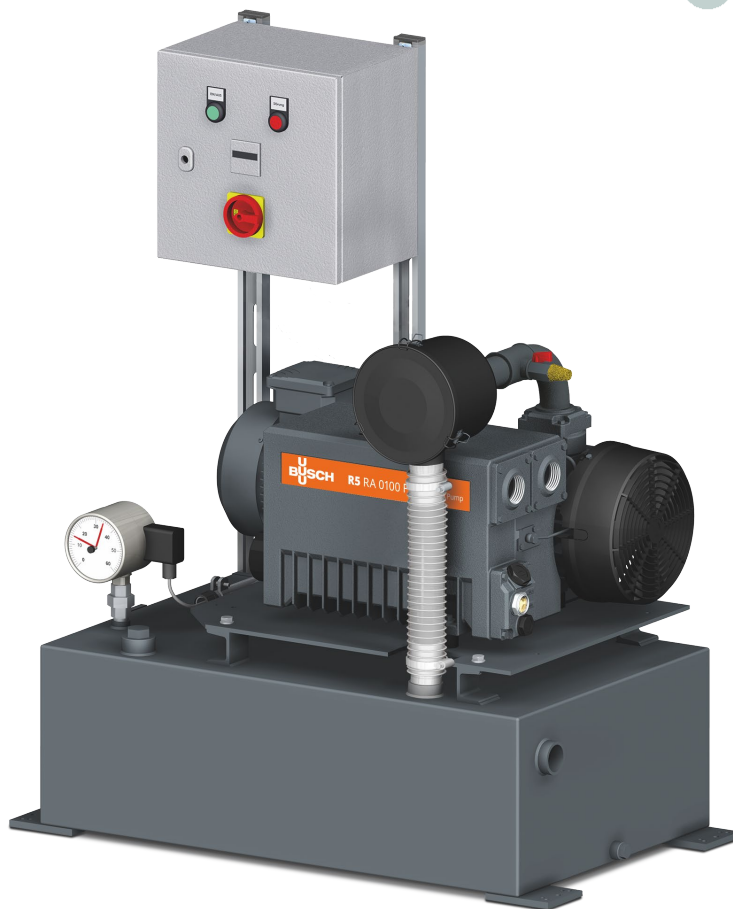


# Operating instructions

## SIMPLEX

Vacuum systems

VD 0025 G - 0063 G - 0100 G



**CE**

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## 2 Safety

Before commissioning of the vacuum system, read these operating instructions with care. Please contact your contact person from Busch if there are any questions.

Keep the operating instructions so that you can use them for reference at a later time if necessary.

These operating instructions remain valid as long as the customer does not make any changes to the product.

The vacuum system is intended for industrial use. It must only be operated by technically trained specialists.

Always wear personal protective equipment in accordance with local regulations.

The vacuum system has been designed and produced according to state-of-the-art methods. Nevertheless, a residual risk remains in operation. Potential dangers are highlighted in these operating instructions. Safety and warning notes are marked as follows, with the words DANGER, WARNING, CAUTION, ATTENTION and NOTE:



### DANGER

... Indicates a threatening hazard. Failure to observe safety instructions will result in death or serious injury.



### WARNING

... Indicates a potential hazard. Failure to observe safety instructions may result in death or serious injury.



### CAUTION

... Indicates a potential hazard. Failure to observe safety instructions may result in slight injury.

### ATTENTION!

... Indicates a potential hazard. Failure to observe safety instructions may result in property damage.



### NOTICE

... Indicates helpful advice and recommendations as well as information for efficient and smooth operation.

### 2.1 Safety devices

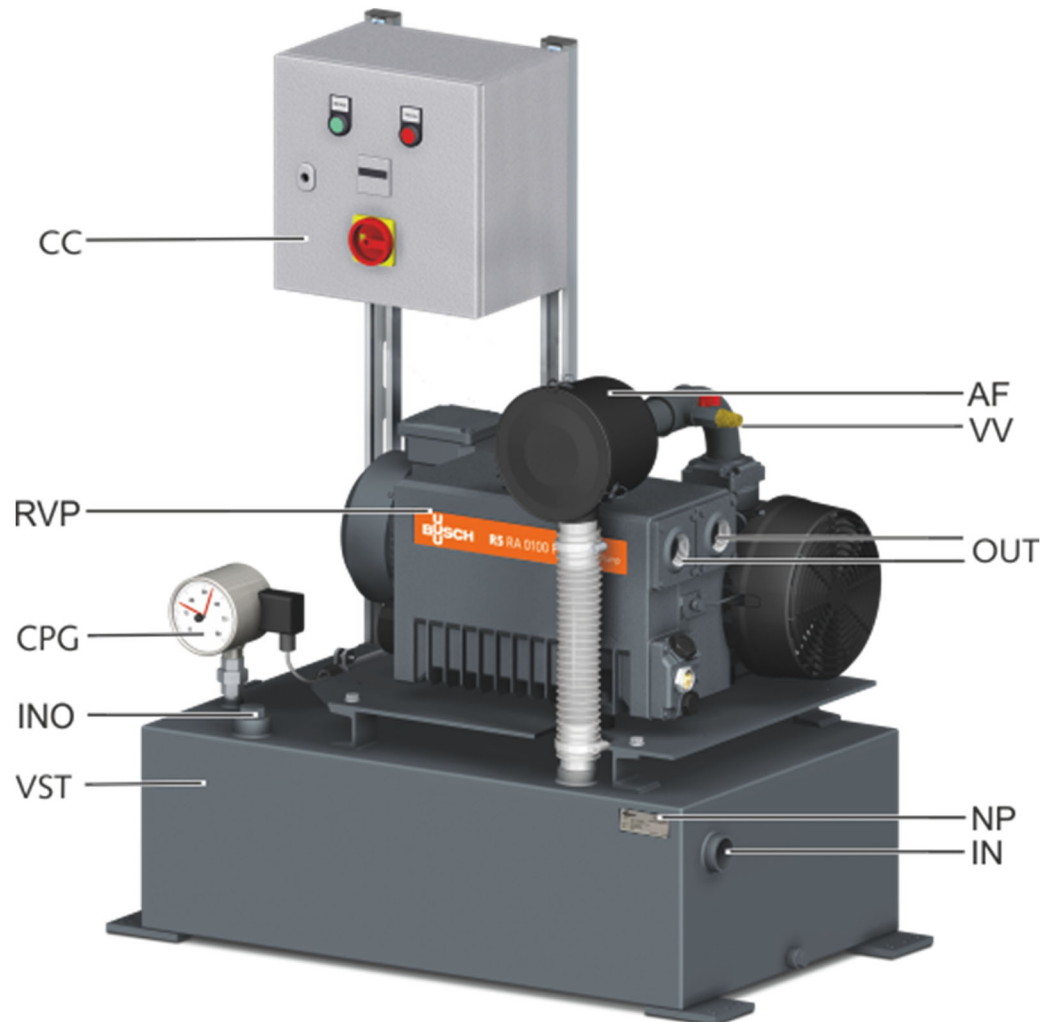
The motor of the rotary vane vacuum pump is safeguarded by a motor protection switch. If an overload occurs the vacuum system is shut down.

### 2.2 Emergency information

In an emergency case, the vacuum system can be switched off with the main switch of the switch and control cabinet, which has the function of an emergency-stop switch.

## 3 Product description

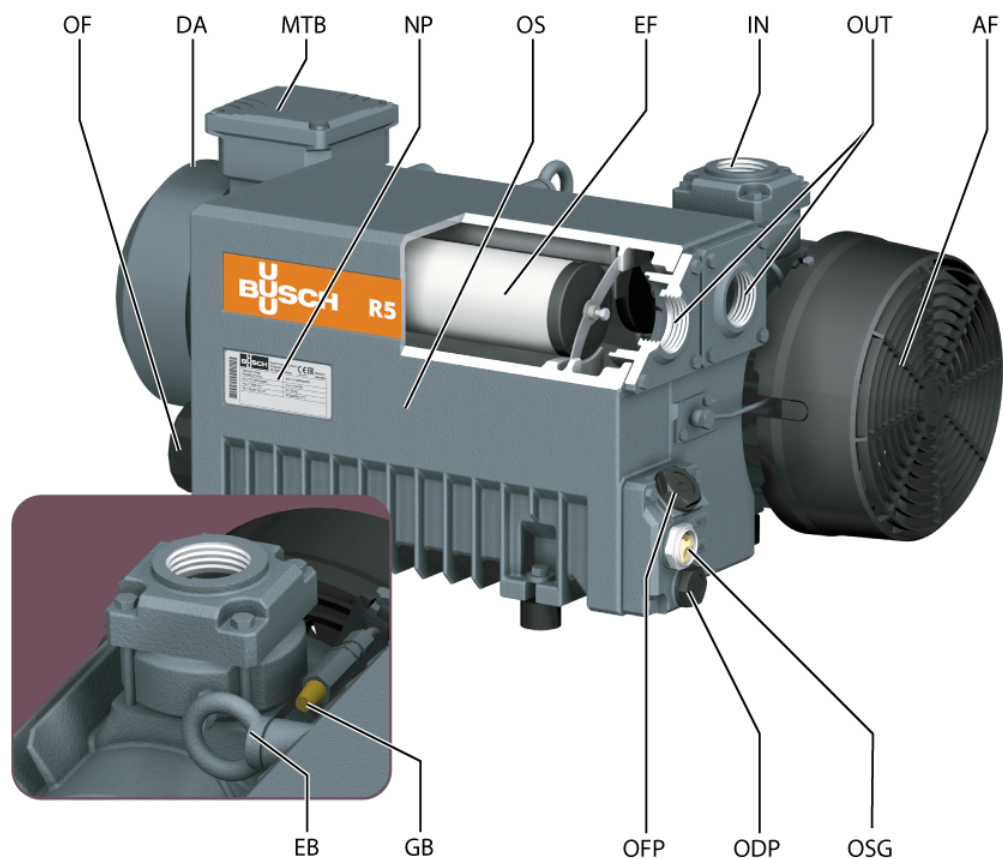
### 3.1 View vacuum system VD



IN	Gas inlet	CC	Switch and control cabinet
OUT	Gas outlet	AF	Air filter
INO	Gas inlet (optional)	VV	Venting valve
RVP	Rotary vane vacuum pump RA	CPG	Contact vacuum gauge
NP	Name plate	VST	Vacuum vessel

Fig. 1: View vacuum system VD

### 3.2 View of the rotary vane vacuum pump R5 RA



IN	Suction connection	MTB	Motor terminal box
OUT	Gas outlet	DA	Rotation direction arrow motor
OFF	Oil fill plug	EF	Exhaust filter
OSG	Oil sight glass	NP	Name plate
ODP	Oil drain plug	OF	Oil filter
EB	Eye bolt	AF	Axial fan
GB	Gas ballast valve	OS	Oil separator

Fig. 2: View rotary vane vacuum pump type R5 RA (0025 F)

### 3.3 Setup

The vacuum system SIMPLEX VD comprises of a single-stage rotary vane vacuum pump type R5 RA. The vacuum pump is mounted on a vacuum vessel.

The intake-side air filter and the strainer installed in the suction flange prevent the ingress of dirt particles in the vacuum pump.

The gas ballast valve is used for the addition of a limited quantity of ambient air to the process gas, to counteract the condensation of vapor in the vacuum pump.

In the vacuum vessel is a contact vacuum gauge installed for the 2-point control which displays the pressure in the vacuum vessel.

The vacuum system is completely piped and the electrical components are wired on a switch and control cabinet.

The vacuum system is also available as a mobile version on a push bar cart with four rolls.



## 3.4 Function principle

### 3.4.1 Vacuum system VD

Gas delivery from the vacuum vessel is effected by the single-stage rotary vane vacuum pump. Pressure gas is exhausted against the atmosphere.

The target values are set to the desired switch-on and switch-off values on the contact vacuum gauge on the vacuum vessel. When the lower switching point is reached, the vacuum pump is switched off. When the vacuum in the vacuum vessel is used up, the pressure in the vessel increases and when the upper switching point is reached, the vacuum pump is switched on again and evacuates the vacuum vessel.

