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

Piston-operated diaphragm valves,
Actuator sizes 40–125 mm, Diameter DN8–DN65
Kolbengesteuerte Membranventile,
Antriebsgrößen 40–125 mm, Nennweiten DN8–DN65
Vannes à membrane, commandé par piston Tailles de mécanisme 40–125 mm, Piston section nominale DN8–DN65
## OPERATING INSTRUCTIONS

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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).
- In the potentially explosion-risk area the device 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.
- During use observe the authorized data, the operating conditions and conditions of use specified in the contract documents and operating instructions.
- 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.

⚠️ Danger – high pressure.

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

⚠️ Risk of burns and risk of fire if used continuously through hot device surface.

- Keep the device away from highly flammable substances and media and do not touch with bare hands.
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

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:

▶ The devices may be used only for 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 or on the Internet at www.burkert.com.
▶ Do not put any loads on the body (e.g. by placing objects on it or standing on it).
▶ Do not make any external modifications to the device bodies. Do not paint the body parts or screws.
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 bodies

**Fig. 2:** Labeling of the forged bodies

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:

<table>
<thead>
<tr>
<th>Material</th>
<th>Size ø</th>
<th>Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>PA</td>
<td>40-125 mm</td>
<td>-10...+60 °C</td>
</tr>
<tr>
<td></td>
<td>40-80 mm</td>
<td>+5...+140 °C</td>
</tr>
<tr>
<td>PPS</td>
<td>100 mm,</td>
<td>+5...+90 °C</td>
</tr>
<tr>
<td></td>
<td>125 mm</td>
<td>(briefly up to +140 °C)</td>
</tr>
</tbody>
</table>

Tab. 1: Ambient temperature for actuators

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

#### Medium temperature for body:

<table>
<thead>
<tr>
<th>Body material</th>
<th>Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless steel</td>
<td>-10...+150 °C</td>
</tr>
<tr>
<td>PVC (see PT graph)</td>
<td>-10...+60 °C</td>
</tr>
<tr>
<td>PVDF (see PT graph)</td>
<td>-10...+120 °C</td>
</tr>
<tr>
<td>PP (see PT graph)</td>
<td>-10...+80 °C</td>
</tr>
</tbody>
</table>

Tab. 2: Medium temperature for body

#### Material 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.

<table>
<thead>
<tr>
<th>Material</th>
<th>Temperature</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPDM (AB)</td>
<td>-10...+130 °C</td>
<td>Steam sterilisation up to +140 °C / 60 min</td>
</tr>
<tr>
<td>EPDM (AD)</td>
<td>-5...+143 °C</td>
<td>Steam sterilisation up to +150 °C / 60 min</td>
</tr>
<tr>
<td>FKM (FF)</td>
<td>0...+130 °C</td>
<td>No steam / dry heat up to +150 °C / 60 min</td>
</tr>
<tr>
<td>PTFE (EA)</td>
<td>-10...+130 °C</td>
<td>Steam sterilisation up to +140 °C / 60 min</td>
</tr>
<tr>
<td>Advanced PTFE (EU)</td>
<td>-5...+143 °C</td>
<td>Steam sterilisation up to +150 °C / 60 min</td>
</tr>
<tr>
<td>Advanced PTFE (ET)</td>
<td>-10...+90 °C</td>
<td>-</td>
</tr>
<tr>
<td>Gylon (ER)</td>
<td>-5...+130 °C</td>
<td>Steam sterilisation up to +140 °C / 60 min</td>
</tr>
</tbody>
</table>

Tab. 3: Medium temperature for diaphragms
6.6.2 Permitted medium pressure

Permitted medium pressure depending on the medium temperature.
Plastic body:

![Graph of medium pressure / Medium temperature]

**Fig. 4:** Graph of medium pressure / Medium temperature

Maximum permitted medium pressure for control function A

The values apply to body made of:
- plastic,
- stainless steel: block material, forged, casted and tube valve body.

