bürkert
FLUID CONTROL SYSTEMS

Type 2100

2/2- and 2/3-way angle seat valve
2/2- und 2/3-Wege-Schrägsitzventil
Vanne à siège incliné 2/2 et 2/3 voies

Operating Instructions

Bedienungsanleitung
Manuel d'utilisation

MAN 1000295303 EN Version: BStatus: RL (released | freigegeben) printed: 22.09.2017

Operating Instructions 1703/09_EU-ML_00805596 / Original DE

MAN 1000295303 EN Version: BStatus: RL (released | freigegeben) printed: 22.09.2017

1 OPERATING INSTRUCTIONS

The operating instructions describes the entire life cycle of the device. Keep these instructions in a location which is easily accessible to every user, and make these instructions available to every new owner of the device.

Important safety information.

Failure to observe these instructions may result in hazardous situations.

- The operating instructions must be read and understood.

1.1 Definition of term / abbreviation

The term “device” used in these instructions always stands for the angle seat valve Type 2100.

The abbreviation “Ex” stands for potentially explosive area.

1.2 Symbols

DANGER!

Warns of an immediate danger.

- Failure to observe the warning may result in a fatal or serious injury.

WARNING!

Warns of a potentially dangerous situation.

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

CAUTION!

Warns of a possible danger.

- Failure to observe this warning may result in a moderate or minor injury.

NOTE!

Warns of damage to property.

Important additional information, tips and recommendations.

Refers to information in these operating instructions or in other documentation.

- designates instructions for risk prevention.

→ designates a procedure which you must carry out.

2 AUTHORIZED USE

Non-authorized use of the device may be a hazard to people, nearby equipment and the environment.

The angle seat valve Type 2100 is designed for the controlled flow of liquid and gaseous media.

- In the potentially explosion-risk area the angle seat valve Type 2100 may be used only according to the specification on the separate Ex type label. For use observe the additional information enclosed with the device together with safety instructions for the explosion-risk area.
- Devices without a separate Ex type label may not be used in a potentially explosive area.
- The admissible data, the operating conditions and conditions of use specified in the contract documents, operating instructions and on the type label are to be observed during use.
- The device may be used only in conjunction with third-party devices and components recommended and authorized by Bürkert.
- Correct transportation, correct storage and installation and careful use and maintenance are essential for reliable and faultless operation.
- Use the device only as intended.

3 BASIC SAFETY INSTRUCTIONS

These safety instructions do not consider any contingencies or incidents 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 – high pressure.

- Before dismounting the lines and valves, turn off the pressure and vent the lines.

Risk of electric shock.

- Before reaching into the device, switch off the power supply and secure to prevent reactivation.
- Observe applicable accident prevention and safety regulations for electrical equipment.

Risk of injury when opening the actuator.

The actuator contains a tensioned spring. If the actuator is opened, there is a risk of injury from the spring jumping out.

- The actuator must not be opened.

Risk of injury from moving parts in the device.

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

Risk of burns.

The surface of the device may become hot during long-term operation.

- Do not touch the device with bare hands.

General hazardous situations.

To prevent injury, ensure:

- That the system cannot be activated unintentionally.
- Installation and repair work may be carried out by authorized technicians only and with the appropriate tools.
- After an interruption in the power supply or pneumatic supply, ensure that the process is restarted in a defined or controlled manner.
- The device may be operated only when in perfect condition and in consideration of the operating instructions.
- The general rules of technology apply to application planning and operation of the device.

To prevent damage to property of the device, ensure:

- Supply the media connections only with those media which are specified as flow media in the chapter entitled "7 Technical data".
- Do not put any loads on the valve (e.g. by placing objects on it or standing on it).
- Do not make any external modifications to the valves. Do not paint the body parts or screws.

4 GENERAL INFORMATION

4.1 Contact address

Germany

Bürkert Fluid Control Systems
Sales Center
Chr.-Bürkert-Str. 13-17
D-74653 Ingelfingen
Tel. : 07940 - 10 91 111
Fax: 07940 - 10 91 448
E-mail: info@burkert.com

International

Contact addresses are found on the final pages of the printed operating manual.

You can also find information on the Internet under:

www.burkert.com

4.2 Warranty

The warranty is only valid if the device is used as authorized in accordance with the specified application conditions.

4.3 Information on the Internet

The operating instructions and data sheets for Type 2100 can be found on the Internet at: www.burkert.com

5 PRODUCT DESCRIPTION

5.1 General description

The angle seat valve Type 2100 is suitable for liquid and gaseous media. It uses neutral gases or air (control media) to control the flow of water, alcohol, oil, fuel, hydraulic fluid, saline solution, lye, organic solvent and steam (flow media).

5.2 Versions

There are 2 versions of the angle seat valve type 2100:

- Standard version **without** separate Ex type label.
  The standard version must not be used in the potentially explosive area.
- Ex version **with** separate Ex type label.
  The Ex version may be used in the potentially explosive area. In doing so, observe the specifications on the separate Ex type label and the additional information enclosed with the device together with safety instructions for the Ex area.

5.3 Properties

- High tightness by self-adjusting packing glands.
- High seat tightness by swivel plate.
- High flow values by the streamlined valve body made of stainless steel.
- Actuator can be rotated steplessly through 360°.
- Maintenance-free under normal conditions.

5.3.1 Options

- Feedback indicator and control unit
  Depending on the requirements, different feedback and control units are available.
- Stroke limitation
  Limit of the maximum or minimum open position / flow rate by means of adjusting screw.

5.3.2 Actuator sizes

The angle seat valve is available for the following actuator sizes:
ø 50 mm, ø 70 mm, ø 90 mm, ø 130 mm.

3-position actuator is available for the following actuator sizes:
ø 50 mm, ø 70 mm, ø 90 mm.

5.3.3 Restrictions

WARNING!

Risk of injury from water hammer.

A water hammer could crack the lines and device. Due to the risk of water hammer**, valves with a flow direction above the seat must not be used for liquid media**.

- ▸ Consider the type of flow direction and the type of medium for operation of the device.

5.4 Designated application area

Observe the maximum pressure range according to the type label.

- Neutral gases and liquids up to 16 bar.
- Steam up to 11 bar absolute / 185 °C.
- Aggressive media.

6 STRUCTURE AND FUNCTION

6.1 Structure

The angle seat valve consists of a pneumatically actuated piston actuator and a 2/2-way valve body. The actuator is manufactured from polyphenylene sulphide (PPS).

6.1.1 2/2-way valve

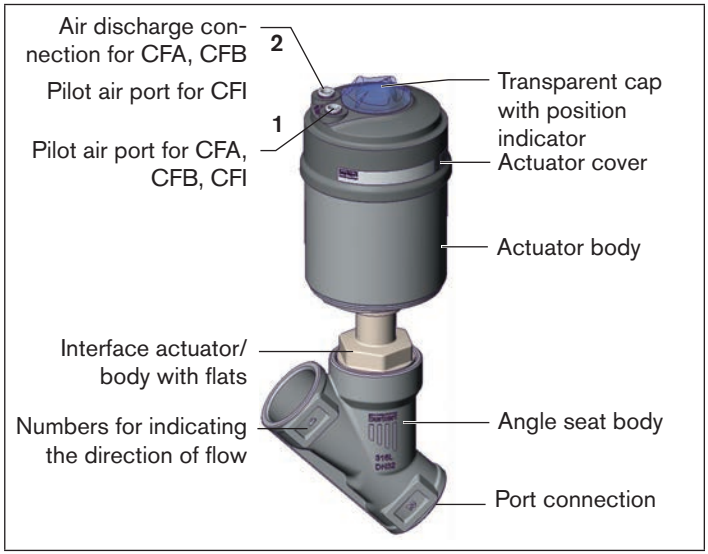


Fig. 1: Structure and description, 2/2-way valve

6.1.2 2/3-way valve

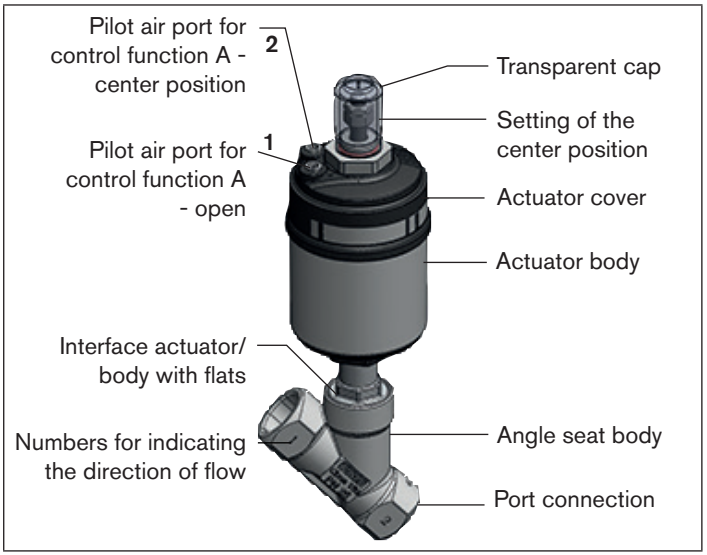


Fig. 2: Structure and description, 2/3-way valve

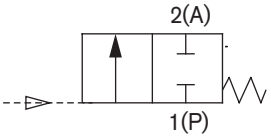
6.2 Function

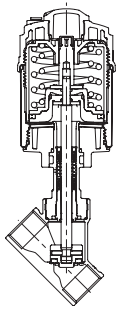
6.2.1 Control function 2/2-way valve

Spring force (CFA) or pneumatic pilot pressure (CFB and CFI) generates the closing force on the swivel plate. The force is transferred via a spindle which is connected to the actuator piston.

