by swivel plate
- Integrated pilot air duct in combination with a Bürkert automation module
- High tightness and long service life due to self-adjusting packing gland
- Maintenance-free under normal conditions

### 5.2 Structure and function

The device consists of a pneumatically actuated piston actuator and a 2-way valve body. The actuator is manufactured from polyphenylene sulphide (PPS). Valve body and actuator housing made of stainless steel.

Spring force or pneumatic pilot pressure generate the closing force on the swivel plate. The closing force is transferred by a spindle connected to the actuator piston.

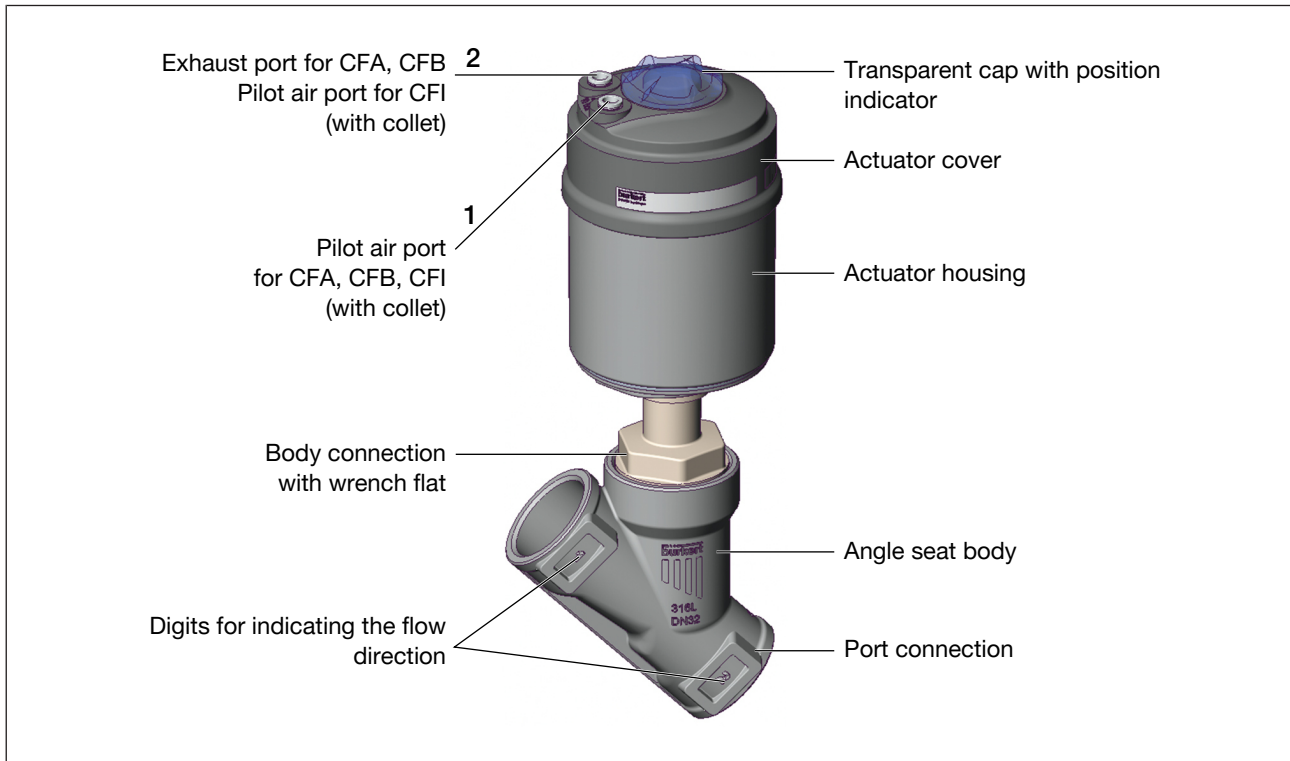


Fig. 1: Structure and description of the device

### 5.2.1 Control functions

| Control function | Definition                                        | Circuit symbol | Figure |
|------------------|---------------------------------------------------|----------------|--------|
| A (CFA)          | Closed by spring force in rest position.          |                |        |
| B (CFB)          | Opened by spring force in rest position.          |                |        |
| I (CFI)          | Actuating function via reciprocal pressurisation. |                |        |

Tab. 1: Control functions

### 5.2.2 Flow direction below seat



#### **WARNING!**

Valve seat leaking when control pressure is too low or medium pressure is too high.

If control pressure is too low for control function B and control function I or medium pressure is too high, the valve seat may leak.

- Observe values for minimum control pressure and maximum medium pressure.

Depending on the control function, the valve closes by spring force (control function A) or pilot pressure (control function B and I) against the medium flow.

As the medium is present under the swivel plate, the medium pressure contributes to the opening of the valve.

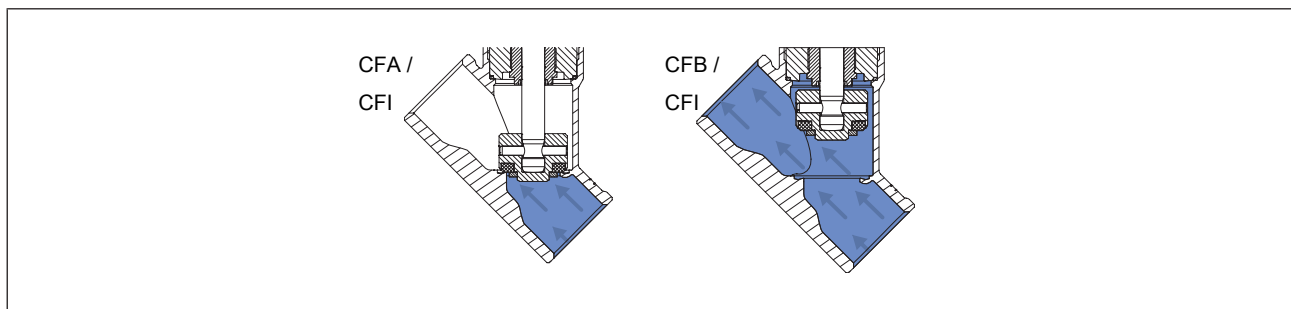


Fig. 2: Flow direction below seat, valve closes against medium flow

### 5.2.3 Flow direction above the seat



#### **DANGER!**

Risk of injury from rupturing lines and device when flow direction above the seat.

A pressure surge of liquid media may cause the lines and device to rupture.

- Do not use valves with flow direction above the seat for liquid media.

Flow direction above the seat is possible only on valves with control function A (closed by spring force in rest position)<sup>1</sup>.

The valve closes by spring force with the medium flow. As the medium is present above the swivel plate, the medium pressure contributes to the closing of the valve. The medium pressure also supports the sealing of the valve seat.

The valve opens by the pilot pressure.

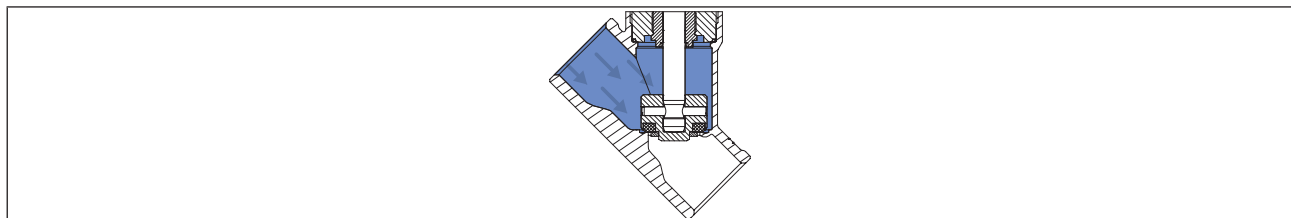


Fig. 3: Flow direction above the seat, valve closes with medium flow

## 5.3 Variant 3-position actuator

With the 3-position actuator the valve can have a middle position. This variant is available only in control function A (closed by spring force in rest position).

<sup>1</sup> Not for seat size 80

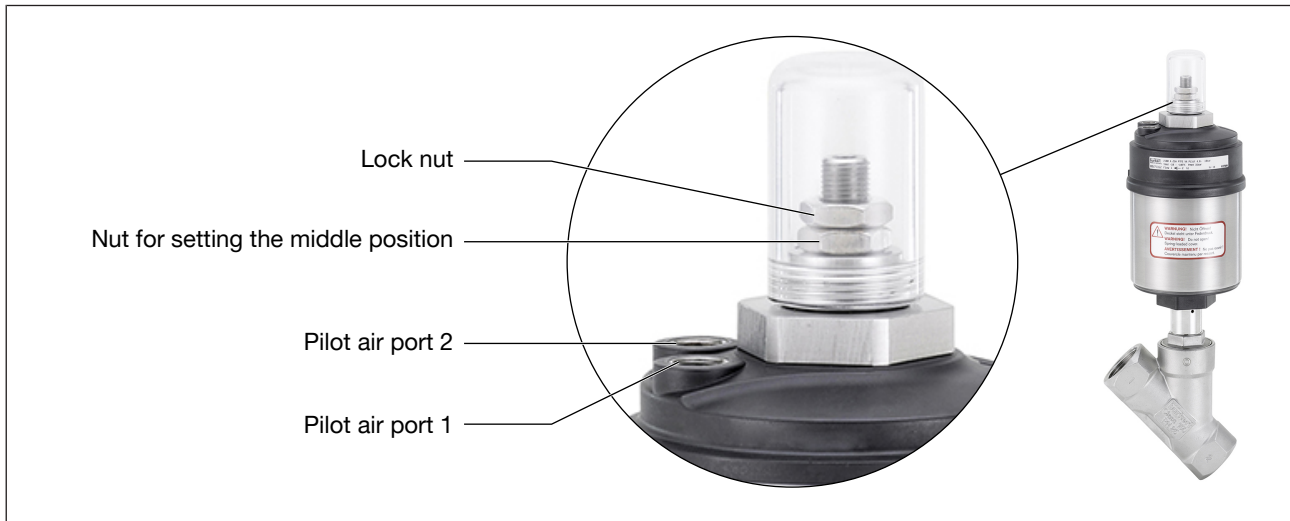


Fig. 4: Variant 3-position actuator

The closing force on the swivel plate is transferred by a spindle. The spindle is connected to the actuator piston.

#### Middle position

The middle position corresponds to a specific, adjustable flow rate of the medium. It is reached by an additional piston in the upper part of the actuator. The middle position is set with a nut (see figure).

The additional piston is used as a stop for the actuator piston. If pilot air port 2 is pressurised, the additional piston moves downwards to the set position. If pilot air port 1 is then pressurised, the actuator piston moves upwards until it hits the additional piston and stops.

#### Maximum stroke

If the upper air chamber is vented by pilot air port 2, both pistons move upwards. As a result, the maximum stroke is reached.

#### Closing the valve

If the lower air chamber is vented by pilot air port 1, the spring force acts on the actuator piston. The spring force moves the actuator piston downwards until the valve is closed (rest position).

### 5.3.1 Control function variant 3-position actuator

| Control function | Definition                               | Circuit symbol | Figure |
|------------------|------------------------------------------|----------------|--------|
| A (CFA)          | Closed by spring force in rest position. |                |        |

Tab. 2: Control functions

The inflow (2->1; 1->2) depends on the flow direction.

## 5.4 Device options

- Stroke limit

Limiting the maximum or minimum flow rate volume with an adjusting screw.

- Position feedback sensors and control units

Different variants are available depending on the requirement.

## 5.5 Variants



Information on the variants of the device can be found in the data sheet at <https://www.burkert.com/en> or in your sales department.

## 6 TECHNICAL DATA

### 6.1 Conformity

The device conforms to the EC directives as per the EC Declaration of Conformity (if applicable).