<table>
<thead>
<tr>
<th>Diaphragm size DN [mm]</th>
<th>Actuator size $\varnothing$ [mm]</th>
<th>Max. sealed medium pressure [bar] $^*)$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Pressure on one side</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EPDM / FKM</td>
</tr>
<tr>
<td>8</td>
<td>40</td>
<td>10</td>
</tr>
<tr>
<td>15</td>
<td>50</td>
<td>8.5</td>
</tr>
<tr>
<td></td>
<td>63</td>
<td>10</td>
</tr>
<tr>
<td>20</td>
<td>63</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>80</td>
<td>10</td>
</tr>
<tr>
<td>25</td>
<td>63</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>80</td>
<td>10</td>
</tr>
<tr>
<td>32</td>
<td>100</td>
<td>10</td>
</tr>
<tr>
<td>40</td>
<td>100</td>
<td>6.5</td>
</tr>
<tr>
<td></td>
<td>125</td>
<td>10</td>
</tr>
<tr>
<td>50</td>
<td>100</td>
<td>4.5</td>
</tr>
<tr>
<td></td>
<td>125</td>
<td>8</td>
</tr>
<tr>
<td>65</td>
<td>125</td>
<td>7</td>
</tr>
</tbody>
</table>

**Tab. 4:** Maximum permitted medium pressure CFA

$^*)$ Approximate data, exact values can be found on the type label.
6.6.3 Control pressure

**WARNING!**

Danger of bursting from overpressure.

If the device explodes, there is a risk of serious injury, chemical burns, scalding.

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

**NOTE!**

Malfunction due to incorrect control pressure.

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

Permitted control pressure

<table>
<thead>
<tr>
<th>Actuator size ø mm</th>
<th>Actuator material</th>
<th>Min. control pressure [bar]</th>
<th>Max. control pressure [bar]</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 – 100</td>
<td>PA</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>125</td>
<td>PA</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>40 – 125</td>
<td>PPS</td>
<td>2</td>
<td>7</td>
</tr>
</tbody>
</table>

Tab. 5: Permitted control pressure

Control pressure for control function A

The values apply to body made of:
- plastic,
- stainless steel: block material, forged, casted and tube valve body.

<table>
<thead>
<tr>
<th>Diaphragm size DN [mm]</th>
<th>Actuator size [mm]</th>
<th>Control pressure [bar] for medium pressure *)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>0 bar</td>
</tr>
<tr>
<td>8</td>
<td>40</td>
<td>5</td>
</tr>
<tr>
<td>15</td>
<td>50</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>63</td>
<td>5</td>
</tr>
<tr>
<td>20</td>
<td>63</td>
<td>5.5</td>
</tr>
<tr>
<td></td>
<td>80</td>
<td>5</td>
</tr>
<tr>
<td>25</td>
<td>63</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>80</td>
<td>5.5</td>
</tr>
<tr>
<td>32</td>
<td>100</td>
<td>5.5</td>
</tr>
<tr>
<td>40</td>
<td>100</td>
<td>5.5</td>
</tr>
<tr>
<td></td>
<td>125</td>
<td>5.5</td>
</tr>
<tr>
<td>50</td>
<td>100</td>
<td>5.5</td>
</tr>
<tr>
<td></td>
<td>125</td>
<td>5.5</td>
</tr>
<tr>
<td>65</td>
<td>125</td>
<td>5.5</td>
</tr>
</tbody>
</table>

Tab. 6: Control pressure CFA

*) Approximate data, exact values can be found on the type label.
6.6.4 Minimum control pressure

Required minimum control pressure depending on medium pressure

The values apply to body made of

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

Control function B (CFB)

NOTE!

Important for the service life of the diaphragm!

- Do not select control pressure higher than required.

---

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

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

Fig. 7: Control function B, PTFE elastomer diaphragm, actuators ø 40 – 80 mm
Control function I (CFI)

**NOTE!**

- Important for the service life of the diaphragm.
- Do not select control pressure higher than required.