Control function A (CFA)

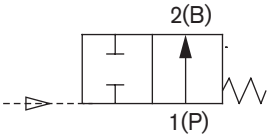
Normally closed by spring action

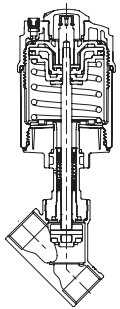




Control function B (CFB)

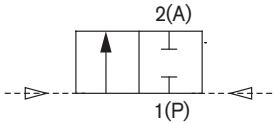
Normally open by spring action

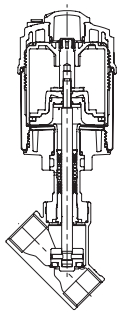




Control function I (CFI)

Actuating function via reciprocal pressurization.





WARNING!

For control function I – Danger if pilot pressure fails.

For control function I control and resetting occur pneumatically. If the pressure fails, no defined position is reached.

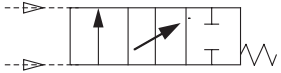
- To ensure a controlled restart, first pressurize the device with pilot pressure, then switch on the medium.

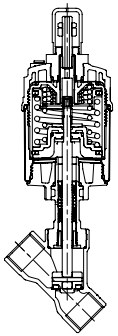
6.2.2 Control function 2/3-way valve

Type 2100 with 3-position actuator is available in control function A (CFA) only.

Control function A (CFA)

Normally closed by spring action





The spindle, which is connected to the actuator piston, transfers the closing force to the swivel plate. Pressurization of the pilot air port 2 moves the upper movable group axially downwards until the preset center position has been reached. Pressurization of the pilot air port 1 moves the lower movable group axially upwards until it hits the upper piston and stops. This center position corresponds to a specific adjustable flow rate of the medium. If the upper air chamber is vented by pilot air port 2, both modules move upwards and the maximum stroke is reached. If the lower air chamber is vented by pilot air port 1, the spring force acts on the lower movable group and therefore moves it downwards until the valve is closed (rest position).

6.2.3 Setting of the center position with the 2/3-way valve

Open position [100 % Stroke]	Center position [0...100 % Stroke]
Pilot air port 1: 5...10 bar	Pilot air port 1: 5...10 bar
Pilot air port 2: 0 bar	Pilot air port 2: 5...10 bar

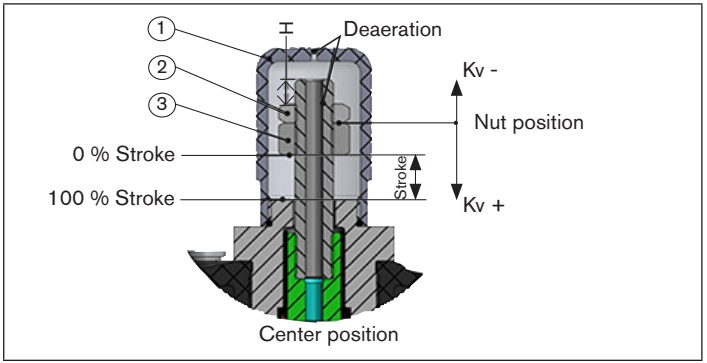


Fig. 3: Setting of the center position

→ Unscrew transparent cap (Position 1):
Actuator size 50, 70 and 90: wrench size 28.

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

→ Loosen lock nut (Position 2):
Actuator size 50: wrench size 13;
Actuator size 70 and 90: wrench size 17.

→ Adjust the center position via the nut (Position 3).

→ Retighten lock nut (Position 2):
Actuator size 50 max. 20^{+5} Nm
Actuator size 70 max. 30^{+5} Nm
Actuator size 90 max. 45^{+5} Nm

→ Screw transparent cap back on.

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

Actuator sizes [mm]	Orifice body DN	Dimension H ±0.3 [mm]	Stroke total [mm]
50	15	10.4	10.8
	20	8.4	14.8
	25	6.4	18.8
70	15	12.9	10.0
	20	8.9	18.0
	25	8.9	18.0
	32	8.9	18.0
	40	8.9	18.0
90	32	10.6	20.4
	40	10.6	20.4
	50	10.6	20.4

Tab. 1: Setting of the center position to 50 % of the total stroke

6.2.4 Flow direction below seat

Depending on the version, the valve is closed against the medium flow with spring action (control function A, CFA) or with pilot pressure (control function B or I, CFB or CFI).
As the medium pressure is under the swivel plate, this pressure contributes to the opening of the valve.

WARNING!

Medium may be discharged if minimum pilot pressure is too low or medium pressure too high.

If the minimum pilot pressure is too low for CFB and CFI or the permitted medium pressure is exceeded, leaks may occur.

- Observe minimum pilot pressure
- Do not exceed medium pressure.

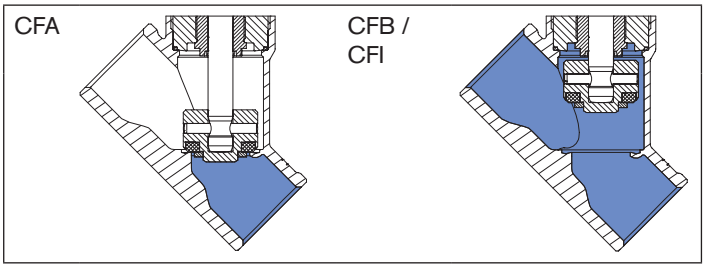


Fig. 4: Flow direction below the seat (Rest open/closed, closing against medium)

6.2.5 Flow direction above the seat

The valve is closed by spring force (control function A, CFA) with the medium flow. As the medium pressure is over the swivel plate, it supports the closing process of the valve and also contributes to the sealing of the valve seat. The valve is opened by the pilot pressure.

WARNING!

Risk of injury from water hammer.

A water hammer could crack the lines and device.
Due to the risk of water hammer**, valves with a flow direction above the seat must not be used for liquid media**.

- Consider the type of flow direction and the type of medium for operation of the device.

To ensure complete opening, the minimum pilot pressure must be used.

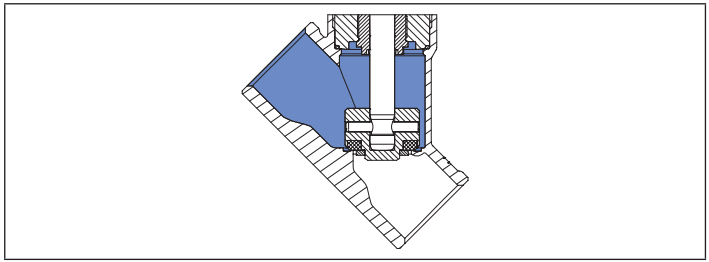


Fig. 5: Flow direction above the seat (Rest closed, closing with medium)

7 TECHNICAL DATA

7.1 Conformity

Type 2100 conforms with the EU Directives according to the EU Declaration of Conformity.

7.2 Standards

The applied standards, which verify conformity with the EU Directives, can be found on the EU-Type Examination Certificate and / or the EU Declaration of Conformity.

According to Pressure Equipment Directive the following operating conditions must be observed:

Line connection orifice	Maximum pressure for compressible fluids of Group 1 (hazardous gases and vapors according to Art. 3 No. 1.3 Letter a first dash)
DN65	15 bar

7.3 Type label

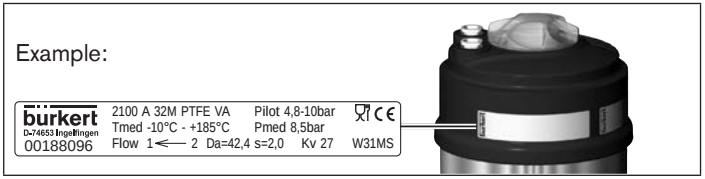


Fig. 6: Position of the type label

WARNING!

Risk of injury from high pressure.

Excessive pressure can damage the device.

- Comply with pressure range values on the type label.

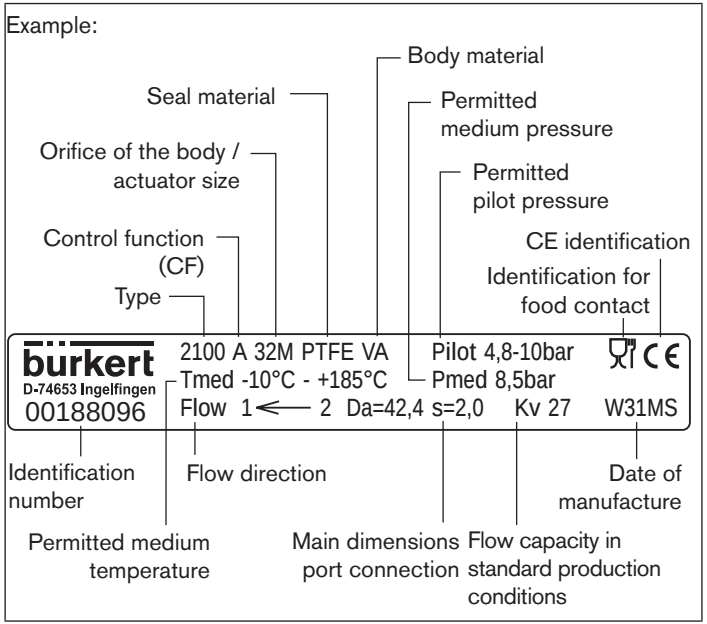


Fig. 7: Description of the type label

7.4 Operating conditions

7.4.1 Temperature ranges

Actuator size	Actuator material	Medium temperature (for PTFE seal)	Ambient temperature[1)]
ø 50 mm	PPS	-10...+185 °C	0...+60 °C[2)] 0...+100 °C[3)]
ø 70 mm			
ø 90 mm			
ø 130 mm			

Tab. 2: Temperature ranges

The angle seat valve is suitable for steam sterilization.

