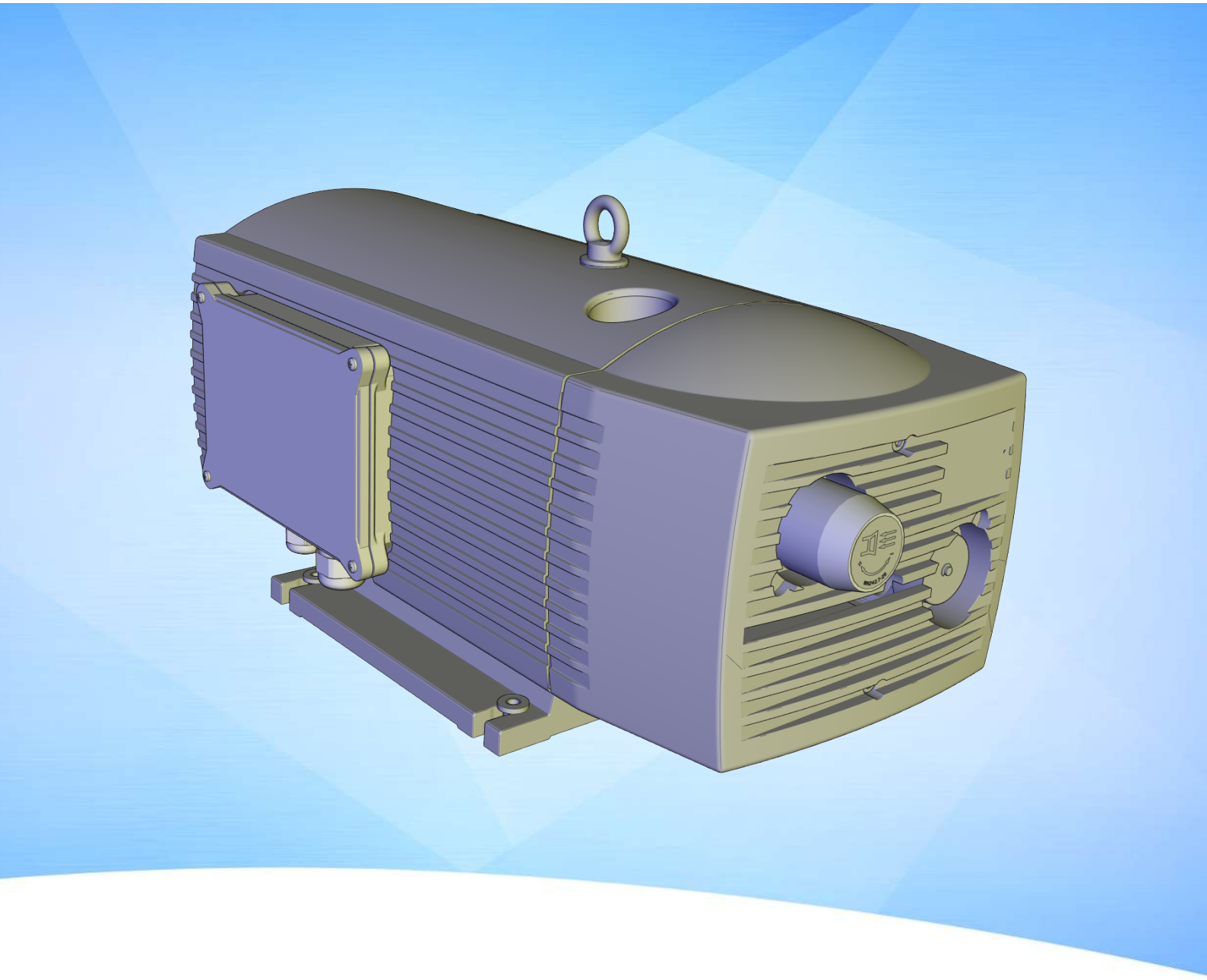

Operating instructions

Vacuum pump EVE-TR 10/16/25/40/50, EVE-TR-X 10/16/25/40

WWW.SCHMALZ.COM

EN-US · 30.30.01.00556 · 03 · 02/25
Translation of the original operating instructions

Note

The Operating instructions were originally written in German. Store in a safe place for future reference. Subject to technical changes without notice. No responsibility is taken for printing or other types of errors.

Published by

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www.schmalz.com/salesnetwork

Contents

1 Important Information

1.1 Note on Using this Document

J. Schmalz GmbH is generally referred to as Schmalz in this document.

The document contains important notes and information about the different operating phases of the product:

- Transport, storage, start of operations and decommissioning
- Safe operation, required maintenance, rectification of any faults

The document describes the product at the time of delivery by Schmalz and is intended for:

- Installers who are trained in handling the product and can operate and install it
- Technically trained service personnel performing the maintenance work
- Technically trained persons who work on electrical equipment

The displayed figures are only examples. Depending on the particular design, they can differ from the product.

1.2 The technical documentation is part of the product

1. For problem-free and safe operation, follow the instructions in the documents.
2. Keep the technical documentation in close proximity to the product. The documentation must be accessible to personnel at all times.
3. Pass on the technical documentation to subsequent users.

⇨ Failure to follow the instructions in these Operating instructions may result in life-threatening injuries!

⇨ Schmalz is not liable for damage or malfunctions that result from failure to heed these instructions.

If you still have questions after reading the technical documentation, contact Schmalz Service at:

www.schmalz.com/services

1.3 Other Applicable Documents

In addition to this operating instructions manual, you must also refer to the following documents and information:

- Safety symbols on the pump and on hazardous material containers
- Regulations on accident prevention, occupational health and safety and environmental protection
- Operating instructions and documentation for components, assemblies and tools provided by third-party manufacturers.
- Spare parts lists
- Data sheets

1.4 Type Plate

The type plate is permanently attached to the product and must always be clearly legible.
It contains product identification data and important technical information.

- For spare parts orders, warranty claims or other inquiries, have the information on the type plate to hand.

1.5 Symbols

This symbol indicates useful and important information.

✓ This symbol represents a prerequisite that must be met before an action is performed.

- This symbol represents an action to be performed.

⇨ This symbol represents the result of an action.

Actions that consist of more than one step are numbered:

1. First action to be performed.
2. Second action to be performed.

2 Fundamental Safety Instructions

2.1 Intended Use

The vacuum pump evacuates air and is used to generate a vacuum.

The product must be protected from weather conditions.

The product is built in accordance with the latest standards of technology and is delivered in a safe operating condition; however, hazards may arise during use.

The product is intended for industrial and commercial applications.

Intended use includes observing the technical data and the installation and operating instructions in this manual.

2.2 Non-Intended Use

In particular, the following are considered non-intended use:

- Operation in a potentially explosive atmosphere (ATEX).
- Connection to a potentially explosive atmosphere (ATEX).
- The conveyance of any other gases (except air), in particular hazardous substances, is not permitted and is prohibited.
- Operation of the pump while it is not fully assembled.

2.3 Personnel Qualifications

Unqualified personnel cannot recognize dangers and are therefore exposed to higher risks!

The operating company must ensure the following points:

- The personnel must be commissioned for the activities described in these instructions.
- The staff must be at least 18 years of age and physically and mentally capable.
- The product must be operated only by persons who have undergone appropriate training.
- Personnel must receive regular safety briefings (frequency as per country-specific regulations).
- Work on electrical equipment must be carried out only by qualified electrical specialists.

The following target groups are addressed in these instructions:

- Mechanical and electrical specialists who are responsible for installing, troubleshooting and maintaining the product.

The operator of the system must comply with country-specific regulations regarding the age, ability and training of the personnel.

Applicable for Germany:

A qualified employee is defined as an employee who has received technical training and has the knowledge and experience – including knowledge of applicable regulations – necessary to enable him or her to recognize possible dangers and implement the appropriate safety measures while performing tasks. Qualified employees must observe the relevant industry-specific rules and regulations.

2.4 Warnings in This Document

Warnings warn against hazards that may occur when handling the product. The signal word indicates the level of danger.

Signal word	Meaning
⚠ DANGER	Indicates a high-risk hazard that will result in death or serious injury if not avoided.
⚠ WARNING	Indicates a medium-risk hazard that could result in death or serious injury if not avoided.
⚠ CAUTION	Indicates a low-risk hazard that could result in minor or moderate injury if not avoided.
NOTE	Indicates a danger that leads to property damage.

2.5 Residual Risks

⚠ DANGER

Danger of fatal electric shock if the electrical installation is damaged

Death due to electric shock

- If the electrical installation becomes damaged, the device must be switched off immediately and the responsible party must be contacted.
- Repair by an electrical specialist must be arranged.

⚠ DANGER

Working at a standstill and in a de-energized state

Work on running or live vacuum pumps/compressors may lead to serious injuries due to body parts being drawn in, cut off or crushed as well as to death by electric shock.

- Work on the vacuum pump must be performed only when it is at a standstill and in a de-energized state.

⚠ DANGER

Risk of fatal injury from unexpected startup

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

- Switch off the pump and all installed assemblies.
- Disconnect the pump from the supply voltage and proceed according to the five safety rules (VDE105).
- Disconnect the pump from the air supply.

⚠ DANGER

Risk of fatal injury due to arcs and creepage when disconnecting plug connections

- Always switch off the power supply before disconnecting the plug connections.

⚠ DANGER

Risk of fatal injury due to defective, removed or manipulated protective devices

- Check that all safety and protective devices are fully installed and functioning.

⚠ WARNING

Danger of injury due to residual stored energy

- Note that there may be mechanical, pneumatic or electrical residual energy on the device after the emergency stop operating element has been pressed or following a shutdown!

⚠ WARNING

Risk of injury due to spare and wearing parts that are not approved by the manufacturer

Spare and wearing parts that have not been approved may pose a danger to people and the device.

- Schmalz spare and wearing parts have been checked by us to ensure they meet their technical and safety requirements. Use only Schmalz spare and wearing parts.

⚠ WARNING

Underpressure/overpressure and escaping media

Pressure and escaping media can cause serious injuries.

- Depressurize the system before commencing work on the vacuum pump.
- Check that all components are depressurized.
- Verify that no media can escape.

⚠ WARNING

Risk of crushing and cutting!

Crushing and cutting of body parts due to falling parts or sharp edges on the open vacuum pump.

- Wear safety glasses, protective gloves and safety shoes during all assembly and dismantling work, troubleshooting and maintenance activities.
- In addition, wear head protection during transport work and when working overhead.

⚠ WARNING

Risk of injury!

Severe injuries due to body parts and hair (vacuum) being sucked and drawn in or due to ejected particles (pressure).

- Wear eye protection and tight-fitting clothing during all operational work.
- Cover long hair with a hair net.
- Remove jewelry and rings.

⚠ WARNING

Hearing damage!

Hearing damage due to presence in noise zone under unfavorable operating conditions or due to noise caused by the escaping pumped medium at the gas outlet or the piping.

- Wear ear protection when working in the noise zone.

⚠ WARNING

Risk of fire and explosion caused by sparks

Serious injury!

- Do not use the product in environments where there is a risk of explosion.

⚠ WARNING

Extraction of hazardous media, liquids or bulk material

Personal injury or damage to property!

- Do not extract harmful media such as dust, oil mists, vapors, aerosols etc.
- Do not extract aggressive gases or media such as acids, acid fumes, bases, biocides, disinfectants or detergents.
- Do not extract liquids or bulk materials, e.g. granulates.

⚠ CAUTION

Touching hot surfaces

Touching hot surfaces may cause injury from burns.

- Wear work gloves.
- Do not touch components during operation.
- Allow the components to cool down before commencing work on the product.

⚠ CAUTION

Vacuum close to the eye

Severe eye injury!

- Wear eye protection.
- Do not look into vacuum openings, e.g. suction cups.

⚠ CAUTION

Falling product

Risk of injury

- Securely attach the product at the site of operation.
- Wear safety shoes (S1) and safety glasses when handling and mounting/dismounting the product.

2.6 Modifications to the Product

Schmalz assumes no liability for consequences of modifications over which it has no control:

1. The product must be operated only in its original condition as delivered.
2. Use only original spare parts from Schmalz.
3. The product must be operated only in perfect condition.

3 Operating Conditions

The CE conformity for the product shall become legally valid only if all the product safety requirements for the “operating conditions” (as defined in Annex I 1.7.4.2.i to Directive 2006/42/EC) formulated in this chapter have been fully implemented by the operator. Only in this case does CE conformity apply and may the device be used.

