

OPERATING INSTRUCTIONS

EN

Original

ISOLATION PENDULUM VALVE

Valve

PFEIFFER  **VACUUM**

Dear customer,

Thank you for choosing a Pfeiffer Vacuum product. Your new Pfeiffer Vacuum valves should support you in your individual application with full performance and without malfunctions. The name Pfeiffer Vacuum stands for high-quality vacuum technology, a comprehensive and complete range of top-quality products and first-class service. With this expertise, we have acquired a multitude of skills contributing to an efficient and secure implementation of our product.

Knowing that our product must not interfere with your actual work, we are convinced that our product offers you the solution that supports you in the effective and trouble-free execution 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.

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.

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

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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 Products concerned

This document applies to products with the following part numbers:

Part number	Description
IPV-Axxxxxxx	Models using aluminum bodies
IPV-Hxxxxxxx	Models using hard anodized aluminum

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 Abbreviations

Abbreviation	Meaning in this document
AWG	American wire gauge
CDA	Clean dry air
Delta P	Delta pressure
DI water	Deionized water
DN	Nominal diameter as size description
FKM	Fluoroelastomers
IPA	Isopropyl alcohol
IPV	Isolation pendulum valve product line
ISO	Flange: Connection in accordance with ISO 1609 and ISO 2861

Tbl. 1: Abbreviations used in this document

1.4 Trademark proof

- Loctite® is a registered trademark of Henkel IP & Holding GmbH, Germany.

2 Safety

2.1 General safety information

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

DANGER

Immediately pending danger

Indicates an immediately pending danger that will result in death or serious injury if not observed.

- ▶ Instructions to avoid the danger situation

WARNING

Potential pending danger

Indicates a pending danger that could result in death or serious injury if not observed.

- ▶ Instructions to avoid the danger situation

CAUTION

Potential pending danger

Indicates a pending danger that could result in minor injuries if not observed.

- ▶ Instructions to avoid the danger situation

NOTICE

Danger of damage to property

Is used to highlight actions that are not associated with personal injury.

- ▶ Instructions to avoid damage to property



Notes, tips or examples indicate important information about the product or about this document.

2.2 Safety instructions

Risks during transport

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.

Risks during installation

WARNING

Risk of injury due to incorrect installation

Dangerous situations may arise from unsafe or incorrect handling

- ▶ Do not put hands or any other body part or objects in the valve.

Risks during maintenance, decommissioning 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.

2.3 Safety precautions

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 when handling the product

- ▶ Observe all applicable safety and accident prevention regulations.
- ▶ Check that all safety measures are observed at regular intervals.
- ▶ Never put hands or any other object in the valve.

2.4 Limits of use of the product

Parameter	Limit value
Installation orientation	Product may be installed in any orientation. Recommended installation direction is gate seal side facing away from the vacuum pump
Allowable ambient humidity	0 - 95 % non-condensing
Process temperature range	-18 °C - 150 °C Process temperatures above 150 °C may require use of seal materials other than FKM
Heating capabilities	Housing can be heated up to 150 °C Actuator can be heated up to 60 °C
Maximum internal pressure	1000 hPa
Maximum delta P before opening	1000 hPa in open direction. 1000 hPa in closing direction.
Compressed air (overpressure)	4,500 - 6,000 hPa
Reliability	200,000 cycles in a clean environment
Leak rate	1 x 10 ⁻⁹ hPa l/s
Supply	24 V DC

Parameter	Limit value
Position indicator power consumption	24 V DC / 0.5 W
Overpressure limits	Valves are designed to run at maximum 6,000 hPa. Do not operate valves above 6,000 hPa.

Tbl. 2: Limits of use for pendulum valves

2.5 Proper use

- ▶ Use the valve to isolate vacuum.
- ▶ Use the valve only in closed indoor areas.
- ▶ Use the valve only for the evacuation of dry and inert gases.

2.6 Foreseeable misuse

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 misuse, in particular:

- Use outside the mechanical and electrical application limits in accordance with the technical data
- Use with corrosive or explosive media, if this is not explicitly permitted
- Use outdoors
- Use with bare hands or with powder gloves
- Use after unauthorized technical changes (on the inside or the outside of the product)
- Use with replacement or accessory parts that are unsuitable or are not approved

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

The Pfeiffer Vacuum isolation pendulum valve creates an airtight seal in a high vacuum system. It is designed to prevent the entry or leakage of contaminants or undesired materials in vacuum environments.

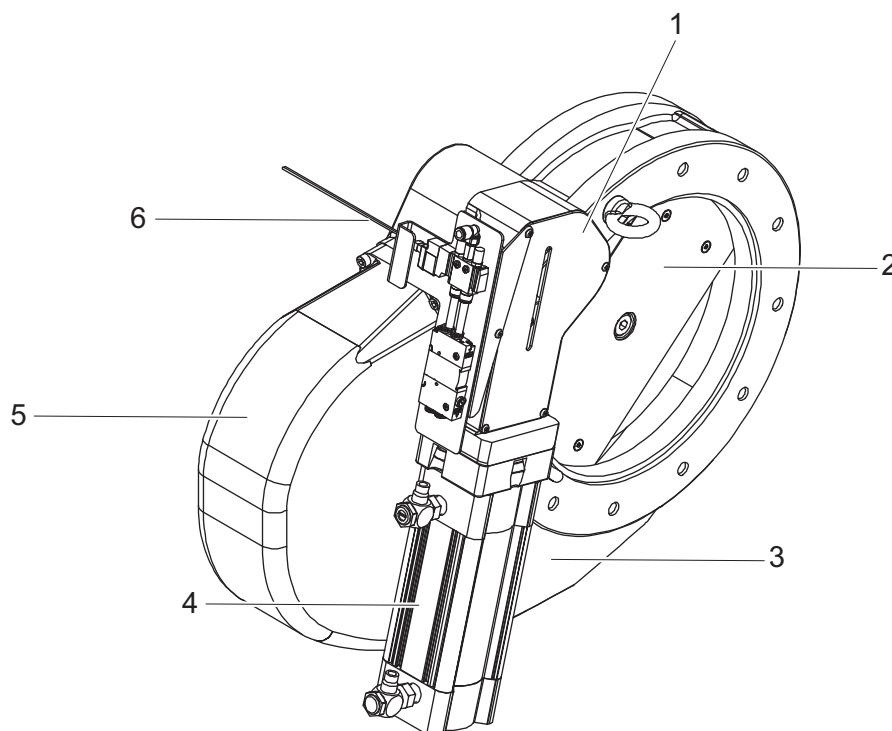


Fig. 1: Isolation Pendulum Valve overview

1 Case	4 Actuator
2 Gate	5 Bonnet
3 Body	6 Cable solenoid connector

3.1.1 Gate assembly function

The gate assembly is designed to open or to close the valve in order to allow or to prevent the passage of the medium being handled. The gate assembly consists of a gate, an actuator mechanism, and associated components. The gate is a plate that fits within the valve body. It is a movable element that either permits or blocks the flow. When the gate is in the closed position, it forms a tight seal against the valve seat, preventing any flow through the valve. By controlling the movement of the gate, the gate assembly enables complete isolation within the vacuum system.