### 6.2 Standards

The applied standards, which are used to demonstrate conformity with the directives, are listed in the EU type examination certificate and/or the EU Declaration of Conformity (if applicable).

| According to Pressure Equipment Directive observe the following operating conditions: |                                                                                                                                      |
|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| Nominal diameter port connection                                                      | Maximum pressure for compressible fluids of Group 1 (dangerous gases and vapours according to Art. 3, No. 1.3, letter a, first dash) |
| DN65                                                                                  | 15 bar                                                                                                                               |

Tab. 3: Maximum pressure for compressible fluids of Group 1

### 6.3 Type label

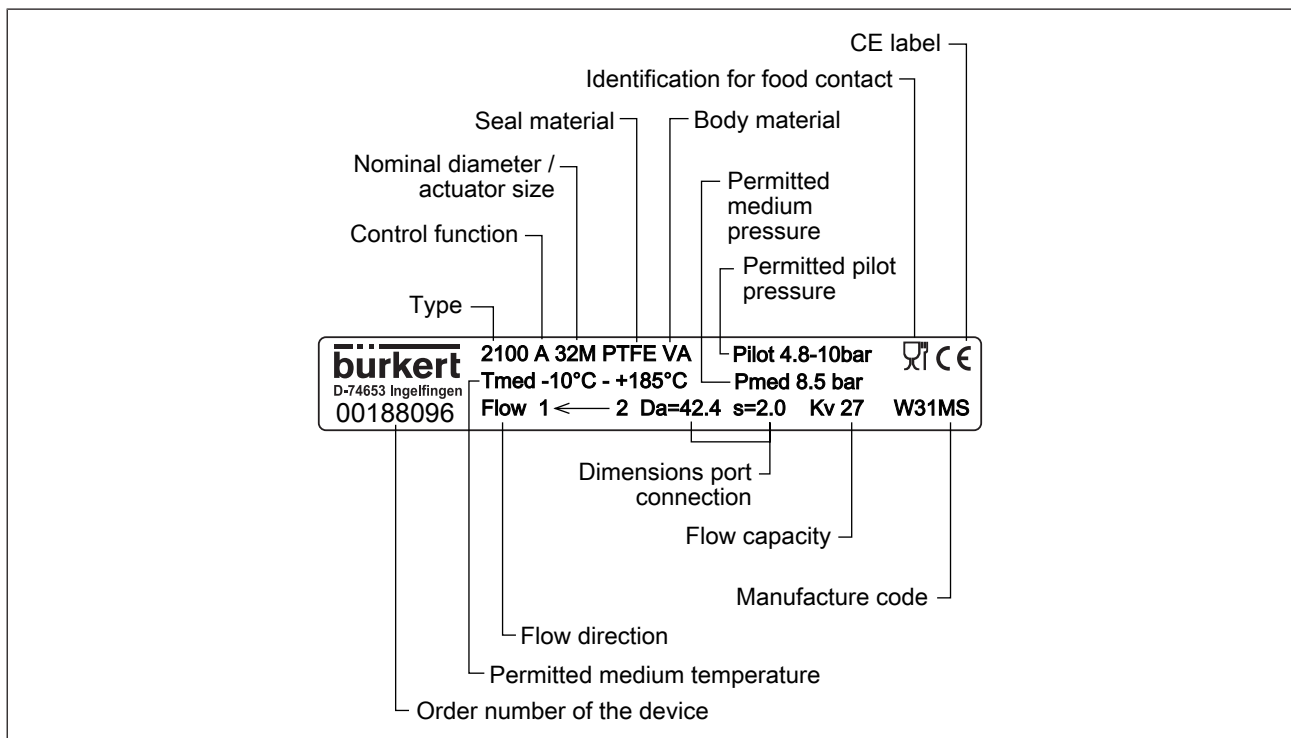


Fig. 5: Example of a type label

#### 6.3.1 Designation of the actuator size

| Actuator size [mm] | Designation |
|--------------------|-------------|
| ø50                | D           |
| ø70                | M           |
| ø90                | N           |

| Actuator size [mm] | Designation |
|--------------------|-------------|
| ø130               | P           |

Tab. 4: Designation of the actuator size

## 6.4 Operating conditions

|                      |                                                                                                                      |
|----------------------|----------------------------------------------------------------------------------------------------------------------|
| Degree of protection | IP67 according to IEC 529 / DIN EN 60529                                                                             |
| Flow media           | Water, alcohols, oils, fuels, hydraulic fluids, saline solutions, lyes, organic solvents, vapour, air, neutral gases |
| Control media        | Neutral gases, air                                                                                                   |
| Sound pressure level | <70 dB(A)<br>The sound pressure level may be higher depending on the usage conditions                                |

### 6.4.1 Temperature ranges

#### Medium

| Actuator size [mm] | Actuator material | Medium temperature (for PTFE seal) [°C] <sup>2</sup> | Ambient temperature <sup>3</sup> [°C] |
|--------------------|-------------------|------------------------------------------------------|---------------------------------------|
| ø 50               | PPS               | -10...+185                                           | 0...+60 <sup>4</sup>                  |
| ø 70               |                   |                                                      | 0...+100 <sup>5</sup>                 |
| ø 90               |                   |                                                      |                                       |
| ø 130              |                   |                                                      |                                       |

Tab. 5: Temperature range of medium

#### Environment

| Pilot air port    | Ambient temperature [°C] <sup>6</sup> |
|-------------------|---------------------------------------|
| Push-in connector | -10...+60                             |
| Threaded bushing  | -10...+100                            |

Tab. 6: Temperature range of environment

### 6.4.2 Pressure ranges 2/2-way valve

#### Maximum pilot pressure

| Actuator size [mm] | Maximum pilot pressure [bar] |
|--------------------|------------------------------|
| ø50                | 10                           |

<sup>2</sup> For applications at T<sub>max</sub> > 130 °C a PEEK seal is recommended.

<sup>3</sup> When using a pilot valve the maximum ambient temperature is +55 °C

<sup>4</sup> Pilot air connector as push-in connector.

<sup>5</sup> Control air connector as threaded bushing.

<sup>6</sup> When using an attachment part, observe its temperature range.

| Actuator size [mm] | Maximum pilot pressure [bar] |
|--------------------|------------------------------|
| ø70                | 10 <sup>7</sup>              |
| ø90                | 10                           |
| ø130               | 7                            |

Tab. 7: Maximum pilot pressure

**Medium pressure and pilot pressure for control function A, flow direction below seat (standard)**

| Seat size | Maximum medium pressure [bar] |     |     |                       | Minimum pilot pressure [bar] |     |     |      |
|-----------|-------------------------------|-----|-----|-----------------------|------------------------------|-----|-----|------|
|           | Actuator size [mm]            |     |     |                       | Actuator size [mm]           |     |     |      |
|           | ø50                           | ø70 | ø90 | ø130                  | ø50                          | ø70 | ø90 | ø130 |
| 15        | 25                            | 25  | -   | -                     | 5.2                          | 4.8 | -   | -    |
| 20        | 16                            | 20  |     |                       |                              |     |     |      |
| 25        | 9                             | 16  |     |                       |                              |     |     |      |
| 32        | -                             | 8.5 | 16  | -                     | -                            | 4.8 | 5   | -    |
| 40        |                               | 6   | 16  |                       |                              |     |     |      |
| 50        | -                             | 4   | 10  | 16                    | -                            | 4.8 | 5   | 5    |
| 65        |                               | -   | 5   | 16 (15 <sup>8</sup> ) |                              |     |     |      |
| 80        |                               | -   | -   | 10                    |                              | -   | -   | 5.6  |

Tab. 8: Medium pressure and pilot pressure, control function A, standard

**Medium pressure and pilot pressure for control function A, flow direction below seat, reduced spring force (EC04)**

| Seat size | Maximum medium pressure [bar] |     |     |      | Minimum pilot pressure [bar] |     |     |      |
|-----------|-------------------------------|-----|-----|------|------------------------------|-----|-----|------|
|           | Actuator size [mm]            |     |     |      | Actuator size [mm]           |     |     |      |
|           | ø50                           | ø70 | ø90 | ø130 | ø50                          | ø70 | ø90 | ø130 |
| 15        | 14                            | 16  | -   | -    | 3.2                          | 2.5 | -   | -    |
| 20        | 6                             | 12  |     |      |                              |     |     |      |
| 25        | 3                             | 6   |     |      |                              |     |     |      |
| 32        | -                             | 3.5 | 9   | -    | -                            | 2.5 | 2.5 | -    |
| 40        |                               | 2   | 6   | 16   |                              |     |     | 2.5  |
| 50        | -                             | -   | 3.5 | 11   | -                            | -   | 2.5 | 2.5  |
| 65        |                               |     | -   | 7.5  |                              |     |     | 3.2  |

Tab. 9: Medium pressure and pilot pressure, control function A, reduced spring force (EC04)

<sup>7</sup> The maximum permitted pilot pressure is limited to 7 bar for the following device variant: Actuator size ø70, seat size 50, flow direction above the seat

<sup>8</sup> According to Pressure Equipment Directive for compressible fluids of Group 1 (dangerous gases and vapours according to Art. 3, No. 1.3, letter a, first dash)

## Required minimum control pressure depending on the medium pressure

In the following graphs the required minimum control pressure is shown for the respective control function depending on the medium pressure.

