



OPERATING INSTRUCTIONS



Original

ANGLE VALVE | INLINE VALVE

Pneumatic and manual version

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.

Table of contents

1	About this manual	4
1.1	Validity	4
1.1.1	Applicable documents	4
1.1.2	Products concerned	4
1.2	Target group	4
1.3	Conventions	4
1.3.1	Instructions in the text	4
1.3.2	Pictographs	5
1.3.3	Abbreviations	5
1.4	Trademark proof	5
2	Safety	6
2.1	General safety information	6
2.2	Safety instructions	6
2.3	Safety precautions	7
2.4	Limits of use of the product	7
2.5	Proper use	8
2.6	Foreseeable improper use	8
3	Product description	9
3.1	Function	9
3.2	Scope of delivery	9
3.3	Identifying the product	9
4	Transportation and Storage	10
4.1	Transport	10
4.2	Storage	10
5	Installation	11
5.1	Preparatory work	11
5.2	Vacuum Connection	11
5.3	Compressed air connection	12
5.4	Replacing or adding pilot valve	13
6	Operation	14
7	Maintenance	15
7.1	General maintenance information	15
7.2	Maintenance	15
8	Decommissioning	17
9	Recycling and disposal	18
9.1	General disposal information	18
10	Malfunctions	19
11	Service solutions by Pfeiffer Vacuum	20
12	Spare parts angle valve	22
13	Technical data and dimensions	23
13.1	General	23
13.2	Technical data	23
13.3	Dimensions	25
	EC Declaration of Conformity	27

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

Document	Reference
Declaration of conformity	included with these operating instructions

1.1.2 Products concerned

This document applies to products with the following part numbers:

Part number	Description
ESV-Sxxxx	Models for high vacuum applications, manual
ESVP-Sxxxx	Models for high vacuum applications, pneumatic
AIV-Sxxxx	Models for high vacuum applications, manual
AIVP-Sxxxx	Models for high vacuum applications, pneumatic
CSV-Sxxxx	Models for ultra high vacuum applications, manual
CSVP-Sxxxx	Models for ultra high vacuum applications, pneumatic
CAIV-Sxxxx	Models for ultra high vacuum applications, manual
CAIVP-Sxxxx	Models for ultra high vacuum applications, pneumatic

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
AIVP	Angle in-line, HV valve
AWG	American wire gauge
CDA	Clean dry air
CF	Flange: Metal-sealed connector in accordance with ISO 3669
Delta P	Delta pressure
DN	Nominal diameter as size description
FKM	Fluoropolymer rubber
HV	High vacuum
IPA	Isopropyl alcohol
ISO	Flange: Connection in accordance with ISO 1609 and ISO 2861
ESVP	Right angle, HV valve
NPT	National taper pipe

Tbl. 1: Abbreviations used in this document

1.4 Trademark proof

- Krytox® is a registered trademark of Chemours Company.
- 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 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.

WARNING

Risk of injury due to overpressure in the vacuum system > 1000 hPa

Released parts and escaped gases can result in injury.

- Do not open clamps while the vacuum system is pressurized.
- Use the clamp types that are suited for overpressure.

WARNING

Risk of injury due to overpressure in the vacuum system > 2500 hPa

KF flange connections with elastomer seals cannot withstand such pressures. Process media can leak and cause potential damage to your health.

- Use O-rings provided with an outer centering ring.

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



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.



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, with flow in either direction.	
Allowable ambient humidity	0 - 95% non-condensing	
Process temperature range	-18°C - 200°C Process temperatures above 150°C may require use of seal materials other than FKM	
Heating capabilities	Body can be heated up to 150°C Actuator can be heated up to 60°C	
Maximum internal pressure	1400 hPa	
Maximum delta-p before opening	1400 hPa in open direction 1400 hPa in closing direction	
Open / close speed	1.5 s to open / 1.25 s to close	
Pneumatic supply	4000 - 8500 hPa	
Solenoid electrical specifications	120V AC	2.5 W
	24 V DC	1.8 W
	240 V AC	4.0 W
	24 V AC	4.0 W

Parameter	Limit value
Reliability	1.000.000 cycles in a clean environment
Leak rate	High Vacuum: 1×10^{-9} mbar l/s Ultra-High Vacuum: 1×10^{-10} mbar l/s

Tbl. 2: Limits of use for legacy pneumatic angle valves

2.5 Proper use

Proper use

- ▶ Use the valve only for isolating in a vacuum system.
- ▶ Use the valve only in closed indoor areas.