3.1.2 Case assembly & actuator function

The case assembly & pneumatic actuator is the mechanism responsible for controlling the movement of the gate within the valve: it either opens or closes the flow path. The mechanism utilizes compressed air to generate the necessary force for actuation. When the actuator receives a signal to open the valve, it applies force to move the gate away from the valve seat, allowing the medium to pass through. Conversely, when the actuator receives a signal to close the valve, it moves the gate back towards the valve seat, blocking the flow of the medium. The cylinder closes the valve by retracting. By extending the cylinder opens the valve. The opening and closing time can be adjusted.

3.1.3 Compressed air supply

The valve is solenoid controlled pilot operated directional valve with a spring return. The valve has 5 ports and 2 positions: opened and closed. The valve is connected to the perfect check block. The perfect check block is there to maintain the air pressure inside the valve when air supply is disconnected. If

the valve loses the power from the solenoid unexpectedly, it will close. If the air pressure is lost, the valve will not move and maintain current position.

3.2 Scope of delivery

- Valve
- Quick-start guide
- Eye bolts for lifting
- Electrical connection kit
 - Mating plugs for the electrical wiring
 - Pins for the electrical wiring

3.3 Identifying the product

- ▶ To ensure clear identification of the product when communicating with Pfeiffer Vacuum, always keep all of the information on the model number and serial number on hand.

3.3.1 Product types

The product designation of Pfeiffer Vacuum isolation pendulum valves from the IPV series is composed of the family name, the size and, if required, an additional feature description.

3.3.2 Product features

Feature	Description
Valve body material	Aluminum or hard anodized aluminum
Seals	FKM elastomer

Tbl. 3: Isolation pendulum valve features

4 Transportation and Storage

4.1 Transport

⚠ 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.



We recommend

Pfeiffer Vacuum recommends keeping the transport packaging and original protective cover.

Requirements

- Electric hoist to lift the valve in its packaging.
- Flat substrate ensured.
- Protective equipment, e.g. safety shoes.

Transport the valve safely

- ▶ Note the center of gravity of the load.
- ▶ Observe safe handling of manually operated transport devices.
- ▶ Transport the valve only within the permissible temperature limits.
- ▶ Ensure harmonious movements and moderate speed.
- ▶ Where possible, always transport or ship the valve in its original packaging.
- ▶ Always carry the valve with both hands or use adequate equipment to transport the valve.
- ▶ Remove the protective cover only immediately prior to installation.
- ▶ Transport the valve in the closed position.

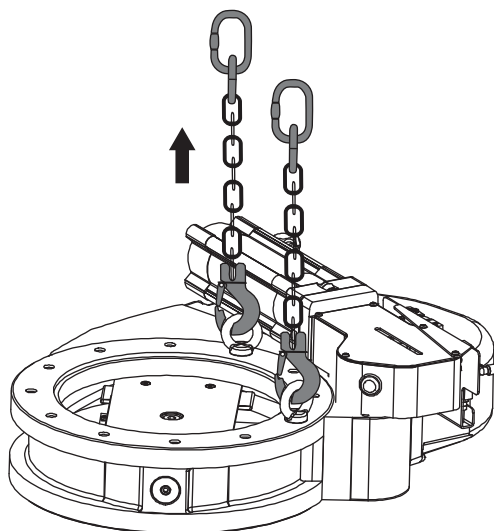


Fig. 2: Lift the valve out of the box

Lift the valve with its packaging

1. Attach suitable lifting tools to the eye bolts.
 - 2 eye bolts are included in the scope of delivery.
2. Pay attention to the correct use and fastening of the lifting equipment.
3. Lift the valve vertically.
4. Remove the eye bolts following transport and installation as required.
5. Keep the eye bolts for future use.

4.2 Storage



We recommend

Pfeiffer Vacuum recommends storing the products in their original transport packaging.

Storing the valve

1. Seal all flange openings with the original protective caps.
2. Seal all other connections (e.g. venting connection) with the corresponding original parts.
3. Store the valve only indoors within the permissible temperature limits.

5 Installation

5.1 Mounting orientation



It is preferable to install the valve with vacuum on the backside of the gate so the valve body remains under vacuum at all times and the pump down of the valve body is eliminated.

- Valve can be mounted in any orientation
- Recommended installation direction is gate seal side facing away from the vacuum pump

5.2 Installing valve into the vacuum system

Requirements for the vacuum system

- Make sure the vacuum system is clean and free from debris or contaminants.
- Make sure ISO-K flanges are undamaged and suitable for connection.

Requirements for the valve

- Remove the protective lids.
- Make sure the flange face is clean and is in good condition.
- Make sure the gate is closed.

Required tools and materials

- Vacuum system: ISO-K
- Centering ring with o-ring seal and sprace ring support
 - Depending on the flange connection type: ISO-F/ISO-F or ISO-F/ISO-K
- ISO-K single claw clamps for utilizing ISO-K connection
- Screws for utilizing ISO-K to ISO-F connection
- Torque wrench

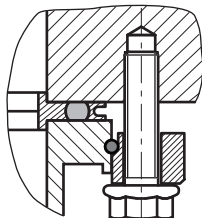


Fig. 3: Flange connection ISO-K to ISO-F, hexagon head screw and tapped hole

Install the centering ring

1. Take the centering ring with the appropriate size.
 - Make sure the centering ring is compatible with the ISO-K flange of the vacuum system.
2. Place the centering ring on the ISO-K flange of the vacuum system.
 - Make sure the O-ring is properly seated within the groove.

Position the valve

1. Align the valve with the centering ring on the vacuum system.
2. Slide the valve onto the centering ring.
 - Make sure the valve seats properly on ISO-K flange.

Connection of the hexagon head screw and tapped hole

1. For the connection of the turbopump, use only the approved mounting kits from Pfeiffer Vacuum.
2. Place the collar flange over the high vacuum flange of the turbopump.
3. Insert the snap ring in the side groove on the high vacuum flange of the turbopump.
4. Attach the turbopump with collar flange, snap ring and centering ring to the counter flange according to the figure.
5. Use all prescribed components for the turbopump.
6. Screw the hexagon head screws into the tapped holes.
 - Observe the minimum tensile strength of the flange material and the screw depth.
7. Fasten the hexagon head screws cross-wise in 3 steps.

Verify the connection

1. Inspect the connection for any visible gaps or misalignments.
 - Make sure the O-ring seal is properly seated and it is not pinched or damaged.
2. Perform a leak test.

5.3 Wiring the mating connectors

Requirement

- Wire gauge for connectors is 24-28 AWG (0.32 mm - 0.51 mm).

Required tool

- A121418-ND tool hand crimper or an equivalent

Mating connectors:

- Solenoid: **1-640517-0**
- Position indicator: **1-640519-0**
- Wire specification: **24-28 AWG**

Wire the mating connectors

1. For the mating connections, use only the approved electrical connection kit from Pfeiffer Vacuum.
 - The electrical connection kit with mating plugs and crimp pins is included in the scope of delivery.
2. Crimp pins to wires with A121418-ND tool hand crimper or an equivalent.

