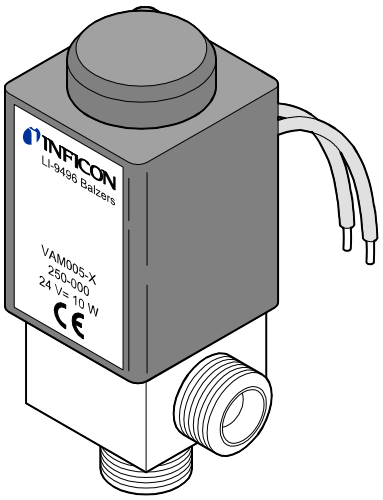
# Angle Valve

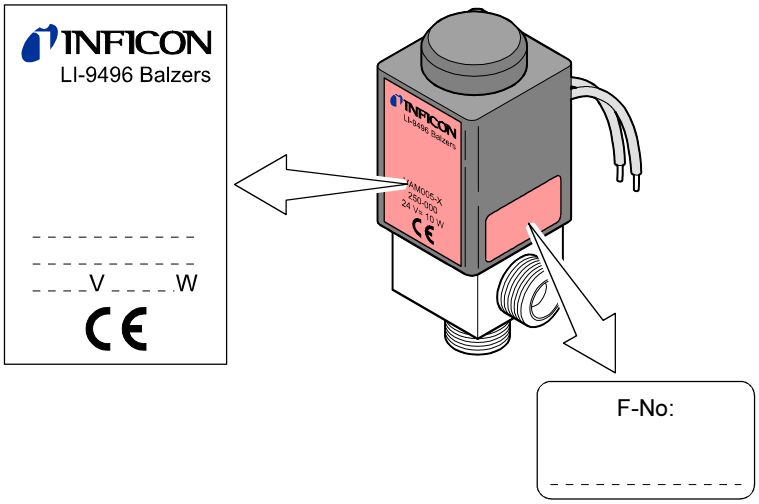
electromagnetically actuated
normally closed

## VAM005-X



## Product Identification

In all communications with Inficon, please specify the information given on the product nameplate. For convenient reference copy that information into the nameplate replica below.




## Validity

This document applies to products with part number 250-000.
The part number can be taken from the product nameplate.

We reserve the right to make technical changes without prior notice.

All dimensions in mm.

## Intended Use

The VAM005-X is predominantly used in fast-cycling vacuum systems, for example, for gas analysis and coating processes.

## Function

The VAM005-X is opened electromagnetically and closed by the prestressed pressure spring.
It will close, or will remain closed, on power loss.

# Table of Contents

# 1 Safety

## 1.1 Symbols Used

**DANGER**

Information on preventing any kind of physical injury.

**WARNING**

Information on preventing extensive equipment and environmental damage.

**Caution**

Information on correct handling or use. Disregard can lead to malfunctions or minor equipment damage.

→ See page ...

## 1.2 Personnel Qualifications

**Skilled personnel**

All work described in this document may only be carried out by persons who have suitable technical training and the necessary experience or who have been instructed by the end-user of the product.

## 1.3 General Safety Instructions

- Adhere to the applicable regulations and take the necessary precautions for the process media used.

  Consider possible reactions between the materials (→ 6) and the process media.

  Consider possible reactions of the process media due to the heat generated by the product.
- Adhere to the applicable regulations and take the necessary precautions for all work you are going to do and consider the safety instructions in this document.
- Before beginning to work, find out whether any vacuum components are contaminated. Adhere to the relevant regulations and take the necessary precautions when handling contaminated parts.

Communicate the safety instructions to all other users.

## 1.4 Liability and Warranty

Inficon assumes no liability and the warranty becomes null and void if the end-user or third parties

- disregard the information in this document
- use the product in a non-conforming manner
- make any kind of interventions (modifications, alterations etc.) on the product
- use the product with accessories not listed in the corresponding product documentation.

The end-user assumes the responsibility in conjunction with the process media used.

