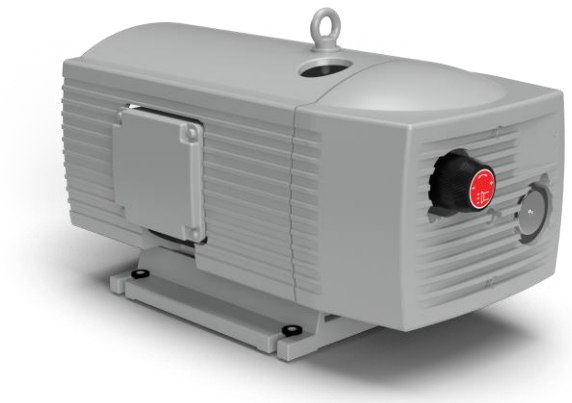
TRANSLATION OF THE OPERATING INSTRUCTIONS

# VT 4.10/4.16/4.25/4.40
# VX 4.10/4.16/4.25/4.40
# ROTARY VANE VACUUM PUMPS

Dry-running

MAKE IT BECKER.



BECKER

**Important information for the user of the operating instructions**

We reserve the right to make technical changes and additions to the operating instructions.

No liability is assumed for the content, in particular for damage caused by existing, non-existent or incorrect information.

The distribution of these operating instructions is not permitted unless expressly authorised.

**Operating instructions valid for:**

| | |
|---|---|
| General designation | Rotary vane vacuum pump, described below as the "pump". |
| Product type | Dry-running |
| Model | VT 4.10/4.16/4.25/4.40<br>VX 4.10/4.16/4.25/4.40 |
| Manufacturer | **Gebr. Becker GmbH**<br>Hölker Feld 29-31<br>42279 Wuppertal |

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# 1 TO THE OPERATING INSTRUCTIONS

## 1.1 GENERAL INFORMATION

These operating instructions are an integral part of the pump and contain the necessary information and important instructions for operating the pump safely and properly. Observing them will help:

- Avoid dangers
- Reduce repair costs and downtime
- increase the reliability and service life of the product

It is the responsibility of the operator to ensure the availability of this document. This applies in particular if the document is lost.

All persons working on the pump must have read and understood the operating manual and these operating instructions.

**HINT**

For a detailed description of the safety instructions, see chapter 2 "Basic safety instructions".

## 1.2 STRUCTURE OF THE SAFETY INSTRUCTIONS

Safety instructions are identified by a pictogram and a signal word. The following signal words are used to indicate dangers, prohibitions and important information:

**DANGER**

This signal word indicates an imminent danger that could result in serious injury or even death.

**WARNING**

This signal word indicates a potentially imminent danger that could result in serious injury or even death.

**CAUTION**

This signal word indicates a potentially imminent danger that could result in minor or serious injuries.

**ATTENTION**

This signal word indicates a potentially imminent danger that could result in material damage.

**HINT**

This symbol indicates tips, recommendations and further information.

## 1.3 SAFETY SYMBOLS

**Warning signs:**

- General warning sign
- Warning of hand injuries
- Warning of hot surfaces
- Warning of automatic start-up
- Danger of slipping
- Tripping hazard
- Warning of electrical voltage

**Command sign:**

- Attention
- Use foot protection
- Use hand protection

 Use hearing protection

 Use eye protection

 Use a protective mask

**Hint:**

 X-Series

 General information

## 1.4 ADDITIONAL DOCUMENTATION

In addition to these operating instructions, the following documents and instructions must be observed:

- Safety symbols according to chapter 1.3 on the pump and on hazardous material containers
- Regulations on accident prevention, occupational safety and environmental protection
- Operating instructions and documents for components, assemblies and aids provided by third-party manufacturers.
- Spare parts lists
- Data sheets

## 1.5 WARRANTY AND LIABILITY

Warranty and liability claims for personal injury or damage to property are invalid if

- Failure to observe the instructions for transport and installation;
- improper use (misuse) or improper operation;
- Failure to observe the operating instructions and the instructions contained therein;
- improper or non-executed maintenance and servicing work;
- incorrect installation, commissioning, maintenance, servicing and cleaning;
- Use of unauthorised operating materials, lubricants or spare parts;
- defective, incorrectly installed or dismantled protective devices;
- inadequate monitoring of pump parts subject to wear;
- Use of externally procured equipment that has not been approved by the manufacturer;
- improper disassembly;

## 1.6 MODIFICATIONS AND CONVERSIONS

Modifications or conversions are prohibited without written authorisation from the manufacturer and are therefore excluded.



**HINT**

Description of the safety instructions. See chapter 2.9 "Safety instructions"

# 2 BASIC SAFETY INSTRUCTIONS

These operating instructions serve as a basis for the safe use and operation of the pump. The operating instructions, in particular the safety instructions and the rules and regulations applicable to the place of use, must be observed by all persons working on or with the pump.

Furthermore, the generally applicable legal and other rules and regulations for accident prevention (e.g. personal protective equipment) and environmental protection must be observed.

**HINT**

Some activities on the pump require compliance with special safety regulations. These safety instructions can be found in the respective chapters of these operating instructions.

**HINT**

The operating instructions must always be kept at the place of use and must be freely accessible to all persons working with the pump.

The instructions of the occupational safety specialist and the instructions from the briefings must be followed at all times.

The pump is only intended for the intended use described in the chapter 2.5.

The pump must not be used for purposes other than those for which it is intended.

All work on the pump may only be carried out by qualified and trained personnel (see chapter 2.4 "Personnel qualifications").

The safety instructions given in chapter 2.9 must be observed for all work on the pump.

## 2.1 PROVISION

The pump is a machine within the meaning of the Machinery Directive 2006/42/EC Art 2a.

The pump conforms to the health and safety requirements of the Machinery Directive 2006/42/EC.

The pump may only be used once the operator has determined that the pump is installed in accordance with the state of the art.

This is fulfilled if, among other things, the operating conditions listed in these operating instructions in accordance with Directive 2006/42/EC Annex 1 Para. 1.7.4.2.i have been fully implemented.

## 2.2 OBLIGATIONS OF THE OPERATOR

The operator undertakes to only allow persons to work on the pump who

- are familiar with the basic occupational safety and accident prevention regulations;
- were instructed for the activities on the pump;
- have read and understood these operating instructions before carrying out any work on the pump;
- have reached the legal minimum age;
- are fit for use;
- are rested and not under the influence of drugs or medication;
- reliably fulfil the work assigned.

In addition, the operator must train staff at regular intervals and inform them about the hazards.

The personnel of the operating company must be permanently committed to safe working practices and informed about the dangers and risks of the pump. This applies in particular to the safety instructions.

The operator must provide the personnel with the necessary protective equipment.

## 2.3 OBLIGATIONS OF THE STAFF

All persons who are commissioned to work on the pump are obliged, before starting work, to

- to observe the basic regulations on occupational safety and accident prevention and
- to read and observe these operating instructions.

**HINT**

Only persons who have read and understood these operating instructions may carry out work on and with the pump!

## 2.4 PERSONNEL QUALIFICATION

Certain activities require the personnel carrying out the work to have certain qualifications. The following table summarises these qualifications:

| Activity | Minimum qualification of personnel | |
|---|---|---|
| | Instructed persons with specialised training | Instructed operating personnel |
| Commissioning | x | |
| Maintenance & servicing | x | |
| Operation | | x |
| Dismantling | x | |
| Symbol "x" authorised personnel | | |

## 2.5 INTENDED USE

The operational safety of the pump is only guaranteed if it is used as intended. Intended use also includes observing the operating instructions for this product and any components, as well as carrying out all maintenance and service work.

The pump may only be used as intended in accordance with the machine description and the technical data.

The intended use is summarised below:

- The pump evacuates air to a vacuum in accordance with chapter 9.2
- Conveying any other gases, in particular hazardous substances, is not permitted and prohibited.
- The permissible technical parameters must be complied with.
- The pump must not be operated in potentially explosive atmospheres.
- The pump must be protected from the weather.
- The manufacturer must be consulted for any operation outside the technical parameters specified in the product data sheet.

**ATTENTION**

Only use the pump for its intended purpose and in a technically safe condition!

This is the only way to guarantee the operational safety of the pump!

## 2.6 UNAUTHORISED USE

The incorrect applications listed below are not permitted and pose a risk to people and machinery. In particular

- the evacuation of hazardous substances, in particular flammable, explosive or toxic gases
- use in potentially explosive environments (explosive gas/vapour/mist/air mixtures or dust/air mixtures or hybrid mixtures of air and flammable substances)
- Use of the pump in non-commercial applications
- operating the pump when it is not fully assembled
- a setup in which the pump is subjected to dynamic loads. Please contact Beckerservice if you have any questions.

## 2.7 PROTECTIVE MEASURES FOR USERS

Personal protective equipment must be worn when working on the pump in order to minimise health hazards.

The protective equipment required for the respective work must always be worn during work.

