



# OPERATING INSTRUCTIONS

EN

Translation of the Original

## MVP 015-2

Diaphragm pump

**PFEIFFER**  **VACUUM**

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## Dear Customer,

Thank you for choosing a Pfeiffer Vacuum product. Your new diaphragm pump is designed to support you with its performance, perfect operation and without impacting your individual application. The name Pfeiffer Vacuum stands for high-quality vacuum technology, a comprehensive and complete range of top-quality products and first-class service. From this extensive, practical experience we have gained a large volume of information that can contribute to efficient deployment and to your personal safety.

In the knowledge that our product must avoid consuming work output, we trust that our product can offer you a solution that supports you in the effective and trouble-free implementation of your individual application.

Please read these operating instructions before putting your product into operation for the first time. If you have any questions or suggestions, please feel free to contact [info@pfeiffer-vacuum.de](mailto:info@pfeiffer-vacuum.de).

Further operating instructions from Pfeiffer Vacuum can be found in the [Download Center](#) on our website.

## Disclaimer of liability

These operating instructions describe all models and variants of your product. Note that your product may not be equipped with all features described in this document. Pfeiffer Vacuum constantly adapts its products to the latest state of the art without prior notice. Please take into account that online operating instructions can deviate from the printed operating instructions supplied with your product.

Furthermore, Pfeiffer Vacuum assumes no responsibility or liability for damage resulting from the use of the product that contradicts its proper use or is explicitly defined as foreseeable misuse.

## Copyright

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We reserve the right to make changes to the technical data and information in this document.

# Table of contents

|          |  |           |
|----------|--|-----------|
| <b>1</b> | <b>About this manual</b>                                 | <b>7</b>  |
| 1.1      | Validity   | 7         |
|          | 1.1.1 Applicable documents                               | 7         |
|          | 1.1.2 Variants   | 7         |
| 1.2      | Target group   | 7         |
| 1.3      | Conventions  | 7         |
|          | 1.3.1 Instructions in the text                           | 7         |
|          | 1.3.2 Pictographs  | 7         |
|          | 1.3.3 Stickers on the product                            | 8         |
|          | 1.3.4 Abbreviations                                      | 9         |
| <b>2</b> | <b>Safety</b>  | <b>10</b> |
| 2.1      | General safety information                               | 10        |
| 2.2      | Safety instructions                                      | 10        |
| 2.3      | Safety precautions                                       | 12        |
| 2.4      | Limits of use of the product                             | 13        |
| 2.5      | Proper use   | 13        |
| 2.6      | Foreseeable improper use                                 | 13        |
| 2.7      | Personnel qualification                                  | 14        |
|          | 2.7.1 Ensuring personnel qualification                   | 14        |
|          | 2.7.2 Personnel qualification for maintenance and repair | 14        |
|          | 2.7.3 Advanced training with Pfeiffer Vacuum             | 14        |
| <b>3</b> | <b>Product description</b>                               | <b>15</b> |
| 3.1      | Function   | 15        |
|          | 3.1.1 Drive  | 15        |
|          | 3.1.2 Pumping system                                     | 15        |
|          | 3.1.3 Cooling  | 16        |
|          | 3.1.4 Gas ballast  | 16        |
| 3.2      | Connections  | 16        |
| 3.3      | Identifying product                                      | 16        |
| 3.4      | Scope of delivery  | 16        |
| <b>4</b> | <b>Transportation and Storage</b>                        | <b>17</b> |
| 4.1      | Transporting the vacuum pump                             | 17        |
| 4.2      | Storing vacuum pump                                      | 17        |
| <b>5</b> | <b>Installation</b>                                      | <b>18</b> |
| 5.1      | Installing the vacuum pump                               | 18        |
| 5.2      | Connecting the vacuum side                               | 18        |
| 5.3      | Connect exhaust side                                     | 18        |
| 5.4      | Establishing mains connection                            | 19        |
| <b>6</b> | <b>Operation</b>   | <b>21</b> |
| 6.1      | Commissioning vacuum pump                                | 21        |
| 6.2      | Switching on vacuum pump                                 | 21        |
| 6.3      | Operating vacuum pump with gas ballast                   | 22        |
| 6.4      | Switching off the vacuum pump                            | 22        |
| <b>7</b> | <b>Maintenance</b>                                       | <b>23</b> |
| 7.1      | Maintenance instructions                                 | 23        |
| 7.2      | Checklist for inspection and maintenance                 | 24        |
| 7.3      | Change the diaphragms and valves                         | 25        |
|          | 7.3.1 Dismantling diaphragm head and valves              | 25        |
|          | 7.3.2 Cleaning and replacing the diaphragms and valves   | 25        |
|          | 7.3.3 Mounting diaphragm head and valves                 | 26        |
| 7.4      | Cleaning gas ballast valve                               | 26        |

|           |   |           |
|-----------|---|-----------|
| 7.5       | Replacing device fuses                      | 27        |
| <b>8</b>  | <b>Decommissioning</b>                      | <b>29</b> |
| <b>9</b>  | <b>Recycling and disposal</b>               | <b>30</b> |
| 9.1       | General disposal information                | 30        |
| 9.2       | Dispose of diaphragm pumps                  | 30        |
| <b>10</b> | <b>Malfunctions</b>                         | <b>31</b> |
| <b>11</b> | <b>Service solutions by Pfeiffer Vacuum</b> | <b>33</b> |
| <b>12</b> | <b>Spare part packages</b>                  | <b>35</b> |
| <b>13</b> | <b>Accessories</b>                          | <b>36</b> |
| 13.1      | Accessory information                       | 36        |
| 13.2      | Ordering accessories                        | 36        |
| <b>14</b> | <b>Technical data and dimensions</b>        | <b>37</b> |
| 14.1      | General                                     | 37        |
| 14.2      | Technical data                              | 37        |
| 14.3      | Substances in contact with the media        | 38        |
| 14.4      | Dimensions                                  | 38        |
|           | <b>EC Declaration of Conformity</b>         | <b>40</b> |
|           | <b>UK Declaration of Conformity</b>         | <b>41</b> |

## List of tables

|          |   |    |
|----------|---|----|
| Tbl. 1:  | Stickers on the product                                     | 8  |
| Tbl. 2:  | Abbreviations used in this document                         | 9  |
| Tbl. 3:  | Permissible ambient conditions                              | 13 |
| Tbl. 4:  | Connection description of the diaphragm pump                | 16 |
| Tbl. 5:  | Permissible voltage range for reversible single-phase motor | 20 |
| Tbl. 6:  | Typical service life with normal use                        | 23 |
| Tbl. 7:  | Maintenance intervals                                       | 24 |
| Tbl. 8:  | Troubleshooting on diaphragm pumps                          | 32 |
| Tbl. 9:  | Spare parts   | 35 |
| Tbl. 10: | Accessories MVP 015-2                                       | 36 |
| Tbl. 11: | Conversion table: Pressure units                            | 37 |
| Tbl. 12: | Conversion table: Units for gas throughput                  | 37 |
| Tbl. 13: | Technical data, MVP 015-2                                   | 38 |
| Tbl. 14: | Materials that make contact with the process media          | 38 |

## List of figures

|          |   |    |
|----------|---|----|
| Fig. 1:  | Position of the stickers on the product     | 8  |
| Fig. 2:  | Diaphragm pump design                       | 15 |
| Fig. 3:  | Voltage selector switch on the terminal box | 20 |
| Fig. 4:  | Gas ballast valve                           | 22 |
| Fig. 5:  | Diaphragm head and valves                   | 25 |
| Fig. 6:  | Gas ballast valve                           | 27 |
| Fig. 7:  | Device fuses                                | 28 |
| Fig. 8:  | Spare parts                                 | 35 |
| Fig. 9:  | Dimensions MVP 015-2   PK T05 100           | 38 |
| Fig. 10: | Dimensions MVP 015-2   PK T05 103           | 39 |

# 1 About this manual



## IMPORTANT

Read carefully before use.  
Keep the manual for future consultation.

## 1.1 Validity

These operating instructions are a customer document of Pfeiffer Vacuum. The operating instructions describe the functions of the named product and provide the most important information for the safe use of the device. The description is written in accordance with the valid directives. The information in these operating instructions refers to the product's current development status. The document shall remain valid provided that the customer does not make any changes to the product.

### 1.1.1 Applicable documents

| Designation               | Document                                    |
|---------------------------|---|
| Declaration of conformity | A component of these operating instructions |

### 1.1.2 Variants

These instructions apply to diaphragm pumps of the AC series:

- MVP 015-2 as standard version

## 1.2 Target group

These operating instructions are aimed at all persons performing the following activities on the product:

- Transportation
- Setup (Installation)
- Usage and operation
- Decommissioning
- Maintenance and cleaning
- Storage or disposal

The work described in this document is only permitted to be performed by persons with the appropriate technical qualifications (expert personnel) or who have received the relevant training from Pfeiffer Vacuum.

## 1.3 Conventions

### 1.3.1 Instructions in the text

Usage instructions in the document follow a general structure that is complete in itself. The required action is indicated by an individual step or multi-part action steps.

#### Individual action step

A horizontal, solid triangle indicates the only step in an action.

- ▶ This is an individual action step.

#### Sequence of multi-part action steps

The numerical list indicates an action with multiple necessary steps.

1. Step 1
2. Step 2
3. ...

### 1.3.2 Pictographs

Pictographs used in the document indicate useful information.