# 2 Technical Data

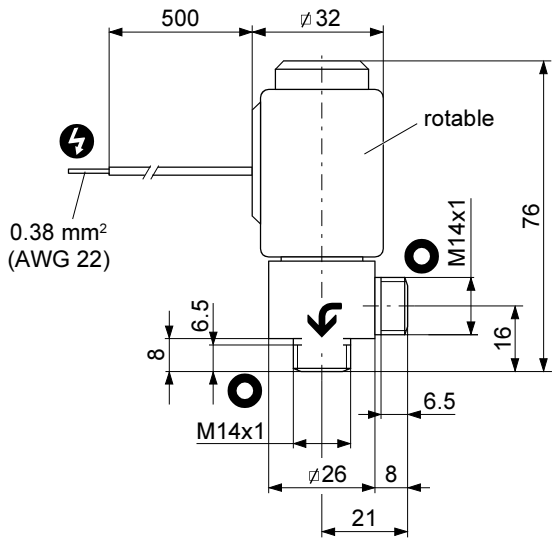
| | |
|---|---|
| Version | normally closed |
| Vacuum connection | ø5 mm / M14×1 |
| Vacuum connection (accessories) | • Flange fitting DN 10 ISO-KF<br>• Tube connection OD ¼"<br>• Tube connection OD 6 mm |
| Nominal voltage | 24 VDC ±10% |
| Nominal power | 10 W |
| Duty cycle | 100% (i.e. continuous duty possible) |
| Type of protection | IP 65 acc. to DIN 40 050 |
| Conductance for air<br>Molecular flow<br>Laminar flow | <br>0.3 l/s<br>3 l/s |
| Mounting orientation | any |
| Switching frequency max. | 300 / min [1] |
| Cycles to first overhaul | ≈2'000'000 [2] |
| Tightness | $1\times10^{-9}$ mbar l/s |
| Pressure range | $1\times10^{-8}$ mbar … 10 bar (absolute) |
| Pressure difference Δp<br>In closing direction<br>In opening direction | <br>5 bar<br>1.5 bar |
| Opens against a pressure difference Δp | 1 bar with 24 VDC |
| Closing time | 7 ms [1] |
| Opening time | 30 ms [1] |
| Temperatures<br>Ambiance<br>Heat generation<br>Bake-out | <br>5 °C [3] … 40 °C<br>60 °C (after 1¼ hours on continuous duty)<br>120 °C (without power)<br>150 °C (without coil) |
| Materials<br>Housing<br>Actuator<br>Seals | <br>Stainless steel 1.4301<br>Stainless steel 1.4105<br>FPM |
| Weight | 0.26 kg |

[1] With pressure difference Δp = 0.

[2] Under clean operating conditions.

[3] -15 °C, if the ambiance is free of condensable gases.

Dimensions [mm]



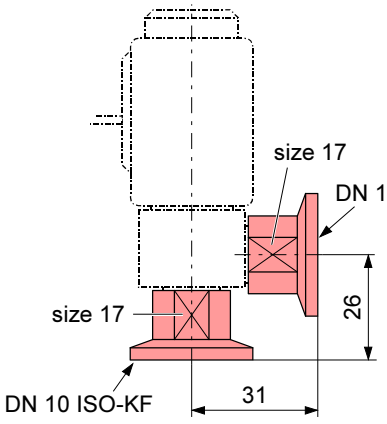

Flow direction

Electrical connection

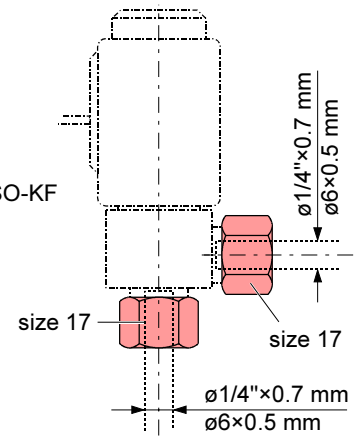
Protective lid

Space requirements with accessories
(accessories → 🗎 9)

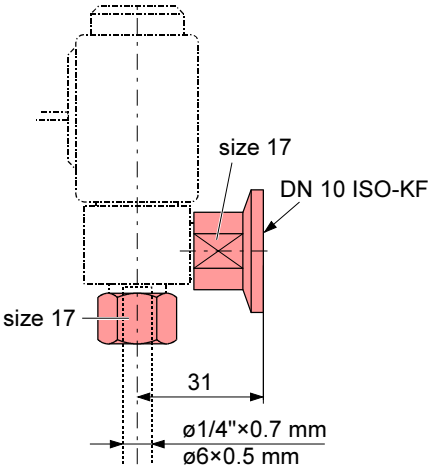
Flange fittings




Tube connections




Flange fitting and tube connection



# 3 Installation

**Skilled personnel**

The installation may only be carried out by persons who have suitable technical training and the necessary experience or who have been instructed by the end-user of the product.