### Control function A (CFA), flow direction above the seat

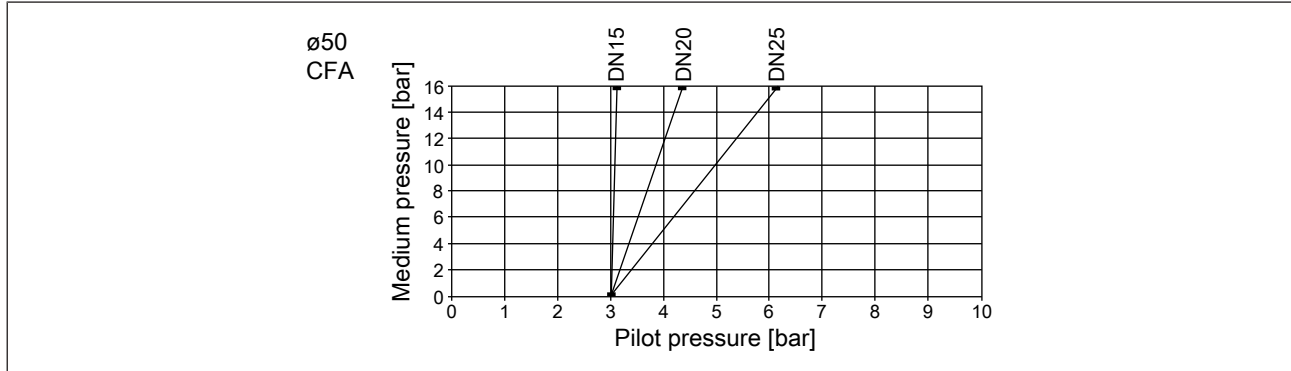


Fig. 6: Actuator ø50 mm, CFA, flow direction above the seat

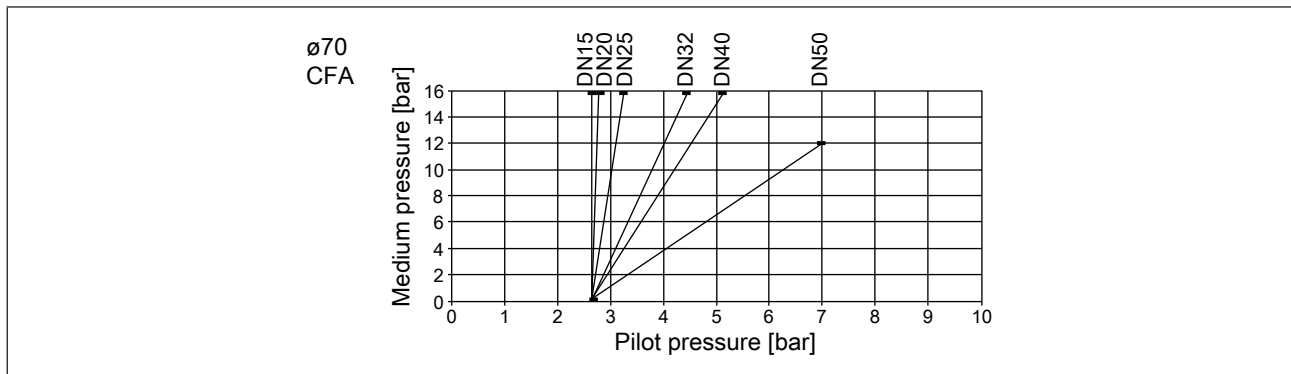


Fig. 7: Actuator ø70 mm, CFA, flow direction above the seat

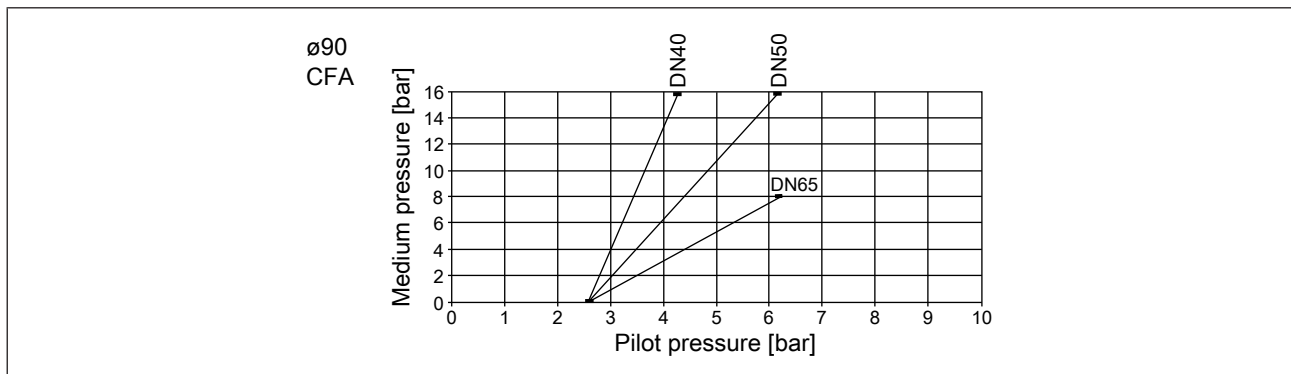


Fig. 8: Actuator ø90 mm, CFA, flow direction above the seat

Control function B and I, flow direction below seat

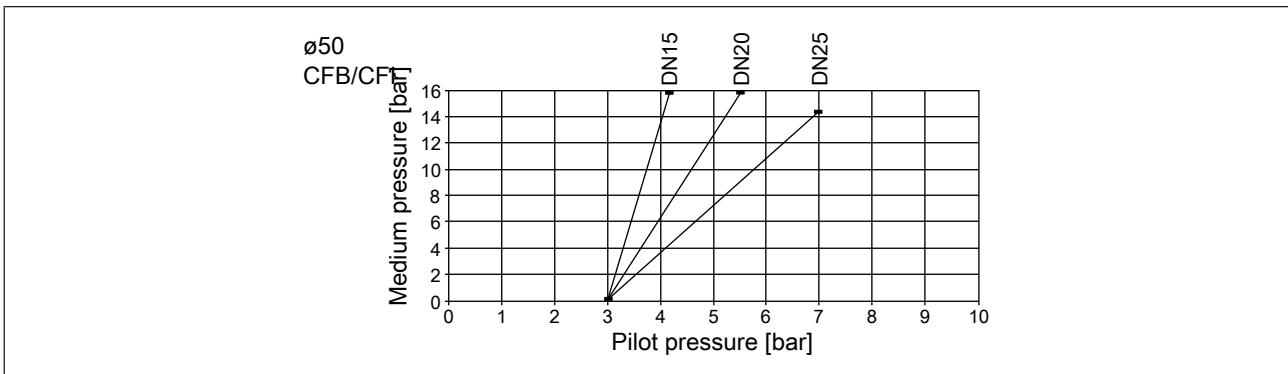


Fig. 9: Actuator ø50 mm, CFB and CFI, flow direction below seat

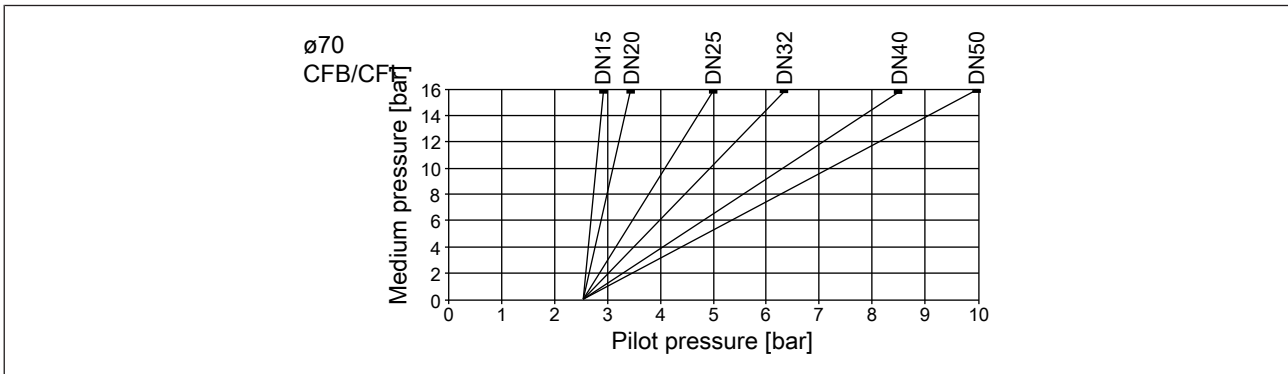


Fig. 10: Actuator ø70 mm, CFB and CFI, flow direction below seat

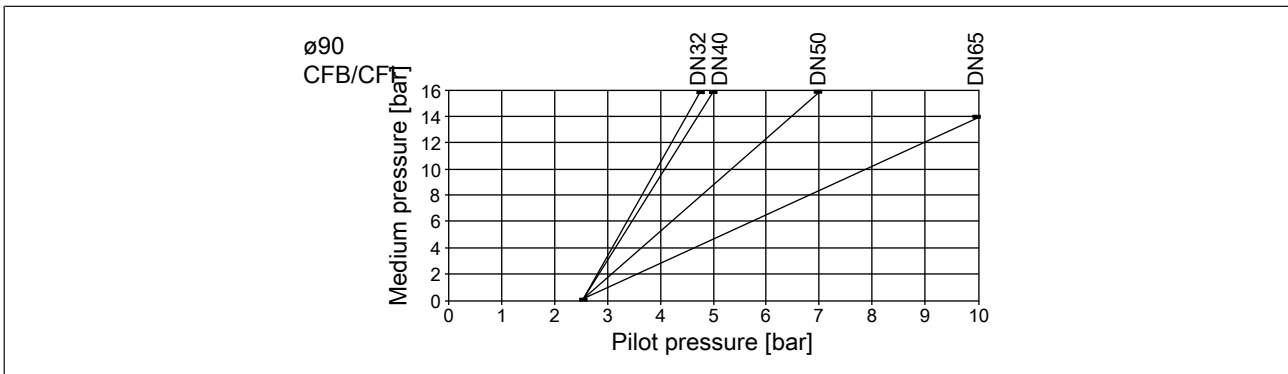


Fig. 11: Actuator ø90 mm, CFB and CFI, flow direction below seat

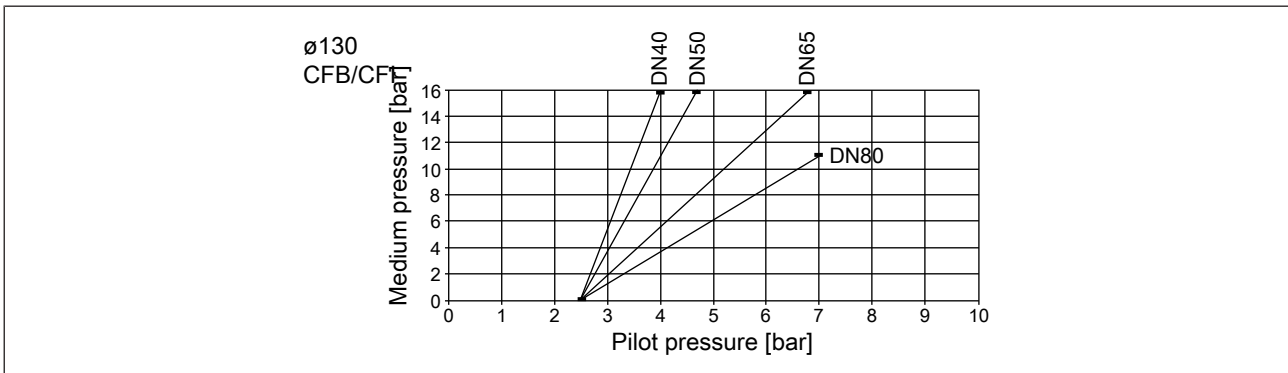


Fig. 12: Actuator ø130 mm, CFB and CFI, flow direction below seat

### 6.4.3 Pressure ranges 2/3-way valve

#### Maximum pilot pressure

| Actuator size [mm] | Maximum pilot pressure [bar] |
|--------------------|------------------------------|
| ø50                | 7                            |
| ø70                |                              |
| ø90                |                              |

Tab. 10: Maximum pilot pressure

#### Medium pressure and pilot pressure for control function A, flow direction below seat (standard)

| Seat size | Maximum medium pressure [bar] |     |     |  | Minimum pilot pressure [bar] |     |     |
|-----------|-------------------------------|-----|-----|--|------------------------------|-----|-----|
|           | Actuator size [mm]            |     |     |  | Actuator size [mm]           |     |     |
|           | ø50                           | ø70 | ø90 |  | ø50                          | ø70 | ø90 |
| 15        | 16                            | 16  | -   |  | 5                            | 5   | -   |
| 20        | 10                            | 16  |     |  |                              |     |     |
| 25        | 5                             | 12  |     |  |                              |     |     |
| 32        | -                             | 8.5 | 16  |  | -                            | 5   | 5   |
| 40        |                               | 5   | 12  |  |                              |     |     |
| 50        | -                             | -   | 7   |  | -                            | -   | 5   |

Tab. 11: Medium pressure and pilot pressure, control function A, standard



Variants with lower pilot pressure (reduced spring force) are available on request. Contact your Bürkert sales department or the Bürkert Sales Center ([info@burkert.com](mailto:info@burkert.com)).

#### Required minimum control pressure depending on the medium pressure

In the following graphs the required minimum control pressure is shown for control function A depending on the medium pressure.

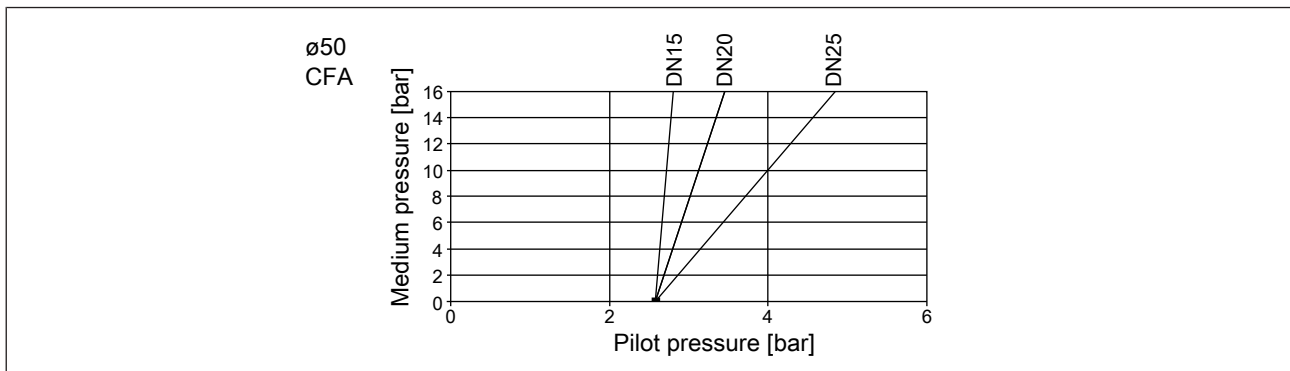


Fig. 13: Actuator ø50 mm, control function A, flow direction above the seat

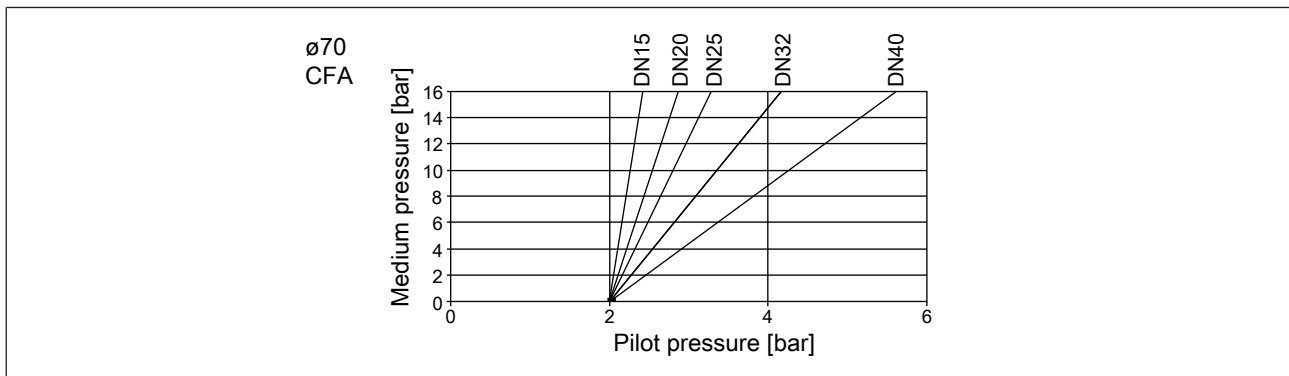


Fig. 14: Actuator ø70 mm, control function A, flow direction above the seat

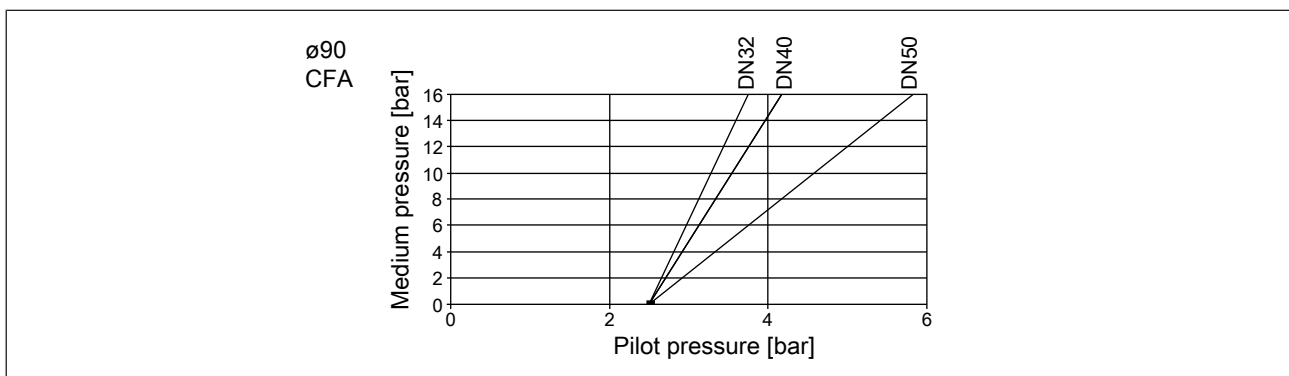


Fig. 15: Actuator ø90 mm, control function A, flow direction above the seat

## 6.5 Flow values and characteristics 2/3-way valve

### Seat size 15

| Stroke [%] | Flow coefficient [m³/h] | Stroke [%] | Flow coefficient [m³/h] |
|------------|-------------------------|------------|-------------------------|
| 0          | 0                       | 60         | 4.25                    |
| 10         | 1.75                    | 70         | 4.50                    |
| 20         | 2.50                    | 80         | 4.65                    |
| 30         | 3.10                    | 90         | 4.80                    |
| 40         | 3.60                    | 100        | 5.00                    |
| 50         | 4.00                    |            |                         |