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 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

3 Product description

3.1 Function

ESVP/CSVP pneumatic angle valves are pneumatically operated bellows sealed angle valves. Designed for use in high vacuum and ultra high vacuum applications.

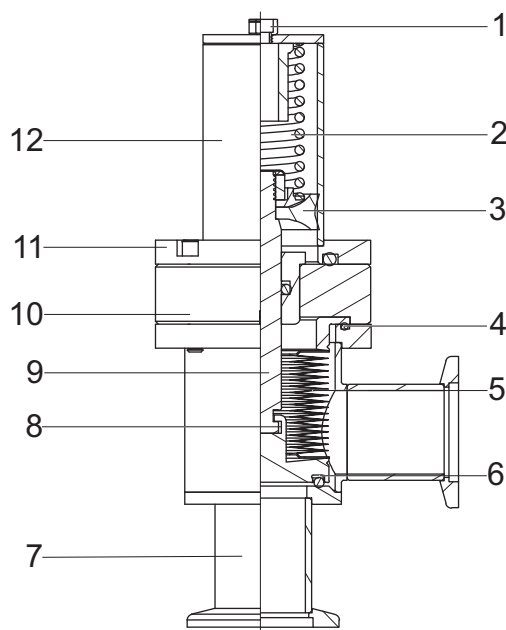


Fig. 1: Pneumatic Angle Valve

- | | |
|-----------------------|--------------------|
| 1 Air filter | 7 Body |
| 2 Air cylinder spring | 8 Set screw |
| 3 Piston cup | 9 Stem shaft |
| 4 Air cylinder O-ring | 10 Center plate |
| 5 Bellows assembly | 11 Retaining plate |
| 6 Poppet O-ring | 12 Air cylinder |

3.2 Scope of delivery

- Valve
- Optional pilot valve
- Quick-start guide

3.3 Identifying the product

Rating plate

- 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.

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.

Transporting the valve safely

- ▶ Transport the valve only within the permissible temperature limits.
- ▶ Where possible, always transport or ship the valve in its original packaging.
- ▶ Always carry the valve with both hands.
- ▶ Remove the protective cover only immediately prior to installation.
- ▶ Transport the valve in the closed position.

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 Preparatory work

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.

Required tools and materials

- Lint-free, dry wipe
- Powder-free latex gloves
- Vacuum grease

Pre-installation

1. Observe the instructions for transport to the installation location.
2. Determine that the valve and adjacent plumbing in the vacuum system will be adequately supported when installed.
3. Make sure the mating flanges are in line, flat, parallel, and the correct distance apart to minimize straining of the valve body.
4. Remove the flange cover and wipe the flange and gaskets with a lint-free, dry wipe.
5. If installing an o-ring seal flange, apply a light film of vacuum grease to the o-ring and install in the flange groove.

5.2 Vacuum Connection



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.

Mounting orientation

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

Required tools and materials

- Seal with centering ring
- Clamp
- Connection flange

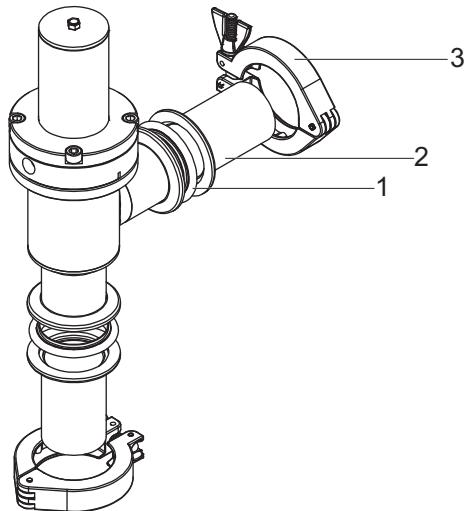


Fig. 2: Vacuum connection

- | | |
|----------------------------|------------------------|
| 1 Seal with centering ring | 3 KF connection flange |
| 2 Clamp | |

Establish the vacuum connection

- Install a vacuum connection according to the connection nominal diameter for ISO-KF, ISO-K and CF-F with fastener and pipe components from the [Pfeiffer Vacuum Components Shop](#).