## 3.1 Vacuum Connection

**Caution**

Caution: vacuum component

Dirt and damages impair the function of the vacuum component.

When handling vacuum components, take appropriate measures to ensure cleanliness and prevent damages.

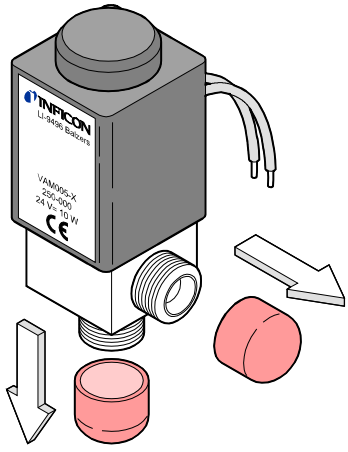
**Caution**

Caution: dirt sensitive area

Touching the product or parts thereof with one's bare hands increases the desorption rate.

Always wear clean, lint-free gloves and use clean tools when working in this area.

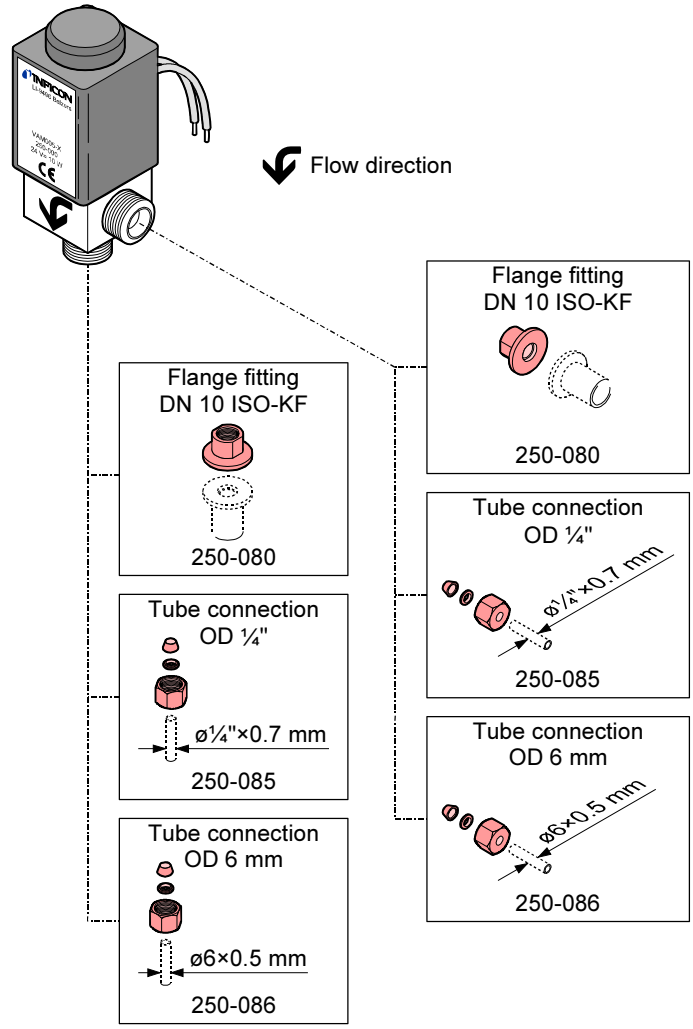
❶ Remove the protective lids




Keep the protective lids.

❷ Mount the valve to the vacuum system using an accessory.

Accessories

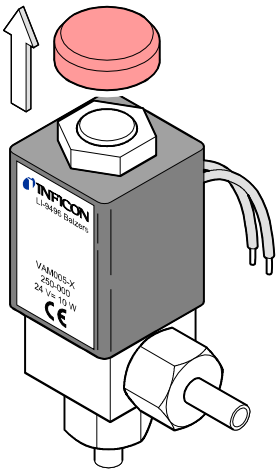



See separate document for installation of the accessories.

