bürkert
FLUID CONTROL SYSTEMS

Type 2030, 2031, 2031 K, 2032, 2033, 2037

Piston-operated diaphragm valves,
Actuator sizes 40–125 mm, Diameter DN8–DN65

Operating Instructions

MAN 1000010235 ML Version: VStatus: RL (released | freigegeben) printed: 30.09.2019

We reserve the right to make technical changes without notice.
Technische Änderungen vorbehalten.
Sous réserve de modification techniques.

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Operating Instructions 1909/20_EU-EN_00893028 / Original DE

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1 OPERATING INSTRUCTIONS

The operating instructions describe 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.

The operating instructions contain 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 the term “device”

In these instructions, the term “device” always refers to the diaphragm valves of Types 2030, 2031, 2031 K, 2032, 2033 and 2037.

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 medium 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 devices may be dangerous to people, nearby equipment and the environment.

- The diaphragm valves of Types 2030, 2031, 2031 K, 2032, 2033 and 2037 are designed for the control of contaminated, ultra-pure or sterile media, as well as for abrasive or aggressive media (also with higher viscosity).
- The device is designed for the controlled flow of liquid and gaseous media.
- In potentially explosive atmospheres, only use devices that are approved for this purpose. These devices are identified by a separate Ex type label. Before use, note the information on the separate Ex type label and the Ex additional instructions or the separate Ex operating instructions.
- During use observe the authorized data, the operating conditions and conditions of use specified in the contract documents and operating instructions.
- Protect device from damaging environmental influences (e.g. radiation, humidity, steam, etc.). If anything is unclear, consult the relevant sales office.
- 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 make allowance for any

- Contingencies and events which may arise during the installation, operation and maintenance of the devices.
- Local safety regulations – the operator is responsible for observing these regulations, also with reference to the installation personnel.

Risk of injury from high pressure and escaping medium.

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

Danger of bursting from overpressure.

- Observe the specifications on the type label for maximal control and medium pressure.
- Observe permitted medium temperature.

Risk of injury from electric shock (when electrical component installed).

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

Risk of injury from moving parts in the device!

- Do not reach into openings.

Danger due to loud noises.

- Depending on the operating conditions, the device may generate loud noises. More detailed information on the likelihood of loud noises is available from the relevant sales office.
- Wear hearing protection when in the vicinity of the device.

Risk of burns or fire from hot device surface due to prolonged switch-on time.

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

Leaking medium when the diaphragm is worn.

- Regularly check relief bore for leaking medium.
- If medium is leaking out of the relief bore, change the diaphragm.
- If the media is hazardous, protect the area surrounding the discharge point against dangers.

General hazardous situations.

To prevent injury, ensure:

- That the system cannot be activated unintentionally.
- Only trained technicians may perform installation and maintenance work.
- Perform installation work and maintenance work using suitable tools only.
- Do not transport, install or remove heavy devices without the aid of a second person and using suitable auxiliary equipment.
- After an interruption, ensure that the process is restarted in a controlled manner. Observe sequence!
  1. Apply supply voltage or pneumatic supply.
  2. Charge the device with medium.
- The device may be operated only when in perfect condition and in consideration of the operating instructions.
- Observe the safety regulations specific to the plant for application planning and operation of the device.
- The plant operator is responsible for the safe operation and handling of the plant.
- Observe the general rules of technology.

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 “6 Technical data”.
- Do not make any changes on the device and do not subject it to mechanical stress.
- The exhaust air may be contaminated with lubricants in the actuator.

4 GENERAL INFORMATION

4.1 Contact addresses

Germany

Bürkert Fluid Control Systems
Sales Center
Chr.-Bürkert-Str. 13-17
D-74653 Ingelfingen
Tel. + 49 (0) 7940 - 10 91 111
Fax + 49 (0) 7940 - 10 91 448
E-mail: info@burkert.com

International

Contact addresses can be found on the final pages of the printed operating instructions.

And also on the Internet at: www.burkert.com

4.2 Warranty

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

4.3 Information on the Internet

The operating instructions and data sheets for Types 2030, 2031, 2031 K, 2032, 2033 and 2037 can be found on the Internet at: www.burkert.com

5 SYSTEM DESCRIPTION

5.1 General description

The Types 2030, 2031, 2031 K, 2032, 2033 and 2037 are an externally controlled diaphragm valve with piston drive and diaphragm seal.

The valve is self-draining in the appropriate installation position.

5.2 Intended application area

The diaphragm valve of Type 2030 is designed for the control of contaminated and aggressive media.

The valves of Type 2031, 2031 K, 2032, 2033 and 2037 can be used even for ultra-pure or sterile media with a higher viscosity.

The valves may only control media which do not attack the body and seal materials (see type label). Information on the resistance of materials to the media is available from your Bürkert sales office.

6 TECHNICAL DATA

6.1 Conformity

Type 2030, 2031, 2031 K, 2032, 2033 and 2037 conforms with the EU Directives according to the EU Declaration of Conformity.

6.2 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.

6.3 Type label

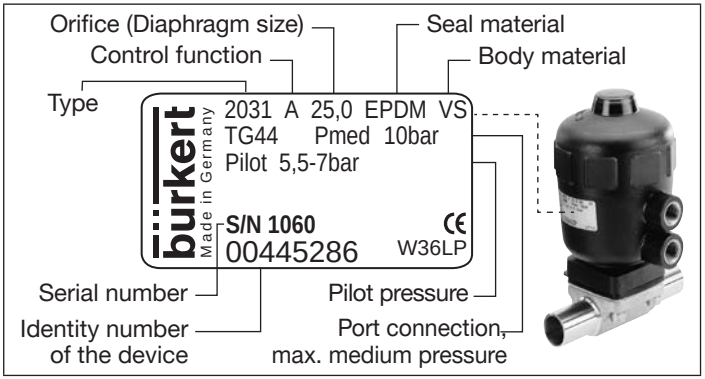


Fig. 1: Position and description of the type label (example)

6.4 Labeling of the forged steel valve body

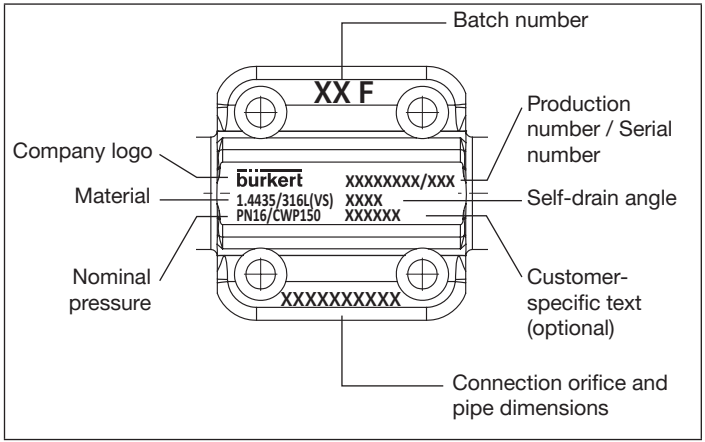


Fig. 2: Labeling of the forged steel valve body

6.5 Labeling of the tube valve body (VP)

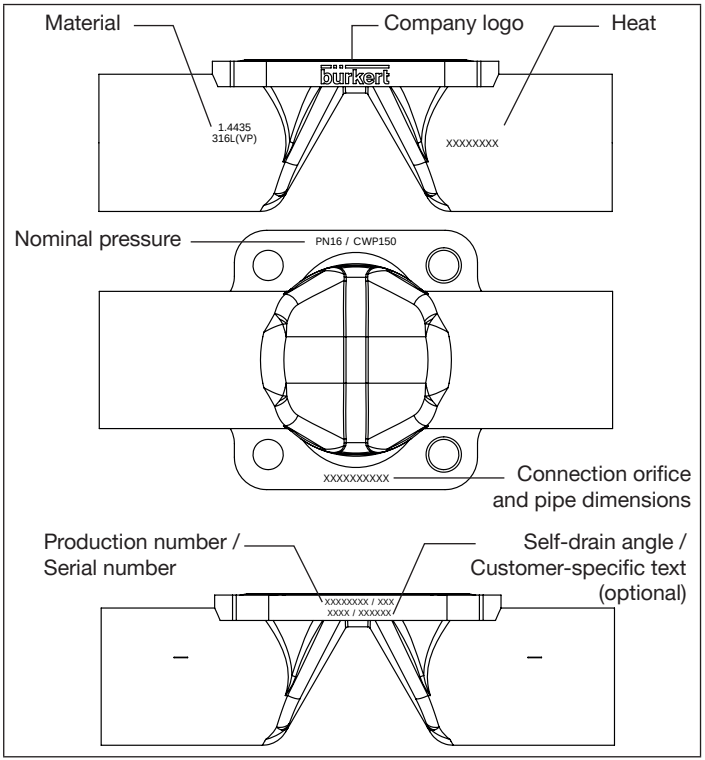


Fig. 3: Labeling of the tube valve body (VP)

6.6 Operating conditions

WARNING!