---

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

**Fig. 9:** Control function I, elastomer diaphragm, actuators ø 40 – 80 mm
Fig. 10: Control function I, elastomer diaphragm, actuators ø 100 – 125 mm

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

Fig. 12: Control function I, PTFE EPDM diaphragm, actuators ø 100 – 125 mm
Required minimum control pressure depending on medium pressure

The values are valid for
- tube valve body (VA) with weld-on ends in accordance with DIN 11850 series 2 as well as with OD weld-on ends, with ANSI and JIS welding neck flange

Control function B (CFB)

**NOTE!**

**Important for the service life of the diaphragm.**
- Do not select control 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
Control function I (CFI)

**NOTE!**

Important for the service life of the diaphragm.
- Do not select control pressure higher than required.

---

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

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

---

**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
Connections
Control air connection  
- G1/8 for actuator sizes ø 40 and 50
- G1/4 for actuator sizes ø 80, 100, 125

Medium connection  
- Welded connection: in accordance with DIN EN 1127 (ISO 4200), DIN 11850 R2, DIN 11866 (ASME-BPE 2055)
- 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 bodies

<table>
<thead>
<tr>
<th>Diaphragm size</th>
<th>Orifice connection (DN)</th>
<th>Actuator size</th>
<th>Seal material</th>
<th>DIN</th>
<th>ISO</th>
<th>ASME</th>
<th>BS</th>
<th>SMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>6</td>
<td>C/40</td>
<td>EPDM</td>
<td>1.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PTFE</td>
<td>1.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 / 1/4&quot;</td>
<td>C/40</td>
<td>EPDM</td>
<td>1.7</td>
<td>1.5</td>
<td>0.7</td>
<td>0.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PTFE</td>
<td>1.9</td>
<td>2.0</td>
<td>0.7</td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td>10 / 3/8&quot;</td>
<td>C/40</td>
<td>EPDM</td>
<td>1.5</td>
<td>1.5</td>
<td>1.6</td>
<td>1.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PTFE</td>
<td>1.9</td>
<td>2.0</td>
<td>1.8</td>
<td>1.6</td>
<td></td>
</tr>
<tr>
<td>15 / 1/2&quot;</td>
<td>C/40</td>
<td>EPDM</td>
<td>1.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.9</td>
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<td></td>
<td></td>
<td>PTFE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>10 / 3/8&quot;</td>
<td>E/63</td>
<td>EPDM</td>
<td>3.5</td>
<td>5.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PTFE</td>
<td>3.4</td>
<td>5.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 / 1/2&quot;</td>
<td>E/63</td>
<td>EPDM</td>
<td>6.5</td>
<td>6.5</td>
<td>3.1</td>
<td>3.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PTFE</td>
<td>6.0</td>
<td>6.0</td>
<td>3.1</td>
<td>3.6</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>20 / 3/4&quot;</td>
<td>E/63</td>
<td>EPDM</td>
<td>12.4</td>
<td>12.5</td>
<td>8.4</td>
<td>8.9</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>PTFE</td>
<td>12.0</td>
<td>12.0</td>
<td>8.5</td>
<td>8.8</td>
<td></td>
</tr>
</tbody>
</table>
### Technical data

#### 6.8.2 Flow values for cast bodies and plastic bodies

<table>
<thead>
<tr>
<th>Diaphragm size</th>
<th>Orifice connection (DN)</th>
<th>Seal material</th>
<th>Cast body VG (all standards)</th>
<th>Plastic body (all materials)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>8</td>
<td>EPDM</td>
<td>0.95</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PTFE</td>
<td>1.5</td>
<td>-</td>
</tr>
<tr>
<td>15</td>
<td>15</td>
<td>EPDM</td>
<td>5.6</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PTFE</td>
<td>5.3</td>
<td>3</td>
</tr>
<tr>
<td>20</td>
<td>20</td>
<td>EPDM</td>
<td>10.7</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PTFE</td>
<td>10.5</td>
<td>6.7</td>
</tr>
<tr>
<td>25</td>
<td>25</td>
<td>EPDM</td>
<td>14.6</td>
<td>11.4</td>
</tr>
<tr>
<td></td>
<td></td>
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* Plastic bodies: measured with bodies ASV