5.4 Wiring the solenoid valve

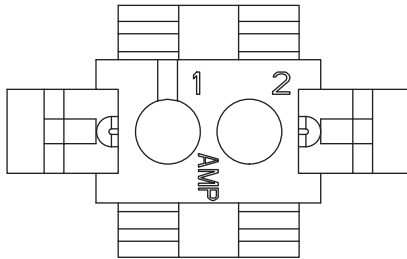


Fig. 4: Solenoid connector

The solenoid has a 2-pin connector. The solenoid connector is there to power the directional valve which controls the opening and closing of the valve. The recommended voltage supply is 24 VDC. The permissible tolerance is +/- 10%. The wires are fully connected and assembled to connectors when delivered.

Valve	Wire Color	Pin
EV-1	Red	1
EV-1	Black	2

Tbl. 4: Wiring of the solenoid connector

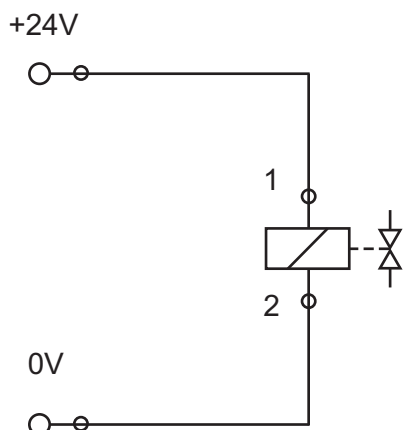


Fig. 5: Solenoid wiring

5.5 Positioning indicator wiring

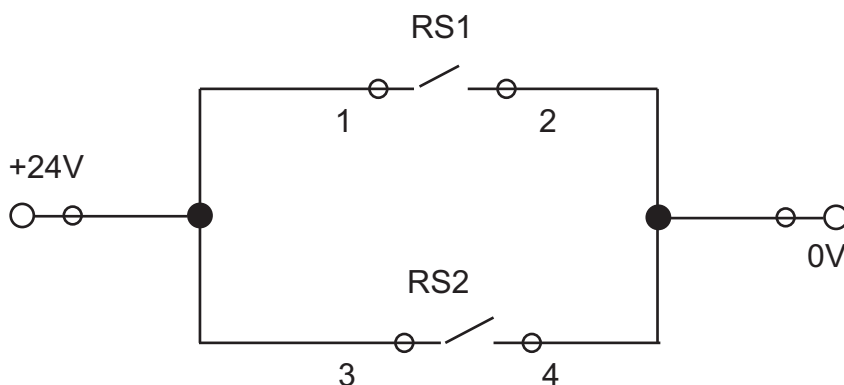


Fig. 6: Position of the indicator wiring

The position indicator has a 4-pin connector. The position indicator connector is there to power up the sensor for opening and closing signals. The recommended voltage supply is 24 VDC. The permissible tolerance is +/- 10%. The wires are fully connected and assembled to connectors when delivered to the customer.

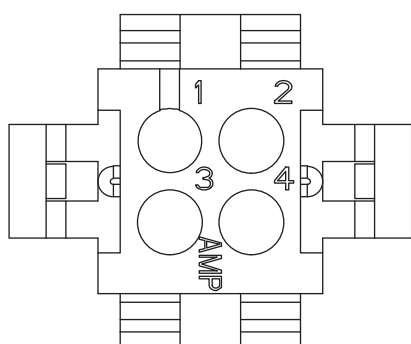


Fig. 7: Position of the indicator connector

PIN	RS1 (open)	RS2 (close)	Voltage
PIN 1	Brown		POS (+)
PIN 2	Blue		NEG (-)
PIN 3		Brown	POS (+)
PIN 4		Blue	NEG (-)

Tbl. 5: Pin assignment of the indicator connector

5.6 Connecting and checking compressed air supply

⚠ WARNING

Risk of injury due to incorrect installation

Dangerous situations may arise from unsafe or incorrect handling

- ▶ Do not put hands or any other body part or objects in the valve.



General notes for the installation of vacuum components

- Choose an installation location that permits access to the product and to supply lines at all times.
- Observe the ambient conditions given for the limits of use.
- Provide the highest possible level of cleanliness during assembly.
- Ensure that flange components during installation are grease-free, dust-free and dry.



- Never lay the valve down with the actuator facing downwards to prevent damage to the actuator.
- Never lift the pendulum valve using the actuator as a lift point.
- Handle valve with care to avoid scratches that may damage machined sealing surfaces.

Required tools and materials

- Lint-free, dry wipe
- Powder-free latex gloves
- Equipment to lift the valve
- CDA or N₂ line
- Plastic tube for air inlet: size Ø6 mm

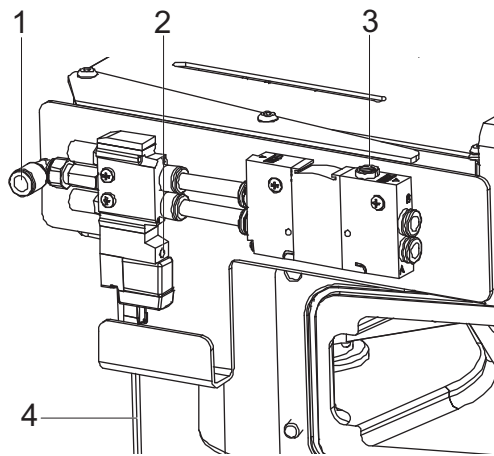


Fig. 8: Directional valve

- | | |
|----------------------|--------------------|
| 1 Air supply port | 3 Vent button |
| 2 Manual open button | 4 Connection cable |

Connect compressed air supply

1. Connect an unpressurized CDA or N₂ line to the input solenoid.
2. Slowly increase the pressure to 4.500 - 6.000 hPa.

Check the functionality of the compressed air supply

1. Manually depress and hold the small orange button on the solenoid near the CDA input to open the valve.
2. Release the button to close the valve.

6 Operation

Requirements

- For continued trouble-free operation, the valve must be clean and free of contaminants.
- Powder-free latex gloves to avoid contaminating the valve with finger oils.
- Clean environment to avoid other contamination.

Required tool

- Flat head screwdriver

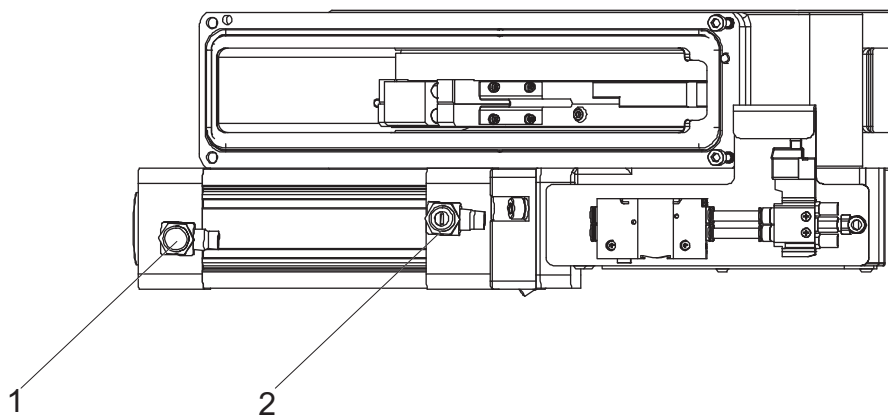


Fig. 9: Operate the speed control

- 1 Opening speed control 2 Closing speed control

Operate the speed control

1. Rotate the screws on the controls with the flat head screwdriver.
2. Rotate counterclockwise to open or close the valve fast.
3. Rotate clockwise to open or close the valve slow.
 - The default opening and closing time of the valve is between 4-5 seconds.

