vacuubrand

VWR®

Instructions for use





VP 100
VP 100 C

Diaphragm pumps

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Dear customer,

Your VACUUBRAND diaphragm pumps should support you for many years without trouble and with optimal performance. Thanks to our long practical experience we have much information and advice how you can achieve powerful application and personal safety through our products. Please read these instructions for use before the initial operation of your pump.
VACUUBRAND diaphragm pumps are the result of many years of experience in design and construction and practical operation of these pumps combined with the latest developments in material and manufacturing technology.

Our quality maxim is the ”zero fault principle”:
Every diaphragm pump, leaving our company, is tested intensively including an endurance run of 14 hours. Therefore faults, even those which occur rarely, are identified and can be eliminated immediately. The achievement of the specifications after the endurance run is tested for every pump.
Every VACUUBRAND pump achieves the specifications. We are committed to providing our customers with this high quality standard.
We know that the vacuum pump can not replace all of your real work and hope that our products contribute to an effective and trouble-free realisation of your work.

Yours
VACUUBRAND GMBH + CO KG

After sales service: Contact your local dealer or call +49 9342 808-5500.

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⚠ DANGER

➨ DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

☞ WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION

• CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to personal injury.



Caution! Hot surface!



Isolate equipment from mains before removing the cover.



Electronic components must not be disposed of in the domestic waste at the end of their service life. Used electronic devices contain harmful substances that can cause damage to the environment or human health. End users are legally obliged to take used electric and electronic devices to a licensed collection point.

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Safety information!

General information

WARNING

☞ **Read this manual carefully before installing or operating the equipment. Observe the instructions contained in this manual.**

NOTICE

Remove all packing material from the packing box. Remove the product from its packing-box and retain all packaging until the equipment is inspected and tested. Remove the protective caps from the inlet and outlet ports and retain for future use. Inspect the equipment promptly and carefully.
If the equipment is damaged, notify the supplier and the carrier in writing within three days. Retain all packing material for inspection. State the item number of the product together with the order number and the supplier's invoice number. Failure to check and give notice of damage will void any and all warranty claims for those deficiencies.
Replace the protective caps, if the equipment is not used immediately. Store the equipment in dry and non-corrosive conditions.

Intended use

WARNING

☞ Do not use the pump or any system parts on humans or animals.

☞ Ensure that the individual components are only connected, combined and operated according to their design and as indicated in the instructions for use. Use only original manufacturer's spare parts and accessories. Otherwise the safety and performance of the equipment, as well as the electromagnetic compatibility of the equipment might be reduced.
The CE mark or the cTÜVus mark may be voided if not using original manufacturer's spare parts.

☞ Comply with all notes on correct vacuum and electrical connections; see section "Use and operation".

☞ The pumps are designed for **ambient temperatures** during operation between +10°C and +40°C. Periodically check maximum temperatures if installing the pump in a cabinet or a housing. Make sure ventilation is adequate to maintain recommended operating temperature. Install an external automatic ventilation system if necessary. If pumping hot process gases, make sure that the maximum permitted gas inlet temperature is not exceeded. The maximum permitted gas inlet temperature depends on several parameters like inlet pressure and ambient temperature (see "Technical data").

☞ Particles and dust must not enter the pump.

NOTICE

Use the equipment **only as intended**, that is, for generation of vacuum in vessels designed for that purpose. Any other use will automatically invalidate all warranty and liability claims. Remain aware of safety and risks.

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Setting up and installing the equipment

DANGER

➨ Equipment must be connected only to a **suitable electrical supply** and a suitable ground point. As such, the plug must be plugged into an outlet that is properly grounded. Failure to connect the motor to ground may result in deadly electrical shock. Provide slow-blow fuse according to voltage supply and current draw (see ”Technical data”).
The supply cable may be fitted with a molded European IEC plug or a plug suitable for your local electrical supply. The cable contains wires colour coded as follows: green or green and yellow: ground; blue or white: neutral; brown or black: hot.

WARNING

☞ Due to the high compression ratio, the pump may generate overpressure at the outlet. Check pressure compatibility with system components (e.g., exhaust tubing or exhaust valve) at the outlet.

☞ Do not permit any **uncontrolled pressurizing**. Make sure that the exhaust tubing cannot become blocked. If there is an exhaust isolation valve, make sure that you cannot operate the equipment with the valve closed to avoid a **risk of bursting!**

CAUTION

- Provide a firm, level platform for the equipment. Check that the system which you are going to evacuate is mechanically stable. Check that all fittings are secure. Ensure a stable position of the pump without any mechanical contact other than the pump feet.

- Comply with **maximum permissible pressures** at inlet and outlet and with **maximum permissible pressure differences** between inlet and outlet. See section ”Technical data”. Do not operate the pump with overpressure at the inlet.