Operating condition: Safety instructions for maintenance work

1. Standalone products – not implemented in a controller
   In the event of maintenance, work must be carried out while the protective devices are removed. This work must be performed only when the pump is at a standstill. To ensure that the pump safely remains stopped, the pump must be disconnected from the electrical supply and the five safety rules according to DIN VDE 0105 must be strictly followed.
2. Implemented products – controlled via the operator controller
   If the operator implements the pump in a controller, the following conditions apply for the “Maintenance” operating mode:
   – The drive must be disconnected from the power supply
   – Alternatively, in the event of a shutdown defined in the controller, comply with the requirements of DIN EN 61800-1:2018-11.

Operating condition: Ventilation of the operating space

The operator must ensure that the space in which the device is operated has adequate ventilation.

Operating condition: Electrical motor protection

The motor protection must meet the latest technological standards. At minimum, it must be protected by a suitable protective device in accordance with DIN EN 60204-1.
The maximum permissible operating temperature may be exceeded due to the failure of the motor ventilation, contamination or other environmental influences.

Operating condition: Ensuring cooling

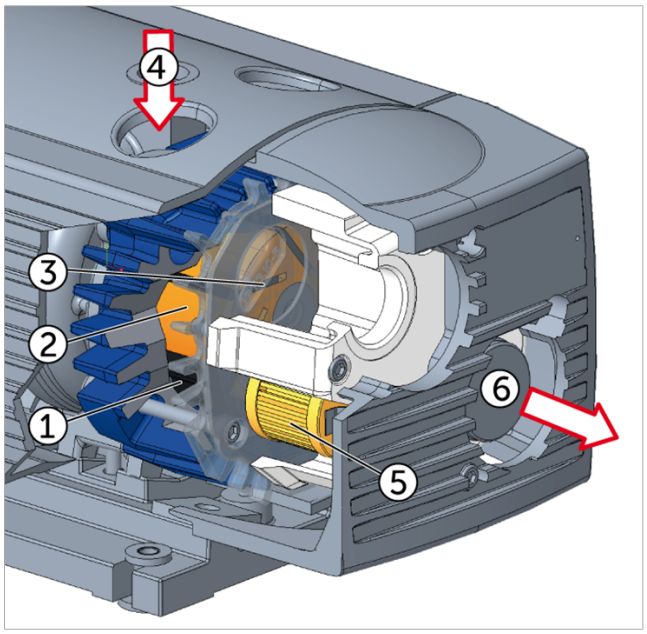
The cooling system flow rate must be ensured unimpeded on the intake side and on the exhaust air side. Dirt (dust in the operating space) may accumulate on the pump, which can affect cooling.
The operator must ensure that the pump is cleaned regularly.

Operating condition: Ensuring unimpeded exhaust air

As standard, the evacuated air is discharged into the environment through the maintenance cover. As an option, the exhaust air can also be discharged via a connected exhaust air line.
In this case, it is essential to ensure that the exhaust air can flow through the exhaust air line unhindered and without any appreciable back pressure (< 100 mbar).

4 Product Description

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 mounted rotor (2), the radially moving vanes (3) and the inlet and outlet (4+6).

When the rotor turns, the air that is sucked in flows through the suction filter (5) into the expanding chamber (1) until the suction filter is blocked off by the next vane. The enclosed air is then compressed until the blow-off valve (6) opens against the atmospheric pressure.

4.2 Variants

These operating instructions include pumps of multiple sizes because they

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

VARIANTS EVE-TR 10-50

Sizes	Standard
EVE-TR 10	X
EVE-TR 16	X
EVE-TR 25	X
EVE-TR 40	X
EVE-TR 50	X

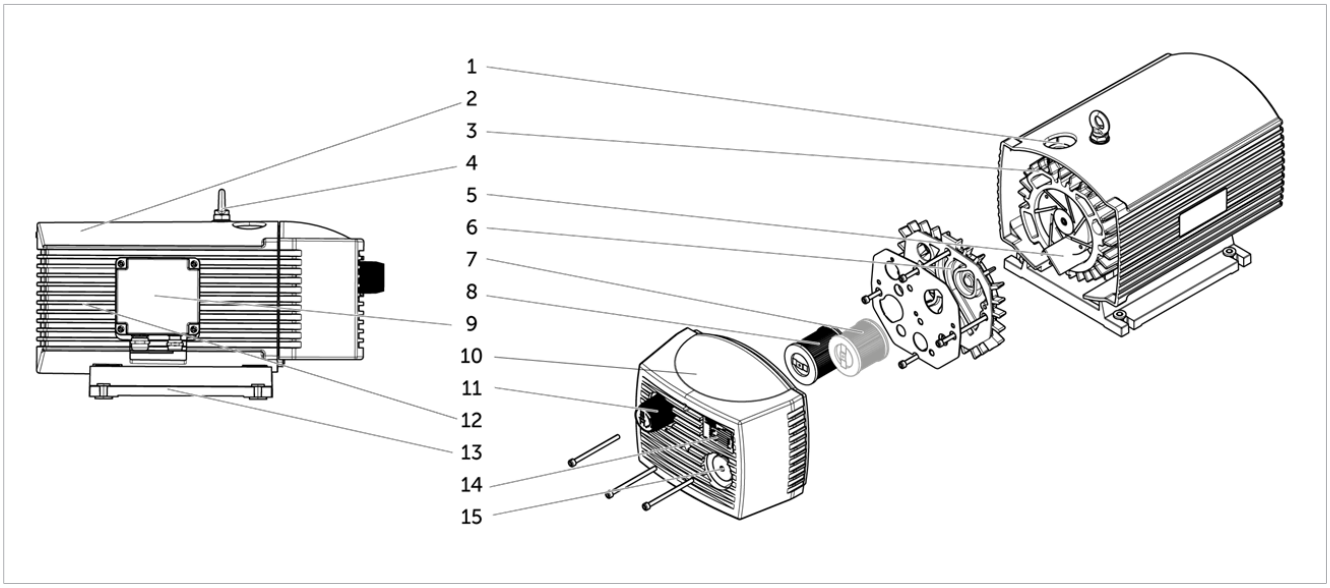
VARIANTS EVE-TR-X 10-40

Pump variant -X with specially designed vanes reduces abrasion and extends vane service lives.

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

Sizes	Special variant
EVE-TR-X10	X
EVE-TR-X16	X
EVE-TR-X25	X
EVE-TR-X40	X

4.3 Vacuum Pump Components



1	Inlet (vacuum line connection)	9	Terminal box with motor type plate
2	Device hood	10	Device hood
3	Pump unit	11	Vacuum regulation valve
4	Eye bolt (attachment point)	12	Motor (drive)
5	Vane	13	Device base
6	Side cover	14	Device type plate
7	Optional: C separator cartridge (additional filter cartridge that filters the carbon abrasion from the vanes out of the exhaust air)	15	Evacuated air outlet, vacuum protection valve
8	Suction filter		

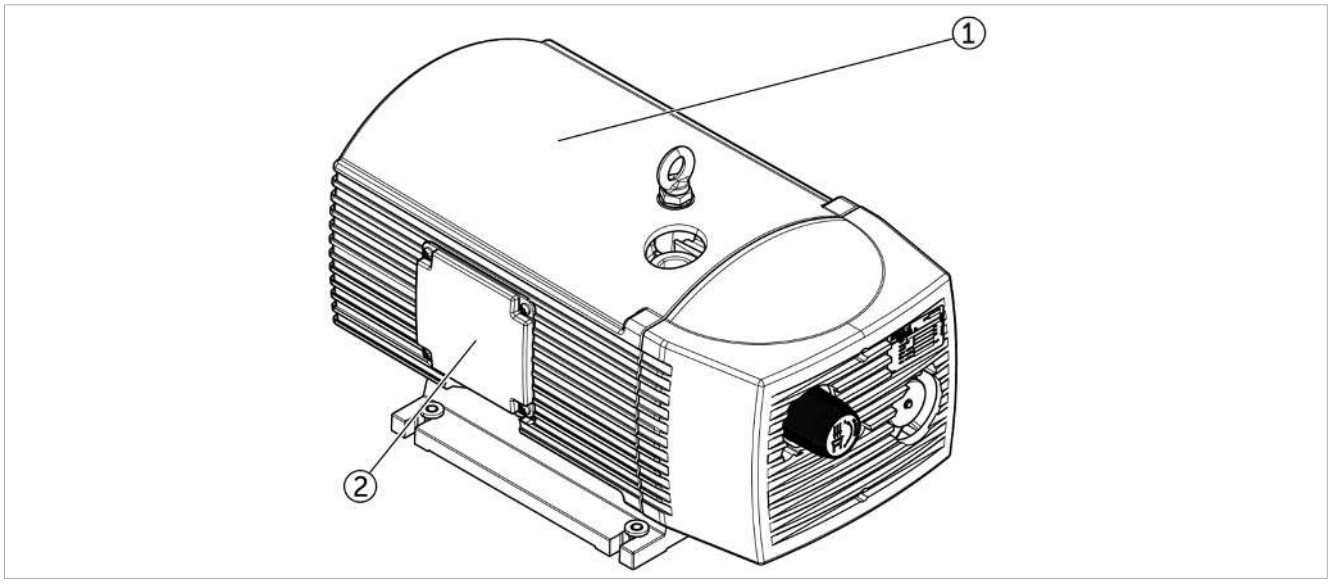
4.4 Safety Features and Protective Devices

⚠ DANGER

Risk of fatal injury due to defective, removed or manipulated protective devices

- Check that all safety and protective devices are fully installed and functioning.

The figure below shows an overview of the pump with the names of the protective devices.



1	Motor fan hood (front of the motor)	2	Terminal box cover (terminal box cover side)

The protective devices on the pump must not be disassembled, modified or taken out of operation. If any protective devices are disassembled, modified or taken out of operation, the pump must be stopped and secured immediately.

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 following all maintenance work on the pump.

If a maintenance task requires any protective devices to be disassembled, they must be disassembled only for the duration of the maintenance task. After the maintenance task is complete, all protective devices are to be fully installed in their designated location immediately and checked for functionality.

The prescribed inspection intervals for protective devices must be observed and complied with. Protective devices may only be repaired, replaced and maintained by specially trained, instructed and authorized personnel. Tampering with or manipulating safety-related parts of the pump is strictly prohibited and must be reported to the responsible body immediately.

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

Damaged equipment must be repaired immediately.

5 Technical Data

5.1 Operating Parameters

The key data for the motor used can be found on the motor type plate.

EVE-TR SERIES 10 to 50

Variant	EVE-TR 10	EVE-TR 16	EVE-TR 25
Max. flow rate 1	10 m³/h (50 Hz)	16 m³/h (50 Hz)	25 m³/h (50 Hz)
Max. flow rate 2	12 m³/h (60 Hz)	19 m³/h (60 Hz)	30 m³/h (60 Hz)
Max. vacuum	150 mbar (abs.)		
Weight	16 kg	22.5 kg	26 to 29 kg
Max. sound pressure level 1	60 dB(A) (50 Hz)	61 dB(A) (50 Hz)	62 dB(A) (50 Hz)
Max. sound pressure level 2	62 dB(A) (60 Hz)	64 dB(A) (60 Hz)	67 dB(A) (60 Hz)
Permissible ambient temperature	5 – 45° C		
Max. exhaust air temperature	87° C	93° C	118° C
Maximum installation elevation	800 m above sea level		
Maximum intake air humidity	90%		

Variant	EVE-TR 40	EVE-TR 50
Max. flow rate 1	40 m³/h (50 Hz)	47 m³/h
Max. flow rate 2	48 m³/h (60 Hz)	55 m³/h
Max. vacuum	150 mbar (abs.)	
Weight	38 to 41 kg	38 to 41 kg
Max. sound pressure level 1	67 dB(A) (50 Hz)	67 dB(A) (50 Hz)
Max. sound pressure level 2	72 dB(A) (60 Hz)	72 dB(A) (60 Hz)
Permissible ambient temperature	5 – 45° C	
Max. exhaust air temperature	126° C	85° C
Maximum installation elevation	800 m above sea level	
Maximum intake air humidity	90%	

EVE-TR-X SERIES 10 to 40

Variant	EVE-TR-X10	EVE-TR-X16	EVE-TR-X25
Max. flow rate 1	10 m³/h (50 Hz)	16 m³/h (50 Hz)	25 m³/h (50 Hz)
Max. flow rate 2	12 m³/h (60 Hz)	19 m³/h (60 Hz)	30 m³/h (60 Hz)
Max. vacuum	100 mbar (abs.)	100 mbar (abs.)	150 mbar (abs.)
Weight	16 kg	22.5 kg	26 to 29 kg
Max. sound pressure level 1	60 dB(A) (50 Hz)	61 dB(A) (50 Hz)	62 dB(A) (50 Hz)
Max. sound pressure level 2	62 dB(A) (60 Hz)	64 dB(A) (60 Hz)	67 dB(A) (60 Hz)
Permissible ambient temperature	5 – 45° C		
Max. exhaust air temperature	87° C	93° C	118° C
Maximum installation elevation	800 m above sea level		
Maximum intake air humidity	90%		