7 Maintenance

7.1 General maintenance information

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.

General notes

- For continued trouble-free operation, keep the valve clean and free of contaminants.
- Use powder-free latex gloves to avoid contaminating the valve with finger oils.
- Work in a clean environment to avoid other contamination.
- Remove O-rings using an O-ring pick and discard.

Required spare parts

- ▶ To order replacement parts or repair kits, contact Pfeiffer Vacuum service.
- ▶ Please provide the model number and serial number when ordering replacement parts.

7.2 Hard stop replacement



It's recommended to change all seals once the hard stop is worn.

Requirements

- Chamber vented
- Valve in open position
- Valve removed from chamber

Required tools and materials

- Appropriate replacement hard stop
- Allen wrench set: **2.5 mm - 10 mm**
- Torque wrench set: **0 Nm - 50 Nm**
- Powder-free latex gloves
- Isopropyl alcohol
- Vacuum grease

7.2.1 Disassembling the hard stop

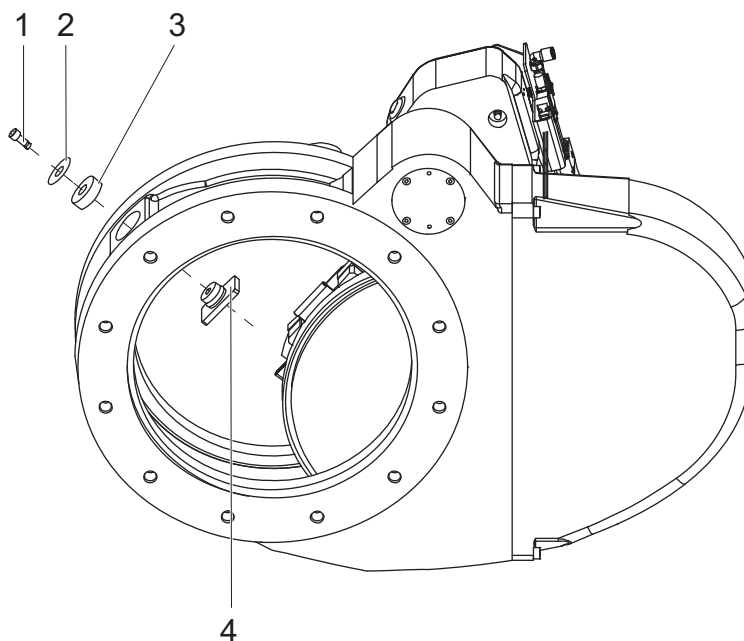


Fig. 10: Disassembling the hard stop

- | | |
|-------------------------|-------------|
| 1 Socket head cap screw | 3 Cap |
| 2 Washer | 4 Hard stop |

Disassemble the hard stop

1. Move gate to open position.
2. Disconnect main airline.
 - Valve maintains in open position.
3. Untighten socket head cap screw.
4. Remove washer.
5. Remove cap.
6. Push out hard stop from top.

7.2.2 Installing the O-ring

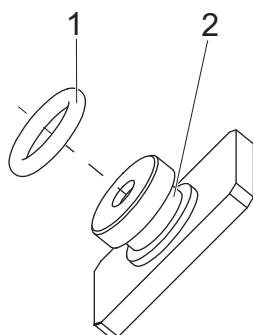


Fig. 11: Installing the O-ring

- | | |
|----------|-------------|
| 1 O-ring | 2 OD groove |
|----------|-------------|

Install o-ring

1. Apply vacuum grease to OD groove of new hard stop.
2. Install O-ring to OD groove.

7.2.3 Reassembling the hard stop

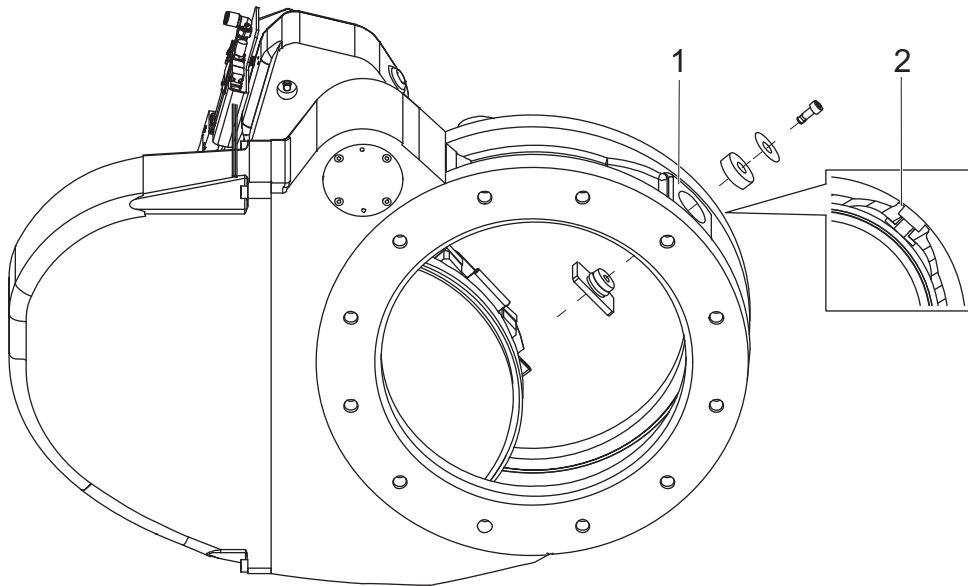


Fig. 12: Reassembling the hard stop

- 1 Body 2 Hard stop bore hole

Reassemble hard stop

1. Apply a light coat of vacuum grease in hard stop bore hole.
2. Install hard stop back to body.
 - Make sure hard stop is well aligned in groove.
3. Install socket head cap screw.
 - Make sure to apply cap and washer.
4. Torque screw to **3.4 Nm**.
 - Make sure to apply pressure gently.

7.3 Maintaining gate and bonnet seals



- Always wear powder-free latex gloves when servicing the valve
- Be careful not to scratch o-ring groove
- Avoid twisting, stretching, or deforming the o-ring
- Avoid damaging the materials
- Heat gun may be required to melt any Loctite on jam nut threads

Requirements

- Chamber vented
- Valve in closed position
- Valve removed from chamber
- Air supply connected to valve

Required tools and materials

- Allen wrench set: 2.5mm - 10 mm
- Torque wrench set: 0 Nm - 50 Nm
- O-ring pick, plastic
- Powder-free latex gloves
- Isopropyl alcohol
- Appropriate replacement O-rings
- Vacuum grease
- Long-shank M5, M6, M8, M10 hex socket drivers
- Cleanroom approved swabs

Fastener description	DN 200 Torque (Nm)	DN 250 Torque (Nm)	DN 350 Torque (Nm)
Power bolt	16.95	39.54	50.84
Spring cover bolts	2.8	2.8	2.8
Bonnet bolts	11.30	11.30	11.30

