OPERATING INSTRUCTIONS

EN

Original

N-SERIES 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.

Copyright

This document is the intellectual property of Pfeiffer Vacuum and all contents of this document are protected by copyright. They may not be copied, altered, reproduced or published without the prior written permission of Pfeiffer Vacuum.

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

Table of contents

1 About this manual

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

1.1 Validity

This operating instructions is 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 this 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
NAP-Sxxxxx	Models for angle valves
NAIP-Sxxxxx	Models for angle inline valves

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
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
NAP	N-Series angle valve
NAIP	N-Series angle in-line valve

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 fatal injury due to electric shock on account of incorrect installation

The device's power supply uses life-threatening voltages. Unsafe or improper installation can lead to life-threatening situations from electric shocks obtained from working with or on the unit.

► Ensure safe integration into an emergency off safety circuit.
► Do not carry out your own conversions or modifications on the unit.

⚠ 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 - 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 with optional heater kits
Maximum internal pressure	1400 hPa
Maximum Delta P across poppet	1400 hPa in open direction. 1400 hPa in closing direction.
Open / close speed	0.5 s to open, 0.7 s to close at 5500 hPa
Pneumatic supply	4000 - 69000 hPa.

Parameter	Limit value	
Solenoid electrical specifications	120 V AC 24 V DC 240 V AC 24 V AC	2.5 W 1.8 W 4.0 W 4.0 W
Position indicators	Optical: NPN Optical: PNP	
Reliability	5 million cycles in clean environment	
Leak rate	1 x 10^{-9} hPa l/s (for valves with FKM seals)	

Tbl. 2: Limits of use for N-Series angle valve

2.5 Proper use

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

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

N-Series valves are pneumatically operated bellows sealed angle valves, designed for light weight and compact size as well as robust operation and long life.