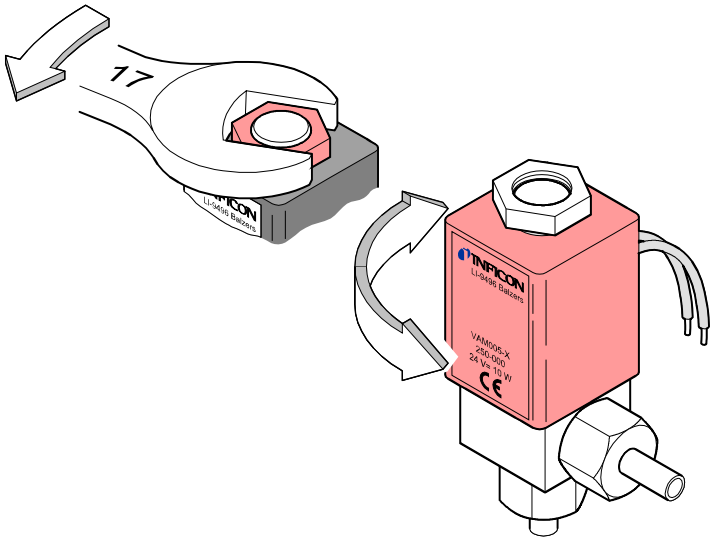
## 3.2 Electrical Connection

### 3.2.1 Bringing the Cable Strands into the Desired Position

❶ Remove the protective lid.



❷ Unfasten the hexagon nut and rotate the solenoid coil until the cable strands are in the desired position.




❸ Tighten the hexagon nut with a torque of ≤3 Nm and place the protective lid.

### 3.2.2 Establish the Electrical Connection

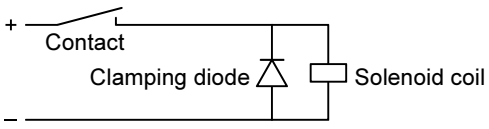
The electrical connection is established via the two cable strands. Adhere to the local regulations with regard to the installation..

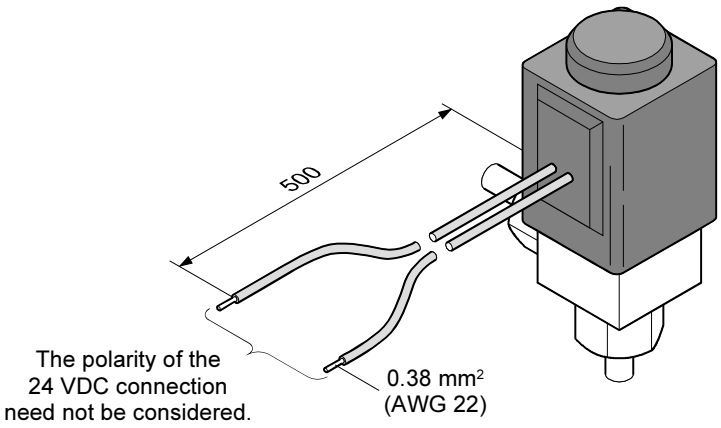
**Caution**

Caution: switching of inductive loads (solenoid coil)

Inductive loads may considerably reduce the life of or even destroy contacts.

Preferably a clamping diode should be connected in parallel to the solenoid coil. The polarity should be chosen in such a way that the diode blocks when the normal operating voltage is applied.



# 4 Operation

The product is ready for operation as soon as it has been installed.

The VAM005-X will close, or remain closed, on power loss.

**DANGER**

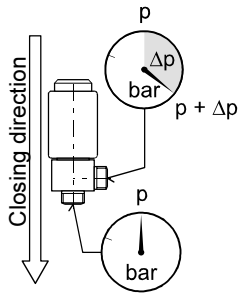
Caution: hot surface

Touching the hot surface (>55 °C) can cause burns.

Wear protective gloves.

Pressure difference Δp in closing direction

**Caution**



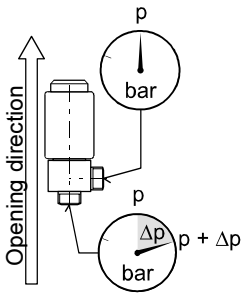

Caution: pressure difference

With Δp > 5 bar the O-ring of the valve plate can get damaged.