- Avoid overpressure of more than 1.2 bar absolute in the event that gas or inert gas is connected to the pump or to a venting valve.

- **Note**: Flexible elements will shrink when evacuated.
- Ensure that no liquids can flow on or into the pump motor when assembling or disassembling vacuum lines at the pump. Risk of corrosion and/or short circuit!
- Connect hoses gas tight at inlet and outlet of the pump.

- Check the power source and the pump’s rating plate to be sure that the power source and the equipment match in voltage, phase, and frequency.

NOTICE

Make sure ventilation is adequate to maintain recommended operating temperature. Keep a minimum distance of 5 cm between the cooling fan and surrounding items (e.g., housing, walls, etc.), or else install an external automatic ventilation system. Check fan regularly for dust/dirt. Clean fan guard grill if necessary to avoid a reduction of ventilation.

The mains plug is a disconnecting device to separate the pump from the supply voltage. Ensure that the mains plug is easily accessible at all times to allow the separation of the device from the power supply.

Use only hoses at the inlet and outlet of the pump with an inner diameter at least as large as the diameter of the pump’s fittings (to avoid overpressure at the outlet, and reduction of pumping speed at the inlet).

Allow the equipment to equilibrate to ambient temperature if you bring it from cold environment into a room prior to operation. Notice if there is water condensation on cold surfaces.
Comply with all **applicable and relevant safety requirements** (regulations and guidelines). **Implement the required actions and adopt suitable safety measures.**

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Ambient conditions

CAUTION

- This product may only be used indoors in a non-explosive atmosphere, and in a dry environment.
  Adopt suitable measures in case of differences from recommended conditions, e.g., installation in higher altitudes (risk of insufficient cooling), conductive pollution or external condensation on the pump.

NOTICE

To the best of our knowledge the equipment is in compliance with the requirements of the applicable EC-directives and harmonized standards (see ”Declaration of Conformity”) with regard to design, type and model. Directive EN 61010-1 gives in detail the conditions under which the equipment can be operated safely (see also IP degree of protection, ”Technical data”).

Operating conditions

DANGER

➨ **These pumps are not approved for operation in potentially explosive atmospheres. Do not operate the pumps in potentially explosive atmospheres.**
➨ **These pumps are not approved for the pumping of potentially explosive atmospheres. Do not pump potentially explosive atmospheres.**

➨ The pumps are **not suitable** to pump any of the substances listed below.
Do not pump:
- **unstable substances**
- substances which react explosively under **impact** (mechanical stress) without air
- substances which react explosively when being exposed to **elevated temperatures** without air,
- substances subject to **auto-ignition**,
- substances which are **inflammable without air**
- **explosive substances**.

➨ The pumps are **not approved** for operation below ground. **Do not operate** the pump **below ground**.

CAUTION

- **Do not pump** substances which may form **deposits** inside the pump. The pumps are not suitable for pumping substances which may form deposits inside the pump. Deposits and condensate in the pump may lead to increased temperatures even to the point of exceeding the maximum permitted temperatures.

- Check the inlet and outlet of the pump, if there is a danger of forming **deposits** inside the pump, e.g., in the pump chambers (the pump chamber is the part between diaphragm and head cover. See section ”Replacing diaphragms and valves”). Inspect the pump chambers regularly and clean if necessary.

- **Consider interactions and chemical reactions of the pumped media.** Ensure that the materials of the pump’s wetted parts are compatible with the pumped substances, see section ”Technical data”.
  When changing the substances pumped, we recommend purging the pump with air or inert gas prior to changing the pumped media. Purging the pump will pump out residues and it will reduce the possibility of reactions of the pumped substances with each other and with the pump’s materials.

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Safety during operation

DANGER

- Adopt suitable measures to prevent the release of dangerous, toxic, explosive, corrosive, noxious or polluting fluids, vapours and gases. To prevent any emission of such substances from the pump outlet, install an appropriate collecting and disposal system and take protective action for pump and environment.
- You must take suitable precautions to prevent any formation of explosive mixtures in the pump chamber or at the outlet of the pump. In case, e.g., of a diaphragm failure, mechanically generated sparks, hot surfaces or static electricity may ignite these mixtures. Use inert gas for venting, if necessary.
- Drain appropriately or otherwise remove any potentially explosive mixtures at the outlet of the pump, or dilute them to non-explosive concentrations.

