

# Operating Instructions

EN

Translation of the original instructions

## **EVB 063...160 SA/X**

**Angle valve**

manually actuated, bellows sealed

**PFEIFFER**  **VACUUM**

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# 1 About these instructions

## 1.1 Validity

These operating instructions are a customer document of Pfeiffer Vacuum. The operating instructions describe the function of the designated product and provides the most important information for safe use of the device. The description follows the applicable EU guidelines. All information provided in these operating instructions refer to the product's current state of development. The documentation remains valid as long as the customer does not make any modifications to the product.

Recent versions of operating instructions are available at [www.pfeiffer-vacuum.com](http://www.pfeiffer-vacuum.com).

These operating instructions are valid for products with the following order numbers:

### Aluminium housing

| Order no. | Description   |
|-----------|---|
| 310VEM063 | EVB 063 SA, angle valve manual w. handwheel, DN 63 ISO-K  |
| 310VEM100 | EVB 100 SA, angle valve manual w. handwheel, DN 100 ISO-K |
| 310VEM160 | EVB 160 SA, angle valve manual w. handwheel, DN 160 ISO-K |

### Stainless steel housing

| Order no. | Description   |
|-----------|---|
| 320VEM063 | EVB 063 SX, angle valve manual w. handwheel, DN 63 ISO-K  |
| 320VEM100 | EVB 100 SX, angle valve manual w. handwheel, DN 100 ISO-K |
| 320VEM160 | EVB 160 SX, angle valve manual w. handwheel, DN 160 ISO-K |

The order number (No) can be found on the valve label. Refer to chapter 4.1 „Product identification “.

Subject to technical modifications without prior notice.

All dimensions in mm.

## 2 Safety

### 2.1 Compulsory reading material

Read this chapter prior to performing any work with or on the product. It contains important information that is significant for your own personal safety. This chapter must have been read and understood by all persons who perform any kind of work with or on the product during any stage of its serviceable life.

| <b>NOTICE</b>   |   |
|---|---|
|  | <p><b>Lack of knowledge</b><br/>Failing to read these instructions may result in property damage.<br/>Read instructions before use.</p> |

These operating instructions are an integral part of a comprehensive documentation belonging to a complete technical system. They must be stored together with the other documentation and accessible for anybody who is authorized to work with the system at any time.

### 2.2 General safety instructions

- Adhere to the relevant regulations and take the necessary protective measures for the process media used.
- Consider possible reactions between materials and process media.
- All work is permitted only when following the relevant regulations and taking the appropriate precautions. Pay attention to the safety instructions in these operating instructions.
- Inform yourself about possible contamination before beginning to work. Adhere to the relevant regulations and take the necessary protective measures when handling contaminated parts.
- Provide the safety instructions to all other users of the product.

## 2.3 Safety precautions

The safety instructions in the operating instructions from Pfeiffer Vacuum are based on the certification standards CSA, ANSI Z-535, SEMI S2, ISO 3864 and DIN 4844. The following hazard levels and instructions are considered in this document:

|   |  |
|---|--|
|    | <p style="text-align: center;"><b>DANGER</b></p> <p><b>High risk</b><br/>Indicates an imminently hazardous situation which, if not avoided, will result in death or severe injury.</p> |
|    | <p style="text-align: center;"><b>WARNING</b></p> <p><b>Medium risk</b><br/>Indicates a hazardous situation which, if not avoided, could result in death or serious injury.</p>        |
|    | <p style="text-align: center;"><b>CAUTION</b></p> <p><b>Low risk</b><br/>Indicates a hazardous situation which, if not avoided, may result in minor or moderate injury.</p>            |
|  | <p style="text-align: center;"><b>NOTICE</b></p> <p><b>Command</b><br/>Indicates a hazardous situation which, if not avoided, may result in property damage.</p>                       |

## 2.4 Personnel qualifications

|   |   |
|---|---|
|  | <p style="text-align: center;"><b>WARNING</b></p> <p><b>Unqualified personnel</b><br/>Inappropriate handling may cause serious injury or property damage. Only qualified personnel are allowed to carry out the described work.</p> |
|---|---|

## 2.5 Intended use

- The angle valve is used as shut-off or venting device.
- Use product only for clean and dry vacuum applications. All other applications require written permission from Pfeiffer Vacuum.