1) *If a pilot valve is used, the max. ambient temperature is +55 °C.*
2) *Pilot air ports with push-in connector.*
3) *Pilot air ports with threaded bushing.*

7.4.2 Pressure ranges 2/2-way valve

Actuator size	Maximum pilot pressure[4)]
ø 50 mm	10 bar
ø 70 mm	
ø 90 mm	
ø 130 mm	7 bar

Tab. 3: Pressure ranges

4) *For the device version ø 70 / Orifice 50 / MC 13 the max. permitted pilot pressure is limited to 7 bar.*

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

Orifice DN	Maximum medium pressure [bar]				Minimum pilot pressure [bar]			
	Actuator size ø [mm]				Actuator size ø [mm]			
	50	70	90	130	50	70	90	130
15	25	25	-	-	5.2	4.8	-	-
20	16	20						
25	9	16						
32	-	8.5	16		-		5	
40		6	16					
50		4	10	16				5
65			5	16 (15*)		-		5.6

Tab. 4: Medium and pilot pressure for CFA, standard

* *According to Pressure Equipment Directive for compressible fluids of Group 1 (hazardous gases and vapors according to Art. 3 No. 1.3 Letter a first dash)*

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

Orifice DN	Maximum medium pressure [bar]				Minimum pilot pressure [bar]			
	Actuator size ø [mm]				Actuator size ø [mm]			
	50	70	90	130	50	70	90	130
15	14	16	-	-	3,2	2,5	-	-
20	6	12						
25	3	6						
32	-	3,5	9		-		2,5	
40		2	6	16				2,5
50		-	3,5	11		-		
65			-	7,5			-	3,2

Tab. 5: Medium and pilot pressure for CFA, reduced pressure spring force (EC04)

Required minimum pilot pressure depending on medium pressure

The following graphs illustrate the required minimum pilot pressure depending on the medium pressure for control functions A, B and I.

Control function A, flow direction above the seat

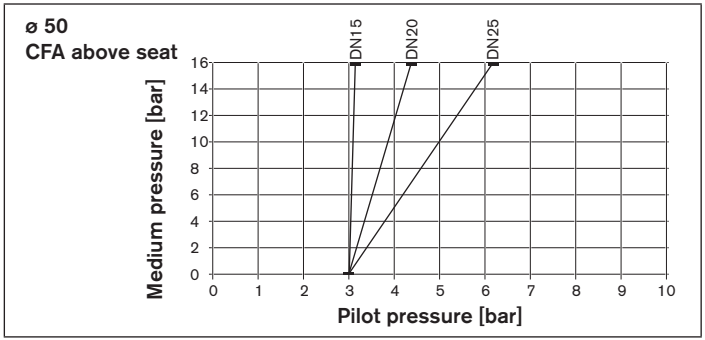


Fig. 8: Pressure graph, actuator ø 50 mm, control function A, flow direction above the seat

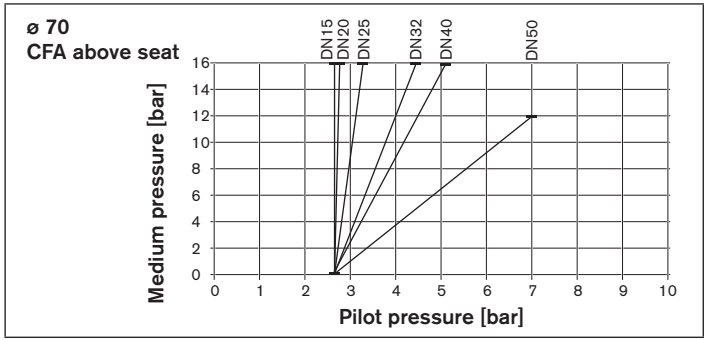


Fig. 9: Pressure graph, actuator ø 70 mm, control function A, flow direction above the seat

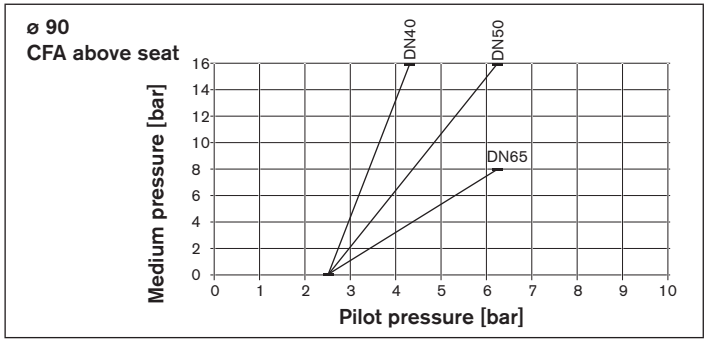


Fig. 10: Pressure graph, actuator ø 90 mm, control function A, flow direction above the seat

Control functions B and I, flow direction below the seat

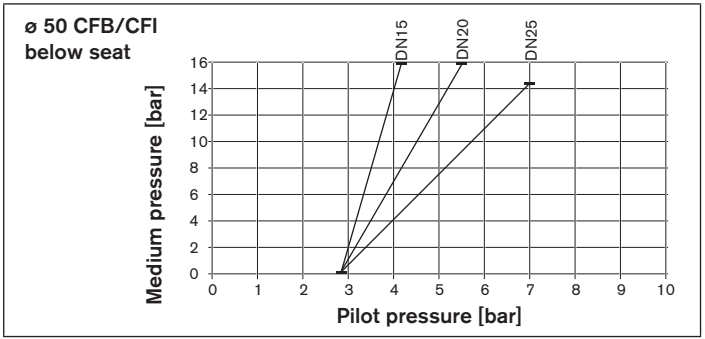


Fig. 11: Pressure graph, actuator ø 50 mm, control functions B and I, flow direction below the seat

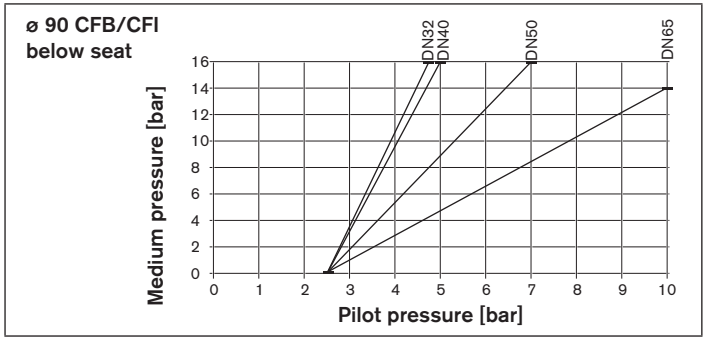


Fig. 13: Pressure graph, actuator ø 90 mm, control functions B and I, flow direction below the seat

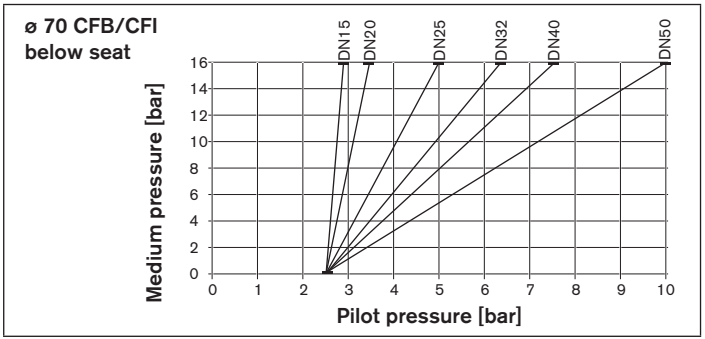


Fig. 12: Pressure graph, actuator ø 70 mm, control functions B and I, flow direction below the seat

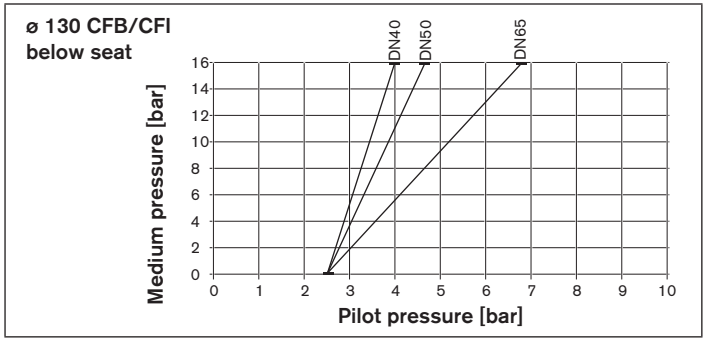


Fig. 14: Pressure graph, actuator ø 130 mm, control functions B and I, flow direction below the seat

7.4.3 Pressure ranges 2/3-way valve

Maximum pilot pressure

Actuator size	Maximum pilot pressure[5)]
ø 50 mm	10 bar
ø 70 mm	
ø 90 mm	

Tab. 6: Pressure ranges

5) For the device version ø 50, ø 70, ø 90 MC13 the maximum permitted pilot pressure is limited to 7 bar.

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

Orifice DN	Maximum medium pressure [bar]			Minimum pilot pressure [bar]		
	Actuator size ø [mm]			Actuator size ø [mm]		
	50	70	90	50	70	90
15	16	16	-	5	5	-
20	10	16				
25	5	12				
32	-	8.5	16	-		5
40		5	12			
50		-	7		-	

Tab. 7: Medium and pilot pressure for CFA, standard

Designs with lower pilot pressure (reduced spring force) are available on request.