Note



Tip

### 1.3.3 Stickers on the product

This section describes all the stickers on the product along with their meanings.

|  |  |
|--|--|
|  | <p><b>Rating plate</b><br/>Rating plate of the diaphragm pump</p>  |
| <p style="background-color: red; color: white; padding: 5px;">Vor Inbetriebnahme: Vorhandene Netzspannung am Spannungswahlschalter der Pumpe einstellen (siehe Betriebsanleitung).<br/>Electrical connection: Set supply voltage on voltage selection switch (see operating instructions).</p> | <p><b>Information on voltage selector switch</b><br/>This sticker indicates that it is necessary to select the mains voltage that applies.</p> |
|  | <p><b>Warranty seal</b><br/>The product is sealed ex factory. Damaging or removing a warranty seal results in loss of the warranty.</p>        |

Tbl. 1: Stickers on the product

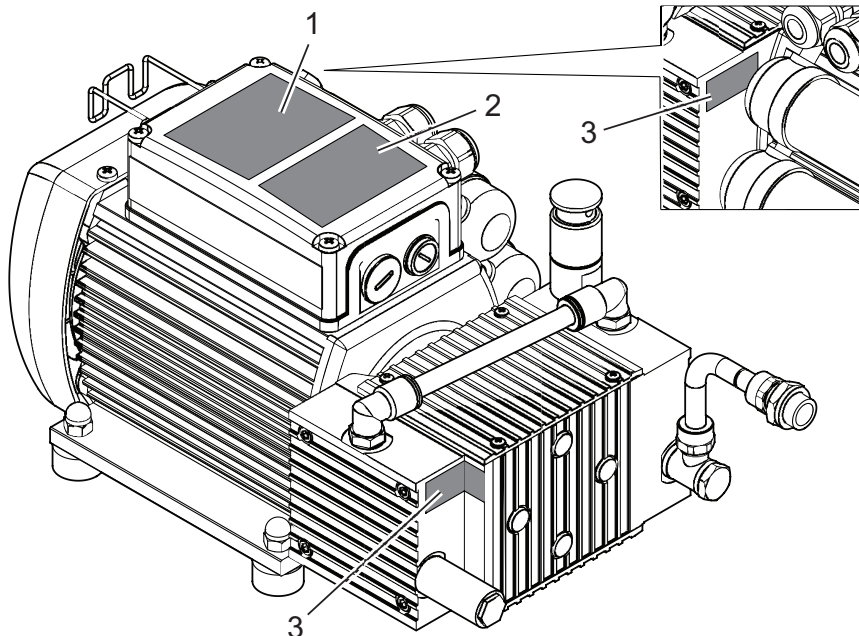


Fig. 1: Position of the stickers on the product

- 1 Rating plate
- 2 Information on voltage selector switch
- 3 Warranty seal



### 1.3.4 Abbreviations

| Abbreviation | Meaning in this document                             |
|--------------|--|
| AC           | Alternating current                                  |
| DN           | Nominal diameter (from the French: diamètre nominal) |
| EPDM         | Ethylenepropylene diene-monomer rubber               |
| MVP          | Diaphragm vacuum pump                                |
| NN           | Mean sea level                                       |
| PA           | Polyamide  |
| PE           | Polyethylene<br>Earthed conductor (protective earth) |
| PVC          | Polyvinyl chloride (PVC)                             |
| WAF          | width across flats                                   |

Tbl. 2: Abbreviations used in this document

## 2 Safety

### 2.1 General safety information

The following 4 risk levels and 1 information level are taken into account in this document.

|   |
|---|
| <b>⚠ DANGER</b>   |
| <p><b>Immediately pending danger</b><br/>                 Indicates an immediately pending danger that will result in death or serious injury if not observed.</p> <ul style="list-style-type: none"> <li>▶ Instructions to avoid the danger situation</li> </ul> |

|   |
|---|
| <b>⚠ WARNING</b>  |
| <p><b>Potential pending danger</b><br/>                 Indicates a pending danger that could result in death or serious injury if not observed.</p> <ul style="list-style-type: none"> <li>▶ Instructions to avoid the danger situation</li> </ul> |

|  |
|--|
| <b>⚠ CAUTION</b>   |
| <p><b>Potential pending danger</b><br/>                 Indicates a pending danger that could result in minor injuries if not observed.</p> <ul style="list-style-type: none"> <li>▶ Instructions to avoid the danger situation</li> </ul> |

|   |
|---|
| <b>NOTICE</b>   |
| <p><b>Danger of damage to property</b><br/>                 Is used to highlight actions that are not associated with personal injury.</p> <ul style="list-style-type: none"> <li>▶ Instructions to avoid damage to property</li> </ul> |

|          |  |
|----------|--|
| <b>i</b> | Notes, tips or examples indicate important information about the product or about this document. |
|----------|--|

### 2.2 Safety instructions

All safety instructions in this document are based on the results of the risk assessment carried out in accordance with Machinery Directive 2006/42/EC Annex I and EN ISO 12100 Section 5. As far as applicable, all unit life cycle phases have been considered.

#### Risks during transport

|  |
|--|
| <b>⚠ WARNING</b>   |
| <p><b>Danger of serious injury due to falling objects</b><br/>                 Due to falling objects there is a risk of injuries to limbs through to broken bones.</p> <ul style="list-style-type: none"> <li>▶ Take particular care and pay special attention when transporting products manually.</li> <li>▶ Do not stack the products.</li> <li>▶ Wear protective equipment, e.g. safety shoes.</li> </ul> |

## Risks during installation

**⚠ DANGER****Danger to life from electric shock**

Inadequate or incorrect grounding of the unit leads to contact-sensitive voltage on the housing. When making contact, increased leakage currents will cause a life-threatening electric shock.

- ▶ Before the installation, check that the connection leads are voltage-free.
- ▶ Conduct the electrical connection in accordance with locally applicable regulations.
- ▶ Make sure that the local mains voltage and frequency match rating plate specifications.
- ▶ Make sure that the mains cable and extension cable meet the requirements for double isolation between input voltage and output voltage, in accordance with IEC 61010 and IEC 60950.
- ▶ Use only a 3-pin mains cable and extension cable with properly connected protective earthing (earthed conductor).
- ▶ Plug the mains plug into a socket with earthing contact only.
- ▶ Always connect the mains cable prior to all other cables, to ensure continuous protective earthing.

**⚠ CAUTION****Danger of injury from bursting as a result of high pressure in the exhaust line**

Faulty or inadequate exhaust pipes lead to dangerous situations, e.g. increased exhaust pressure. There is a danger of bursting. Injuries caused by flying fragments, the escaping of high pressure, and damage to the unit cannot be excluded.

- ▶ Route the exhaust line without shut-off units.
- ▶ Observe the permissible pressures and pressure differentials for the product.
- ▶ Check the function of the exhaust line on a regular basis.

## Risks during operation

**⚠ WARNING****Danger of poisoning due to toxic process media escaping from the exhaust pipe**

During operation with no exhaust line, the vacuum pump allows exhaust gases and vapors to escape freely into the air. There is a risk of injury and fatality due to poisoning in processes with toxic process media.

- ▶ Observe the pertinent regulations for handling toxic process media.
- ▶ Safely purge toxic process media via an exhaust line.
- ▶ Use appropriate filter equipment to separate toxic process media.

**⚠ WARNING****Risk of burns on hot surfaces**

During vacuum pump operation, exposed surfaces reach high temperatures. There is a risk of burning.

- ▶ Allow the vacuum pump to cool down before carrying out any work.
- ▶ Wear protective gloves in accordance with EN ISO 21420.

## Risks during maintenance, decommissioning and in the event of malfunctions

**⚠ WARNING****Risk of burns on hot surfaces**

During vacuum pump operation, exposed surfaces reach high temperatures. There is a risk of burning.

- ▶ Allow the vacuum pump to cool down before carrying out any work.
- ▶ Wear protective gloves in accordance with EN ISO 21420.

**⚠ WARNING**

**Health hazard through poisoning from toxic contaminated components or devices**

Toxic process media result in contamination of devices or parts of them. During maintenance work, there is a risk to health from contact with these poisonous substances. Illegal disposal of toxic substances causes environmental damage.

- ▶ Take suitable safety precautions and prevent health hazards or environmental pollution by toxic process media.
- ▶ Decontaminate affected parts before carrying out maintenance work.
- ▶ Wear protective equipment.

**Risks during disposal**

**⚠ WARNING**

**Health hazard through poisoning from toxic contaminated components or devices**

Toxic process media result in contamination of devices or parts of them. During maintenance work, there is a risk to health from contact with these poisonous substances. Illegal disposal of toxic substances causes environmental damage.

- ▶ Take suitable safety precautions and prevent health hazards or environmental pollution by toxic process media.
- ▶ Decontaminate affected parts before carrying out maintenance work.
- ▶ Wear protective equipment.

## 2.3 Safety precautions

The product is designed according to the latest technology and recognized safety engineering rules. Nevertheless, improper use can result in danger to operator all third party life and limb, and product damage and additional property damage.

**i**

**Duty to provide information on potential dangers**

The product holder or user is obliged to make all operating personnel aware of dangers posed by this product.

Every person who is involved in the installation, operation or maintenance of the product must read, understand and adhere to the safety-related parts of this document.

**i**

**Infringement of conformity due to modifications to the product**

The Declaration of Conformity from the manufacturer is no longer valid if the operator changes the original product or installs additional equipment.

- Following the installation into a system, the operator is required to check and re-evaluate the conformity of the overall system in the context of the relevant European Directives, before commissioning that system.

**General safety precautions for working with the vacuum pump**

- ▶ Observe all applicable safety and accident prevention regulations.
- ▶ Check that all safety measures are observed at regular intervals.
- ▶ Do not expose body parts to the vacuum.
- ▶ Always ensure a secure connection to the earthed conductor (PE).
- ▶ Never disconnect plug connections during operation.
- ▶ Observe the above shutdown procedures.
- ▶ Keep lines and cables away from hot surfaces (> 70 °C).
- ▶ Never fill or operate the unit with cleaning agents or cleaning agent residues.
- ▶ Do not carry out your own conversions or modifications on the unit.
- ▶ Observe the unit protection class prior to installation or operation in other environments.
- ▶ Observe statutory and local regulations regarding solvents handling.
- ▶ Never operate an open or faulty unit.
- ▶ Before carrying out any maintenance, first allow the unit to cool and disconnect it from the vacuum equipment.

- ▶ Disconnect the vacuum pump from the mains prior to every intervention, and wait an additional five seconds until the capacitors have discharged.
- ▶ Implement suitable safety precautions where unintentional vacuum pump venting can cause hazards.
  - Power failures can cause unintentional venting.

## 2.4 Limits of use of the product

|                          |   |
|--------------------------|---|
| Installation location    | Interiors, protected against the accumulation of dust and weather influences, in a non-explosive, dry environment |
| Installation altitude    | max. 2000 m above sea level <sup>1)</sup>   |
| Relative humidity of air | 80% at T ≤ 31 °C, to max. 50% at T ≤ 40 °C  |
| Protection degree        | IP 20 according to IEC 60529<br>Type 1 according to UL 50E  |
| Overvoltage category     | II  |
| Degree of pollution      | 2   |
| Ambient temperature      | +5 °C to +40 °C   |

**Tbl. 3: Permissible ambient conditions**

## 2.5 Proper use

- ▶ Use the vacuum pump for vacuum generation only.
- ▶ Adhere to the installation, commissioning, operating, and maintenance instructions.
- ▶ Use only accessory parts recommended by Pfeiffer Vacuum.

## 2.6 Foreseeable improper use

Improper use of the product invalidates all warranty and liability claims. Any use that is counter to the purpose of the product, whether intentional or unintentional, is regarded as improper use; in particular:

- Pumping of corrosive media
- Pumping explosive media
- Pumping radioactive or volatile media
- Pumping of gases that contain contamination such as particles, dust, or condensate
- Pumping of fluids
- Pumping FKM-solubilizing media
- Pumping vapors from combustible liquids
- Pumping pressurized media (> atmospheric pressure)
- Pumping media that can condense or cause adhering deposits to form in the suction chamber
- Using the vacuum pump outside the specified range of application
- Using the vacuum pump below ground
- Using the vacuum pump to generate pressure
- Use of the vacuum pump in systems in which sporadic loads and vibrations or periodic forces act on the unit
- Using the vacuum pump in strong electrical, magnetic, or electromagnetic fields
- Connecting to vacuum pumps and units that are not designed for this purpose according to their operating instructions
- Connecting to units with exposed live parts
- Connecting to sockets without earthing contact
- Use of pipes to lift the vacuum pump
- Use of accessories or spare parts not listed in these instructions
- Using the vacuum pump as a climbing aid
- Using the connection lines between the diaphragm heads as carrying handles
- Using the pump in ambient conditions that do not meet the specified IP protection degree limits

1) at an installation location higher than 1000 meters above sea level, there is a risk of insufficient cooling. If necessary, take measures according to Directive DIN EN 61010.