WARNING

- Prevent any part of the human body from coming into contact with vacuum.
- Make sure that the exhaust tubing cannot become blocked.
- Comply with applicable regulations when disposing of chemicals. Take into consideration that chemicals may be contaminated. Take adequate precautions to protect people from the effects of dangerous substances (chemicals, thermal decomposition products of fluoroelastomers). Use appropriate protective clothing and safety goggles.
- Interruption of the pump (e.g., due to power failure), failure of connected components or of parts of the supply, or change in parameters must not be allowed to lead to dangerous conditions. In case of a diaphragm failure or in case of a leak in the manifold, pumped substances might be released into the environment or into the pump housing or motor.
  Comply with all notes regarding proper use of the pumps, as well as operation and maintenance guidance.
- The residual **leak rate of the equipment** might render possible an exchange of gas, albeit extremely slight, between the environment and the vacuum system.
  Adopt suitable measures to prevent contamination of the pumped substances or the environment.

CAUTION



- Pay attention to the safety symbol ”hot surfaces” on the equipment. Hot parts may cause burns if touched. Adopt suitable measures to prevent any danger arising from hot surfaces or electric sparks. Ensure that hot surfaces of the pump do not cause burns. Provide a suitable contact guard if necessary.

NOTICE

Prevent the backpressure of gases and the backflow of condensates at the outlet.

Provide appropriate protective measures to allow for the possibility of failure and malfunction. The protective measures must also allow for the requirements of the respective application.

In case of overload, the motor is shut down by a **self-hold thermal cutout** in the winding.
Note: Only manual reset is possible. Switch off the pump and disconnect from the power source. Identify and eliminate the cause of failure. Wait approx. five minutes before restarting the pump.

CAUTION

- **Note**: In case of **supply voltage below 100V**, the lock of the cutout might be impaired and the pump may restart on its own after sufficient cooling down. Take appropriate precautions, if an automatic restart of the pump may lead to a dangerous situation (e.g., switch off the pump and disconnect from the power source).

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Maintenance and repair

NOTICE

In order to comply with laws (occupational, health and safety regulations, safety at work law and regulations for environmental protection) vacuum pumps, components and measuring instruments can only be returned when certain procedures (see section ”**Repair - Maintenance - Return - Calibration**”) are followed.

Take advantage of our service seminars, which put special focus on the maintenance and repair of vacuum pumps. For details and for the online ”Instructions for repair” manual see www.vacuubrand.com.
In normal use, the lifetime of the diaphragms and valves is typically 15,000 operating hours. Bearings have a typical durability of 40000 h. Motor capacitors have a typical durability in the range of 10000 to 40000 h depending strongly on operation conditions including ambient temperature, humidity or load.

DANGER

➨ **Ensure that the pump cannot be operated accidentally. Never operate the pump if covers or other parts of the pump are disassembled.**



➨ **Switch off the pump. Disconnect the electrical power cord and wait five seconds** before starting maintenance to allow the capacitors to discharge.

➨ **Note**: The pump may be contaminated with process chemicals, which have been pumped during operation. Ensure that the pump is completely decontaminated before maintenance commences.

WARNING

☞ Take adequate precautions to protect people from the effects of dangerous substances if contamination has occurred. Use appropriate protective clothing, safety goggles and protective gloves.

☞ **Wear parts have to be replaced regularly.**
☞ **Never operate a defective or damaged pump.**

☞ Check every motor capacitor regularly by measuring its capacity and estimating its time in operation. Replace old capacitors early enough to prevent a failure in operation. If an old motor capacitor fails, the capacitor may get hot. It may even melt or emit a flame, which could be **dangerous for persons and equipment in the vicinity**. The capacitors have to be replaced by an electrician.

☞ Vent the pump before starting maintenance. Isolate the pump and other components from the vacuum system. Allow sufficient cooling of the pump.

NOTICE

Clean polluted surface with a clean, slightly moistened cloth. To moisten the cloth we recommend water or mild soap.

Ensure that **maintenance** is done only by suitably trained and supervised technicians. Ensure that the maintenance technician is familiar with the safety procedures, which relate to the products processed by the pumping system.

Only dismantle the pump as far as necessary.

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Technical data

Type		VP 100	VP 100 C
Maximum pumping speed at 50/60 Hz (ISO 21360)	m^3/h	0.7 / 0.85	
Ultimate vacuum (absolute)	mbar	100	
Maximum permissible inlet pressure (absolute)	bar	1.1	
Maximum permissible outlet pressure (absolute)	bar	1.1	
Maximum pressure difference between inlet and outlet	bar	1.1	
Permissible ambient temperature storage / operation	°C	-10 to +60 / +10 to +40	
Permissible relative atmospheric moisture during operation (no condensation)	%	30 to 85	
Maximum permissible installation altitude above mean sea level	m	2000	
Rated power	kW	0.04	
No-load speed 50/60 Hz	rpm	1500 / 1800	
Maximum permissible range of supply voltage (±10%) **Attention: Observe specifications of rating plate!**		100-120 V~ 50/60 Hz 230 V~ 50/60 Hz	
Maximum rated current at: 100-120 V~ 50/60 Hz 230 V~ 50/60 Hz	 A A	 1.9 / 1.4 0.8 / 0.6	
Motor protection		thermal cutout, manual reset*	
Overvoltage category		II	
Degree of protection IEC 60529		IP 40	
Degree of protection UL 50E		type 1	
Pollution degree		2	
A-weighted emission sound pressure level** (uncertainty K_{pA}: 3 dB(A))	dB(A)	45	
Inlet		hose nozzle DN 6/10 mm / G 1/8”	hose nozzle DN 10 mm
Outlet		silencer / G 1/8”	hose nozzle DN 10 mm