Avoid pressure differences Δp > 5 bar.

Pressure difference Δp in opening direction

**Caution**



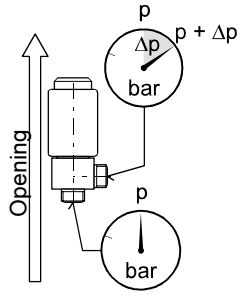

Caution: pressure difference

With Δp > 1.5 bar the valve is opened.

Avoid pressure differences Δp > 1.5 bar.

Opens against a pressure difference Δp

**Caution**




Caution: Pressure difference

With Δp > 1 bar the valve cannot open.

Avoid pressure differences Δp > 1 bar.

# 5 Deinstallation

**DANGER**

Caution: contaminated parts

Contaminated parts can be detrimental to health and environment.

Before beginning to work, find out whether any parts are contaminated. Adhere to the relevant regulations and take the necessary precautions when handling contaminated parts.

**Caution**

Caution: vacuum component

Dirt and damages impair the function of the vacuum component.

When handling vacuum components, take appropriate measures to ensure cleanliness and prevent damages.

**Caution**

Caution: dirt sensitive area

Touching the product or parts thereof with one's bare hands increases the desorption rate.

Always wear clean, lint-free gloves and use clean tools when working in this area.

Preconditions

- Vacuum system vented
- Control system disconnected from the power source
- Valve cooled down to <55 °C

Procedure

1. Disconnect the product from the power source.
2. Disconnect the product from the vacuum system and place the protective lids.

# 6 Maintenance / Repair

Under clean operating conditions the product requires no maintenance during the rated cycle life.

## 6.1 Cleaning the Valve / Replace Parts

**DANGER**

Caution: contaminated parts

Contaminated parts can be detrimental to health and environment.

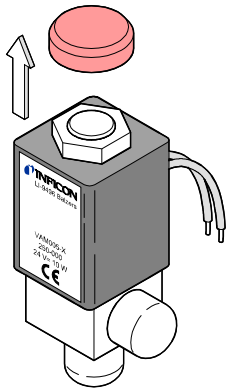
Before beginning to work, find out whether any parts are contaminated. Adhere to the relevant regulations and take the necessary precautions when handling contaminated parts.

Precondition

Valve disconnected from the vacuum system (→ 🗎 12).

Disassembling the valve

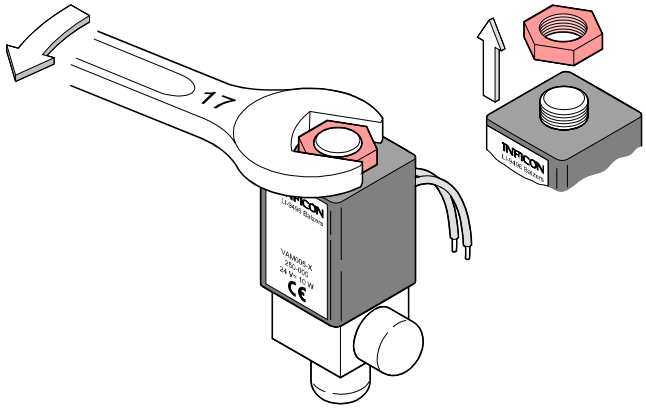
❶ Remove the protective lid.



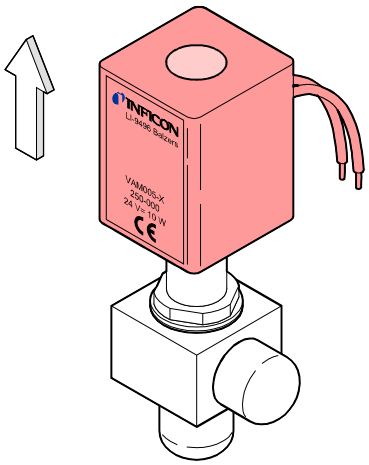
❷ Unfasten and remove the hexagon nut.