## 2.7 Personnel qualification

The work described in this document may only be carried out by persons who have appropriate professional qualifications and the necessary experience or who have completed the necessary training as provided by Pfeiffer Vacuum.

### Training people

1. Train the technical personnel on the product.
2. Only let personnel to be trained work with and on the product when under the supervision of trained personnel.
3. Only allow trained technical personnel to work with the product.
4. Before starting work, make sure that the commissioned personnel have read and understood these operating instructions and all applicable documents, in particular the safety, maintenance and repair information.

### 2.7.1 Ensuring personnel qualification

#### Specialist for mechanical work

Only a trained specialist may carry out mechanical work. Within the meaning of this document, specialists are people responsible for construction, mechanical installation, troubleshooting and maintenance of the product, and who have the following qualifications:

- Qualification in the mechanical field in accordance with nationally applicable regulations
- Knowledge of this documentation

#### Specialist for electrotechnical work

Only a trained electrician may carry out electrical engineering work. Within the meaning of this document, electricians are people responsible for electrical installation, commissioning, troubleshooting, and maintenance of the product, and who have the following qualifications:

- Qualification in the electrical engineering field in accordance with nationally applicable regulations
- Knowledge of this documentation

In addition, these individuals must be familiar with applicable safety regulations and laws, as well as the other standards, guidelines, and laws referred to in this documentation. The above individuals must have an explicitly granted operational authorization to commission, program, configure, mark, and earth devices, systems, and circuits in accordance with safety technology standards.

#### Trained individuals

Only adequately trained individuals may carry out all works in other transport, storage, operation and disposal fields. Such training must ensure that individuals are capable of carrying out the required activities and work steps safely and properly.

### 2.7.2 Personnel qualification for maintenance and repair



#### Advanced training courses

Pfeiffer Vacuum offers advanced training courses to maintenance levels 2 and 3.

Adequately trained individuals are:

- **Maintenance level 1**
  - Customer (trained specialist)
- **Maintenance level 2**
  - Customer with technical education
  - Pfeiffer Vacuum service technician
- **Maintenance level 3**
  - Customer with Pfeiffer Vacuum service training
  - Pfeiffer Vacuum service technician

### 2.7.3 Advanced training with Pfeiffer Vacuum

For optimal and trouble-free use of this product, Pfeiffer Vacuum offers a comprehensive range of courses and technical trainings.

For more information, please contact [Pfeiffer Vacuum technical training](#).

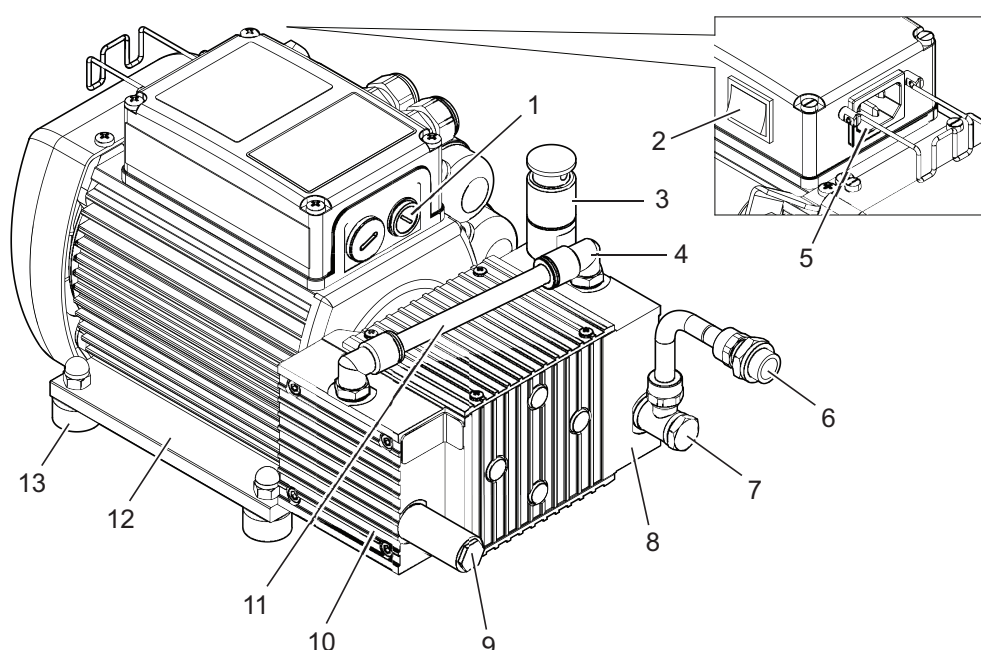
## 3 Product description

### 3.1 Function

Diaphragm pumps are dry compressing displacement pumps. The movement of diaphragms generates a periodic change of the suction chamber volume. The gas flow causes the valves to open and close automatically. The pump unit is directly connected to the drive motor.



Scan the QR code or [click here](#) to see how Pfeiffer Vacuum diaphragm pumps work.



**Fig. 2: Diaphragm pump design**

- |  |                                    |
|--|------------------------------------|
| 1 Voltage selector switch                    | 8 Diaphragm head 1                 |
| 2 Mains switch                               | 9 Exhaust connection with silencer |
| 3 Gas ballast valve                          | 10 Diaphragm head 2                |
| 4 Interhead connection with push-in fittings | 11 Hose connection                 |
| 5 Mains connection with locking plate        | 12 Base plate                      |
| 6 Input amplification                        | 13 Rubber feet (4×)                |
| 7 Vacuum connection                          |                                    |

#### 3.1.1 Drive

The drive motor is an alternating current motor with

- reversible voltage range on the voltage selector switch,
- thermal protection switch,
- mains switch and
- rubber connector

In event of excess temperature ( $> 95\text{ °C}$ ), the thermic protection switch interrupts the motor current, but does not offer a permanent shut-down of the motor. Once the motor has cooled down, the vacuum pump restarts automatically.

#### 3.1.2 Pumping system

The diaphragm pump has 2 diaphragm heads and 2 pumping stages.

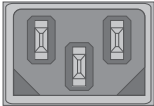
### 3.1.3 Cooling

The diaphragm pump is convection-cooled. The drive motor has its own fan.

### 3.1.4 Gas ballast

An integrated gas ballast system serves the controlled supply of ambient air or inert gas into the suction chamber. Gas ballast supports the reduction of condensate accumulating in the pumping system.

## 3.2 Connections

| Connection  | Description   |
|---|---|
|  | <b>Mains power supply</b><br>Housing connector C14 for the voltage supply |

Tbl. 4: Connection description of the diaphragm pump

## 3.3 Identifying product

- ▶ To ensure clear identification of the product when communicating with Pfeiffer Vacuum, always keep all of the information on the rating plate to hand.
- ▶ Learn about certifications through test seals on the product or at [www.tuev-sued.de](http://www.tuev-sued.de).

## 3.4 Scope of delivery

- Vacuum pump with drive
- Mains connection (reversible)
- Silencer
- G 1/8" elbow union with enclosed hose DN 6 x 1000 mm with a straight union in G 1/4" at the end
- Blind plug on the vacuum connection
- Operating instructions



## 4 Transportation and Storage

### 4.1 Transporting the vacuum pump

#### **WARNING**

##### **Danger of serious injury due to falling objects**

Due to falling objects there is a risk of injuries to limbs through to broken bones.

- ▶ Take particular care and pay special attention when transporting products manually.
- ▶ Do not stack the products.
- ▶ Wear protective equipment, e.g. safety shoes.



#### **Packing**

We recommend keeping the transport packaging and original protective cover.

#### **Safe transport of the product**

- ▶ Observe the weight specified on the packaging.
- ▶ Where possible, always transport or ship the product in the original packaging.
- ▶ Always place the product on an adequately sized, level surface.

#### **Transporting the vacuum pump without its packaging**

1. Unpack the vacuum pump.
2. To protect the inside of the pump, leave the blind plugs on the vacuum connection during transport.
3. Lift the vacuum pump on both front sides.
4. Lift the vacuum pump out of the transport packaging.
5. Make sure that no forces are acting on the piping system.
6. Always place the vacuum pump on an adequately sized, level surface.

### 4.2 Storing vacuum pump



#### **Packing**

We recommend storing the product in its original packaging.

#### **Safe storing vacuum pump**

- ▶ Seal the vacuum connection with the blind plug.
- ▶ Store the vacuum pump only in dry, dust-free rooms, within the specified ambient conditions.
- ▶ In rooms with humid or aggressive atmospheres: Hermetically seal the vacuum pump together with a drying agent in a plastic bag.

## 5 Installation

### 5.1 Installing the vacuum pump

#### Procedure

- ▶ Place the vacuum pump on a flat, horizontal surface.
- ▶ For stationary installation, screw the vacuum pump direct to the mounting surface.
- ▶ When installing the pump in a closed housing, ensure adequate air circulation.
- ▶ Keep the specifications on the motor rating plate visible and freely accessible.
- ▶ Keep the gas ballast valve visible and freely accessible.

### 5.2 Connecting the vacuum side

#### NOTICE

##### Property damage from contaminated gases

Pumping gases that contain contamination damages the vacuum pump.

- ▶ Use suitable filters or separators from the Pfeiffer Vacuum range of accessories, to protect the vacuum pump.



##### Installation and operation of accessories

Pfeiffer Vacuum offers a series of special, compatible accessories for its diaphragm pumps.

- Information and ordering options for approved [accessories](#) can be found online.
- Described accessories are not included in the shipment.



##### Preventing throttling losses

Using the shortest possible vacuum connection lines with large nominal diameter prevents pressure losses.



##### Condensate separator

Pfeiffer Vacuum recommends the installation of a condensate separator in case vapors are formed from moisture during evacuation.

#### Procedure

1. Remove the blind plug from the vacuum connection.
2. Establish the shortest possible connection between vacuum pump and vacuum chamber.
3. Choose a minimum vacuum line diameter equal to the nominal diameter of the vacuum connection.
4. Depending on the pump type, use PVC or metallic hoses with flange connections from the [Pfeiffer Vacuum component shop](#).
5. Connect the vacuum pump to the vacuum system using the vacuum connection.