* In case of supply voltage below 100V, the lock of the cutout might be impaired.

** Measurement according to EN ISO 2151:2004 and EN ISO 3744:1995 at 230V/50Hz and at ultimate vacuum with exhaust tube (VP 100 C) or with silencer (VP 100) at outlet.

We reserve the right for technical modification without prior notice!

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Type		VP 100	VP 100 C
Dimensions L x W x H approx.	mm	247 x 121 x 145	
Weight approx. 100-120 V Version 230 V Version	 kg kg	 5.4 5.0	

Gas inlet temperatures

Operating condition	Inlet pressure	Permitted range of gas temperatures at inlet
Continuous operation	> 200 mbar (high gas load)	+10°C to +40°C
Continuous operation	< 200 mbar (low gas load)	0°C to +60°C
Short-time (< 5 minutes)	< 200 mbar (low gas load)	-10°C to +80°C

Wetted parts

Components	Wetted materials	
	VP 100	VP 100 C
Housing cover	Aluminium alloy (AlMgSi)	-
Housing cover insert	-	PTFE carbon reinforced
Head cover	Aluminium alloy (AlMgSi)	ETFE
Diaphragm clamping disc	Aluminium alloy (AlMgSi)	ETFE carbon reinforced
Diaphragm	PTFE	PTFE
Valves	PTFE	PTFE
Inlet	Aluminium alloy (AlMgSi)	ETFE
Outlet	PA / PE / aluminium alloy	ETFE

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Pump parts

Position	Component
1	Mains connection
2	ON/OFF switch
3	Pump rating plate
4	Inlet
5	Outlet

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VP 100



VP 100 C



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Use and operation

Installing in a vacuum system

DANGER

➨ If dangerous or polluting fluids could be released at the outlet, install an appropriate system to catch and dispose of those fluids.

WARNING

☞ Connect a gas-tight exhaust line at the pump outlet if necessary. Always vent exhaust gases appropriately (e.g., into a fume hood).

☞ Never block the gas outlet. The exhaust line must always be free of obstructions (no back pressure) to ensure an unimpeded discharge of gas. The cross-section of the outlet tubing must be at least the size of the pump's exhaust connection.

☞ Particles and dust must not be aspirated. If necessary, you must install appropriate filters. You must ensure their suitability concerning gas flow, chemical resistance and resistance to clogging prior to use.

☞ Make sure ventilation is adequate, especially if the pump is installed in an enclosure, or if the ambient temperature is elevated. Provide external ventilation, if necessary.

CAUTION

- Reduce the transmission of vibration. Prevent mechanical load due to rigid tubing. Insert elastic hoses or flexible elements as couplings between the pump and rigid pipes. **Note**: Flexible elements will compress or flatten when evacuated if not designed for use under vacuum.
- Hose connections at the pump inlet must always be gas tight.

- A power failure may cause accidental ventilation of the pump. If this constitutes a potential source of danger, take appropriate safety measures.
- Check the power source and the pump's rating plate to be sure that the power source and the equipment match in voltage, phase, and frequency.

NOTICE

Make sure ventilation is adequate to maintain recommended operating temperature. Keep a minimum distance of 5 cm between the cooling fan and surrounding items (e.g., housing, walls, etc.), or else install an external automatic ventilation system.