Contact your Bürkert sales office or our Sales Center, E-mail: info@burkert.com

Required minimum pilot pressure depending on medium pressure

The following graphs illustrate the required minimum pilot pressure depending on the medium pressure for control functions A.

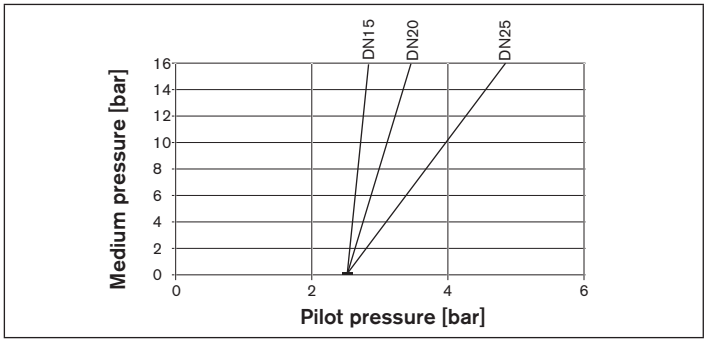


Fig. 15: Pressure graph, actuator ø 50 mm, control function A, flow direction above the seat

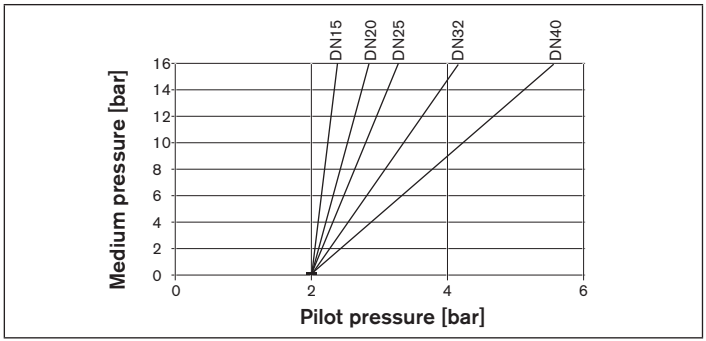


Fig. 16: Pressure graph, actuator ø 70 mm, control function A, flow direction above the seat

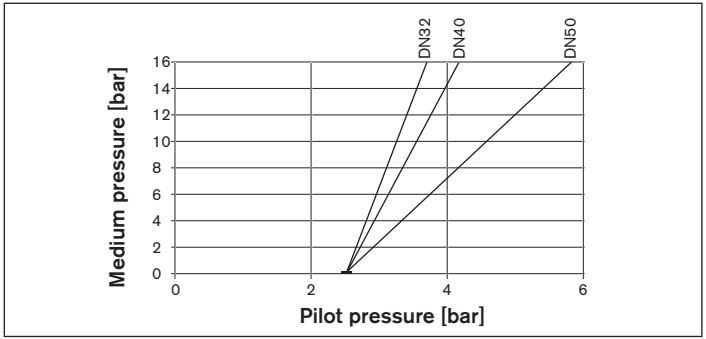


Fig. 17: Pressure graph, actuator ø 90 mm, control function A, flow direction above the seat

7.5 Flow values and characteristics 2/3-way valve

Flow values for orifice 15, ANTG D (ø 50)

Stroke [%]	Kv value [m³/h]	Stroke [%]	Kv value [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. 8: Flow values for orifice 15 (ø 50)

Flow characteristic for orifice 15, ANTG D (ø 50)

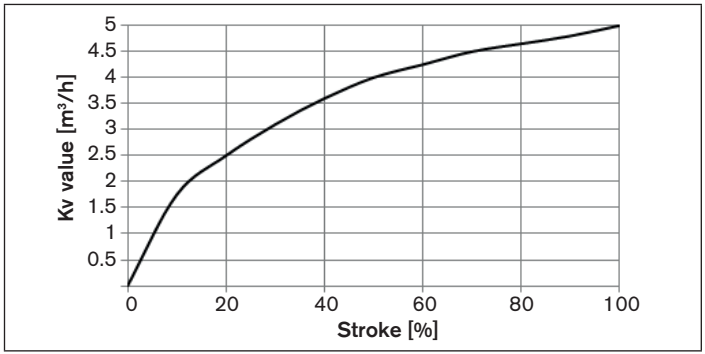


Fig. 18: Flow characteristic for orifice 15 (ø 50)

Flow values for orifice 15, ANTG M (ø 70)

Stroke [%]	Kv value [m³/h]	Stroke [%]	Kv value [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. 9: Flow values for orifice 15 (ø 70)

Flow values for orifice 20, ANTG D (ø 50)

Stroke [%]	Kv value [m³/h]	Stroke [%]	Kv value [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. 10: Flow values for orifice 20 (ø 50)

Flow characteristic for orifice 15, ANTG M (ø 70)

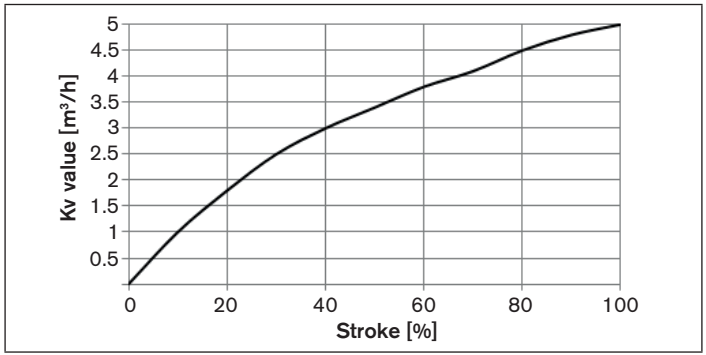


Fig. 19: Flow characteristic for orifice 15 (ø 70)

Flow characteristic for orifice 20, ANTG D (ø 50)

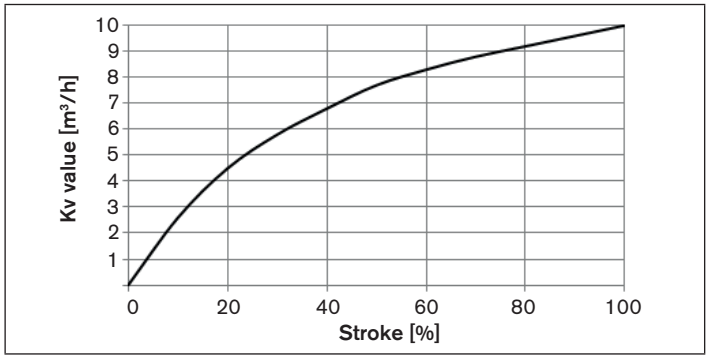


Fig. 20: Flow characteristic for orifice 20 (ø 50)

Flow values for orifice 20, ANTG M (ø 70)

Stroke [%]	Kv value [m³/h]	Stroke [%]	Kv value [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. 11: Flow values for orifice 20 (ø 70)

Flow values for orifice 25, ANTG D (ø 50)

Stroke [%]	Kv value [m³/h]	Stroke [%]	Kv value [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. 12: Flow values for orifice 25 (ø 50)

Flow characteristic for orifice 20, ANTG M (ø 70)

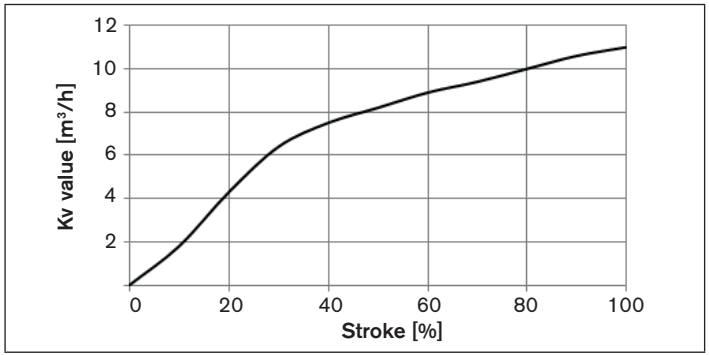


Fig. 21: Flow characteristic for orifice 20 (ø 70)

Flow characteristic for orifice 25, ANTG D (ø 50)

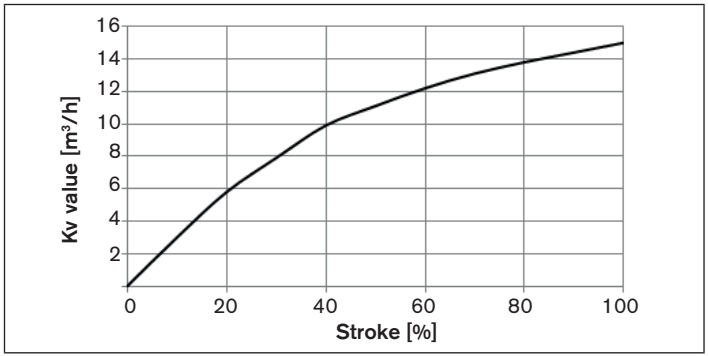


Fig. 22: Flow characteristic for orifice 25 (ø 50)

Flow values for orifice 25, ANTG M (ø 70)

Stroke [%]	Kv value [m³/h]	Stroke [%]	Kv value [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. 13: Flow values for orifice 25 (ø 70)

Flow values for orifice 32, ANTG M (ø 70)

Stroke [%]	Kv value [m³/h]	Stroke [%]	Kv value [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. 14: Flow values for orifice 32 (ø 70)

Flow characteristic for orifice 25, ANTG M (ø 70)