### 5.3 Connect exhaust side

#### ⚠ WARNING

##### Danger to life from poisoning where toxic process gases leak with no exhaust line

During normal operation, the vacuum pump expels exhaust gases and vapors freely into the air. In processes involving toxic media, there is a risk of injury and danger to life due to poisoning.

- ▶ Observe the relevant regulations for handling toxic substances.
- ▶ Safely purge toxic process gases via an exhaust line.

**⚠ CAUTION****Danger of injury from bursting as a result of high pressure in the exhaust line**

Faulty or inadequate exhaust pipes lead to dangerous situations, e.g. increased exhaust pressure. There is a danger of bursting. Injuries caused by flying fragments, the escaping of high pressure, and damage to the unit cannot be excluded.

- ▶ Route the exhaust line without shut-off units.
- ▶ Observe the permissible pressures and pressure differentials for the product.
- ▶ Check the function of the exhaust line on a regular basis.

**⚠ CAUTION****Health hazard from increased noise emission**

Operation without silencer leads to higher noise emissions. Remaining in the close proximity of the vacuum pump for a sustained period of time may cause hearing damage.

- ▶ Install a suitable exhaust line.
- ▶ Wear hearing protection.

**Condensate separator**

Pfeiffer Vacuum recommends installing a condensate separator, with condensate drain at the lowest point of the exhaust line.

**Procedure**

1. Check the installed silencer for free passage.
2. Choose a minimum exhaust line diameter equal to the nominal diameter of the connection flange.
3. Depending on the pump type, use PVC or metallic hoses with flange connections from the [Pfeiffer Vacuum component shop](#).
4. Option: In case of higher gas throughputs, mount an exhaust line.
5. Route the piping downwards from the vacuum pump, to prevent condensate return.
6. Support or suspend the piping to the vacuum pump so that no piping system forces act on the vacuum pump.

## 5.4 Establishing mains connection

**⚠ DANGER****Danger to life from electric shock**

Touching exposed and voltage-bearing elements causes an electric shock. Improper connection of the mains supply leads to the risk of touchable live housing parts. There is a risk to life.

- ▶ Before the installation, check that the connection leads are voltage-free.
- ▶ Make sure that electrical installations are only carried out by qualified electricians.
- ▶ Provide adequate grounding for the device.
- ▶ After connection work, carry out an earthed conductor check.

**NOTICE****Risk of property damage from excess voltage**

Incorrect or excessive mains voltage will destroy the motor.

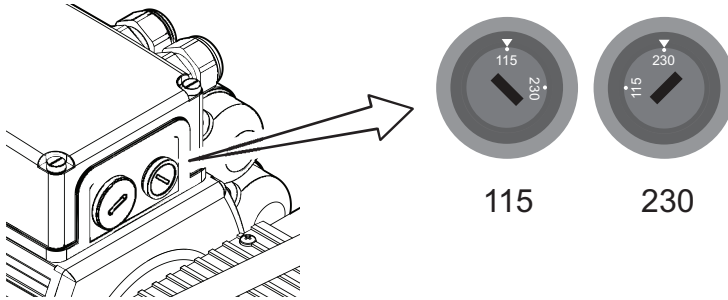
- ▶ Always observe the motor rating plate specifications.
- ▶ Route the mains connection in accordance with locally applicable provisions.
- ▶ Always provide a suitable mains fuse to protect the motor and supply cable in the event of a fault.

**NOTICE**

**Property damage from the voltage range being set incorrectly**

Recommissioning after longer downtimes of the vacuum pump or after changing the oil requires the current settings to be checked.

- ▶ Before switching the vacuum pump on each time, check the currently set voltage range.
- ▶ Make changes to the voltage range only after the vacuum pump has been disconnected from the mains.



**Fig. 3: Voltage selector switch on the terminal box**

| Switch position: | "115"                | "230"                 |
|------------------|----------------------|-----------------------|
| Voltage range    | 90 – 127 V, 50/60 Hz | 187 – 259 V, 50/60 Hz |

**Tbl. 5: Permissible voltage range for reversible single-phase motor**

**Required tool**

- Screwdriver

**Changing the voltage range**

1. The mains voltage must be determined on-site each time before the vacuum pump is installed or moved to a different location.
2. Disconnect the vacuum pump from the mains.
3. Set the required voltage range on the voltage selector switch using a suitable screwdriver.

**Establish the mains supply**

1. Order a corresponding mains connection cable from the Pfeiffer Vacuum accessories range.
2. Always ensure a secure connection to the earthed conductor (PE).
3. Plug the mains cable into the power supply plug of the vacuum pump.

## 6 Operation

### 6.1 Commissioning vacuum pump

#### **WARNING**

##### **Danger of poisoning due to toxic process media escaping from the exhaust pipe**

During operation with no exhaust line, the vacuum pump allows exhaust gases and vapors to escape freely into the air. There is a risk of injury and fatality due to poisoning in processes with toxic process media.

- ▶ Observe the pertinent regulations for handling toxic process media.
- ▶ Safely purge toxic process media via an exhaust line.
- ▶ Use appropriate filter equipment to separate toxic process media.

#### **CAUTION**

##### **Danger of burns on hot surfaces**

Depending on the operating and ambient conditions, the surface temperature of the vacuum pump can increase to above 70 °C. If access to the vacuum pump is unrestricted, there is a danger of burns due to contact with hot surfaces.

- ▶ Install suitable touch protection if the vacuum pump is unrestrictedly accessible.
- ▶ Allow the vacuum pump to cool down before carrying out any work.
- ▶ Contact Pfeiffer Vacuum for suitable touch protection in system solutions.

#### **NOTICE**

##### **Vacuum pump damage caused by overpressure**

Mixing up the connections causes overpressure overload. The vacuum pump can be started only against max. 1 bar differential pressure between inlet and outlet; otherwise the motor jams and sustains damage.

- ▶ Make sure that the distributor is installed correctly on the diaphragm heads, before connecting the vacuum pump to the vacuum equipment.
- ▶ Before commissioning, make completely sure that the pressure side pressure is below the permissible limit.

#### **Procedure**

1. Compare the frequency specifications on the rating plate with the available supply voltage.
2. Check the exhaust connection for free passage (max. permissible pressure: 1100 hPa absolute).
3. Actuate the shut-off units so that the shut-off units open before or at the same time as the vacuum pump starts up.

### 6.2 Switching on vacuum pump

#### **CAUTION**

##### **Danger of burns on hot surfaces**

Depending on the operating and ambient conditions, the surface temperature of the vacuum pump can increase to above 70 °C. If access to the vacuum pump is unrestricted, there is a danger of burns due to contact with hot surfaces.

- ▶ Install suitable touch protection if the vacuum pump is unrestrictedly accessible.
- ▶ Allow the vacuum pump to cool down before carrying out any work.
- ▶ Contact Pfeiffer Vacuum for suitable touch protection in system solutions.



#### **Warm-up time of the vacuum pump**

The warm-up time depends on the ambient temperature and takes at least 30 minutes.

When pumping down dry gases, no special precautions are required.

**Prerequisite**

- Required mains connection established

**Switching on the vacuum pump**

1. If required, switch the vacuum pump on in each pressure range at the mains switch.
2. Allow the vacuum pump to warm up prior to process start, with the vacuum connection closed.

The vacuum pump achieves the specified throughput and final pressure values once the operating temperature has been reached.

### 6.3 Operating vacuum pump with gas ballast

**NOTICE**

**Risk of damage from condensation in vacuum pump**

During operation without gas ballast, condensation may form as a result of the vapor compatibility of the vacuum pump being exceeded.

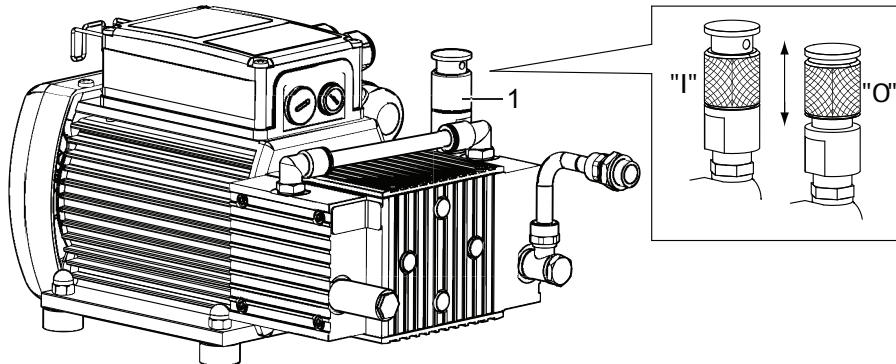
- ▶ Pump condensable vapors only when the vacuum pump is warm and the gas ballast valve open.
- ▶ To protect the vacuum pump against corrosion, allow the vacuum pump to run on after process end for another 30 minutes with the gas ballast valve open.



**No intermediate setting possible on the gas ballast valve**

An intermediate setting between "open" and "closed" is not possible.

The gas ballast valve supplies air to the working chamber of the vacuum pump periodically at the beginning of the compression phase. When pumping down vapors, this air prevents condensation within certain limits in the vacuum pump.



**Fig. 4: Gas ballast valve**

- |   |                                 |              |                          |
|---|---------------------------------|--------------|--------------------------|
| 1 | Sleeve on the gas ballast valve | Position "I" | Gas ballast valve open   |
|   | Position "0"                    |              | Gas ballast valve closed |

**Behavior with process gases with condensable vapors**

- ▶ Operate the vacuum pump with gas ballast, i.e. with the gas ballast valve open.

**Open gas ballast valve**

- ▶ To open the gas ballast valve, push the sleeve on the valve down into position "I".

**Close gas ballast valve**

- ▶ To close the gas ballast valve, push the sleeve on the valve upwards into position "0".

### 6.4 Switching off the vacuum pump

**Procedure**

1. Allow the vacuum pump to run on for 5 to 10 minutes with the vacuum connection open to allow any condensate that may be present to be removed from the vacuum pump.
2. If required, switch the vacuum pump off in each pressure range at the mains switch.

## 7 Maintenance

### 7.1 Maintenance instructions

#### **⚠ WARNING**

##### **Health hazard through poisoning from toxic contaminated components or devices**

Toxic process media result in contamination of devices or parts of them. During maintenance work, there is a risk to health from contact with these poisonous substances. Illegal disposal of toxic substances causes environmental damage.

- ▶ Take suitable safety precautions and prevent health hazards or environmental pollution by toxic process media.
- ▶ Decontaminate affected parts before carrying out maintenance work.
- ▶ Wear protective equipment.

#### **⚠ CAUTION**

##### **Danger of injury from moving parts**

After a power failure or a standstill as a result of overheating, the motor restarts automatically. There is a risk of injury to fingers and hands if they enter the operating range of rotating parts.

- ▶ Safely disconnect motor from the mains.
- ▶ Secure the motor against reactivation.
- ▶ Dismantle the vacuum pump for inspection, away from the system if necessary.

#### **NOTICE**

##### **Damage caused by unsuitable cleaning agents**

Unsuitable cleaning agents damage pump parts.