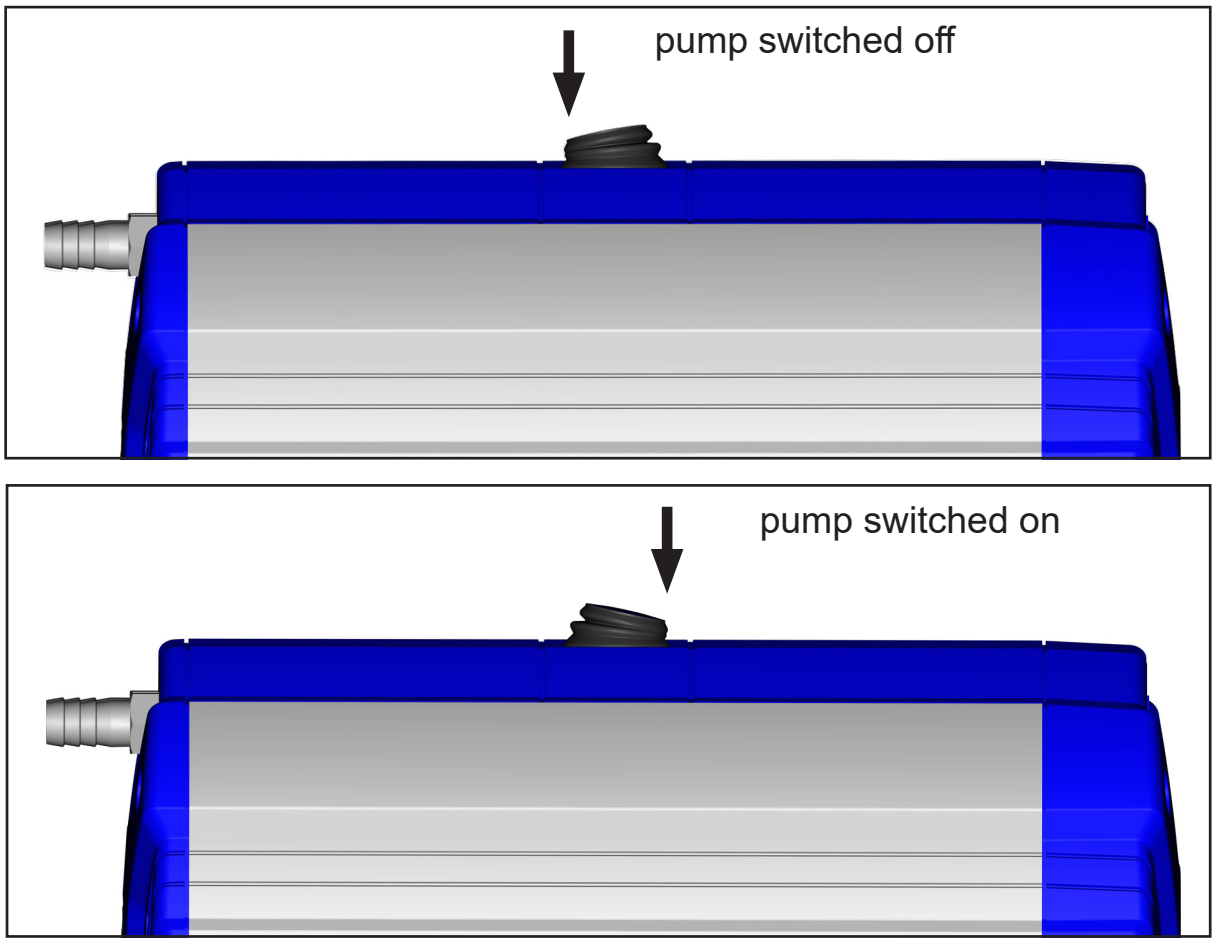
The mains plug is a disconnecting device to separate the pump from the supply voltage. Ensure that the mains plug is easily accessible at all times to allow the separation of the device from the power supply.

Use connecting hoses with large diameter and keep them as short as possible to avoid flow losses. Locate the pump as closely as possible to the application.
Always install outlet tubing descending from the pump or provide other measures to avoid backflow of condensate towards the pump.
When assembling, ensure **vacuum-tightness**. After assembly, check the whole system for leaks.
Secure hose connections at the pump appropriately, e.g., with hose clamps, to protect against accidental detachment.

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During operation

On/off switch



DANGER

➨ Vent and dispose of **potentially dangerous gases or vapors** at the outlet of the pump appropriately.

WARNING

☞ Due to the high compression ratio, the pump might generate overpressure at the outlet. Check pressure compatibility with system components (e.g., exhaust tubing or exhaust valve) at the outlet. Ensure that the pump outlet is neither blocked nor restricted.

☞ **Maximum ambient temperature**: 40 °C
Check the maximum temperatures, if installing the pump in a cabinet or a housing. Make sure ventilation is adequate, especially if the ambient temperature is elevated.

☞ Operation with silencer at the outlet: Operating the pump at a high inlet pressure or pumping dusty gases for a long time may cause clogging of the silencer. Check the silencer regularly and replace if necessary.

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⚠CAUTION

- If the pump is installed at an altitude of more than 2000 m above mean sea level, check compatibility with applicable safety requirements, and adopt suitable measures. There is a risk of the motor overheating due to insufficient cooling.
- Check compatibility with the **maximally permitted pressure** at outlet and the **maximum pressure difference** between inlet and outlet ports.