Tab. 12: Flow values seat size 15, actuator size D (ø50)

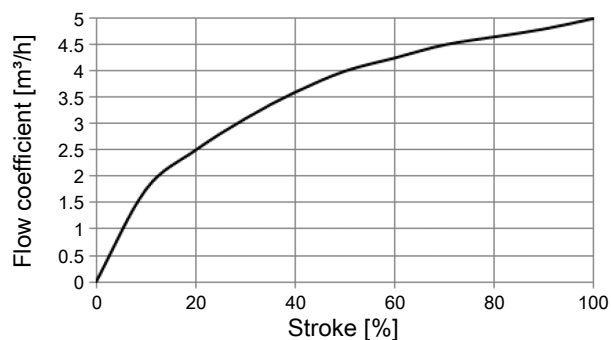


Fig. 16: Flow characteristics seat size 15, actuator size D (ø50)

| Stroke [%] | Flow coefficient [m³/h] | Stroke [%] | Flow coefficient [m³/h] |
|------------|-------------------------|------------|-------------------------|
| 0          | 0                       | 60         | 3.80                    |
| 10         | 1.00                    | 70         | 4.10                    |
| 20         | 1.80                    | 80         | 4.50                    |
| 30         | 2.50                    | 90         | 4.80                    |
| 40         | 3.00                    | 100        | 5.00                    |
| 50         | 3.40                    |            |                         |

Tab. 13: Flow values seat size 15, actuator size M (ø70)

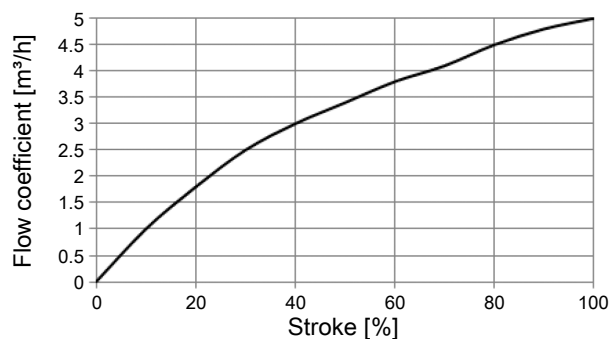


Fig. 17: Flow characteristics seat size 15, actuator size M (ø70)

### Seat size 20

| Stroke [%] | Flow coefficient [m³/h] | Stroke [%] | Flow coefficient [m³/h] |
|------------|-------------------------|------------|-------------------------|
| 0          | 0                       | 60         | 8.30                    |
| 10         | 2.60                    | 70         | 8.80                    |
| 20         | 4.50                    | 80         | 9.20                    |
| 30         | 5.80                    | 90         | 9.60                    |
| 40         | 6.80                    | 100        | 10.00                   |
| 50         | 7.70                    |            |                         |

Tab. 14: Flow values seat size 20, actuator size D (ø50)

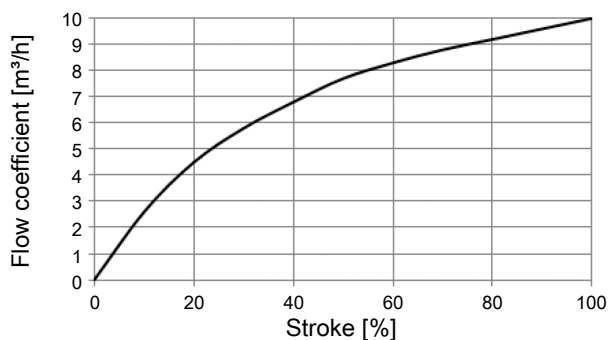


Fig. 18: Flow characteristics seat size 20, actuator size D (ø50)

| Stroke [%] | Flow coefficient [m³/h] | Stroke [%] | Flow coefficient [m³/h] |
|------------|-------------------------|------------|-------------------------|
| 0          | 0                       | 60         | 8.90                    |
| 10         | 1.50                    | 70         | 9.40                    |
| 20         | 4.30                    | 80         | 10.00                   |
| 30         | 6.40                    | 90         | 10.60                   |
| 40         | 7.50                    | 100        | 11.00                   |
| 50         | 8.20                    |            |                         |

Tab. 15: Flow values seat size 20, actuator size M (ø70)

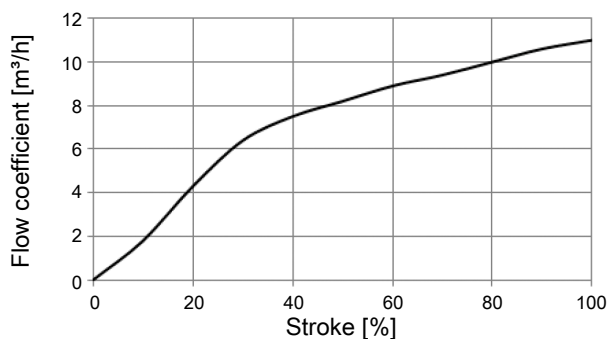


Fig. 19: Flow characteristics seat size 20, actuator size M (ø70)

### Seat size 25

| Stroke [%] | Flow coefficient [m³/h] | Stroke [%] | Flow coefficient [m³/h] |
|------------|-------------------------|------------|-------------------------|
| 0          | 0                       | 60         | 12.20                   |
| 10         | 3.00                    | 70         | 13.10                   |
| 20         | 5.80                    | 80         | 13.80                   |
| 30         | 7.90                    | 90         | 14.40                   |
| 40         | 9.90                    | 100        | 15.00                   |
| 50         | 11.10                   |            |                         |

Tab. 16: Flow values seat size 25, actuator size D (ø50)

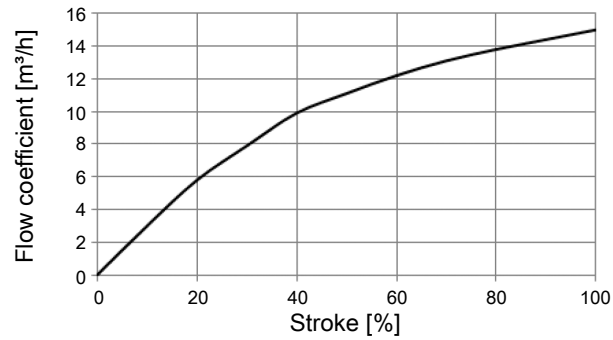


Fig. 20: Flow characteristics seat size 25, actuator size D (ø50)

| Stroke [%] | Flow coefficient [m³/h] | Stroke [%] | Flow coefficient [m³/h] |
|------------|-------------------------|------------|-------------------------|
| 0          | 0                       | 60         | 13.50                   |
| 10         | 1.50                    | 70         | 14.80                   |
| 20         | 4.40                    | 80         | 15.70                   |
| 30         | 7.80                    | 90         | 16.50                   |
| 40         | 10.30                   | 100        | 18.00                   |
| 50         | 12.10                   |            |                         |

Tab. 17: Flow values seat size 25, actuator size M (ø70)

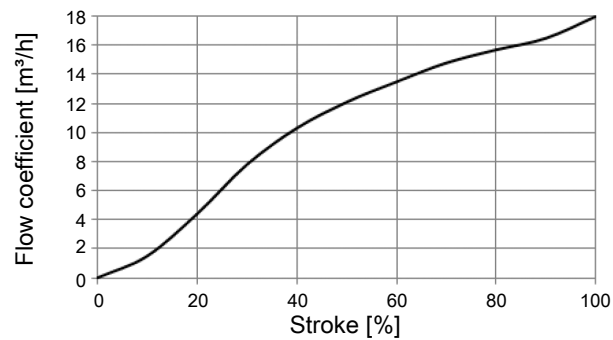


Fig. 21: Flow characteristics seat size 25, actuator size M (ø70)

### Seat size 32

| Stroke [%] | Flow coefficient [m³/h] | Stroke [%] | Flow coefficient [m³/h] |
|------------|-------------------------|------------|-------------------------|
| 0          | 0                       | 60         | 19.70                   |
| 10         | 5.20                    | 70         | 21.80                   |
| 20         | 9.40                    | 80         | 23.70                   |
| 30         | 12.50                   | 90         | 25.00                   |
| 40         | 15.00                   | 100        | 26.00                   |
| 50         | 17.40                   |            |                         |

Tab. 18: Flow values seat size 32, actuator size M (ø70)

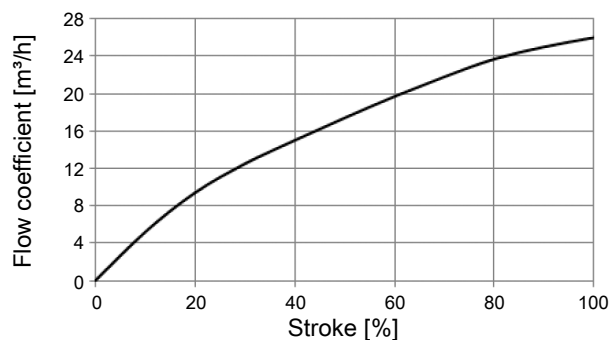


Fig. 22: Flow characteristics seat size 32, actuator size M (ø70)

| Stroke [%] | Flow coefficient [m³/h] | Stroke [%] | Flow coefficient [m³/h] |
|------------|-------------------------|------------|-------------------------|
| 0          | 0                       | 60         | 21.00                   |
| 10         | 5.40                    | 70         | 23.10                   |
| 20         | 10.10                   | 80         | 24.80                   |
| 30         | 13.20                   | 90         | 26.10                   |
| 40         | 16.20                   | 100        | 27.00                   |
| 50         | 18.70                   |            |                         |

Tab. 19: Flow values seat size 32, actuator size N (ø90)



Fig. 23: Flow characteristics seat size 32, actuator size N (ø90)

#### Seat size 40

| Stroke [%] | Flow coefficient [m³/h] | Stroke [%] | Flow coefficient [m³/h] |
|------------|-------------------------|------------|-------------------------|
| 0          | 0                       | 60         | 25.40                   |
| 10         | 5.50                    | 70         | 28.30                   |
| 20         | 10.50                   | 80         | 31.10                   |
| 30         | 14.90                   | 90         | 33.80                   |
| 40         | 18.80                   | 100        | 36.00                   |
| 50         | 22.30                   |            |                         |

Tab. 20: Flow values seat size 40, actuator size M (ø70)

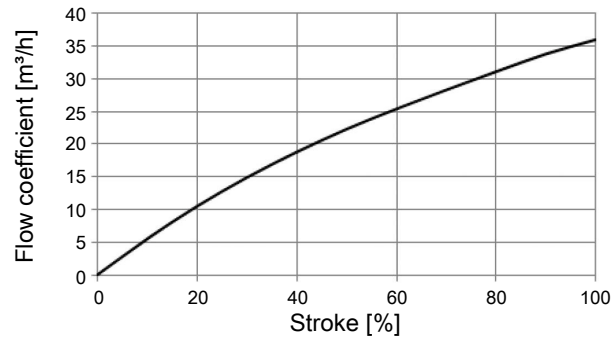


Fig. 24: Flow characteristics seat size 40, actuator size M (ø70)

| Stroke [%] | Flow coefficient [m³/h] | Stroke [%] | Flow coefficient [m³/h] |
|------------|-------------------------|------------|-------------------------|
| 0          | 0                       | 60         | 27.30                   |
| 10         | 6.20                    | 70         | 30.60                   |
| 20         | 11.60                   | 80         | 33.60                   |
| 30         | 16.10                   | 90         | 36.30                   |
| 40         | 20.00                   | 100        | 38.00                   |
| 50         | 23.70                   |            |                         |

Tab. 21: Flow values seat size 40, actuator size N (ø90)



Fig. 25: Flow characteristics seat size 40, actuator size N (ø90)

### Seat size 50

| Stroke [%] | Flow coefficient [m³/h] | Stroke [%] | Flow coefficient [m³/h] |
|------------|-------------------------|------------|-------------------------|
| 0          | 0                       | 60         | 32.10                   |
| 10         | 8.10                    | 70         | 35.90                   |
| 20         | 13.50                   | 80         | 40.20                   |
| 30         | 18.60                   | 90         | 44.70                   |
| 40         | 23.00                   | 100        | 49.00                   |
| 50         | 28.00                   |            |                         |

Tab. 22: Flow values seat size 50, actuator size N (ø90)