## 2.6 Unintended use

Unintended use will cause all claims for liability and warranty to be forfeited. Unintended use is deemed to be all use for purposes deviating from those mentioned above, especially:

- Use of accessories and spare parts which are not listed in these operating instructions.

## 2.7 Liability and warranty

Pfeiffer Vacuum disclaims all liability and warranty, if the end user or third party users:

- Disregard the information in this document.
- Use the product in an unintended manner.
- Make any kind of interventions (modifications, alterations etc.) on the product
- Use the product with accessories not listed in the product documentation.

The end-user is responsible for the process media used.

Failures due to contamination or wear and tear, as well as expendable parts (e.g. seals), are not covered by warranty.

## 3 Packaging and Transport

With the acceptance of the delivery check that the product has not been damaged during transport. If the product is damaged, take the necessary measures with the shipping carrier and inform the manufacturer. We recommend in any case:

- Leave the product in its original packaging, so that it remains in the clean state in which it was shipped from our factory. Unpack the product only at the final location of use.
- Store packaging material (recyclable material) for further transport or storage.
- Do not remove covers from the valve openings as long as the product is not in use.

### 3.1 Packaging

| <b>NOTICE</b>   |  |
|---|--|
|  | <p><b>Inappropriate packaging</b></p> <p>Product may get damaged if inappropriate packaging material is used. Always use the original packaging material and handle product with care.</p> |

- Cover all valve openings with protective foil.
- Pack valve using original packaging material.

Pfeiffer Vacuum disclaims any liability for damages resulting from inappropriate packaging.

## 3.2 Transport

| <b>WARNING</b>  |  |
|---|--|
|  | <p><b>Harmful substances</b></p> <p>Risk of injury in case of contact with harmful substances.</p> <p>Remove harmful substances (e.g. toxic, caustic or microbiological) from valve before returning the valve to Pfeiffer Vacuum.</p> |

| <b>NOTICE</b>   |   |
|---|---|
|  | <p><b>Inappropriate packaging</b></p> <p>Product may get damaged if inappropriate packaging material is used.</p> <p>Always use the original packaging material and handle product with care.</p> |

Returning contaminated valves:

Microbiologically, explosively or radioactively contaminated valves will not be accepted. "Harmful substances" are substances and compounds according to the ordinance on hazardous substances in its current version.

- ➔ Hermetically seal all openings.
- ➔ Shrink-wrap valve into suitable protective foil.
- ➔ Ship valve only in appropriate transport containers and in compliance with the effective transportation conditions.

In case of a missing or incomplete declaration of contamination and/or use of inappropriate transport packaging, Pfeiffer Vacuum reserves the right to perform a paid decontamination and/or to return the product at sender's expense.

For detailed information, addresses and forms visit:  
[www.pfeiffer-vacuum.com](http://www.pfeiffer-vacuum.com) (Service)

Pfeiffer Vacuum disclaims any liability for damages resulting from inappropriate packaging.