Risk of injury due to bursting in case of overpressure.

- Do not exceed the maximum pressure range or the permitted temperatures. Observe specifications on the type label.

6.6.1 Allowable temperatures

Ambient temperature for actuators:

Material	Actuator size ø	Temperature
PA	40-125 mm	-10...+60 °C
PPS	40-80 mm	+5...+140 °C
	100 mm, 125 mm	+5...+90 °C (briefly up to +140 °C)

Tab. 1: Ambient temperature for actuators

PPS actuator must be selected for applications with high temperatures (e.g. steam sterilization).

Medium temperature for body:

Body material	Temperature
Stainless steel	-10...+150 °C
PVC (see PT graph)	-10...+60 °C
PVDF (see PT graph)	-10...+120 °C
PP (see PT graph)	-10...+80 °C

Tab. 2: Medium temperature for body

Medium temperature for diaphragms:

The indicated medium temperatures apply only to media which do not corrode or swell the diaphragm materials.

The behavior of the medium with respect to the diaphragm may be changed by the medium temperature.

The function properties, in particular the service life of the diaphragm, may deteriorate if the medium temperature increases.

Do not use the diaphragms as steam shut-off element.

Material	Temperature	Remarks
EPDM (AB)	-10...+130 °C	Steam sterilisation up to +140 °C / 60 min
EPDM (AD)	-10...+143 °C	Steam sterilisation up to +150 °C / 60 min
FKM (FF)	0...+130 °C	No steam / dry heat up to +150 °C / 60 min
PTFE (EA)	-10...+130 °C	Steam sterilisation up to +140 °C / 60 min
Advanced PTFE (EU)	-5...+143 °C	Steam sterilisation up to +150 °C / 60 min
Gylon (ER)	-5...+130 °C	Steam sterilisation up to +140 °C / 60 min

Tab. 3: Medium temperature for diaphragms

6.6.2 Permitted medium pressure

Permitted medium pressure depending on the medium temperature with plastic valve body:

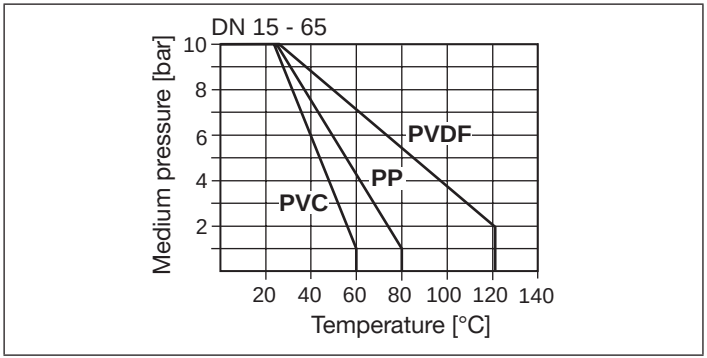


Fig. 4: Graph of medium pressure / Medium temperature with plastic valve body

Maximum permitted medium pressure for control function A

The values apply to valve bodies made of:

- plastic,
- stainless steel: block material, forged, casted and tube valve body.

Orifice DN (Diaph-ragm size)	Actuator size ø [mm]	Max. sealed medium pressure [bar] *)			
		Pressure on one side		Pressure on both sides	
		EPDM/FKM	PTFE	EPDM/FKM	PTFE
8	40	10	10	10	9
15	50	8.5	5	7	3.5
	63	10	10	10	9
20	63	10	5	8	5
	80	10	10	10	10
25	63	3	–	2	–
	80	10	7.5	8.5	5.5
32	100	10	8	9	6
40	100	6.5	6	5	5
	125	10	10	10	9
50	100	4.5	2.5	3.5	2
	125	8	7	7	6
65	125	7	4	4.5	2

Tab. 4: Maximum permitted medium pressure CFA

*) Approximate data, exact values can be found on the type label.

6.6.3 Pilot pressure

WARNING!

Danger of bursting from overpressure.

- Do not exceed the maximum control and medium pressure. Observe specifications on the type label.

NOTE!

Malfunction due to incorrect pilot pressure.

The specifications on the type label apply to valves with reduced spring force (i.e. with lower pilot pressure). If you are unsure, please contact your Bürkert sales office.

Permitted pilot pressure

Actuator size ø [mm]	Actuator material	Min. pilot pressure [bar]	Max. pilot pressure [bar]
40 – 100	PA	2	10
125	PA	2	7
40 – 125	PPS	2	7

Tab. 5: Permitted pilot pressure

Pilot pressure for control function A

The values apply to valve bodies made of:

- plastic,
- stainless steel: block material, forged, casted and tube valve body.

Orifice DN (Diaphragm size)	Actuator size ø [mm]	Pilot pressure [bar] for medium pressure *)	
		0 bar	maximum
8	40	5	4
15	50	5	3.5
	63	5	4
20	63	5.5	4
	80	5	4
25	63	5	4.5
	80	5.5	4.5
32	100	5.5	4
40	100	5.5	4
	125	5.5	4
50	100	5.5	3.5
	125	5.5	3
65	125	5.5	4.5

Tab. 6: Pilot pressure CFA

*) Approximate data, exact values can be found on the type label.

6.6.4 Minimum pilot pressure

Required minimum pilot pressure depending on medium pressure

The values apply to valve bodies made of

- Plastic,
- All models with cast valve body (VG), forged steel valve body (VS) and tube valve body (VP),
- Tube valve body (VA) with socket, DIN welding neck flange and welded connection in accordance with EN ISO 1127 (ISO 4200).

Control function B (CFB)

NOTE!

Important for the service life of the diaphragm!

- Do not select pilot pressure higher than required.