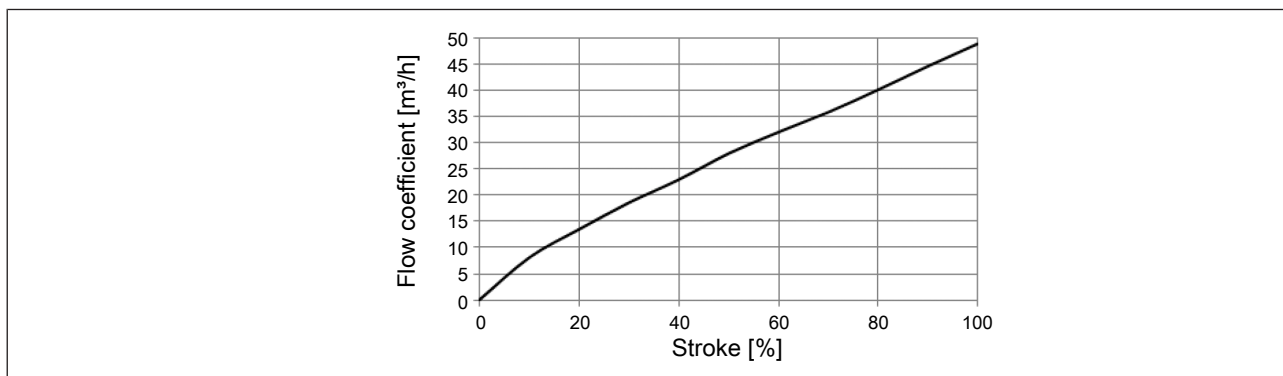


Fig. 26: Flow characteristics seat size 50, actuator size N (ø90)

## 6.6 Mechanical data

|                       |                                  |
|-----------------------|----------------------------------|
| Actuator size         | See type label                   |
| Installation position | any, preferably actuator face up |

### Materials

|                                     |                                        |
|-------------------------------------|----------------------------------------|
| Valve body                          | 316L                                   |
| Actuator                            | PPS and stainless steel                |
| Sealing elements                    | FKM and EPDM                           |
| Spindle seal (with silicone grease) | PTFE V-rings with spring compensation  |
| Spindle                             | 1.4401, 1.4404                         |
| Spindle guide                       | PEEK                                   |
| Seat seal swivel plate              | PTFE, PEEK<br>Optional: EPDM, NBR, FKM |

### Ports

|                 |                                                                                                        |
|-----------------|--------------------------------------------------------------------------------------------------------|
| Pilot air port  | Push-in connector 6/4 mm or threaded connection 1/4"<br>More on request                                |
| Port connection | G1/2...G3 (NPT, RC on request)<br>Welded connection as per ISO 4200, DIN 11850 R2<br>Others on request |

## 7 INSTALLATION

### 7.1 Safety instructions installation



#### **DANGER!**

Risk of injury from high pressure and discharge of medium.

- ▶ Before working on the device or system, switch off the pressure. Vent or drain lines.



#### **WARNING!**

Risk of injury due to improper installation.

- ▶ Only trained technicians may perform installations.
- ▶ Perform installations with suitable tools only.



#### **WARNING!**

Risk of injury due to unintentional activation of the system and uncontrolled restart.

- ▶ Secure plant to prevent unintentional activation..
- ▶ Ensure that the plant starts up in a controlled manner only.



#### **DANGER!**

For control function I: Danger due to the control pressure failing.

If the control pressure fails, the valve remains in an undefined position.

- ▶ For a controlled restart, pressurize the device with control pressure and then connect the medium.



#### **WARNING!**

Risk of injury due to moving parts.

- ▶ Do not reach into openings in the device.
- ▶ Operate 3-position actuator with transparent cap only.



#### **CAUTION!**

Risk of injury from heavy device.

During transportation or installation work, a heavy device may fall down and cause injuries.

- ▶ Transport, install and remove heavy device with the aid of a second person only.
- ▶ Use suitable tools.



#### **WARNING!**

Valve seat leaking when control pressure is too low or medium pressure is too high.

If control pressure is too low for control function B and control function I or medium pressure is too high, the valve seat may leak.

- ▶ Observe values for minimum control pressure and maximum medium pressure.

## **DANGER!**

Risk of injury from rupturing lines and device when flow direction above the seat.

A pressure surge of liquid media may cause the lines and device to rupture.

- ▶ Do not use valves with flow direction above the seat for liquid media.

## **7.2 Preparatory work**

- Observe flow direction on the type label.
- Remove soiling from pipelines.
- Ensure that pipelines are in alignment.

### **7.2.1 Attach dirt trap**

Dirt trap for devices with approval according to DIN EN 161

According to DIN EN 161 "Automatic shut-off valves for gas burners and gas appliances", a dirt trap, which prevents the penetration of a 1 mm test pin, must be installed upstream of the valve.

- Attach dirt trap upstream of the valve.

## **7.3 Installing valve body**

- Connect valve body to pipeline.
- Devices with welded connection: Weld valve body into pipeline. To do this, observe chapter "Installing devices with welded connection".

## **7.4 Installing devices with welded connection**

### **ATTENTION!**

Damage to the actuator when welding the valve body into the pipeline.

- ▶ Before welding into the pipeline, remove the actuator.

### **7.4.1 Removing actuator from the valve body for devices without control unit**

- Clamp valve body into a holding device.

Devices with collet

### **ATTENTION!**

Damage to the valve seat seal or seat contour.

- ▶ When removing the actuator, the valve must be in the open position.

- For control function A pressurise the pilot air port 1 with compressed air (5 bar). Valve opens.
- Place a suitable open-end wrench on the wrench flat of the body connection.
- Unscrew actuator from the valve body.

#### Devices without collet

→ For control function A: Install control unit. To do this, follow the operating instructions for the control unit.

#### ATTENTION!

**Damage to the valve seat seal or seat contour.**

▶ When removing the actuator, the valve must be in the open position.

→ For control function A pressurise the pilot air port 1 with compressed air (5 bar). Valve opens.

→ For control function A with pilot valve: Manually switch device with pilot valve. To do this, follow the operating instructions for the control unit. Valve opens.

→ Place a suitable open-end wrench on the wrench flat of the body connection.

→ Unscrew actuator from the valve body.

#### 7.4.2 Removing actuator from the valve body for devices with installed control unit

→ Clamp valve body into a holding device.

#### ATTENTION!

**Damage to the valve seat seal or seat contour.**

▶ When removing the actuator, the valve must be in the open position.

→ For control function A pressurise the pilot air port 1 with compressed air (5 bar). Valve opens.

→ For control function A with pilot valve: Manually switch device with pilot valve. To do this, follow the operating instructions for the control unit. Valve opens.

→ Place a suitable open-end wrench on the wrench flat of the body connection.

→ Unscrew actuator from the valve body.

#### 7.4.3 Installing actuator on valve body

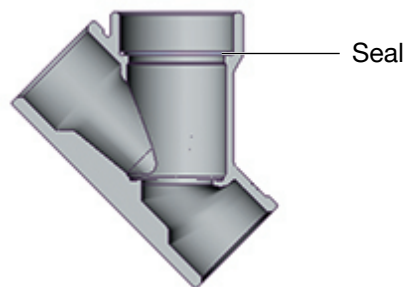


Fig. 27: Seal

→ Check seal and replace if required.

## **DANGER!**

### **Danger due to lubricant.**

Lubricant may contaminate the medium. There is a risk of explosion in oxygen applications.

- For specific applications use only approved lubricants (e.g. for oxygen applications or analysis applications).

→ Before re-installation, grease the thread of the body connection (e.g. with Klüberpaste UH1 96-402 from Klüber).

## **ATTENTION!**

### **Damage to the valve seat seal or seat contour.**

- When installing the actuator, the valve must be in the open position.

→ For control function A pressurise the pilot air port 1 with compressed air (5 bar): Valve opens.

→ Screw actuator into the valve body. Observe tightening torques of the following table.

| Seat size | Tightening torque [Nm] |
|-----------|------------------------|
| 15        | 45 ±3                  |
| 20        | 50 ±3                  |
| 25        | 60 ±3                  |
| 32        | 65 ±3                  |
| 40        | 65 ±3                  |
| 50        | 70 ±3                  |
| 65        | 100 ±3                 |
| 80        | 120 ±5                 |

Tab. 23: Tightening torques valve body and body connection

## **7.5 Installing control unit**



Description see chapter "Installation" in the operating instructions for the corresponding control unit.

## **7.6 Turning actuator**

### **7.6.1 Turning the actuator, devices with hexagon nut**



The following description applies only to devices with a hexagon head on the actuator.

For devices without a hexagon head on the actuator: in the operating instructions observe the chapter "Turning actuator, devices without a hexagon head".

The position of the ports can be steplessly aligned by turning the actuator through 360°.

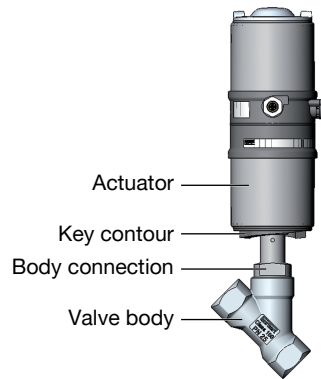


Fig. 28: Turn actuator (1)

→ Clamp valve body in a holding device (only for valves which have not yet been installed).

### ATTENTION!

**Damage to the seat seal or seat contour.**

► When turning the actuator, the valve must be in the open position.

→ For control function A und I<sup>9</sup>:

pressurise the pilot air port 1 with compressed air. Valve opens.

→ For devices with control unit and pilot valve: Manually switch device with pilot valve (see operating instructions for the control unit).

→ Counter with a suitable open-end wrench on the wrench flat of the body connection.

→ Place a suitable open-end wrench on the hexagon head of the actuator.



### DANGER!

**Risk of injury from high pressure and discharge of medium.**

If the direction of rotation is wrong, the body connection may become detached.

► Only turn the actuator in the prescribed direction.

→ Move the actuator into the required position by turning it counterclockwise (seen from below).

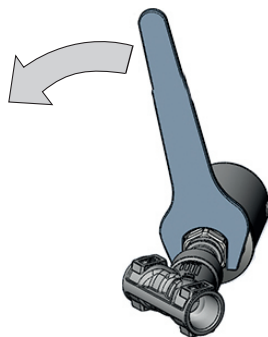


Fig. 29: Turn actuator (2)

## 7.6.2 Turning actuator, devices without hexagon head

The position of the ports can be steplessly aligned by turning the actuator through 360°.

<sup>9</sup> If variant available

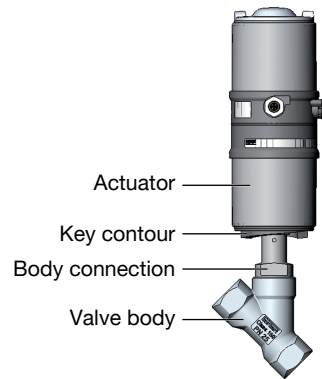


Fig. 30: Turn actuator (1), devices without hexagon head

→ Clamp valve body in a holding device (only for valves which have not yet been installed).

## ATTENTION!

**Damage to the seat seal or seat contour.**

▶ When turning the actuator, the valve must be in the open position.

→ For control function A und I<sup>10</sup>:

pressurise the pilot air port 1 with compressed air. Valve opens.

→ Counter with a suitable open-end wrench on the wrench flat of the body connection.

→ Place special wrench<sup>11</sup> in the key contour of the actuator.

## DANGER!

**Risk of injury from high pressure and discharge of medium.**

If the direction of rotation is wrong, the body connection may become detached.

▶ Only turn the actuator in the prescribed direction.

→ Move the actuator into the required position by turning it clockwise (seen from below).

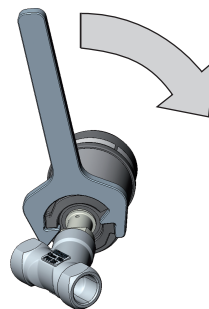


Fig. 31: Turn actuator (2), devices without hexagon head

<sup>10</sup> If variant available

<sup>11</sup> The special wrench (00665702) is available from your Bürkert sales department.

## 7.7 Connecting device pneumatically

### **DANGER!**

Risk of injury due to connection of unsuitable hoses.

- ▶ Use only hoses which can withstand the pressure and temperature of the medium.
- ▶ Observe technical data of the hose manufacturer.

### **DANGER!**

For control function I: Danger due to the control pressure failing.

If the control pressure fails, the valve remains in an undefined position.

- ▶ For a controlled restart, pressurize the device with control pressure and then connect the medium.



For devices with control unit follow the operating instructions for the corresponding control unit.

### 7.7.1 Connecting control medium



The position of the ports can be steplessly aligned by turning the actuator through 360°. The procedure is described in the chapter "Turning actuator".

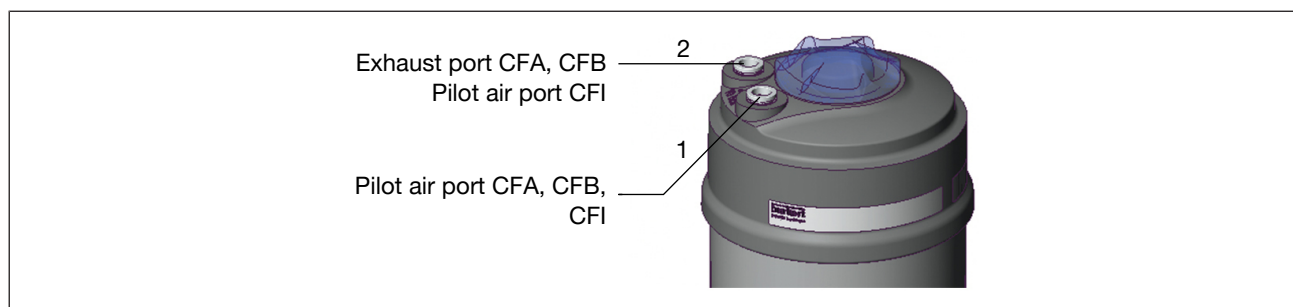


Fig. 32: Pneumatic ports

#### Control function A and B:

- Connect control medium to pilot air port 1 of the actuator.