### 3.4.2 Rotary vane vacuum pump R5 RA

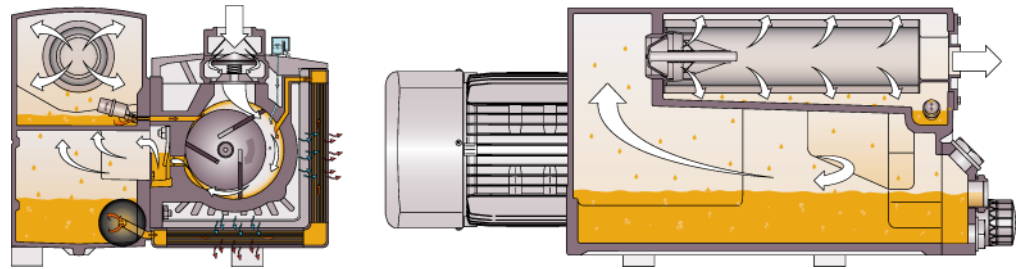


Fig. 3: Operating principle of the rotary vane vacuum pump R5 RA

The vacuum pump R5 RA works according to the rotary vane principle.

The oil seals the spaces, lubricates the sliders and discharges the compression heat. The oil filter cleans the circulating oil.

Then the exhaust filters separate the oil from the discharged gas.

### 3.4.3 Gas ballast valve

The vacuum pump is equipped with a gas ballast valve. The gas ballast valve is used for the addition of a limited quantity of ambient air to the process gas, to counteract the condensation of vapor in the vacuum pump. The gas ballast valve reduces the final pressure of the vacuum pump, see "Technical data" in chap. 15.

## 3.5 Intended use

The vacuum system was designed for conveying air and other dry, non-aggressive, non-toxic and non-explosive gases.

Conveying any other media leads to increased thermal and/or mechanical stress of the vacuum system and is only permitted in coordination with Busch.

The vacuum system is designed for operation in a non-hazardous area. The vacuum system can be operated continuously at final pressure and is suitable for continuous operation. The permitted ambience conditions can be found in the technical data (chap. 15).

The vacuum system is designed for indoor use; for outdoor installation, contact Busch to make special arrangements if necessary.

## 4 Transport



### WARNING

#### **Danger of severe injury!**

Suspended load.

- Never walk, stand or work below suspended loads.



### WARNING

#### **Hazard from vacuum system falling or tipping over!**

**The weight of the vacuum system can kill a person or cause severe crushing.**

- Use a pallet appropriate to the weight and size of the system on which it can be moved by a forklift truck. Or lift the vacuum system using slings and suitable lifting gears with a forklift or lift truck to move it or remove the pallet.
- Take care to avoid strain on the pipe work and vacuum pumps while placing the slings.
- Observe the center of gravity and the lifting points; these are indicated in the scale drawings, see chap. 13.

### ATTENTION!

#### **Damage to the vacuum system!**

The vacuum system is already filled with oil at delivery.

- Drain the oil before transport if transport in horizontal orientation is not possible.

The vacuum system is packed in a wooden crate. It protects the system from damage during transport.

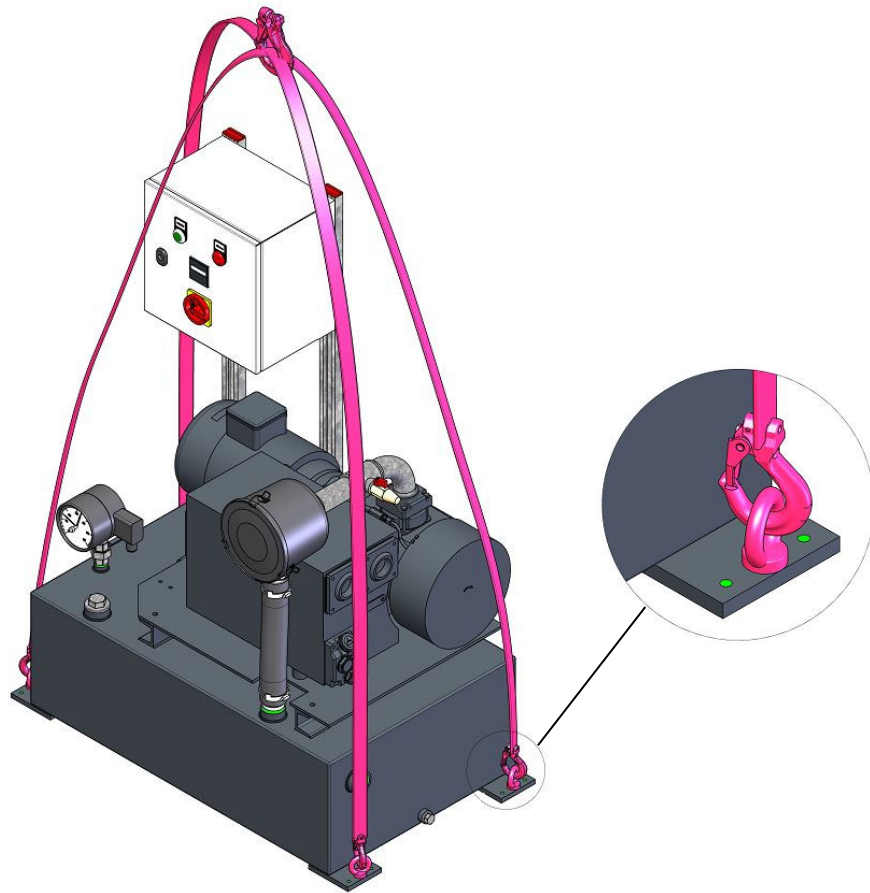
The vacuum system is packed in a wooden structure and can be moved using a forklift.

- Unpack the vacuum system as near to the installation site as possible.
- Check scope of delivery for completeness.
- Check the vacuum system for transport damage.
- Dispose of packing material as required by current regulations.

**⚠ WARNING****Danger of severe injury!**

Lift the vacuum system by devices of the individual components.

- Do not lift the vacuum system by devices of the individual components, e.g. the vacuum pump, motor, etc.
- Only lift the vacuum system as presented.



*Fig. 4: Transport of the vacuum system*

Screw four M10 eye bolts (not included in the scope of delivery) into the holes on the feet of the vacuum vessel (see fig. 4). Pass slings through the openings of the eye bolts and thus lift the vacuum system with a crane or a forklift.

The vacuum pump can be lifted by the eye bolts.

### **WARNING**

#### **Danger of severe injury!**

Suspended load.

- Never walk, stand and work below suspended loads!
- The eye bolts (EB) must be in perfect condition and completely screwed into the machine and hand-tightened!
- Do not lift the vacuum pump on an eye bolt of the motor. Lift the vacuum pump only as shown.

### **ATTENTION!**

#### **Damage to the vacuum system!**

The vacuum system is already filled with oil at delivery.

**Tilting a vacuum pump that is already filled with oil can cause large amounts of oil to enter the cylinder. If the vacuum pump is started while there are excessive amounts of oil in the cylinder, this will damage the sliders, resulting in a total damage of the vacuum pump.**

- Drain the oil before transport if transport in horizontal orientation is not possible.

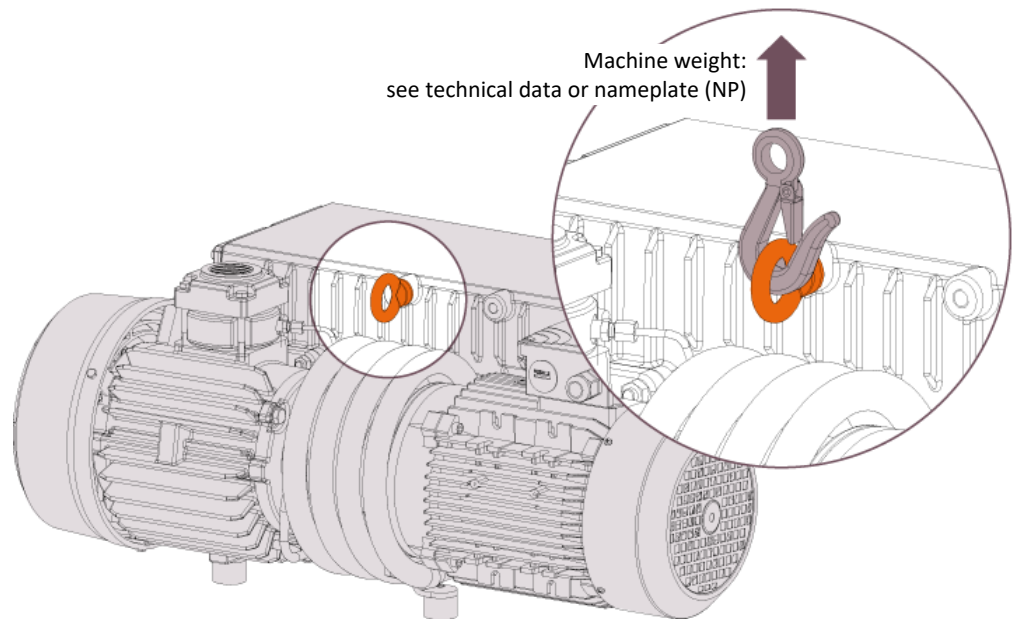


Fig. 5: Transport of the vacuum pump on the eye bolts

## 5 Storage

### ATTENTION!

#### **Danger of damage to the vacuum pump drive!**

Long storage periods may cause capacitors in the drive to be weakened by electro-chemical condensation. In the most detrimental case, this may cause short-circuit and thereby destruction of the drive.

- The vacuum pump should therefore be connected to the power supply for 30 minutes every 18 months.

Proceed as follows for storage:

- Close all openings with the protective caps included in the scope of delivery (penetration of dirt and water is prevented)

If storage for more than 3 months is intended:

- Secure loose cables
- Drain all process and operating media
- Clean and dry the vacuum system (Prior to storing make absolutely sure that all parts are clean, drained and dry)
- Where necessary use oil for conservation
- Wrap the vacuum system in corrosion-inhibiting film.
- Store the vacuum system in a protected, dry and dust-free room at a temperature between 0 and 40 °C.

## 6 Installation

### 6.1 Installation

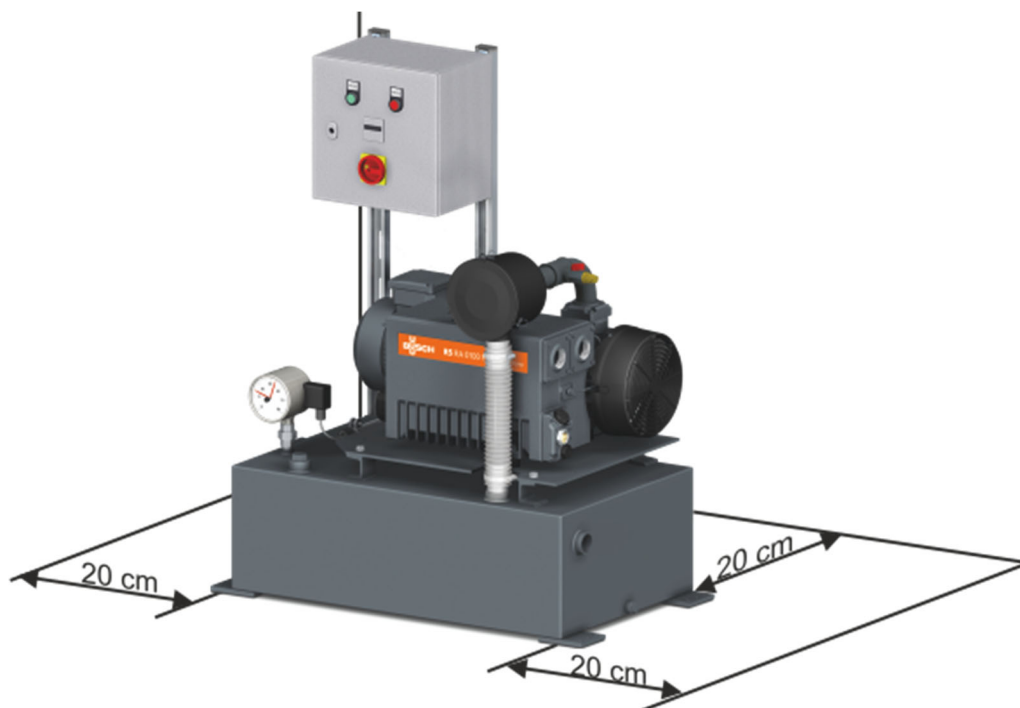


Fig. 6: Installation environment

- Ensure that the vacuum system is set up horizontally (deviation 1° max.) and anchor it in the ground with four bolts if necessary.
- Technical data must be complied with.
- The ambient conditions must meet the protection class of the vacuum pump.
- The installation site must be vented so that sufficient cooling of the vacuum system is ensured.
- Ensure that the ventilation openings (inlets and outlets) are not covered and that the cooling air can flow unhindered.
- Sufficient space for maintenance work must be ensured.
- Visibility of the oil sight glass (OSG, fig. 2) must be ensured at all times.
- Check the oil level and top up oil if necessary (for more information, see topping up with oil (chap. 7.1.1)).
- Ensure that all covers, safety devices, etc. are installed.