---

Tab. 7: Kvs values for forged bodies

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<th>25 / 1”</th>
<th>F/80</th>
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<td>EPDM</td>
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<td>37.0</td>
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Tab. 8: Kvs values for cast bodies and plastic bodies
### 6.8.3 Flow values for tube valve body

#### Kvs values $[m^3/h]$ for tube valve body VP (IHU2) TVB3G

<table>
<thead>
<tr>
<th>Diaphragm size</th>
<th>Orifice connection (DN)</th>
<th>Actuator size</th>
<th>Seal material</th>
<th>DIN</th>
<th>ISO</th>
<th>ASME</th>
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<td>8 / 1/4&quot;</td>
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<tr>
<td>10 / 3/8&quot;</td>
<td>C/40</td>
<td>EPDM</td>
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<td></td>
<td>PTFE</td>
<td>2.4</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>15 / 1/2&quot;</td>
<td>C/40</td>
<td>EPDM</td>
<td></td>
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</tr>
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<td></td>
<td></td>
<td></td>
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<td>15 / 1/2&quot;</td>
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<td></td>
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<td>12.7</td>
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<td>25 / 1&quot;</td>
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<td>E/63</td>
<td>EPDM</td>
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<tr>
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<td></td>
<td>PTFE</td>
<td>14.2</td>
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#### Tab. 9: Kvs values for tube valve body VP

<table>
<thead>
<tr>
<th>Type</th>
<th>Orifice connection (DN)</th>
<th>Actuator size</th>
<th>Seal material</th>
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<th>ISO</th>
<th>ASME</th>
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<td>PTFE</td>
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</tr>
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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.

![Diagram of 2/2-way valve type 2030, 2031 and 2031 K]

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

7.1.2 T-valve Type 2032

![Diagram of T-valve Type 2032]

**Fig. 22:** Structure and description Type 2032
7.1.3 Tank bottom valve Type 2033

- Transparent cap with position indicator
- Actuator cover
- Actuator body
- Upper control air connection (for CFB and CFI)
- Lower control air connection (for CFA and CFI)
- Diaphragm socket
- Port connection
- Tank bottom valve with welding flange

Fig. 23: Structure and description Type 2033

7.1.4 Y-valve Type 2037

- Transparent cap with position indicator
- Actuator cover
- Actuator body
- Upper control air connection (for CFB and CFI)
- Lower control air connection (for CFA and CFI)
- Diaphragm socket
- Y-valve body
- Port connection

Fig. 24: Structure and description Type 2037
7.2 Function

Spring force (CFA) or pneumatic control 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.

8.1 Before installation

▪ Before connecting the valve, ensure the pipelines are flush.
▪ The flow direction is optional.
8.1.1 Installation position general

Installation for self-drainage of the body

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

Installation for leakage detection

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

8.1.2 Installation position 2/2-way valve

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

To ensure self-drainage:

→ Install body inclined by angle $\alpha = 10^\circ$ to $40^\circ$ to the horizontal (see “Fig. 25: Installation position for self-drainage of the body”).

→ Observe an inclination angle of $1^\circ$ – $5^\circ$. Forged and cast bodies feature a mark which must face upwards (12 o’clock position, see “Fig. 26: Mark for the correct installation position”).

→ One of the bores in the diaphragm socket for monitoring leakage must be at the lowest point.
8.1.3 Installation position T-valve Type 2032

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

<table>
<thead>
<tr>
<th>When media is supplied:</th>
<th>When media is removed:</th>
</tr>
</thead>
</table>

Fig. 27: Installation position type 2032

8.1.4 Installation position Y-valve Type 2037

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

<table>
<thead>
<tr>
<th>When media is supplied:</th>
<th>When media is removed:</th>
</tr>
</thead>
</table>

Fig. 28: Installation position type 2037

8.1.5 Installation of the tank bottom valve Type 2033

For further information on containers and welding instructions, please refer to the standard ASME VIII Division I.

It is recommended to weld the valve prior to the container installation. However, it is possible to weld the valves to ready-assembled containers.