#### Control function A, 3-position actuator:

- Connect control medium to pilot air port 1 and 2 of the actuator.
  - Pressure on pilot air port 1: Valve opens.
  - Pressure on pilot air port 1 and 2: Valve in middle position.

#### Control function I:

- Connect control medium to pilot air port 1 and 2 of the actuator.
  - Pressure on pilot air port 1: Valve opens.
  - Pressure on pilot air port 2: Valve closes.

#### Silencer

For devices with push-in connection, the silencer to reduce the exhaust air volume is loosely supplied.

- Connect the silencer to the free exhaust port 2.



When operating in an aggressive environment, divert free pneumatic ports into a neutral atmosphere using a pneumatic hose.

#### **Pilot air hose**

Pilot air hoses of sizes 6/4 mm or 1/4" can be used.

## 8 START-UP



### WARNING!

Risk of injury from high pressure or hot medium.

Excessively high pressure or temperatures may damage the device and cause leaks.

► Observe values for pressure and medium temperature indicated on the type label.



In the case of devices with control unit, observe start-up in the operating instructions for the corresponding control unit.

### 8.1 Set middle position on 3-position actuator

Open position [100 % stroke]

Pilot air port 1: 5...7 bar

Pilot air port 2: 0 bar

Middle position [0...100 % stroke]

Pilot air port 1: 5...7 bar

Pilot air port 2: 5...7 bar

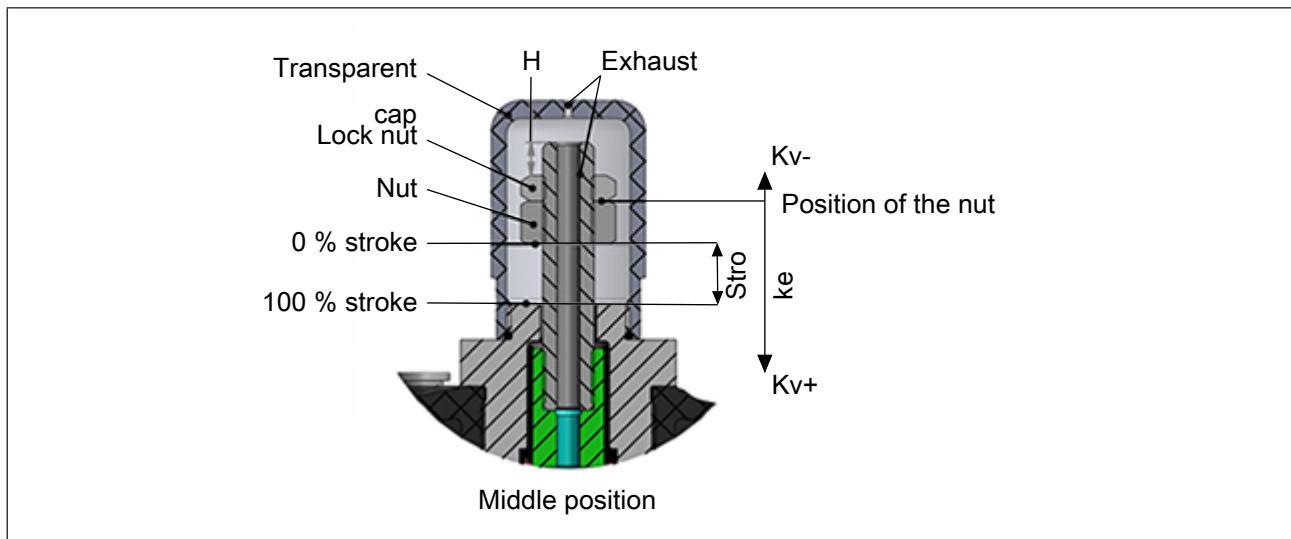


Fig. 33: Setting middle position

→ Unscrewing transparent cap: Actuator sizes  $\varnothing 50$ ,  $\varnothing 70$  and  $\varnothing 90$ : Width across flats 28.

→ Pressurise pilot air port 1 of the actuator with compressed air (5 bar).

→ Loosening lock nut: Actuator size  $\varnothing 50$ : Width across flats 13; actuator size  $\varnothing 70$  and  $\varnothing 90$ : Width across flats 17.

→ Adjust the middle position with the nut.

→ Retightening lock nut: Actuator size  $\varnothing 50$  max. 20+5 Nm; actuator size  $\varnothing 70$  max. 30+5 Nm; actuator size  $\varnothing 90$  max. 45+5 Nm.

→ Screw transparent cap back on.

To limit the middle position to 50 % of the total stroke, set dimension H on the nuts.

| Actuator size [mm] | Seat size | Dimension H $\pm 0.3$ [mm] | Total stroke [mm] |
|--------------------|-----------|----------------------------|-------------------|
| ø50                | 15        | 10.4                       | 10.8              |
|                    | 20        | 8.4                        | 14.8              |
|                    | 25        | 6.4                        | 18.8              |
| ø70                | 15        | 12.9                       | 10                |
|                    | 20        | 8.9                        | 18                |
|                    | 25        | 8.9                        | 18                |
|                    | 32        | 8.9                        | 18                |
|                    | 40        | 8.9                        | 18                |
| ø90                | 32        | 10.6                       | 20.4              |
|                    | 40        | 10.6                       | 20.4              |
|                    | 50        | 10.6                       | 20.4              |

Tab. 24: Setting the middle position to 50 % of the total stroke

## 9 DEINSTALLATION



### **DANGER!**

Risk of injury from high pressure and discharge of medium.

► Before working on the device or system, switch off the pressure. Vent or drain lines.

→ Loosen pneumatic connection.

→ Disassemble the device.

## 10 MAINTENANCE

### 10.1 Safety instructions maintenance



#### **DANGER!**

Risk of injury from high pressure and discharge of medium.

- Before working on the device or system, switch off the pressure. Vent or drain lines.



#### **DANGER!**

For control function I: Danger due to the control pressure failing.

If the control pressure fails, the valve remains in an undefined position.

- For a controlled restart, pressurize the device with control pressure and then connect the medium.



#### **DANGER!**

Risk of injury due to electric shock.

- Before working on the device or system, switch off the power supply. Secure against reactivation.
- Observe the applicable accident prevention and safety regulations for electrical devices.



#### **WARNING!**

Risk of injury due to unintentional activation of the system and uncontrolled restart.

- Secure plant to prevent unintentional activation..
- Ensure that the plant starts up in a controlled manner only.



#### **WARNING!**

Risk of injury due to moving parts.

- Do not reach into openings in the device.
- Operate 3-position actuator with transparent cap only.



#### **DANGER!**

Risk of injury due to improper maintenance.

- Only trained technicians may perform maintenance work.
- Perform maintenance work using suitable tools only.

### 10.2 Maintenance work

The maintenance work is described in the separate service instructions. These instructions can be found on our homepage at [www.buerkert.de](http://www.buerkert.de).

#### 10.2.1 Actuator

When used in accordance with these operating instructions, the actuator is maintenance-free.

#### 10.2.2 Wearing parts

The following parts are subject to natural wear:

- Seal
- Swivel plate with seal

→ If leaks occur, replace the respective wearing part.

### 10.2.3 Visual inspection

According to the usage conditions, perform regular visual inspections:

- Check medium ports for tightness.
- Check relief bore on the pipe for leaks.

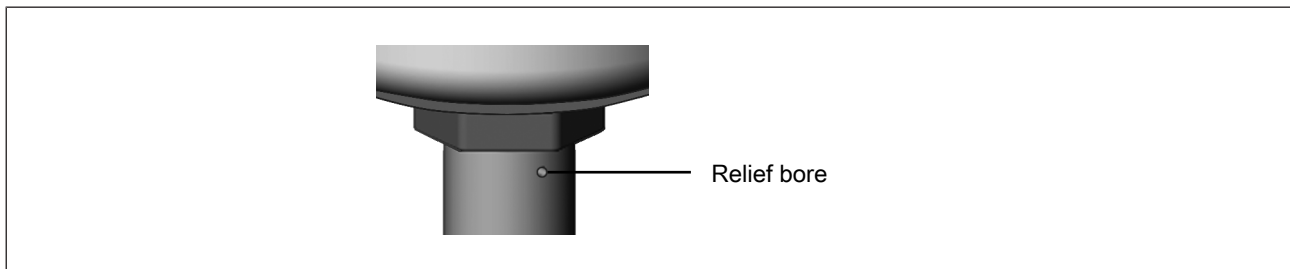


Fig. 34: Relief bore

### 10.2.4 Cleaning

Commercially available cleaning agents can be used to clean the outside.

#### ATTENTION!

Avoid causing damage with cleaning agents.

- Before cleaning, check that the cleaning agents are compatible with body materials and seals.

## 10.3 Changing the valve set

The valve set consists of:

- Swivel plate with seal
- Pin
- Seal

To change the valve set, first remove the actuator from the valve body.



#### DANGER!

Risk of injury from high pressure and discharge of medium.

- Before working on the device or system, switch off the pressure. Vent or drain lines.



#### DANGER!

Risk of injury due to improper maintenance.

- Only trained technicians may perform maintenance work.
- Perform maintenance work using suitable tools only.

### 10.3.1 Removing actuator from the valve body for devices without control unit

→ Clamp valve body into a holding device.

Devices with collet

#### **ATTENTION!**

**Damage to the valve seat seal or seat contour.**

► When removing the actuator, the valve must be in the open position.

→ For control function A pressurise the pilot air port 1 with compressed air (5 bar). Valve opens.

→ Place a suitable open-end wrench on the wrench flat of the body connection.

→ Unscrew actuator from the valve body.

Devices without collet

→ For control function A: Install control unit. To do this, follow the operating instructions for the control unit.

#### **ATTENTION!**

**Damage to the valve seat seal or seat contour.**

► When removing the actuator, the valve must be in the open position.

→ For control function A pressurise the pilot air port 1 with compressed air (5 bar). Valve opens.

→ For control function A with pilot valve: Manually switch device with pilot valve. To do this, follow the operating instructions for the control unit. Valve opens.

→ Place a suitable open-end wrench on the wrench flat of the body connection.

→ Unscrew actuator from the valve body.

### 10.3.2 Changing the valve set

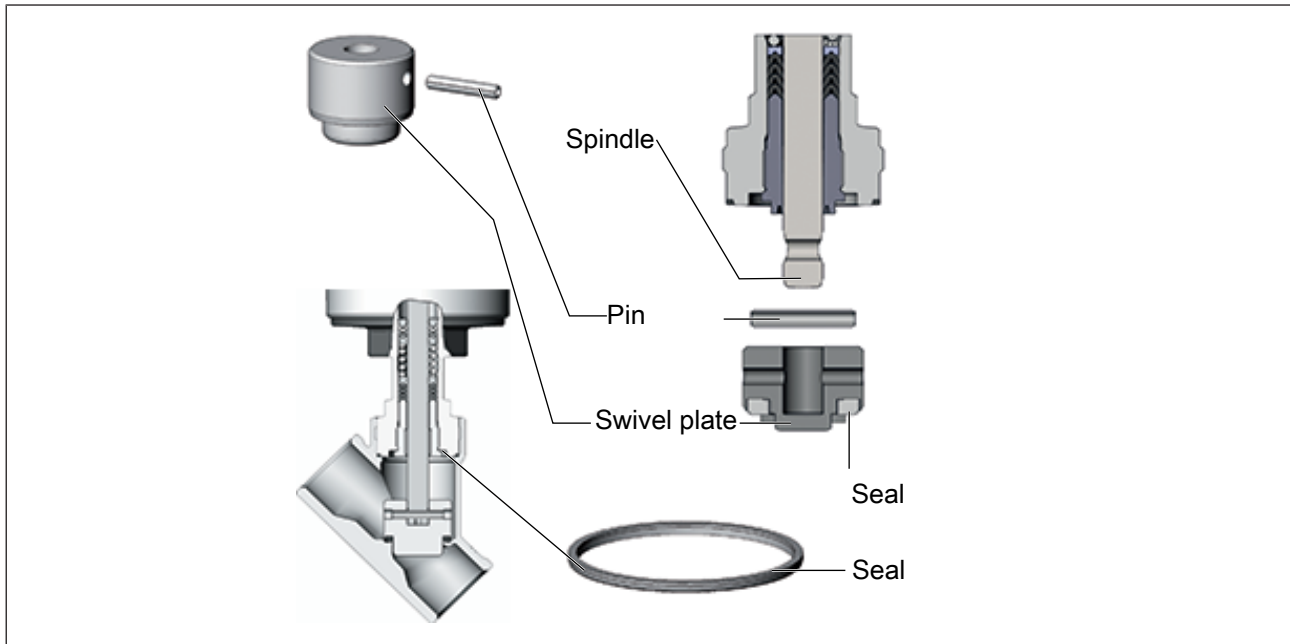


Fig. 35: Valve set

- Support swivel plate on the cylindrical part using a prism or something similar.
- Knock out pin using a suitable pin punch. Pin punch  $\varnothing 3$  mm, for 10 mm spindle diameter on the swivel plate. Pin punch  $\varnothing 5$  mm, for 14 mm spindle diameter on the swivel plate.
- Remove swivel plate.
- Connect new swivel plate to the spindle.
- Align boreholes in the swivel plate and spindle.
- Support swivel plate on the cylindrical part using a prism or something similar.
- Insert pin into the borehole.
- Caulk pin boreholes on both sides of the swivel plate using a chisel or centre punch.