5.3 Compressed air connection

Requirements

- The compressed air line is not pressurized.
- The product is installed in a vacuum system or
- The moving parts are protected to avoid accidental contact.

Required tools and materials

- Fitting, 1/8" NPT to plastic tube for air inlet (not included in delivery scope)
 - Bursting pressure ≥ 9807 hPa overpressure
 - Material: polyamide soft or polyurethane
- Compressed air control system that meets the following specifications:
 - 3923-5884 hPa overpressure
- Thread sealant

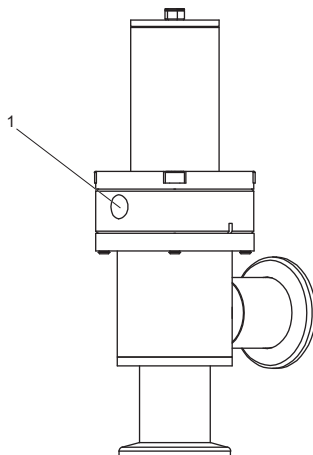


Fig. 3: Compressed air connection

- | |
|-----------------------------|
| 1 Compressed air connection |
|-----------------------------|

Procedure

1. Apply thread sealant to NPT threads on air fitting.
2. Thread fitting into centerplate pneumatic connection port.
3. Connect airline to fitting.

5.4 Replacing or adding pilot valve

Requirements

- Dismount valve from the vacuum system

Required tools and materials

- 2 mm hex key
- 7/16" wrench
- Lint-free gloves
- Plastic polyamide soft or polyurethane tubing
- Fusible connector for electrical connection (wire specification: 0.75 mm² / 18 AWG)
- Pilot valve kit

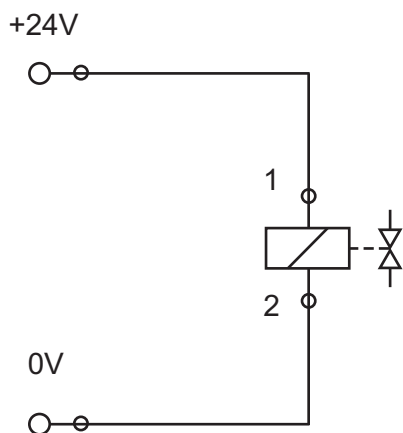


Fig. 4: Solenoid wiring

Remove pilot valve

1. Remove the poly tubing from the air fitting of the valve and the air fitting of the pilot valve.
2. Remove the electrical connection.
3. Use 7/16" wrench to loosen the air fitting from the valve.
4. Use hex key to remove the two air fittings and air filter from the pilot valve.

Install pilot valve

1. Use hex key to install the two air fittings and air filter onto the pilot valve.
2. Use 7/16" wrench tighten the air fitting onto the valve.
3. Insert the poly tubing into the air fitting of the valve and the air fitting of the pilot valve.
4. Make the electrical connection.

Pilot valve test

1. Insert air supply line into the straight fitting on the pilot valve.
2. Apply 4000 - 7000 hPa air pressure.
 - Valve should not open until power is applied.
 - Verify valve opens when power is applied and closes when power is removed.
 - Alternately you can actuate the pilot valve by pressing the manual actuation button.

6 Operation

- For continued trouble-free operation, keep the valve clean and free of contaminants.
- Use lint-free gloves to avoid contaminating the valve with finger oils.
- Work in a clean environment to avoid other contamination.
- The product is ready for operation as soon as it has been installed.

7 Maintenance

7.1 General maintenance information

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.

Serviceable parts

- Contact Pfeiffer Vacuum service for repair of non-user-serviceable parts

7.2 Maintenance

Internal service seals and bellow assembly



- Use lint free gloves when handling the valve
- Be careful to insert the O-rings into the grooves without twisting them

Requirements

- Valve dismounted from the vacuum system

Required tools and materials

- Lint-free gloves
- Replacement O-rings
- Replacement bellow assembly
- High temperature grease e.g. #PTL0161-001
- DN10 to DN25
 - 7/16" open end wrench
 - 7/16" socket
 - 1/2" Hex key
- DN40
 - 3/16" Hex key
 - 9/16" socket
 - 7/16" open end wrench
 - 1/2" Hex key
- DN50
 - 5/32" Hex key
 - 9/16" socket
 - 7/16" open end wrench
 - 1/2" Hex key