Instructions on personal protective equipment displayed in the work area must be followed.

**WARNING**

**Risk of injury to hands due to crushing, cutting and high temperatures**

Hand protection in accordance with the glove plan must be worn during all work on the pump.

**HINT**

The hand protection must be provided by the operator, must be suitable for the activities to be carried out and must comply with the applicable standards (e.g. EN 388).

**WARNING**

**Risk of injury to feet from crushing and falling objects**

Foot protection must be worn during all work on the pump.

**HINT**

The foot protection must be provided by the operator, must be suitable for the activities to be carried out and must comply with the applicable standards (e.g. DIN EN ISO 20345).

**WARNING**

**Hearing damage due to high volume**

Hearing protection must be worn during activities that must be carried out while the pump is running.

**HINT**

Hearing protection must be provided by the operator, must be suitable for the noise levels generated and must comply with the applicable standards (e.g. DIN EN 352).

**WARNING**

**Eye injuries due to flying particles**

Eye protection must be worn during all cleaning work on the pump.

**HINT**

Eye protection must be provided by the operator, must be suitable for the activities to be carried out and must comply with the applicable standards (e.g. EN 166).

**WARNING**

**Health damage to the respiratory tract caused by pollutants and particles**

Respiratory protection must be worn during all cleaning work on the pump.

**HINT**

Respiratory protection must be provided by the operator, must be suitable for the resulting air pollution and must comply with the applicable standards (e.g. DIN EN 143, filter class FFP2).

## 2.8 INFORMATION ON RESIDUAL RISKS

The pump is built in accordance with the current state of the art and recognised safety regulations. When using the pump, health hazards for persons working directly with the pump and third parties cannot be ruled out.

## 2.9 SAFETY INSTRUCTIONS

The dangers and risks in the respective life phases of the pump are described below. The following hazard warnings must be observed.

**DANGER**

**Danger to life due to electric shock**

**Personnel qualification**

Work and tasks on the electrical system may only be carried out by qualified electricians who can demonstrate that they have successfully completed recognised training in the relevant specialist area and have been instructed in the special technical features of the pump.

Without exception, persons who do not fulfil the above conditions are prohibited from carrying out electrical work, including the simplest auxiliary activities.

To carry out tasks and activities on the electrical system of the pump, work must be carried out in accordance with the five safety rules as per DIN VDE 0105.

**DANGER**

**Danger to life due to electric shock**

**Measures in the event of damage to the electrical installation**

Damage to the electrical installation and contact with live parts can be life-threatening.

The following measures are therefore mandatory:

- In the event of damage to the electrical installation, switch off the pump immediately and inform the responsible organisation.
- Repairs must be carried out by a qualified electrician.

**DANGER**

**Danger to life due to unexpected start-up**

**Countermeasures**

The following steps must be followed when preparing for servicing and maintenance work:

1. Switch off the pump and all attached assemblies.
2. Disconnect the pump from the supply voltage and proceed in accordance with the five safety rules (VDE105).
3. Disconnect the pump from the air supply.

**DANGER**

**Fire and danger to life due to insufficient distance to neighbouring parts**

If the pump is enclosed, minimum distances to the product must be maintained to prevent potential fires.

Information on minimum distances can be found in chapter 6 "Installation and commissioning".

**DANGER**

**Danger to life due to arcing and creepage distance when disconnecting plug connections**

Always switch off the power supply before disconnecting plug connections.

**DANGER**

**Danger to life due to defective, dismantled and manipulated protective devices**

The pump may only be operated if all safety and protective devices are in place and fully functional!

Faulty safety and protective equipment can lead to dangerous situations!

For this reason:

1. Switch off the pump immediately,
2. Secure against restarting and
3. Disconnect from air supply and electrical power!

**WARNING**

**Risk of injury! Risk of crushing in the hand and arm area due to product assembly**

If assembly work is carried out, the employee must be trained in the use of lifting equipment and have provided proof of this. Use suitable protective equipment!

**WARNING**

**Risk of injury due to incorrect lifting conditions**

If assembly work is carried out, the employee must be trained in the use of lifting equipment and have provided proof of this.

The pump may only be lifted in accordance with the specifications (see chapter 5 "Transport").

**WARNING**

**Safety risk when leaving the operating parameters**

Safe operation of the pump can no longer be guaranteed outside the permitted operating parameters. The limits of the permissible operating parameters are shown in the chapter 9.2.

**WARNING**

**Safety risk due to spare parts not approved by the manufacturer**

Gebr. Becker Spare parts have been checked by us for their technical requirements and safety.

Unapproved spare parts can pose a danger to people and the pump.

**WARNING**

**Danger from hot components and equipment**

Media and pump parts can reach high temperatures during operation. Before intervening manually in the pump, it is therefore necessary to wait until it has cooled down before working safely with protective gloves to avoid burns and scalding.

**WARNING**

**Risk of injury due to stored residual energy**

The occurrence of residual mechanical, pneumatic and electrical energy on the pump after actuating the operating element for stopping in an emergency or after switching off the pump must be taken into account!

**WARNING**

**Risk of injury due to slipping, tripping and falling**

The operator of the pump is responsible for traffic safety. If operating fluids leak from the pump, the areas must be cordoned off and labelled accordingly and suitable measures must be taken.

**HINT**

**Wear safety shoes**

Foot protection must be worn during all work on the pump.

**HINT**

**Wear protective gloves**

The pump must be allowed to cool down until it is safe to carry out work with protective gloves.

If this time cannot be guaranteed, protective gloves with adequate heat protection must be used. The exact model can be found in the operator's glove plan.

## 2.10 BEHAVIOUR IN THE EVENT OF DANGER AND ACCIDENTS

The protective measures to be taken and the responsibility for drawing up an occupational safety concept lie with the operator of the workplace.

The operator must ensure safe use through the "Operating conditions" described in chapter 3.

## 2.11 REQUIREMENTS FOR STABILITY

The pump fulfils the stability requirements in accordance with DIN EN 1012-1 (compressors) or DIN EN 1012-2 (vacuum pumps) depending on the application.

Further information on installation is described in chapter 6.1 "General requirements".

## 2.12 OCCUPATIONAL SAFETY

The pump has been set up in accordance with the Machinery Directive 2006/42/EC and the relevant health and safety and accident prevention regulations. Before starting repair work, the pump must be de-energised and depressurised to prevent accidents. Previously removed protective devices must be refitted before commissioning.

## 2.13 AIRBORNE NOISE EMISSIONS

According to Directive 2006/42/EC, information on the airborne noise emission of the pump must be provided. Detailed information can be found in the Machinery Directive under point 1.7.4.2.

Information on the pump in this regard can be found in the chapter 9.2 "Operating parameters".

## 2.14 ERGONOMICS

With regard to maintenance and servicing, special behaviour with regard to ergonomics must be taken into account in accordance with Directive 2006/42/EC Annex i 1.1.6 "Ergonomics"

## 2.15 ECODESIGN REGULATION (EU) 2019/1781

This pump falls under an exception to EU 2019/1781 as the motor and pump have common parts.

# 3 OPERATING CONDITIONS

The CE conformity of the product only becomes legally valid when all product safety requirements of the "operating conditions" formulated in this chapter within the meaning of Directive 2006/42/EC Annex I 1.7.4.2.i have been fully realised by the operator. Only in this case is CE conformity valid and the pump may be operated.

**Operating condition 1: Safety instructions for maintenance work**

1. **Standalone products - not implemented in a control system**

   Shutting down the pump for maintenance

   In the event of maintenance, work must be carried out with the protective devices removed. This work may only be carried out when the pump is at a standstill. To ensure the safe shutdown of the pump, the pump must be disconnected from the power supply and the five safety rules in accordance with DIN VDE 0105 must be observed.

2. **Implemented products - product is controlled via the operator's control system**

   If the pump is implemented in a control system by the operator, the following conditions apply for the "Maintenance" operating mode:

   - The drive must be de-energised
   - Or, in the case of a shutdown stored in the control system, comply with the requirements of DIN EN 61800-1.

**Operating condition 2: Measures against unexpected start-up**

Energy separation:

Before carrying out any servicing or maintenance work or interfering with the product, it must be manually disconnected from the energy source in accordance with DIN EN ISO 14118, section 4.2.

**Operating condition 3: Ventilation of the operating room**

The operator must design the operating room in such a way that the atmospheric air pressure is maintained even in the event of a product fault.

This prevents negative pressure from leading to physical injury or escape routes being blocked by blocked doors.

**Operating condition 4: Behaviour when leaving the operating parameters**

If the pump deviates noticeably from the usual operating parameters, it must be switched off immediately and maintenance carried out.

Operation outside the specified operating parameters is prohibited by the manufacturer.

**Operating condition 5: Permitted operating materials (process media)**

The permissible operating materials are defined within the scope of the intended use.