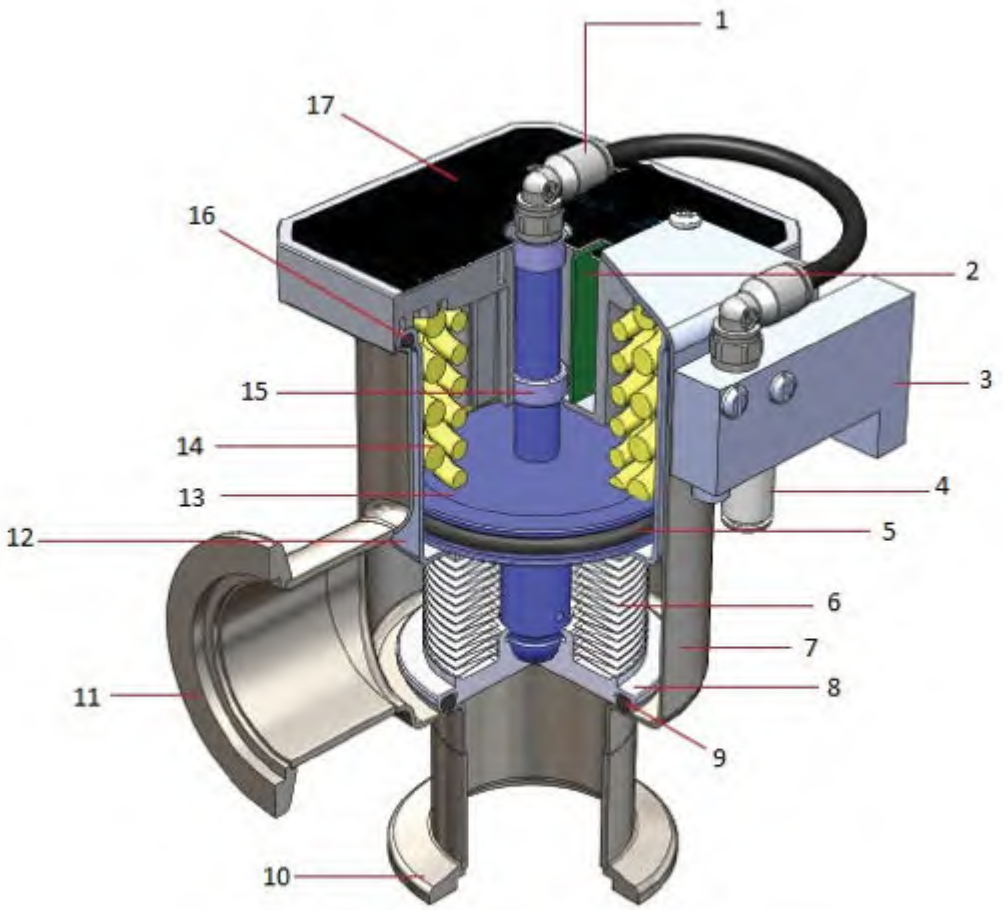


Fig. 1: N-Series valve design

1 Activation air inlet standard with 360° swivel
2 Position sensor board (optional)
3 Air solenoid (ptional)
4 Activation air inlet
5 Piston seal
6 Bellows
7 Valve body
8 Poppet
9 O-Ring seal
10 Bottom port
11 Side port
12 Air cylinder
13 Piston
14 Closing springs
15 Position sensor ring
16 Bonnet seal
17 Actuator cap

3.2 Scope of delivery

- N-Series angle valve
- Quick-start guide

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 N-Series angle valves from the NAP (angle) and NAIP (angle in-line) series is composed of the family name, the size and, if required, an additional feature description.

Family	Size/model
NAP	DN 16 to 50
NAIP	DN 16 to 50

Tbl. 3: Product designation of Pfeiffer Vacuum N-Series Angle Valves

3.3.2 Product features

Feature	Description	Valve version
Valve body material	304 stainless steel	NAP and NAIP
Welded bellows shaft seal	AM-350	NAP and NAIP
Bonnet / poppet seals	FKM elastomer	NAP and NAIP

Tbl. 4: N-Series angle 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.

Instructions for safe transport

- ► 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 N-Series angle 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 aparty 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 Mounting the valve

- Bending moments across the inlet and outlet flange connections should never exceed 5.65 Nm.

Required tools and materials

- Clamps
- Lint-free gloves

Prerequisites

- Make sure no foreign particles enter the valve
- Leave protective caps in place until the product is ready to be installed

Procedure

1. Remove protective flange caps from the valve.
2. Connect the valve to the vacuum system using the clamps

5.2.1 Pneumatic connection

Connection to the compressed air supply may only be established if:

- 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

- Lint free gloves
- Plastic tube for air inlet:
  - Size ø4 mm
  - Material: polyamide soft or polyurethane

Prerequisites

- Prepare the plastic tube to ensure leak tightness
  - Cut the plastic tube orthogonally
  - Make sure the outside of the plastic tube is not damaged

Connect air line

1. Push the plastic tubes into the instant push-in fittings until the stop position is reached.
2. Check for correct mounting by slightly pulling.

5.2.2 Power supply connection

⚠ WARNING

Risk of fatal injury due to electric shock on account of incorrect installation

The device's power supply uses life-threatening voltages. Unsafe or improper installation can lead to life-threatening situations from electric shocks obtained from working with or on the unit.

► Ensure safe integration into an emergency off safety circuit.
► Do not carry out your own conversions or modifications on the unit.

Connection to the power supply may only be established if:

- The power supply is de-energized
- The product is installed in a vacuum system
- The moving parts are protected to avoid accidental contact

Required tools and materials

- Lint free gloves
- Electrical connection for pilot valve
- Electrical connection for position indicator

Connect pilot valve

► Make electrical connection to black and red wires on pilot valve.

Connect position indicator

► Make electrical connection to position indicator:
  – Black wire is ground
  – Green wire is closed
  – White wire is open
  – Red wire is 24 V DC

6 Operation

- 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.