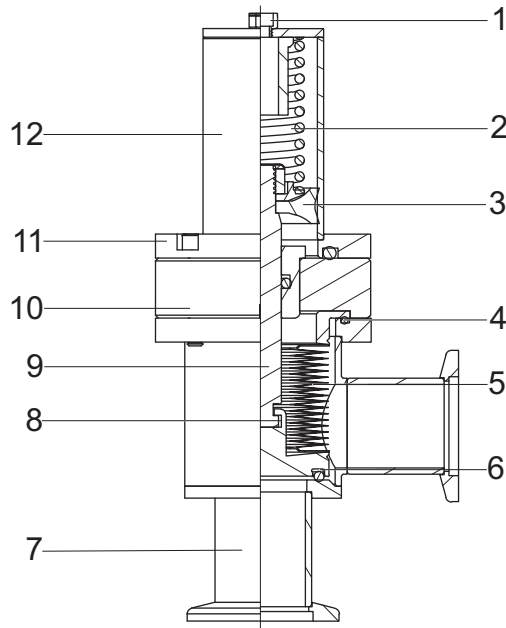


Fig. 5: Pneumatic Angle Valve

- | | |
|-----------------------|--------------------|
| 1 Air filter | 7 Body |
| 2 Air cylinder spring | 8 Set screw |
| 3 Piston cup | 9 Stem shaft |
| 4 Air cylinder O-ring | 10 Center plate |
| 5 Bellows assembly | 11 Retaining plate |
| 6 Poppet O-ring | 12 Air cylinder |

Replacing components

1. Remove air fitting at centerplate.
2. Remove air cylinder, apply 30 to 40 lbs. of force against the top of the air cylinder to neutralize the spring while removing the bonnet screws.
3. Remove valve internals from the body.
4. Remove bonnet and poppet seals.
5. If bellow assembly requires replacement, remove jam nut by first inserting 7/16" open end wrench in the stem shaft to keep the bellow assembly from rotating while removing the jam nut.
Reassemble the valve.
6. Remove piston cup.
7. Slide off centerplate.
8. Remove set screw, replace bellow assembly.
9. Apply a light film of high vacuum grease on the O-ring prior to installing.
10. Replace O-rings.
11. Apply anti-seize or equivalent on set screw and bonnet screws.
12. Apply Lubriplate high temperature grease #PTL0161-001 or equivalent on stem shaft.
13. Re-assemble the valve in reverse order.
14. After reassembly, perform a few switching cycles in order for the O-rings to perfectly adapt to the sealing surfaces.

8 Decommissioning

Required tools and materials

- Lint-free gloves
- Protective covers for the valve flanges

Prerequisites

- Vent the vacuum system
- Turn off the control system
- Close the valve

Procedure

1. For the power supply, loosen the connector and unplug it.
2. For the air connection, pull out the tube while depressing the thrust ring.
3. Remove the valve from the vacuum system using the installation instructions, but in the reverse order.
4. Install the protective lids.

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
Valve does not open or close	Compressed air not connected properly	Check air pressure
	Pilot valve not connected properly	Check power supply connection and wiring
Leak at body or plate	Process contamination has caused seal degradation	Clean or replace the seals

Tbl. 3: 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](#).

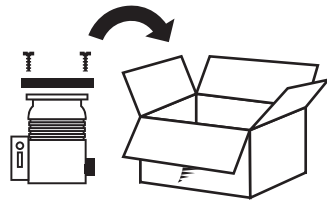


4. You will receive an acknowledgment from Pfeiffer Vacuum.

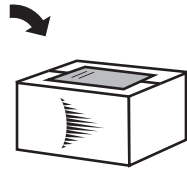
PFEIFFER VACUUM

Submission of contaminated products

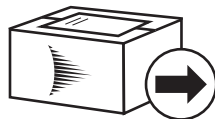
No microbiological, explosive, or radiologically contaminated products will be accepted. Where products are contaminated, or the contamination declaration is missing, Pfeiffer Vacuum will contact you before starting service work. Depending on the product and degree of pollution, **additional decontamination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