It is prohibited to convey hazardous substances - especially pyrophoric substances - as this cannot rule out the possibility of ignition of an explosive atmosphere on hot surfaces.

**Operating condition 6: Electrical protection of the motor**

The motor must be protected using state-of-the-art technology. At least one motor protection switch and separate temperature monitoring are required.

Temperature monitoring based solely on plausibility checks of the current consumption is not permitted.

**Operating condition 7: Dimensioning the electrical supply line**

Unless otherwise specified by the operator, the supplier of the electrical equipment is not responsible for providing the supply line and the overcurrent protection device.

**Operating condition 8: Command device for stopping**

The pump must have a device with which it can be completely shut down safely.

Each workstation is equipped with a control device which - depending on the hazard - switches off individual or all functions of the pump in order to establish a safe state.

- The stop command has priority over any start command.
- After shutting down, the power supplies to the drives concerned must be disconnected.
- It must not be possible to overwrite or undo a shutdown command that has been issued.

**Operating condition 9: Command device for emergency shutdown**

The pump must be equipped with at least one EMERGENCY STOP command device. If necessary, several devices must be provided to ensure a safe shutdown in an emergency.

**Operating condition 10: Disconnection from the power source by main switch**

The pump must be equipped with devices with which it can be safely disconnected from any energy source.

These devices must be clearly labelled and lockable if reconnection could pose a danger to persons.

Lockability is also required if the operating personnel cannot monitor the permanent interruption of the energy supply from every access point.

**Operating condition 11: Ensuring cooling**

The cooling volume flow must be unhindered on both the intake and exhaust sides.

Contamination (dust in the operating room) can lead to deposits on the pump, which can impair cooling. The operator must ensure that the pump is cleaned regularly.

**Operating condition 12: Ensuring unobstructed exhaust air**

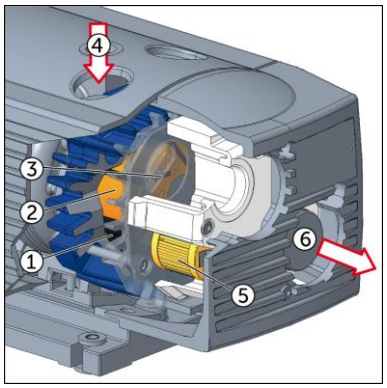
As standard, the evacuated air is discharged from the pump directly into the environment. Optionally, the exhaust air can be discharged via a connected exhaust air pipe. In this case, it is essential to ensure that the exhaust air can flow through the exhaust air duct unhindered and without significant back pressure (< 100 mbar).

# 4 PUMP DESCRIPTION

This chapter explains the assemblies and components of the pump and how they work.

The following information is intended to help you understand the operation of the pump. This information can help to avoid dangers and errors due to incorrect operation.

## 4.1 GENERAL DESCRIPTION OF THE PUMP




The pump is a classic dry-running rotary vane vacuum pump.

It consists of a housing, the eccentrically installed rotor (2), the radially moving vanes (3) and the inlet and outlet (4+6).

When the rotor turns, the intake air flows through the intake filter (5) into the expanding chamber (1) until it is shut off by the next slide valve. The trapped air is then compressed until the blow-off valve (6) opens against atmospheric pressure.

## 4.2 SIZES

Several pumps of different sizes are listed in these operating instructions, as they

- work according to the same active principle,
- have the same intended use,
- are subject to the same legal and standardisation requirements,
- have a similar design,
- have similar physical characteristics,
- and are also very similar in terms of maintenance, service and commissioning.

## 4.3 VARIANTS

### 4.3.1 VARIANTS VT 4.10-4.40

Within the VT 4.10-4.40 series, a distinction is made between 2 variants.

The VT 4.40/0-90 is a special version with a larger scooping chamber for more suction volume.

| Sizes | Variants | |
|---|---|---|
| | Standard | Special variant |
| VT 4.10 | x | --- |
| VT 4.16 | x | --- |
| VT 4.25 | x | --- |
| VT 4.40 | x | VT 4.40/0-90 |

Table: Variants VT 4.10 - VT 4.40

### 4.3.2 VARIANTS VX 4.10-4.40



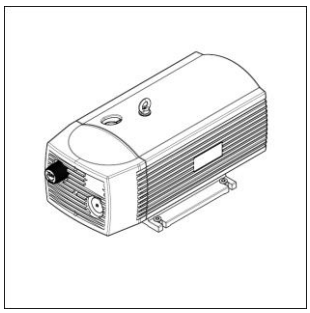
**Note on the series**

Series X gate valves are characterised by a long service life.

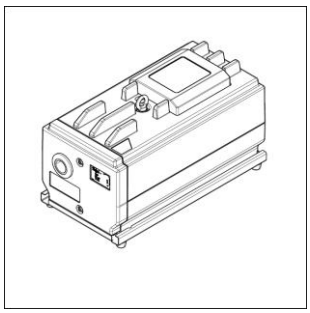
Becker guarantees a valve service life of 20,000 operating hours or a maximum of 3 years for this pump.

Series X intake filters have a removable cover (pre-filter) that extends the service life of the filter when cleaned regularly.

Within the VX 4.10-4.40 series, a distinction is made between 2 variants.



VX 4.XX (Standard)



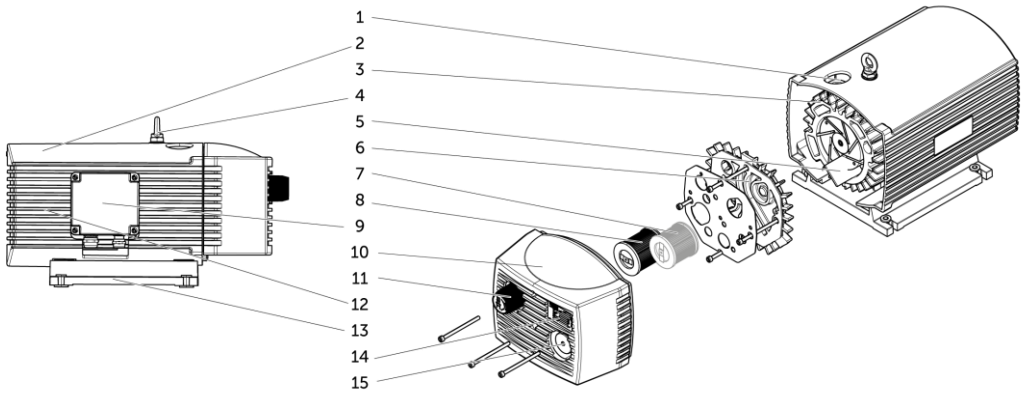
VX 4.25/0-47

The VX 4.25/0-47 is a special version with EPP cover, stand and cable connection.

| Sizes | Variants | |
|---|---|---|
| | Standard | Special variant |
| VX 4.10 | x | --- |
| VX 4.16 | x | --- |
| VX 4.25 | x | VX 4.25/0-47 |
| VX 4.40 | x | --- |

Table: Variants VX 4.10 - VX 4.40

### 4.3.3 COMPONENTS



| Position | Component | Function |
|---|---|---|
| 1 | Admission | Connection of the vacuum line |
| 2 | Device cover | Flow optimisation, noise reduction |
| 3 | Pump unit | The pump unit includes pump housing, piston and slider |
| 4 | Eyebolt | Attachment point |
| 5 | Slider | Forms the compression chambers |
| 6 | Side cover | Lateral closure of the pump housing |
| 7 | C-separator cartridge | An additional filter cartridge can be installed as an option, which also filters the carbon abrasion from the sliders out of the exhaust air. |
| 8 | Intake filter | Filtering of the evacuated intake air (exception VX 4.25/0-47). |
| 9 | Terminal box with motor rating plate | Electrical connection Conformity mark and technical data - Motor |
| 10 | Device cover | Flow optimisation, noise reduction |
| 11 | Vacuum regulating valve | Setting the required vacuum |
| 12 | Engine | Drive |
| 13 | Device base | Stable installation and fastening of the pump |
| 14 | Device type plate | Conformity markings and technical data - Pump |
| 15 | Blow-off valve | Outlet of evacuated air, vacuum safety device |

Table: Components

## 4.4 MOTORS

The characteristics of the motor used can be found on the motor rating plate.

## 4.5 SAFETY AND PROTECTIVE EQUIPMENT

**DANGER**

Danger to life due to defective, dismantled and manipulated protective devices

**HINT**

For a detailed description of the safety instructions, see chapter 2 "Basic safety instructions".

The pump's protective devices must not be dismantled, modified or put out of operation. The pump must be shut down and secured immediately if any protective devices have been removed, modified or taken out of operation.

Defects in protective devices must be rectified immediately. All protective devices must be undamaged, fully assembled and functional. Warning and information signs must be clearly visible.

All protective devices must be checked for functionality, damage and completeness after each maintenance of the pump.

If a maintenance activity requires the dismantling of protective devices, these may only be dismantled for the duration of the maintenance activity. Immediately after completion of the maintenance work, all protective devices must be fully installed at the intended location and checked for proper functioning.