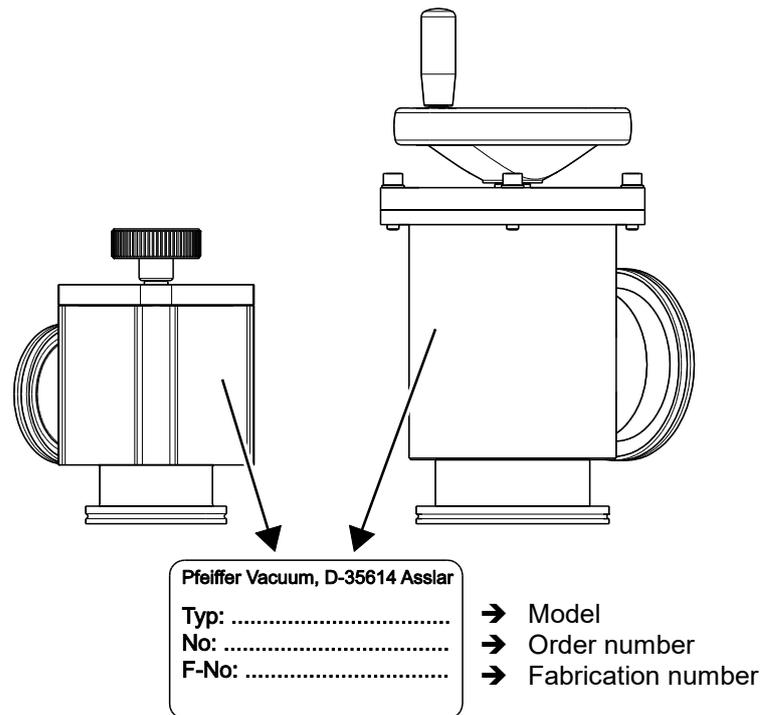
## 4 Product description

### 4.1 Product identification

Information to clearly identify the product and to get in contact with Pfeiffer Vacuum can be found on the valve label of the product.

Angle valve DN 63

Angle valve DN 100/DN 160

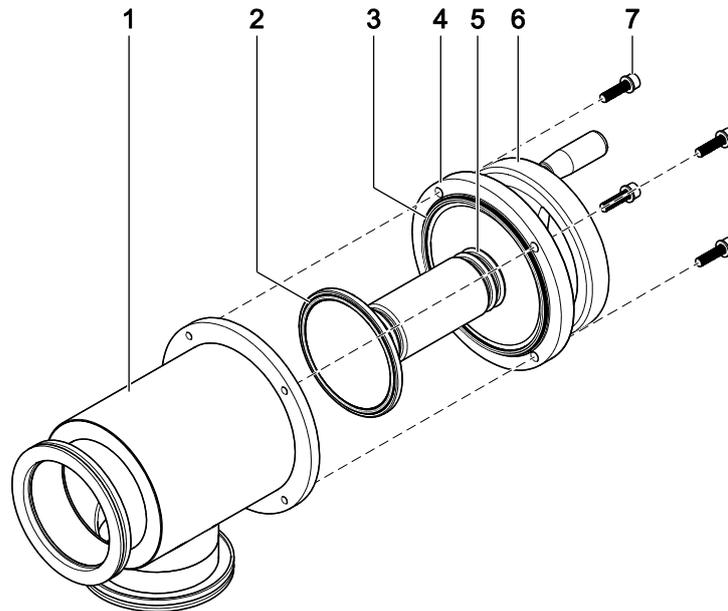


Symbolic image

### 4.2 Scope of delivery

- 1x angle valve
- 1x operating instructions

### 4.3 Components



*Symbolic image*

- |                     |                       |
|---------------------|-----------------------|
| 1 Housing           | 5 Bellows feedthrough |
| 2 Plate seal        | 6 Handwheel           |
| 3 Bonnet seal       | 7 Screws              |
| 4 Manual drive unit |                       |

## 5 Installation

|   |   |
|---|---|
|  | <b>WARNING</b>  |
|   | <p><b>Unqualified personnel</b><br/>Inappropriate handling may cause serious injury or property damage.<br/>Only qualified personnel are allowed to carry out the described work.</p> |

### 5.1 Unpacking

- Make sure that the delivered products are in accordance with your order.
- Inspect the quality of the supplied products visually. If it does not meet your requirements, please contact Pfeiffer Vacuum immediately.
- Store the original packaging material. It may be useful if products must be returned to VAT.
- The protective covers may only be removed immediately before the valve is mounted into the system. Unprotected sealing surfaces must be treated with care and keep clean.

|   |  |
|---|--|
|  | <b>NOTICE</b>  |
|   | <p><b>Sensitive product</b><br/>Product may get damaged if not handled carefully.<br/>Handle product with care: Do not touch solid objects when lifting the product.</p> |

- Place the angle valve on a clean surface or install it to a clean connection flange on a system.

## 5.2 Installation on a system

|   |  |
|---|--|
|  | <b>NOTICE</b>  |
|   | <p><b>Contamination</b></p> <p>The angle valve may get contaminated.<br/>Always wear cleanroom gloves when installing or uninstalling the angle valve.</p> |

|   |  |
|---|--|
|  | <b>NOTICE</b>  |
|   | <p><b>Inappropriate tools</b></p> <p>Sealing surfaces may get damaged.<br/>Do not use sharp-edged tools.</p> |

- Check and carefully clean the sealing surfaces on the valve flanges and counter flanges.
- Install the angle valve with connection components appropriate for ISO-K flanges according to the specification.