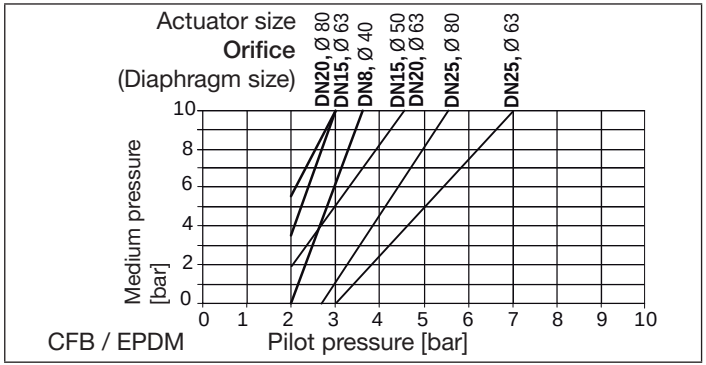


Fig. 5: Control function B, EPDM diaphragm, actuators ø 40 – 80 mm

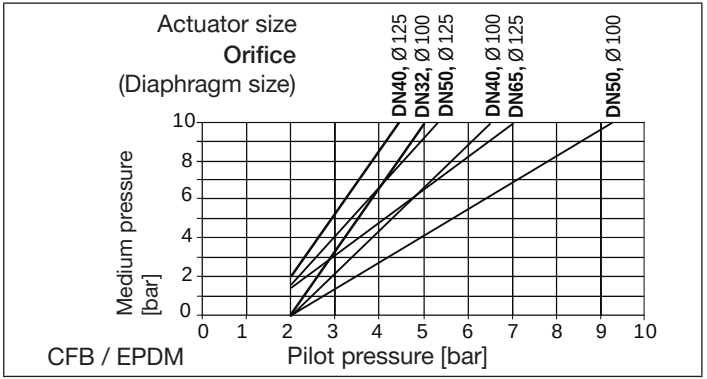


Fig. 6: Control function B, EPDM diaphragm, actuators ø 100 – 125 mm

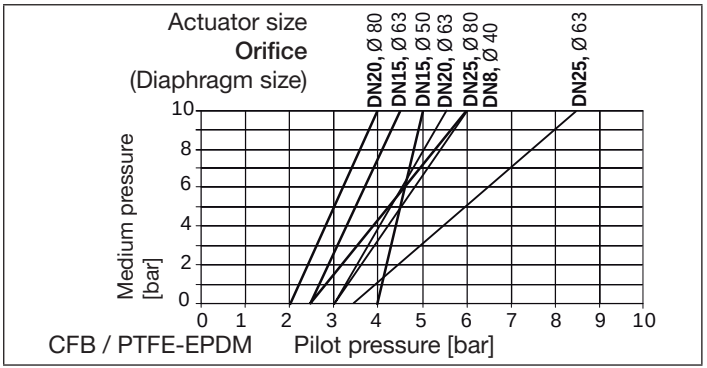


Fig. 7: Control function B, PTFE-EPDM diaphragm, actuators ø 40 – 80 mm

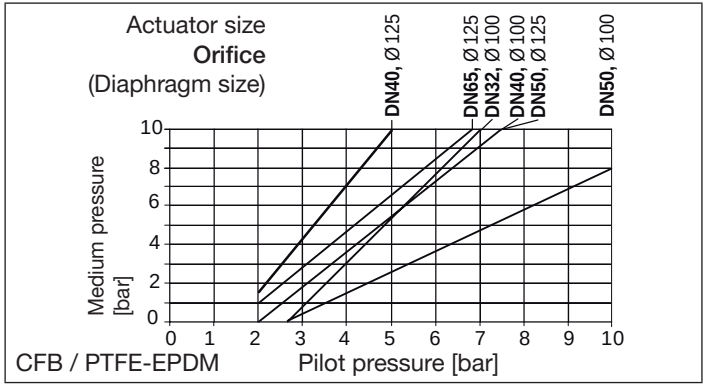


Fig. 8: Control function B, PTFE-EPDM diaphragm, actuators ø 100 – 125 mm

Control function I (CFI)

NOTE!

Important for the service life of the diaphragm.

- Do not select pilot pressure higher than required.

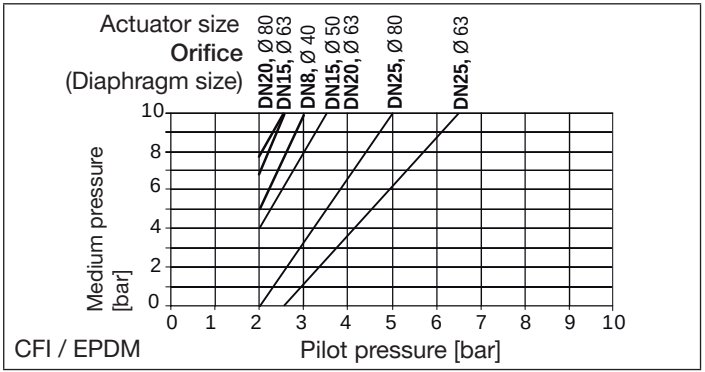


Fig. 9: Control function I, EPDM diaphragm, actuators ø 40 – 80 mm

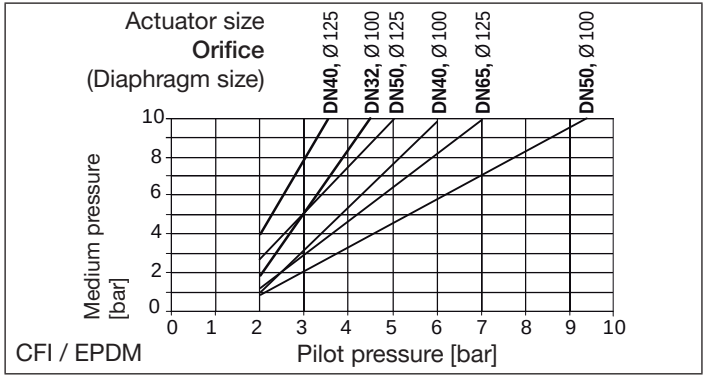


Fig. 10: Control function I, EPDM diaphragm, actuators ø 100 – 125 mm

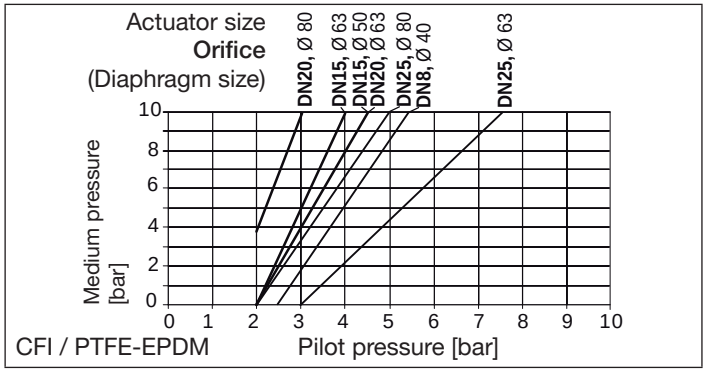


Fig. 11: Control function I, PTFE-EPDM diaphragm, actuators ø 40 – 80 mm

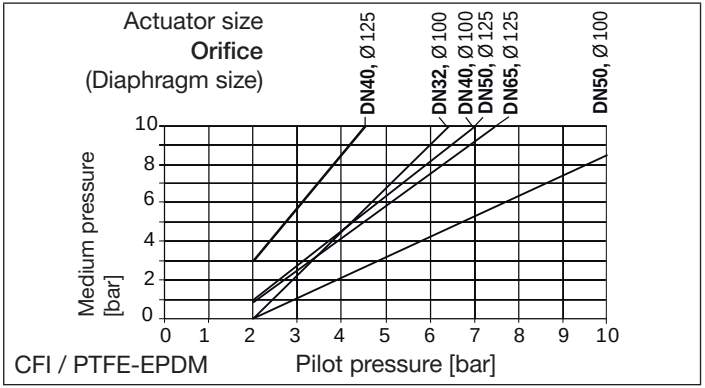


Fig. 12: Control function I, PTFE-EPDM diaphragm, actuators ø 100 – 125 mm

Required minimum pilot pressure depending on medium pressure

The values are valid for

- tube valve body (VA) with welded connection in accordance with DIN 11850 series 2 as well as with OD welded connection, with ANSI and JIS welding neck flange

Control function B (CFB)

NOTE!

Important for the service life of the diaphragm.

- Do not select pilot pressure higher than required.