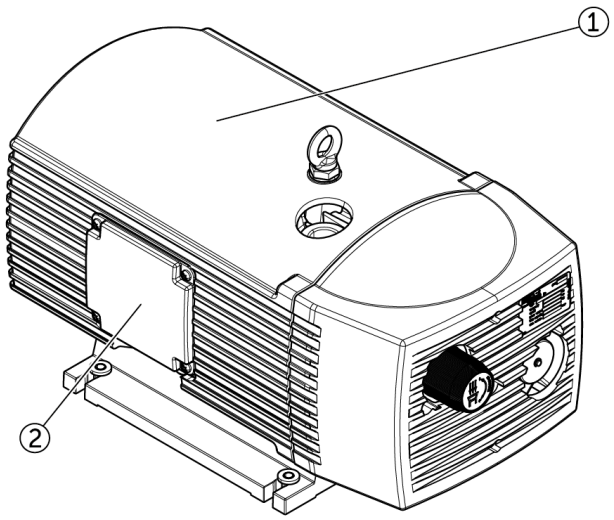
The prescribed inspection intervals for protective devices must be observed and complied with. Protective devices may only be maintained, replaced and serviced by trained, instructed and authorised specialist personnel.

Unauthorised tampering with or manipulation of the safety-related parts of the pump is strictly prohibited and must be reported immediately to the responsible department.

All safety and accident prevention equipment, such as warning and information signs, covers, protective panelling, etc., must be in place. The removal or modification of these devices is prohibited.

Damaged equipment must be repaired immediately.

An overview of the pump with the designations of the protective devices is shown below.




| Position | Component | Place |
|---|---|---|
| 1 | Device cover | Back cover |
| 2 | Terminal box cover | Cover side of the terminal box |

Table: Protective devices

## 4.6 TESTING THE SAFETY AND PROTECTIVE EQUIPMENT

**HINT**

All safety and protective equipment must be checked regularly.

For maintenance intervals, see chapter 8.1

The condition and function of safety and protective equipment must be checked if:

- modifications and repairs have been carried out on the pump
- Damage has occurred to the pump
- service and maintenance intervals are to be carried out

# 5 TRANSPORT

**WARNING**

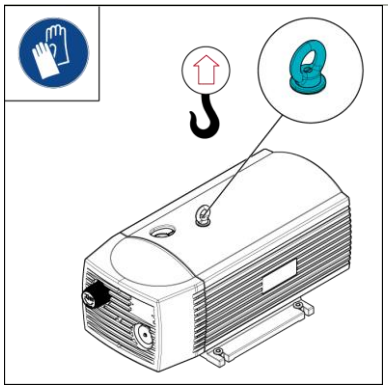
Risk of injury due to incorrect lifting conditions

**HINT**

For a detailed description of the safety instructions, see chapter 2 "Basic safety instructions".

**HINT**

Wear suitable PPE



The pump may only be attached to the eyebolt. The following must be observed:

- Select lifting gear according to the total weight to be transported.
- Secure the pump against tipping and falling.
- Always suspend the pump from all available load suspension devices.
- Do not stand under suspended loads.

# 6 INSTALLATION AND COMMISSIONING

## 6.1 GENERAL REQUIREMENTS

The installation location of the pump should be dry and protected from splashing water.

We recommend setting up the pump so that maintenance work can be carried out easily.

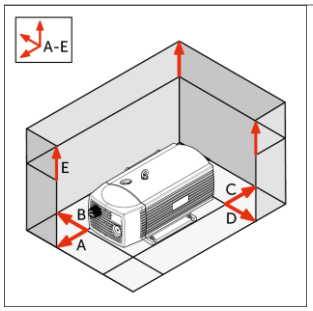
The following points must be observed when installing components and assemblies in order to avoid injuries and damage to the pump:

- Components from third-party manufacturers may only be installed if they have been approved by the manufacturer and comply with the directives and laws applicable in the country of use.
- Loose and non-pump parts must be removed from the pump environment after installation.
- Protruding parts (pipes, cables, etc.) must be properly installed, laid and labelled.
- Contact points of components must be clean and intact.

**ATTENTION**

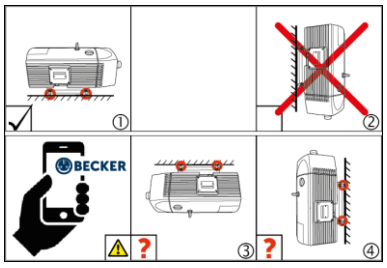
Compliance with the minimum distance

The minimum distance between the pump and all neighbouring parts must be observed in accordance with the following table. Failure to observe the minimum distances can lead to a fire risk due to the high level of heat emitted.




| A | B | C | D | E |
|---|---|---|---|---|
| 10 cm | 10 cm | 10 cm | 10 cm | 10 cm |

Table: Minimum distances




**Installation**

The pump must be securely fixed at the installation site.

Physical stresses on the pump housing must be avoided.

The pump must be set up as shown in the adjacent figure (1).

Fixing to the ceiling (3/overhead) and wall mounting (4/motor position below) are usually possible after consultation with Gebr.

Wall mounting with motor position at the top (2) is not permitted.

**ATTENTION**

Comply with operating parameters

Safe operation of the pump can no longer be guaranteed outside the permitted operating parameters (for permitted operating parameters, see chapter 9.2).

**HINT**

FASTENING TO THE SUBSTRATE

The pump can be installed on solid ground without anchoring. If the pump is installed on a substructure, we recommend using elastic buffer elements to secure it.

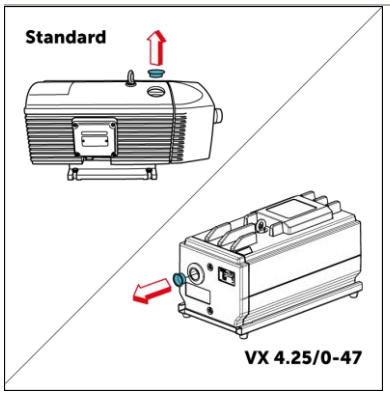
Dynamic installation is possible for some pumps, taking special requirements into account.

Consult with Gebr. Becker about specifications and structural adjustments.

## 6.2 CONNECTING THE MEDIA LINES

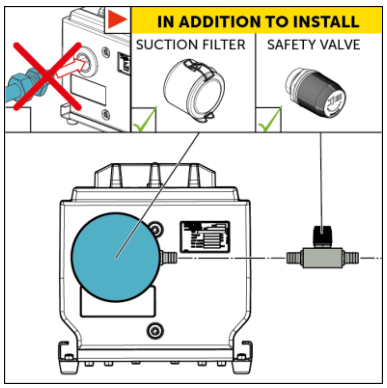
**WARNING**

When installing media lines that have a high temperature, please note that they must be covered, insulated and labelled accordingly to prevent injury and pump damage.




**Remove the sealing plug**

The suction connection is protected against the ingress of dirt and foreign bodies during transport with a sealing plug. This must be removed before commissioning.



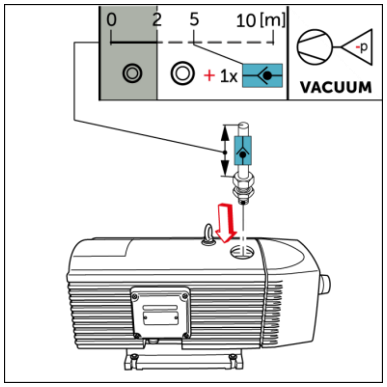

**Connection features VX 4.25/0-47**

This pump variant has neither a suction filter nor a vacuum safety valve as standard.

These must be installed by the customer before commissioning.

**ATTENTION!**

A direct suction connection without these safety components will damage the pump.




**Dimensioning the suction line**

Make the diameter of the pipes at least equal to the nominal connection diameter.

For cable lengths > 2 m, the next largest cross-section must be selected.

For pipe lengths > 5 m, we also recommend installing non-return valves as close as possible to the suction connection. Otherwise, the backflowing air can cause the piston with the valves to rotate in the opposite direction to the specified direction of rotation (risk of valve breakage!)

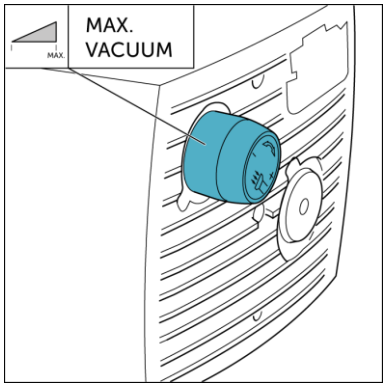
Keep connections free of oil, grease, water and other soiling.