## 6.2 Connection lines/pipes

### ATTENTION!

**Danger of damage to the vacuum system from foreign bodies in the pipes.**

- Remove all foreign matter (welding beads, filings, etc.) from the pipelines! This may be done by flushing or blowing through pipelines.
- The client must ensure that the pipework at the inlet is clean.

### ATTENTION!

**Vacuum system can be damaged by tensile or compressive stresses on pipeline connections!**

- If stresses could occur, use compensators to connect pipelines.

### ! ATTENTION!

**Condensate damages vacuum pumps!**

- Lay the piping on the intake and pressure sides at an angle to prevent accumulated condensation from entering the vacuum pump.

The line cross-section of the connection lines must have at least the same cross-section as the connections of the vacuum system across the entire length.

In case of very long connection lines, it is recommended to use lines with larger cross-sections to avoid loss of efficiency. Please contact your contact person from Busch.

### 6.2.1 Gas inlet

#### WARNING

**Danger of severe injury!**

Open gas inlet!

- Never insert your hand or fingers into the gas inlet!

Connect the suction side pipeline to the gas inlet of the vacuum system (IN, fig. 1).

#### NOTICE

Before initial start-up check the pipelines to the vacuum system for leaks. Rectify any leaks.

Dimensions see scale drawings in the appendix.

## 6.2.2 Gas outlet

### CAUTION

#### Health risk!

The discharged gas contains small amounts of oil.

Ensure sufficient ventilation in the installation room when the air is routed into rooms where there are people.

- Connect the gas outlet line to both gas outlet openings of the vacuum pump if required. Dimensions, see scale drawing in the appendix; connection size of thread: G 1 ¼".
- Ensure that the discharged gas can flow off unhindered. Never close the gas outlet line, do not throttle it and do not use it as a compressed air source.

If the air taken in is not discharged to the environment in the direct proximity of the vacuum system, observe the following:

- Place the gas outlet line dropping towards the vacuum system or install a liquid separator or a siphon with a drain valve so that no liquid can flow back into the vacuum system.



Fig. 7: Gas outlet



## 6.3 Electrical connection

### DANGER

#### **Danger from electric shock!**

**Electric shock will cause death or serious injury.**

- All live lines must be powered down before the electrical installation!
- Before any electrical work, ensure that the vacuum pump is disconnected from the power supply and secured against accidental activation.
- Electrical installation work must only be performed by trained specialists.

### ATTENTION!

#### **Incorrect rotation of drive motors can seriously damage the vacuum system!**

Switch vacuum pumps briefly on and off again to check the rotational direction of the motor. The rotational direction is marked by a direction of rotation arrow on the motor.

If the direction is wrong, reverse two connection phase poles.

### 6.3.1 Connection of the power supply

### ATTENTION!

#### **Danger of damage to the vacuum system.**

Wrong connection.

Wire the vacuum system according to the circuit diagram in the switch and control cabinet.

#### **Procedure:**

- Ensure that the power supply for the vacuum system corresponds to the specifications in the circuit diagram.
- Ensure that the vacuum system is not impaired by electrical or electromagnetic impulses of the power supply. Contact Busch if necessary.
- Connect the switch and control cabinet to the power supply (connection values, see chap. 14).

### ATTENTION!

#### **Danger of damage to the motor**

Wrong rotating direction.

- Operation in the wrong rotating direction may damage the vacuum system after a very brief time. Ensure that the rotating direction is correct before commissioning.
- Use the glued-on/cast-in arrow to determine the intended rotating direction.
- Switch on the vacuum pump for a fraction of a second.
- Observe the fan wheel and determine the rotating direction just before standstill.

To change the rotating direction:

- Swap any two phases of the power supply.

## 7 Start-up

### 7.1 Indication and control elements

#### **DANGER**

**Danger from electric shock!**  
**Electric shock will cause death or serious injury.**

- Before commissioning, ensure that all electrical lines are covered and that the terminal box is closed!

#### **CAUTION**

**Burn hazard!**  
**The surface of the vacuum pump may reach operating temperatures in excess of 70 °C in operation.**  
 Do not touch the vacuum pump during and directly after operation.

#### **ATTENTION!**

**Insufficient familiarity with the indicators and operating controls may result in damage to the vacuum system.**

Wrong operation.

- Operating staff must be familiar with the indicating and operating elements.

#### **ATTENTION!**

**Operation of the vacuum pump without oil will cause severe damage to it quickly.**

- The vacuum system is already filled with oil at delivery. The oil level must be checked and, if necessary, topped up before commissioning.

#### 7.1.1 Topping up with oil

For oil type and oil quantity, see Technical data (chap. 15) and Oil (chap. 16).

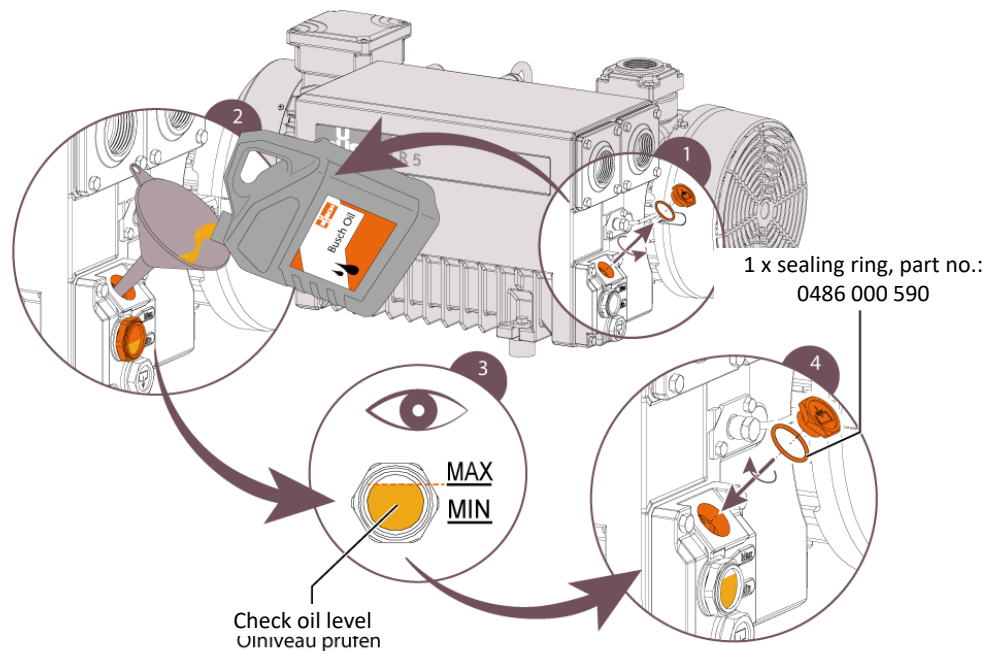


Fig. 8: Topping up oil

### 7.1.2 Display and control elements at the switching and control cabinet

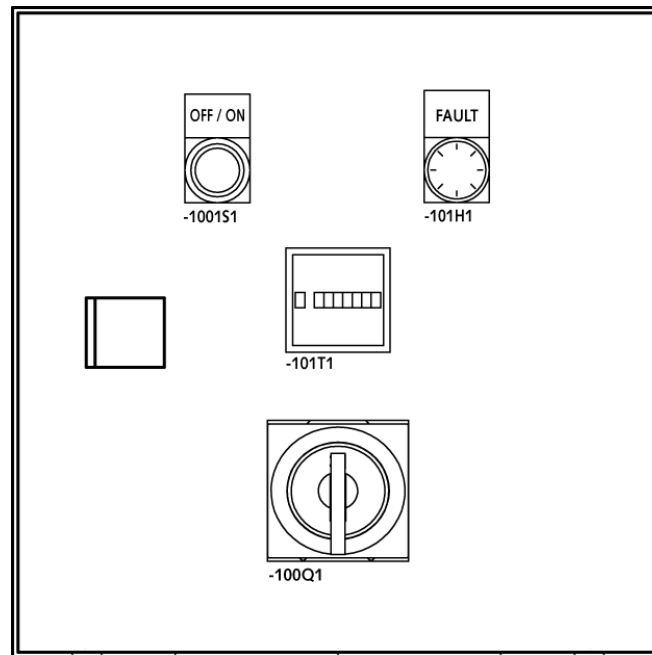


Fig. 9: Switch and control cabinet

- **Pushbutton with indicator lamp (101S1)**  
Pushbutton for switching the vacuum system on and off  
Indicator lamp lights up during operation
- **Indicator lamp of the collective failure (101H1)**  
Indicator lamp lights up red when there is an error
- **Operating hours counter (101T1)**  
Displays the operating hours
- **Main switch (100Q1)**  
Switch for switching the supply voltage on and off

### 7.1.3 Indicators and control elements on the vacuum system

The indicating devices are as follows:

- **Contact vacuum gauge (CPG, fig. 1)**  
Indicates the pressure in the vacuum vessel.  
The switch-on and switch-off value (pressure range) is set on the contact vacuum gauge.
- **Venting valve (VV, fig. 1)**  
The vacuum system is vented to atmospheric pressure via this valve for maintenance work.
- **Oil sight glass (OSG, fig. 2)** at the vacuum pump

### 7.1.4 Setting the target value needle on the contact vacuum gauge

The target values are set via the adjustment lock in the sight disc using the adjustment key (enclosed, can be found on the side of the cable socket). To adjust the set pointer, place the adjustment key at the adjustment lock, press it in and set the required set point.



Fig. 10: Contact vacuum gauge

The set pointers of the limit switches can be adjusted freely throughout the scale range. For reasons of switching accuracy, switching safety and service life of the mechanical measuring systems, the switching points should be between 10 % and 90 % of the measuring range.

Set the set pointers to desired activation and shutdown pressures. The clearance between the two set pointers is approx. 10% of the scale range.

When the lower switching point is reached, the vacuum pump is switched off and corresponding, when the upper switching point is reached, again switched on.

Factory settings of the switching points:

- lower switching point: - 0.9 bar (90 %)
- upper switching point: - 0.8 bar (80 %)

#### NOTICE

The recommended minimum clearance between two contacts is 10% of the measuring span. The switch hysteresis is 2 ... 5%.

## 7.2 Operation

### CAUTION

#### **Burn hazard!**

The surface of the vacuum pump may reach operating temperatures in excess of 70 °C in operation.

Do not touch the vacuum pump during and directly after operation.

### CAUTION

#### **Danger of hearing damage.**

Noise development of the running vacuum pump.

Use hearing protection near the vacuum pump.

- Ensure that the installation conditions (chap. 6.1) are fulfilled.
- The permitted maximum number of starts (12) per hour must not be exceeded.

When the vacuum pump is operated under normal operating conditions, proceed as follows:

- Measure the motor current and record it for reference purposes for future maintenance work and for troubleshooting.
- After a few minutes of vacuum operation, check the oil level and top up oil if necessary.

### Starting the Vacuum System

- Set the main switch (100Q1, fig. 9) to “ON”.
- Press the pushbutton (101S1, fig. 9) on the switch and control cabinet.
- The vacuum pump switches on and off depending on the pressure. The vacuum system is in operation.

### Stopping the vacuum system

- Press the pushbutton (101S1, fig. 9) on the switch and control cabinet.
- The motor switches off.
- Set the main switch (100Q1, fig. 9) to “OFF”.

## 7.3 Conveying condensing vapors

A certain quantity of water vapor within the gas flow is tolerated.

For information, see technical data (chap. 15).

Contact Busch to get information on transporting other vapors.

Note the following when conveying condensing vapors:

- Start the vacuum system, all vacuum pumps must be running.
- Close the shut-off valve on the suction side (not part of the scope of delivery)
- Allow the vacuum pumps to warm up (approx. 30 min.) so that no condensate can form in the suction chamber.
- Open the shut-off valve on the suction side and start your process
- Close the shut-off valve on the suction side after the end of the process
- The vacuum pumps must now run for approx. 30 min. to remove any moisture that may be present.
- Switch off the vacuum system.

## 8 Maintenance

### WARNING

#### Hazard from running vacuum pump!

There is a severe threat for life and limb depending on the repair and maintenance work to be carried out if the vacuum pump is running.

Only carry out any repair or maintenance work if:

- the vacuum pump is not running
- the vacuum pump is disconnected from the electrical supply and secured against unintentional start-up
- vacuum system is not under pressure!
- hot surfaces are cooling down!