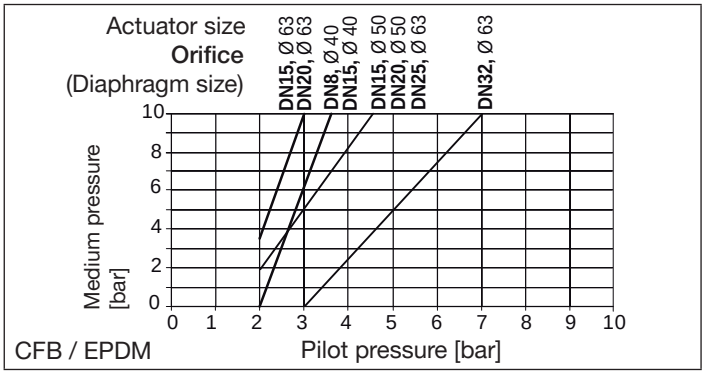


Fig. 13: Control function B, EPDM diaphragm, actuators ø 40 – 63 mm

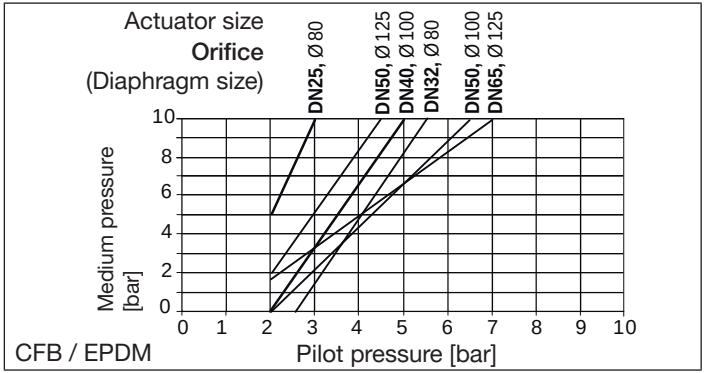


Fig. 14: Control function B, EPDM diaphragm, actuators ø 80 – 125 mm

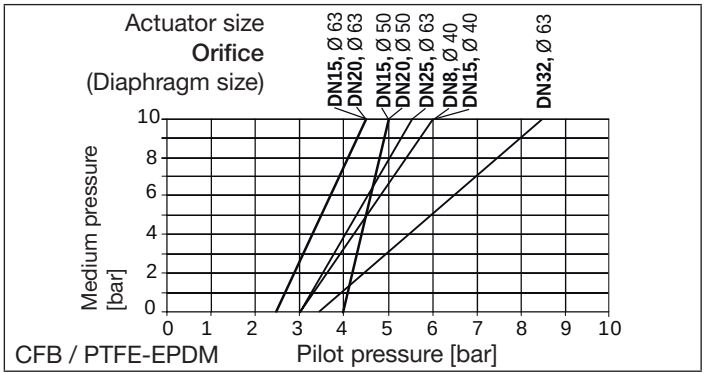


Fig. 15: Control function B, PTFE-EPDM diaphragm, actuators ø 40 – 63 mm

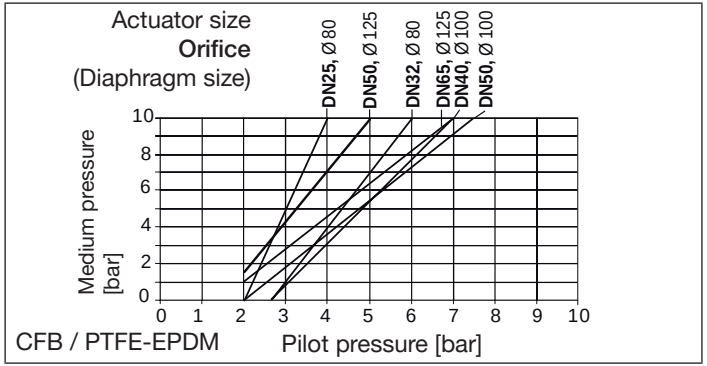


Fig. 16: Control function B, PTFE-EPDM diaphragm, actuators ø 80 – 125 mm

Control function I (CFI)

NOTE!

Important for the service life of the diaphragm.

- Do not select pilot pressure higher than required.

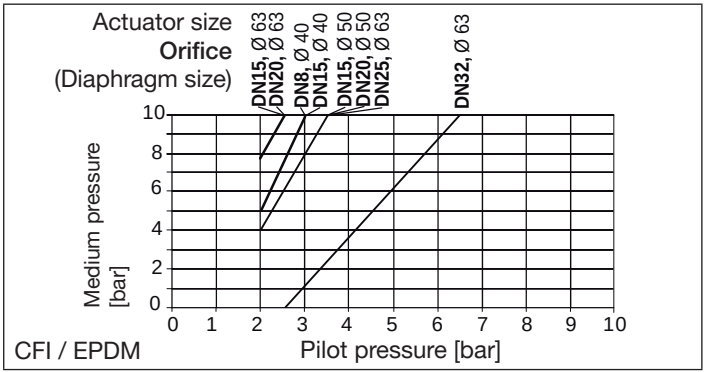


Fig. 17: Control function I, EPDM diaphragm, actuators ø 40 – 63 mm

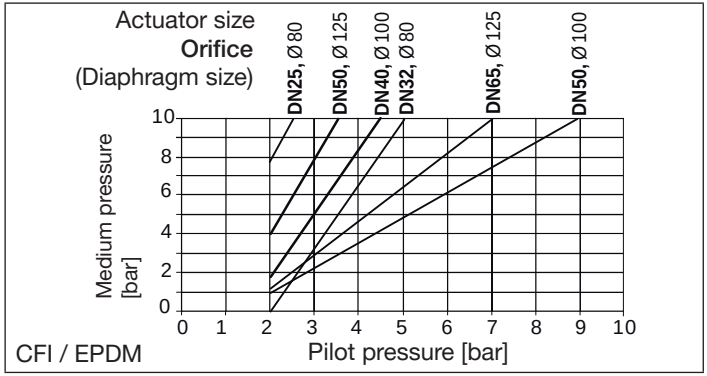


Fig. 18: Control function I, EPDM diaphragm, actuators ø 80 – 125 mm

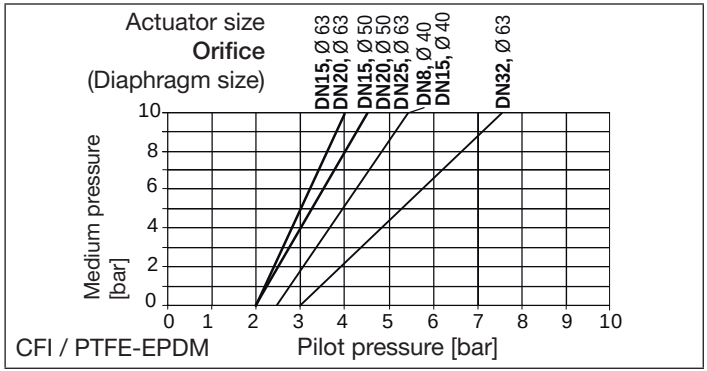


Fig. 19: Control function I, PTFE-EPDM diaphragm, actuators ø 40 – 63 mm

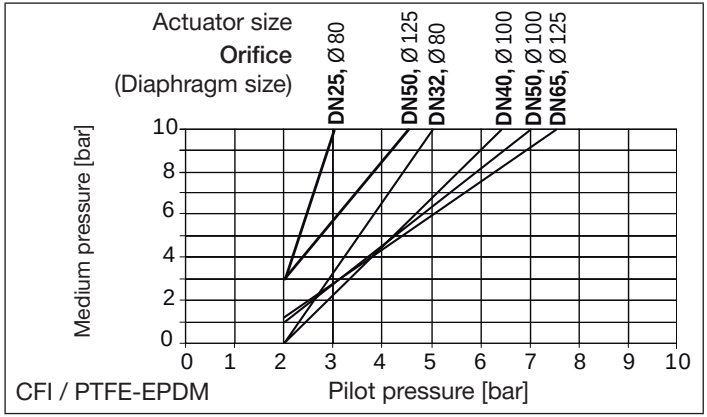


Fig. 20: Control function I, PTFE-EPDM diaphragm, actuators ø 80 – 125 mm

6.7 General technical data

Materials

Body

Type 2030	PP, PVC, PVDF
Type 2031	Stainless steel precision casting (VG), Forged steel (VS) Stainless steel tube valve body (VA, VP)
Type 2032, 2033, 2037	Stainless steel - block material
Actuator	PA, PPS
Sealing elements actuators	FKM, NBR
Diaphragm	EPDM, PTFE, FKM

Connections

Control air connection	G1/8 for actuator sizes ø 40 and 50 G1/4 for actuator sizes ø 63, 80, 100, 125
Medium connection	Welded connection: in accordance with DIN EN 1127 (ISO 4200), DIN 11850 R2, DIN 11866 (ASME-BPE) other connections on request

Media

Control medium	neutral gases, air
Flow media	Type 2030; contaminated and aggressive media Types 2031, 2031 K, 2032, 2033 and 2037; contaminated, aggressive, ultra-pure, sterile media and media with higher viscosity.
Installation position	any position, preferably with the actuator face up Tank bottom valve Type 2033: Actuator to the bottom

6.8 Flow values

6.8.1 Flow values for forged steel valve bodies

Diaph-ragm size	Orifice connec-tion (DN)	Actua-tor size	Seal mate-rial	Kvs values [m³/h] as per standard				
				DIN	ISO	ASME	BS	SMS
8	6	C/40	EPDM	1.1				
			PTFE	1.1				
	8 / 1/4"	C/40	EPDM	1.7	1.5	0.7	0.5	
			PTFE	1.9	2.0	0.7	0.5	
	10 / 3/8"	C/40	EPDM	1.5	1.5	1.6	1.4	
			PTFE	1.9	2.0	1.8	1.6	
	15 / 1/2"	C/40	EPDM			1.5		
			PTFE			1.9		
15	10 / 3/8"	E/63	EPDM	3.5	5.5			
			PTFE	3.4	5.2			
	15 / 1/2"	E/63	EPDM	6.5	6.5	3.1	3.7	
			PTFE	6.0	6.0	3.1	3.6	
	20 / 3/4"	E/63	EPDM			6.5		
			PTFE			6.0		
20	20 / 3/4"	F/80	EPDM	12.4	12.5	8.4	8.9	
			PTFE	12.0	12.0	8.5	8.8	
25	25 / 1"	F/80	EPDM	20.0	18.0	15.5		16.0
			PTFE	17.0	16.0	14.5		14.8
40	32	H/125	EPDM	34.0				
			PTFE	34.0				
	40 / 1 1/2"	H/125	EPDM	40.0	41.0	37.0		38.0
			PTFE	40.0	40.0	37.5		38.0
50	50 / 2"	H/125	EPDM	66.0	66.0	66.0		66.0
			PTFE	66.0	67.0	66.0		66.0
	2 1/2"	H/125	EPDM			66.0		
			PTFE			66.0		