The supply line must be installed mechanically stress-free using a flexible hose or rigid pipe.

| Size | Connection | Cable cross-section (MIN) | |
|---|---|---|---|
| | | Length ≤ 2 m | Length ≥ 2 m |
| VT(VX) 4.10 | G ½ | 13 mm | 19 mm |
| VT(VX) 4.16 | G ½ | 13 mm | 19 mm |
| VT(VX) 4.25 | G ¾ | 19 mm | 25 mm |
| VX 4.25/0-47 | G 1 | 25 mm | 32 mm |
| VT(VX) 4.40 | G ¾ | 19 mm | 25 mm |
| VT 4.40/0-90 | G 1 | 25 mm | 32 mm |

Table: Dimensioning the pressure lines

## 6.3 SET VALVE




**Setting the vacuum**

The pump is equipped with a vacuum regulating valve, which allows the vacuum required for the application to be set.

This value is limited depending on the size.

Exceptions VX 4.25/0-47, where a suitable valve must be fitted before commissioning.

Corresponding data (absolute vacuum) can be found in the chapter 9.2.

## 6.4 ELECTRICAL INSTALLATION

**DANGER**

Danger to life due to defective, dismantled and manipulated protective devices

**DANGER**

Danger to life due to electric shock - Personnel qualification

**DANGER**

Danger to life due to unexpected start-up

**HINT**

Description of the safety instructions. See chapter 2.9 "Safety instructions"

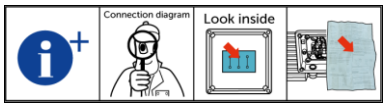
The electrical installation of the pump must comply with the requirements of Directive 2006/42/EC and EN 60204.

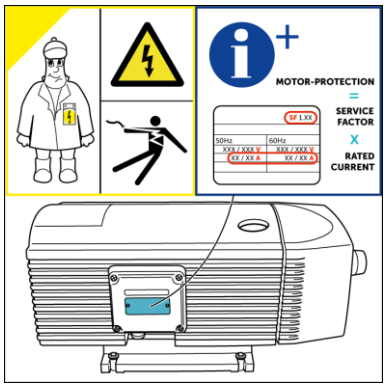
If the pump is integrated into a control system, it must be ensured that the pump does not restart automatically after an unintentional voltage drop. The measures against unexpected start-up in accordance with DIN EN ISO 14118 must be realised. This also applies after a shutdown following an emergency stop.

The following points must be observed when installing the pump:

- The pump may be operated with a maximum of 10 start/stop cycles per hour.
- The pump must be protected by overload protection. Operation without appropriate protection is prohibited.
- The pump supply line must meet the minimum requirements of the state of the art.

### 6.4.1 ELECTRICAL CONNECTION



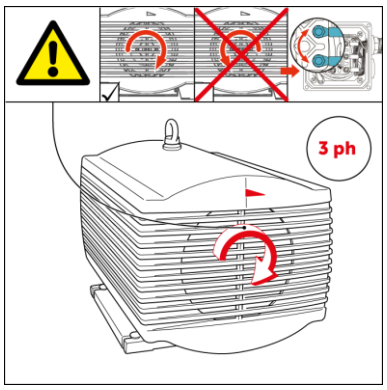




**Connecting the motor**

The motor must be connected according to the wiring diagram (see terminal box cover or instruction leaflet in the terminal box).

The permissible connection types of the motor can be found on the motor rating plate.

The motor must be protected by a motor protection switch, taking into account the service factor (SF). Operation without appropriate protection is prohibited.

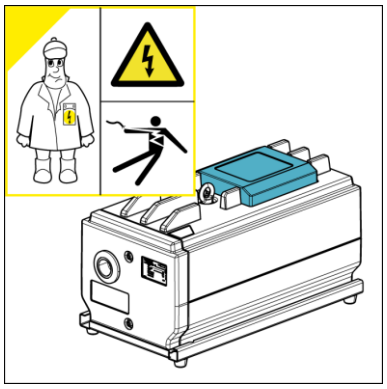



**Authorised direction of rotation of the pump**

Before commissioning, check that the pump is rotating in the prescribed direction (observe the direction of rotation arrow on the side cover). To do this, only start the pump briefly (max. 3 seconds), as operation in the wrong direction of rotation will damage the pump.

If the pump does not run in the specified direction of rotation (looking at the motor's fan wheel), this must be changed by exchanging two connection phases.

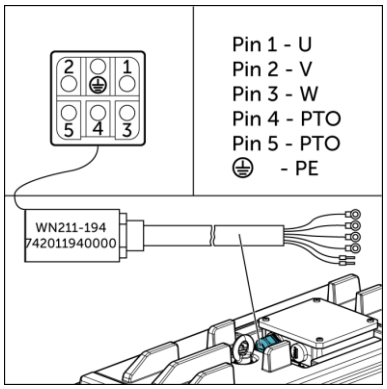
### 6.4.2 ELECTRICAL CONNECTION (VX 4.25/0-47)



**Connecting the motor**

The motor must be connected as shown in the following illustrations.

The motor must be protected by a motor protection switch, taking into account the service factor (SF). Operation without appropriate protection is prohibited.




The special version VX 4.25/0-47 is connected via a special connector (ILME CQM 05 pin insert 5+PE-pole).

For more information, see also separate data sheet (ds_VX 4.25 0-47)

## 6.5 SWITCHING THE PUMP ON

The pump is switched on via switching elements in the application. After switching on, the pump switches directly to normal operating mode. There are no subordinate operating modes for set-up, maintenance or troubleshooting.

The pump may only be switched on when it has been set up properly, the electrical installation has been carried out correctly and the media lines have been connected.

## 6.6 NORMAL OPERATION

In normal operation, the pump operates fully automatically within its physical limits, in accordance with the customer's control system.

## 6.7 SWITCH OFF THE PUMP

**1. shutdown**

To switch off, the pump must be shut down from the application and secured against being switched on again. In addition, a warning sign must be attached to the mains isolating device.

All electrical equipment must be disconnected individually. Maintenance during operation or when the pump is switched on is strictly prohibited.

**2. disconnection from the power supply**

A qualified electrician switches the motor off and disconnects it. After carrying out the 5 safety rules, non-qualified electricians may also carry out work on the pump.

After completion of the activities, the activities under the point: "Recommissioning" must be followed.

## 6.8 RECOMMISSIONING

After the storage and shutdown period, the pump must be checked to ensure that it is operational. If it is not operational, appropriate maintenance and servicing measures must be carried out to restore its operational capability.

The following points must be worked through in the specified order to enable the pump to be safely recommissioned:

1. The pump must be serviced, cleaned and, if necessary, repaired in accordance with the chapters "Servicing and maintenance" and "Cleaning".
2. Electrical components must be recommissioned in accordance with the installation instructions and the manufacturer's documentation. The power supply must not yet be restored.
3. All safety devices must be fitted and checked for functionality and effectiveness. Damaged parts must be replaced immediately.

# 7 TROUBLESHOOTING/TROUBLESHOOTING

**DANGER**
Danger to life due to electric shock - Personnel qualification

**DANGER**
Danger to life due to defective, dismantled and manipulated protective devices

**DANGER**
Danger to life due to unexpected start-up

**WARNING**
Danger from hot components and equipment

**WARNING**
Risk of injury due to slipping, tripping

**HINT**
For a detailed description of the safety instructions, see chapter 2 "Basic safety instructions".

If troubleshooting is carried out immediately after operation, the cooling time must be observed.

Troubleshooting on the pump is only permitted under the following conditions:

**Shutdown**

For troubleshooting, the pump must be shut down and secured against being switched on again. In addition, a warning sign must be attached to the mains disconnection device.

All existing electrical equipment must be individually disconnected.

If safety devices have to be dismantled or modified for troubleshooting purposes, they must be refitted, adjusted and tested after the maintenance and servicing work has been completed and before the pump is started.

A qualified electrician may then carry out work on the pump.

Once the work has been completed, the pump may be put back into operation after a visual inspection.

When troubleshooting, check the pump for defects in particular.

- Damage, in particular to:
  - Ventilation grilles
  - Screw connections
  - Media lines
  - Electrical cables
- Leaks
- Loose objects
- Loose screw connections or fastenings
- Contact protection on live parts.

**HINT**
Visual inspection: The pump is free of foreign objects. After an initial inspection, the pump is free of damage. This also includes checking the electrical and pneumatic components and connections.

Instruct unauthorised persons to leave the pump.

If defects and hazards become apparent during the inspection, the pump must be shut down immediately. The pump may only be put into operation if it is in perfect condition.

The chapter 8.1 "Maintenance and servicing" must be followed.