Tbl. 6: Torque standards

7.3.1 Removing the bonnet O-ring

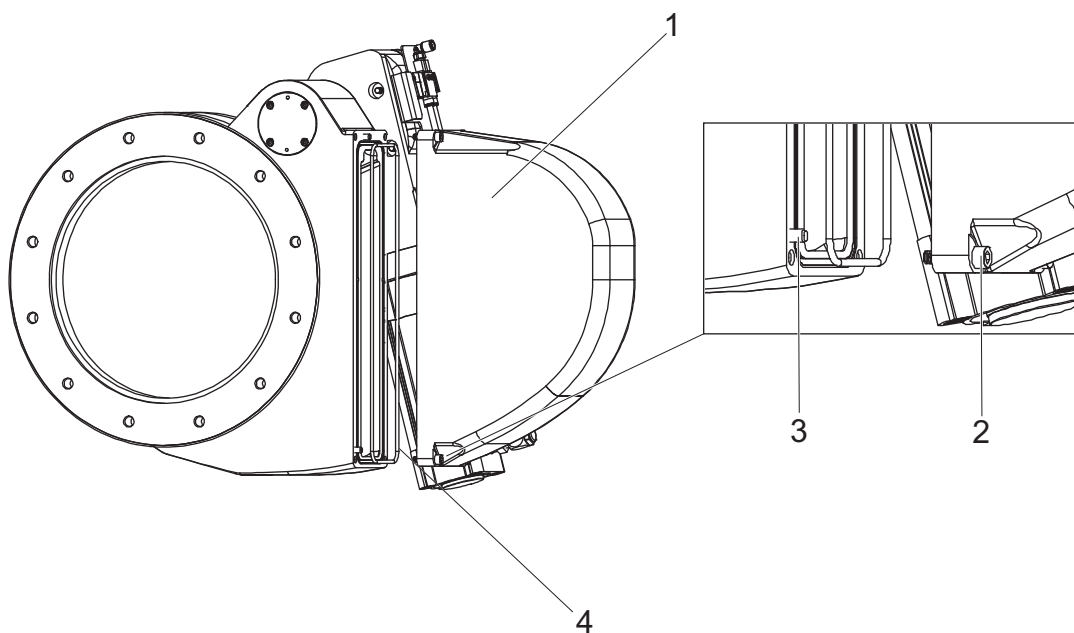


Fig. 13: Remove the bonnet O-ring

- | | |
|----------------|-----------------|
| 1 Bonnet | 3 Alignment pin |
| 2 Bonnet screw | 4 Bonnet O-ring |

Remove bonnet O-ring

1. Loosen and remove bonnet screws.
2. Remove bonnet.
3. Remove O-rings using an O-ring pick and discard.
4. Clean the O-ring groove with IPA and dry out with nitrogen or CDA.

7.3.2 Venting the gate cylinder

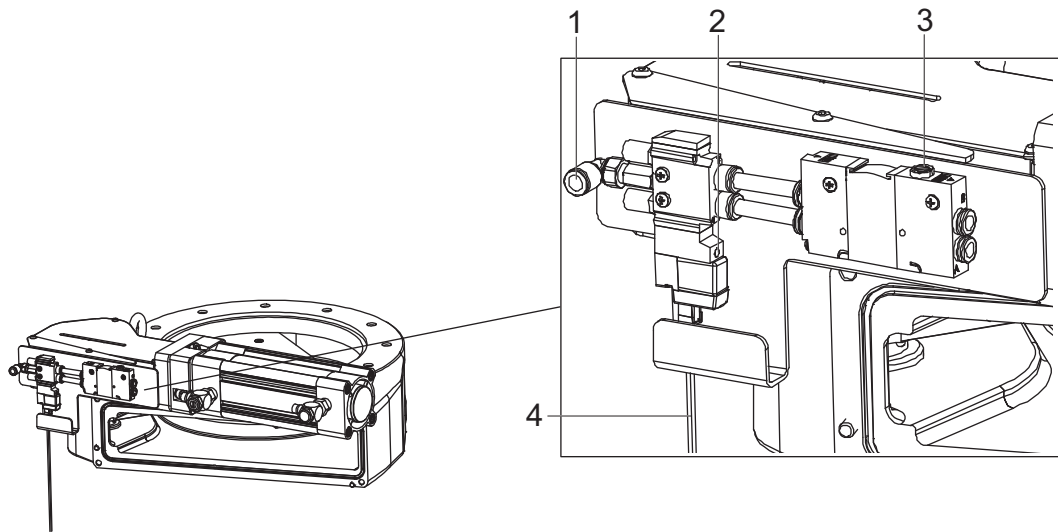


Fig. 14: Vent the cylinder

- | | |
|----------------------|--------------------|
| 1 Air supply port | 3 Vent button |
| 2 Manual open button | 4 Connection cable |

Vent the cylinder

1. With the bonnet removed and air supply connected, open the gate valve manually by pressing and holding the orange button on the air control assembly.
 - The button is located next to the piston cylinder case housing.
2. Remove the main air supply line.
3. Vent the cylinder by pressing and holding the vent button on the air control assembly for about 20 seconds.

7.3.3 Disassembling the gate

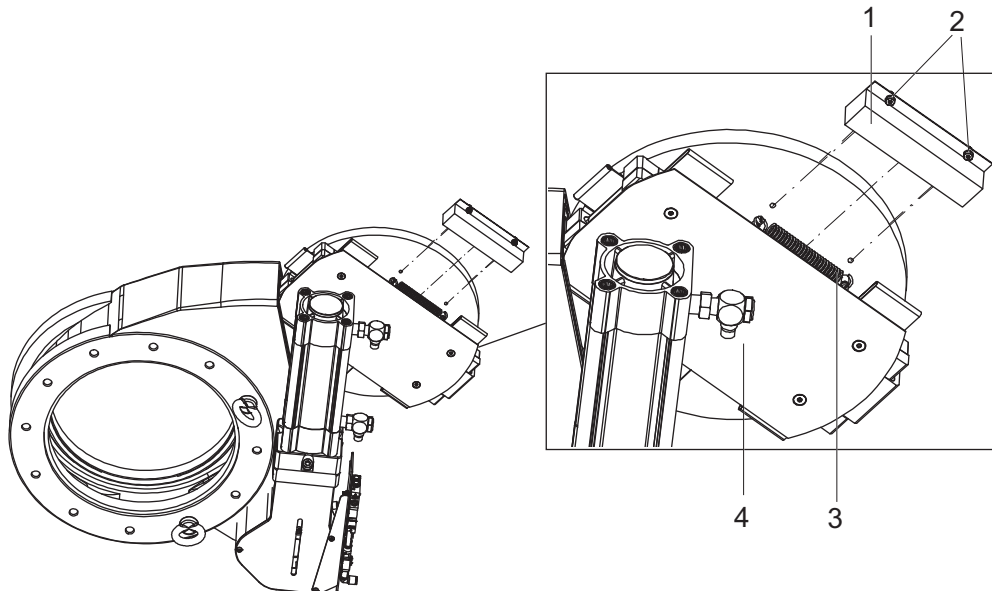
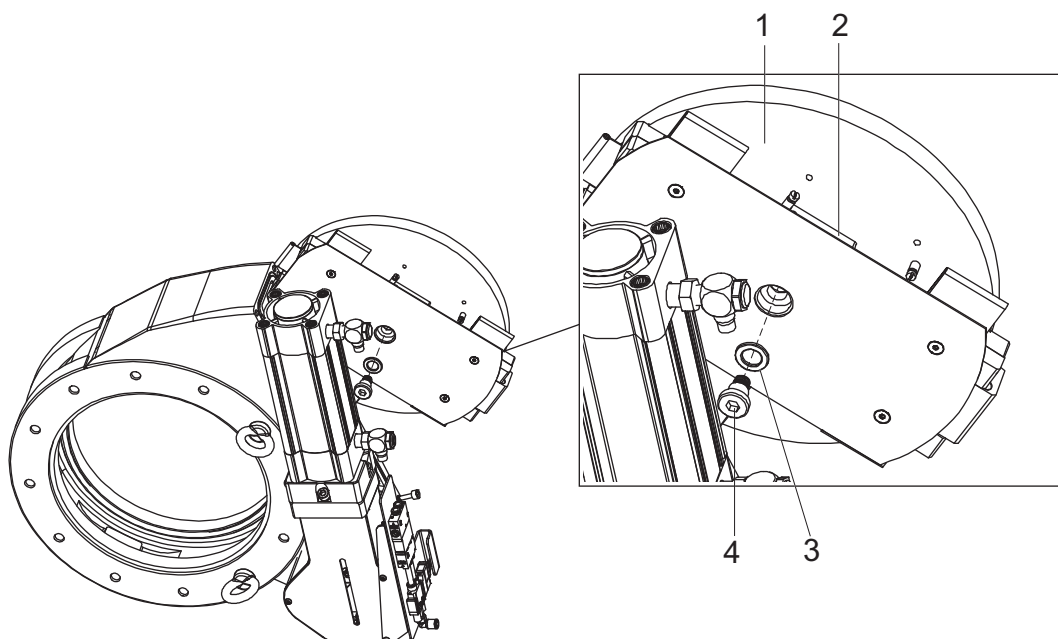