Tab. 7: Kvs values for forged steel valve bodies

6.8.2 Flow values for cast valve bodies and plastic valve bodies

Diaphragm size	Orifice connection (DN)	Seal material	Kvs values [m³/h]	
			Cast valve body VG (all standards)	Plastic valve body (all materials)*
8	8	EPDM	0.95	-
		PTFE	1.5	-
15	15	EPDM	5.6	3
		PTFE	5.3	3
20	20	EPDM	10.7	7
		PTFE	10.5	6.7
25	25	EPDM	14.6	11.4
		PTFE	13.6	10
32	32	EPDM	-	17.5
		PTFE	-	17.1
40	40	EPDM	35.0	24.5
		PTFE	35.0	24.0
50	50	EPDM	47.0	41.5
		PTFE	48.0	41.5

Tab. 8: Kvs values for cast valve bodies and plastic valve bodies

** Plastic valve bodies: measured with bodies ASV*

6.8.3 Flow values for tube valve body

Diaphragm size	Orifice connection (DN)	Actuator size	Seal material	Kvs values [m³/h] as per standard		
				DIN	ISO	ASME
8	8 / 1/4"	C/40	EPDM		1.9	
			PTFE		2.4	
	10 / 3/8"	C/40	EPDM	1.9		
			PTFE	2.4		
	15 / 1/2"	C/40	EPDM			
			PTFE			2.2
15	15 / 1/2"	E/63	EPDM	7.2	7	
			PTFE	6.7	6.6	
	20 / 3/4"	E/63	EPDM	6.9		
			PTFE	5.5		6.5
20	20 / 3/4"	F/80	EPDM		13.5	
			PTFE		12.1	
	25 / 1"	F/80	EPDM	14.9		
			PTFE	13.7		12.7
25	25 / 1"	E/63	EPDM		17.3	
			PTFE		14.1	
	32	E/63	EPDM	18.6		
			PTFE	14.2		
	25 / 1"	F/80	EPDM		19.1	
			PTFE		15.6	
	32	F/80	EPDM	20.0		
			PTFE	15.8		
32	32	G/100	EPDM		36.0	

Diaphragm size	Orifice connection (DN)	Actuator size	Seal material	Kvs values [m³/h] as per standard		
				DIN	ISO	ASME
			PTFE		36.0	
	40 / 1 1/2"	G/100	EPDM	35.0		
			PTFE	34.5		32.0
40	40 / 1 1/2"	H/125	EPDM		48.0	
			PTFE		47.0	
	50 / 2"	H/125	EPDM	46.0		
			PTFE	43.5		45.0
50	50 / 2"	H/125	EPDM		70.0	
			PTFE		70.0	

Tab. 9: Kvs values for tube valve body VP

7 STRUCTURE AND FUNCTION

7.1 Structure

7.1.1 2/2-way valve Type 2030, 2031 and 2031 K

The piston-controlled diaphragm valve consists of a pneumatically actuated piston actuator and a 2/2-way valve body.

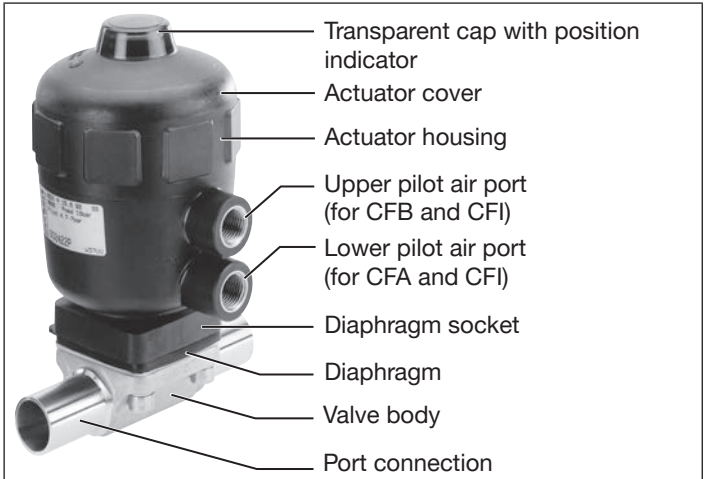


Fig. 21: Structure and description Type 2030, 2031 and 2031 K

7.1.2 T-valve Type 2032

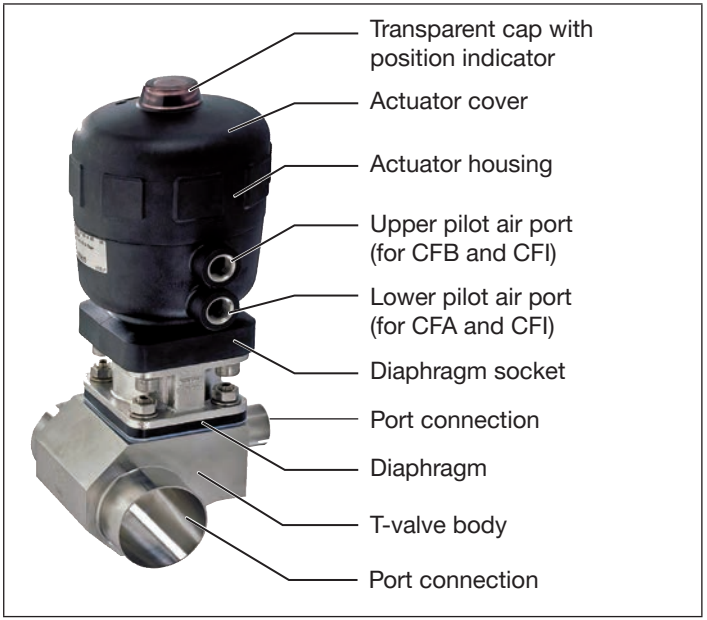


Fig. 22: Structure and description Type 2032

7.1.3 Tank bottom valve Type 2033

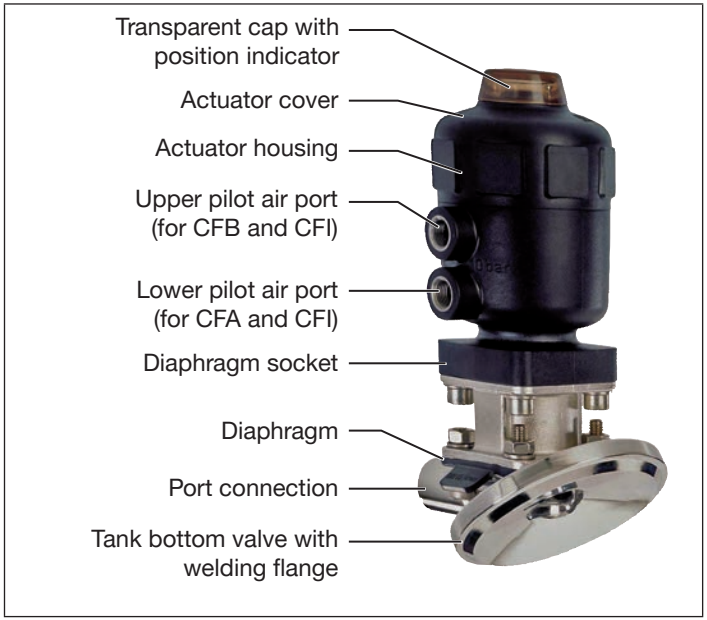


Fig. 23: Structure and description Type 2033

7.1.4 Y-valve Type 2037

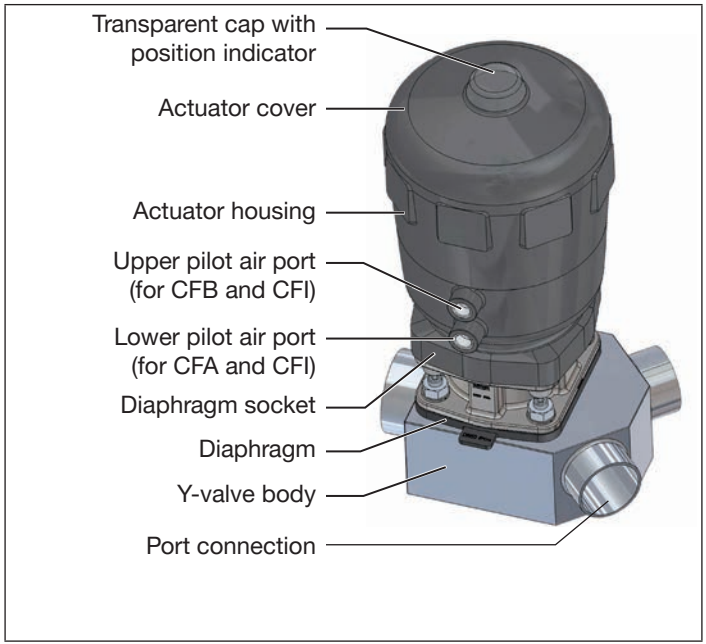


Fig. 24: Structure and description Type 2037

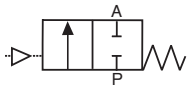
7.2 Function

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

7.2.1 Control functions

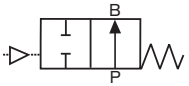
Control function A (CFA)

Closed by spring force in rest position



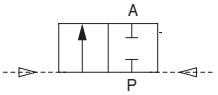
Control function B (CFB)

Opened by spring force in rest position



Control function I (CFI)

Double-acting actuator without spring



8 INSTALLATION

DANGER!