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 Replacing O-ring seal

- 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

Required tools and materials

- 3/32" hex key
- Lint-free gloves
- Replacement o-rings

Prerequisites

- Dismount valve from the vacuum system
- Remove air fitting, if installed

Remove and clean o-rings

1. Install vented screw with large flat washer until screw stops.
   – Do not overtighten.
   – This partially opens the valve allowing the bellows/actuator assembly to be removed.
2. Remove the four button head screws using hex key.
3. Lift bellows/actuator assembly out of body.
4. Remove and discard the old bonnet and poppet o-rings.
   – Avoid scratching the seal surfaces by using a plastic o-ring pick to remove the o-rings.

Reassemble valve

1. Clean the bonnet and poppet o-ring grooves using IPA soaked cleanroom wipe.
2. Wipe o-rings with IPA.
3. Blow-dry with CDA.
4. Evenly apply a light sheen of Krytox to both o-rings.
5. Install the o-rings.
6. Wipe off any excess Krytox with IPA.
7. Carefully install the sub-assembly into the body.
   – Be sure that the body o-ring is seated into the groove.
8. Place a small amount of anti-seize onto the button head screws.
9. Insert and tighten down all four screws.
   – Torque to 1.69 Nm. using a cross pattern.
10. Remove the vented screw and flat washer from the top cap.
11. Thread the air fitting into the stem to complete the valve.

7.3 Replacing or adding pilot valve

Required tools and materials

- 2 mm hex key
- Lint-free gloves
- Plastic polyamide soft or polyurethane tubing
- Pilot vlave kit

Prerequisites

- Dismount valve from the vacuum system

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 pilot valve assembly from the bracket.
3. Remove the pilot valve bracket.
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. Install pilot valve bracket.
3. Attach the pilot valve assembly to the bracket.
4. Insert the poly tubing into the air fitting of the valve and the air fitting of the pilot valve.

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.

7.4 Replacing or adding position indicator

- Position indicators are mounted on a printed circuit board which is located in a pre-formed slot in the top housing of the valve.
- The label on top of the valve must be removed to access the position indicator.
- Do not wear latex gloves when handling boards.

Required tools and materials

- Lint free gloves.
- Position indicator kit.

Remove position indicator

1. Remove air fitting, if installed.
2. Remove the label to access the position indicator card slot.
   - Replacement label is included in the kit.

Install position indicator

1. Install the sensor board with the optics toward the stem and the electrical connector located at the top of the valve facing away from the stem.
2. Place label onto valve so that the electrical connector is accessible through the opening in the label.
3. Reinstall the air fitting.
4. Connect position indicator cable.
   - Black wire is ground
   - Green wire is closed
   - White wire is open
   - Red wire is +24 V DC
5. Connect air line for normal valve operation.
   - When the valve is in the open position the "I" led should illuminate on the valve.
   - When the valve is in the closed position the "0" led should illuminate on the valve.

8 Decommissioning

Required tools and materials

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

Prerequisites

- Vacuum system vented
- Control system off
- Valve closed

Procedure

1. Loosen the power supply connector and unplug it.
2. Disconnect the air tube.
3. Remove the valve from the vacuum system.
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.

Environmental protection

The product and its components **must be disposed of in accordance with the applicable regulations relating to environmental protection and human health**, with a view to reducing natural resource wastage and preventing pollution.