NOTICE

Do not start the pump if the **pressure difference between inlet and outlet ports exceeds max. 1.1 bar**. Attempts to start the pump at higher pressure difference may cause stalling and damage of the motor.
Prevent internal condensation, transfer of liquids or dust. The diaphragms and valves will be damaged, if liquids are pumped in significant amounts.
Check the pump regularly for external soiling and deposits. Clean the pump if necessary to avoid an increase of the pump's operating temperature.

In case of overload, the motor is shut down by a **self-hold thermal circuit breaker** in the winding.
Note: Only a manual reset is possible. Switch off the pump and disconnect the electrical power cord. Identify and eliminate the cause of failure. Wait approximately five minutes before restarting the pump.

⚠CAUTION

- **Note**: In case of **supply voltage below 100V**, the lock of the breaker may not latch and the pump might restart on its own after sufficient cooling. Take appropriate precautions, if an automatic restart of the pump may lead to a dangerous situation.

NOTICE

Avoid overheating (e.g., due to hot process gases).
A warm up period (approximately 15 min.) is required to ensure that the rated ultimate vacuum and pumping speed are attained.

Shutdown

NOTICE

Short-term:
Has the pump been exposed to condensate?
Allow the pump to continue to run at atmospheric pressure for a few minutes.
Has the pump been exposed to media which may damage the pump materials or form **deposits**?
Check and clean pump heads if necessary.

Long-term:
Take measures as described in section short-term shutdown.
Separate pump from the application.
Close inlet and outlet port (e.g., with transport caps).
Store the pump in dry conditions.

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Accessories

VACUUBRAND order no.



Vacuum gauge DVR 2pro **20682906**

VACUUBRAND order no.

Vacuum hose (caoutchouc) DN 8 mm **20686001**
Vacuum hose (caoutchouc) 10 mm ID **20686002**
Silencer for hose nozzle DN 10 mm **20636588**

Attention: Dust-laden gases, deposits and condensed solvent vapour can restrict air flow out the silencer. The resultant back pressure can lead to damage of pump bearings, diaphragms, and valves. Under those conditions, a silencer must not be used.

Upgrade possibilities

VACUUBRAND order no.

Controller CVC 3000 ..... **20683160**
In-line valve VV-B 6C **20674291**

Kit ”Vacuum adjustment device” with manometer for VP 100 ..... **20696842**
Kit ”Vacuum adjustment device” with manometer for VP 100 C..... **20696843**

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Troubleshooting

Fault	Possible cause	Remedy
❑ Pump does not start or stops immediately.	➡ Supply voltage too low or power supply failure?	✓ Check supply voltage. Check fuse.
	➡ Device fuse blown?	✓ Identify cause of failure. Replace device fuses.
	➡ Pressure in outlet pipeline too high?	✓ Remove blockade in line, open valve.
	➡ Motor overloaded?	✓ Allow motor to cool down, identify and eliminate cause of failure. Manual reset is necessary. Switch off pump or unplug mains.
❑ Pump does not achieve its ultimate vacuum.	➡ Leak in the pipeline or vacuum system?	✓ Check pump directly - connect vacuum gauge directly at pump inlet - then check connection, pipeline and vacuum system if necessary.
	➡ Long, narrow line?	✓ Use lines with larger diameter, length as short as possible.
	➡ Pump has been exposed to condensate?	✓ Allow pump to run for some minutes with atmospheric pressure at the inlet.
	➡ Deposits have been formed inside the pump?	✓ Clean and inspect the pump heads.
	➡ Diaphragms or valves damaged?	✓ Replace diaphragms and/or valves.
	➡ Outgassing substances or vapour generated in the process?	✓ Check process parameters.
❑ Pump too noisy.	➡ Atmospheric or high pressure at the pump inlet?	✓ Connect hose or silencer to pump outlet.
	➡ Diaphragm crack or diaphragm clamping disc loose?	✓ Perform maintenance.
	➡ Other than above mentioned causes?	✓ Contact local distributor.
❑ Pump seized.		✓ Contact local distributor.

NOTICE

A **service manual** with exploded view drawings, spare part lists and directions for repair is available on request (only in German or English).
☞ The service manual is for trained service people.

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Replacing diaphragms and valves

DANGER



- **Never operate the pump if covers or other parts of the pump are disassembled.** Ensure that the pump cannot be operated accidentally.
- Before starting maintenance, **disconnect the electrical power cord**. **Wait five seconds** after isolating the equipment from AC power to allow the capacitors to discharge.
- **Note**: The pump might be contaminated with the process chemicals that have been pumped during operation. Ensure that the pump is decontaminated before maintenance. Avoid the release of pollutants.