## 7.1 FAULT TABLES

The following tables describe possible causes of faults and the activities required to rectify them. In the event of faults that cannot be rectified using the following instructions, please contact Gebr. Becker.

| The pump does not reach the required vacuum | | |
|---|---|---|
| Possible cause | Review | Troubleshooting |
| Leakage in the vacuum line | Visual inspection of the vacuum line elements (e.g. pipework, fittings, hose clamps) | Replacing the faulty supply line elements |
| Slider worn out | Visual inspection for damage Measure slider width | Remove the slider, check and replace if damaged or if the minimum width is not reached |
| Filter dirty | Check filter contamination | Clean / replace filter |
| Resistance in the supply line too high | Check the dimensions of the supply line | Carry out dimensioning in accordance with the operating instructions. Further support from Gebr. Becker service |
| Resistance in the supply line too high | Check supply lines for blockages, kinks and deformations | Remove foreign objects from the media line. Repair supply lines if necessary |
| Resistance in the supply line too high | Check throttle elements for opening condition | Open throttle elements if necessary |
| The motor runs in the wrong direction of rotation if the pump does not prime correctly and emits loud noises. | Check the direction of rotation using the direction of rotation arrow | The motor installation must be corrected by a qualified electrician. |

Table: Fault tables: The pump does not reach the required vacuum

| The pump does not start | | |
|---|---|---|
| Possible cause | Review | Troubleshooting |
| Supply voltage is not present | Check electrical protective devices (e.g. motor protection switch, fuses, emergency stop) | Identified fault rectified by a qualified electrician |
| Supply voltage is not present | Check electrical connection cable | Repairing the connecting cable |
| Supply voltage is not present | Check the electrical connection | Identified fault rectified by a qualified electrician |
| Pump mechanically blocked | Exclude electrical causesCheck the free movement of the engine fan (with a screwdriver) | Gebr. Becker-Contact service |

Table: Fault tables: The pump does not start

| The pump becomes unusually hot | | |
|---|---|---|
| Possible cause | Review | Troubleshooting |
| Motor/appliance fan damaged or clogged | Visual inspection for visual damage. Listen for unusual noises (e.g. grinding noises) | The pump must be safely shut down or disconnected from the supply voltage by a qualified electrician. The "fan cover" protective device must be removed and the fan wheel cleaned of dirt or replaced if damaged. |
| Temperature of the evacuated gas is too high | Measure the temperature of the evacuated gas and compare it with the authorised maximum temperature (chapter Operating parameters) | This temperature limit must be observed. |
| Filter dirty | Check filter contamination | Clean / replace filter |
| Ambient temperature of the pump is too high | Measure ambient temperature | Sufficient ventilation and compliance with the minimum distances must be must be checked and ensured. |

Table: Fault tables: The pump becomes unusually hot

# 8 MAINTENANCE, SERVICING AND DISMANTLING

**DANGER**

Danger to life due to electric shock - Personnel qualification

**DANGER**

Danger to life due to defective, dismantled and manipulated protective devices

**WARNING**

Danger from hot components and equipment

**HINT**

For a detailed description of the safety instructions, see chapter 2 "Basic safety instructions".

**HINT**

Wear suitable PPE

If a maintenance activity requires the dismantling of protective devices, these may only be dismantled for the duration of the maintenance activity. Immediately after completion of the maintenance work, all protective devices must be fully installed in the designated position and checked for proper functioning.

The prescribed inspection intervals for protective devices must be observed and complied with. Protective devices may only be maintained, replaced and serviced by trained, instructed and authorised specialist personnel.

Safety-related parts of the pump could be damaged or disabled by unauthorised tampering or manipulation. Unauthorised tampering and manipulation of the safety-related parts of the pump, adjustable components, is strictly prohibited and must be reported immediately to the responsible body.

## 8.1 MAINTENANCE AND SERVICING

As a prerequisite for safe and proper operation, it is essential that the pump is inspected, serviced and maintained by suitably qualified personnel at regular intervals. In addition, regular maintenance and servicing increases the availability and extends the service life of the pump. The recommended service and maintenance intervals are listed in this chapter.

Under very unfavourable operating conditions, it may be necessary to adjust the maintenance intervals and the time of inspection accordingly.

## 8.2 PREPARATION

The responsibilities for installation, operation, maintenance and cleaning must be clearly regulated and defined.

For maintenance and servicing measures, it must be ensured that sufficient space is available for all work. The maintenance area must be secured.

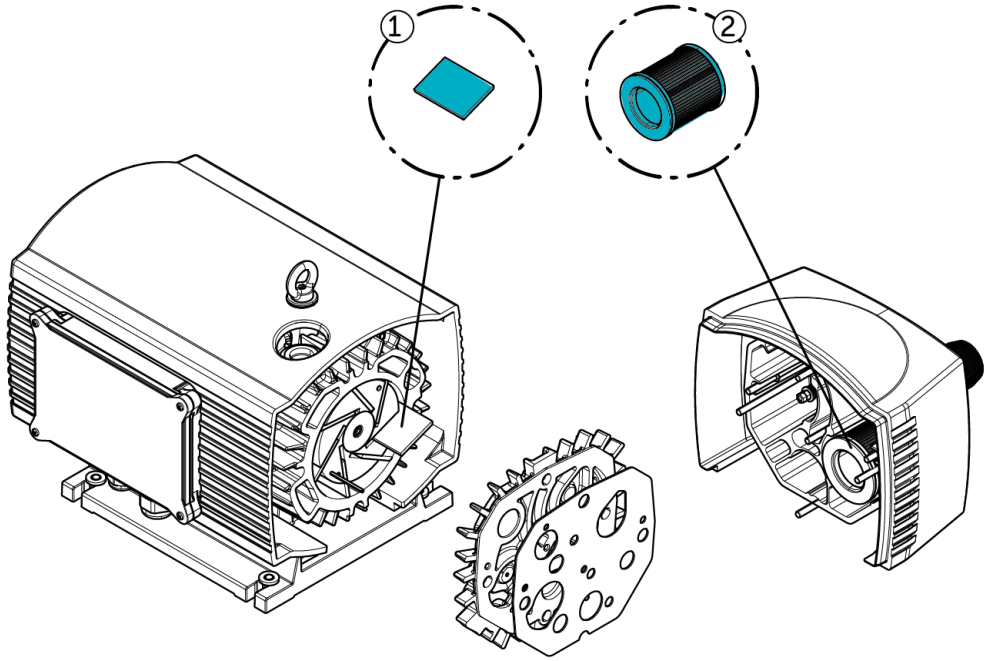
The following steps must be observed when preparing for servicing and maintenance work:

1. All existing electrical equipment must be individually disconnected. Maintenance during operation or when the pump is switched on is strictly prohibited.
2. If safety devices have to be dismantled or modified, they must be refitted, adjusted and tested immediately after completion of the maintenance and servicing work and before the pump is started.
3. After this, a qualified electrician may carry out work on the pump, taking into account the 5 safety rules.

Once the work has been completed, the pump may be put back into operation after a visual inspection.

## 8.3 MAINTENANCE INTERVALS

The maintenance intervals are shown in the following overview:




### 8.3.1 VT 4.10-4.40 SERIES

| Component | 40 - 200 h | 3000 h | 8000 h |
|---|---|---|---|
| Rotary vane | | measure, (switch) | |
| Intake filter | check, clean, change | | |
| Housing | clean | | |
| Inspection | | | Inspection by the Gebr. Becker service - arrange an appointment |
| Protective devices | Visual inspection | | |

Table: Maintenance intervals

### 8.3.2 VX 4.10-4.40 SERIES

| Component | 40 - 200 h | 7500 h | 20000 h |
|---|---|---|---|
| Rotary vane | | measure, (switch) | |
| Intake filter | check, clean, change | | |
| Housing | clean | | |
| Inspection | | | Inspection by the Gebr. Becker service - arrange an appointment |
| Protective devices | Visual inspection | | |

Table: Maintenance intervals

We are happy to support our customers with this work and in assessing the condition of the device with the help of our Gebr. Becker service. We always recommend an on-site consultation for large pumps.

## 8.4 SPARE AND WEAR PARTS

**WARNING**

Safety risk due to spare parts not approved by the manufacturer

**Maintenance kits**

A maintenance kit contains all the parts required for maintenance, such as wearing parts (filter elements etc.) and seals.

| Size | Order number | Size | Order number |
|---|---|---|---|
| VT 4.10 | 57330027300 | VX 4.10 | 56650058500 |
| VT 4.16 | 57330027400 | VX 4.16 | 56650058600 |
| VT 4.25 | 57330027500 | VX 4.25 | 56650058700 |
| VT 4.40 | 57330027600 | VX 4.40 | 56650058800 |

Table: Maintenance set - Order numbers

A comprehensive spare parts list with all spare and wear parts for the series listed here can be found on our homepage under the following link:

www.becker-international-shop.com

## 8.5 MAINTENANCE ACTIVITIES

**DANGER**

Danger to life due to defective, dismantled and manipulated protective devices

**WARNING**

Danger from hot components and equipment

**HINT**

For a detailed description of the safety instructions, see chapter 2 "Basic safety instructions".