Risk of injury from 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 device or the equipment, 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 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 assembly, ensure a controlled restart.

CAUTION!

Risk of injury due heavy devices!

- During transport or during assembly, a heavy device may fall and cause injury.
- Do not transport, install or remove heavy devices without the aid of a second person and using suitable auxiliary equipment.
- Use appropriate tools.

8.1 Installation position 2/2-way valve

- The piston-controlled diaphragm valve can be installed in any installation position, preferably with the actuator face up.

Installation for leakage detection

One of the bores in the diaphragm socket, for monitoring leakage must be at the lowest point.

To ensure self-draining

It is the responsibility of the installer and operator to ensure self-draining.

Self-draining must be considered during the installation:

- Inclination angle of the pipeline.
  Observe an inclination angle of 1°...5° for the pipeline.
- Self-drainage-angle for valve body:

  The self-drainage-angle (α) depends on the valve body size (diaphragm size) and the inner diameter of the port connection (DN).

  The self-drainage angle is specified as a value on forged steel valve bodies (VS) and tube valve bodies (VP). (See “Fig. 2” and “Fig. 3”).

  The marking on the port connection of valve bodies serves as an orientation aid (see “Fig. 25”). The marking must point upwards.

  The actual self-drainage-angle must be set with a suitable measuring tool.

For valve bodies without angle information, you can find the self-drainage-angle on the Internet.
www.Buerkert.com. Type / User Manuals / Additional manual „Angles for self-draining of diaphragm valves“.

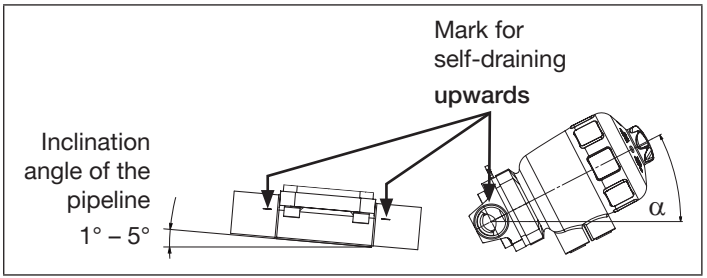


Fig. 25: Installation position for self-draining of the body

If you require clarification, contact your Bürkert sales department.

8.2 Installation position T-valve Type 2032

Installation for leakage detection

One of the bores in the diaphragm socket, for monitoring leakage must be at the lowest point.

For the installation of the T-valves into circular pipelines, we recommend the following installation positions:

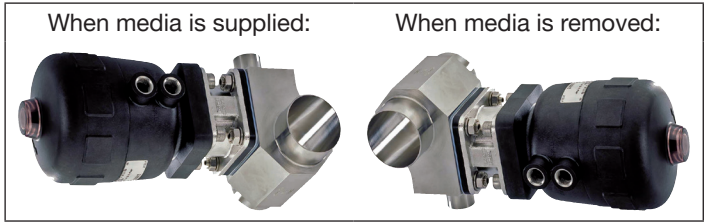


Fig. 26: Installation position Type 2032

8.3 Installation position Y-valve Type 2037

Installation for leakage detection

One of the bores in the diaphragm socket, for monitoring leakage must be at the lowest point.

For the installation of the Y-valves into systems, we recommend the following installation positions:

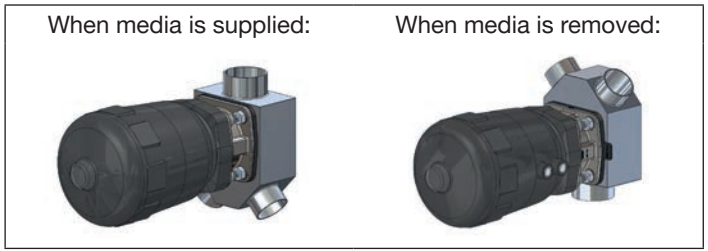


Fig. 27: Installation position Type 2037

8.4 Installation into the pipeline

8.4.1 Preparatory work

→ Clean pipelines (sealing material, swarf, etc.).

→ Support and align pipelines.

8.4.2 Installation requirements

- Ensure that pipelines are in alignment.
- Flow direction as required.

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

8.4.3 Weld or glue the valve body into the pipeline

Before welding or gluing the body, the actuator and the diaphragm must be removed.

The installation is divided into the following steps:

1. Disassemble actuator and diaphragm, see chapter “8.5”.
2. → Weld or glue the valve body into the pipeline.
   → After welding or gluing in the body, smooth the valve body surface by grinding if required.
   → Carefully clean the body.
3. Mount the actuator and diaphragm, see chapter “8.6”.

8.4.4 Welding tank bottom body Type 2033

Recommendation

Observe sequence:

1. Weld the tank bottom body onto the base of the tank before installing the tank. Welding onto a tank which has already been installed is possible but more difficult. Weld the tank bottom body in the middle of the tank base so that the tank can be optimally drained.
2. Weld tank bottom body into the pipeline.

Installation requirements:

Pipelines: Ensure that the pipelines are aligned.

Preparation: Support and align pipelines. To ensure that the pipeline is self-draining, observe an inclination angle of 1°...5°.

DANGER

Risk of injury from high pressure.

- Before working on the system, switch off the pressure and vent or drain lines.

For information on tanks and instructions on welding observe the standard ASME VIII Division I.

Before you start welding, check the batch number indicated on the supplied manufacturer’s certificate 3.1.

Observe the applicable laws and regulations of the respective country with regard to the qualification of welders and the execution of welding work.

1. Welding tank bottom body onto the tank.

NOTE

Before welding, note the following:

- Use only welding material which is suitable for the tank bottom body.
- The tank bottom valve must not collide with any other installation part; the actuator must be easy to install and remove.

2. Welding tank bottom body into the pipeline.

→ Weld in tank bottom body.
⚠ Ensure installation is de-energized and low-vibration.

After welding in the valve body:

Install the diaphragm and the actuator, see chapter “8.6”.

8.5 Removing the actuator and diaphragm from the valve body

8.5.1 Procedure for control function A

→ Pressurize lower pilot air port with compressed air (value as indicated on the type label) (see “Fig. 29”).
This is required to detach the diaphragm without damage from the body.

→ Loosen fastening screws crosswise and remove actuator together with diaphragm from the valve body.

8.5.2 Procedure for control functions B and I

→ Loosen fastening screws crosswise and remove actuator together with diaphragm from the valve body.

8.6 Mounting the actuator and diaphragm on the valve body

WARNING!

Risk of injury due to damaged device or malfunction.

The failure to observe the tightening torque can damage the device or lead to malfunctions.

- Observe the tightening torque (see "Tab. 10: Tightening torques for diaphragms").

8.6.1 Procedure for control function A

→ Pressurize lower pilot air port with compressed air (value as indicated on the type label) (see "Fig. 28").

→ Place actuator on the body.

→ Lightly cross-tighten the body screws until the diaphragm lies between the body and actuator.
Do not tighten the screws yet.

→ Actuate the diaphragm valve twice to position the diaphragm correctly.

→ Tighten body screws without pressurization in diagonal pairs in three stages (approx. 1/3, approx. 2/3, 3/3 of the tightening torque), according to table (see "Tab. 10"). The diaphragm should be positioned and pressed evenly all around the actuator and body.

8.6.2 Procedure for control functions B and I

→ Place actuator on the body.