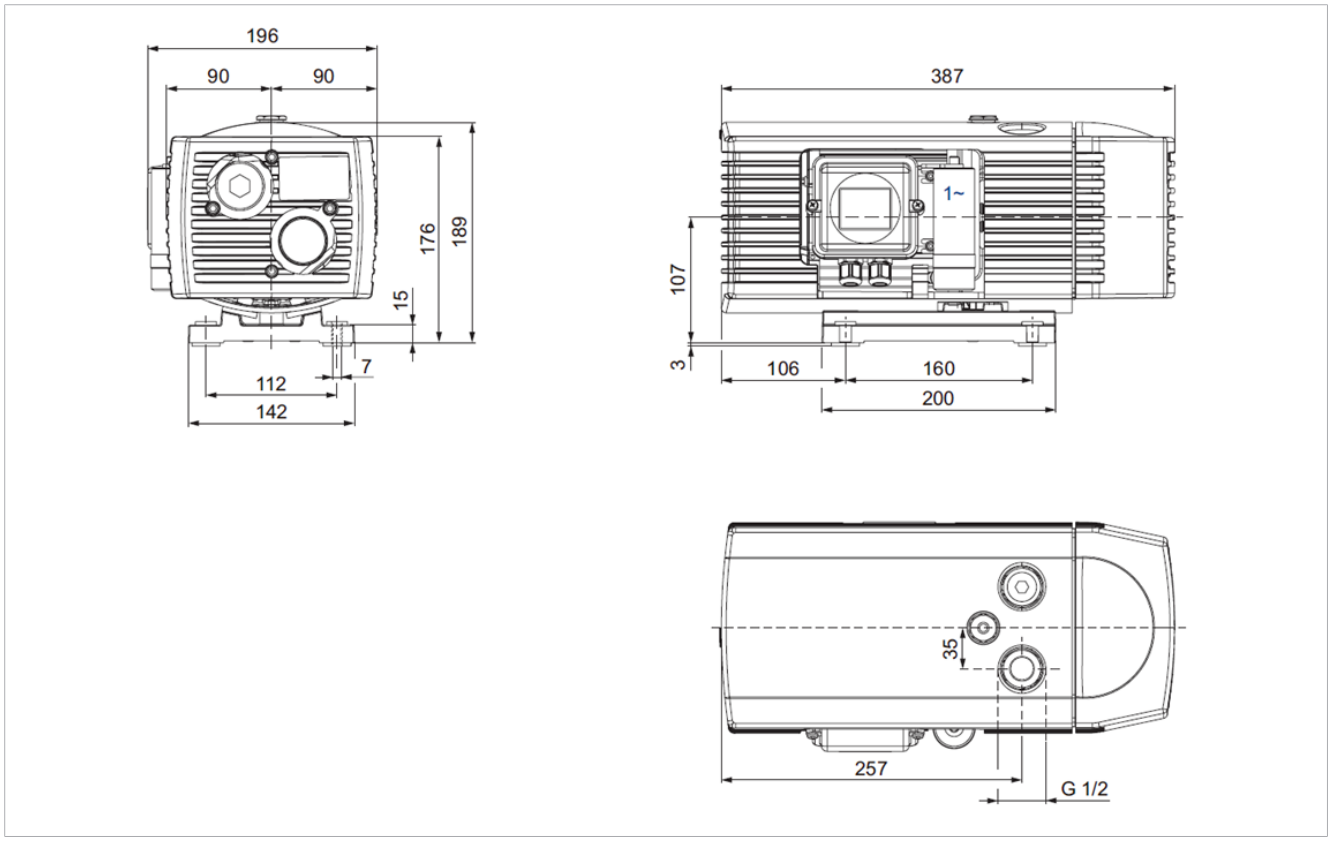
Variant	EVE-TR-X40
Max. flow rate 1	40 m³/h (50 Hz)
Max. flow rate 2	48 m³/h (60 Hz)
Max. vacuum	100 mbar (abs.)
Weight	38 to 41 kg
Max. sound pressure level 1	67 dB(A) (50 Hz)
Max. sound pressure level 2	72 dB(A) (60 Hz)
Permissible ambient temperature	5 – 45° C
Max. exhaust air temperature	126° C
Maximum installation elevation	800 m above sea level
Maximum intake air humidity	90%

5.2 Additional Technical Data

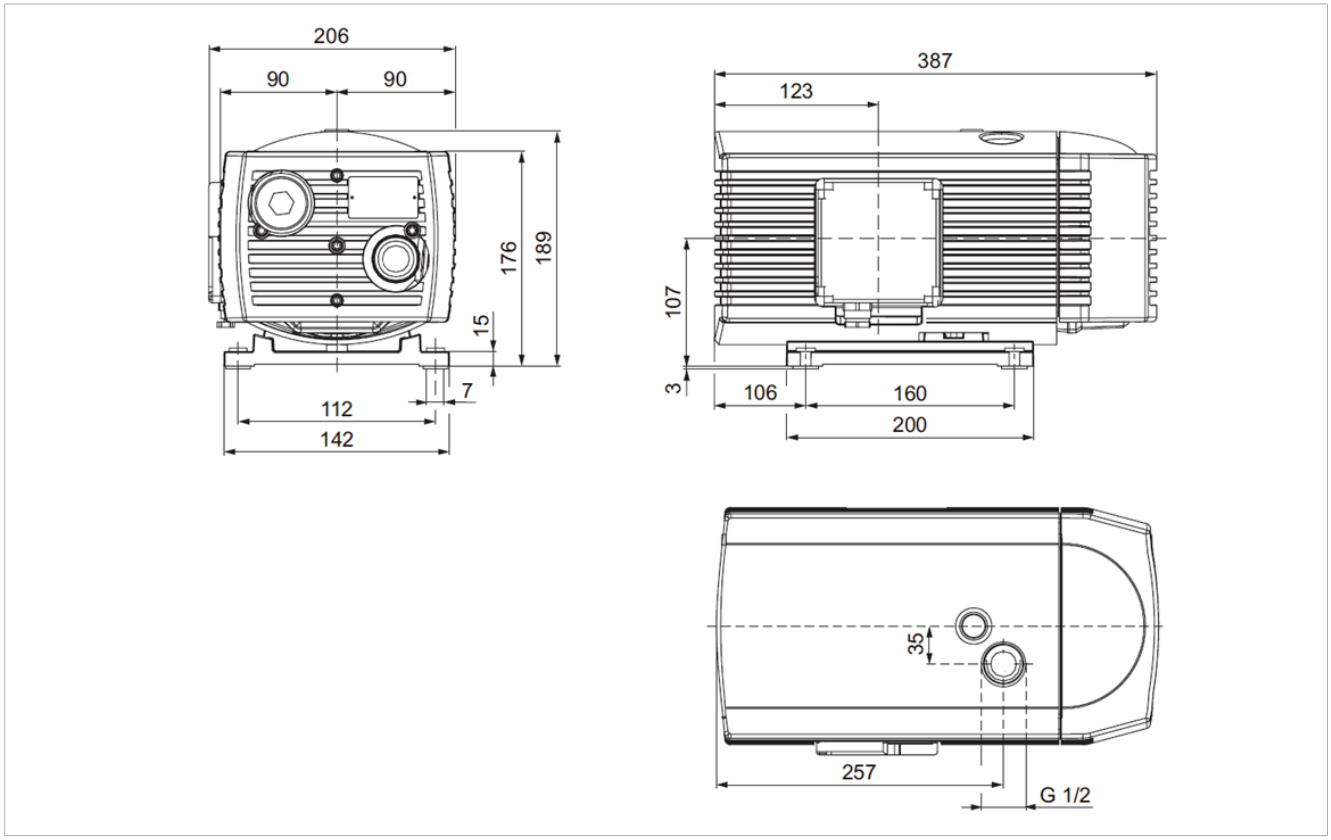
You can find the technical data sheets for the devices in the Schmalz “ControlRoom” app. The app is available for Android and iOS devices.