## 6 Operation

After the installation the angle valve is ready for use.

### 6.1 Normal operation

The angle valve is opened and closed by rotating the handwheel.  
Refer to chapter 6.2 Opening and closing angle valve.

### 6.2 Opening and closing angle valve

#### 6.2.1 Opening angle valve

→ Rotate the handwheel counter-clockwise to open the angle valve.

#### 6.2.2 Closing angle valve

→ Rotate the handwheel clockwise to close the angle valve.

### 6.3 Operation under increased temperature

Maximum allowed operation temperature refer to chapter 12 Technical Data.

### 6.4 Trouble shooting

| Failure                      | Check                                  | Action                   | Refer tor   |
|------------------------------|--|--------------------------|-------------|
| Leak at plate or bonnet seal | Are the sealing surfaces contaminated? | Clean or replace O-rings | Chapter 7.2 |

## 7 Maintenance

|   |  |
|---|--|
|    | <p style="text-align: center;"><b>WARNING</b></p> <p><b>Unqualified personnel</b><br/>                 Inappropriate handling may cause serious injury or property damage.<br/>                 Only qualified personnel are allowed to carry out the described work.</p>  |
|    | <p style="text-align: center;"><b>WARNING</b></p> <p><b>Contaminated parts</b><br/>                 Contaminated parts can be detrimental to health and environment.<br/>                 Inform yourself about possible contamination before beginning to work. Adhere to the relevant regulations and take the necessary protective measures when handling contaminated parts.</p> |
|    | <p style="text-align: center;"><b>NOTICE</b></p> <p><b>Contamination</b><br/>                 The angle valve may get contaminated.<br/>                 Always wear cleanroom gloves when installing or uninstalling the angle valve.</p>   |
|  | <p style="text-align: center;"><b>NOTICE</b></p> <p><b>Inappropriate tools</b><br/>                 Sealing surfaces may get damaged.<br/>                 Do not use sharp-edged tools.</p>   |

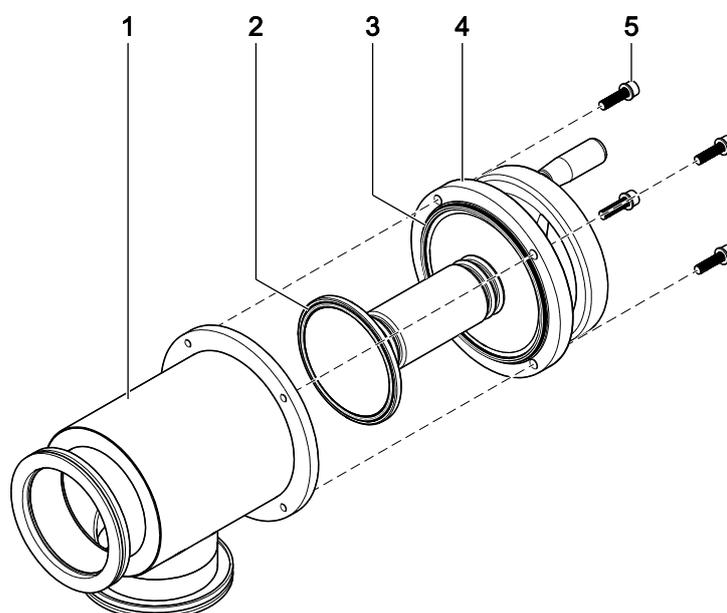
## 7.1 Maintenance intervals

The angle valve requires cleaning/maintenance before reaching its serviceable life if operated under high wearing or contaminating operating conditions.

Contamination resulting from process can affect the function of the angle valve and may require shorter maintenance cycles.

Failures due to contamination or wear and tear, as well as expendable parts (e.g. seals), are not covered by warranty.

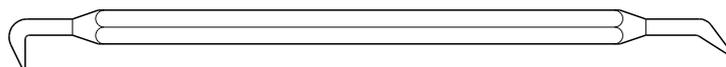
## 7.2 Exchanging/cleaning O-rings



*Symbolic image*

- |               |                     |
|---------------|---------------------|
| 1 Housing     | 4 Manual drive unit |
| 2 Plate seal  | 5 Screws            |
| 3 Bonnet seal |                     |

It is recommended to use the O-ring removal tool (order number: V-TOOL-1) for removing O-rings. Push one end of the O-ring removal tool between the O-ring and the O-ring groove. The sealing surface of the O-ring groove does not get damaged.