Disconnect the vacuum system from the process and make sure that there is ambient pressure in the vacuum system! Procedure: Close the shut-off device on the inlet side (not included in the scope of delivery) and slowly open the venting valve (VV, fig. 1).

### WARNING

#### Danger from vacuum pump contaminated with hazardous material!

There is a danger of poisoning!

- Vent the vacuum pumps before they are maintained

## 8.1 Maintenance plan

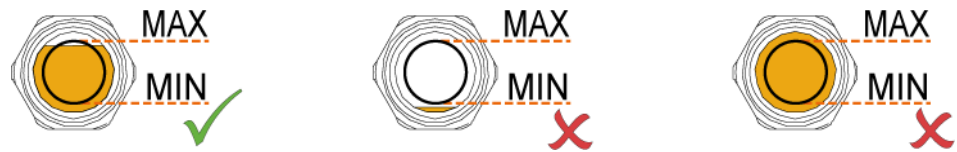
The maintenance intervals strongly depend on the individual operating conditions. The intervals specified below are to be considered reference values and should be individually shortened or extended. Especially at high stress, e.g. in case of high dust load in the environment or the process gas, or in case of other contamination or ingress of process material, it may be necessary to shorten the maintenance intervals a lot.

Interval	Maintenance task
<b>Rotary vane vacuum pump R5 RA</b>	
daily	<ul style="list-style-type: none"> <li>• Check the oil level, see chap. 8.2.</li> </ul>
Monthly	<ul style="list-style-type: none"> <li>• Check the vacuum pump for escaping oil. Have the vacuum pump repaired by Busch if there are any leaks.</li> <li>• Check the filter insert in the suction filter and replace if necessary, see chap. 8.5.</li> </ul>
six-monthly	<ul style="list-style-type: none"> <li>• Clean the vacuum pump from dust and contamination.</li> <li>• Clean the filter of the gas ballast valve (GB, fig. 2)</li> </ul>
<p><b>Normal use:</b> after max. 4,000 operating hours or after one year at the latest</p> <p><b>Highly demanding purpose:</b> after max. 2,000 operating hours or after no more than half a year</p>	<ul style="list-style-type: none"> <li>• Replace the oil*, the oil filter* (OF, fig. 2, chap. 8.3) and exhaust filters (EF, fig. 2, chap. 8.4).</li> </ul> <p>*Note: Maintenance interval for synthetic oil. Shorten the maintenance interval if mineral oil is used. Contact the Busch Service.</p>
Every 5 years	<ul style="list-style-type: none"> <li>• Perform a general overhaul of the vacuum pump (inform Busch).</li> </ul>
<b>Switch and control cabinet</b>	
Every 8000 hrs. or, at the latest, after 1 year	<ul style="list-style-type: none"> <li>• Check switch function, check for broken wires.</li> </ul>

## 8.2 Check oil level

Proceed as follows:

- Switch off the vacuum system.
- Wait 1 minute after switching off the vacuum pumps, before checking the oil level.



Top up with oil if necessary.

## 8.3 Oil and oil filter change

### ! ATTENTION!

**Operation of the vacuum pump without oil will cause severe damage to it quickly.**

- Only use oils approved by Busch.  
For information to the oil type and oil volume, see the technical data (chap. 15) and oil (chap. 16).