Fig. 15: Remove the spring

- | | |
|---|----------|
| 1 Spring case | 3 Spring |
| 2 Spring case cover bolts and cover bolts washers | 4 Gate |

Remove the spring

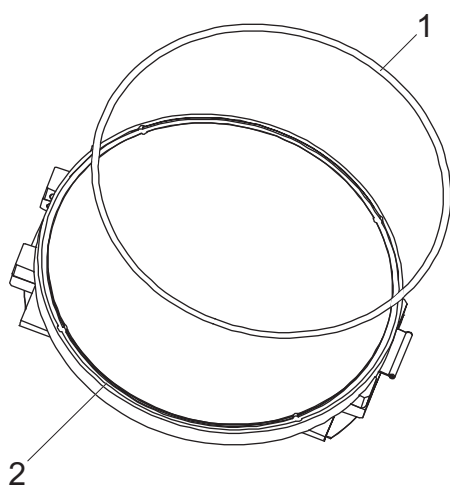
1. Remove the open and close air lines from the air control assembly.
2. Loosen the two captive bolts from the spring cover on the bottom of the gate assembly.
 - Keep the captive screws with the spring case.
3. Remove the spring.

**Fig. 16: Remove the gate**

- | | |
|------------|---------------------|
| 1 Gate | 3 Power bolt washer |
| 2 Gate arm | 4 Power bolt |

Remove the gate

1. Remove the power bolt and power bolt washer from the bottom center of the gate assembly.
 - If the power bolt does not come out easily, ease the power bolt out by using a back and forth motion and DI water to slowly work it out.
2. Remove the gate from the gate by lifting the gate off the arm and sliding it out.

7.3.4 Replacing the gate O-ring**Fig. 17: Replace the gate O-ring**

- | | |
|----------|-----------------|
| 1 O-ring | 2 O-ring groove |
|----------|-----------------|

Replace the gate O-ring

1. Remove the gate O-ring and discard.
2. Clean the O-ring groove with IPA and dry out with nitrogen or CDA.
3. Lubricate the O-ring with a light amount of vacuum grease.
4. Place the new O-ring on the bonnet groove.
5. Press and stretch the O-ring into the groove until it is fully set inside the groove.
 - Do not twist the O-ring. The seam of the O-ring must be invisible after inserting into the groove.

7.4 Reassembling the gate and the bonnet

Requirement

- Make sure the rotary pad is in place before installing the gate assembly.

7.4.1 Reassembling the gate

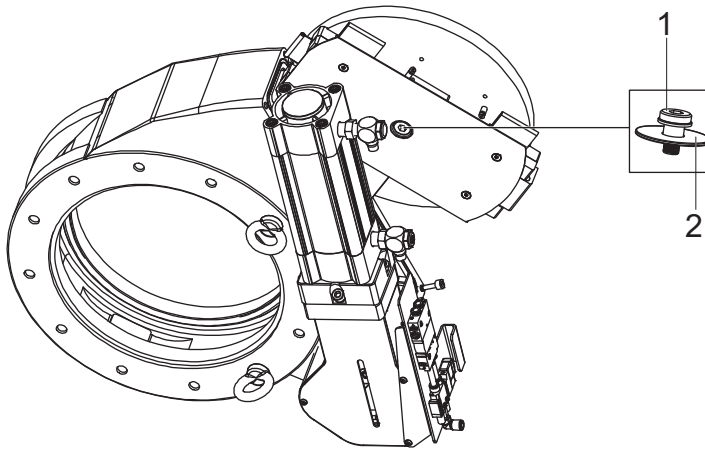


Fig. 18: Assemble the gate on the gate arm

- 1 Power bolt 2 Power bolt washer

Valve	Torque specifications
160/200	16 Nm
250	40 Nm
350	51 Nm

Tbl. 7: Torque specifications for the power bolt

Reassemble gate

1. Reinstall the gate assembly on to the gate arm.
2. Locate the threads in the gate arm and center the gate assembly on the gate arm.
3. Lubricate the non-threaded (shoulder) surface of power bolt with 1/4 bead of vacuum grease.
4. Install the power bolt washer onto the power bolt with the round side towards the head of the bolt.
5. Install the power bolt on the gate assembly and torque.
6. Twist the gate back and forth around the power bolt to make sure the gate assembly moves freely.
7. Check for gate wobble by lifting both sides of the gate up and down.
 - If there is more than 3 mm of travel, loosen the power bolt, clean the threads, and retry.