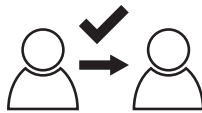
5. Prepare the product for transport in accordance with the provisions in the contamination declaration.
 - a) Neutralize the product with nitrogen or dry air.
 - b) Seal all openings with blind flanges, so that they are airtight.
 - c) Shrink-wrap the product in suitable protective foil.
 - d) Package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

Size	Material	Part number
DN 16 / DN25	FKM	ESVP-075-95
DN 40	FKM	ESVP-150-95
DN 50	FKM	ESVP-200-95

Tbl. 4: Replacement seal kit pneumatic ESVP/AIVP

Size	Material	Part number
DN 16 / DN25	AM-350/304 stainless steel FKM	ESV-075-16K
DN 40	AM-350/304 stainless steel FKM	ESV-150-16K
DN 50	AM-350/304 stainless steel FKM	ESV-200-16K

Tbl. 5: Replacement bellows kit pneumatic ESVP/AIVP

Size	Material	Part number
DN 16/ DN 25	FKM, Cu	CSVP-075-95
DN 40	FKM, Cu	CSVP-150-95
DN 63	FKM, Cu	CSVP-250-95

Tbl. 6: Replacement seal kit pneumatic CSVP/CAIVP

Size	Material	Part number
DN 16 / DN 25	AM-350/304 stainless steel	CSVP-075-16K
DN 40	AM-350/304 stainless steel	CSVP-150-16K
DN 63	AM-350/304 stainless steel	CSVP-250-16K

Tbl. 7: Replacement bellow kit pneumatic CSVP/CAIVP

Size	Material	Part number
DN 16/ DN25	FKM	ESV-075-95
DN 40	FKM	ESV-150-95
DN 50	FKM	ESV-200-95

Tbl. 8: Replacement seal kit manual ESV/AIV

Size	Material	Part number
DN 16/ DN 25	AM-350/304 stainless steel	ESV-075-16K
DN 40	AM-350/304 stainless steel	ESV-150-16K
DN 50	AM-350/304 stainless steel	ESV-200-16K

Tbl. 9: Replacement bellow kit manual ESV/AIV

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 m³/s	sccm	Torr l/s	atm cm³/s
mbar l/s	1	0.1	59.2	0.75	0.987
Pa m³/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 cm³/s	1.01	0.101	59.8	0.76	1

Tbl. 11: Conversion table: Units for gas throughput

13.2 Technical data

Part number	ESVP-S02100	ESVP-S03100	ESVP-S04100	ESVP-S05100
Connection flange	DN 16 ISO-KF	DN 25 ISO-KF	DN 40 ISO-KF	DN 50 ISO-KF
Actuator	Pneumatic	Pneumatic	Pneumatic	Pneumatic
Conductance value with molecular flow	5 l/s	12 l/s	37 l/s	65 l/s
Compressed air volume	10 cm³	10 cm³	26 cm³	100 cm³
Compressed air (overpressure)	6 000 – 8 000 hPa	6 000 – 8 000 hPa	6 000 – 8 000 hPa	6 000 – 8 000 hPa
Opening time	1.5 s	1.5 s	1.5 s	1.5 s
Closing time	1.25 s	1.25 s	1.25 s	1.25 s
Tightness	$1 \cdot 10^{-9}$ mbar l/s	$1 \cdot 10^{-9}$ mbar l/s	$1 \cdot 10^{-9}$ mbar l/s	$1 \cdot 10^{-9}$ mbar l/s
Operating pressure min.	$1 \cdot 10^{-8}$ hPa	$1 \cdot 10^{-8}$ hPa	$1 \cdot 10^{-8}$ hPa	$1 \cdot 10^{-8}$ hPa
Pressure max. (absolute)	1000 hPa	1000 hPa	1000 hPa	1000 hPa
Differential pressure in closing direction	1400 hPa	1400 hPa	1400 hPa	1400 hPa
Differential pressure in opening direction	1400 hPa	1400 hPa	1400 hPa	1400 hPa
Bakeout temperature: housing	150 °C	150 °C	150 °C	150 °C
Bakeout temperature: actuator, pilot valve	60 °C	60 °C	60 °C	60 °C
Service life	1000000 cycles	1000000 cycles	1000000 cycles	1000000 cycles
Main material	Stainless steel	Stainless steel	Stainless steel	Stainless steel