5.3 Dimensions

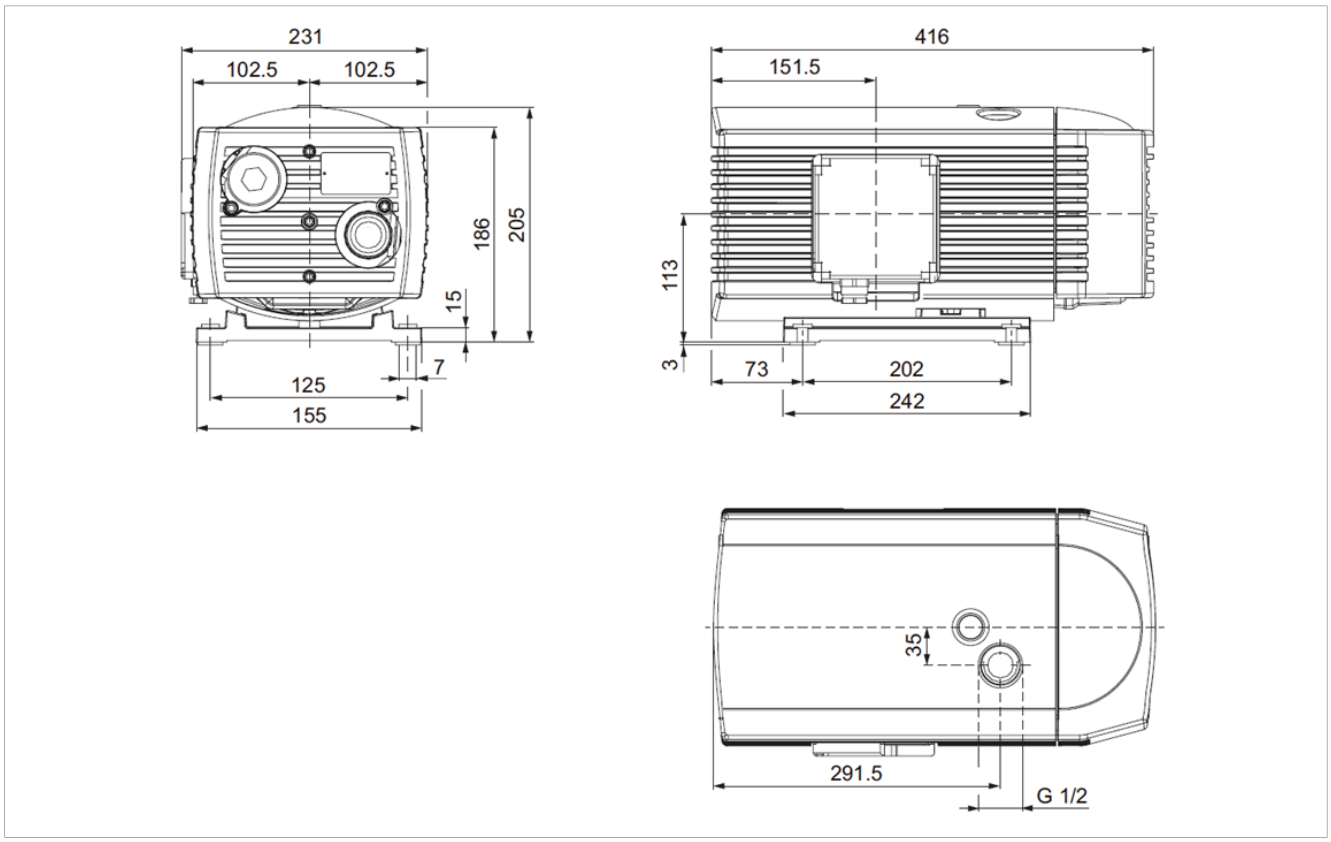
Variant EVE-TR 10



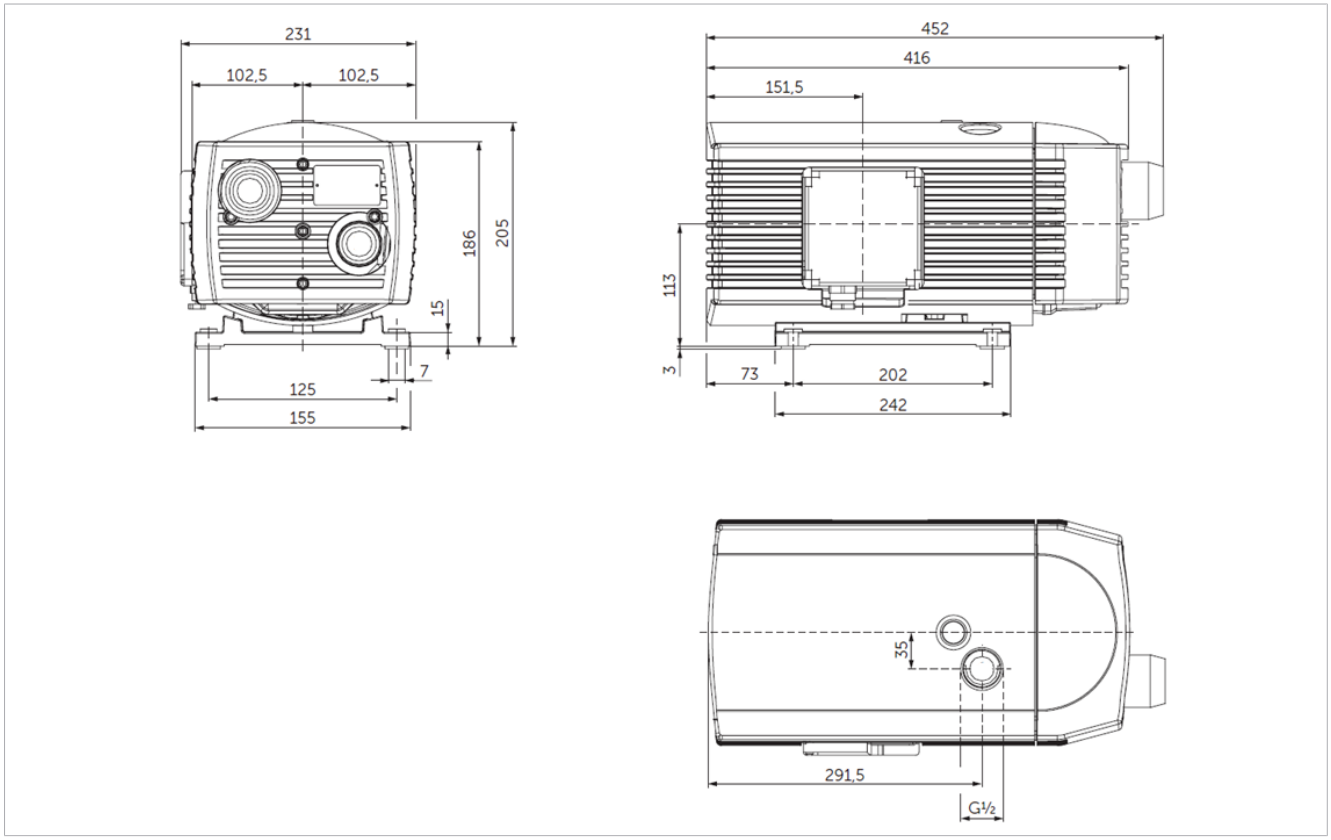
Version EVE-TR-X 10



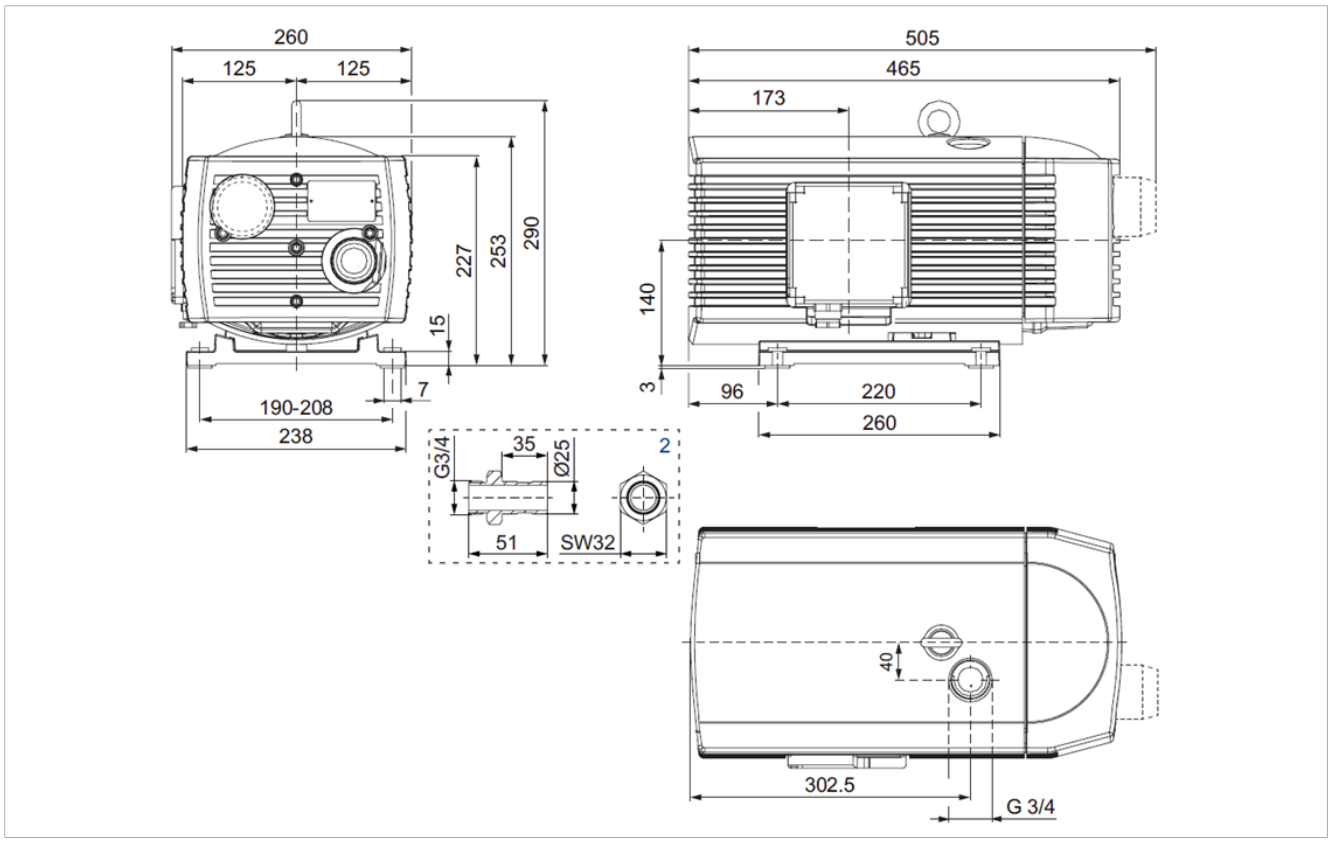
Variant EVE-TR 16



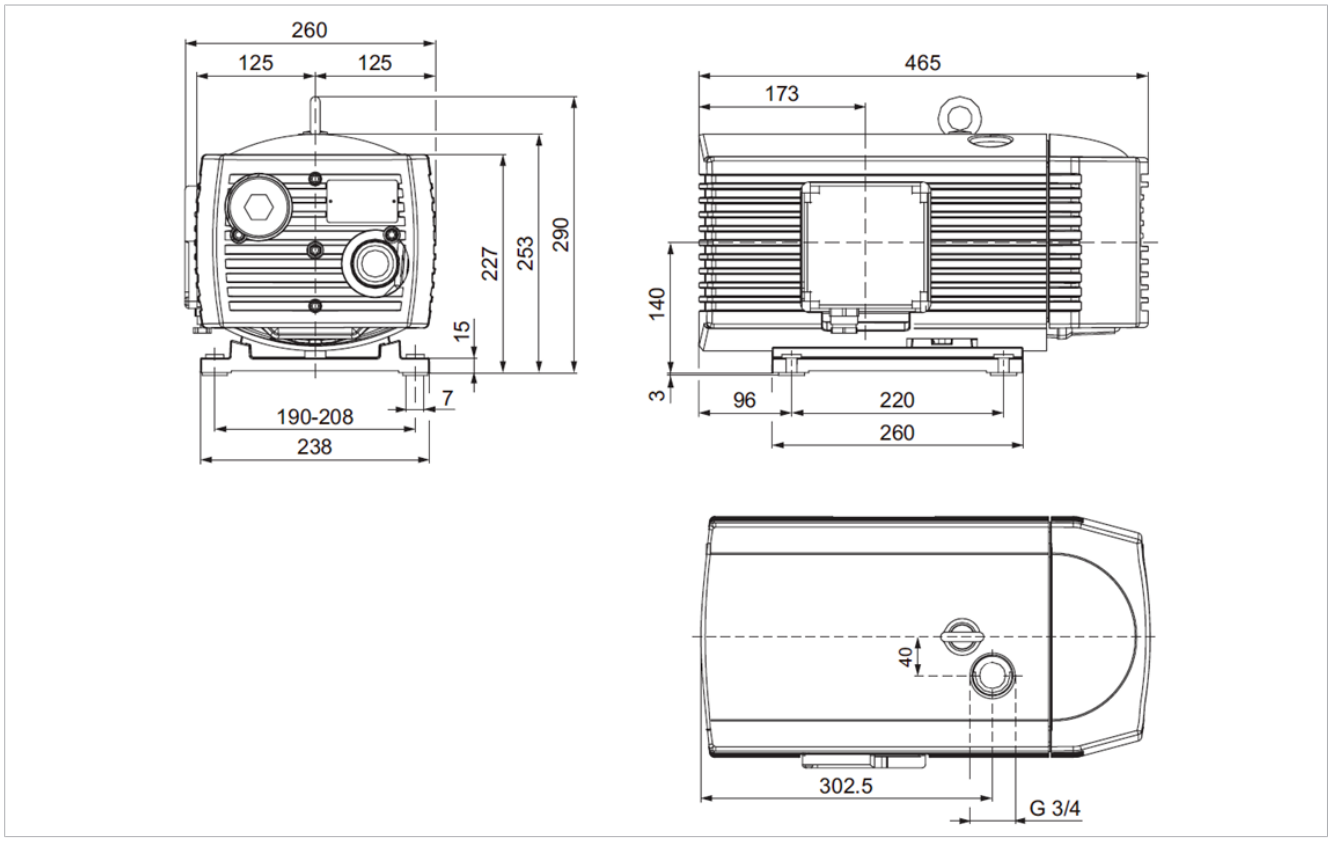
Version EVE-TR-X 16



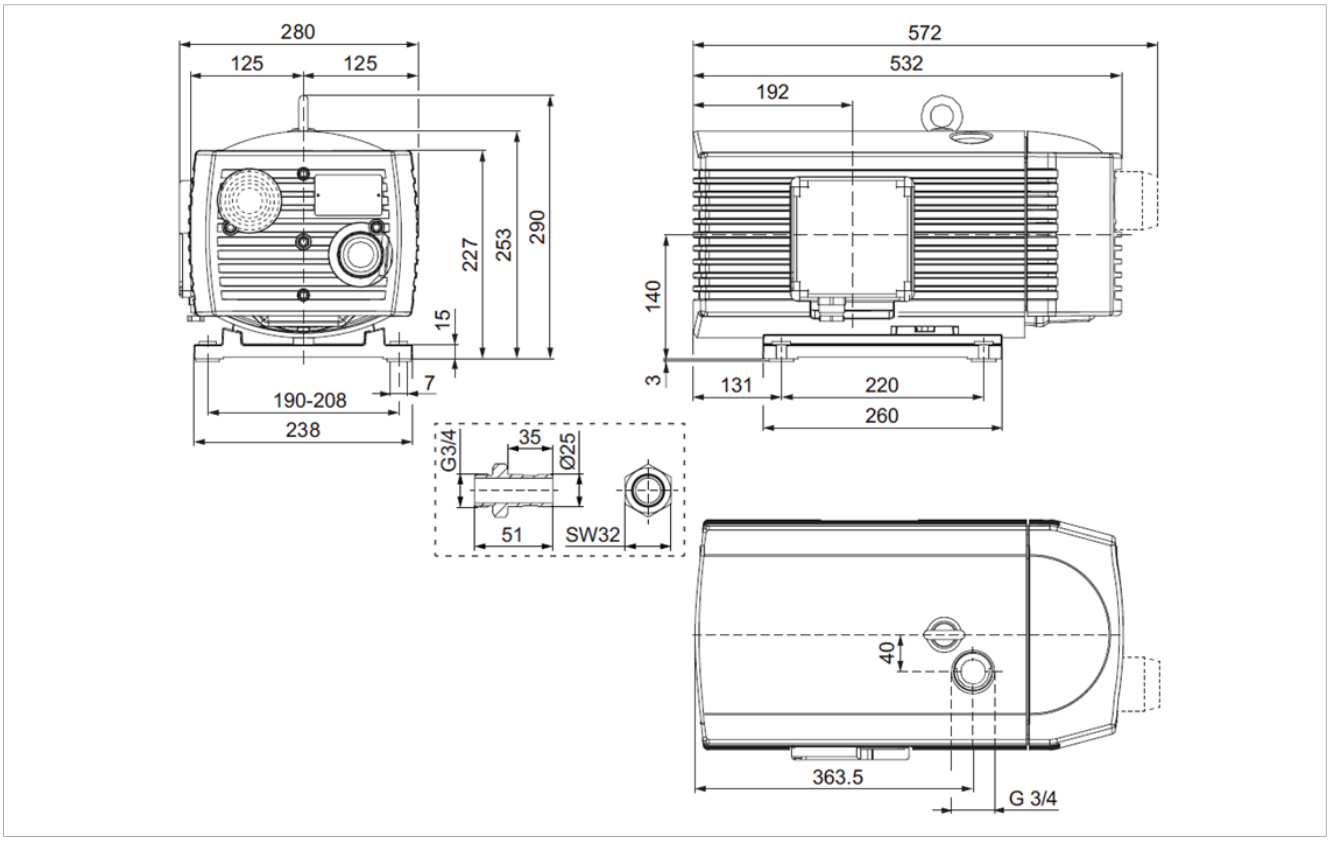
Variant EVE-TR 25



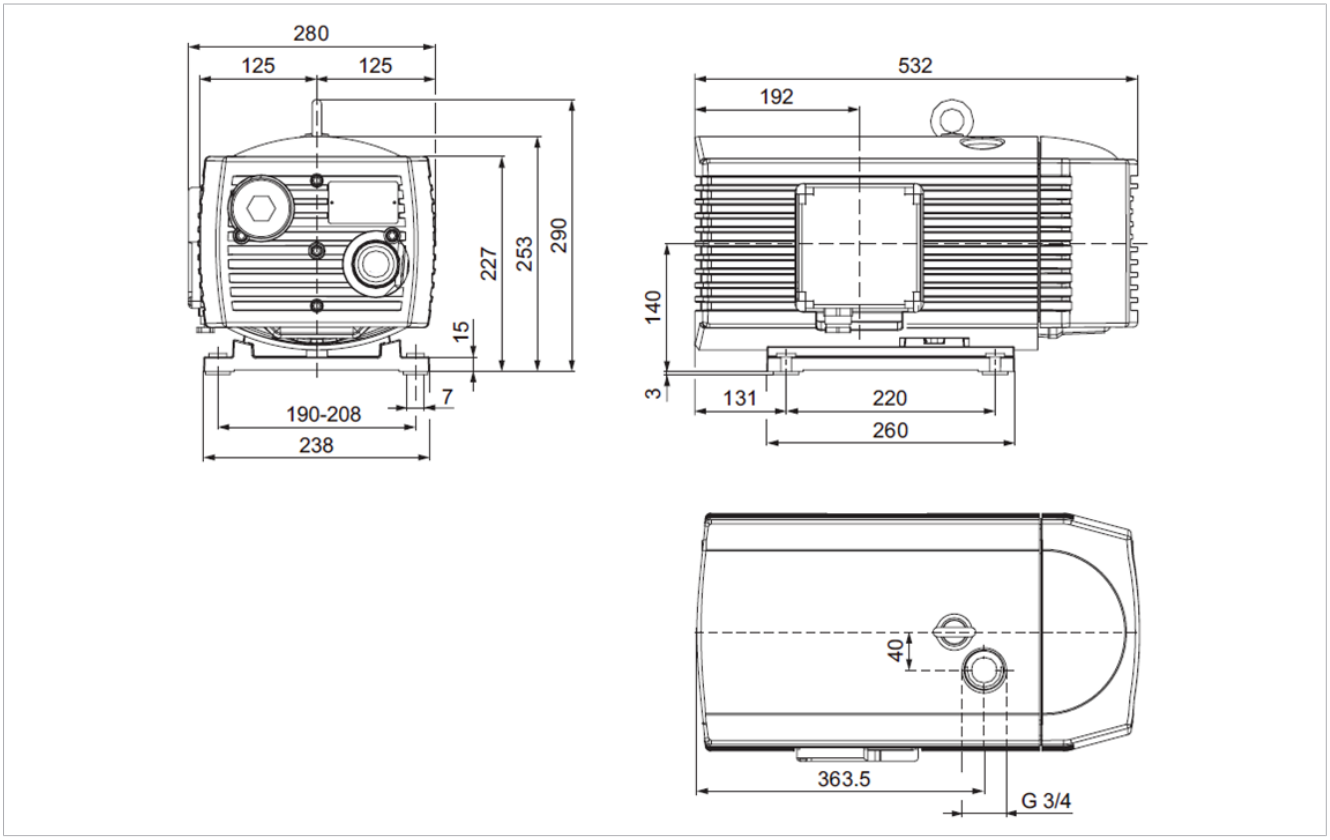
Version EVE-TR-X 25



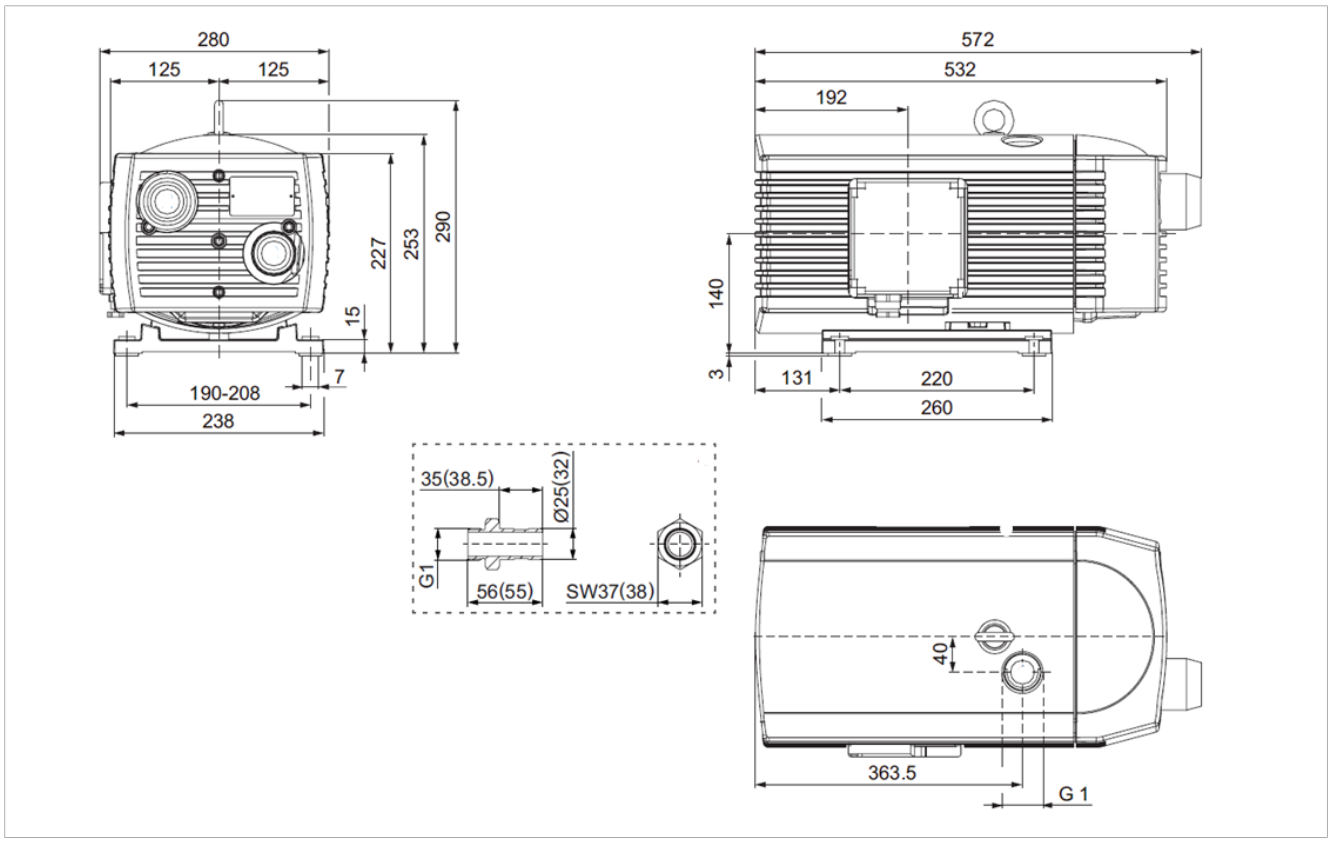
Variant EVE-TR 40



Version EVE-TR-X 40



Variant EVE-TR 50



6 Transportation and Storage

6.1 Checking the Delivery

The scope of delivery can be found in the order confirmation. The weights and dimensions are listed in the delivery notes.

1. Compare the entire delivery with the supplied delivery notes to make sure nothing is missing.
2. Damage caused by defective packaging or occurring in transit must be reported immediately to the carrier and J. Schmalz GmbH.

6.2 Transporting the Vacuum Pump

✓ Wear protective work shoes and gloves.

1. Secure the load according to national regulations before every transport operation.
2. Ensure that any personnel involved in transporting with lifting devices or industrial trucks are authorized and qualified to do so.

⚠ WARNING

Suspended load

Risk of injury!

- Do not walk, stand or work under suspended loads.

⚠ CAUTION

Risk of crushing and cutting

Crushing and cutting of body parts due to tipping or falling loads during transport!

- Always transport the product horizontally.
- The load-bearing capacity of the lifting straps and load suspension devices must correspond to the mass.
- Protect against tipping or falling.
- Place the product on a load-bearing, horizontal surface.

NOTE

Mechanical damage

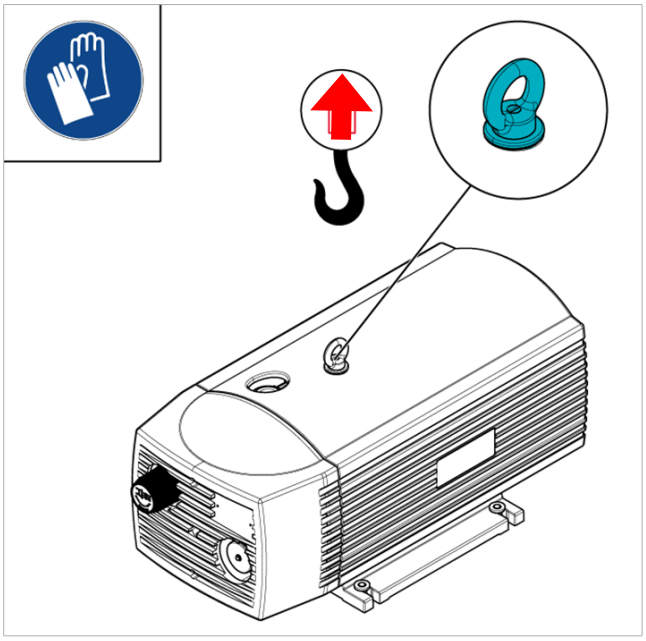
The vacuum pump can be damaged during transport.

- The vacuum pump is designed to be transported with a crane or forklift. Do not subject the vacuum pump to shocks and impacts during transport.

The pump must only be attached at the eyebolts.

Observe the following when doing so:

- Select the appropriate hoist for the total weight to be transported. If necessary, observe the sling angle.
- Secure the pump against tipping and falling.
- Always suspend the pump from the provided load suspension points.
- Do not stand under suspended loads.
- Set the goods down on a horizontal surface (max. inclination: 10° in all directions).



6.3 Storage

During storage, the following storage location requirements must be observed to keep the unused pump in a proper condition over a longer period of time.
Failure to observe the following requirements may cause damage to the pump.

The storage location must be:

- dry and clean
- level
- protected against sudden changes in temperature and humidity
- protected from salt mist, industrial gases, corrosive liquids, rodents and fungal infestation

If the pump is to be stored for a longer period (of more than 2 months) after use, you must follow the steps below.

1. Make sure that the pump is free of water or steam.
2. Close the intake opening.
3. Run the pump for 30 minutes after reaching its operating temperature. Suck in only a small amount of dry ambient air.
4. Seal all inlets and outlets with a plug immediately after switching the pump off.
5. Place silica gel packets inside the filter housing. Attach warning labels so that the packets are removed again before starting operations.

If the pump was used to convey air with a high moisture content before the downtime, we recommend taking the steps above even for shorter storage periods.

7 Installation

7.1 Installation Instructions

To ensure safe installation, observe the following instructions:

1. Where necessary, remove the transport guards before installing the product.
2. Install the product only using the operating parameters and under the conditions described in the “Technical Data” chapter.
3. Use only the connectors, mounting holes and attachment materials that have been provided.
4. Firmly connect and secure pneumatic and electrical line connections to the device.