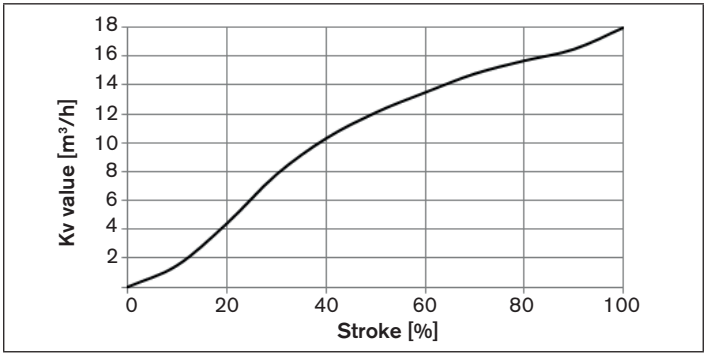


Fig. 23: Flow characteristic for orifice 25 (ø 70)

Flow characteristic for orifice 32, ANTG M (ø 70)

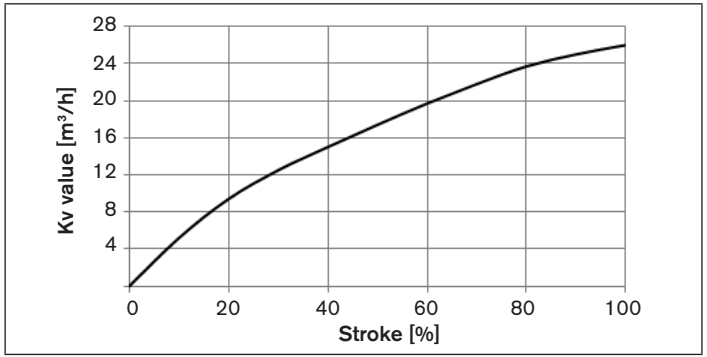


Fig. 24: Flow characteristic for orifice 32 (ø 70)

Flow values for orifice 32, ANTG N (ø 90)

Stroke [%]	Kv value [m³/h]	Stroke [%]	Kv value [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. 15: Flow values for orifice 32 (ø 90)

Flow values for orifice 40, ANTG M (ø 70)

Stroke [%]	Kv value [m³/h]	Stroke [%]	Kv value [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. 16: Flow values for orifice 40 (ø 70)

Flow characteristic for orifice 32, ANTG N (ø 90)

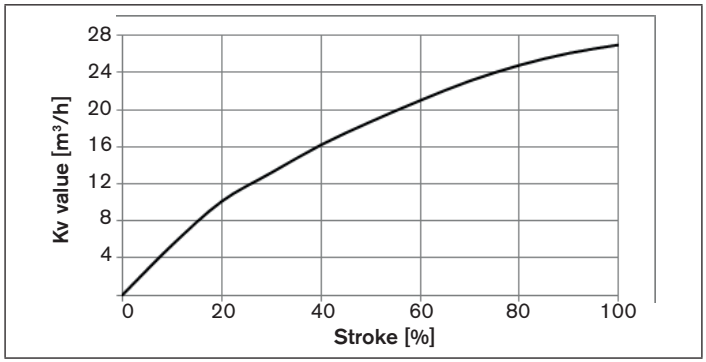


Fig. 25: Flow characteristic for orifice 32 (ø 90)

Flow characteristic for orifice 40, ANTG M (ø 70)

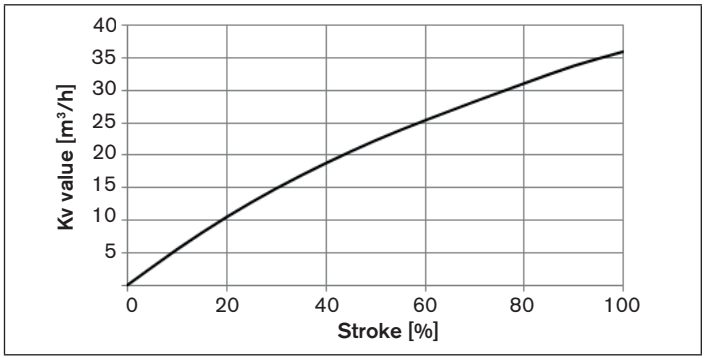


Fig. 26: Flow characteristic for orifice 40 (ø 70)

Flow values for orifice 40, ANTG N (ø 90)

Stroke [%]	Kv value [m³/h]	Stroke [%]	Kv value [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. 17: Flow values for orifice 40 (ø 90)

Flow values for orifice 50, ANTG N (ø 90)

Stroke [%]	Kv value [m³/h]	Stroke [%]	Kv value [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. 18: Flow values for orifice 50 (ø 90)

Flow characteristic for orifice 40, ANTG N (ø 90)

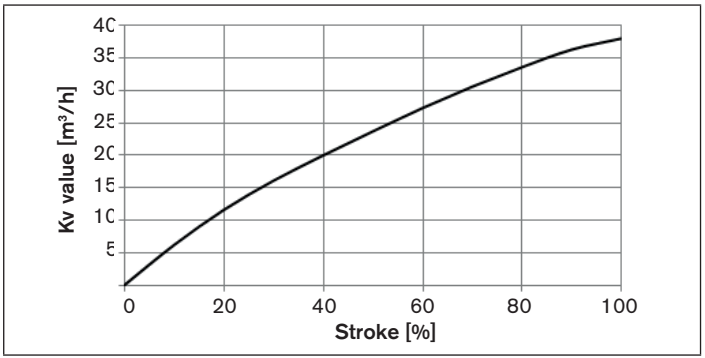


Fig. 27: Flow characteristic for orifice 40 (ø 90)

Flow characteristic for orifice 50, ANTG N (ø 90)

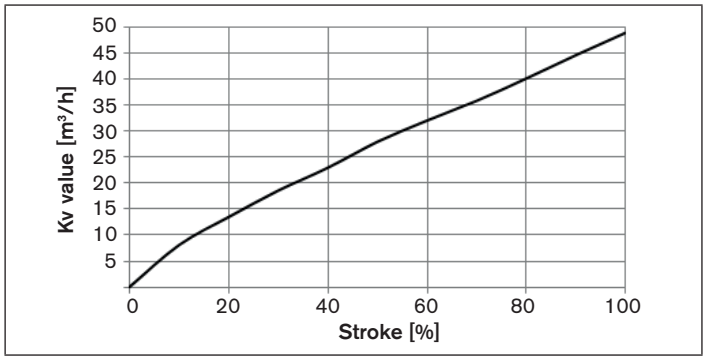


Fig. 28: Flow characteristic for orifice 50 (ø 90)

7.6 General technical data

Actuator size	see type label
Control function	see type label, description of control functions see chapter “6.2”
Installation	as required, preferably with actuator in upright position
Protection class	IP67 in accordance with IEC 529 / EN 60529

Media:

Control medium	Neutral gases, air
Flow media	Water, alcohol, fuel, hydraulic liquids, saline solutions, lye, organic solvents

Materials:

Valve body	316L
Actuator	PPS and stainless steel
Sealing elements	FKM and EPDM
Spindle sealing (with silicone grease)	PTFE V rings with spring compensation
Seat seal Swivel plate	PTFE (NBR, EPDM, FKM on request)
Spindle	1.4401 / 1.4404
Spindle guide	PEEK

Connections

Pilot air ports	push-in connector 6/4 mm or 1/4” others on request
Medium connection	Socket: G ½ – G 2 ½ (NPT, RC on request) Welded connection: in accordance with ISO 4200, DIN 11850 R2 other connections on request

8 INSTALLATION

DANGER!

Risk of injury from high pressure.

- Before loosening the lines and valves, turn off the pressure and vent the lines.

WARNING!

Risk of injury from improper installation.

- Installation may be carried out by authorized technicians only and with the appropriate tools!

Risk of injury from unintentional activation of the system and an uncontrolled restart.

- Secure system from unintentional activation.
- Following installation, ensure a controlled restart.

For control function I – Danger if pilot pressure fails.

For control function I control and resetting occur pneumatically. If the pressure fails, no defined position is reached.

- To ensure a controlled restart, first pressurize the device with pilot pressure, then switch on the medium.

Risk of injury from moving parts in the device.

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

8.1 Before installation

- Before connecting the valve, ensure the lines are flush.
- Observe direction of flow (see type label).
- Clean pipelines (sealing material, swarf, etc.)

Devices with welded body

NOTE!

For valves with installed control:

When welding the valve body into the pipeline, the control must not be installed.

- Remove control from the actuator (see installation chapter in the operating instructions for the corresponding control).

8.2 Remove the actuator from valve body (welded body)

→ Clamp the valve body in a holding device.

NOTE!

Damage to the seat seal or the seat contour.

- When removing the actuator, ensure that the valve is open.

→ Control function A pressurize the pilot air port 1 with compressed air (5 bar): valve opens.

→ Counter on the flats of the nipple with a suitable open-end wrench.

→ Unscrew the actuator from the valve body.

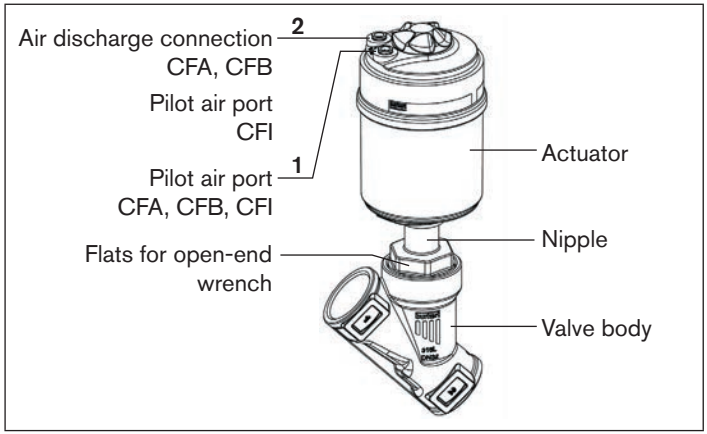


Fig. 29: Angle seat valve Type 2100

8.3 Installation of the valve body

WARNING!