Part number	ESVP-S02100	ESVP-S03100	ESVP-S04100	ESVP-S05100
Seal	FKM	FKM	FKM	FKM
Weight	0.9 kg	1.4 kg	1.8 kg	2.7 kg

Tbl. 12: Technical data for pneumatic angle valves

Part number	ESVPA-S06200	ESVPA-S07200	CSVP-S02400	CSVP-S04400
Connection flange	DN 63 ISO-K	DN 80 ISO-K	DN 16 CF	DN 40 CF
Actuator	Pneumatic	Pneumatic	Pneumatic	Pneumatic
Conductance value with molecular flow	136 l/s	217 l/s	5 l/s	37 l/s
Compressed air volume	112 cm ³	138 cm ³	10 cm ³	26 cm ³
Compressed air (overpressure)	6 000 – 8 000 hPa	6 000 – 8 000 hPa	6 000 – 8 000 hPa	6 000 – 8 000 hPa
Opening time	0.5 s	0.5 s	1.5 s	1.5 s
Closing time	0.75 s	0.75 s	1.25 s	1.25 s
Tightness	1 · 10 ⁻⁹ mbar l/s	1 · 10 ⁻⁹ mbar l/s	1 · 10 ⁻¹⁰ mbar l/s	1 · 10 ⁻¹⁰ mbar l/s
Operating pressure min.	1 · 10 ⁻⁸ hPa	1 · 10 ⁻⁸ hPa	1 · 10 ⁻⁹ hPa	1 · 10 ⁻⁹ hPa
Pressure max. (absolute)	1000 hPa	1000 hPa	1000 hPa	1000 hPa
Differential pressure in closing direction	1400 hPa	1400 hPa	1400 hPa	1400 hPa
Differential pressure in opening direction	1400 hPa	1400 hPa	1400 hPa	1400 hPa
Bakeout temperature: housing	150 °C	150 °C	150 °C	150 °C
Bakeout temperature: actuator, pilot valve	60 °C	60 °C	60 °C	60 °C
Service life	1000000 cycles	1000000 cycles	1000000 cycles	1000000 cycles
Main material	Stainless steel	Stainless steel	Stainless steel	Stainless steel
Seal	FKM	FKM	–	–
Weight	3.1 kg	4.5 kg	1 kg	2 kg

Tbl. 13: Technical data for pneumatic angle valves

Part number	AIVP-S02100	AIVP-S03100	AIVP-S04100	AIVP-S05100
Connection flange	DN 16 ISO-KF	DN 25 ISO-KF	DN 40 ISO-KF	DN 50 ISO-KF
Actuator	Pneumatic	Pneumatic	Pneumatic	Pneumatic
Conductance value with molecular flow	4 l/s	9 l/s	25 l/s	48 l/s
Compressed air volume	10 cm ³	10 cm ³	26 cm ³	100 cm ³
Compressed air (overpressure)	6 000 – 8 000 hPa	6 000 – 8 000 hPa	6 000 – 8 000 hPa	6 000 – 8 000 hPa
Opening time	1.5 s	1.5 s	1.5 s	1.5 s
Closing time	1.25 s	1.25 s	1.25 s	1.25 s
Tightness	1 · 10 ⁻⁹ mbar l/s	1 · 10 ⁻⁹ mbar l/s	1 · 10 ⁻⁹ mbar l/s	1 · 10 ⁻⁹ mbar l/s
Operating pressure min.	1 · 10 ⁻⁸ hPa	1 · 10 ⁻⁸ hPa	1 · 10 ⁻⁸ hPa	1 · 10 ⁻⁸ hPa
Pressure max. (absolute)	1000 hPa	1000 hPa	1000 hPa	1000 hPa
Differential pressure in closing direction	1400 hPa	1400 hPa	1400 hPa	1400 hPa

Part number	AIVP-S02100	AIVP-S03100	AIVP-S04100	AIVP-S05100
Differential pressure in opening direction	1400 hPa	1400 hPa	1400 hPa	1400 hPa
Bakeout temperature: housing	150 °C	150 °C	150 °C	150 °C
Bakeout temperature: actuator, pilot valve	60 °C	60 °C	60 °C	60 °C
Service life	1000000 cycles	1000000 cycles	1000000 cycles	1000000 cycles
Main material	Stainless steel	Stainless steel	Stainless steel	Stainless steel
Seal	FKM	FKM	FKM	FKM
Weight	1 kg	1.5 kg	2 kg	3 kg