**Caution**

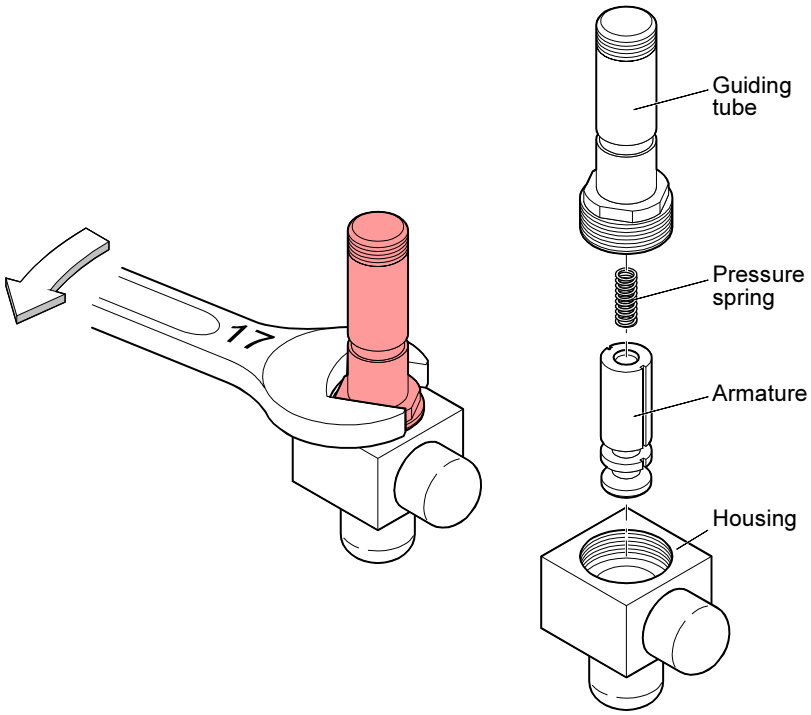
When reinstalling the product, tighten the connection with a maximum torque of 3 Nm. Otherwise the solenoid coil will be damaged.



❸ Remove the solenoid coil.



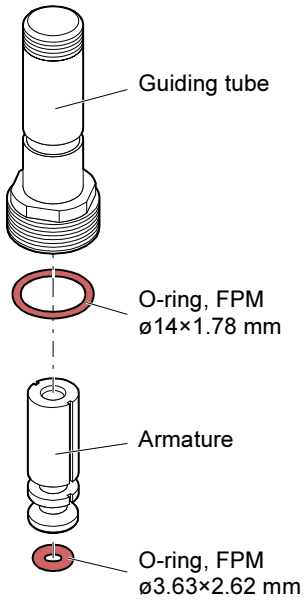
❹ Unscrew the guiding tube and disassemble it.



❺ Remove the O-rings.

**Caution**

When reinstalling the product, be careful to insert the O-rings level into the grooves without twisting them.




## Cleaning the valve

❻ Clean the valve.

**DANGER**

Caution: cleaning agents

Cleaning agents can be detrimental to health and environment.

Adhere to the relevant regulations and take the necessary precautions when handling and disposing of cleaning agents. Consider possible reactions with the product materials (→ 🗎 6).

- Clean the parts with a grease-solving, non-scouring cleaning agent.
- After cleaning, the parts should preferably be rinsed with alcohol and subsequently heated to ≈ 50° C in an oven or with an industrial blower.
- Clean the sealing surfaces with a lint-free cloth soaked with alcohol. Allow them to dry.
- Wipe the O-rings with a lint-free cloth which has been slightly moistened with vacuum oil.

## Reassembling the valve

❼ Proceed in reverse order to reassemble the valve.

**Caution**

After reassembly, a few switching cycles should be performed in order for the O-rings to perfectly adapt to the sealing surfaces. Take the necessary precautions for this procedure.