**HINT**

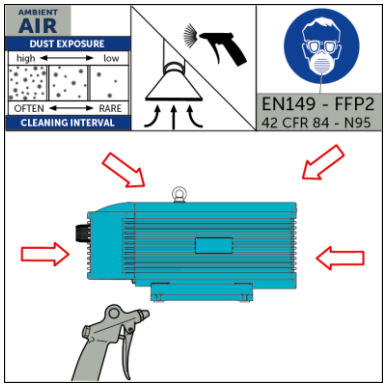
Wear suitable PPE

The safety instructions must always be observed:

- Use suitable tools and handle with care.
- Personal protective equipment must be used to prevent injuries caused by tools or components.
- The maintenance area must be kept clean and tidy. Objects lying around can pose a tripping hazard.
- If anything is unclear, the responsible body or the manufacturer should be consulted.

The maintenance plan provides for the following activities:

### 8.5.1 VACUUM / CLEAN SURFACE WITH COMPRESSED AIR

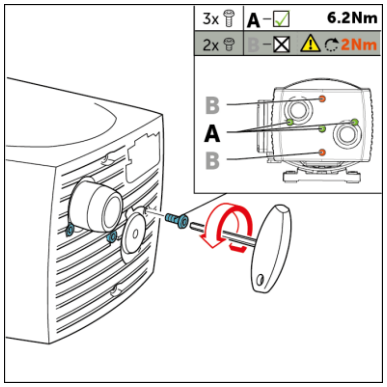



**Clean the surface with compressed air**

The pump must be cleaned regularly. The interval depends on the degree of soiling on the housing.

Protective goggles and an FFP2 mask in accordance with EN 149:2008 must be worn during cleaning.

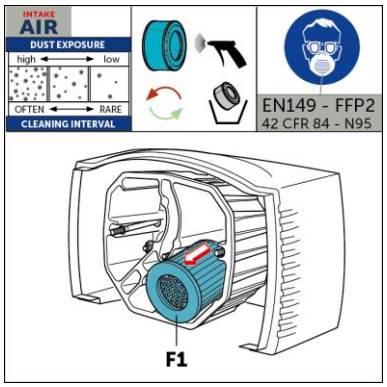
## 8.5.2 CLEAN FILTER




The filter cartridge is installed behind the front cover, which is fastened with 3 Allen screws (A). Loosen these, remove the filter cartridge and blow through with compressed air from the inside to the outside.

If the function of the filter is restricted even after the cleaning process (clogged, oily, greasy or damaged), it must be replaced.

Only original spare parts from Gebr. Becker may be used.



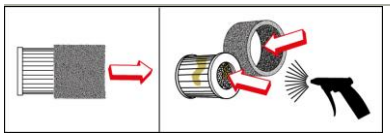

**Intake filter - F1**

The filter cartridge becomes clogged depending on the degree of contamination of the intake air. It must be cleaned with compressed air at the aforementioned intervals, but at least every 200 hours.

Protective goggles and an FFP2 mask in accordance with EN 149:2008 must be worn during cleaning.

**HINT**

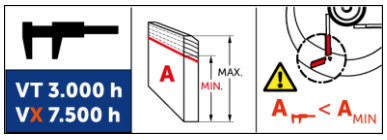
The intake filters installed in the X series have a removable cover (pre-filter), which extends the service life of the filters when cleaned regularly.



To clean, remove the pre-filter from the actual intake filter and blow off both filters with compressed air.

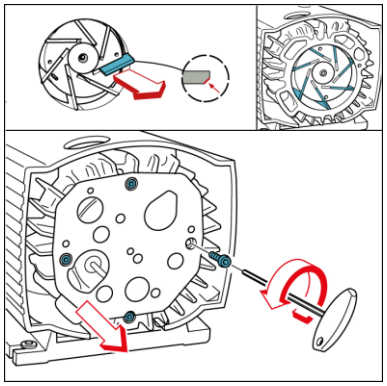
## 8.5.3 CHECK ROTARY VANES

The sliders are subject to wear and must be checked/replaced at regular intervals.




The sliders are also installed behind the bonnet. Loosen and remove these as described in the previous point.

The side cover underneath is fastened with 4 Allen screws. Loosen these and remove the side cover.



Pull the sliders out of the slider grooves of the piston.

Visually check for damage and measure the valve width, replace the valve if necessary.

When reinstalling the sliders, ensure that they are installed in the correct position.

Blow out the housing with dry compressed air.

**ATTENTION**

The minimum valve widths must be observed, otherwise the valves may break and damage the pump.

**ATTENTION**
The X series sliders are not compatible with the standard series.

**HINT**
The X series with specially developed sliders achieves improved slider service life due to less abrasion.

**Slider widths:**

| Size | Minimum width | Size | Minimum width |
|---|---|---|---|
| VT 4.10 | 18 mm | VX 4.16 | 21 mm |
| VT 4.16 | 21 mm | VX 4.25 | 28 mm |
| VT 4.25 | 28 mm | VX 4.25/0-47 | 28 mm |
| VT 4.40 | 28 mm | VX 4.40 | 28 mm |
| VT 4.40/0-90 | 33 mm | | |
| VX 4.10 | 18 mm | | |

## 8.6 MEDIA LINES

**WARNING**
Risk of injury due to stored residual energy

Lines, hoses, pipes, valves and connections must be checked for damage (leaks) at regular intervals.

The following instructions must be observed when carrying out maintenance and repair work on media lines:

- Before starting work on the media lines, the system must be depressurised and secured against being switched on again. Residual energy must be dissipated or discharged. Residual liquids in media lines must be drained off.

## 8.7 CONDITIONS FOR SWITCHING ON AGAIN

The following points must be observed before restarting after maintenance and servicing work:

- Unauthorised persons must be removed from the pump.
- The proper connection between the pump and the media lines must be checked.
- The media lines must be checked for leaks and damage.
- The power supply must be checked for damage and proper functioning.
- All protective devices must be present, functional and tested.

## 8.8 TEMPORARY SHUTDOWN

The following steps must be observed during a temporary shutdown:

1. Shutdown
2. To switch off the pump, it must be shut down and secured against being switched on again. In addition, a warning sign must be attached to the mains disconnection device.
3. All existing electrical equipment must be individually disconnected.
4. Disconnection from the power supply
5. A qualified electrician switches the motor off and disconnects it. After carrying out the 5 safety rules, non-qualified electricians may also carry out work on the pump.
6. After completion of the decommissioning, the activities under "Recommissioning" must be followed.

## 8.9 CLEANING

**DANGER**
Danger to life due to defective, dismantled and manipulated protective devices

**DANGER**
Danger to life due to unexpected start-up

**WARNING**
Danger from hot components and equipment

**WARNING**
Risk of injury due to slipping, tripping

**ATTENTION**
Incorrect cleaning, for example by using the wrong cleaning agents or cleaning equipment (e.g. high-pressure cleaner), can cause damage to the pump.

**HINT**
For a detailed description of the safety instructions, see chapter 2 "Basic safety instructions".

**HINT**
Wear suitable PPE

The entire pump must be cleaned at regular intervals depending on the amount of dust. This includes cleaning all surfaces of the pump with a compressed air gun and a moistened cleaning cloth.

The cleaning instructions of the manufacturers of components and assemblies must be observed.

The use of solvents or cleaning agents containing solvents is prohibited.

The use of cleaning agents that are highly flammable or generally flammable is prohibited!

The statutory environmental protection regulations must be observed during cleaning.

The pump may only be switched on again if there is no damage to the pump and no person is exposed to danger.

## 8.10 DISMANTLING AND DECOMMISSIONING

**DANGER**
Danger to life due to electric shock - Personnel qualification

**DANGER**
Danger to life due to unexpected start-up

**WARNING**
Danger from hot components and equipment

**WARNING**
Risk of injury due to slipping, tripping

**HINT**
For a detailed description of the safety instructions, see chapter 2 "Basic safety instructions".

**HINT**
Wear suitable PPE

The following steps must be observed during dismantling and decommissioning:

1. Switch off the pump and enable the drive.
2. Switch off the power supply and secure it against unintentional restarting.
3. Disconnect the supply line of the drive.
4. Shut off media lines and discharge pressure differences if necessary.
5. Disconnect the media lines from the pump.
6. Dismantle the pump in reverse order of assembly or according to the separate dismantling instructions. Loose parts must be secured to prevent them from tipping over or falling.
7. Protect the pump from further contamination
8. Clean the pump thoroughly

## 8.11 STORAGE

The following requirements for the storage location must be observed in order to store the unused pump in a proper condition over a longer period of time. If the following requirements are not observed, damage to the pump may occur.

- the storage location must be dry and clean
- the storage location must be level
- the storage location must be protected from sudden changes in temperature and humidity
- the storage location must be protected from salt spray, industrial gases, corrosive liquids, rodents and fungal infestation

- The suction and discharge connections of the pump must be closed and filter covers must be fitted.

**Restocking**

If the pump is to be stored for a longer period of time (more than two months) after use, the following steps must be observed.