7.2 General Requirements

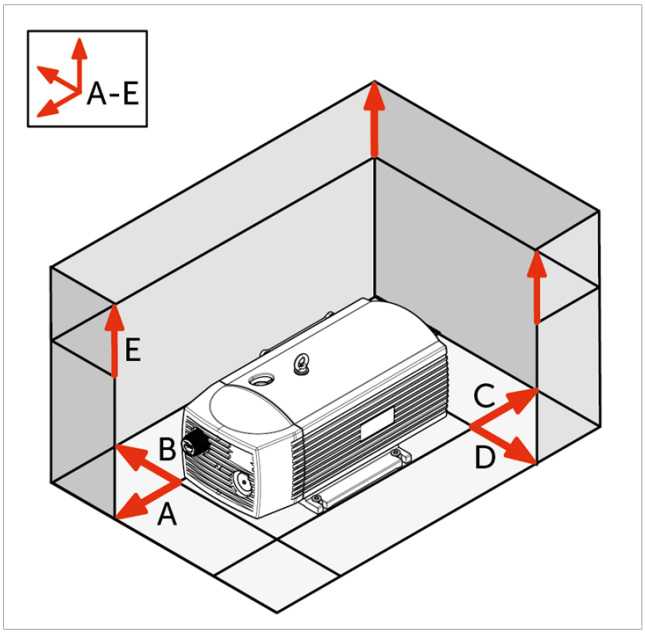
The pump installation site should be dry and protected from water spray.

We recommend that you set up the product in such a way that maintenance work can be carried out easily.

When mounting components and assemblies, you must observe the following points to prevent injuries and damage to the pump:

- Components from third-party manufacturers must be installed only if they have been approved by the manufacturer and comply with the guidelines and legislation in force in the country of use.
- Loose parts and parts that do not belong to the pump must be removed from the pump environment after mounting.
- Protruding parts (pipes, cables, etc.) must be properly fitted, routed and marked.
- Component contact points must be clean and intact.

The minimum distance between the pump and all adjacent parts must be maintained in accordance with the following table.
Failure to observe the minimum distances poses a **risk of fire** due to the high degree of heat emitted.



A	B	C	D	E
10 cm	10 cm	10 cm	10 cm	10 cm

7.3 Mounting

Before mounting the pump at the installation location, bring it to the ambient temperature.

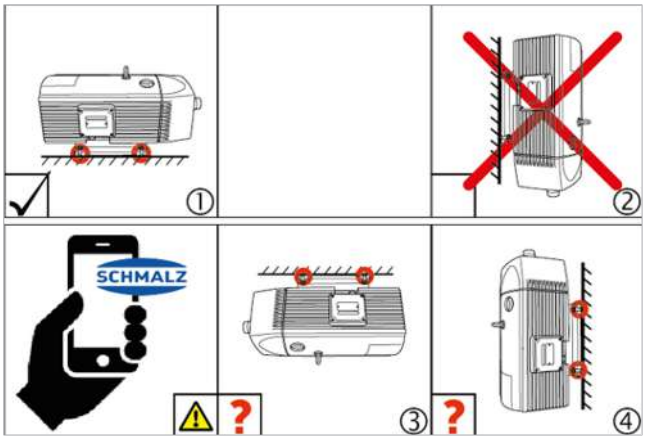
The pump must be securely fixed in place at the installation site.

Physical strain on the pump housing must be avoided.

The pump must be installed as shown in the figure opposite (1).

Mounting on the ceiling (3/overhead) or wall (4/motor positioned at the bottom) is usually possible following consultation with Schmalz.

Mounting on the wall with the motor positioned at the top (2) is **not permitted**.



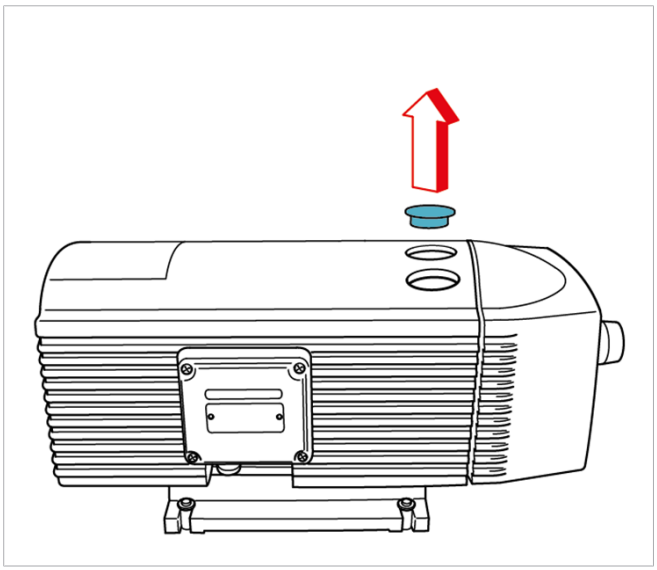
The pump can be installed on solid ground without any anchoring. For installations on a substructure, attachment using rubber buffer elements is recommended.

7.4 Pneumatically Connecting the Vacuum Pump

Use only hoses that are designed for the maximum permitted pump operating pressure (see the chapter “Technical Data”).

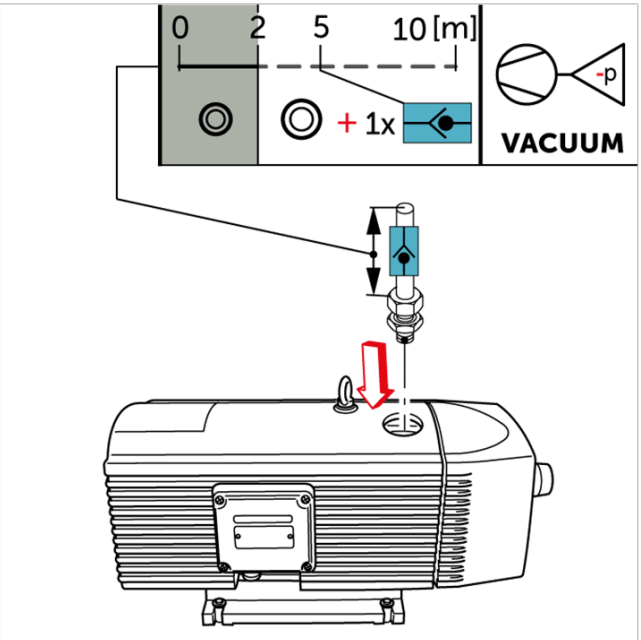
When installing media lines that reach high temperatures, be aware that they must be shielded, insulated, and appropriately labeled to prevent injury and damage to the pump.

For transport, the suction connection is protected by a plug that prevents the entry of dirt and foreign bodies. It must be removed before the start of operations.



- Remove the plug before the start of operations.

Dimensioning of the Suction Line



The diameter of the lines must correspond to the nominal connection width at minimum.

For lines longer than 2 m, the next larger cross section must be chosen.

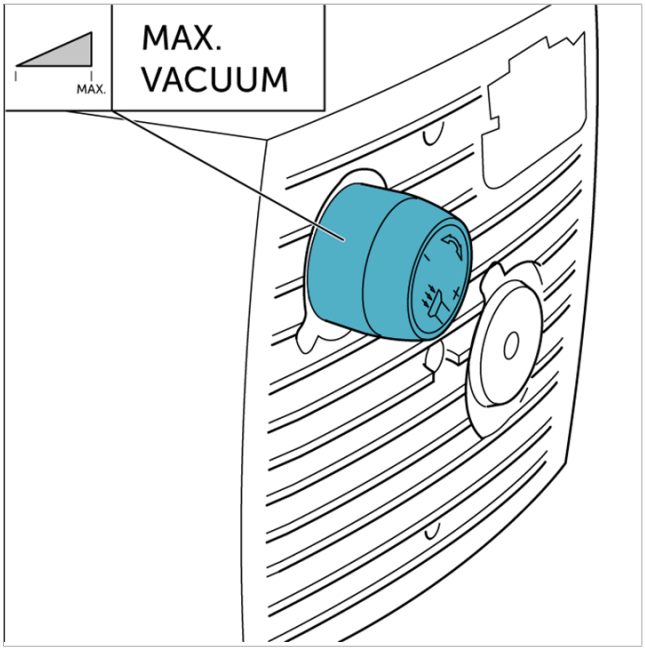
For lines longer than 5 m, we also recommend fitting non-return valves as close as possible to the suction connection. Otherwise, air flowing back can cause the piston and the vanes to rotate counter to the defined direction of rotation (risk of vane breakage!).

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

The supply line must be installed without any mechanical stress by using a flexible hose or rigid pipe.

Size	Connection	Line cross section (MIN)	
		Length ≤ 2 m	Length ≥ 2 m
EVE-TR(-X) 10	1/2" thread	13 mm	19 mm
EVE-TR(-X) 16	1/2" thread	13 mm	19 mm
EVE-TR(-X) 25	3/4" thread	19 mm	25 mm
EVE-TR(-X) 40	3/4" thread	19 mm	25 mm
EVE-TR 50	1" thread	25 mm	32 mm

7.5 Setting the Valve



Set the vacuum at the valve.

The pump is fitted with a vacuum regulating valve, which can be used to set the vacuum required for the application.

This value is limited based on the size. The relevant specifications (absolute vacuum) can be found in the operating parameters.

7.6 Electrical Installation

⚠ DANGER

Electrocution by live components or wires

Serious injury or death!

- Electrical installation work may only be carried out by qualified personnel.
- Make sure that the electrical components are not live before installation, maintenance and troubleshooting.
- Switch off the mains switch and secure against unauthorized restart.

NOTE

Incorrect electrical connection of the vacuum pump

Danger of motor damage.

- The following circuit diagrams show the typical wirings. Check that the motor terminal box contains instructions for the cabling/circuit diagrams.

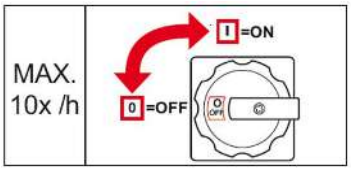
The electrical installation must comply with applicable national and international standards, guidelines and regulations.

If the pump is integrated into a control unit, ensure that the pump does not start up again on its own after an unwanted voltage drop. The measures against unexpected start-up in accordance with DIN EN ISO 14118 must be implemented. This also applies following a shutdown after an emergency stop.

The power supply for the motor must comply with the specifications on the motor type plate.

You must also observe the following points during pump installation:

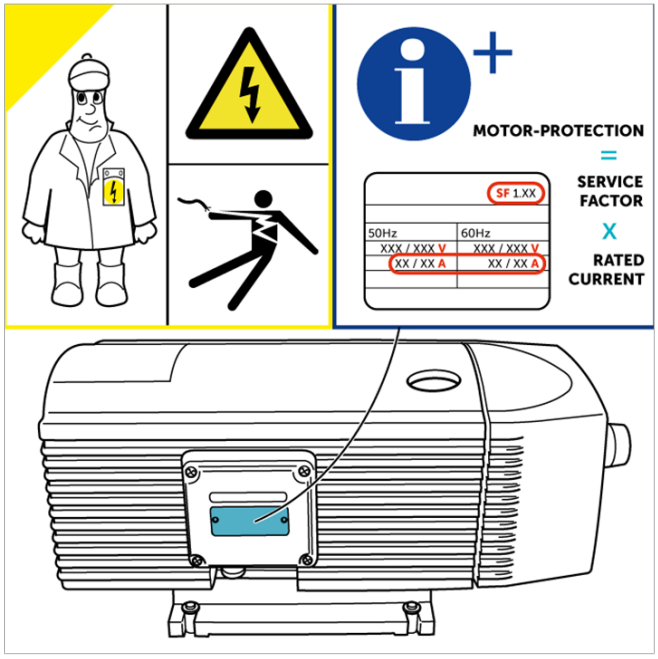
- The pump must be operated with a maximum of 10 start/stop cycles per hour.



- The pump must be protected using overload protection. Operation without adequate fuse protection is prohibited.
- The pump supply line must meet the minimum requirements as per the latest standards of technology.

7.6.1 Electrical Connection

1. Connect the motor in accordance with the connection diagram (see the terminal box cover).



2. Consult the motor type plate for information about the permissible connection types for the motor.
   The motor must be protected with a motor-protection switch, for which the service factor (SF) must also be taken into account.
   Operation without adequate fuse protection is prohibited.