7.4.2 Reinstalling the spring

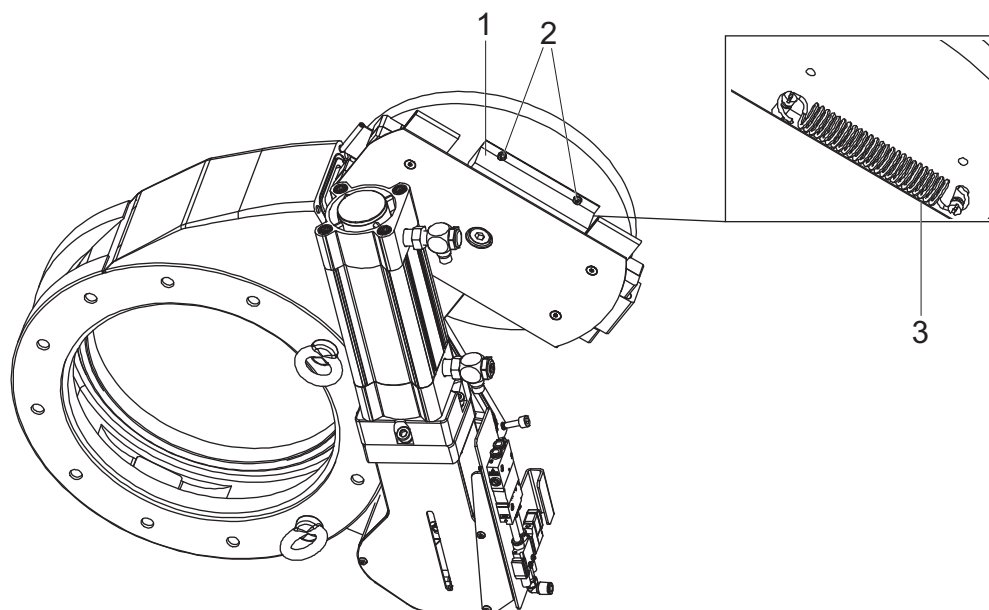


Fig. 19: Reinstall the spring and the spring cover

- | | |
|----------------------|----------|
| 1 Spring cover | 3 Spring |
| 2 Spring cover bolts | |

Reinstall the spring and the spring cover

1. Reinstall the spring.
2. Add the spring cover.
3. Torque the spring cover bolts to 25 in-lbs.

7.4.3 Reassembling the bonnet

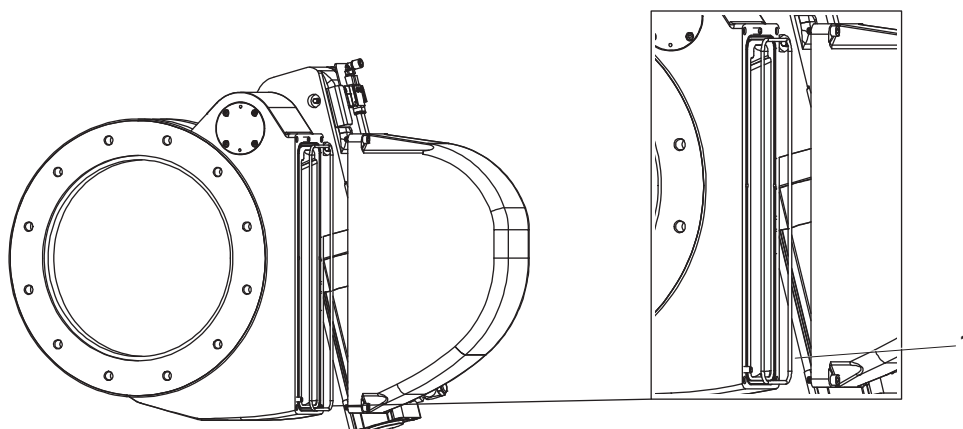


Fig. 20: Insert the new bonnet O-ring

- | |
|----------|
| 1 O-ring |
|----------|

Insert the new bonnet O-ring

1. Lubricate the O-ring with a light amount of vacuum grease.
2. Place the new O-ring on the bonnet groove.
3. Press and stretch the O-ring into the groove until it is fully set inside the groove.
 - Make sure the seam of the o-ring is not visible when installing the o-ring into the groove.

Reassemble the bonnet

1. Gently push the gate assembly back into the valve body.
 - Verify there is no mechanical scraping during opening/closing.
2. Install the bonnet.
3. Torque bonnet captive screws.

7.4.4 Reassembling the valve

Reassemble the valve

1. Reconnect the air lines.
2. Reconnect the power cables.
3. Power the valve.
4. Perform leak check.

8 Decommissioning

Dismount the valve

1. Open the valve.
2. Vent system to atmosphere.
3. Close the valve.
4. Disconnect the air supply.
5. Dismount the valve from the system.

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

10 Malfunctions

Problem	Possible causes	Remedy
Leak at gate	Dirty or damaged gate seal	<ul style="list-style-type: none"> • Replace the gate seal • Contact Pfeiffer Vacuum Service
Leak to outside	Valve bonnet is not leak-tight	<ul style="list-style-type: none"> • Check bonnet screws torque and tighten as necessary • Replace the bonnet seal • Contact Pfeiffer Vacuum Service
	Flanges not sealed fully	<ul style="list-style-type: none"> • Check if valve is mounted correctly • Contact Pfeiffer Vacuum Service if flanges sealing surface is damaged
Valve does not open / close	Air pressure issue	Check compressed air connection
	Operating pressure issue	Check and adjust operating pressure
	Electrical connection faulty	Connect the voltage, if applicable

Tbl. 8: Troubleshooting the valve

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 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](#).

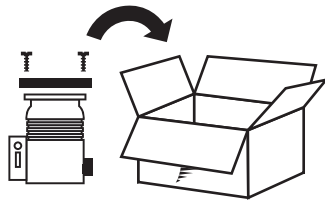


4. You will receive an acknowledgment from Pfeiffer Vacuum.

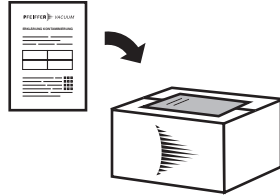
PFEIFFER VACUUM

Submission of contaminated products

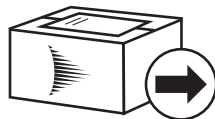
No microbiological, explosive, or radiologically contaminated products will be accepted. Where products are contaminated, or the contamination declaration is missing, Pfeiffer Vacuum will contact you before starting service work. Depending on the product and degree of pollution, **additional decontamination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



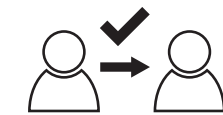
5. Prepare the product for transport in accordance with the provisions in the contamination declaration.
 - a) Neutralize the product with nitrogen or dry air.
 - b) Seal all openings with blind flanges, so that they are airtight.
 - c) Shrink-wrap the product in suitable protective foil.
 - d) Package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

For size not shown on the below tables, please contact Pfeiffer Vacuum for more information on the recommended spare parts.

Description	Part number
Seal kit for the valve IPV/TPV ISO160/JIS150	IPVTPV-10-95
Seal kit for the valve IPV/TPV ISO200/JIS200	IPVTPV-11-95
Seal kit for the valve IPV/TPV ISO250/JIS250	IPVTPV-12-95
Seal kit for the valve IPV/TPV JIS350, 300, ISO320	IPVTPV-14-95
1st level service kit for the valve IPV/TPV [ISO160, JIS150]	IPVTPV-10-90
1st level service kit for the valve IPV/TPV [ISO200, JIS200]	IPVTPV-11-90
1st level service kit for the valve IPV/TPV [ISO250, JIS250]	IPVTPV-12-90
1st level service kit for the valve IPV/TPV [JIS350, 300, ISO320]	IPVTPV-14-90

Tbl. 9: Available seal kits

13 Technical data and dimensions

13.1 General

	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

$$1 \text{ Pa} = 1 \text{ N/m}^2$$

Tbl. 10: Conversion table: Pressure units

	mbar l/s	Pa m ³ /s	sccm	Torr l/s	atm cm ³ /s
mbar l/s	1	0.1	59.2	0.75	0.987
Pa m ³ /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 ³ /s	1.01	0.101	59.8	0.76	1