Follow the figures

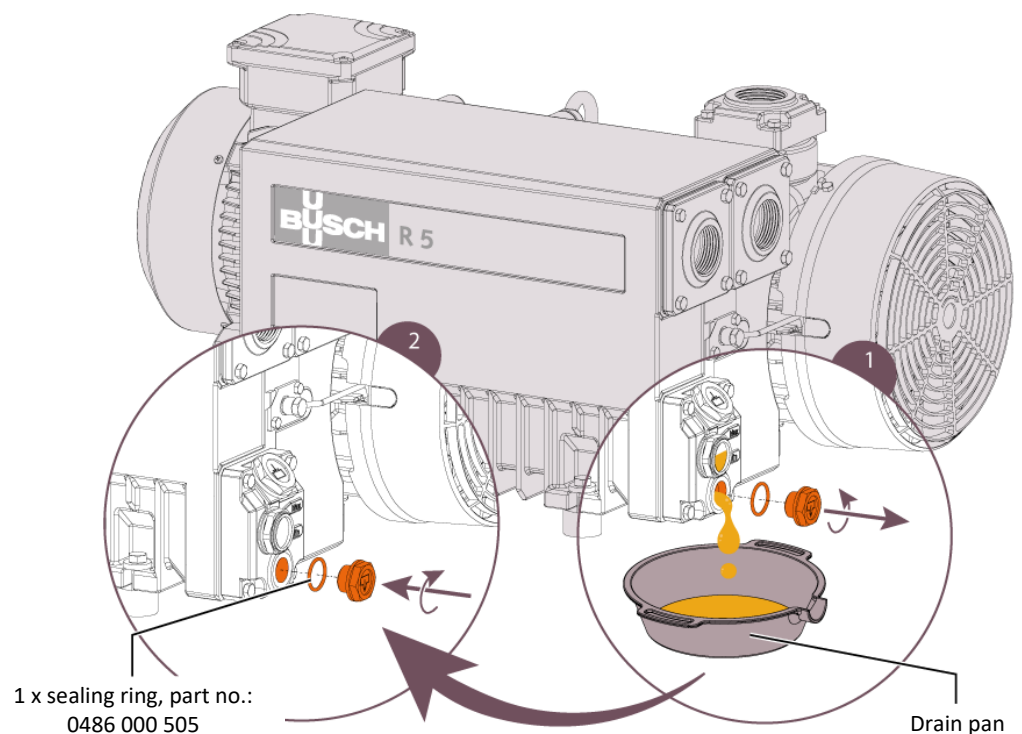


Fig. 11: Drain oil



Original spare parts from Busch  
1 x oil filter (OF), part no.: 0531 000 002

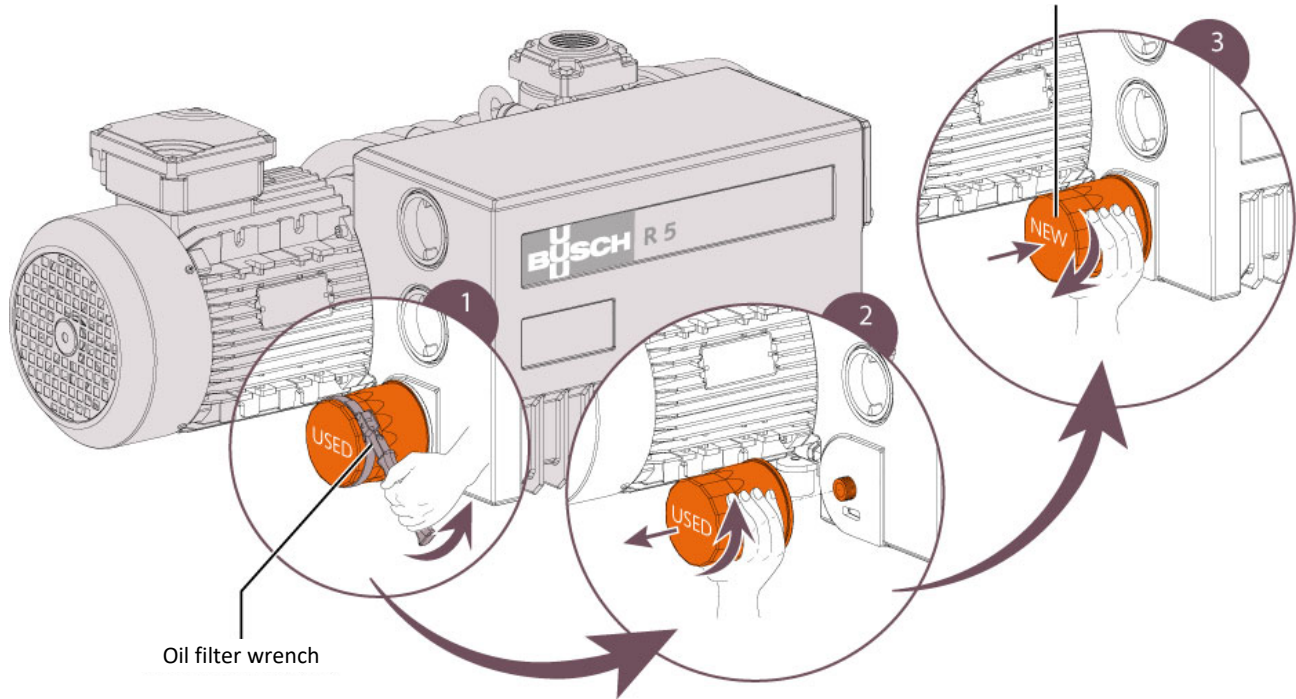


Fig. 12: Replacing the oil filter

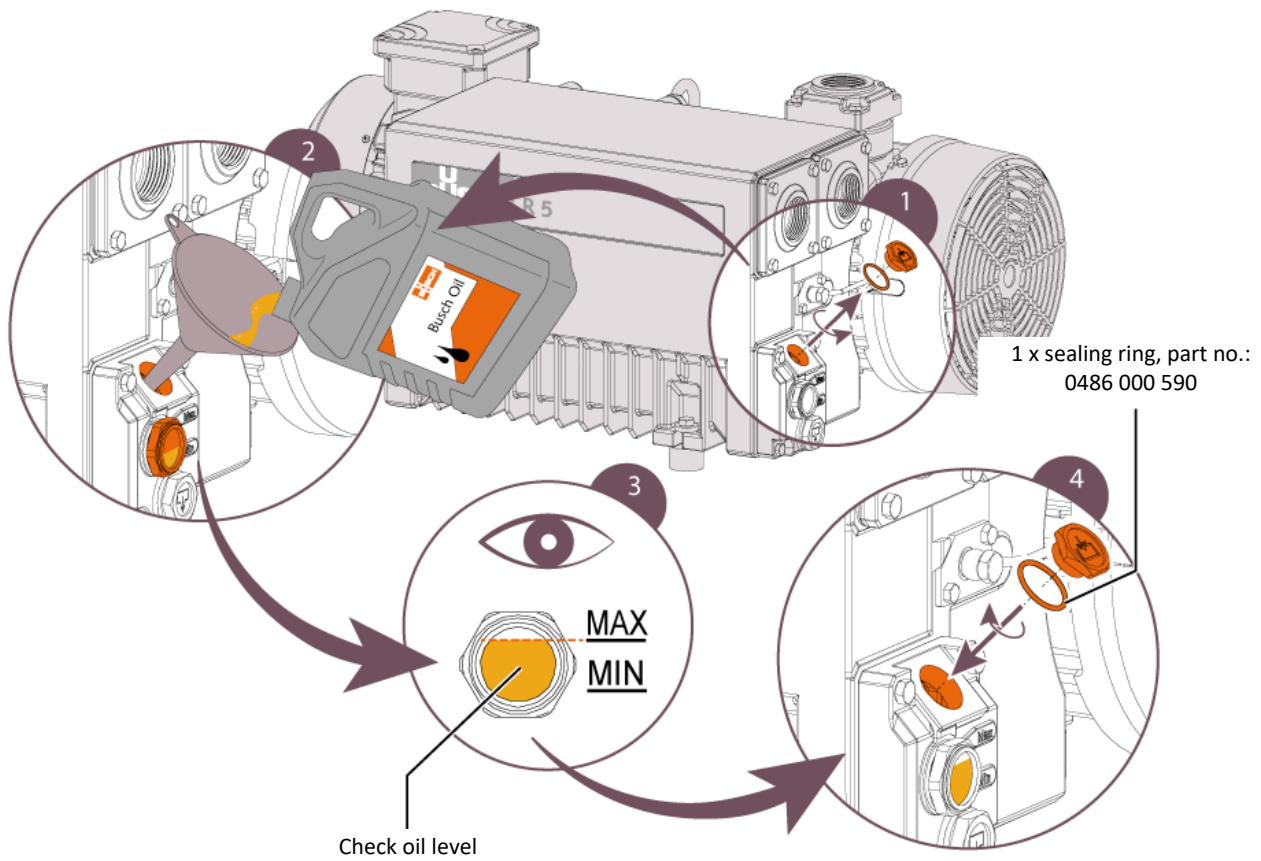


Fig. 13: Filling in oil



## 8.4 Replacing the exhaust filters

Follow the figures

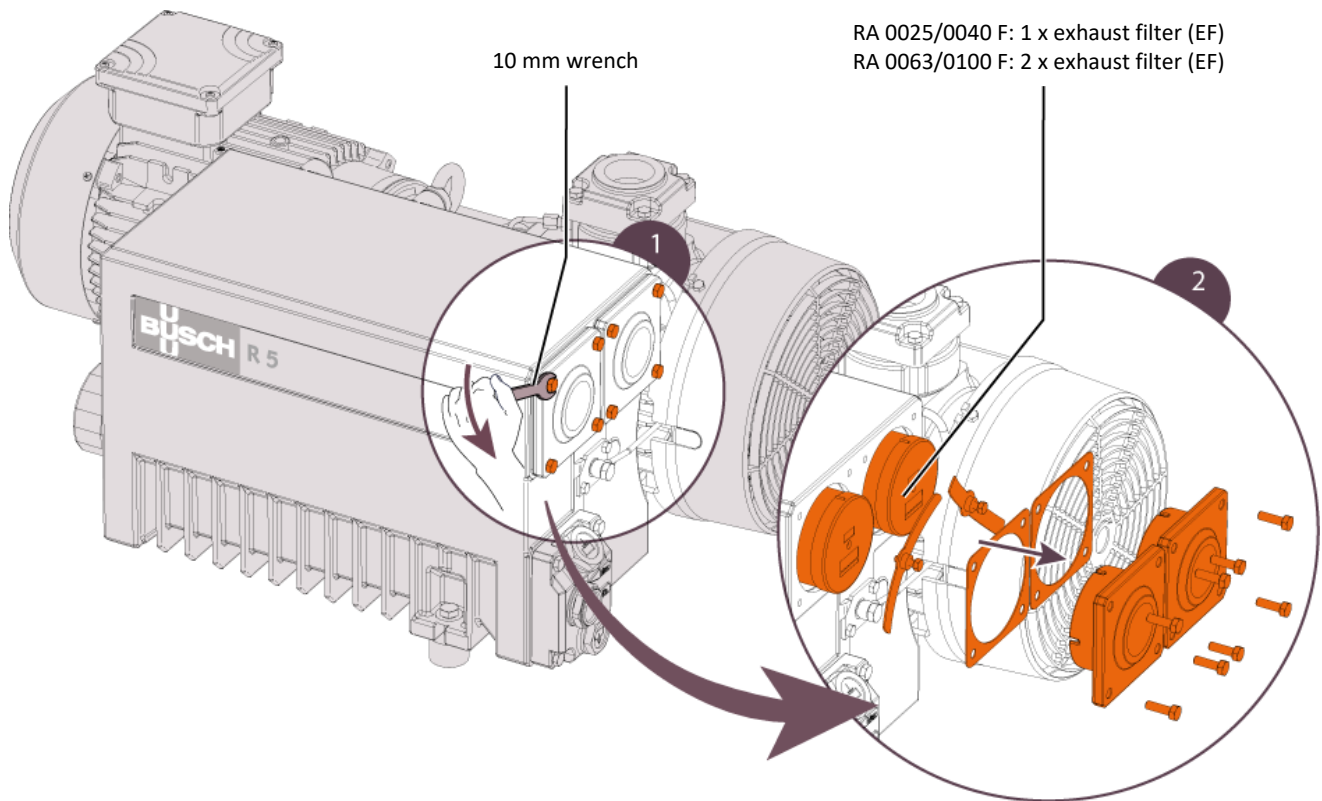


Fig. 14: Remove exhaust filter

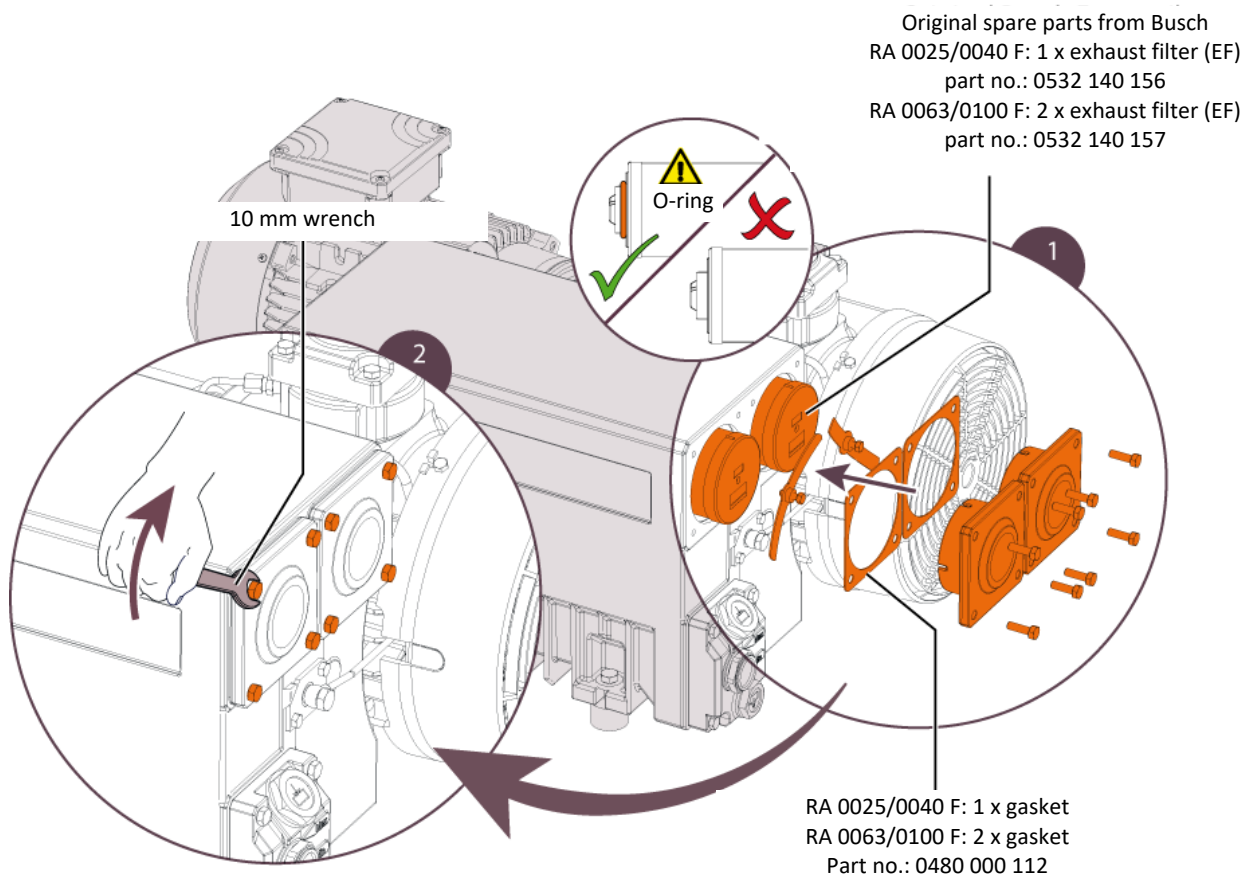


Fig. 15: Insert and tighten the new exhaust filter

## 8.5 Changing the air filter insert

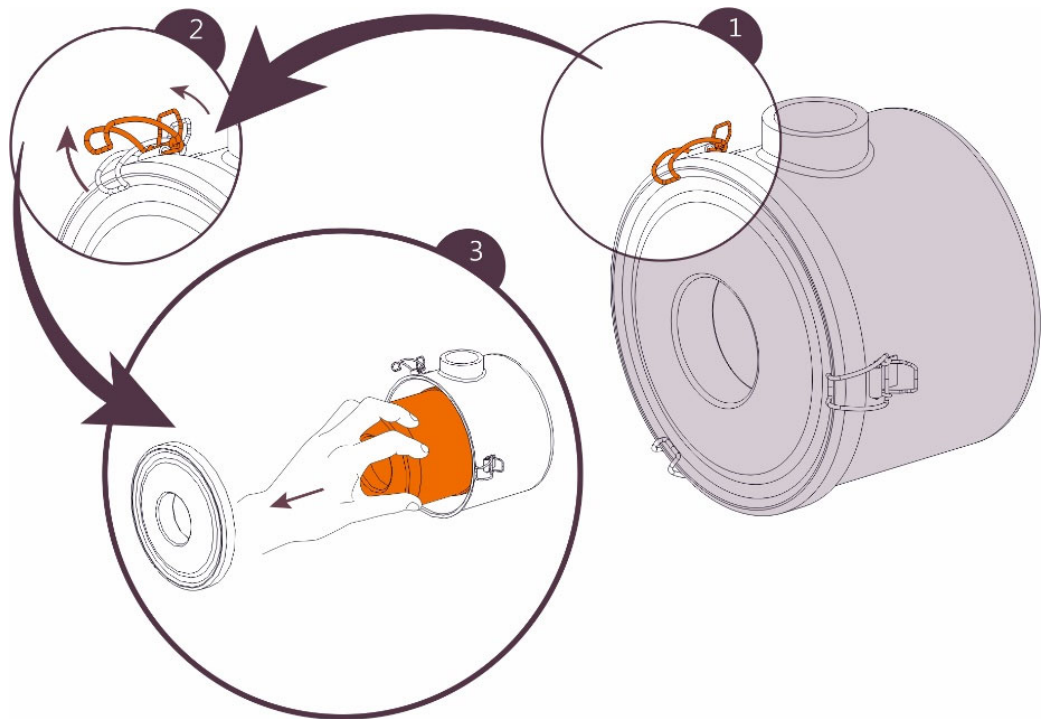


Fig. 16: Changing the air filter insert

Proceed as follows:

- Open the quick clamps and remove the filter insert
- Insert a new filter.  
Original spare part from Busch: Parts no. 0532 000 003

## 9 Troubleshooting

### DANGER

**Electric shock danger.**

Live wires.

- Electrical installation work must only be performed by qualified specialists.

### WARNING

**Hazard from running vacuum pump!**

**There is a severe threat for life and limb depending on the repair and maintenance work to be carried out if the vacuum pump is running.**

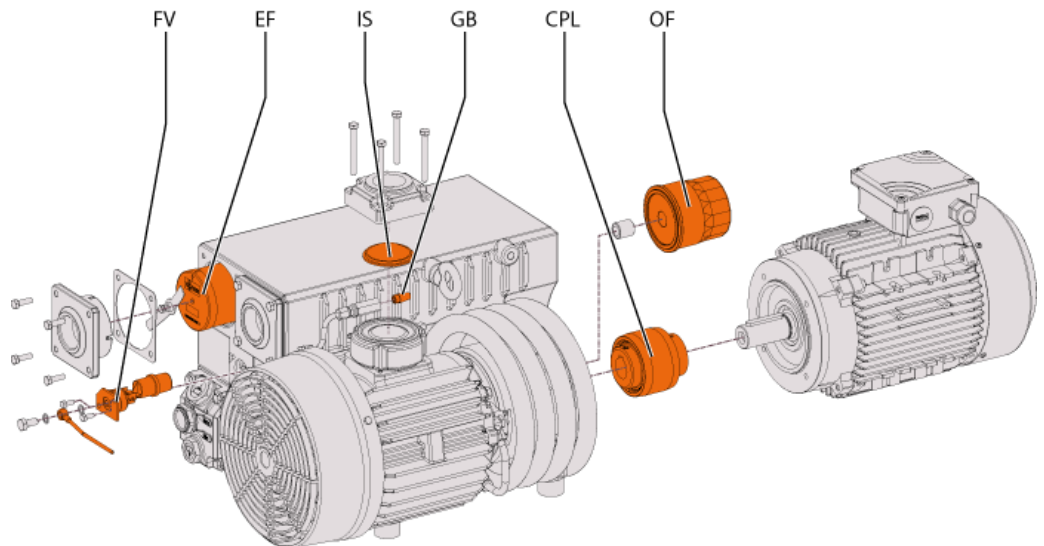
Only carry out any repair or maintenance work if:

- the vacuum pump is not running
- the vacuum pump is disconnected from the electrical supply and secured against unintentional start-up
- vacuum system and pipes are not under pressure,
- hot surfaces are cooled down,

Disconnect the vacuum system from the process and make sure that there is ambient pressure in the vacuum system! Procedure: Close the shut-off device on the inlet side (not included in the scope of delivery) and slowly open the venting valve (AF, fig. 1).

### 9.1 General faults

The figure shows the components that are relevant for troubleshooting.