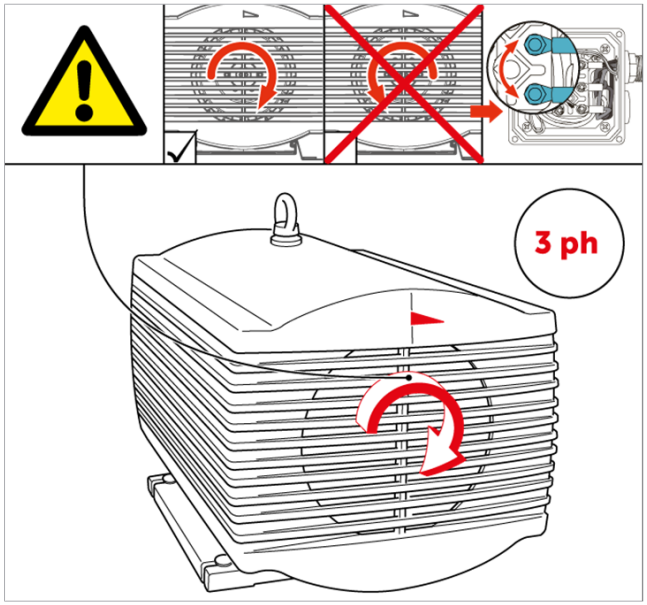
NOTE

Electric motor running in the wrong direction

Damage to the motor

- Reverse the rotational direction by reversing the polarity in the supply line.

Before the start of operations, check that the pump is rotating in the specified direction (refer to the directional arrow on the side cover):



1. Switch on the vacuum pump briefly (max. 3 seconds) because operation with the incorrect direction of rotation results in damage to the pump.
2. If the pump does not run in the specified direction of rotation (look at the motor fan wheel), you must change the direction of rotation by swapping two connection phases.

Damage or destruction of the motor resulting from operation with the incorrect rotational direction is not covered by the warranty.

8 Operation

8.1 Switching On the Pump

The pump is switched on using the switching elements in the application. Following activation, the pump switches directly to normal operating mode. There are no lower-level operating modes for setup, maintenance or troubleshooting.

Do not start the pump until it has been properly set up, the electrical connection has been properly established and the media lines have been connected.

During use, the customer's specific parameterization determines which additional measures (release, setpoint specification) are required to enter normal operation.

8.2 Normal operation

During normal operation, the pump operates fully automatically within its physical limits in accordance with the customer's controller.

8.3 Switching Off the Pump

1. Shutdown

To switch off the pump, stop the pump from the application and prevent it from being switched on again.

In addition, affix a warning sign to the electrical supply disconnection device.

All pieces of electrical equipment must be disconnected individually. Maintenance while the pump is running or powered on is strictly prohibited.

2. Disconnection from the power supply

An electrical specialist with verifiable qualifications isolates and disconnects the motor. Once the 5 safety rules have been implemented, non-electrical specialists are then allowed to carry out tasks on the pump.

Once the tasks are complete, the tasks under: "Recommissioning" (> See ch. 8.4 Recommissioning, p. 31) are to be followed.

8.4 Recommissioning

Following storage and downtime periods, you must check that the pump is operating correctly.
If it is not operating correctly, you must take appropriate maintenance and servicing measures to restore its operability.

Work through the following points in the order specified to ensure that the pump can be put back into operation safely:

1. Maintain, clean and, if necessary, repair the pump as per the chapters "Maintenance and Servicing" and "Cleaning".
2. The electrical connection must be established in accordance with the chapter "Electrical Installation". The power supply must not be restored yet.
3. All safety features must be fitted and checked for functionality and effectiveness. Damaged parts must be replaced immediately.

Once you have completed all the above points and referred to the chapter "Switching On the Pump," you can resume operations with the pump.

9 Troubleshooting

9.1 Troubleshooting

Follow the detailed description of the safety instructions (> See ch. 2.5 Residual Risks, p. 8) .

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

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

- For troubleshooting, stop the pump and prevent it from being switched on again.
- In addition, affix a warning sign to the electrical supply disconnection device.
- All the pieces of electrical equipment in place must be disconnected individually.

If safety features need to be disassembled or modified for troubleshooting, they must be reattached, set up and tested once the maintenance or repair work is completed and before the pump is started.

An electrical specialist with verifiable qualifications then has to perform tasks on the pump.

Once the tasks are completed, the pump can be put back into operation following a visual inspection.

During troubleshooting, the pump must be checked for defects, in particular:

- Damage, in particular to:
  - Ventilation grids
  - Screw unions
  - Media lines
  - Electrical cables
- Leaks
- Loose objects
- Loose screw unions or attachments
- Touch guards on live parts

If defects and hazards become apparent during the check, the pump must be stopped immediately. The pump must only be put into operation in perfect condition.
Observe the “Maintenance” chapter.

9.2 Troubleshooting

Fault	Cause	Troubleshooting
The pump does not start	Supply voltage not present, pump not connected to power supply	▸ Connect pump to the power supply
	Power supply is switched off	▸ Switch on the power supply
	Connections or lines are blocked	1. Check electrical protection devices (e.g. motor-protection switches, fuses, emergency stop) 2. Have an electrician correct the identified fault
	Pump mechanically blocked	▸ Rule out electrical causes; check that the motor fan can run freely (with a screwdriver)
Conveying power, vacuum or pressure too low The pump does not achieve the power specified in the technical data or data sheet.	Leakage in vacuum line, hose connections not air-tight	▸ Replace the faulty line elements
	Vane worn	1. Visually inspect for damage Measure vane width 2. Remove the vane, inspect it and replace it if it is damaged or less than the minimum width
	Filter dirty	▸ Clean/replace filter
	Resistance in the supply line too high	1. Ensure that the dimensioning is in accordance with the instruction manual. Further support from Schmalz Service 2. Remove obstructions from media line. Repair supply lines if necessary 3. Open throttle elements if necessary
	Pressure and suction lines have been mixed up	▸ Switch the pressure and suction lines with each other
	If the pump is not sucking properly and is emitting a loud noise, the motor is rotating in the wrong direction.	1. Check direction of rotation using the direction of rotation arrow 2. The motor installation must be corrected by an electrician.
	Pneumatic connections or lines are partly or fully blocked	1. Check the pneumatic connections and lines. 2. Remove parts and particles causing the blockage.
The pump gets unusually hot	Motor/device fan damaged or clogged	1. Visual inspection for visual damage. Listen for unusual noises (e.g. grinding noises) 2. The pump must be safely stopped or disconnected from the supply voltage by an electrician. Remove the fan cover safety device and clean the fan wheel or replace it if it is damaged.

Fault	Cause	Troubleshooting
	Evacuated gas temperature is too high	1. Measure the temperature of the evacuated gas and compare it with the maximum permissible temperature (chapter “Operating Parameters”). 2. The temperature limit must be adhered to.
	Filter dirty	▸ Clean/replace filter
	Pump ambient temperature is too high	1. Check for adequate ventilation and compliance with the minimum clearances. 2. Provide cooling if the ambient temperature is too high.

The fault cannot be corrected

If you cannot identify any of the listed causes, send the pump to Schmalz customer service.

1. Flush the pump with air for a number of minutes (if required for safety reasons: with an inert gas) at the atmospheric pressure to clear hazardous or abrasive gases from the pump head.
2. Clean the pump.
3. Send the pump to Schmalz together with the completed declaration of decontamination, and specifying the conveyed medium.

10 Maintenance

Follow the detailed description of the safety instructions (> See ch. 2.5 Residual Risks, p. 8) .

If a maintenance task requires any protective devices to be disassembled, they must be disassembled only for the duration of the maintenance task. After the maintenance task is complete, all protective devices are to be fully installed in their designated location immediately and checked for functionality.

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

Safety-related parts of the pump may be damaged or put out of operation through tampering or manipulation. Tampering with or manipulating safety-related parts of the pump and adjustable components is strictly prohibited and must be reported to the responsible body immediately.

10.1 Maintenance and Servicing

As a prerequisite for safe and proper operation, it is essential that the pump is regularly maintained and serviced by suitably qualified personnel.

Regular maintenance and servicing also increases the availability and service life of the pump. The recommended maintenance and servicing intervals are listed in this chapter.

If the operating conditions are very unfavorable, the maintenance and inspection intervals may have to be adapted accordingly.

10.2 Preparation

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

Ensure that sufficient space is provided for all maintenance and service work. The maintenance area must be secured.

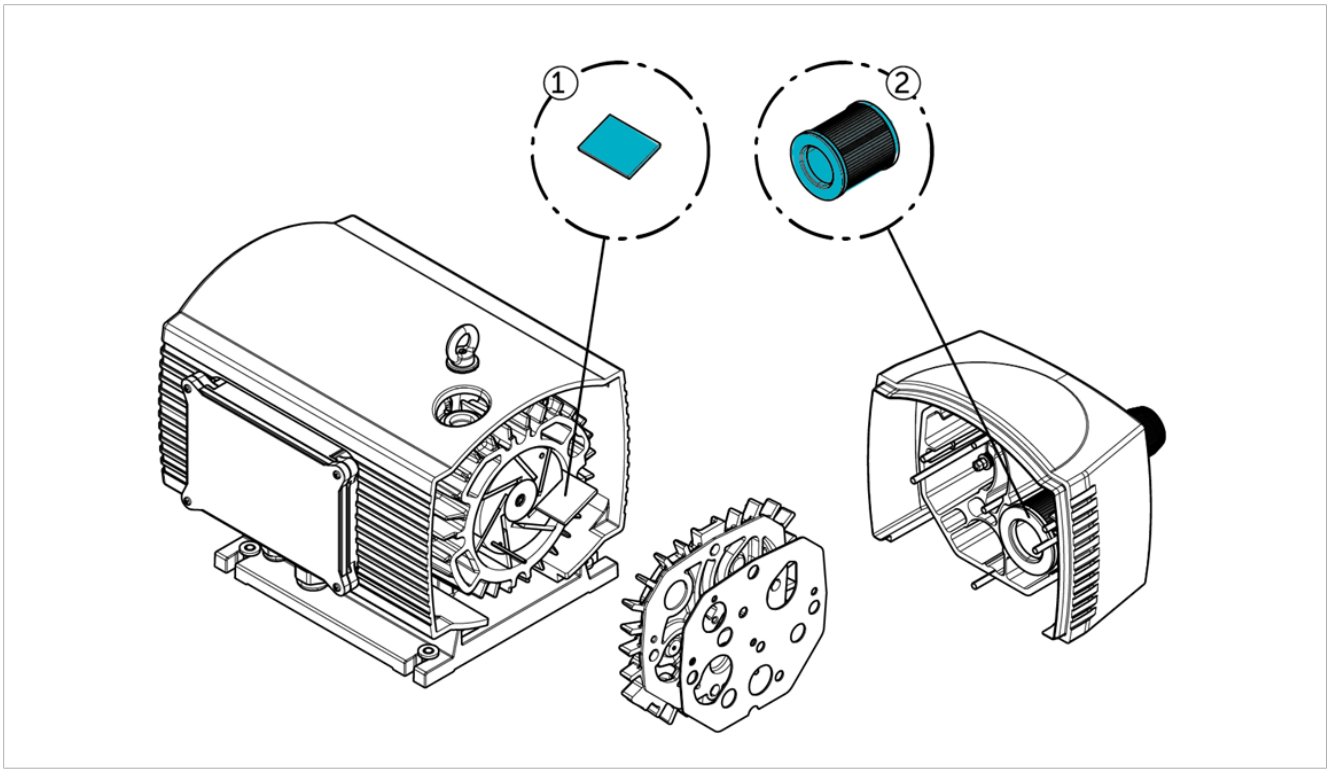
Observe the following steps when preparing for maintenance and servicing work:

1. All the pieces of electrical equipment in place must be disconnected individually. Maintenance while the pump is running or powered on is **strictly prohibited**.
2. If safety features need to be disassembled or modified, they must be reattached, set up and tested immediately once the maintenance or repair work is completed and before the pump is started.
3. An electrical specialist with verifiable qualifications then has to perform tasks on the pump, following the 5 safety rules.

Once the tasks are completed, the pump can be put back into operation following a visual inspection.

10.3 Maintenance intervals

The following overview shows the maintenance intervals:



EVE-TR SERIES 10-50

Component	40 – 200 h	3000 h	8000 h
Rotary vane (1)		Measure, (replace)	
Suction filter (2)	Check, clean, replace		
Housing	Clean		
Inspection			Inspection by Schmalz Service – agree date
Protective devices	Visual inspection		

EVE-TR-X SERIES 10-40

Component	40 – 200 h	7500 h	20,000 h
Rotary vane (1)		Measure, (replace)	
Suction filter (2)	Check, clean, replace		
Housing	Clean		
Inspection			Inspection by Schmalz Service – agree date
Protective devices	Visual inspection		

We are happy to assist our customers with this work and with the assessment of the condition of the device with help from our Schmalz Service.

10.4 Maintenance tasks

The safety instructions must be strictly observed:

- Use appropriate tools and handle them with care.
- Use personal protective equipment to prevent injury from tools or components.
- Keep the maintenance area clean and tidy. Objects left lying around are a tripping hazard.
- If there is any confusion, consult the responsible body or the manufacturer.