Tbl. 11: Conversion table: Units for gas throughput

13.2 Technical data

Part number	IPV-A10342	IPV-A11342	IPV-A12342	IPV-A13342
Nominal diameter	DN 160 ISO-F	DN 200 ISO-F	DN 250 ISO-F	DN 320 ISO-F
Actuation	Electro-pneumatic	Electro-pneumatic	Electro-pneumatic	Electro-pneumatic
Conductance	5000 l/s	12000 l/s	12000 l/s	30000 l/s
Compressed air volume	2529 cm ³	2529 cm ³	4144 cm ³	8266 cm ³
Compressed air (overpressure)	4500 - 6000 hPa	4500 - 6000 hPa	4500 - 6000 hPa	4500 - 6000 hPa
Opening time	4 s	4 s	4 s	5 s
Closing time	4 s	4 s	4 s	5 s
Tightness	1×10^{-9} hPa l/s	1×10^{-9} hPa l/s	1×10^{-9} hPa l/s	1×10^{-9} hPa l/s
Pressure minimum	1×10^{-9} hPa	1×10^{-9} hPa	1×10^{-9} hPa	1×10^{-9} hPa
Pressure maximum	1000 hPa	1000 hPa	1000 hPa	1000 hPa
Delta P in closing direction	1000 hPa	1000 hPa	1000 hPa	1000 hPa
Delta P in opening direction	1000 hPa	1000 hPa	1000 hPa	1000 hPa
Opens against differential pressure of	20 hPa	20 hPa	24 hPa	29 hPa
Temperature: bakeout housing	150°C	150°C	150°C	150°C
Temperature: bakeout actuator	60°C	60°C	60°C	60°C
Temperature: bakeout pilot valve	60°C	60°C	60°C	60°C
Power consumption	24 V DC / 0.5 W	24 V DC / 0.5 W	24 V DC / 0.5 W	24 V DC / 0.5 W

Part number	IPV-A10342	IPV-A11342	IPV-A12342	IPV-A13342
Cycle life	200.000	200.000	200.000	200.000
Material	Aluminum	Aluminum	Aluminum	Aluminum
Seals	FKM	FKM	FKM	FKM
Weight	18 kg	22 kg	28 kg	55 kg

Tbl. 12: Technical data for pendulum valves

13.3 Dimensions

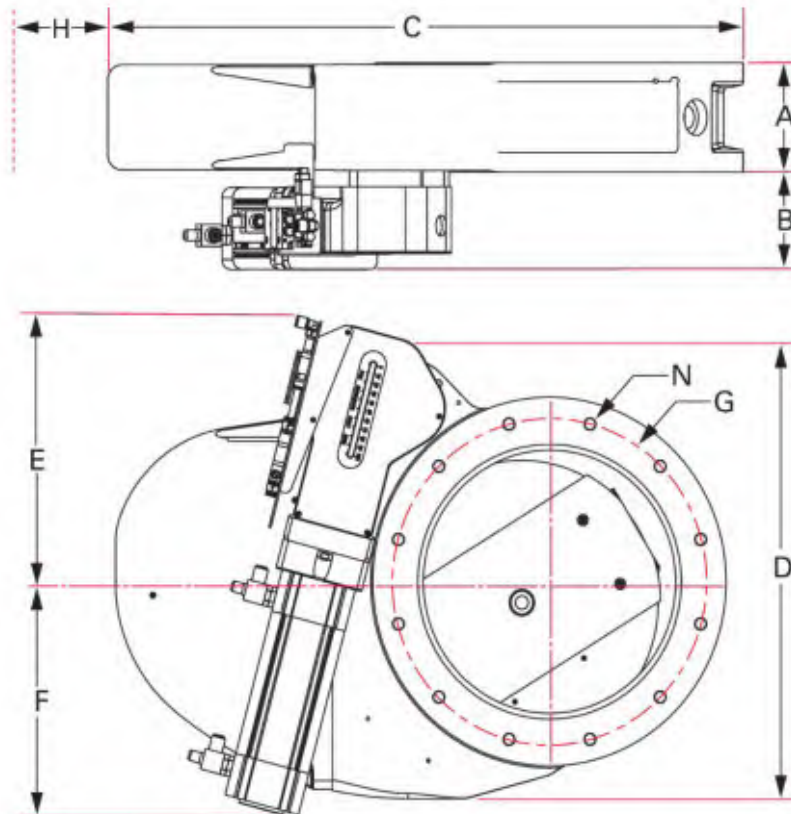


Fig. 21: Dimensions of pendulum valves
Dimensions in mm

Part number	A	B	C	D	E	F	G	H	N
IPV-A10342	88	84	520	326	211	246	200	135	8 x M10 x 10
IPV-A11342	88	84	582	373	243	214	260	165	12 x M10 x 10
IPV-A12342	100	90	607	417	253	222	310	215	12 x M10 x 10
IPV-A13342	123	120	760	534	307	273	395	270	12 x M12 x 18

Tbl. 13: Dimensions of pendulum valves

Please contact Pfeiffer Vacuum for more information if the part number requested is not listed below.

EC Declaration of Conformity

Declaration for product(s) of the type:

Valves

IPV Series

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

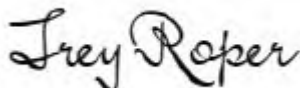
Machinery 2006/42/EC (Annex II, no. 1 A)

Harmonized standards and applied national standards and specifications:

DIN EN ISO 4414:2010	DIN EN 547-1:1996+A1:2008
DIN EN 60204-1:2006/AC:2010	DIN EN 547-2:1996+A1:2008
DIN EN 1037:1995+A1:2008	DIN EN 547-3:1996+A1:2008
DIN EN ISO 13850:2015	DIN EN ISO 13732-1:2008
DIN EN ISO 13857:2008	DIN EN 614-1:2006+A1:2009
DIN EN 349:1993+A1:2008	DIN EN 614-2:2000+A1:2008
DIN EN ISO 14120:2015	DIN EN ISO 13849-1:2008
DIN EN 13849-2:2012	

The authorized representative for the compilation of technical documents is Mr. Sean Casarotti, Pfeiffer Vacuum Nor-Cal Products, 1967 South Oregon Street, Yreka, CA 96097 - USA.

Signature:



Nor-Cal Products by Pfeiffer Vacuum
1967 South Oregon Street
96097 Yreka, CA

January 29, 2021



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:

Valves

IPV Series

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

Supply of Machinery (Safety) Regulations 2008

Applied standards and specifications:

EN ISO 4414:2010	EN 547-2:1996+A1:2008
EN 60204-1:2018	EN 547-2:1996+A1:2008
EN 1037:1995+A1:2008	EN 547-3:1996+A1:2008
EN ISO 13850:2015	EN ISO 13732-1:2008
EN ISO 13857:2019	EN 614-1:2006+A1:2009
EN 349:1993+A1:2008	EN 614-2:2000+A1:2008
EN ISO 14120:2015	EN ISO 13849-1:2015
EN ISO 13849-2:2012	

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:



Nor-Cal Products by Pfeiffer Vacuum
1967 South Oregon Street
96097 Yreka, CA

September 09, 2023

**UK
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Pfeiffer Vacuum GmbH
Headquarters • Germany
T +49 6441 802-0
info@pfeiffer-vacuum.de

www.pfeiffer-vacuum.com

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