*O-ring removal tool*

### 7.2.1 Dismounting angle valve

- Vent system to atmospheric pressure.
- Loosen ISO-K connection parts.
- Remove angle valve carefully from the system.
- Place angle valve on a clean, dry and flat surface.

### 7.2.2 Dismounting manual drive unit

- Loosen and remove screws (5) in cross diagonal pattern.
- Pull manual drive unit (4) carefully off the housing (1).
- Use the O-ring removal tool to remove bonnet seal (3) from the O-ring groove.

### 7.2.3 Replacing plate seal

- Use the O-ring removal tool to remove plate seal (2) from O-ring groove.
- Visually inspect the sealing surfaces and wipe with an alcohol soaked (2% methyl ethyl ketone) cleanroom wipe.
- Position new plate seal (2) over O-ring groove and press it at 4 opposite positions into groove.
- Press O-ring twist-free into O-ring groove.
- Press remaining O-ring sections uniformly into O-ring groove.

### 7.2.4 Mounting manual drive unit

- Visually inspect the sealing surfaces and wipe with an alcohol soaked (2% methyl ethyl ketone) cleanroom wipe.
- Clean and visually inspect bonnet seal (3) → replace if required.
- Position bonnet seal (3) over O-ring groove and press it at 4 opposite positions into groove.
- Press O-ring twist free into O-ring groove.
- Press remaining O-ring sections into O-ring groove
- Carefully insert the manual drive unit (4) into the housing (1).
- Insert screws (5) in cross diagonal pattern and fasten hand tight.
- Fasten screws (5) in cross diagonal pattern in 2 to 3 passes.

| Nominal diameter | DN 63 | DN 100 | DN 160 |
|------------------|-------|--------|--------|
| Torque [Nm]      | 5     | 20     | 20     |

- The angle valve is ready to use.

## 8 Spare parts

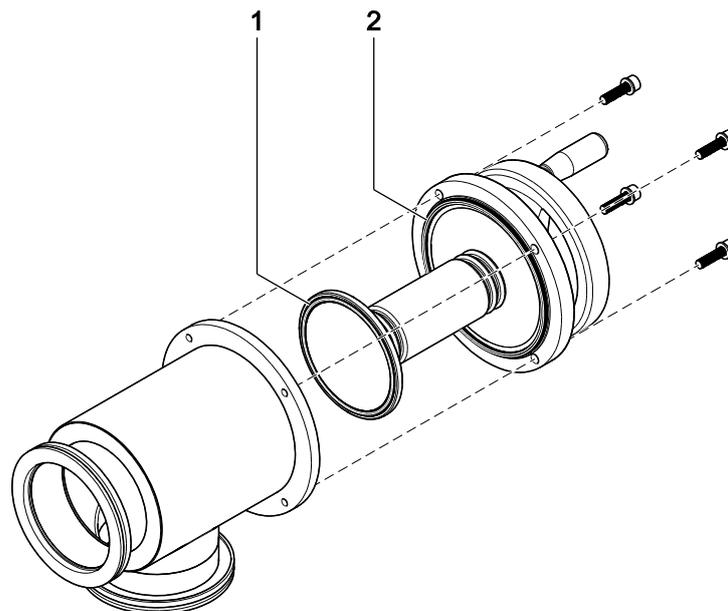
| <b>NOTICE</b>   |  |
|---|--|
|  | <p><b>Non-original spare parts</b><br/>Non-original spare parts may cause damage to the product.<br/>Only use original spare parts from Pfeiffer Vacuum.</p> |

Always provide the fabrication number when ordering spare parts. This ensures appropriate spare parts delivery.

Pfeiffer Vacuum differentiates between spare parts which can be replaced by the end user and spare parts which can only be replaced by Pfeiffer Vacuum customer support.

The following table only shows spare parts which can be replaced by the end user. If you need other spare parts, please contact Pfeiffer Vacuum customer support.

### 8.1 Overview



*Symbolic image*

- 1 Plate seal
- 2 Bonnet seal

## 8.2 O-ring removal tool

It is recommended to use the O-ring removal tool (order number: V-TOOL-1) for removing O-rings.