WARNING

- **Never operate a defective or damaged pump**.
- Take adequate precautions to protect people from the effects of dangerous substances that may have contaminated the pump and may be released upon disassembly. Ensure that the maintenance technician is familiar with the safety procedures which relate to the products processed by the pumping system.
  Use appropriate protective clothing, safety goggles and protective gloves.
- Check every motor capacitor regularly by measuring its capacity and estimating its service life. Replace old capacitors early enough to prevent a failure. The capacitors must be replaced by a trained electrician.
- **Vent the pump and isolate it from the vacuum system before you start maintenance.** Allow sufficient cooling of the pump before starting maintenance.

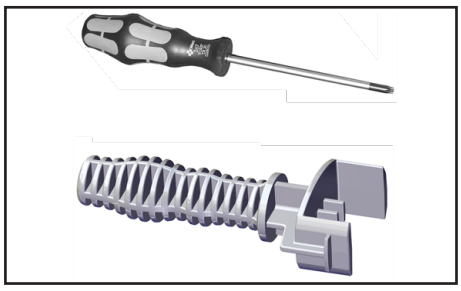
NOTICE

Ensure that maintenance is done only by suitably trained and supervised technicians.
The valves and diaphragms as well as the motor capacitors are wear parts. If the rated ultimate vacuum is no longer achieved or in case of increased noise level, the pump interior, the diaphragms and the valves must be cleaned and the diaphragms and valves must be checked for cracks or other damage.
All bearings are encapsulated and are filled with long-life lubricant. Under normal operating conditions, the drive system is maintenance free.
In demanding circumstances, it may be efficient to check and clean the pump heads on a regular basis. In normal use, the lifetime of the diaphragms and valves is typically 15,000 operating hours.

- Prevent internal condensation, transfer of liquids or dust. The diaphragms and valves will be damaged if liquid is pumped in significant amount.
- Carry out maintenance frequently if the pump is exposed to corrosive media or in case of deposits.
- Regular maintenance will improve the lifetime of the pump and also protect both users and the environment.

VACUUBRAND order no.

Set of seals VP 100 / VP 100 C (1 diaphragm, 2 valves, diaphragm key) **20696874**



Tools required (metric):

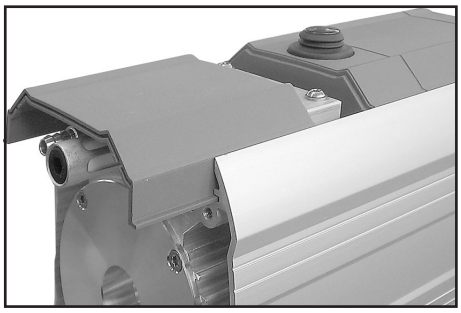
- Diaphragm key w/f 46 (included in set of seals)
- Torx screw driver TX20

Please read section ”Replacing diaphragms and valves” completely before starting maintenance.
Partially the pictures show pumps in other versions. This doesn’t influence replacing diaphragms and valves of the pump.

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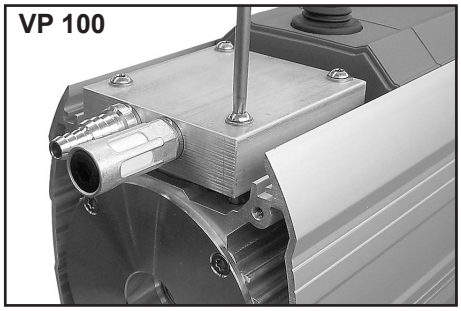


➨ Unscrew front cover.

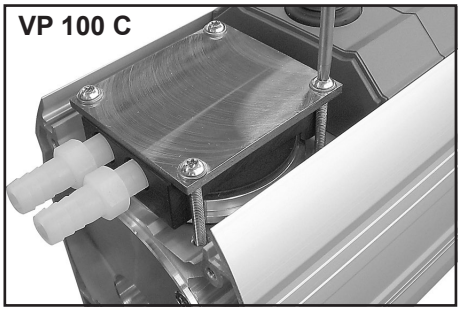


➨ Pull the cover off the housing.

VP 100



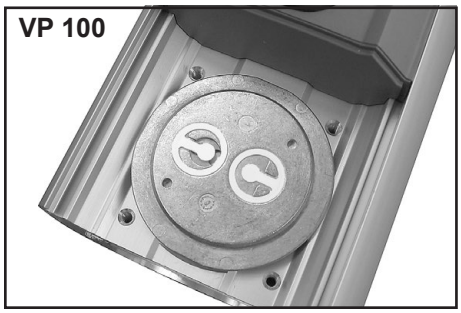
VP 100 C



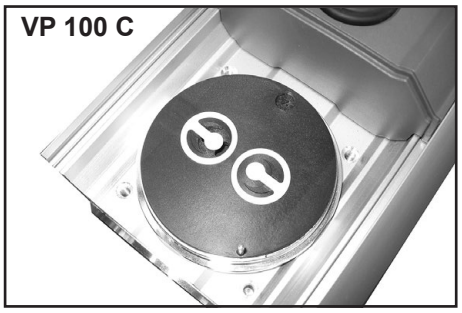
➨ Unscrew four screws at the pump head and remove housing cover (VP 100 C: housing cover with housing cover insert).