10.4.1 Cleaning the Product

NOTE

Incorrectly cleaning the product and its components

Damage to the product or individual components due to aggressive cleaning agents or excessive temperatures!

- For cleaning, use only cleaning agents that do not corrode or damage the materials used.
- Do not use sharp-edged objects (wire brushes, sandpaper, etc.).
- Do not exceed the specified max. temperature during cleaning.

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 damp cleaning cloth. The interval depends on the level of dirt on the housing.

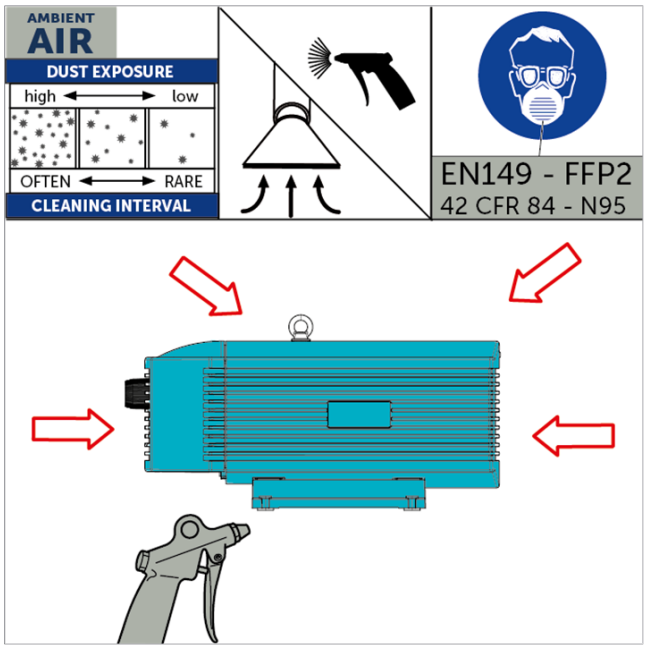
The use of solvents or cleaning agents containing solvents is prohibited.

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

The legal environmental protection requirements must be observed during cleaning.

During cleaning, wear protective glasses and an FFP2 mask in accordance with EN 149:2008.

- Vacuum the surface/clean it with compressed air
  Remove the dirt from the fan vents using a vacuum instead of compressed air.



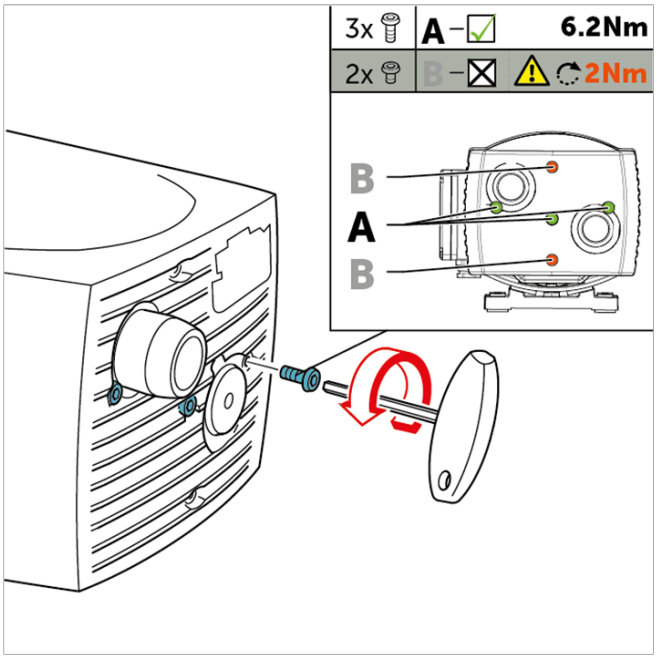
10.4.2 Cleaning the Suction Filter

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

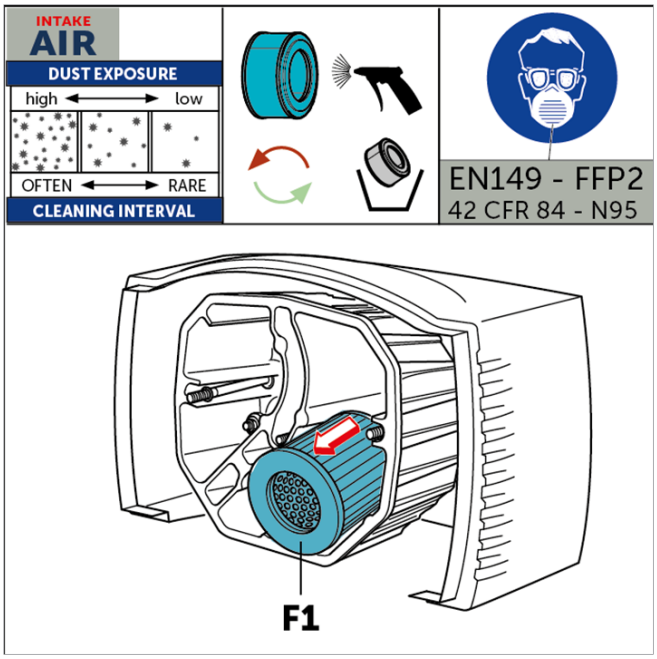
During cleaning, wear protective glasses and an FFP2 mask in accordance with EN 149:2008.

The filter cartridge is installed behind the front hood, which is fastened with 3 Allen screws (A).

1. Remove the front hood.



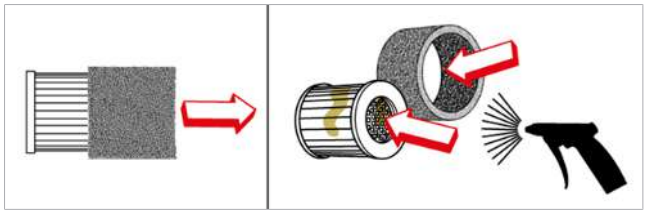
2. Remove the filter cartridge and blow with compressed air from inside to outside.



3. If the function of the filter is still impaired (clogged, oily, greasy or damaged) after the cleaning process, it must be replaced.
Use only Schmalz original spare parts.

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

- For cleaning, remove the pre-filter from the suction filter and blow off both filters with compressed air.

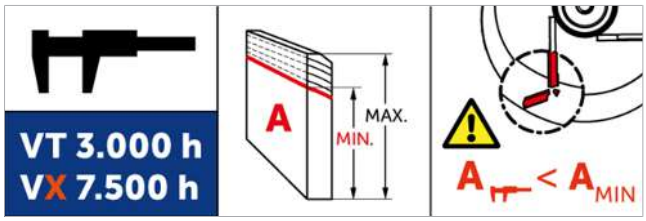


10.4.3 Checking the Rotary Vanes

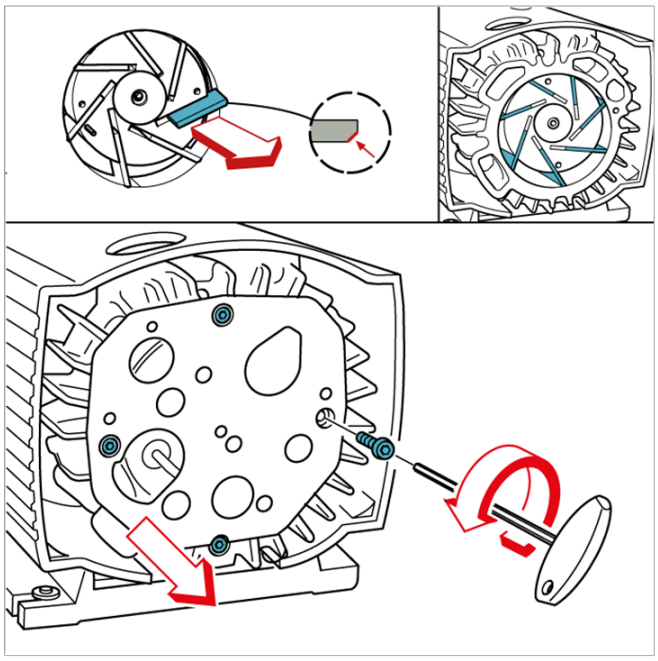
The vanes are subject to wear and must be checked/replaced at regular intervals.

The minimum vane widths must be complied with at all times; otherwise, the vanes may break and damage the pump.

Check the width of the vane after 3000 or 7500 hours of operation or at least annually.



1. The vanes are also installed behind the front hood. Release and remove it as described above. The side cover below it is fastened with screws. Unscrew them and remove the side cover.



2. Pull the vanes out of the piston. Visually inspect for damage and measure vane width **A**, replace vanes if necessary.

3. When reinstalling the vanes, make sure that they are in the correct installation position. Blow out the housing with dry compressed air.

The vanes of pump version -X are not compatible with the standard series.

Pump variant -X with specially designed vanes reduces abrasion and extends vane service lives.

The following table shows the minimum width $\mathbf{A}_{min}$ of the vanes:

Size	Minimum width A
VX 4.40	28 mm
EVE-TR 10	18 mm
EVE-TR 16	21 mm
EVE-TR 25	28 mm
EVE-TR 40	28 mm
EVE-TR 50	33 mm

Size	Minimum width A
EVE-TR-X10	18 mm
EVE-TR-X16	21 mm
EVE-TR-X25	28 mm
EVE-TR-X40	28 mm

10.5 Conditions for Reactivation

Before starting up again after maintenance and repair work, ensure the following:

- Unauthorized persons must be removed from the vicinity of the device.
- Check that there is a proper connection between the device and the media lines.
- Check the media lines for leaks and damage.
- Check the power supply for damage and proper operation.
- All protective devices must be in place, functioning and checked.

11 Spare and Wearing Parts

NOTE

Use of non-original (non-Schmalz) spare parts.

Danger of premature failure of the machine and loss of efficiency.

- The exclusive use of original spare parts is a prerequisite for the proper functioning of the system and for the validity of the warranty.

For information about wear and spare parts for your item, proceed as follows:

1. Load and start the Schmalz ControlRoom app. The detailed spare parts list is available here.
2. Or visit the web shop at www.schmalz.com

12 Temporary Decommissioning

Follow the steps below during temporary decommissioning:

1. Shutdown
2. To switch off the pump, stop it and prevent it from being switched on again. In addition, affix a warning sign to the electrical supply disconnection device.
3. All the pieces of electrical equipment in place must be disconnected individually.
4. Disconnect from the power supply.
5. An electrical specialist with verifiable qualifications isolates and disconnects the motor. Once the 5 safety rules have been implemented, non-electrical specialists are then allowed to carry out tasks on the pump.
6. At the end of the downtime, the tasks under: “Recommissioning” are to be followed (> See ch. 8.4 Recommissioning, p. 31).

13 Disassembly and Decommissioning

The following steps must be taken during disassembly and decommissioning:

1. Switch off the pump and unlock the drive.
2. Turn off the power supply and secure against unintentional reactivation.
3. Disconnect the drive supply line.
4. Shut off the media lines and eliminate any pressure differences.
5. Disconnect the media lines from the pump.
6. Clean the pump thoroughly.
7. Disassemble the pump in the reverse order to assembly or according to the separate disassembly instructions. Loose parts must be secured to prevent them from tipping over or falling down.
8. Protect the pump from further contamination.

14 Disposal

The product Vacuum Pump must be decommissioned and prepared for disposal only by qualified specialists.

The pump is disposed of in a disassembled state (see the chapter “Disassembly and Decommissioning”)

For proper disposal, please contact a company specializing in the disposal of technical goods and instruct the company to observe the applicable disposal and environmental regulations. Schmalz is happy to assist you in finding a suitable company.

15 EU Conformity

EU Declaration of Conformity

The manufacturer Schmalz confirms that the vacuum pump EVE-KL described in these operating instructions fulfills the following applicable EU directives:

2006/42/EC	Machinery Directive
2014/30/EU	Electromagnetic Compatibility
2011/65/EU	RoHS Directive

The following harmonized standards were applied:

EN ISO 12100	Safety of machinery — General principles for design — Risk assessment and risk reduction
EN ISO 2151	Acoustics - Noise test code for compressors and vacuum pumps - Engineering method (grade 2)
EN ISO 3744: 2010	Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Engineering methods for an essentially free field over a reflecting plane
EN 1012-1	Compressors and Vacuum Pumps - Safety requirements - Part 1: compressors
EN 1012-2: 1996 +A1:2009	Compressors and Vacuum Pumps - Safety requirements - Part 2: Vacuum pumps
EN 61000-6-2+AC	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments
EN 61000-6-3+A1+AC	Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments
EN IEC 63000	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

The EU Declaration of Conformity valid at the time of product delivery is delivered with product or made available online. The standards and directives cited here reflect the status at the time of publication of the operating and assembly instructions.

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