### 10.3.3 Installing actuator on valve body

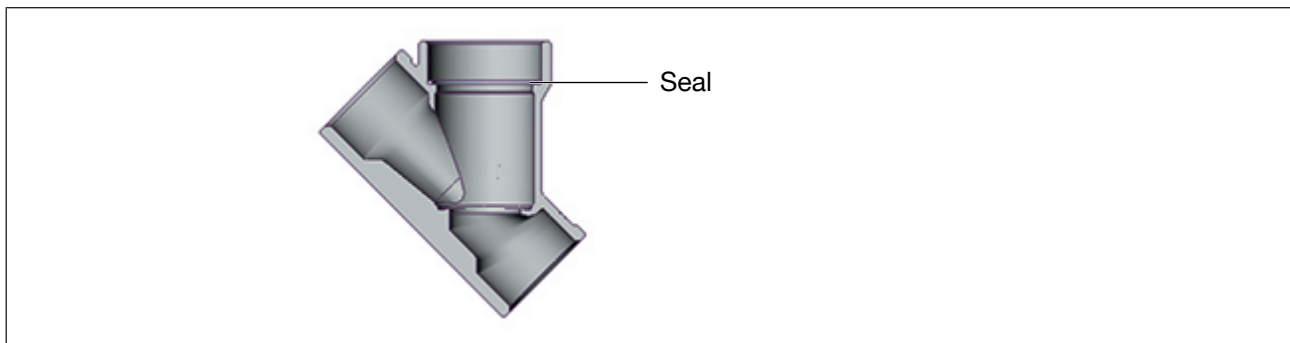


Fig. 36: Seal

- Check seal and replace if required.

## **DANGER!**

### **Danger due to lubricant.**

Lubricant may contaminate the medium. There is a risk of explosion in oxygen applications.

- For specific applications use only approved lubricants (e.g. for oxygen applications or analysis applications).

→ Before re-installation, grease the thread of the body connection (e.g. with Klüberpaste UH1 96-402 from Klüber).

## **ATTENTION!**

### **Damage to the valve seat seal or seat contour.**

- When installing the actuator, the valve must be in the open position.

→ For control function A pressurise the pilot air port 1 with compressed air (5 bar): Valve opens.

→ Screw actuator into the valve body. Observe tightening torques of the following table.

| Seat size | Tightening torque [Nm] |
|-----------|------------------------|
| 15        | 45 ±3                  |
| 20        | 50 ±3                  |
| 25        | 60 ±3                  |
| 32        | 65 ±3                  |
| 40        | 65 ±3                  |
| 50        | 70 ±3                  |
| 65        | 100 ±3                 |
| 80        | 120 ±5                 |

Tab. 25: Tightening torques valve body and body connection

## **10.4 Changing the packing gland**

The seal set for the packing gland includes

- 1 support ring
- 7 chevron seals
- 2 thrust collars
- 1 compression spring
- 1 spindle guide
- Seal
- Lubricant



For devices of actuator size ø70 with seat size 50 the packing gland can be changed as of series-production status January 2017.

## **DANGER!**

### **Risk of injury from high pressure and discharge of medium.**

- Before working on the device or system, switch off the pressure. Vent or drain lines.

 **DANGER!**

Risk of injury due to improper maintenance.

- ▶ Only trained technicians may perform maintenance work.
- ▶ Perform maintenance work using suitable tools only.

 **WARNING!**

Risk of injury due to using wrong tool.

- ▶ To replace the packing gland, use special installation wrench or socket wrench.
- ▶ Observe tightening torques.

To change the packing gland, first remove the actuator from the valve body and remove the swivel plate.

### 10.4.1 Removing actuator from the valve body for devices without control unit

→ Clamp valve body into a holding device.

Devices with collet

#### ATTENTION!

Damage to the valve seat seal or seat contour.

- ▶ When removing the actuator, the valve must be in the open position.

→ For control function A pressurise the pilot air port 1 with compressed air (5 bar). Valve opens.

→ Place a suitable open-end wrench on the wrench flat of the body connection.

→ Unscrew actuator from the valve body.

Devices without collet

→ For control function A: Install control unit. To do this, follow the operating instructions for the control unit.

#### ATTENTION!

Damage to the valve seat seal or seat contour.

- ▶ When removing the actuator, the valve must be in the open position.

→ For control function A pressurise the pilot air port 1 with compressed air (5 bar). Valve opens.

→ For control function A with pilot valve: Manually switch device with pilot valve. To do this, follow the operating instructions for the control unit. Valve opens.

→ Place a suitable open-end wrench on the wrench flat of the body connection.

→ Unscrew actuator from the valve body.

### 10.4.2 Removing swivel plate

→ Knock out pin using a suitable pin punch. Pin punch  $\varnothing 3$  mm, for 10 mm spindle diameter on the swivel plate. Pin punch  $\varnothing 5$  mm, for 14 mm spindle diameter on the swivel plate.

→ Remove swivel plate.

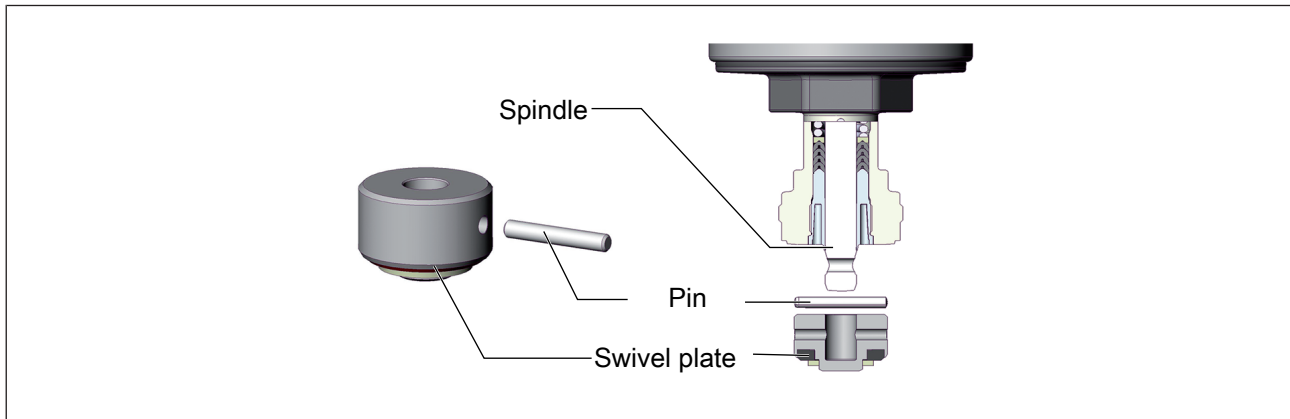


Fig. 37: Removing the swivel plate

### 10.4.3 Changing packing gland

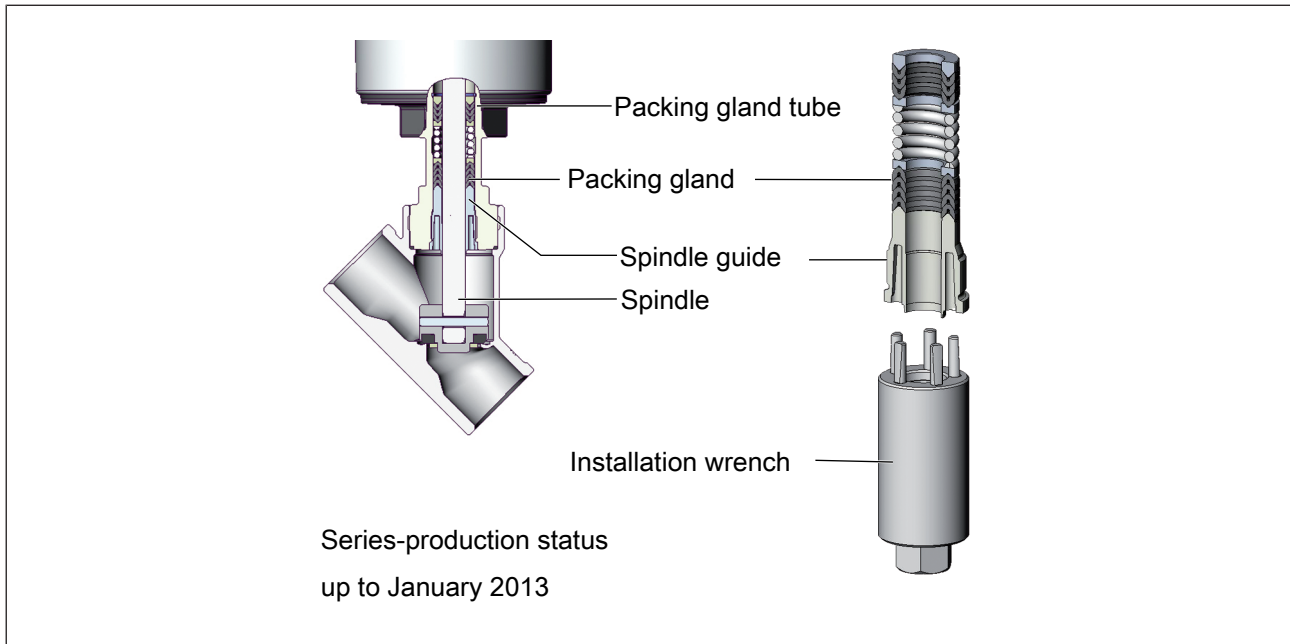


Fig. 38: Changing packing gland (series-production status up to January 2013)

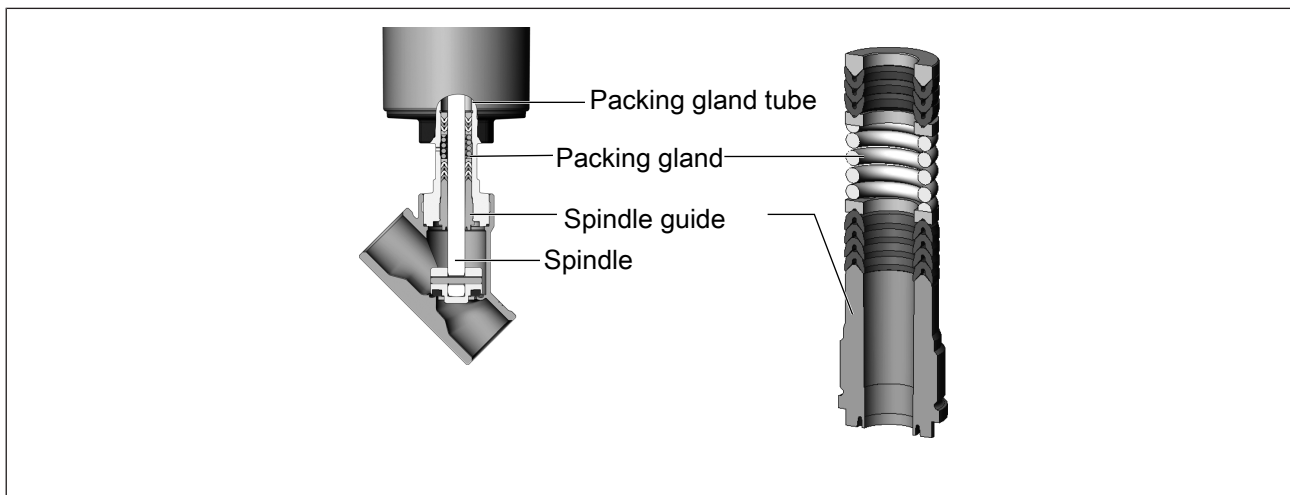


Fig. 39: Changing packing gland (series-production status since January 2013)

**Series-production status up to January 2013:**

→ Unscrew spindle guide using the installation wrench<sup>12</sup>, simultaneously countering with an open-end wrench on the hexagon head of the valve body.

**Series-production status as of January 2013:**

→ Unscrew spindle guide using the modified socket wrench<sup>13</sup>.

**! WARNING!**

**Risk of injury due to parts being ejected.**

When the spindle opening is exposed, the individual parts of the packing gland will be pressed out at an undefined speed when the pilot air port is pressurised.

► Before pressurising with pilot air, safeguard the area around the outlet, e.g. place the spindle on a firm surface.

→ For control function A and I pressurise the pilot air port 1 with 6...8 bar of compressed air.

→ For control function B pressurise the pilot air port 2 with 6...8 bar of compressed air.

→ Grease individual parts of the new packing gland with the supplied lubricant.

→ Place individual parts on the spindle in the specified direction and sequence.

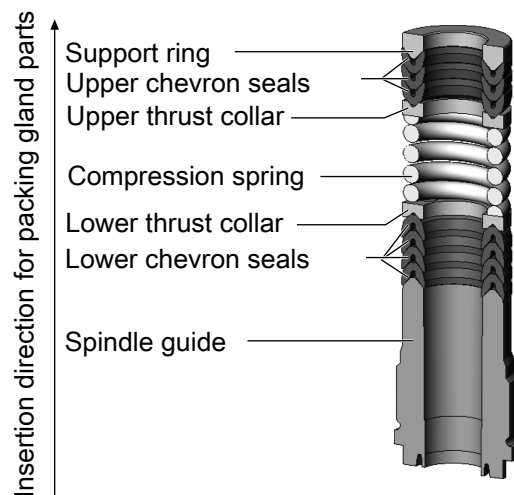


Fig. 40: Seal set for packing gland

→ Push the packing gland pack into the packing gland tube.