Risk of injury from improper installation.

- Installation may only be performed by qualified and trained personnel.
- For installation use an open-end wrench.
- Observe the tightening torque.

Dirt trap for devices with authorization in accordance with DIN EN 161

In accordance with DIN EN 161 „Automatic shut-off valves for gas burners and gas appliances“ a dirt trap must be connected upstream of the valve and prevent the insertion of a 1 mm plug gauge.

→ If the authorisation also applies to stainless steel bodies, the same type of dirt trap must be attached in front of the angle seat valve.

Welded bodies:

→ Weld valve body in pipeline system.

Other bodies:

→ Connect body to pipeline.

8.4 Install actuator (welded body)

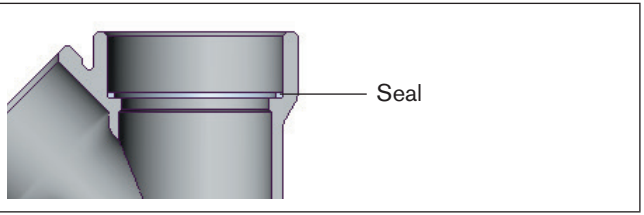


Fig. 30: Seal

→ Check the seal and if required, replace it.

WARNING!

Danger if incorrect lubricants used.

Unsuitable lubricant may contaminate the medium. In oxygen applications there is a risk of an explosion.

- In specific applications, e.g. oxygen or analysis applications, use appropriately authorised lubricants only.

→ Grease nipple thread before re-installing the actuator (e.g. with Klüber paste UH1 96-402 from Klüber).

NOTE!

Damage to the seat seal or the seat contour.

- When installing the actuator, ensure that the valve is open.

→ Control function A pressurize the pilot air port 1 with compressed air (5 bar): valve opens.

→ Screw actuator into the valve body. Observe tightening torque "Tab. 19".

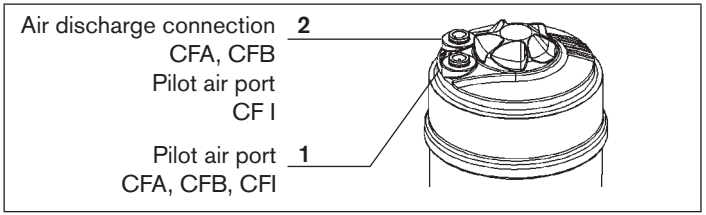


Fig. 31: Pneumatic connections

Orifice	Tightening torque [Nm]
15	45 ±3
20	50 ±3
25	60 ±3
32	65 ±3
40	
50	70 ±3
65	100 ±3

Tab. 19: Tightening torques of valve body / nipples

8.5 Install control unit

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

8.6 Rotating the actuator

The position of the connections can be aligned steplessly by rotating the actuator through 360°.

NOTE!

Damage to the seat seal or the seat contour.

- When rotating the actuator, ensure that the valve is open.

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

→ Control function A pressurize the pilot air port 1 with compressed air (5 bar): valve opens.

→ Counter on the flats of the nipple with a suitable open-end wrench.

→ Actuator with hexagon:
Place suitable open-end wrench on the hexagon of the actuator.

→ Actuator without hexagon:
Fit special wrench[6] exactly to the underside of the actuator.

6) *The special key (identification number 665 702) is available from your Bürkert sales office.*

WARNING!

Risk of injury from discharge of medium and pressure.

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

- Rotate the actuator module in the specified direction only (see "Fig. 32").

→ Actuator with hexagon:
Rotate counter-clockwise (as seen from below) to bring the actuator module into the required position.

→ Actuator without hexagon:
Rotate clockwise (as seen from below) to bring the actuator module into the required position.

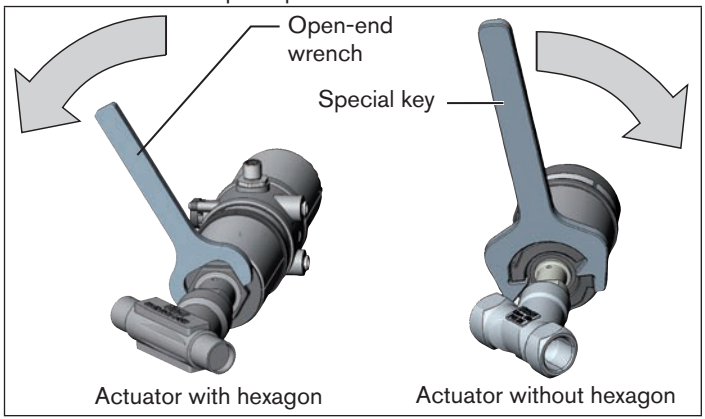


Fig. 32: Rotating with special key / open-end wrench

8.7 Pneumatic connection

WARNING!

Risk of injury from unsuitable connection hoses.

- Use only hoses which are authorised for the indicated pressure and temperature range.
- Observe the data sheet specifications from the hose manufacturers.

For control function I – Danger if pilot pressure fails.

For control function I control and resetting occur pneumatically. If the pressure fails, no defined position is reached.

- To ensure a controlled restart, first pressurize the device with pilot pressure, then switch on the medium.

8.7.1 Connection of the control medium

If the position of the pilot air ports for installation of the hoses is unfavorable, these can be aligned steplessly by rotating the actuator through 360°.

The procedure is described in the chapter entitled "8.6 Rotating the actuator".

Control functions A and B:

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

Control function A, 3-position actuator:

→ Connect the control medium to the pilot air port 1 and 2 of the actuator (see "Fig. 2" in chapter 6)
Pressure on the pilot air port 1 opens the valve.
Pressure on the pilot air port 2 sets the center position.

Control function I:

→ Connect the control medium to the pilot air port 1 and 2 of the actuator (see "Fig. 33")
Pressure on connection 1 opens the valve.
Pressure on connection 2 closes the valve.

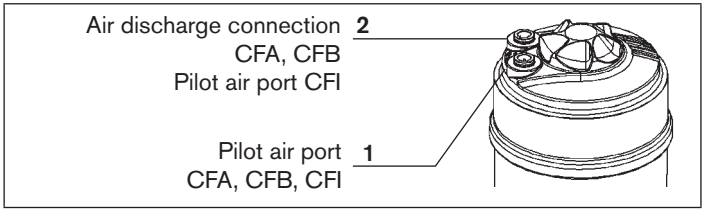


Fig. 33: Pneumatic connection

Silencer

For the versions with a plug-in connection the silencer for reducing the exhaust air noise is supplied loose.

→ Plug the silencer into the free air discharge connection 2 (see "Fig. 33").

If used in an aggressive environment, we recommend conveying all free pneumatic connections into a neutral atmosphere with the aid of a pneumatic hose.

Control air hose

6/4 mm or 1/4" control air hoses can be used.

Optionally a pilot air port is possible via a G 1/8 thread.

8.8 Start-up

After installing the device, run the teach function. This function presets the control parameters.

Description see operating instructions for the control unit.

8.9 Removal

DANGER!

Risk of injury from discharge of medium and pressure.

It is dangerous to remove a device which is under pressure due to the sudden release of pressure or discharge of medium.

▸ Before removing a device, switch off the pressure and vent the lines.

→ Loosen the pneumatic connection.

→ Remove the device.

9 ELECTRICAL CONTROL UNIT

The valve Type 2100 can be combined with following control units:

- Type 8690 Pneumatic Control Unit (actuator size ∅ 70 - ∅ 130)
- Type 8691 Control head (actuator size ∅ 70 – ∅ 130)
- Type 8695 Control head (actuator size ∅ 50)
- Type 8697 Pneumatic Control Unit (actuator size ∅ 50)

The electrical connection of the pilot valve or the control unit is described in the respective operating instructions for the pilot valve/control unit.

10 MAINTENANCE, CLEANING

DANGER!

Danger – high pressure in the equipment.

- Before loosening the lines and valves, turn off the pressure and vent the lines.

Risk of injury due to electrical shock.

- Before reaching into the system, switch off the power supply and secure to prevent reactivation.
- Observe applicable accident prevention and safety regulations for electrical equipment.

WARNING!

Risk of injury from improper maintenance.

- Maintenance may be performed by authorised technicians only.
- To screw on or unscrew valve body or actuator, use an open-end wrench, never a pipe wrench, and observe tightening torques.

Risk of injury from unintentional activation of the system and an uncontrolled restart.

- Secure system from unintentional activation.
- Following maintenance, ensure a controlled restart.

Risk of injury from moving parts in the device.

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

WARNING!

For control function I – Danger if pilot pressure fails.

For control function I control and resetting occur pneumatically. If the pressure fails, no defined position is reached.

- To ensure a controlled restart, first pressurize the device with pilot pressure, then switch on the medium.

10.1 Maintenance work

Actuator:

The actuator of the angle seat valve is maintenance-free provided it is used according to these operating instructions.

Wearing parts of the angle seat valve:

Parts which are subject to natural wear:

- Seals
- Swivel plate

→ If leaks occur, replace the particular wearing part with an appropriate spare part. (For spare-part sets and installation tools see chapter entitled “12 Replacement parts”).

The replacing of the wearing parts is described in chapter “10.2” and “10.3”.

Visual inspection:

Perform regular visual inspections according to the application conditions:

→ Check media connections for leaks.

→ Check release bore on the tube for leaks.