- ▶ Use only approved cleaning agents to clean pump parts.
- ▶ Use only a clean dry cloth to clean the diaphragms and valves.
- ▶ Do not use any alcohol or other cleaning agents to clean the diaphragms and valves.

#### **NOTICE**

##### **Danger of property damage from improper maintenance**

Unprofessional work on the vacuum pump will lead to damage for which Pfeiffer Vacuum accepts no liability.

- ▶ We recommend taking advantage of our service training offering.
- ▶ When ordering spare parts, specify the information on the nameplate.

The following section relates to the tasks for cleaning and maintaining the vacuum pump. Valves and diaphragms are wear parts.

| Component  | Operating hours |
|------------|-----------------|
| Diaphragms | 17 500          |
| Valves     | 17 500          |

**Tbl. 6: Typical service life with normal use**

#### **Prerequisites**

- Vacuum pump switched off
- Vacuum pump vented from atmospheric pressure
- Vacuum pump cooled

#### **Required materials**

- Cloth (clean, lint-free)
- Water or mild soap solution

**Servicing the vacuum pump**

1. Disconnect the vacuum pump from the voltage supply.
2. Secure the motor against reactivation.
3. Remove any external contamination on the vacuum pump with cloth slightly moistened with water or a mild soap solution.
4. Allow all cleaned parts to dry well.
5. For maintenance work, only dismantle the vacuum pump to the extend needed.
6. Clean the suction chamber, diaphragms, and valves with a dry cloth.
7. Examine the diaphragms and valves for cracks at the latest when the pressure values achieved decrease.

**7.2 Checklist for inspection and maintenance**



**Maintenance frequency and service lives**

Maintenance frequency and service lives are process-dependent. Chemical and thermic loads or contamination reduce the recommended reference values.

- Determine the specific service lives during the first operating interval.
- Consult with Pfeiffer Vacuum Service if you wish to reduce the maintenance frequency.



**Maintenance by Pfeiffer Vacuum Service**

We recommend that Pfeiffer Vacuum Service carry out maintenance work. If the specified intervals are exceeded, or if maintenance work is carried out improperly, no warranty or liability claims are accepted on the part of Pfeiffer Vacuum. This also applies wherever parts other than original spare parts are used.

| Action   | Inspection                                     | Maintenance                            | Required material                            |
|--|--|--|--|
| Interval                                       | as required;<br>at least once every six months | as required;<br>at least every 2 years |  |
| Check silencer for contamination <sup>2)</sup> | ■  |  |  |
| Test vacuum pump optically and acoustically    | ■  |  |  |
| Read out and analyze pump data <sup>3)</sup>   |  | ■                                      |  |
| Clean the vacuum pump                          |  | ■                                      |  |
| Change the diaphragms and valves               |  | ■                                      | Overhaul kit                                 |
| Change silencer <sup>4)</sup>                  |  | ■                                      | Silencer                                     |
| Performing a function test                     |  | ■                                      |  |
| Performing incoming inspection                 |  | ■                                      |  |
| Clean vacuum pump completely                   |  | ■                                      |  |
| Change gas ballast filter <sup>5)</sup>        |  | ■                                      | Filter                                       |
| Replace wear parts                             |  | ■                                      | Diaphragms, valves, sealing rings, silencers |

**Tbl. 7: Maintenance intervals**

2) if present  
 3) DC pumps only  
 4) if present  
 5) if present



## 7.3 Change the diaphragms and valves

### NOTICE

#### Property damage from incorrect installation

Change in dead volume due to incorrect installation of the original spacer disks impairs the final vacuum or leads to bearing damage.

- ▶ During disassembly, keep the existing spacer disks separate per installation location.
- ▶ Reinstall the same number of original spacer disks per diaphragm head.

### 7.3.1 Dismantling diaphragm head and valves

#### Required tools

- Allen key, WAF 4

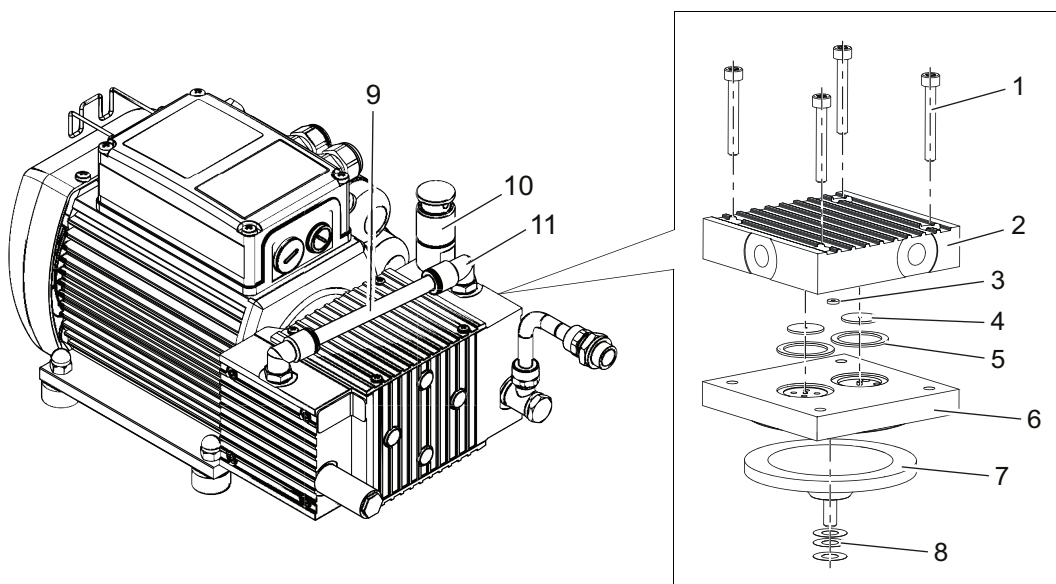


Fig. 5: Diaphragm head and valves

- |                                      |  |
|--------------------------------------|--|
| 1 Interior hexagon socket screw (4×) | 7 Diaphragm                              |
| 2 Diaphragm head cover               | 8 Spacer disks                           |
| 3 Seal on the suction side           | 9 Hose connection                        |
| 4 Valve plate (2×)                   | 10 Gas ballast valve                     |
| 5 Sealing ring on the suction side   | 11 Interconnection with push-in fittings |
| 6 Intermediate plate                 |  |

#### Procedure

1. Disconnect the hose connection from the push-in fittings.
2. Rotate the diaphragm pump so that the diaphragm head to be dismantled is facing upwards.
3. Unscrew the interior hexagon socket screws from the diaphragm head cover.
4. Remove the diaphragm head.
  - Observe the sealing rings and the seal on the suction side.
5. Remove the intermediate plate.
6. Release the valves and the sealing rings from the intermediate plate.
7. Lift the diaphragm slightly at the side.
8. Unscrew and remove the diaphragm from the connection rod by hand.
  - The diaphragm has a right-hand thread.
  - Pay attention to the spacer disks.

### 7.3.2 Cleaning and replacing the diaphragms and valves

#### Prerequisite

- Diaphragm and valves removed

**Required spare parts**

- Overhaul kit

**Required consumables**

- Clean, dry cloth
- Isopropanol

**Procedure**

1. Clean diaphragms and valves with a clean, dry cloth.
  - Do not use isopropanol or other cleaning agents to clean diaphragms and valves.
2. Clean valve seats, intermediate plate and head cover with isopropanol.
3. Check valve seats, intermediate plate and head cover for wear.
4. Replace all wear parts according to the inspection sets.

### 7.3.3 Mounting diaphragm head and valves

**Spacer disks**

Spacer disks are available in 3 sizes:

- 13.0 × 6.4 × 0.5 mm
- 13.0 × 6.4 × 0.1 mm
- 16.0 × 6.4 × 0.05 mm

The number and size of the spacer disks vary between the diaphragm heads.

Install the same number and size of original spacer disks per diaphragm head.

**Required tools**

- Allen key, **WAF 4**

**Procedure**

1. Rotate the diaphragm pump so that the diaphragm head to be mounted is facing upwards.
2. Screw the diaphragm into the connection rod by hand.
  - The diaphragm has a right-hand thread.
  - Pay attention to the spacer disks.
3. Place the valves and the sealing rings in the intermediate plate.
4. Position the intermediate plate.
5. Put on the diaphragm head cover.
  - Observe the sealing rings and the seal on the suction side.
6. Screw the interior hexagon socket screws into the diaphragm head cover.
7. Mount the hose connection using the push-in fittings.

### 7.4 Cleaning gas ballast valve

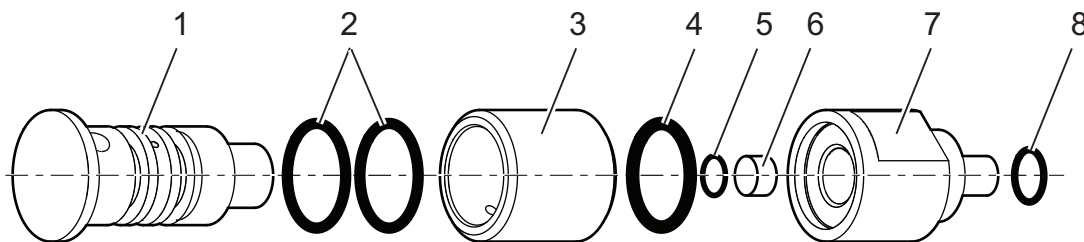
The gas ballast filter is soiled if the vacuum pump takes in ambient air containing dust during gas ballast operation. As the soiling increases, the throughput of the gas ballast filter decreases. The risk of condensation and corrosion in the vacuum pump increases.

**Required tools**

- Bolt, **max. Ø 3.5 mm**
- Screwdriver

**Required consumables**

- Compressed air
- Clean, dry cloth



**Fig. 6: Gas ballast valve**

- |                 |                      |
|-----------------|----------------------|
| 1 Valve housing | 5 Circular spring    |
| 2 O-ring (2x)   | 6 Gas ballast filter |
| 3 Sleeve        | 7 Reducing piece     |
| 4 USIT ring     | 8 O-ring             |

#### Strip the gas ballast valve

1. Unscrew and remove the gas ballast valve.
  - Be careful with the o-ring.
2. Push the bolt into the cross hole on the valve housing.
3. Screw the valve housing with the bolt out of the reducing piece.
4. Remove the sleeve from the valve housing.
5. Carefully lever the circular spring out of the reducing piece.
6. Remove the circular spring and the filter out of the reducing piece.

#### Cleaning gas ballast valve

1. Clean the gas ballast filter using compressed air.
2. Check all parts for wear.
3. Replace the gas ballast valve in the event of major contamination or wear.

#### Installing gas ballast valve

1. Insert the filter in the reducing piece.
2. Secure the circular spring in the reducing piece.
3. Push the sleeve onto the valve housing.
  - Observe the position of the bore in the sleeve.
4. Push the bolt into the cross hole on the valve housing.
5. Screw the valve housing with the bolt into the reducing piece.
6. Screw in the gas ballast valve.
  - Be careful with the o-ring.