Prior to welding, please check to ensure that:

- The tank bottom valve does not collide with other equipment components and assembly/disassembly of the actuator is always possible.
- A minimal distance between two welding joints three times the thickness of the container wall is adhered to.

It is recommended to weld the valve in the center of the drain to ensure optimum draining of the container.

The diameter of the hole in the container and the flange must be equal. The valve has two welding edges to make welding and positioning of the valve easier. The length of the welding edges is approximately 3 mm. In case the thickness of the container wall exceeds 3 mm, the valve must be positioned as shown in "Fig. 29: Grinding point on tank".

→ Prior to welding the valve, grind the outlet wall.
Prior to commencing the welding process, check the charge number indicated on the supplied manufacturer’s certificate 3.1.

**Procedure:**

→ Position the flange into the hole so that the flange surface is tangent to the drain surface.
→ Tack 4 welding points and check the position of the valve.
→ Weld the valve evenly to the inside and outside of the container, with gas being supplied and using welding material compatible with the valve’s stainless steel 316L (DIN 1.4435).
→ Allow the welds to cool down before burnishing and cleaning them according to the applicable specifications.

These instructions assist in the installation of the tank bottom valves and allow the prevention of deformation and softening within the containers.

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

**8.1.6 Preparatory work**

→ Clean pipelines (sealing material, swarf, etc.).
→ Support and align pipelines.

**Devices with welded or glued body:**

![Warning]

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

**8.2 Installation**

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

**WARNING!**

**Risk of injury from improper installation.**

Non-observance of the tightening torque is dangerous as the device may be damaged.

▶ Observe tightening torque during installation (see “Tab. 10: Tightening torques in Nm for diaphragms”).

Fig. 29: Grinding point on tank
8.2.1 Devices with welded or glued body

NOTE!

To prevent damage.

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

Remove actuator and diaphragm from the body:

Procedure for control function A

→ Pressurize lower control air connection with compressed air (value as indicated on the type label) (see “Fig. 30”). 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.

→ Weld or glue body into the pipeline.

Procedure for control functions B and I

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

→ Weld or glue body into the pipeline.

Mount actuator and diaphragm on the body:

→ After welding or gluing in the body, smooth the body surface by grinding if required.

→ Carefully clean the body.

Procedure for control function A

→ Pressurize lower control air connection with compressed air (value as indicated on the type label) (see “Fig. 30”).

→ Place actuator on the body.

→ Lightly cross-tighten the body screws until the diaphragm is between the body and actuator.

Do not tighten the screws yet.

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

→ Without applying pressure, tighten the body screws to the permitted tightening torque (see “Tab. 10”).

→ Pressurize lower control air connection with compressed air (value as indicated on the type label).

→ Check the tightening torque of the screws again.

Procedure for actuator with control functions B and I:

→ Place actuator on the body.

→ Lightly cross-tighten the body screws without pressurization until the diaphragm is between the body and actuator.

Do not tighten the screws yet.

→ Pressurize upper control air connection with compressed air (value as indicated on the type label) (see below “Fig. 30”).

→ Actuate the diaphragm valve twice.

→ Tighten the body screws to the permitted tightening torque (see “Tab. 10”).
### 8.2.2 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. 31: Pneumatic Connection”).
→ Pressure on the upper connection closes the valve.
→ Pressure on the lower connection opens the valve.

---

#### Tab. 10: Tightening torques in Nm for diaphragms

<table>
<thead>
<tr>
<th>Orifice (Diaphragm size) [mm]</th>
<th>VS, PP, PVC, PVDF, VG</th>
<th>VA and VP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EPDM/FKM</td>
<td>PTFE/advanced PTFE/laminated PTFE</td>
</tr>
<tr>
<td>8</td>
<td>2</td>
<td>2.5</td>
</tr>
<tr>
<td>15</td>
<td>3.5</td>
<td>4</td>
</tr>
<tr>
<td>20</td>
<td>4</td>
<td>4.5</td>
</tr>
<tr>
<td>25</td>
<td>5</td>
<td>6</td>
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<tr>
<td>32</td>
<td>6</td>
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<td>15</td>
</tr>
<tr>
<td>65</td>
<td>20</td>
<td>30</td>
</tr>
</tbody>
</table>

---

**Fig. 30: Control air connection**

**Fig. 31: Pneumatic Connection**
8.3 Disassembly

⚠️ DANGER!