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	Possible solution
Valve does not open	Obstruction inside valve	Clear/remove any obstructions
	Broken or worn spring in actuator	Replace actuator spring
	Degraded or inadequate lubrication	Clean and relubricate appropriately
	Blockage of the air vent	Clear air vent
	Faulty pilot valve	Check/replace pilot valve
Valve does not close	Inadequate air supply pressure	Ensure there is at least minimum pressure of 4000 hPa
	Kink or blockage in pneumatic supply line or inlet fitting	Clear or replace line
	Faulty pilot valve	Check/replace pilot valve
	Pneumatic air cylinder piston o-ring leak	Replace piston o-ring
	Piston stem seal leak	Replace piston stem seal
Valve does not seal adequately	Poppet seal o-ring is defective or contaminated	Clean/replace o-ring
	Poppet valve seat is contaminated	Clean valve seat
	Valve is not closing fully	Refer to section above regarding valve not closing
	Process contamination has caused seal degradation	Replace seal(s)
Vacuum system will not pump down to ultimate pressure	Leaks due to damage of flanges or o-rings	Repair flanges/replace o-rings
	Valve body leaks due to severe bending moments during installation	Look for signs of deformation or cracking
	Ambient air leak into body cavity due to static top cap o-ring being compromised	Check/replace static top cap o-ring
	Ambient air leak due to damaged bellows	Check/replace bellows
Position indicators not sending signals	Valve not opening or closing fully	Refer to sections above regarding valve not opening or closing
	Sensor cable not connected properly	Ensure cable is connected
	Position indicator is broken or needs replacement	Replace position indicator

Tbl. 5: Troubleshooting the valve

11 Service solutions by Pfeiffer Vacuum

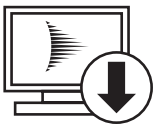
We offer first-class service
High vacuum component service life, in combination with low downtime, are clear expectations that you place on us. We meet your needs with efficient products and outstanding service.

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 Pfeiffer Vacuum Service section.

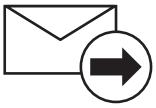
You can obtain advice on the optimal solution for you, from your Pfeiffer Vacuum representative.
For fast and smooth service process handling, we recommend the following:



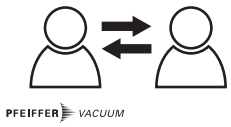
1. Download the up-to-date form templates.
   - Explanations of service requests
   - Service requests
   - Contamination declaration

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.

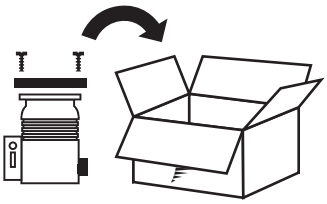


3. Send the forms by email, fax, or post to your local Service Center.

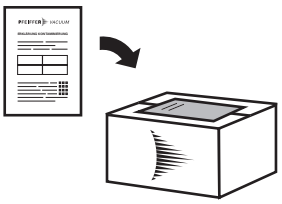


4. You will receive an acknowledgment from Pfeiffer Vacuum.

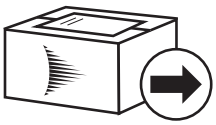
Submission of contaminated products
No microbiological, explosive, or radiologically contaminated products will be accepted. Where products are contaminated, or the contamination declaration is missing, Pfeiffer Vacuum will contact you before starting service work. Depending on the product and degree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



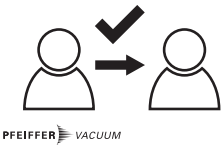
5. Prepare the product for transport in accordance with the provisions in the contamination declaration.
a) Neutralize the product with nitrogen or dry air.
b) Seal all openings with blind flanges, so that they are airtight.
c) Shrink-wrap the product in suitable protective foil.
d) Package the product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

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

12 Spare parts - N-Series valve

Universal kit part numbers for all sizes.

Kit description	Part number
Seal kit	NA-075-95
Rebuild kit	NA-075-99
Position indicator kit	N-NPN N-PNP
Pilot valve kit, 120 V AC	N-S11-K
Pilot valve kit, 24 V DC	N-S21-K
Pilot valve kit, 240 V AC	N-S31-K
Pilot valve kit, 24 V AC	N-S41-K

Tbl. 6: Replacement Parts

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 Pa = 1 N/m^2						

Tbl. 7: 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. 8: Conversion table: Units for gas throughput