## 7.5 Replacing device fuses

### **⚠ WARNING**

#### **Danger to life from electric shock during maintenance and service work**

The vacuum pump is only completely de-energized when the mains plug has been disconnected. There is a danger to life from electric shock when making contact with live components.

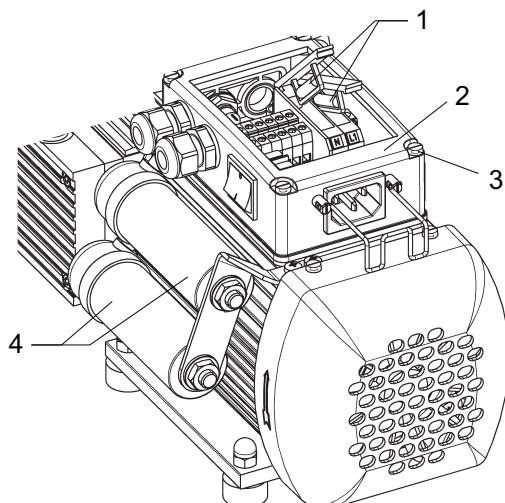
- ▶ Before performing all work, switch off the mains switch.
- ▶ Disconnect mains cable from mains plug.
- ▶ Wait 2 minutes until the capacitors have discharged.
- ▶ Secure the vacuum pump against unintentional re-start.

#### Required tool

- Flat-tip screwdriver

#### Spare parts required

- 2× microfuses 5 × 20 (3,15 A T)



**Fig. 7: Device fuses**

- |                                   |                       |
|-----------------------------------|-----------------------|
| 1 Device fuses in the fuse holder | 3 Cylinder screw (4×) |
| 2 Terminal box                    | 4 Capacitors          |

**Replacing defective device fuses**

1. Loosen the 4 cylinder screws.
2. Remove the cover from the terminal box.
3. Open the fuse holder.
4. Replace faulty fuses.
5. Close fuse holder.
6. Place the terminal box cover on the vacuum pump.
7. Fasten the 4 cylinder screws.

## 8 Decommissioning

Before shutting down the vacuum pump, observe the following instructions to adequately protect the interior of the vacuum pump (suction chamber) from corrosion:

### **Procedure for temporary vacuum pump shutdowns**

1. Allow the vacuum pump to run on for 5 to 10 minutes with the vacuum connection open to allow any condensate that may be present to be removed from the vacuum pump.
2. If media has entered the vacuum pump that may attack the pump materials or lead to deposits, clean the inside of the pump heads.

### **Procedure for longer vacuum pump shutdowns**

1. Disconnect the vacuum pump from the vacuum system.
2. Remove the vacuum pump from the vacuum system if necessary.
3. Seal the vacuum connection with the original sealing plugs.
4. Store the vacuum pump in dry, dust-free rooms, within the specified ambient conditions.
5. Pack the vacuum pump together with a drying agent in a plastic bag, and seal the vacuum pump airtight if it is to be stored in rooms with damp or aggressive atmospheres.

## 9 Recycling and disposal

### **WARNING**

#### **Health hazard through poisoning from toxic contaminated components or devices**

Toxic process media result in contamination of devices or parts of them. During maintenance work, there is a risk to health from contact with these poisonous substances. Illegal disposal of toxic substances causes environmental damage.

- ▶ Take suitable safety precautions and prevent health hazards or environmental pollution by toxic process media.
- ▶ Decontaminate affected parts before carrying out maintenance work.
- ▶ Wear protective equipment.



#### **Environmental protection**

You **must** dispose of the product and its components in accordance with all applicable regulations for protecting people, the environment and nature.

- Help to reduce the wastage of natural resources.
- Prevent contamination.

### 9.1 General disposal information

Pfeiffer Vacuum products contain materials that you must recycle.

- ▶ Dispose of our products according to the following:
  - Iron
  - Aluminium
  - Copper
  - Synthetic
  - Electronic components
  - Oil and fat, solvent-free
- ▶ Observe the special precautionary measures when disposing of:
  - Fluoroelastomers (FKM)
  - Potentially contaminated components that come into contact with media

### 9.2 Dispose of diaphragm pumps

Pfeiffer Vacuum diaphragm pumps contain materials that you must recycle.

1. Disconnect the electronic drive unit.
2. Dismantle the motor.
3. Decontaminate the components that come into contact with process gases.
4. Separate the components into recyclable materials.
5. Recycle the non-contaminated components.
6. Dispose of the product or components in a safe manner according to locally applicable regulations.

## 10 Malfunctions

### ⚠ CAUTION

#### Danger of injury from moving parts

After a power failure or a standstill as a result of overheating, the motor restarts automatically. There is a risk of injury to fingers and hands if they enter the operating range of rotating parts.

- ▶ Safely disconnect motor from the mains.
- ▶ Secure the motor against reactivation.
- ▶ Dismantle the vacuum pump for inspection, away from the system if necessary.

### ⚠ CAUTION

#### Danger of burns on hot surfaces

In the event of a fault, the surface temperature of the vacuum pump can increase to above 105 °C.

- ▶ Allow the vacuum pump to cool down before carrying out any work.
- ▶ Wear personal protective equipment if necessary.

### NOTICE

#### Danger of property damage from improper maintenance

Unprofessional work on the vacuum pump will lead to damage for which Pfeiffer Vacuum accepts no liability.

- ▶ We recommend taking advantage of our service training offering.
- ▶ When ordering spare parts, specify the information on the nameplate.

Should malfunctions occur, you can find information about possible causes and how to fix them here:

| Problem  | Possible causes  | Remedy   |
|--|--|--|
| Vacuum pump will not start up                              | <ul style="list-style-type: none"> <li>• No supply voltage or voltage does not correspond to the motor data</li> </ul> | <ul style="list-style-type: none"> <li>• Check the supply voltage.</li> </ul>  |
|  | <ul style="list-style-type: none"> <li>• Pump temperature too low</li> </ul>   | <ul style="list-style-type: none"> <li>• Heat the vacuum pump to a temperature of &gt; 5°C.</li> </ul>                           |
|  | <ul style="list-style-type: none"> <li>• Thermal protection of the motor has triggered</li> </ul>                      | <ul style="list-style-type: none"> <li>• Identify and eliminate the cause and allow vacuum pump to cool if necessary.</li> </ul> |
|  | <ul style="list-style-type: none"> <li>• Phase failure</li> </ul>  | <ul style="list-style-type: none"> <li>• Check the built-in device fuses.</li> <li>• Replace defective device fuses.</li> </ul>  |
|  | <ul style="list-style-type: none"> <li>• Diaphragms or valves dirty</li> </ul>   | <ul style="list-style-type: none"> <li>• Clean the vacuum pump.</li> </ul>   |
|  | <ul style="list-style-type: none"> <li>• Overpressure in the exhaust line</li> </ul>                                   | <ul style="list-style-type: none"> <li>• If required, check and clean the exhaust line.</li> </ul>                               |
|  | <ul style="list-style-type: none"> <li>• Fuse failure</li> </ul>   | <ul style="list-style-type: none"> <li>• Check the built-in device fuses.</li> <li>• Replace defective device fuses.</li> </ul>  |
| Vacuum pump switches off after a while after being started | <ul style="list-style-type: none"> <li>• Thermal protection of the motor has triggered</li> </ul>                      | <ul style="list-style-type: none"> <li>• Identify and eliminate the cause and allow vacuum pump to cool if necessary.</li> </ul> |
|  | <ul style="list-style-type: none"> <li>• Device fuse triggered due to overload (e.g. cold start)</li> </ul>            | <ul style="list-style-type: none"> <li>• Heat up the vacuum pump.</li> </ul>   |
|  | <ul style="list-style-type: none"> <li>• Exhaust pressure too high</li> </ul>  | <ul style="list-style-type: none"> <li>• Check the exhaust line outlet opening and exhaust side accessories.</li> </ul>          |

| Problem   | Possible causes   | Remedy   |
|---|---|--|
| Vacuum pump does not reach the specified final pressure | <ul style="list-style-type: none"> <li>• Condensate in the vacuum pump</li> </ul>               | <ul style="list-style-type: none"> <li>• Operate the vacuum pump over a longer period at atmospheric pressure and, if necessary, with the gas ballast valve open.</li> </ul> |
|   | <ul style="list-style-type: none"> <li>• Gas ballast valve open</li> </ul>                      | <ul style="list-style-type: none"> <li>• Close the gas ballast valve.</li> </ul>   |
|   | <ul style="list-style-type: none"> <li>• Soiled valves or diaphragms</li> </ul>                 | <ul style="list-style-type: none"> <li>• If necessary, clean or replace the valves and diaphragms.</li> </ul>  |
|   | <ul style="list-style-type: none"> <li>• Leak in system</li> </ul>                              | <ul style="list-style-type: none"> <li>• Locate and eliminate the leak.</li> </ul>   |
| Pumping speed of vacuum pump too low                    | <ul style="list-style-type: none"> <li>• The intake line is not suitably dimensioned</li> </ul> | <ul style="list-style-type: none"> <li>• Make sure that connections are short and cross sections adequately dimensioned.</li> </ul>  |
|   | <ul style="list-style-type: none"> <li>• Exhaust pressure too high</li> </ul>                   | <ul style="list-style-type: none"> <li>• Checking exhaust line outlet opening and exhaust side accessories.</li> </ul>   |
| Unusual noises during operation                         | <ul style="list-style-type: none"> <li>• Defective valves or diaphragms</li> </ul>              | <ul style="list-style-type: none"> <li>• If necessary, clean or replace the valves and diaphragms.</li> </ul>  |
|   | <ul style="list-style-type: none"> <li>• Suction chamber dirty</li> </ul>                       | <ul style="list-style-type: none"> <li>• Clean suction chamber.</li> </ul>   |
|   | <ul style="list-style-type: none"> <li>• Silencer loose or missing</li> </ul>                   | <ul style="list-style-type: none"> <li>• If necessary, check or replace the silencer.</li> </ul>   |
|   | <ul style="list-style-type: none"> <li>• Valves dirty or defective</li> </ul>                   | <ul style="list-style-type: none"> <li>• If necessary, clean or replace the valves and diaphragms.</li> </ul>  |
|   | <ul style="list-style-type: none"> <li>• Motor fan defective</li> </ul>                         | <ul style="list-style-type: none"> <li>• Replace the motor fan.</li> <li>• Contact <a href="#">Pfeiffer Vacuum Service</a>.</li> </ul>                                       |
|   | <ul style="list-style-type: none"> <li>• Connection rod or motor bearing defective</li> </ul>   | <ul style="list-style-type: none"> <li>• Contact <a href="#">Pfeiffer Vacuum Service</a>.</li> </ul>   |

**Tbl. 8: Troubleshooting on diaphragm pumps**



# 11 Service solutions by Pfeiffer Vacuum

## We offer first-class service

High vacuum component service life, in combination with low downtime, are clear expectations that you place on us. We meet your needs with efficient products and outstanding service.