Risk of injury from discharge of medium (acid, alkali, hot media).
It is dangerous to remove the device while under medium and control 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”).

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,
- Control 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 control 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

<table>
<thead>
<tr>
<th>Orifice (Diaphragm size) [mm]</th>
<th>Fastening types for diaphragms</th>
<th>PTFE</th>
<th>EPDM / FKM / laminated PTFE</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>Diaphragm buttoned</td>
<td></td>
<td>Diaphragm buttoned</td>
</tr>
<tr>
<td>15</td>
<td>Diaphragm with bayonet catch</td>
<td></td>
<td>Diaphragm with bayonet catch</td>
</tr>
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<td>20</td>
<td>Diaphragm with bayonet catch</td>
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</tr>
<tr>
<td>25</td>
<td>Diaphragm with bayonet catch</td>
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<td>Diaphragm screwed in</td>
</tr>
<tr>
<td>32</td>
<td>Diaphragm with bayonet catch</td>
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<td></td>
</tr>
<tr>
<td>40</td>
<td>Diaphragm with bayonet catch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>Diaphragm screwed in</td>
<td></td>
<td></td>
</tr>
<tr>
<td>65</td>
<td>Diaphragm screwed in</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Tab. 11: Fastening types for diaphragms

Fig. 32: 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 control air connection 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.

→ Place actuator back on the body.

→ Lightly cross-tighten the body screws until the diaphragm is between the body and actuator.

Do not tighten the screws yet.

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

→ Without applying pressure, tighten the body screws to the permitted tightening torque (see “Tab. 12”).

→ Pressurize lower control air connection with compressed air (value as indicated on the type label).

→ Check the tightening torque of the screws again.

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.

→ Place actuator back on the body.

→ Lightly cross-tighten the body screws without pressurization until the diaphragm is between the body and actuator.

Do not tighten the screws yet.

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

→ Actuate the diaphragm valve twice.

→ Tighten the body screws to the permitted tightening torque (see “Tab. 12”).
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.

### Table 12: Tightening torques in Nm for diaphragms

<table>
<thead>
<tr>
<th>Orifice (Diaphragm size) [mm]</th>
<th>VS, PP, PVC, PVDF, VG</th>
<th>VA and VP</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPDM/ FKM</td>
<td>PTFE/advanced PTFE/ laminated PTFE</td>
<td>EPDM/ FKM</td>
</tr>
<tr>
<td>8</td>
<td>2</td>
<td>2.5</td>
</tr>
<tr>
<td>15</td>
<td>3.5</td>
<td>4</td>
</tr>
<tr>
<td>20</td>
<td>4</td>
<td>4.5</td>
</tr>
<tr>
<td>25</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>32</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>40</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>50</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>65</td>
<td>20</td>
<td>30</td>
</tr>
</tbody>
</table>

**11 MALFUNCTIONS**

<table>
<thead>
<tr>
<th>Malfunction</th>
<th>Cause / Remedial action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actuator does not switch</td>
<td>Control connection interchanged *</td>
</tr>
<tr>
<td>CFA</td>
<td>Connect lower control connection</td>
</tr>
<tr>
<td>CFB</td>
<td>Connect upper control connection</td>
</tr>
<tr>
<td>CFI</td>
<td>Upper control connection: Close Lower control connection: Open</td>
</tr>
</tbody>
</table>

* see “Fig. 30: Control air connection”