13.2 Technical data

Type designation	DN 16	DN 25	DN 40	DN 50
Part number	NAP-S021xx NAIP-S021xx	NAP-S031xx NAIP-S031xx	NAP-S041xx NAIP-S041xx	NAP-S051xx NAIP-S051xx
Vacuum connection	DN 16 ISO-KF	DN 25 ISO-KF	DN 40 ISO-KF	DN 50 ISO-KF
Actuation: opening and closing	pneumatic	pneumatic	pneumatic	pneumatic
Conductance	5 l/s	12 l/s	37 l/s	37 l/s
Compressed air volume	31 cm^3	31 cm^3	31 cm^3	31 cm^3
Opening time	0.5 s	0.5 s	0.5 s	0.5 s
Closing time	0.7 s	0.7 s	0.7 s	0.7 s
Tightness	$1x10^{-9}$ hPa l/s	$1x10^{-9}$ hPa l/s	$1x10^{-9}$ hPa l/s	$1x10^{-9}$ hPa l/s
Operating pressure minimum	$1x10^{-8}$ hPa	$1x10^{-8}$ hPa	$1x10^{-8}$ hPa	$1x10^{-8}$ hPa
Operating pressure maximum	1000 hPa	1000 hPa	1000 hPa	1000 hPa
Delta P in closing direction	1400 hPa	1400 hPa	1400 hPa	1400 hPa
Delta P in opening direction	1400 hPa	1400 hPa	1400 hPa	1400 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
Pilot valve	4.5 W (DC voltage)	4.5 W (DC voltage)	4.5 W (DC voltage)	4.5 W (DC voltage)
Position indicator	24 V DC / 0.02 A	24 V DC / 0.02 A	24 V DC / 0.02 A	24 V DC / 0.02 A
Cycle life	5 million	5 million	5 million	5 million
Housing material	Stainless steel	Stainless steel	Stainless steel	Stainless steel
Bellows/valve plate material	Stainless steel	Stainless steel	Stainless steel	Stainless steel
Seals	FKM	FKM	FKM	FKM
Weight	1.3 kg	1.3 kg	1.3 kg	1.3 kg

Tbl. 9: Technical data for N-Series

13.3 Dimensions

Fig. 2: Dimensions N-Series NAP valve

Dimensions in mm

Part number	O.D.	A	B	C	D
NAP-S02100 NAP-S02102 NAP-S02110 NAP-S02112 NAP-S02122	19.1	40	104	24	70
NAP-S03100 NAP-S03102 NAP-S03110 NAP-S03112 NAP-S03122	25.4	50	114	24	70
NAP-S04100 NAP-S04102 NAP-S04110 NAP-S04112 NAP-S04122	38.1	65	129	24	70
NAP-S05100 NAP-S05102 NAP-S05110 NAP-S05112 NAP-S05122	38.1	70	134	24	70

Tbl. 10: Dimensions table for NAP valves

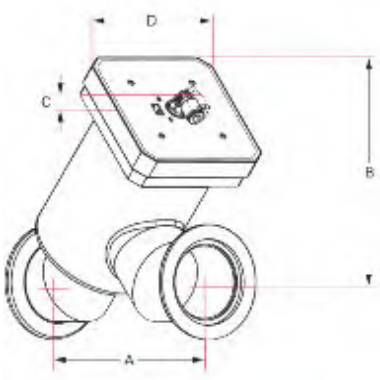


Fig. 3: Dimensions N-Series NAIP valve

Dimensions in mm

Part number	O.D.	A	B	C	D
NAIP-S02100 NAIP-S02102 NAIP-S02110 NAIP-S02112	19.1	80	117	24	70
NAIP-S03100 NAIP-S03102 NAIP-S03110 NAIP-S03112	24.5	100	102	24	70
NAIP-S04100 NAIP-S04102 NAIP-S04110 NAIP-S04112	38.1	130	111	24	70
NAIP-S05100 NAIP-S05102 NAIP-S05110 NAIP-S05112	38.1	140	111	24	70

Tbl. 11: Dimensions table for NAIP valves

Declaration of Conformity

Declaration for product(s) of the type:

Valves

ESVP Series	CAIVP Series
CSVP Series	NAP Series
AIVP 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+A12008
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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