We are always focused on perfecting our core competence – servicing of vacuum components. Once you have purchased a product from Pfeiffer Vacuum, our service is far from over. This is often exactly where service begins. Obviously, in proven Pfeiffer Vacuum quality.

Our professional sales and service employees are available to provide you with reliable assistance, worldwide. Pfeiffer Vacuum offers an entire range of services, from [original replacement parts](#) to [service contracts](#).

## Make use of Pfeiffer Vacuum service

Whether preventive, on-site service carried out by our field service, fast replacement with mint condition replacement products, or repair carried out in a [Service Center](#) near you – you have various options for maintaining your equipment availability. You can find more detailed information and addresses on our homepage, in the [Pfeiffer Vacuum Service](#) section.

**You can obtain advice on the optimal solution for you, from your [Pfeiffer Vacuum representative](#).**

**For fast and smooth service process handling, we recommend the following:**



1. Download the up-to-date form templates.
  - [Explanations of service requests](#)
  - [Service requests](#)
  - [Contamination declaration](#)

- a) Remove and store all accessories (all external parts, such as valves, protective screens, etc.).
- b) If necessary, drain operating fluid/lubricant.
- c) If necessary, drain coolant.



2. Complete the service request and contamination declaration.



3. Send the forms by email, fax, or post to your local [Service Center](#).

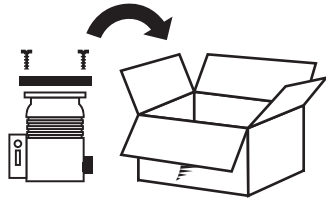


4. You will receive an acknowledgment from Pfeiffer Vacuum.

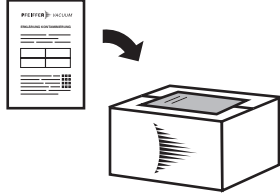
PFEIFFER VACUUM

## Submission of contaminated products

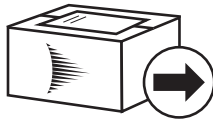
No microbiological, explosive, or radiologically contaminated products will be accepted. Where products are contaminated, or the contamination declaration is missing, Pfeiffer Vacuum will contact you before starting service work. Depending on the product and degree of pollution, **additional decontamination costs** may be incurred.



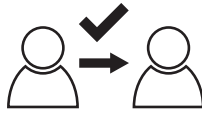
5. Prepare the product for transport in accordance with the provisions in the contamination declaration.
  - a) Neutralize the product with nitrogen or dry air.
  - b) Seal all openings with blind flanges, so that they are airtight.
  - c) Shrink-wrap the product in suitable protective foil.
  - d) Package the product in suitable, stable transport containers only.
  - e) Maintain applicable transport conditions.



6. Attach the contamination declaration to the **outside** of the packaging.



7. Now send your product to your local Service Center.



8. You will receive an acknowledgment/quotation, from Pfeiffer Vacuum.

PFEIFFER VACUUM

Our sales and delivery conditions and repair and maintenance conditions for vacuum devices and components apply to all service orders.

## 12 Spare part packages

### Ordering spare part packages

- ▶ Have the vacuum pump part number to hand, along with other details from the rating plate if necessary.
- ▶ Install original spare parts only.
- ▶ When ordering the inspection set, observe the respective part number of the diaphragm pump.

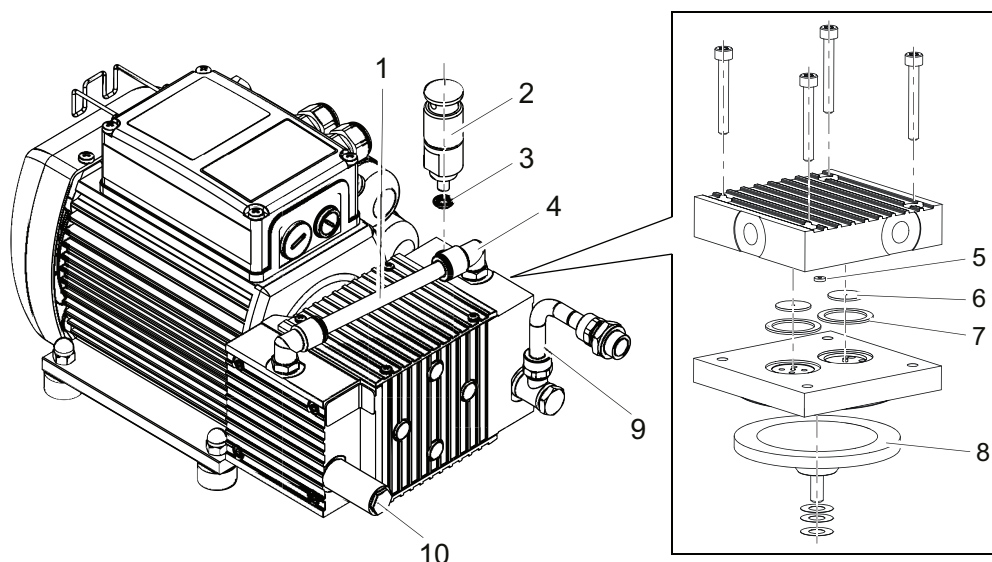


Fig. 8: Spare parts

- |                               |                                    |
|-------------------------------|------------------------------------|
| 1 Hose connection             | 6 Valve plate (2×)                 |
| 2 Gas ballast valve, complete | 7 Sealing ring on the suction side |
| 3 Seal for gas ballast valve  | 8 Diaphragm                        |
| 4 Push-in fitting             | 9 Suction hose                     |
| 5 Seal on the suction side    | 10 Silencer                        |

| Spare parts                 | Order number  | consisting of items | Description                                      |
|-----------------------------|---------------|---------------------|--|
| Overhaul kit                | PU E22 001 -T | 3, 5, 6, 7, 8       | Valve plates, sealing rings, diaphragms          |
| Silencer                    | P 0920 567 E  | 10                  | -  |
| Interhead connection        | PK 050 327    | 1, 4 (2×)           | Interhead connection between the diaphragm heads |
| Suction hose                | P 0991 939    | 9                   | Ø 6/8 mm, 1 m long, PE                           |
| Gas ballast valve, complete | PK 050 148 -U | 2                   | -  |
| Device fuse                 | P 0920 109 E  | -                   | Microfuse 5 × 20 mm, 250 V, 3,15 A, slow-blow    |
| Fan                         | PU E22 026 -T | -                   | Motor fan and fan cover                          |

Tbl. 9: Spare parts

## 13 Accessories

### 13.1 Accessory information

#### Relay boxes

Relay boxes are used to control backing pumps in conjunction with the electronic drive unit TC of the turbopump.

#### Mains Cable

Mains cables provide a secure and suitable connection.

### 13.2 Ordering accessories

| Selection field  | Part number   |
|--|---------------|
| Relay box, shielded, for backing pumps, 1-phase motor 7A for TC 110/120 and TCP 350, plug M8       | PM 071 282 -X |
| Relay box, shielded, for backing pumps, 1-phase motor 7 A for TC 400/1200, TM 700 and TCP 350, M12 | PM 071 284 -X |
| Mains cable 230 V AC, CEE 7/7 to C13, 3 m  | P 4564 309 ZA |
| Mains cable 115 V AC, NEMA 5-15 to C13, 3 m  | P 4564 309 ZE |
| Mains cable 115/230 V without plug, IEC socket (straight), 3 m                                     | P 4564 309 ZH |
| Screwing flange DN 16 ISO-KF / 1/8" thread incl. seal  | PK 050 108 -T |
| Push-in T-fitting 1/8" thread including seal for hose connection (8/6 mm)                          | P 4131 030 E  |
| Push-in fitting 1/8" thread including seal for hose connection (8/6 mm)                            | P 4131 026 C  |
| Push-in fitting G 1/8" including seal for hose connection (8/6 mm)                                 | P 4131 029 G  |
| Hose DN 6; (ø 8/6 mm) polyethylene   | P 0991 939    |

Tbl. 10: Accessories MVP 015-2

## 14 Technical data and dimensions

### 14.1 General

Basis for the technical data of Pfeiffer Vacuum diaphragm pumps:

- Specifications according to PNEUROP committee PN5
- ISO 21360:2012: "Vacuum technology - Standard methods for measuring vacuum-pump performance - General description"

The following harmonized standards are fulfilled:

- IEC 61010-1
- UL 61010-1
- CSA 61010-1

|              | mbar | bar                  | Pa             | hPa  | kPa               | Torr   mm Hg        |
|--------------|------|----------------------|----------------|------|-------------------|---------------------|
| mbar         | 1    | $1 \cdot 10^{-3}$    | 100            | 1    | 0.1               | 0.75                |
| bar          | 1000 | 1                    | $1 \cdot 10^5$ | 1000 | 100               | 750                 |
| Pa           | 0.01 | $1 \cdot 10^{-5}$    | 1              | 0.01 | $1 \cdot 10^{-3}$ | $7.5 \cdot 10^{-3}$ |
| hPa          | 1    | $1 \cdot 10^{-3}$    | 100            | 1    | 0.1               | 0.75                |
| kPa          | 10   | 0.01                 | 1000           | 10   | 1                 | 7.5                 |
| Torr   mm Hg | 1.33 | $1.33 \cdot 10^{-3}$ | 133.32         | 1.33 | 0.133             | 1                   |

1 Pa = 1 N/m<sup>2</sup>

**Tbl. 11: Conversion table: Pressure units**

|                        | mbar l/s             | Pa m <sup>3</sup> /s | sccm | Torr l/s             | atm cm <sup>3</sup> /s |
|------------------------|----------------------|----------------------|------|----------------------|------------------------|
| mbar l/s               | 1                    | 0.1                  | 59.2 | 0.75                 | 0.987                  |
| Pa m <sup>3</sup> /s   | 10                   | 1                    | 592  | 7.5                  | 9.87                   |
| sccm                   | $1.69 \cdot 10^{-2}$ | $1.69 \cdot 10^{-3}$ | 1    | $1.27 \cdot 10^{-2}$ | $1.67 \cdot 10^{-2}$   |
| Torr l/s               | 1.33                 | 0.133                | 78.9 | 1                    | 1.32                   |
| atm cm <sup>3</sup> /s | 1.01                 | 0.101                | 59.8 | 0.76                 | 1                      |