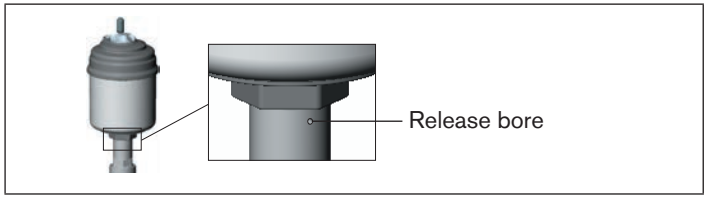


Fig. 34: Release bore

10.1.1 Cleaning

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

NOTE!

Avoid causing damage with cleaning agents.

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

10.2 Replacing the valve set

The valve set consists of

- Swivel plate
- Pin
- Seal

Before the valve set can be replaced, the actuator must be removed from the valve body.

DANGER!

Risk of injury from discharge of medium and pressure.

It is dangerous to remove a device which is under pressure due to the sudden release of pressure or discharge of medium.

- Before removing a device, switch off the pressure and vent the lines.

WARNING!

Risk of injury if the wrong tools are used.

It is dangerous to use unsuitable tools for installation work as the device may be damaged.

- To remove the actuator from the valve body, use an open-end wrench, never a pipe wrench.

10.2.1 Remove the actuator from the valve body

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

NOTE!

Damage to the seat seal or the seat contour.

▸ When removing the actuator, ensure that the valve is open.

→ Control function A pressurize the pilot air port 1 with compressed air (5 bar): valve opens.

→ Using a suitable open-end wrench, place the wrench flat on the tube.

→ Unscrew the actuator from the valve body.

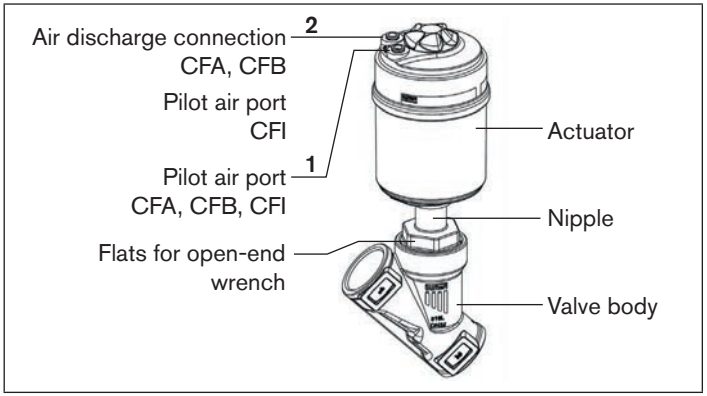


Fig. 35: Designation parts

10.2.2 Replacing valve set

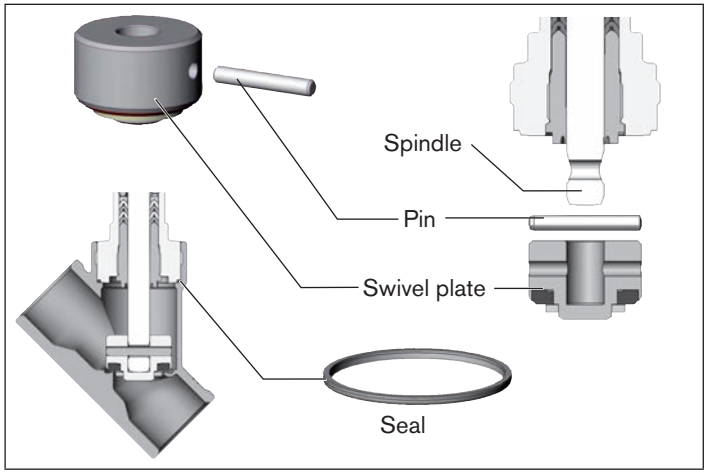


Fig. 36: Valve set

→ Support swivel plate on the cylindrical part with the aid of a prism or something similar.

→ Knock out the pin with a suitable pin punch.
Pin punch ø 3 mm, for spindle diameter 10 mm on the swivel plate.
Pin punch ø 5 mm, for spindle diameter 14 mm on the swivel plate.

→ Remove swivel plate.

→ Connect new swivel plate to the spindle.

→ Align bores of the swivel plate and spindle.

→ Support swivel plate on the cylindrical part with the aid of a prism or something similar.

→ Insert pin into the bore.

→ Swage pin bores on both sides of the swivel plate using a chisel or center punch.

10.2.3 Installing the actuator on the valve body

→ Check the seal and if required, replace it.

WARNING!

Danger if incorrect lubricants used.

Unsuitable lubricant may contaminate the medium. In oxygen applications there is a risk of an explosion!

- In specific applications, e.g. oxygen or analysis applications, use appropriately authorised lubricants only.

→ Grease nipple thread before re-installing the actuator (e.g. with Klüber paste UH1 96-402 from Klüber).

NOTE!

Damage to the seat seal or the seat contour.

- When installing the actuator, ensure that the valve is open.

→ Control function A pressurize the pilot air port 1 with compressed air (5 bar): valve opens.

→ Screw actuator into the valve body. Observe tightening torque (see "Tab. 20").

Orifice	Tightening torque [Nm]
15	45±3
20	50±3
25	60±3
32	65±3
40	
50	70±3
65	100±3

Tab. 20: Tightening torques of valve body / nipples

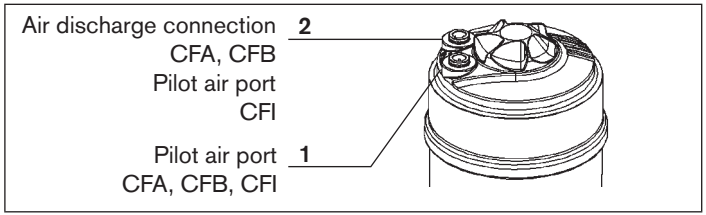


Fig. 37: Pneumatic connections

If the position of the pilot air ports for installation of the hoses is unfavorable, these can be aligned steplessly by rotating the actuator through 360°. The procedure is described in the chapter entitled "8.6 Rotating the actuator".

10.3 Replacing the packing gland

The seal set for the packing gland contains

- 1 support ring
- 7 chevron seals
- 2 pressure rings
- 1 pressure spring
- 1 spindle guide
- Seal
- Lubricant

The packing gland can be changed for the device combination ø 70 / DN50 as of series-production status January 2017.

DANGER!

Risk of injury from discharge of medium and pressure.

It is dangerous to remove a device which is under pressure due to the sudden release of pressure or discharge of medium.

- ▸ Before removing a device, switch off the pressure and vent the lines.

WARNING!

Risk of injury if the wrong tools are used.

- ▸ To remove the actuator from the valve body, use an open-end wrench, never a pipe wrench.
- ▸ To replace the packing gland, use a special installation wrench or a socket wrench.
- ▸ Observe tightening torques.

Before the packing gland can be replaced, the actuator must be removed from the valve body and the swivel plate removed.

10.3.1 Remove the actuator from the valve body

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

NOTE!

Damage to the seat seal or the seat contour

- ▸ When removing the actuator, ensure that the valve is open.

→ Control function A pressurize the pilot air port 1 with compressed air (5 bar): valve opens.

→ Using a suitable open-end wrench, place the wrench flat on the tube.

→ Unscrew the actuator from the valve body.

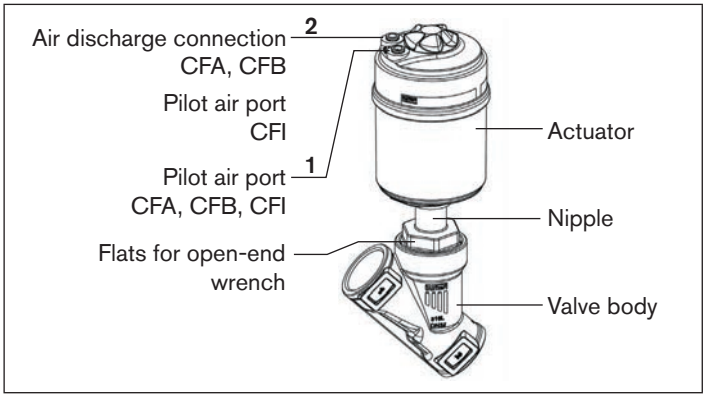


Fig. 38: Designation parts

10.3.2 Removing the swivel plate

→ Knock out the pin with a suitable pin punch.
Pin punch ø 3 mm, for spindle diameter 10 mm on the swivel plate.
Pin punch ø 5 mm, for spindle diameter 14 mm on the swivel plate.

→ Remove swivel plate.