→ Lightly cross-tighten the body screws without pressurization until the diaphragm lies between the body and actuator.
Do not tighten the screws yet.

→ Pressurize upper pilot air port with compressed air (value as indicated on the type label) (see "Fig. 28").

→ Actuate the diaphragm valve twice.

→ Tighten body screws with pressurization in diagonal pairs in three stages (approx. 1/3, approx. 2/3, 3/3 of the tightening torque), according to Table (see "Tab. 10"). The diaphragm should be positioned and pressed evenly all around the actuator and body.

Orifice DN (Diaphragm size)	Tightening torques for diaphragms [Nm]			
	VS, PP, PVC, PVDF, VG		VA and VP	
	EPDM/ FKM	PTFE/advanced PTFE/laminated PTFE	EPDM/ FKM	PTFE/advanced PTFE/laminated PTFE
8	2	2.5	2.5	2.5
15	3.5	4	3.5	4
20	4	4.5	4	4.5
25	5	6	7	8
32	6	8	8	10
40	8	10	12	15
50	12	15	15	20
65	20	30	20	30

Tab. 10: Tightening torques for diaphragms

→ A tolerance of +10% of the respective tightening torque applies to all values.

8.7 Connection of the control medium

Control function A:

→ Connect control medium to lower connection.

Control function B:

→ Connect control medium to upper connection.

Control function I:

→ Connect control medium to upper and lower connections (see “Fig. 28: Pneumatic Connection”).
Pressure on the upper connection closes the valve.
Pressure on the lower connection opens the valve.

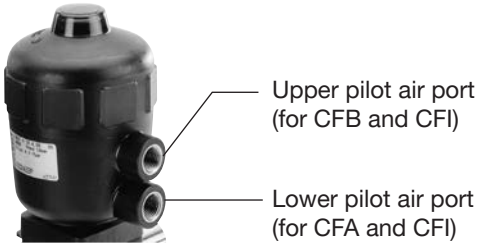


Fig. 28: Pneumatic Connection

8.8 Disassembly

DANGER!

Risk of injury from discharge of medium (acid, alkali, hot media).

It is dangerous to remove the device while under medium and pilot pressure due to the sudden release of pressure or discharge of medium.

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

Replacement of the diaphragm is described in the chapter entitled “10.2 Repairs”.

9 ELECTRICAL CONNECTION

The electrical connection is described in the respective operating instructions for the pilot valve.

Note the voltage and current Type as specified on the type label.
(Voltage tolerance ±10%)!

10 MAINTENANCE

DANGER!

Risk of injury from 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 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 maintenance, ensure a controlled restart.

10.1 Maintenance

10.1.1 Actuator

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

10.1.2 Wearing parts of the diaphragm valve

Parts which are subject to natural wear:

- Seals
- Diaphragm

→ If leaks occur, replace the particular wearing parts with an appropriate spare part (see chapter “12 Spare parts”).

→ Periodic control of the leakage detection bore (see “Fig. 29”)

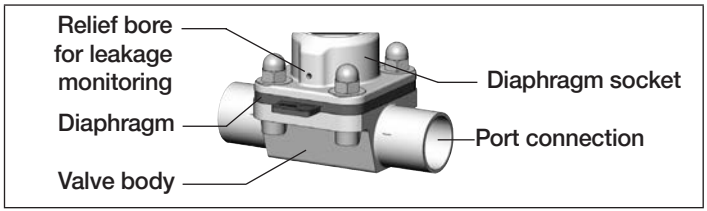


Fig. 29: Relief bore

A bulging PTFE diaphragm may reduce the flow-rate.

10.1.3 Inspection Intervals

The following maintenance work is required for the diaphragm valve:

→ After the first steam sterilization or when required retighten body screws crosswise.

→ After maximum 10^5 switching cycles check the diaphragm for wear.

Muddy and abrasive media require correspondingly shorter inspection intervals!

10.1.4 Service life of the diaphragm

The service life of the diaphragm depends on the following factors:

- Diaphragm material,
- Medium,
- Medium pressure,
- Medium temperature,
- Actuator size,
- Pilot pressure for CFB and CFI.

Protecting the diaphragm

→ For CFA match the actuator size (actuator force) to the medium pressure to be actuated. If required, select the actuator with reduced spring force EC04.

→ For CFB and CFI try and select the pilot pressure not higher than is required to actuate the medium pressure.

10.1.5 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 Repairs

10.2.1 Replacing the diaphragm

DANGER!

Risk of injury due to discharge of medium.

It is dangerous to remove the device under pressure due to the sudden release of pressure or discharge of medium. During reinstallation slackened body screws may cause medium to be discharged.

- Before removing a device, switch off the pressure and vent the lines.
- Completely drain the lines.
- During reinstallation check tightening torque of the body screws.

Fastening types

Orifice DN (Diaphragm size)	Fastening types for diaphragms	
	PTFE	EPDM / FKM / laminated PTFE
8	Diaphragm buttoned	Diaphragm buttoned
15	Diaphragm with bayonet catch	Diaphragm with bayonet catch
20		
25, 32, 40, 50, 65	Diaphragm with bayonet catch	Diaphragm with threaded connection

Tab. 11: Fastening types for diaphragms

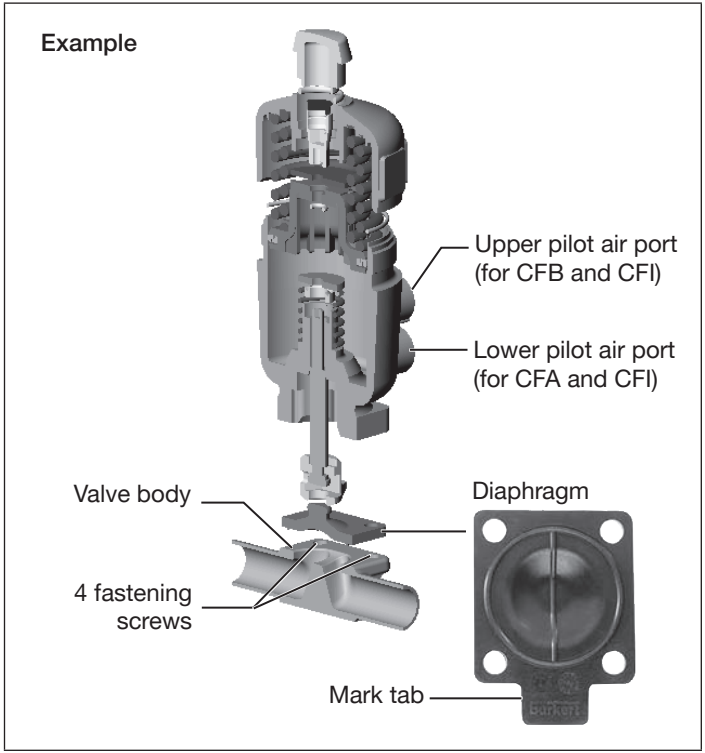


Fig. 30: Replacement of diaphragm

Replacement of the diaphragm for control function A

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

→ Pressurize lower pilot air port with compressed air (value as indicated on the type label). This is required to detach the diaphragm without damage from the body.

→ Loosen fastening screws crosswise and remove actuator together with diaphragm from the body.

→ Unbutton or unscrew the old diaphragm. If attachment is with a bayonet catch, remove the diaphragm by rotating it through 90° (see "Tab. 11"). For orifice DN25-DN50 observe chapter "10.2.2".

→ Install new diaphragm in actuator (see "Tab. 11").

→ Align diaphragm.
Mark tab vertical to the flow direction.

NOTE!

For diaphragms with threated connection:

If the pin is strained, the diaphragm may be damaged.

▸ Screw in the diaphragm hand-tight to begin with. Then, turn it back counterclockwise by half a turn.

→ Place actuator back on the body.

→ Lightly cross-tighten the body screws until the diaphragm lies between the body and actuator.
Do not tighten the screws yet.

→ Actuate the diaphragm valve twice to position the diaphragm correctly.

→ Tighten body screws without pressurization in diagonal pairs in three stages (approx. 1/3, approx. 2/3, 3/3 of the tightening torque), according to Table (see "Tab. 12"). The diaphragm should be positioned and pressed evenly all around the actuator and body.

Replacement of the diaphragm for control functions B and I

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

→ Loosen the fastening screws crosswise and remove actuator together with diaphragm from the body.

→ Unbutton or unscrew old diaphragm. If attachment is with a bayonet catch, remove the diaphragm by rotating it through 90° (see "Tab. 11"). For orifice DN25-DN50 observe chapter "10.2.2".