*O-ring removal tool*

## 8.3 Sealing kits

### 8.3.1 DN 63 ISO-K

Sealing kit for aluminium housing (EVB 063 SA) and stainless steel housing (EVB 063 SX):

| Description                                     | Order number | Quantity per valve | Maintenance procedure see chapter |
|---|--------------|--------------------|-----------------------------------|
| Sealing kit (consists of bonnet and plate seal) | 302VEM063-DS | 1                  | 7.2                               |

### 8.3.2 DN 100 ISO-K

Sealing kit for aluminium housing (EVB 100 SA) and stainless steel housing (EVB 100 SX):

| Description                                     | Order number | Quantity per valve | Maintenance procedure see chapter |
|---|--------------|--------------------|-----------------------------------|
| Sealing kit (consists of bonnet and plate seal) | 302VEM100-DS | 1                  | 7.2                               |

### 8.3.3 DN 160 ISO-K

Sealing kit for aluminium housing (EVB 160 SA) and stainless steel housing (EVB 160 SX):

| Description                                      | Order number | Quantity per valve | Maintenance procedure see chapter |
|--|--------------|--------------------|-----------------------------------|
| Sealing kit (consists of bonnet and plate seal)) | 302VEM160-DS | 1                  | 7.2                               |

## 9 Repairs

Only Pfeiffer Vacuum is allowed to carry out repair work.

Repairs in the Pfeiffer Vacuum service center:

We recommend the following steps for a quick and smooth repair process:

- Fill out form „Service Request“ and send it to your local service center.
- Attach the service request confirmation from Pfeiffer Vacuum to the shipment.
- Fill out form „Declaration of Contamination“ and attach it to the shipment (mandatory!). Each product/device requires a separate declaration of contamination.
- Dismount all accessory parts and store them at a safe place.
- Use airtight metal blank flanges for contaminated angle valves.
- Ship angle valve in original packaging material.

For detailed information, addresses and forms visit:  
[www.pfeiffer-vacuum.com](http://www.pfeiffer-vacuum.com) (Service)

## 10 Dismounting and Storage

|   |   |
|---|---|
|  | <b>WARNING</b>  |
|   | <p><b>Unqualified personnel</b><br/>                 Inappropriate handling may cause serious injury or property damage.<br/>                 Only qualified personnel are allowed to carry out the described work.</p> |

|   |  |
|---|--|
|  | <b>WARNING</b>   |
|   | <p><b>Contaminated parts</b><br/>                 Contaminated parts can be detrimental to health and environment.<br/>                 Inform yourself about possible contamination before beginning to work. Adhere to the relevant regulations and take the necessary protective measures when handling contaminated parts.</p> |

|   |   |
|---|---|
|  | <b>NOTICE</b>   |
|   | <p><b>Contamination</b><br/>                 The angle valve may get contaminated.<br/>                 Always wear cleanroom gloves when installing or uninstalling the angle valve.</p> |

### 10.1 Dismounting

|   |   |
|---|---|
|  | <b>NOTICE</b>   |
|   | <p><b>Angle valve in open position</b><br/>                 Valve body and plate may get damaged if valve is in open position.<br/>                 Close the angle valve before dismounting from the system.</p> |

- Vent system to atmospheric pressure.
- Loosen ISO-K connection parts.
- Remove angle valve carefully from the system.
- Place angle valve on a clean, dry and flat surface.

## 10.2 Storage

| <b>NOTICE</b>   |  |
|---|--|
|  | <p><b>Wrong storage</b></p> <p>Inappropriate temperatures and air humidity may cause damage to the product.</p> <p>Valve must be stored at:</p> <ul style="list-style-type: none"><li>– relative air humidity between 10% and 70%</li><li>– temperature between 10 °C and 50 °C</li><li>– non-condensing environment</li></ul> |

| <b>NOTICE</b>   |  |
|---|--|
|  | <p><b>Inappropriate packaging</b></p> <p>Product may get damaged if inappropriate packaging material is used. Always use the original packaging material and handle product with care.</p> |

- Clean angle valve → decontaminate if necessary.
- Cover all valve openings with protective foil.
- Pack valve using original packaging material.