FV Float valve

EF Exhaust filter

IS Intake screen

GB Gas ballast valve

CPL Clutch

OF Oil filter

*Fig. 17: Vacuum pump with components relevant for troubleshooting*

## 9.2 Failure table and measures

Problem	Possible cause	Remedy
The vacuum pump does not start up.	The required voltage is not pending at the motor.	<ul style="list-style-type: none"> <li>• Check the power supply.</li> <li>• Switch on the main switch.</li> </ul>
	The motor is defective.	<ul style="list-style-type: none"> <li>• Replace the motor.</li> </ul>
	The coupling (CPL, fig. 17) is defective.	<ul style="list-style-type: none"> <li>• Replace the coupling (CPL, fig. 17).</li> </ul>
	Motor protection switch (101Q1) has tripped	<ul style="list-style-type: none"> <li>• Turn the motor protection switch to position "0" and then to position "1".</li> </ul>
	Fuse (100F1) has tripped.	<ul style="list-style-type: none"> <li>• Check fuse (100F1).</li> </ul>
Problem	Possible cause	Remedy
The required pressure cannot be built up on the intake connection.	The intake screen (IS, fig. 17) is partially clogged	<ul style="list-style-type: none"> <li>• Clean the intake screen (IS, fig. 17).</li> </ul>
	The air filter insert (fig. 18) is clogged	<ul style="list-style-type: none"> <li>• Replace the air filter insert.</li> </ul>
	The venting valve (VV, fig. 1) is open.	<ul style="list-style-type: none"> <li>• Close the venting valve.</li> </ul>
	The oil level is too low	<ul style="list-style-type: none"> <li>• Top up oil.</li> </ul>
	Inner components are worn or damaged	<ul style="list-style-type: none"> <li>• Have the vacuum pump repaired (Busch Service)</li> </ul>
	Leak in piping system	<ul style="list-style-type: none"> <li>• Locate and repair leakage.</li> </ul>
High noise development during operation of the vacuum pump	The bearings are defective.	<ul style="list-style-type: none"> <li>• Have the vacuum pump repaired (Busch Service).</li> </ul>
	The coupling (CPL, fig. 17) is worn.	<ul style="list-style-type: none"> <li>• Replace the coupling (CPL, fig. 17).</li> </ul>
	The sliders are stuck.	<ul style="list-style-type: none"> <li>• Have the vacuum pump repaired (Busch Service).</li> </ul>
High heat development during operation of the vacuum pump	The cooling is insufficient.	<ul style="list-style-type: none"> <li>• Clean the vacuum pump from dust and contamination.</li> </ul>
	The ambient temperature is too high.	<ul style="list-style-type: none"> <li>• Observe admissible ambient temperature.</li> </ul>
	The fan does not run or turns in the wrong direction.	<ul style="list-style-type: none"> <li>• Check electrical connection.</li> </ul>
	The oil level is too low.	<ul style="list-style-type: none"> <li>• Top up oil.</li> </ul>
	The exhaust filters (EF, fig. 2 and 17) are partially clogged.	<ul style="list-style-type: none"> <li>• Replace the exhaust filters (EF, fig. 2 and 17).</li> </ul>

Problem	Possible cause	Remedy
Vapors or oil drops escape from the gas outlet of the vacuum pump.	The exhaust filters (EF, fig. 2 and 17) are partially clogged.	<ul style="list-style-type: none"> <li>• Replace the exhaust filters (EF, fig. 2 and 17).</li> </ul>
	Exhaust filters (EF, fig. 2 and 17) and o-rings are not installed properly.	<ul style="list-style-type: none"> <li>• Determine the proper position of the exhaust filters (EF, fig. 2 and 17) and o-rings.</li> </ul>
	The float valve (FV, fig. 17) does not work properly.	<ul style="list-style-type: none"> <li>• Check the float valve.</li> <li>• Let the vacuum pump repaired by Busch.</li> </ul>
The oil is black.	The periods between the oil changes are too long.	<ul style="list-style-type: none"> <li>• Flush the vacuum pump. Please contact your contact person from Busch for this.</li> </ul>
	The air filter (AF, fig. 1) is defective.	<ul style="list-style-type: none"> <li>• Replace air filter.</li> </ul>
	There is a high heat development during operation of the vacuum pump.	<ul style="list-style-type: none"> <li>• See "High noise development during operation of the vacuum pump".</li> </ul>
The oil is emulsified.	Liquids or large amounts of vapors have been sucked into the vacuum pump.	<ul style="list-style-type: none"> <li>• Flush the vacuum pump. Please contact your contact person from Busch for this.</li> </ul>
		<ul style="list-style-type: none"> <li>• Clean the filter of the gas ballast valve (GB, fig. 2 and 17).</li> </ul>
		<ul style="list-style-type: none"> <li>• Change the operating mode (see Transport of condensing vapors (chap. 7.3)).</li> </ul>

To solve any problems that are not listed in the section on troubleshooting, talk to your Busch contact.

# 10 Spare parts and accessories

## 10.1 Spare parts

### ATTENTION!

**There is a risk of premature failure of the vacuum system.**

Loss of efficiency when using non-original (non-Busch) spare parts.

- We recommend using only original spare parts and consumables from Busch to ensure proper functioning of the vacuum system and to fulfill all warranty and guarantee-related requirements.

Spare part	Description	Part number
Maintenance kit VD 0025 G	Contains all spare parts needed for maintenance, comprising:	0992 S01 700
	1 x maintenance kit RA 0025 D	0992 101 463
	1 x air filter insert (paper) for suction filter	0532 000 003
	1 x vacuum pump oil VM 100, package size 1 liter	0831 000 060
Maintenance kit VD 0063 / 0100 G	Contains all spare parts needed for maintenance, comprising:	0992 S01 701
	1 x maintenance kit RA 0063 F, RA 0100 F	0992 106 214
	1 x air filter insert (paper) for suction filter	0532 000 003
	1 x vacuum pump oil VM 100, package size 1 liter	0831 000 060
Contact vacuum gauge NG 100	Measuring range: 0 to -1.0 bar 2 switching contacts	0653 116 079

If further spare parts are needed, proceed as follows:

- Request the detailed spare parts list from your Busch contact.

The list of Busch companies around the world (at the time these operating instructions are issued)

can be found on the reverse.

# 11 Repair

Observe the following notes if the vacuum pump is returned to Busch.

Proceed as follows when the vacuum pump was used to transport gas contaminated with foreign substances hazardous to health:

- Decontaminate the vacuum pump and indicate the contamination status based on a "Confirmation declaration".

Busch accepts only vacuum pumps that include a completed and legally signed "Contamination declaration".

The form can be downloaded from [www.buschvacuum.com](http://www.buschvacuum.com).

## 12 Decommissioning and disposal

### 12.1 Stop operating vacuum system

- Disconnect the vacuum system from the power supply.
- Vent all connected pipes to atmospheric pressure.
- Disconnect all connections.

If the vacuum system has to be stocked, observe following:

- For more information, see storage (chap. 5).

### 12.2 Disassembly and disposal

- Drain the oil.
- Remove the exhaust filters.
- Remove the oil filter.
- Remove all electrical components.
- Separate the hazardous waste from the vacuum pump.
- Dispose of hazardous waste according to the applicable legal provisions.
- Dispose of the vacuum system as waste metal and electronic scrap.



# 13 Dimensions sheets

## Dimensions vacuum system VD 0025 G AAA TAXX

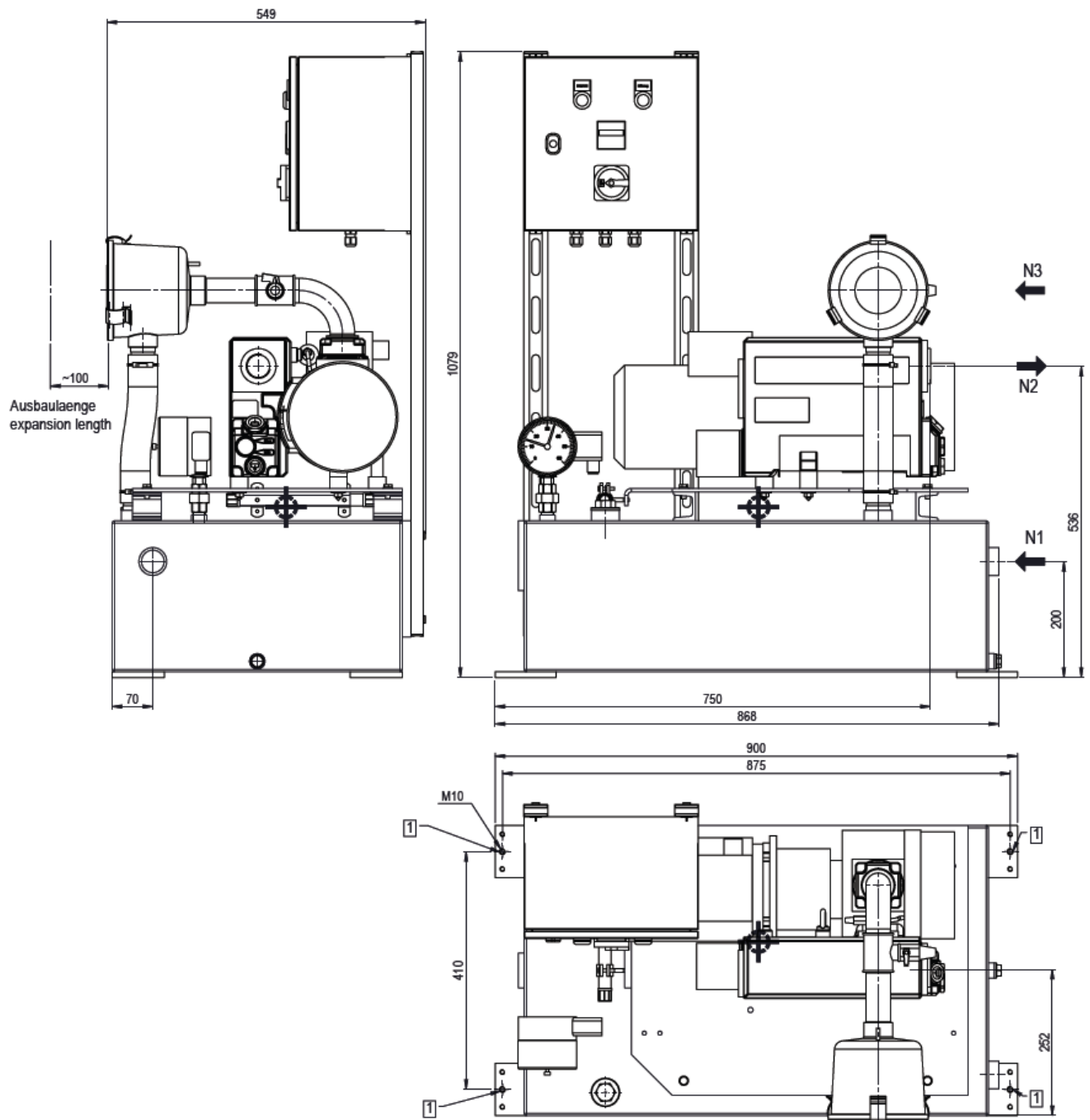


Fig. 18: Dimensions vacuum system VD 0025 G AAA TAXX



Center of gravity



Lifting point

Pos.	Designation	Connection	Standard
N1	Gas inlet	G 1 1/4", female thread	ISO 228-1
N2	Gas outlet	G 1 1/4", female thread	ISO 228-1
N3	Venting valve		