→ Install new diaphragm in actuator (see "Tab. 11").

→ Align diaphragm.
Mark tab vertical to the flow direction.

NOTE!

For diaphragms with threated connection:

If the pin is strained, the diaphragm may be damaged.

▸ Screw in the diaphragm hand-tight to begin with. Then, turn it back counterclockwise by half a turn.

→ Place actuator back on the body.

→ Lightly cross-tighten the body screws without pressurization until the diaphragm lies between the body and actuator.
Do not tighten the screws yet.

→ Pressurize upper pilot air port with compressed air (value as indicated on the type label) .

→ Actuate the diaphragm valve twice.

→ Tighten body screws with pressurization in diagonal pairs in three stages (approx. 1/3, approx. 2/3, 3/3 of the tightening torque), according to Table (see “Tab. 12”). The diaphragm should be positioned and pressed evenly all around the actuator and body.

Orifice DN (Diaphragm size)	Tightening torques for diaphragms [Nm]			
	VS, PP, PVC, PVDF, VG		VA and VP	
	EPDM/ FKM	PTFE/advanced PTFE/laminated PTFE	EPDM/ FKM	PTFE/advanced PTFE/laminated PTFE
8	2	2.5	2.5	2.5
15	3.5	4	3.5	4
20	4	4.5	4	4.5
25	5	6	7	8
32	6	8	8	10
40	8	10	12	15
50	12	15	15	20
65	20	30	20	30

Tab. 12: Tightening torques for diaphragms

→ A tolerance of +10% of the respective tightening torque applies to all values.

10.2.2 Switch between PTFE and EPDM diaphragms

Orifice DN8:

→ Detach PTFE diaphragm and attach new EPDM diaphragm.

Orifice DN15 and DN20:

→ Loosen PTFE diaphragm bayonet and attach new EPDM diaphragm.

Orifice DN25 up to DN50:

→ Loosen PTFE diaphragm bayonet.

→ Place the insert in the pressure piece.

→ Insert and screw in EPDM diaphragm.

NOTE!

For diaphragms with threated connection:

If the pin is strained, the diaphragm may be damaged.

▸ Screw in the diaphragm hand-tight to begin with. Then, turn it back counterclockwise by half a turn.

11 MALFUNCTIONS

Malfunction	Cause / Remedial action
Actuator does not switch	Pilot air port interchanged * CFA → Connect lower pilot air port CFB → Connect upper pilot air port CFI → Upper pilot air port: Close Lower pilot air port: Open * *see* "Fig. 28: Pneumatic Connection"
	Pilot pressure too low → See pressure specifications on the type label
	Medium pressure too high → See pressure specifications on the type label
Valve is not sealed	Medium pressure too high → See pressure specifications on the type label
	Pilot pressure too low → See pressure specifications on the type label
Flow rate reduced	PTFE diaphragm bulging → Replace diaphragm

12 SPARE PARTS

WARNING!

Risk of injury when opening the actuator housing.

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

- ▸ Carefully open the actuator housing and hold it in such a way that any parts which jump out cannot injure anyone or damage anything.

CAUTION!

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

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

- ▸ Use only original accessories and original spare parts from Bürkert.

Types 2030, 2031, 2031 K, 2032 and 2033 are available as spare parts for the piston-controlled diaphragm valves.

- Seal set,
- Diaphragm.

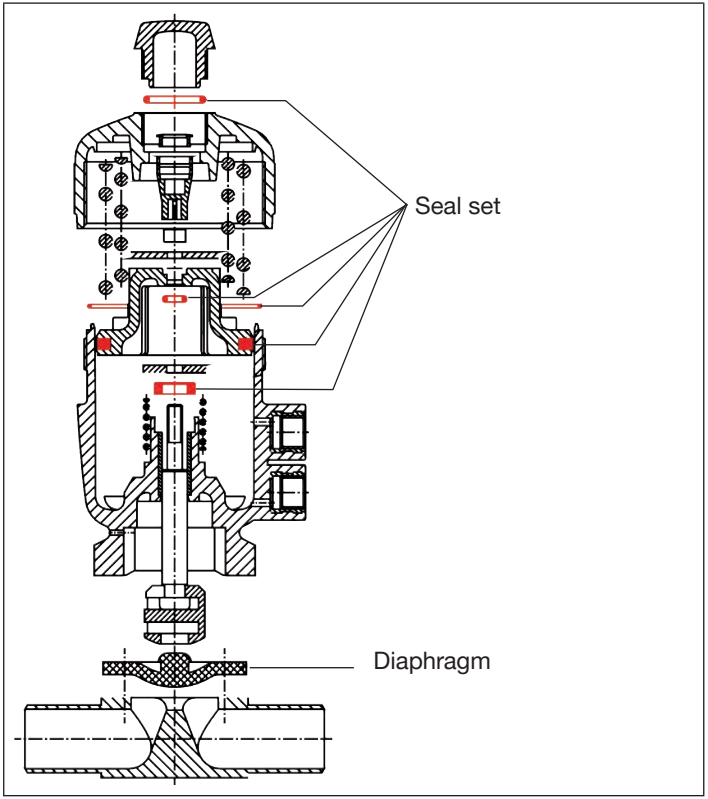


Fig. 31: Spare parts

12.1 Order table for seal sets

Actuator	Orifice DN (Diaphragm size)	Order numbers for seal sets	
		PPS actuator	PA actuator
C	8	011 465	–
D	15	011 477	011 426
E	15, 20	011 488	011 440
F	20, 25	011 492	011 448
G	32, 40	012 127	012 125
H	40, 50, 65	011 494	011 464

Tab. 13: Order numbers for seal sets

12.2 Order tables for diaphragm

Orifice DN (Diaphragm size)	Order numbers for diaphragms					
	EPDM (AB*)		EPDM (AD*)		FKM (FF*)	
8	677 663	E02**	688 421	E03/E04**	677 684	F01**
15	677 664	E02**	688 422	E03/E04**	677 685	F01**
15 BC**	693 162	E02**	693 163	E03/E04**	693 164	F01**
20	677 665	E02**	688 423	E03/E04**	677 686	F01**
20 BC**	693 165	E02**	693 166	E03/E04**	693 167	F01**
25	677 667	E01**	688 424	E03/E04**	677 687	F01**
32	677 668	E01**	688 425	E03/E04**	677 688	F01**
40	677 669	E01**	688 426	E03/E04**	677 689	F01**
50	677 670	E01**	688 427	E03/E04**	677 690	F01**
65	677 671	E01**	688 428	E03/E04**	677 691	F01**

Tab. 14: Order numbers for diaphragms (EPDM, FKM)

Orifice DN (Diaphragm size)	Order numbers for diaphragms					
	PTFE (EA*)		Advanced PTFE (EU*)		Laminated Gylon (ER*)	
8	677 674	L04/L10**	679 540	L05/L09**	693 175	L06/L08**
15	677 675	E02/E04-PTFE**	679 541	E02/E04-PTFE+Hole**	693 176	L06/L08**
20	677 676	E02/E04-PTFE**	679 542	E02/E04-PTFE+Hole**	693 177	L06/L08**
25	677 677	E02/E04-PTFE**	679 543	E02/E04-PTFE+Hole**	693 178	L06/L08**
32	677 678	E02/E04-PTFE**	679 544	E02/E04-PTFE+Hole**	693 179	L06/L08**
40	584 378	E02/E04-PTFE**	584 379	E02/E04-PTFE+Hole**	693 180	L06/L08**
50	584 386	E02/E04-PTFE**	584 387	E02/E04-PTFE+Hole**	693 181	L06/L08**
65	677 681	E02/E04-PTFE**	679 743	E02/E04-PTFE+Hole**	586 616	L08**

Tab. 15: Order numbers for diaphragms (PTFE, Gylon)

* *SAP Code*

** *Identification on the diaphragm*

The data sheet and further information for the Type can be found on the Internet at: www.burkert.com.

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

13 TRANSPORT, STORAGE, DISPOSAL

NOTE!

Transport damages.

Inadequately protected equipment may be damaged during transport.

- During transportation protect the device against wet and dirt in shock-resistant packaging.
- Observe permitted storage temperature.
- Protect pneumatic connections from damage with protective caps.

Incorrect storage may damage the device.

- For prolonged storage, slacken the body screws to prevent the diaphragm from becoming distorted.
- Identify slackened screws for reasons of safety.
- Store the device in a dry and dust-free location.
- Storage temperature. -40...+55 °C.

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

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

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