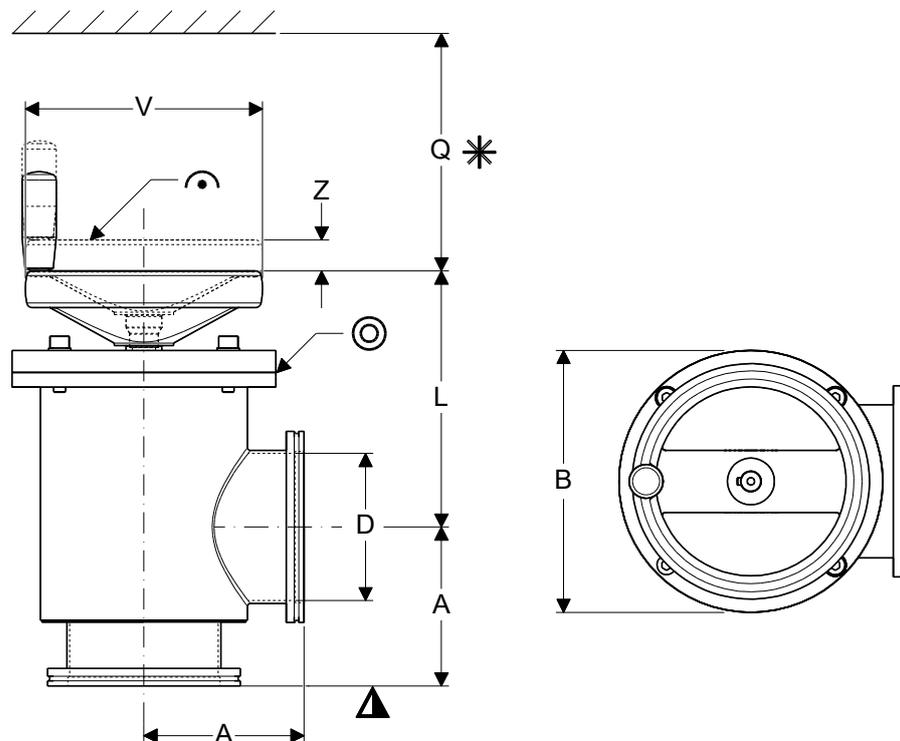
Pfeiffer Vacuum disclaims any liability for damages resulting from inappropriate packaging.

## 11 Disposal

|   |   |
|---|---|
|  | <b>WARNING</b>  |
|   | <b>Harmful substances</b><br>Environmental pollution.<br>Dispose products and parts according to the local regulations. |

## 12 Technical Data

### 12.1 Dimensions



Symbolic image

- ▼ Valve seat side
- \* Height required to dismount valve
- ⊙ Mechanical position indicator
- ⊖ Leak detection slot

#### 12.1.1 Aluminium housing

| DN           | A   | B      | D    | L     | Q   | V    | Z    |
|--------------|-----|--------|------|-------|-----|------|------|
| DN 63 ISO-K  | 88  | □107.6 | Ø63  | 112   | 105 | Ø60  | 13.4 |
| DN 100 ISO-K | 108 | Ø178   | Ø102 | 246.9 | 170 | Ø160 | 21   |
| DN 160 ISO-K | 138 | Ø220   | Ø153 | 246.9 | 195 | Ø160 | 25   |

#### 12.1.2 Stainless steel housing

| DN           | A   | B    | D    | L     | Q   | V    | Z    |
|--------------|-----|------|------|-------|-----|------|------|
| DN 63 ISO-K  | 88  | Ø123 | Ø66  | 111.7 | 105 | Ø60  | 13.4 |
| DN 100 ISO-K | 108 | Ø178 | Ø102 | 240.3 | 170 | Ø160 | 21   |
| DN 160 ISO-K | 138 | Ø220 | Ø153 | 240.3 | 195 | Ø160 | 25   |