# 7 Accessories

→ 🗎 9

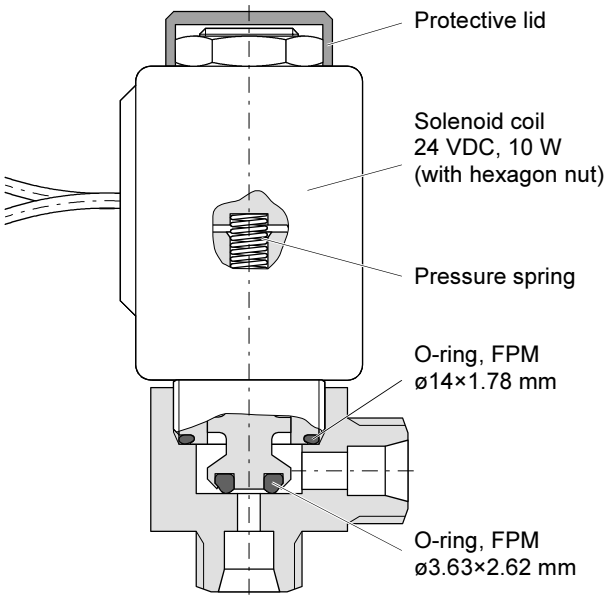
# 8 Spare Parts

When ordering spare parts, always indicate:

- all information on the nameplate
- description and ordering number according to the spare parts list.

Spare parts list

| Description | Ordering number |
|---|---|
| Spare parts kit comprising: | 215-365 |



# 9 Returning the Product

**WARNING**

Caution: forwarding contaminated products

Contaminated products (e.g. radioactive, toxic, caustic or microbiological hazard) can be detrimental to health and environment.

Products returned to Inficon should preferably be free of harmful substances. Adhere to the forwarding regulations of all involved countries and forwarding companies and enclose a duly completed declaration of contamination (→ 🗎 18).

Products that are not clearly declared as "free of harmful substances" are decontaminated at the expense of the customer.

Products not accompanied by a duly completed declaration of contamination are returned to the sender at his own expense.

# 10 Disposal

**DANGER**

Caution: contaminated parts

Contaminated parts can be detrimental to health and environment.

Before beginning to work, find out whether any parts are contaminated. Adhere to the relevant regulations and take the necessary precautions when handling contaminated parts.

**WARNING**


Caution: substances detrimental to the environment

Products or parts thereof (mechanical and electric components, operating fluids etc.) can be detrimental to the environment.

Dispose of such substances in accordance with the relevant local regulations.

## Separating the components

After disassembling the product, separate its components according to the following criteria:

### Contaminated components

Contaminated components (radioactive, toxic, caustic, or biological hazard etc.) must be decontaminated in accordance with the relevant national regulations, separated according to their materials, and disposed of.

### Other components

Such components must be separated according to their materials and recycled.

# Declaration of Contamination

The service, repair, and/or disposal of vacuum equipment and components will only be carried out if a correctly completed declaration has been submitted. Non-completion will result in delay.
This declaration may only be completed (in block letters) and signed by authorized and qualified staff.

**1** **Description of product**

Type _____
Article Number _____
Serial Number _____

**2** **Reason for return**

_____
_____
_____

**3** **Operating fluid(s) used** (Must be drained before shipping.)

_____
_____

**4** **Process related contamination of product:**

| | | |
|---|---|---|
| toxic | no ❑ 1) | yes ❑ |
| caustic | no ❑ 1) | yes ❑ |
| biological hazard | no ❑ | yes ❑ 2) |
| explosive | no ❑ | yes ❑ 2) |
| radioactive | no ❑ | yes ❑ 2) |
| other harmful substances | no ❑ 1) | yes ❑ |

The product is free of any substances which are damaging to health yes ❑

1) or not containing any amount of hazardous residues that exceed the permissible exposure limits

2) Products thus contaminated will not be accepted without written evidence of decontamination!

**5** **Harmful substances, gases and/or by-products**

Please list all substances, gases, and by-products which the product may have come into contact with:

| Trade/product name | Chemical name (or symbol) | Precautions associated with substance | Action if human contact |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |

**6** **Legally binding declaration:**

I/we hereby declare that the information on this form is complete and accurate and that I/we will assume any further costs that may arise. The contaminated product will be dispatched in accordance with the applicable regulations.

Organization/company _____

Address _____ Post code, place _____

Phone _____ Fax _____

Email _____

Name _____

Date and legally binding signature _____

Company stamp

This form can be downloaded from our website.

Copies:
Original for addressee - 1 copy for accompanying documents - 1 copy for file of sender

Notes:

Original: German sina07d1 (0103)

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