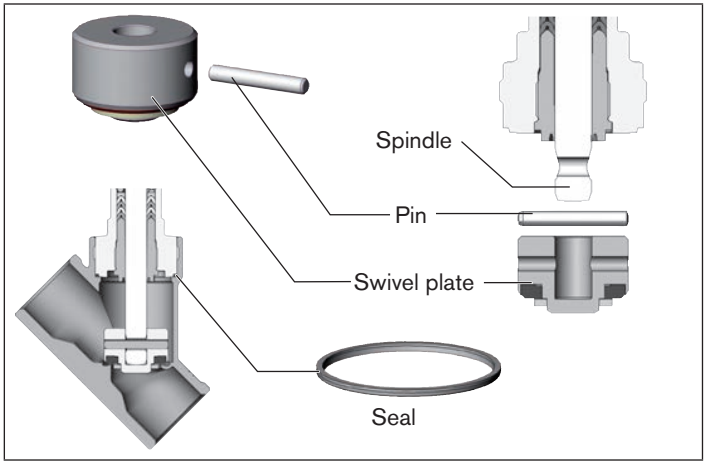


Fig. 39: Valve set

10.3.3 Replacing packing gland

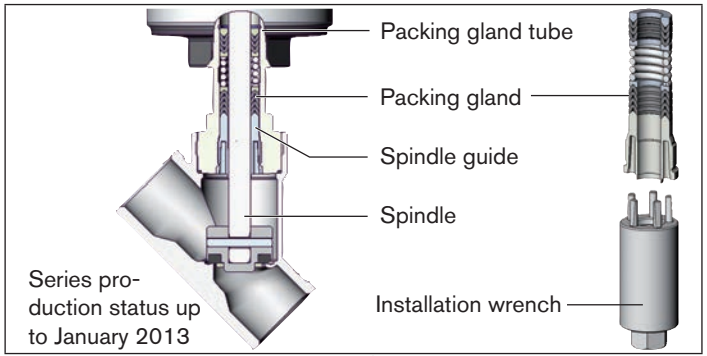


Fig. 40: Replacing packing gland (Series production status up to January 2013)

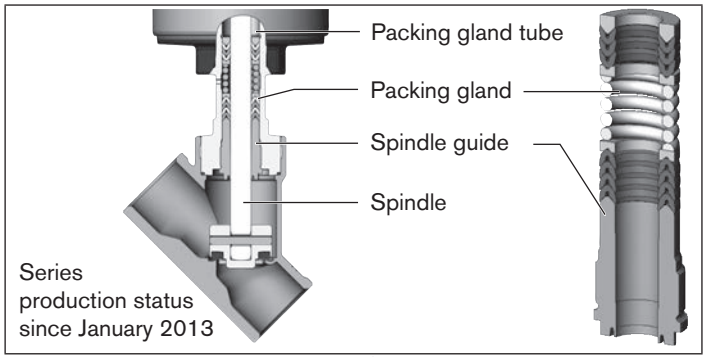


Fig. 41: Replacing packing gland (Series production status since January 2013)

Series production status up to January 2013

→ Unscrew the spindle guide with the aid of the installation wrench[7)] and an open-end wrench.

Series production status since January

→ Unscrew the spindle guide with the aid of a modified socket wrench[7)].

WARNING!

Risk of injury from parts jumping out.

When the spindle opening is exposed, the individual parts of the packing gland are pressed out at an undefined speed when the pilot air ports is pressurized.

- Before pressurizing with control air, safeguard the ambient area of the discharge opening (e.g. place spindle on a firm base).

→ **Control function A and I** Pressurize pilot air port **1** with 6 – 8 bar.

→ **Control function B** Pressurize pilot air port **2** with 6 – 8 bar.

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

→ Connect the individual parts to the spindle in the specified direction and sequence (as illustrated in “Fig. 42”).

7) *The installation wrench or modified socket wrench is available from your Bürkert sales office.*

→ Push packing gland into the packing gland tube.

→ Screw spindle guide back in using the installation tool. Observe torque (see “Tab. 21”)

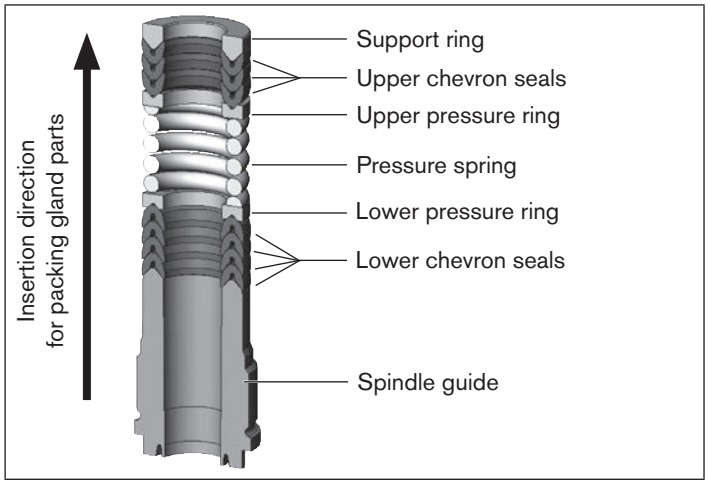


Fig. 42: Seal set for packing gland

Tightening torques of spindle	
Spindle diameter	**Tightening torque [Nm]**
10 mm	6
14 mm	15

Tab. 21: Tightening torques of spindle

10.3.4 Installing swivel plate

→ Connect swivel plate to the spindle.

→ Align bores of the swivel plate and spindle.

→ Support swivel plate on the cylindrical part with the aid of a prism or something similar.

→ Insert pin into the bore.

→ Swage pin bores on both sides of the swivel plate using a chisel or center punch.

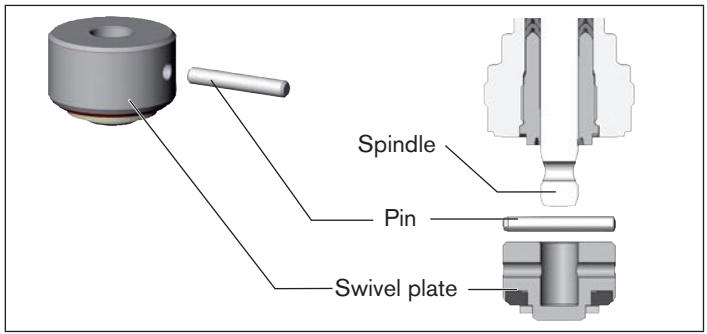


Fig. 43: Swivel plate

10.3.5 Installing the actuator on the valve body

For description see chapter "8.4 Install actuator (welded body)"

11 MALFUNCTIONS

Malfunction	Reason	Remedial action	
Actuator does not switch	Pilot air port interchanged [8)]	CFA (2/2-way valve)	Connecting pilot air port
		CFB	Connecting pilot air port 2
		CFI	Pilot air port 1: Open Pilot air port 2: Close
		CFA (2/3-way valve	Pilot air port 1: Open Pilot air port 2: Centre position
	Pilot pressure too low	See pressure specifications on the type label	
	Medium pressure too high		
	Flow direction reversed	See direction arrow on the body	

Valve is not sealed	Dirt between seal and valve seat	Installing dirt trap
	Seat seal worn	Installing new swivel plate
	Flow direction reversed	See direction arrow on the body
	Medium pressure too high	See pressure specifications on the type label
	Pilot pressure too low	
Valve is leaking on the release bore	Packing gland worn	Renew packing gland or replace actuator

8) *See "8.7 Pneumatic connection".*

12 REPLACEMENT PARTS

CAUTION!

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

Incorrect accessories and unsuitable replacement parts may cause injuries and damage the device and the surrounding area.

- Use only original accessories and original replacement parts from Bürkert.

12.1 Replacement part sets

The following replacement part sets are available for the angle seat valve Type 2100:

- Valve set
  consists of swivel plate with PTFE seal, pin and seal.
- Sealing 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 sealing set).

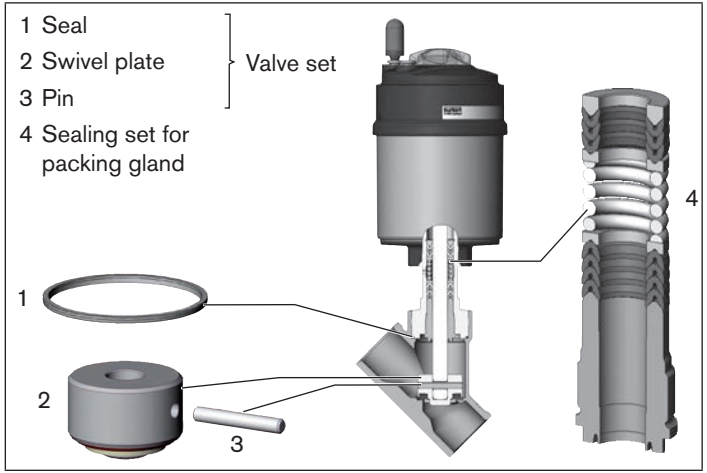


Fig. 44: Replacement parts

Valve set	
Orifice	**Order no.**
15	011 134
20	011 171
25	160 737
32	011 208
40	011 209
50	216 431
50 (Actuator size ø 70)[9)]	307 392
65	241 777

Tab. 22: Valve set with PTFE seal

Sealing set for packing gland			
Spindle ∅	**Orifice**	**Actuator size**	**Order no.**
10	15–50[9)]	∅ 50	216 433
		∅ 70	
14	32–65	∅ 90	216 435
		∅ 130	

Tab. 23: Sealing set for packing gland

9) *As of series-production status January 2017 change also possible for DN50 spindle ø 10*

12.2 Installation tools

Installation wrench for packing gland (Only for removal of packing glands up to January 2013)		
Installation wrench	**Orifice**	**Order no.**
Spindle ∅ 10 mm	15–40	665 700
Spindle ∅ 14 mm	32–65	665 701

Tab. 24: Installation wrench

Modified socket wrench for packing gland (Series production status since January 2013)				
	**Socket wrench**	**Orifice**	**AF**	**Order no.**
	Spindle ∅ 10 mm	15–50[10)]	19	683 221
	Spindle ∅ 14 mm	32–65	21	683 223

Tab. 25: Modified socket wrench

10) As of series-production status January 2017 also for DN50

Special wrench for rotating the actuator (Series-production status until end of 2011)	
Order no.	665 702

Tab. 26: Special wrench

If you have any queries, please contact your Bürkert sales office.

13 PACKAGING, TRANSPORT, STORAGE

NOTE!

Transport damages.

Inadequately protected equipment may be damaged during transport.

- During transportation protect the device against wet and dirt in shock-resistant packaging.
- Avoid exceeding or dropping below the permitted storage temperature.

Incorrect storage may damage the device.

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

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

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

Observe national waste disposal regulations.

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