**Tbl. 12: Conversion table: Units for gas throughput**

### 14.2 Technical data

| Type designation                   | MVP 015-2                                   | MVP 015-2  |
|------------------------------------|---|--|
| Part number                        | PK T05 100                                  | PK T05 103   |
| Connection flange (in)             | G 1/8"                                      | G 1/8" with Swagelok tube fitting, 1/4" tube OD x 1/8" external thread |
| Connection flange (out)            | 1/8" thread with silencer                   | 1/8" thread with silencer  |
| Pumping speed at 60 Hz             | 0.7 m <sup>3</sup> /h                       | 0.7 m <sup>3</sup> /h  |
| Pumping speed at 50 Hz             | 0.5 m <sup>3</sup> /h                       | 0.5 m <sup>3</sup> /h  |
| Final pressure without gas ballast | 3.5 hPa                                     | 3.5 hPa  |
| Final pressure with gas ballast    | 4.5 hPa                                     | 4.5 hPa  |
| Gas ballast                        | Yes   | Yes  |
| Intake pressure max.               | 1100 hPa                                    | 1100 hPa   |
| Exhaust pressure, max.             | 1100 hPa                                    | 1100 hPa   |
| Integral leak rate                 | $\leq 5 \cdot 10^{-4}$ Pa m <sup>3</sup> /s | $5 \cdot 10^{-4}$ Pa m <sup>3</sup> /s                                 |
| Motor type                         | 1-phase motor                               | 1-phase motor  |
| Motor protection                   | Thermal winding protection                  | Thermal winding protection   |

| Type designation          | MVP 015-2                                    | MVP 015-2                                    |
|---------------------------|--|--|
| Input voltage(s)          | 100 – 115 / 208 – 236 V AC (±10 %), 50/60 Hz | 100 – 115 / 208 – 236 V AC (±10 %), 50/60 Hz |
| Rated current consumption | 1.1 A  | 1.1 A  |
| Current, max.             | 2.8  | 2.8  |
| Rotation speed at 50 Hz   | 1500 rpm                                     | 1500 rpm                                     |
| Rotation speed at 60 Hz   | 1800 rpm                                     | 1800 rpm                                     |
| Sound pressure level      | 52 dB(A)                                     | 52 dB(A)                                     |
| Cooling method            | Forced convection                            | Forced convection                            |
| Operating altitude, max.  | 2000 m                                       | 2000 m                                       |
| Protection degree         | IP20, Type 1                                 | IP20, Type 1                                 |
| Ambient temperature       | 5 – 40 °C                                    | 5 – 40 °C                                    |
| Temperature: Storage      | 5 – 40 °C                                    | 5 – 40 °C                                    |
| Temperature: Shipping     | -10 – 60 °C                                  | -10 – 60 °C                                  |
| Weight                    | 6.5 kg                                       | 6.5 kg                                       |

Tbl. 13: Technical data, MVP 015-2

### 14.3 Substances in contact with the media

| Pump parts  | Substances in contact with the media |
|---|--------------------------------------|
| Diaphragm   | EPDM                                 |
| Valves  | EPDM                                 |
| Head cover  | Aluminum                             |
| Hose connection                                   | PVC                                  |
| Push-in fitting                                   | CuZn, nickel-plated                  |
| Straight compression coupling on the suction hose | CuZn, nickel-plated                  |
| Suction hose                                      | PE                                   |
| Exhaust, silencer                                 | PA                                   |

Tbl. 14: Materials that make contact with the process media

### 14.4 Dimensions

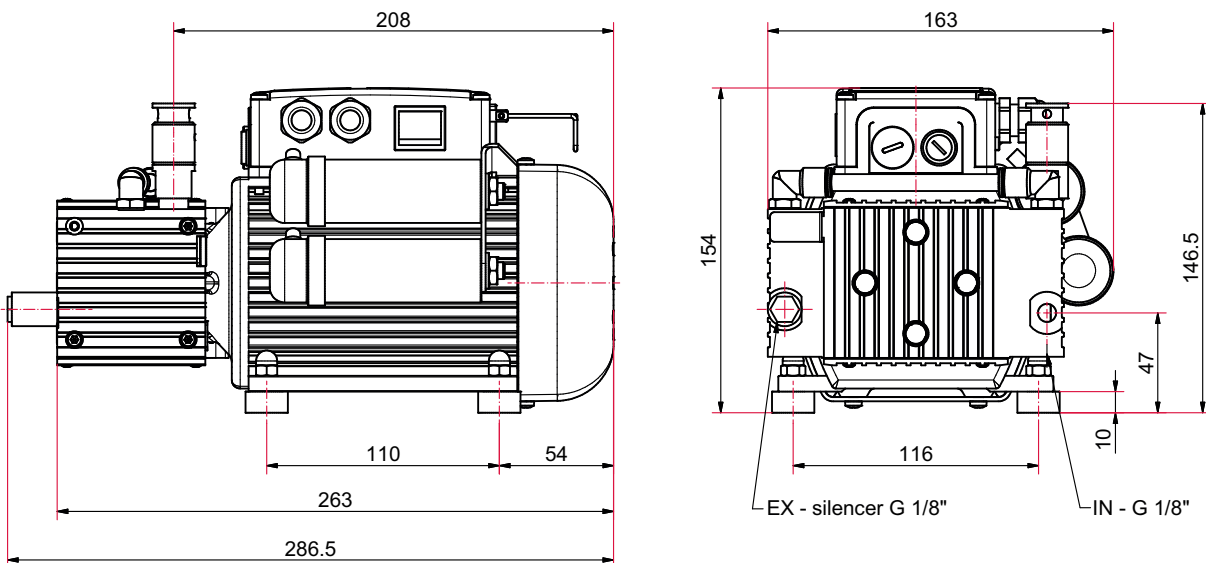
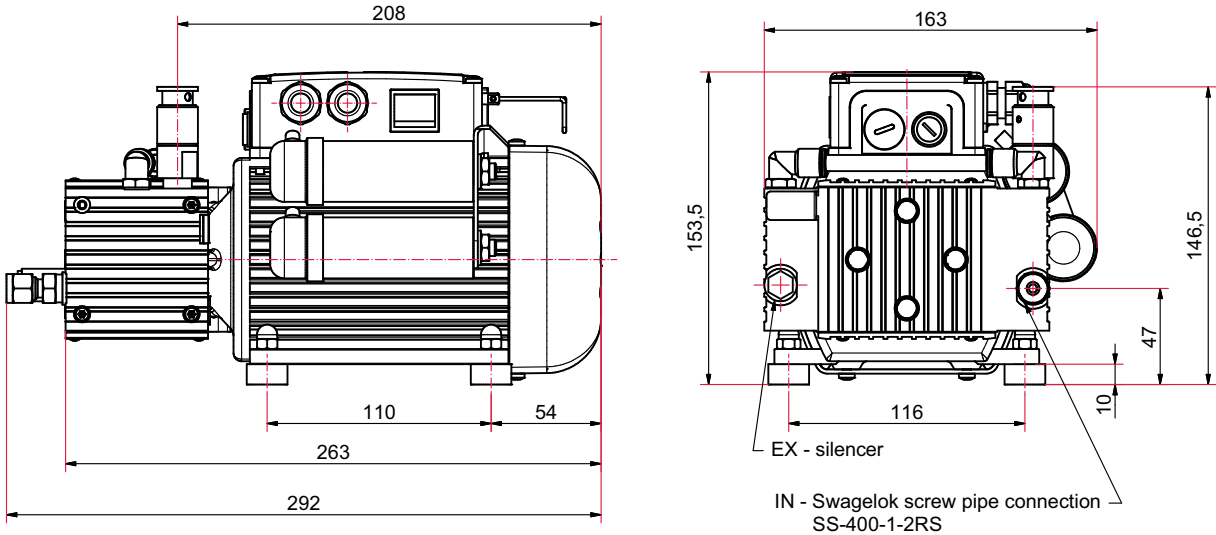


Fig. 9: Dimensions MVP 015-2 | PK T05 100  
Dimensions in mm



**Fig. 10: Dimensions MVP 015-2 | PK T05 103**  
**Dimensions in mm**

# EC Declaration of Conformity

Declaration for product(s) of the type:

**Diaphragm pump**

MVP 015-2

We hereby declare that the listed product satisfies all relevant provisions of the following **European Directives**.

**Machinery 2006/42/EC (Annex II, no. 1 A)**

**Electromagnetic compatibility 2014/30/EU**

**Restriction of the use of certain hazardous substances 2011/65/EU**

**Restriction of the use of certain hazardous substances, delegated directive 2015/863/EU**

**Harmonized standards and applied national standards and specifications:**

EN ISO 12100:2010

EN IEC 55014-2:2021

EN 1012-2:1996+A1:2009

EN IEC 61000-3-2:2019

EN 61010-1:2010 + A1:2019 + A1:2019/AC:2019; Correction 2

EN 61000-3-3:2013 + A1:2019 + A2:2021 + A2:2021/AC:2022

EN IEC 55014-1:2021

EN IEC 63000:2018

The authorized representative for the compilation of technical documents is  
Dr. Adrian Wirth, Pfeiffer Vacuum GmbH, Berliner Straße 43, 35614 Asslar, Germany.

Signature:



Pfeiffer Vacuum GmbH  
Berliner Straße 43  
35614 Asslar  
Germany

(Daniel Sälzer)  
Managing Director

Asslar, 2022-01-06





# UK Declaration of Conformity

This declaration of conformity has been issued under the sole responsibility of the manufacturer.

Declaration for product(s) of the type:

## Diaphragm pump

MVP 015-2

We hereby declare that the listed product satisfies all relevant provisions of the following **British Directives**.

### Supply of Machinery (Safety) Regulations 2008

### Electromagnetic Compatibility Regulations 2016

### The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012

#### Applied standards and specifications:

EN ISO 12100:2010

EN IEC 55014-2:2021

EN 1012-2:1996+A1:2009

EN IEC 61000-3-2:2019

EN 61010-1:2010 + A1:2019 + A1:2019/AC:2019; Correction 2

EN 61000-3-3:2013 + A1:2019 + A2:2021 + A2:2021/AC:2022

EN IEC 55014-1:2021

EN IEC 63000:2018

The manufacturer's authorized representative in the United Kingdom and the authorized agent for compiling the technical documentation is Pfeiffer Vacuum Ltd, 16 Plover Close, Interchange Park, MK169PS Newport Pagnell.

Signature:



Pfeiffer Vacuum GmbH  
Berliner Straße 43  
35614 Asslar  
Germany

(Daniel Sälzer)  
Managing Director

Asslar, 2023-05-15

**UK  
CA**

## VACUUM SOLUTIONS FROM A SINGLE SOURCE

Pfeiffer Vacuum stands for innovative and custom vacuum solutions worldwide, technological perfection, competent advice and reliable service.

## COMPLETE RANGE OF PRODUCTS

From a single component to complex systems:

We are the only supplier of vacuum technology that provides a complete product portfolio.

## COMPETENCE IN THEORY AND PRACTICE

Benefit from our know-how and our portfolio of training opportunities!

We support you with your plant layout and provide first-class on-site service worldwide.

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Are you looking for a  
perfect vacuum solution?  
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