Tab. 1: Connections vacuum system VD 0025 G AAA TAXX

### Dimensions vacuum system VD 0025 G AAA TAAX (mobile)

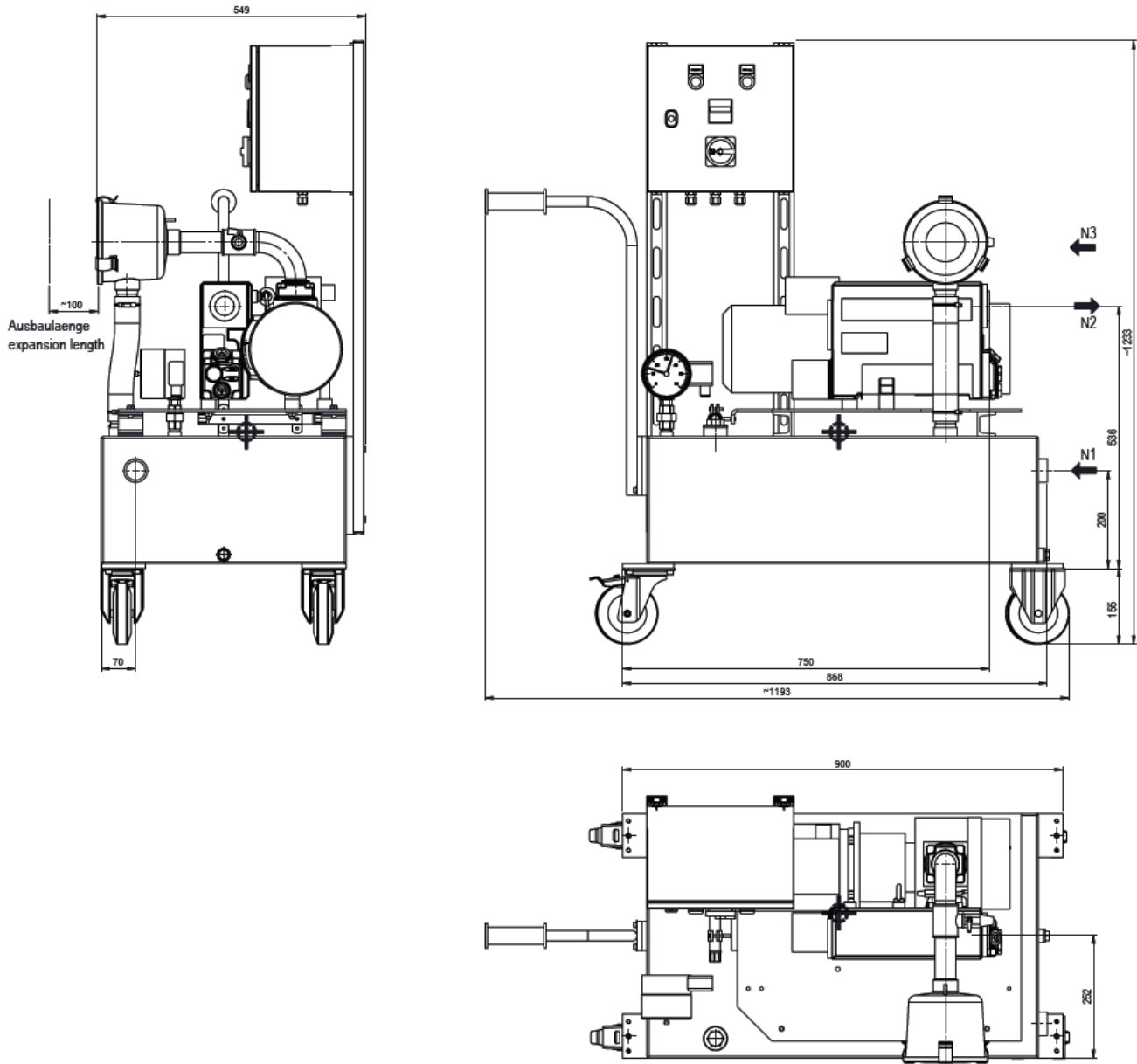


Fig. 19: Dimensions vacuum system VD 0025 G AAA TAAX (mobile)

⊕ Center of gravity

Pos.	Designation	Connection	Standard
N1	Gas inlet	G 1 1/4", female thread	ISO 228-1
N2	Gas outlet	G 1 1/4", female thread	ISO 228-1
N3	Venting valve		

Tab. 2: Connections vacuum system VD 0025 G AAA TAAX (mobile)

## Dimensions vacuum system VD 0063 G AAA TCXX

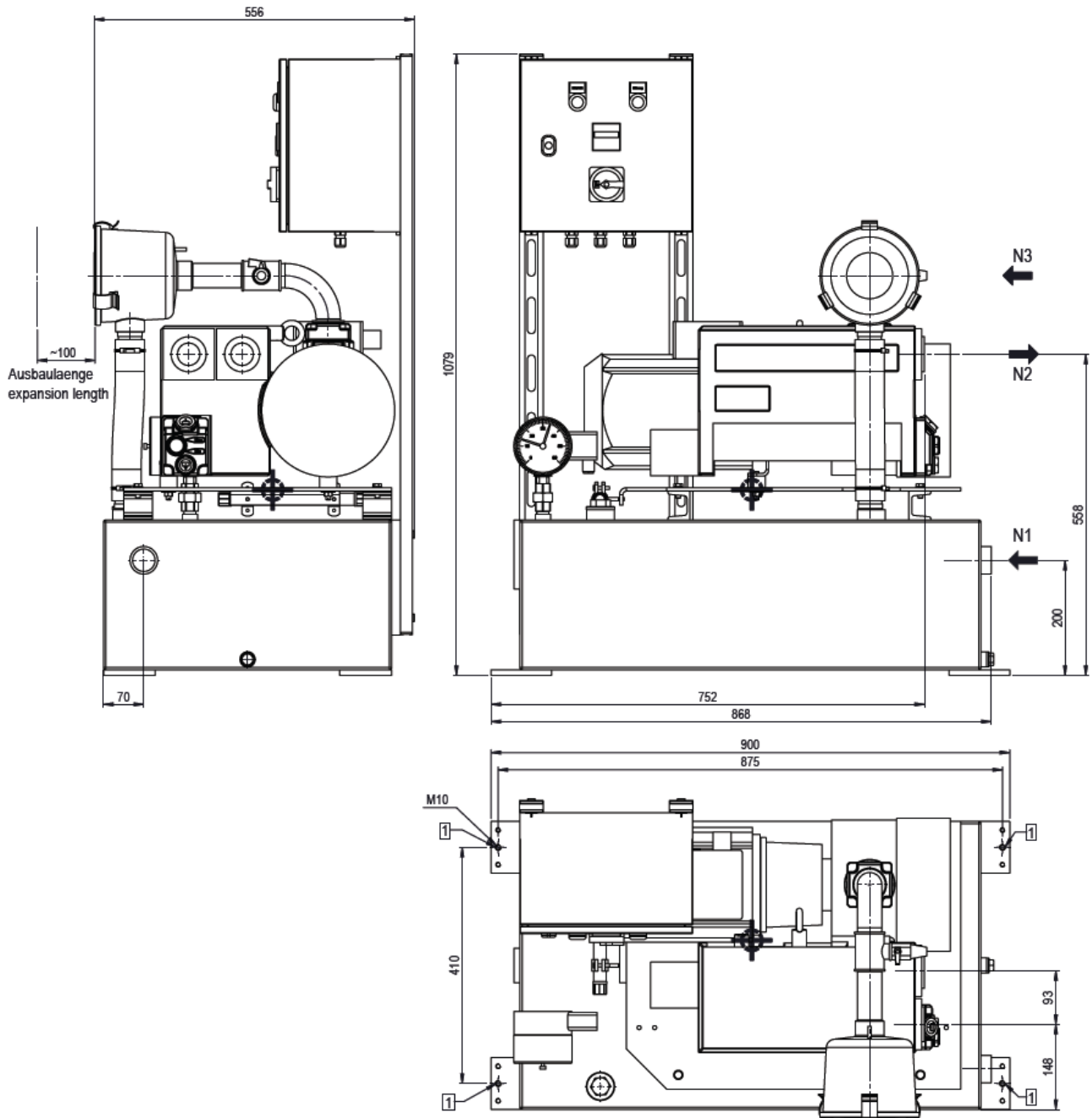


Fig. 20: Dimensions vacuum system VD 0063 G AAA TCXX



Center of gravity



Lifting point

Pos.	Designation	Connection	Standard
N1	Gas inlet	G 1 1/4", female thread	ISO 228-1
N2	Gas outlet	G 1 1/4", female thread	ISO 228-1
N3	Venting valve		

Tab. 3: Connections vacuum system VD 0063 G AAA TCXX

### Dimensions vacuum system VD 0063 G AAA TCAX (mobile)

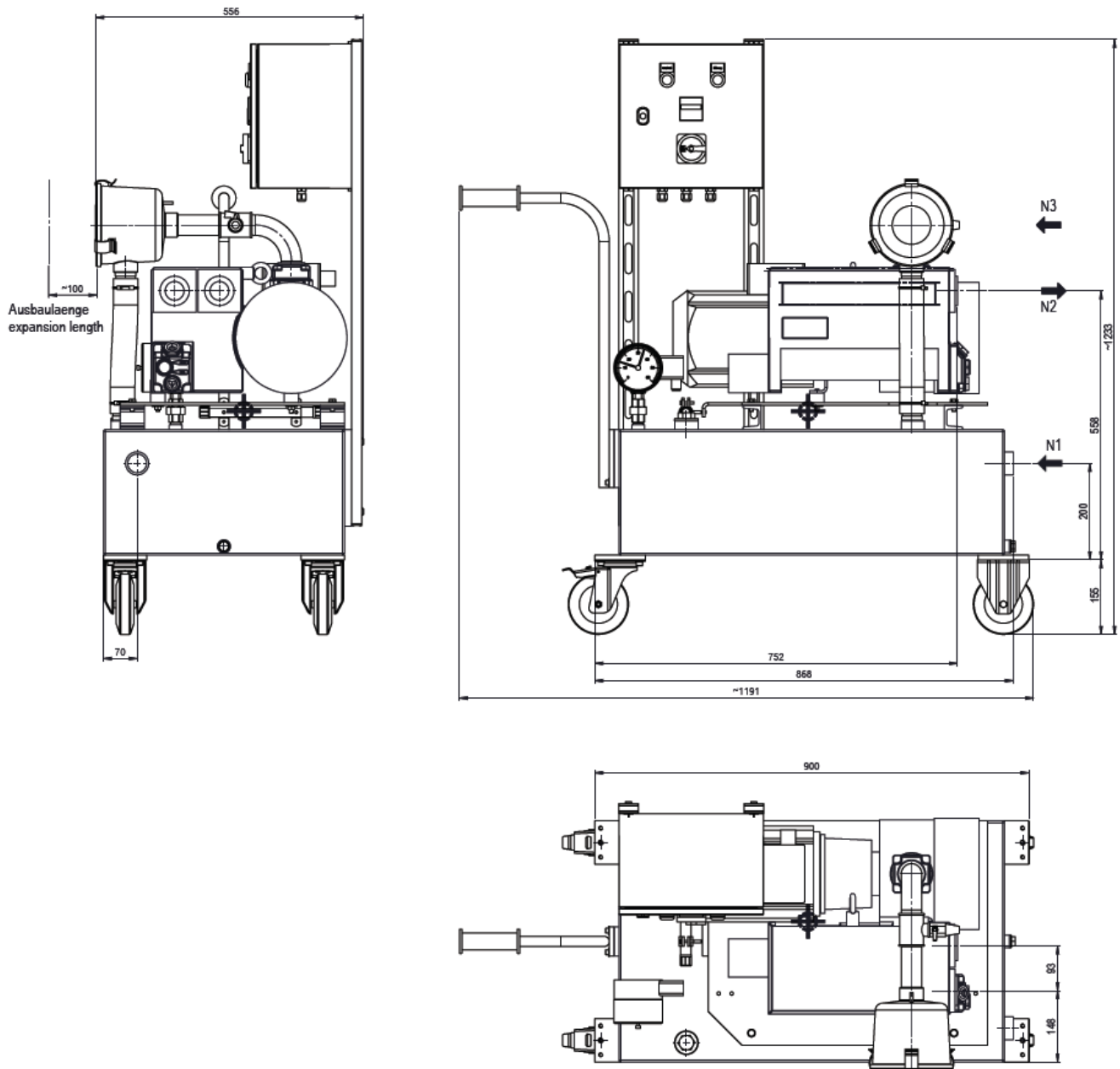



Fig. 21: Dimensions vacuum system VD 0063 G AAA TCAX (mobile)

 Center of gravity

Pos.	Designation	Connection	Standard
N1	Gas inlet	G 1 1/4", female thread	ISO 228-1
N2	Gas outlet	G 1 1/4", female thread	ISO 228-1
N3	Venting valve		

Tab. 4: Connections vacuum system VD 0063 G AAA TCAX (mobile)