## 12.2 Technical Data

| Vacuum flange size                 | DN 63<br>ISO-K              | DN 100<br>ISO-K | DN 160<br>ISO-K |         |  |
|------------------------------------|-----------------------------|-----------------|-----------------|---------|--|
| Actuator                           | manual, handwheel           |                 |                 |         |  |
| Stroke valve plate                 | 26 mm                       | 38 mm           | 45 mm           |         |  |
| Conductance <sup>1)</sup>          | 160 l/s                     | 440 l/s         | 1000 l/s        |         |  |
| Serviceable life <sup>2)</sup>     | 20000 cycles                |                 |                 |         |  |
| Leak rate                          | 1x10 <sup>-9</sup> mbar l/s |                 |                 |         |  |
| Compressive strength<br>(absolute) | 4 bar                       | 2 bar           |                 |         |  |
| Operating pressure min.            | 1x10 <sup>-8</sup> mbar     |                 |                 |         |  |
| Operating pressure max.            | 2 bar                       |                 |                 |         |  |
| Differential pressure              | ≤ 1 bar in both directions  |                 |                 |         |  |
| → when opening                     |                             |                 |                 |         |  |
| → in opening direction             |                             |                 |                 | 1.2 bar |  |
| → in closing direction             | 4 bar                       | 2 bar           |                 |         |  |
| Temperature                        | 0 °C...50 °C                |                 |                 |         |  |
| Environment:                       |                             |                 |                 |         |  |
| Bake-out:                          |                             |                 |                 |         |  |
| → aluminium housing                |                             |                 |                 | 150 °C  |  |
| → stainless steel housing          |                             |                 |                 | 150 °C  |  |
| → handwheel                        | 80 °C                       |                 |                 |         |  |
| Usage                              | Altitude up to 2500 m NN    |                 |                 |         |  |
| Mounting position                  | any                         |                 |                 |         |  |
| Flow direction <sup>3)</sup>       | any                         |                 |                 |         |  |

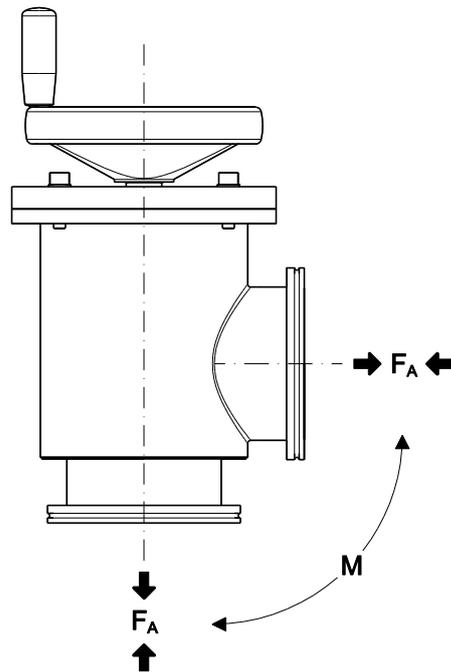
<sup>1)</sup> For air at molecular flow

<sup>2)</sup> Number of cycles without extendable parts (sealings) and under clean operation conditions.

The angle valve requires cleaning/maintenance before reaching its serviceable life if operated under high wearing or contaminating operating conditions.

<sup>3)</sup> Recommended mounting position: Valve seat facing towards vacuum chamber

### 12.3 Admissible forces and bending moments



Symbolic image

| DN<br>(nominal diameter) |      | Axial tensile or<br>compressive force<br>« $F_A$ » |     | Bending moment<br>« $M$ » |        |
|--------------------------|------|--|-----|---------------------------|--------|
| mm                       | inch | N  | lbf | Nm                        | lbf ft |
| 63                       | 2½   | 200  | 45  | 18                        | 13     |
| 100                      | 4    | 250  | 56  | 27                        | 20     |
| 160                      | 6    | 300  | 68  | 42                        | 31     |

A combination of both forces (« $F_A$ » und « $M$ ») is not allowed.

## 12.4 Materials

|                         |                              |
|-------------------------|------------------------------|
| Aluminium housing       | EN AW 6060 / EN AC-42100K T6 |
| Stainless steel housing | 1.4404                       |
| Bellows/valve plate     | 1.4571 / 1.4404              |
| Sealings                | FKM                          |
| Handwheel               | Plastic                      |
| Protective cover        | PE                           |
| Packaging               | Cardboard, PE                |

## 12.5 Weight

| Angle valve type        | DN 63<br>ISO-K | DN 100<br>ISO-K | DN 160<br>ISO-K |
|-------------------------|----------------|-----------------|-----------------|
| Aluminium Housing       | 2.9 kg         | 6.0 kg          | 10.0 kg         |
| Stainless steel housing | 2.8 kg         | 6.5 kg          | 10.0 kg         |



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