→ Screw the spindle guide back in using the socket wrench. Observe tightening torque.

| Tightening torques spindle guide |                        |
|----------------------------------|------------------------|
| Spindle diameter [mm]            | Tightening torque [Nm] |
| ø10                              | 6                      |
| ø14                              | 15                     |

Tab. 26: Tightening torques spindle guide

<sup>12</sup> The installation wrench is available from your Bürkert sales department.

<sup>13</sup> The modified socket wrench is available from your Bürkert sales department.

#### 10.4.4 Installing swivel plate

- Connect swivel plate to the spindle.
- Align boreholes in the swivel plate and spindle.
- Support swivel plate on the cylindrical part using a prism or similar object.
- Insert pin into the borehole.
- Caulk pin boreholes on both sides of the swivel plate using a chisel or centre punch.

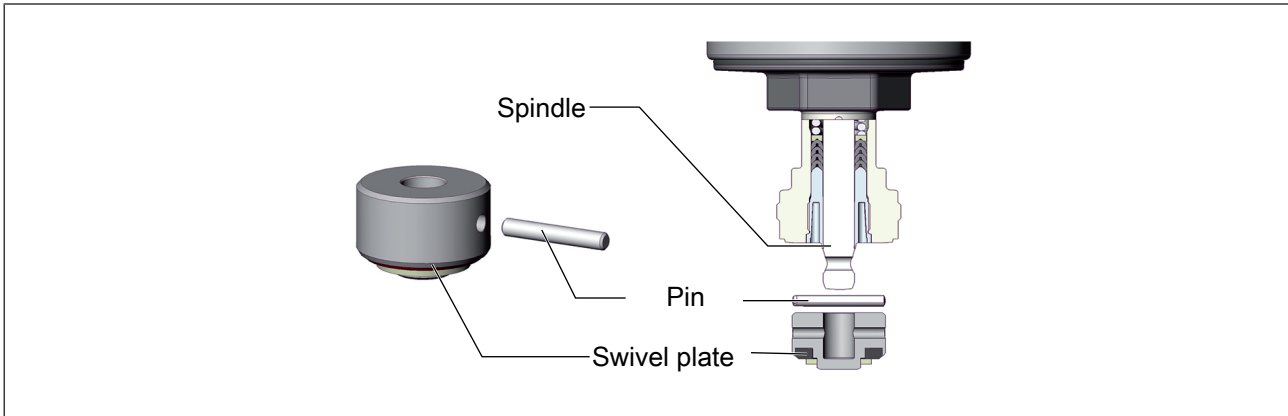


Fig. 41: Swivel plate

#### 10.4.5 Installing actuator on valve body

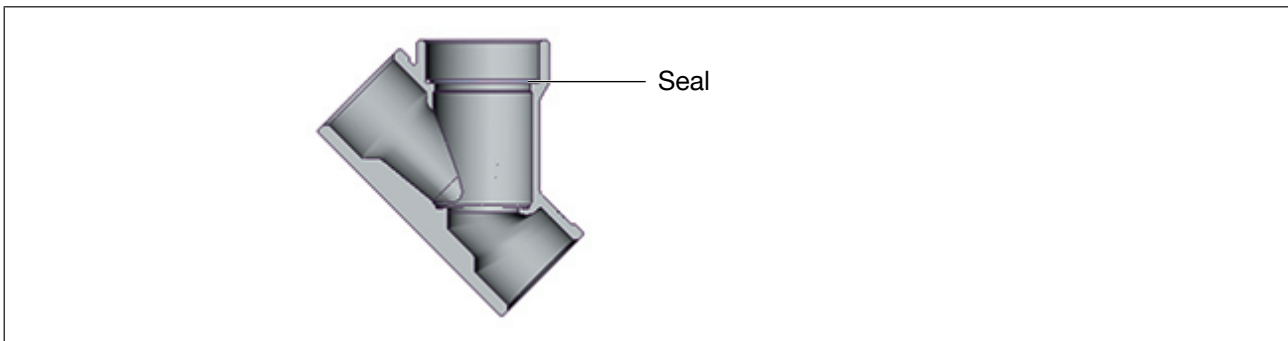


Fig. 42: Seal

- Check seal and replace if required.



#### **DANGER!**

**Danger due to lubricant.**

Lubricant may contaminate the medium. There is a risk of explosion in oxygen applications.

- ▶ For specific applications use only approved lubricants (e.g. for oxygen applications or analysis applications).

- Before re-installation, grease the thread of the body connection (e.g. with Klüberpaste UH1 96-402 from Klüber).

#### **ATTENTION!**

**Damage to the valve seat seal or seat contour.**

- ▶ When installing the actuator, the valve must be in the open position.

- For control function A pressurise the pilot air port 1 with compressed air (5 bar): Valve opens.

→ Screw actuator into the valve body. Observe tightening torques of the following table.

| Seat size | Tightening torque [Nm] |
|-----------|------------------------|
| 15        | 45 ±3                  |
| 20        | 50 ±3                  |
| 25        | 60 ±3                  |
| 32        | 65 ±3                  |
| 40        | 65 ±3                  |
| 50        | 70 ±3                  |
| 65        | 100 ±3                 |
| 80        | 120 ±5                 |

Tab. 27: Tightening torques valve body and body connection

## 11 FAULTS

| Fault                               | Cause                            | Elimination                                       |                                                                 |
|-------------------------------------|----------------------------------|---------------------------------------------------|-----------------------------------------------------------------|
| Actuator does not switch            | Pilot air port inter-changed     | CFA (2/2-way valve)                               | Connect pilot air port 1                                        |
|                                     |                                  | CFB                                               | Connect pilot air port 1                                        |
|                                     |                                  | CFI                                               | Pilot air port 1: Opening;<br>pilot air port 2: Closing         |
|                                     |                                  | CFA (2/3-way valve)                               | Pilot air port 1: Opening;<br>pilot air port 2: Middle position |
|                                     | Pilot pressure too low           | Observe pressure specifications on the type label |                                                                 |
|                                     | Medium pressure too high         |                                                   |                                                                 |
|                                     | Flow direction inter-changed     | Observe direction of arrow on the type label      |                                                                 |
| Valve is not tight                  | Dirt between seal and valve seat | Install dirt trap                                 |                                                                 |
|                                     | Seal on the swivel plate worn    | Install new swivel plate                          |                                                                 |
|                                     | Flow direction inter-changed     | Observe direction of arrow on the type label      |                                                                 |
|                                     | Medium pressure too high         | Observe pressure specifications on the type label |                                                                 |
|                                     | Pilot pressure too low           |                                                   |                                                                 |
| Valve is leaking on the relief bore | Packing gland worn               | Replace packing gland or actuator                 |                                                                 |

Tab. 28: Faults

## 12 REPLACEMENT PARTS, ACCESSORIES



### CAUTION!

Risk of injury and/or damage due to the use of incorrect parts.

Incorrect accessories and unsuitable spare parts may cause injuries and damage the device and its environment.

► Use original accessories and original spare parts from Bürkert only.

### 12.1 Replacement part set

The following replacement part sets are available for the angle seat valve:

- Valve set consists of swivel plate with seal, pin and seal.
- Seal set for packing gland consists of the individual parts of the packing gland, seal and lubricant. The modified socket wrench is not included in the seal set.

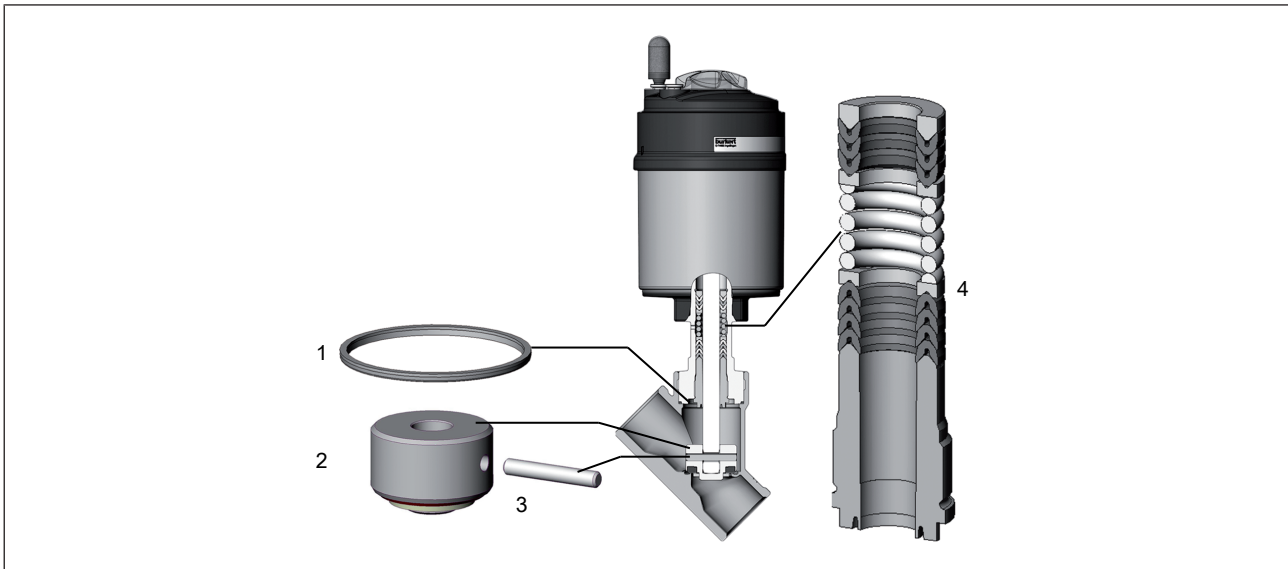


Fig. 43: Replacement parts

| Item | Description                |           |
|------|----------------------------|-----------|
| 1    | Seal                       | Valve set |
| 2    | Swivel plate with seal     |           |
| 3    | Pin                        |           |
| 4    | Seal set for packing gland |           |

Tab. 29: Legend

Seal set for valve set

| Seat size valve | Order No. |
|-----------------|-----------|
| 15              | 011134    |
| 20              | 011171    |
| 25              | 160737    |
| 32              | 011208    |

| Seat size valve                      | Order No. |
|--------------------------------------|-----------|
| 40                                   | 011209    |
| 50                                   | 216431    |
| 50 (actuator size ø70) <sup>14</sup> | 307392    |
| 65                                   | 241777    |
| 80                                   | 350831    |

Tab. 30: Seal set for valve set

Seal set for packing gland

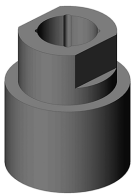
| Spindle [mm] | Seat size             | Actuator size [mm] | Order No. |
|--------------|-----------------------|--------------------|-----------|
| ø10          | 15...50 <sup>15</sup> | ø50                | 216433    |
|              |                       | ø70                |           |
| ø14          | 32...80               | ø90                | 216435    |
|              |                       | ø130               |           |

Tab. 31: Seal set for packing gland

## 12.2 Installation tools

| Installation wrench for packing gland (series-production status up to January 2013) |           |           |
|-------------------------------------------------------------------------------------|-----------|-----------|
| Spindle [mm]                                                                        | Seat size | Order No. |
| ø10                                                                                 | 15...40   | 665700    |
| ø14                                                                                 | 32...65   | 665701    |

Tab. 32: Installation wrench

| Modified socket wrench for packing gland (series-production status as of January 2013) |              |                       |                    |           |
|----------------------------------------------------------------------------------------|--------------|-----------------------|--------------------|-----------|
|     | Spindle [mm] | Seat size             | Width across flats | Order No. |
|                                                                                        | ø10          | 15...50 <sup>16</sup> | 19                 | 683221    |
|                                                                                        | ø14          | 32...80               | 21                 | 683223    |

Tab. 33: Modified socket wrench

| Special wrench for turning the actuator (series-production status up to end of 2011) |        |
|--------------------------------------------------------------------------------------|--------|
| Order No.                                                                            | 665702 |

Tab. 34: Special wrench



If you have any questions, contact your Bürkert sales department.

<sup>14</sup> As of series-production status January 2017 change also possible for seat size 50, spindle ø10 mm.

<sup>15</sup> As of series-production status January 2017 change also possible for seat size 50, spindle ø10 mm.

<sup>16</sup> As of series-production status January 2017 also for seat size 50

## 13 TRANSPORTATION, STORAGE, DISPOSAL

### ATTENTION!

Damage in transit due to inadequately protected devices.

- ▶ Protect the device against moisture and dirt in shock-resistant packaging during transportation.
- ▶ Observe permitted storage temperature.

### ATTENTION!

Incorrect storage may damage the device.

- ▶ Store the device in a dry and dust-free location.
- ▶ Storage temperature: -20 to +65 °C

### ATTENTION!

Damage to the environment caused by device components contaminated with media.

- ▶ Dispose of the device and packaging in an environmentally friendly manner.
- ▶ Observe applicable disposal and environmental regulations.



Observe national regulations on the disposal of waste.