## Dimensions vacuum system VD 0100 G AAA TDXX

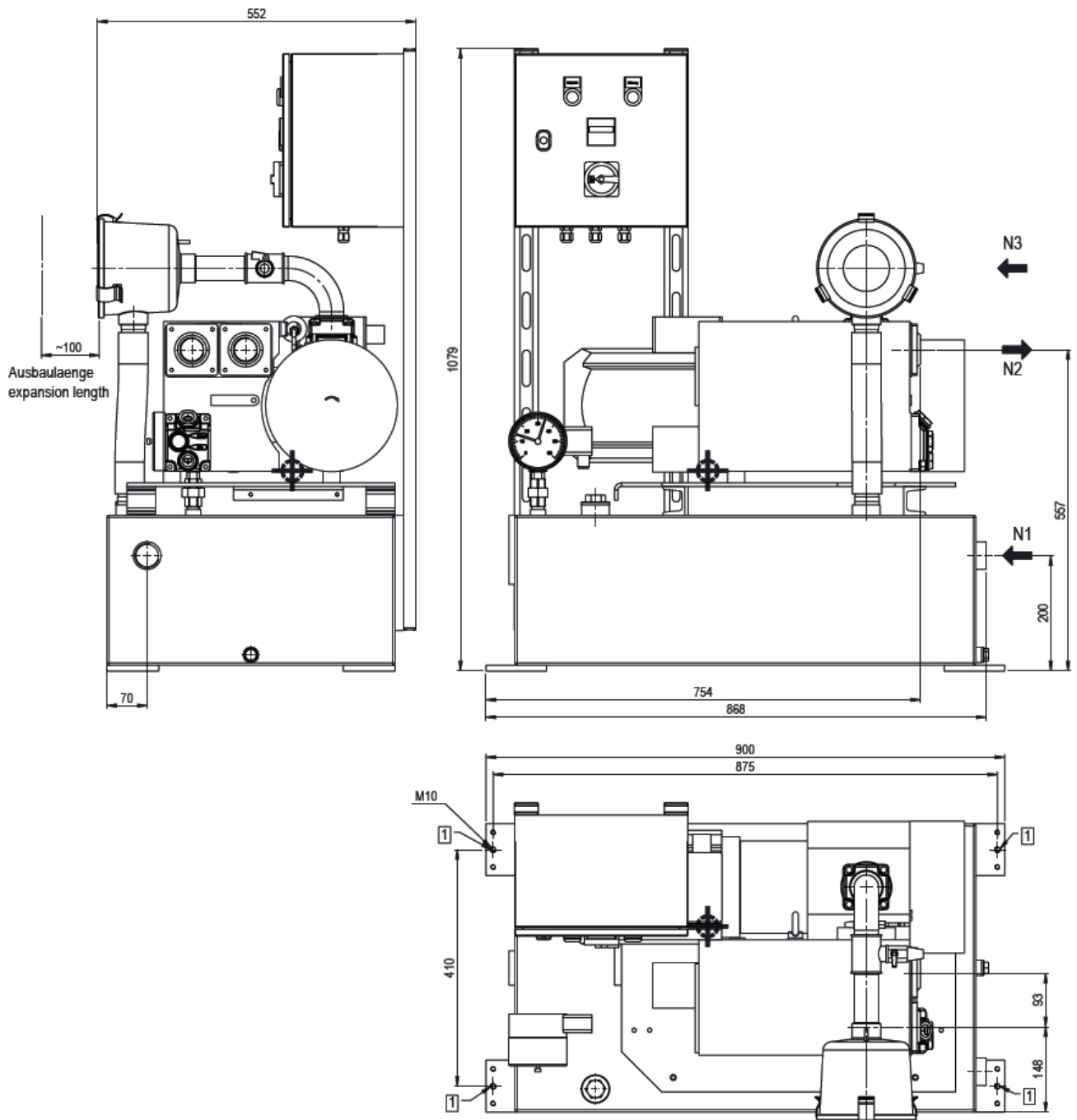


Fig. 22: Dimensions vacuum system VD 0100 G AAA TDXX



Center of gravity



Lifting point

Pos.	Designation	Connection	Standard
N1	Gas inlet	G 1 1/4", female thread	ISO 228-1
N2	Gas outlet	G 1 1/4", female thread	ISO 228-1
N3	Venting valve		

Tab. 5: Connections vacuum system VD 0100 G AAA TDXX

### Dimensions vacuum system VD 0100 G AAA TDAX (mobile)

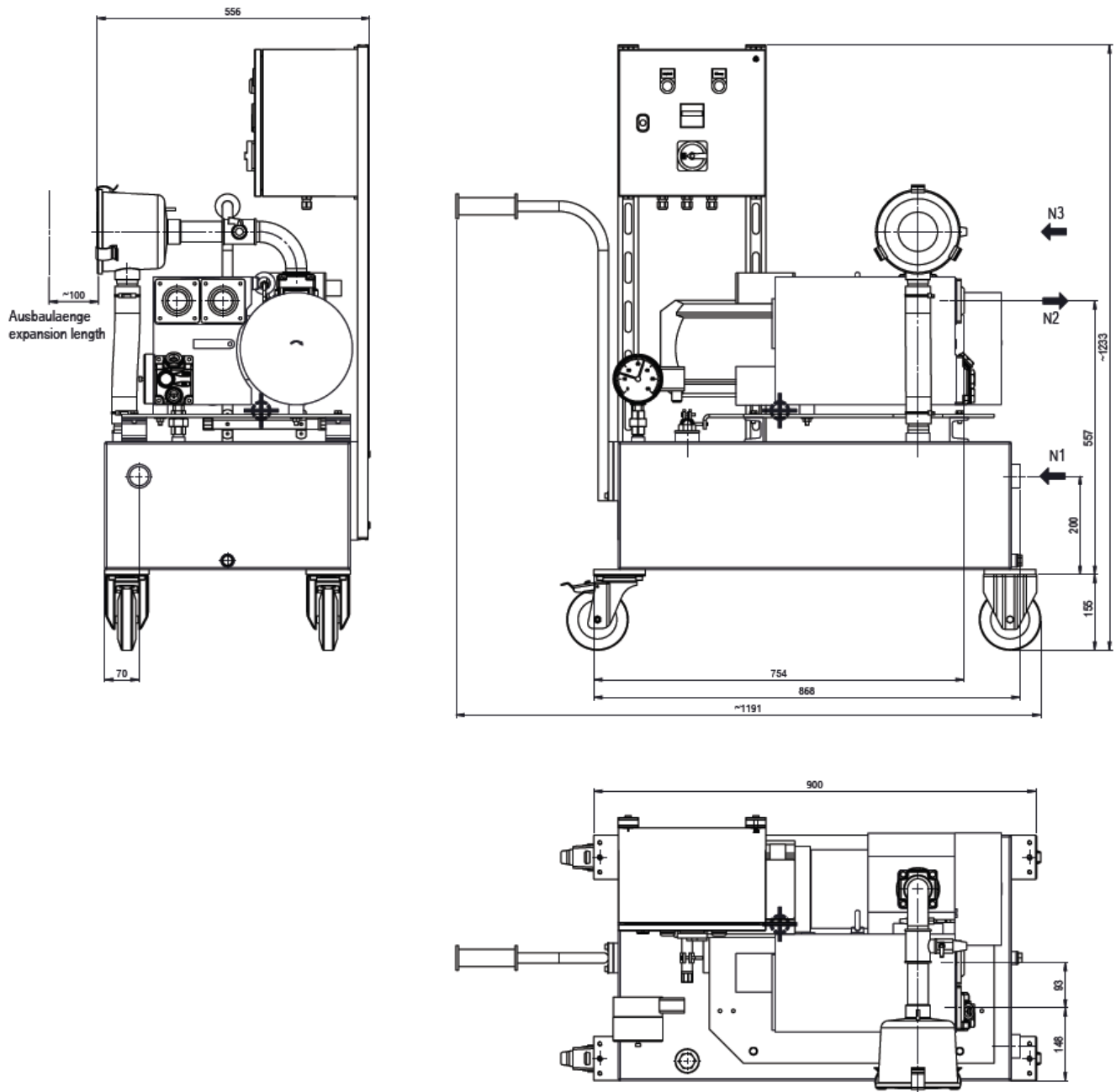



Fig. 23: Dimensions vacuum system VD 0100 G AAA TDAX (mobile)

 Center of gravity

Pos.	Designation	Connection	Standard
N1	Gas inlet	G 1 1/4", female thread	ISO 228-1
N2	Gas outlet	G 1 1/4", female thread	ISO 228-1
N3	Venting valve		

Tab. 6: Connections vacuum system VD 0100 G AAA TDAX (mobile)

# 14 Connection values of the vacuum system VD

## 14.1 Connection values

Vacuum system type	Voltage	Control voltage	Frequency	Power consumption	Rated current	Max. perm. pre-fuse
VD 0025 G	3 x 380 - 400 V AC / PE	230 V AC	50 Hz	1.5 kW	3 A	16 A
VD 0063 G *	3 x 380 - 400 V AC / PE	230 V AC	50 Hz	2.5 kW	5 A	16 A
VD 0100 G *	3 x 380 - 400 V AC / PE	230 V AC	50 Hz	3.0 kW	6 A	16 A

Tab. 7: Connection values of the vacuum systems VD

### ATTENTION!

#### Damage to the drives.

- \* Before commissioning, the circuit breaker (-101Q1) must be set to the rated current of the motor, see circuit diagram in the switch and control cabinet.

## 15 Technical data

	Unit	VD 0025 G	VD 0063 G	VD 0100 G
Nominal suction capacity (50 Hz)	m <sup>3</sup> /h	25	63	100
Final pressure	hPa (mbar) abs.	1,5		
Rated output of motor (50 Hz)	kW	1.0	2.0	2.7
Connected load switch and control cabinet (50 Hz)	kW	1.5	2.5	3.0
Sound pressure level according to EN ISO 2151 (at 50 Hz)	dB(A)	60	64	65
Max. water vapor compatibility with gas ballast valve (at 50 Hz)	hPa (mbar)	40		
Water vapor capacity with gas ballast valve (50 Hz)	kg/h	0.9	1.8	2.8
Ambient temperature range	°C	see oil chap. 16		
Ambient pressure		Atmospheric pressure		
Oil volume	l	1.0	2.0	2.0
Oil type		see oil chap. 16		
Weight	kg	110	127	155



# 16 Oil

	VM 100	VSA 100 *	VSC 100	VSB 100
ISO-VG	100	100	100	100
Oil type	Mineral oil	Synthetic oil	Synthetic oil	Synthetic oil
Ambience temperature range [°C]	5 ... 35	5 ... 40	5 ... 40	5 ... 40
Part number 1 l packaging	0831 000 060	0831 163 968	0831 168 356	0831 168 351
Part number 5 l packaging	0831 000 059	0831 136 969	0831 168 357	0831 168 352

Check the name plate (NP, fig. 2) to see which oil the vacuum pump was filled with.

\* for applications in the food industry (H1), corrosion protection, not suitable for continuous operation

If necessary, an oil with a different viscosity can be used for unfavorable room temperatures. Contact Busch Service for more information.



# 17 EU Declaration of conformity

This EU declaration of conformity and the CE marking on the name plate apply to the machine in the scope of the delivery by Busch. The manufacturer is solely responsible for issuing this declaration of conformity.

If the machine is integrated into a higher-level machine system, the manufacturer of this system (if applicable, the company operating the system) must issue a declaration of conformity for the higher-level machine or system and affix the CE marking.

Manufacturer **Dr. Ing. K Busch GmbH**  
**Schauinslandstr. 1**  
**DE-79689 Maulburg**

Declaration for vacuum system(s) of type: **VD 0025 G, VD 0063 G, VD 0100 G**

with serial number from **2021 ... to 2022 ...**

was/were produced according to the following EU standards:

- "Machinery directive" 2006/42/EG
- "Directive on electromagnetic compatibility" 2014/30/EU
- "RoHS2 Directive" 2011/65/EU, 2017/2102, Restriction of the use of certain hazardous substances in electrical and electronic devices

and according to the corresponding standards.

Standard	Name of the standard
EN ISO 12100:2010	Safety of machinery – General principles for design, risk assessment and risk reduction
EN ISO 13857:2019	Safety of machinery – Safety distances to prevent hazard zones being reached by upper and lower limbs
EN 1012-1:2010 EN 1012-2:1996+A1:2009	Compressors and vacuum pumps – Safety requirements – Parts 1 and 2
EN ISO 2151:2008	Acoustics – Noise test code for compressors and vacuum pumps – Engineering method (grade 2)
EN 60204-1:2018	Safety of machinery – Electrical equipment of machines – Part 1: General requirements
EN IEC 61000-6-2:2019	Electromagnetic compatibility (EMC) – Generic standards – Immunity standard for industrial environments
EN 61000-6-4:2007+A1:2011	Electromagnetic compatibility (EMC) – Generic standards – Emission standard for industrial environments
EN ISO 13849-1:2015	Safety of machinery – Safety-related parts of control systems – Part 1: General principles for design

Person authorized to compile the technical data:

Klaus Digeser  
 Dr. Ing K. Busch GmbH  
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 DE-79689 Maulburg

Maulburg, 03/08/2021



**Dr.-Ing Karl Busch, general manager**



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We shape vacuum for you

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