<table>
<thead>
<tr>
<th>Malfunction</th>
<th>Cause / Remedial action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control pressure too low</td>
<td>See pressure specifications on the type label.</td>
</tr>
<tr>
<td>Medium pressure too high</td>
<td>See pressure specifications on the type label.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Malfunction</th>
<th>Cause / Remedial action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valve is not sealed</td>
<td>Medium pressure too high</td>
</tr>
<tr>
<td></td>
<td>See pressure specifications on the type label.</td>
</tr>
<tr>
<td>Control pressure too low</td>
<td>See pressure specifications on the type label.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Malfunction</th>
<th>Cause / Remedial action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow rate reduced</td>
<td>PTFE diaphragm bulging</td>
</tr>
<tr>
<td></td>
<td>Replace diaphragm.</td>
</tr>
</tbody>
</table>
12 SPARE PARTS

WARNING!
Risk of injury when opening the actuator body.
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 body 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. 33: Spare parts
### 12.1 Order table for seal sets

<table>
<thead>
<tr>
<th>Actuator</th>
<th>Orifice (Diaphragm size)</th>
<th>Order numbers for seal sets</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PPS actuator</td>
<td>PA actuator</td>
</tr>
<tr>
<td>C</td>
<td>8</td>
<td>011 465  -</td>
</tr>
<tr>
<td>D</td>
<td>15</td>
<td>011 477  011 426</td>
</tr>
<tr>
<td>E</td>
<td>15, 20</td>
<td>011 488  011 440</td>
</tr>
<tr>
<td>F</td>
<td>20, 25</td>
<td>011 492  011 448</td>
</tr>
<tr>
<td>G</td>
<td>32, 40</td>
<td>012 127  012 125</td>
</tr>
<tr>
<td>H</td>
<td>40, 50, 65</td>
<td>011 494  011 446</td>
</tr>
</tbody>
</table>

**Tab. 13: Order numbers for seal sets**

### 12.2 Order table for diaphragm

<table>
<thead>
<tr>
<th>Orifice (Diaphragm size) [mm]</th>
<th>Order numbers for diaphragms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EPDM (AB*)</td>
</tr>
<tr>
<td>8</td>
<td>677 663</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>677 664</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>15 BC**</td>
<td>693 162</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>677 665</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>20 BC**</td>
<td>693 165</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>677 667</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>677 668</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>677 669</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>677 670</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>65</td>
<td>677 671</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PTFE (EA*)</th>
<th>Advanced PTFE (EU*)</th>
<th>Laminated Gylon (ER*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>677 674 L04**</td>
<td>679 540 L05**</td>
</tr>
<tr>
<td></td>
<td>679 541 E02-PTFE**</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>677 675 E02-PTFE**</td>
<td>693 175 L06**</td>
</tr>
<tr>
<td></td>
<td>679 531 E02-PTFE+Hole**</td>
<td>693 176 L06**</td>
</tr>
<tr>
<td>20</td>
<td>677 676 E02-PTFE**</td>
<td>679 542 E02-PTFE+Hole**</td>
</tr>
</tbody>
</table>

**Tab. 14: Order numbers for diaphragms**
### 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.

---

<table>
<thead>
<tr>
<th>25</th>
<th>677 677</th>
<th>E02-PTFE**</th>
<th>679 543</th>
<th>E02-PTFE+Hole**</th>
<th>693 178</th>
<th>L06**</th>
</tr>
</thead>
<tbody>
<tr>
<td>32</td>
<td>677 678</td>
<td>E02-PTFE**</td>
<td>679 544</td>
<td>E02-PTFE+Hole**</td>
<td>693 179</td>
<td>L06**</td>
</tr>
<tr>
<td>40</td>
<td>677 679</td>
<td>E02-PTFE**</td>
<td>679 545</td>
<td>E02-PTFE+Hole**</td>
<td>693 180</td>
<td>L06**</td>
</tr>
<tr>
<td>50</td>
<td>677 680</td>
<td>E02-PTFE**</td>
<td>679 546</td>
<td>E02-PTFE+Hole**</td>
<td>693 181</td>
<td>L06**</td>
</tr>
<tr>
<td>65</td>
<td>677 681</td>
<td>E02-PTFE**</td>
<td>679 743</td>
<td>E02-PTFE+Hole**</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

Tab. 14: Order numbers for diaphragms

* 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](http://www.burkert.com).

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