1. Ensure that the pump is free of water or water vapour.
2. To do this, close the intake. Set the vacuum regulating valve to the maximum vacuum.
3. Allow the pump to run for 30 minutes after reaching operating temperature. Only draw in a small amount of dry ambient air.
4. Immediately after switching off the pump, seal all inlets and outlets with sealing plugs.
5. Silica gel packets must be placed inside the filter housing. Attach warning stickers to ensure that the packets are removed before commissioning.

**ATTENTION**

If the pump was pumping air with a high moisture content before the shutdown period, the above steps are also recommended for shorter storage periods

## 8.12 WASTE DISPOSAL

**HINT**

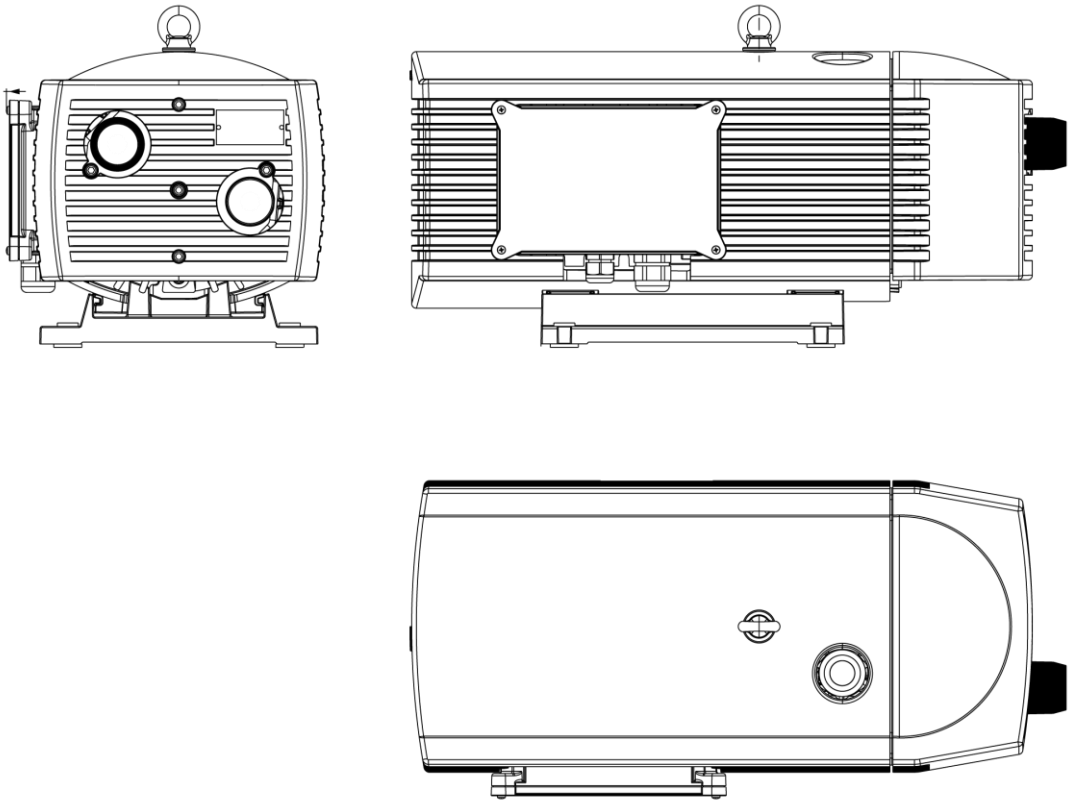
For a detailed description of the safety instructions, see chapter 2 "Basic safety instructions".

The pump is disposed of in a disassembled state. See chapter 8.10.

When disposing of the pump, the relevant local environmental regulations must be observed.

# 9 PRODUCT DATA SHEET

## 9.1 PRODUCT OVERVIEW



## 9.2 OPERATING PARAMETERS

### 9.2.1 VT 4.10-4.40 SERIES

| Variant | VT 4.10 | VT 4.16 | VT 4.25 | VT 4.40 |
|---|---|---|---|---|
| Volume flow 1 max. | 10 $m^3$/h (50 Hz) | 16 $m^3$/h (50 Hz) | 25 $m^3$/h (50 Hz) | 40 $m^3$/h (50 Hz) |
| Volume flow 2 max. | 12 $m^3$/h (60 Hz) | 19 $m^3$/h (60 Hz) | 30 $m^3$/h (60 Hz) | 48 $m^3$/h (60 Hz) |
| Vacuum | 150 mbar (abs) | 150 mbar (abs) | 150 mbar (abs) | 150 mbar (abs) |
| Weight | 16 kg | 22,5 kg | 26 - 29 kg | 38 - 41 kg |
| Sound pressure level 1 max. | 60 dB(A) (50 Hz) | 61 dB(A) (50 Hz) | 62 dB(A) (50 Hz) | 67 dB(A) (50 Hz) |
| Sound pressure level 2 max. | 62 dB(A) (60 Hz) | 64 dB(A) (60 Hz) | 67 dB(A) (60 Hz) | 72 dB(A) (60 Hz) |
| Permissible ambient temperature | 5 - 40 °C | 5 - 40 °C | 5 - 40 °C | 5 - 40 °C |
| Exhaust air temperature max. | 87 °C | 93 °C | 118 °C | 126 °C |
| Maximum installation height | 800 m a.s.l. | 800 m a.s.l. | 800 m a.s.l. | 800 m a.s.l. |
| Maximum humidity of the intake air | 90 % | 90 % | 90 % | 90 % |

* Reference data (atmosphere): 1000 mbar (100 kPa), 20 °C

Table: Operating parameters

| Variant | VT 4.40/0-90 |
|---|---|
| Volume flow 1 max. | 47 $m^3$/h (50 Hz) |
| Volume flow 2 max. | 55 $m^3$/h (60 Hz) |
| Vacuum | 150 mbar (abs) |
| Weight | 38 - 41 kg |
| Sound pressure level 1 max. | 67 dB(A) (50 Hz) |
| Sound pressure level 2 max. | 72 dB(A) (60 Hz) |
| Permissible ambient temperature | 5 - 40 °C |
| Exhaust air temperature max. | 85 °C |
| Maximum installation height | 800 m a.s.l. |
| Maximum humidity of the intake air | 90 % |

* Reference data (atmosphere): 1000 mbar (100 kPa), 20 °C

Table: Operating parameters

### 9.2.2 VX 4.10-4.40 SERIES

| Variant | VX 4.10 | VX 4.16 | VX 4.25 | VX 4.40 |
|---|---|---|---|---|
| Volume flow 1 max. | 10 $m^3$/h (50 Hz) | 16 $m^3$/h (50 Hz) | 25 $m^3$/h (50 Hz) | 40 $m^3$/h (50 Hz) |
| Volume flow 2 max. | 12 $m^3$/h (60 Hz) | 19 $m^3$/h (60 Hz) | 30 $m^3$/h (60 Hz) | 48 $m^3$/h (60 Hz) |
| Vacuum | 100 mbar (abs) | 100 mbar (abs) | 100 mbar (abs) | 100 mbar (abs) |
| Weight | 16 kg | 22,5 kg | 26 - 29 kg | 38 - 41 kg |
| Sound pressure level 1 max. | 60 dB(A) (50 Hz) | 61 dB(A) (50 Hz) | 62 dB(A) (50 Hz) | 67 dB(A) (50 Hz) |
| Sound pressure level 2 max. | 62 dB(A) (60 Hz) | 64 dB(A) (60 Hz) | 67 dB(A) (60 Hz) | 72 dB(A) (60 Hz) |
| Permissible ambient temperature | 5 - 40 °C | 5 - 40 °C | 5 - 40 °C | 5 - 40 °C |
| Exhaust air temperature max. | 87 °C | 93 °C | 118 °C | 126 °C |
| Maximum installation height | 800 m a.s.l. | 800 m a.s.l. | 800 m a.s.l. | 800 m a.s.l. |
| Maximum humidity of the intake air | 90 % | 90 % | 90 % | 90 % |

* Reference data (atmosphere): 1000 mbar (100 kPa), 20 °C

Table: Operating parameters

| Variant | VX 4.25/0-47 |
|---|---|
| Volume flow 1 max. | 25 $m^3$/h (50 Hz) |
| Volume flow 2 max. | 30 $m^3$/h (60 Hz) |
| Vacuum | 100 mbar (abs) |
| Weight | 34,5 kg |
| Sound pressure level 1 max. | 55 dB(A) (50 Hz) |
| Sound pressure level 2 max. | 60 dB(A) (60 Hz) |
| Permissible ambient temperature | 5 - 40 °C |
| Exhaust air temperature max. | 118 °C |
| Maximum installation height | 800 m a.s.l. |
| Maximum humidity of the intake air | 90 % |

* Reference data (atmosphere): 1000 mbar (100 kPa), 20 °C

Table: Operating parameters

## 9.3 TECHNICAL DATA

Technical data sheets for the pumps can be found on our homepage under the following link:

www.becker-international.com/download

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