Tbl. 14: Technical data for pneumatic inline valves

13.3 Dimensions

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

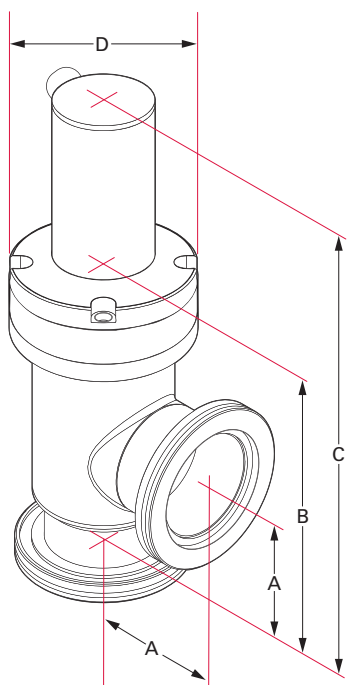


Fig. 6: Dimensions of pneumatic angle valves

Part number	A	B	C	D
ESVP-S02100	40 mm	94 mm	148 mm	57 mm
ESVP-S03100	50 mm	100 mm	155 mm	57 mm
ESVP-S04100	65 mm	134 mm	200 mm	76 mm
ESVP-S05100	70 mm	159 mm	273 mm	89 mm
ESVPA-S06200	88 mm	195 mm	269 mm	100 mm
ESVPA-S07200	98 mm	209 mm	295 mm	114 mm
CSV-P-S02400	38 mm	95 mm	146 mm	69 mm
CSV-P-S04400	63 mm	132 mm	197 mm	83 mm

Tbl. 15: Dimensions of pneumatic angle valves

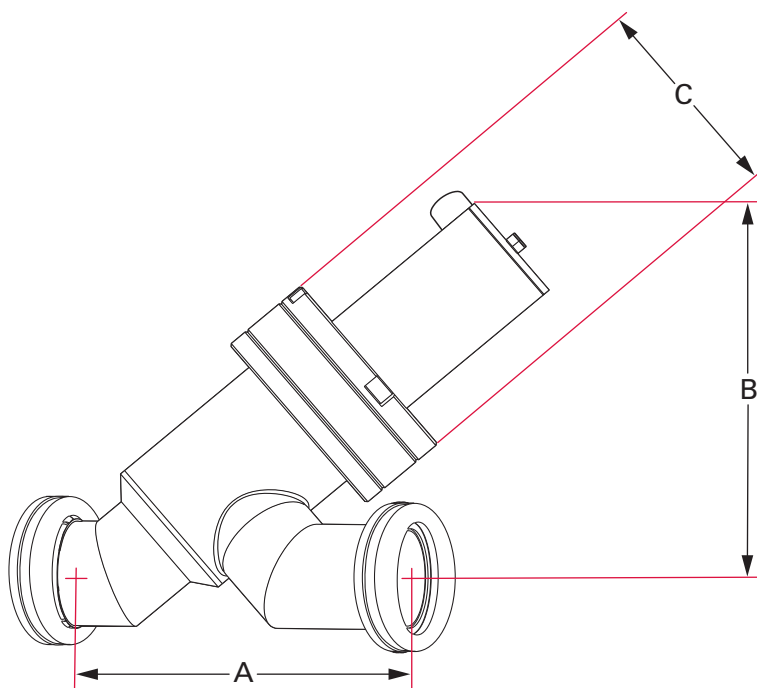


Fig. 7: Dimensions of pneumatic inline valves

Part number	A	B	C
AIVP-S02100	102 mm	110 mm	57 mm
AIVP-S03100	107 mm	108 mm	57 mm
AIVP-S04100	130 mm	145 mm	76 mm
AIVP-S05100	178 mm	202 mm	89 mm

Tbl. 16: Dimensions of pneumatic inline valves

EC Declaration of Conformity

Declaration for product(s) of the type:

Valves

ESVP Series

CSVP Series

AIVP Series

CAIVP Series

NAP Series

NAIP 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



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