☞ Never remove parts using a spiky or sharp-edged tool (e.g., screw driver), we recommend to use a rubber mallet or compressed air (to be blown carefully into port).

VP 100



VP 100 C



➨ Note the position of the valves and remove them.

☞ Replace valves if damaged.
Use petroleum ether or industrial solvent to remove deposits. Do not inhale.

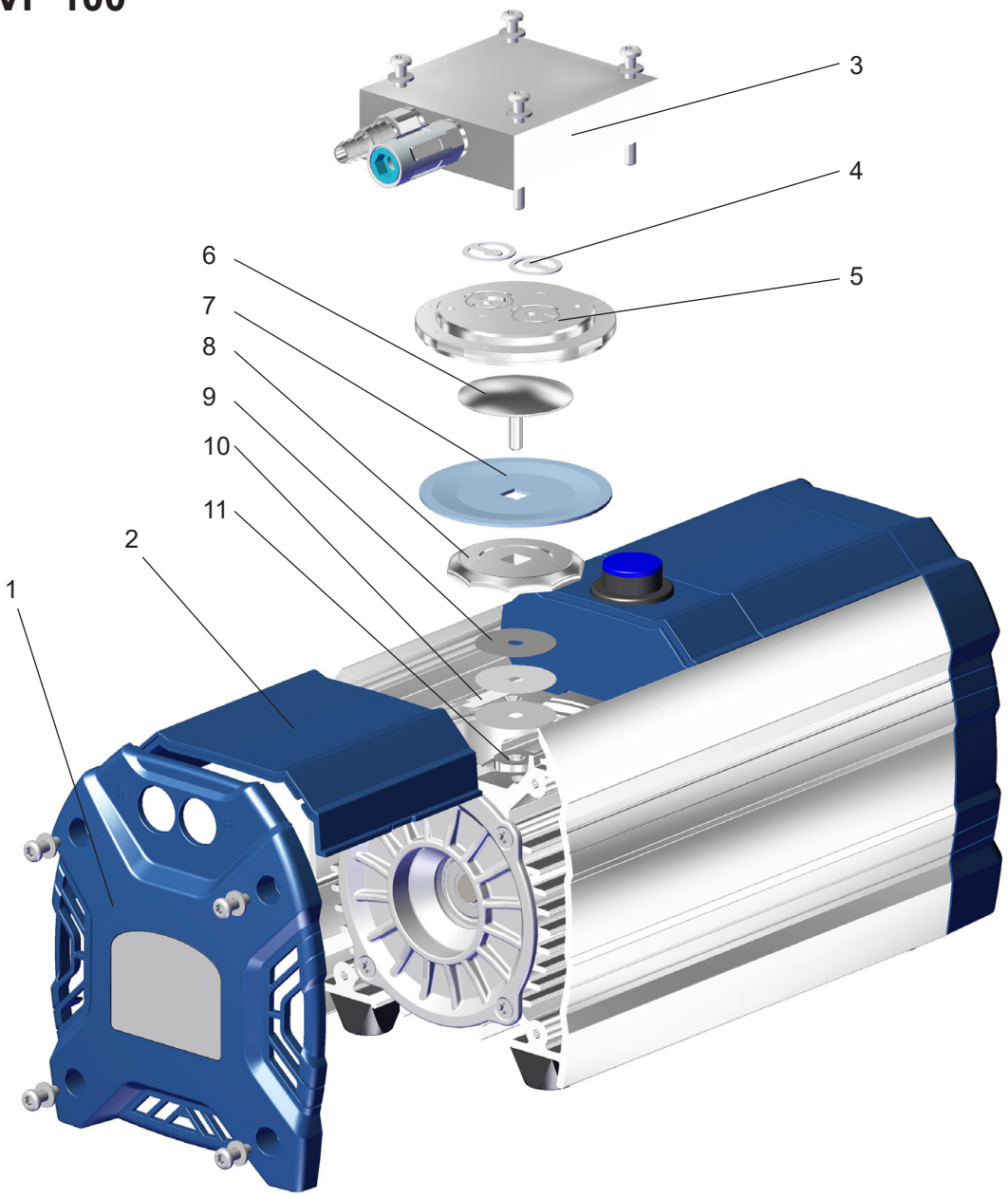
☞ Remove head cover.

☞ Check the diaphragms for damage and replace if necessary.

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View of the disassembled pump head parts

VP 100



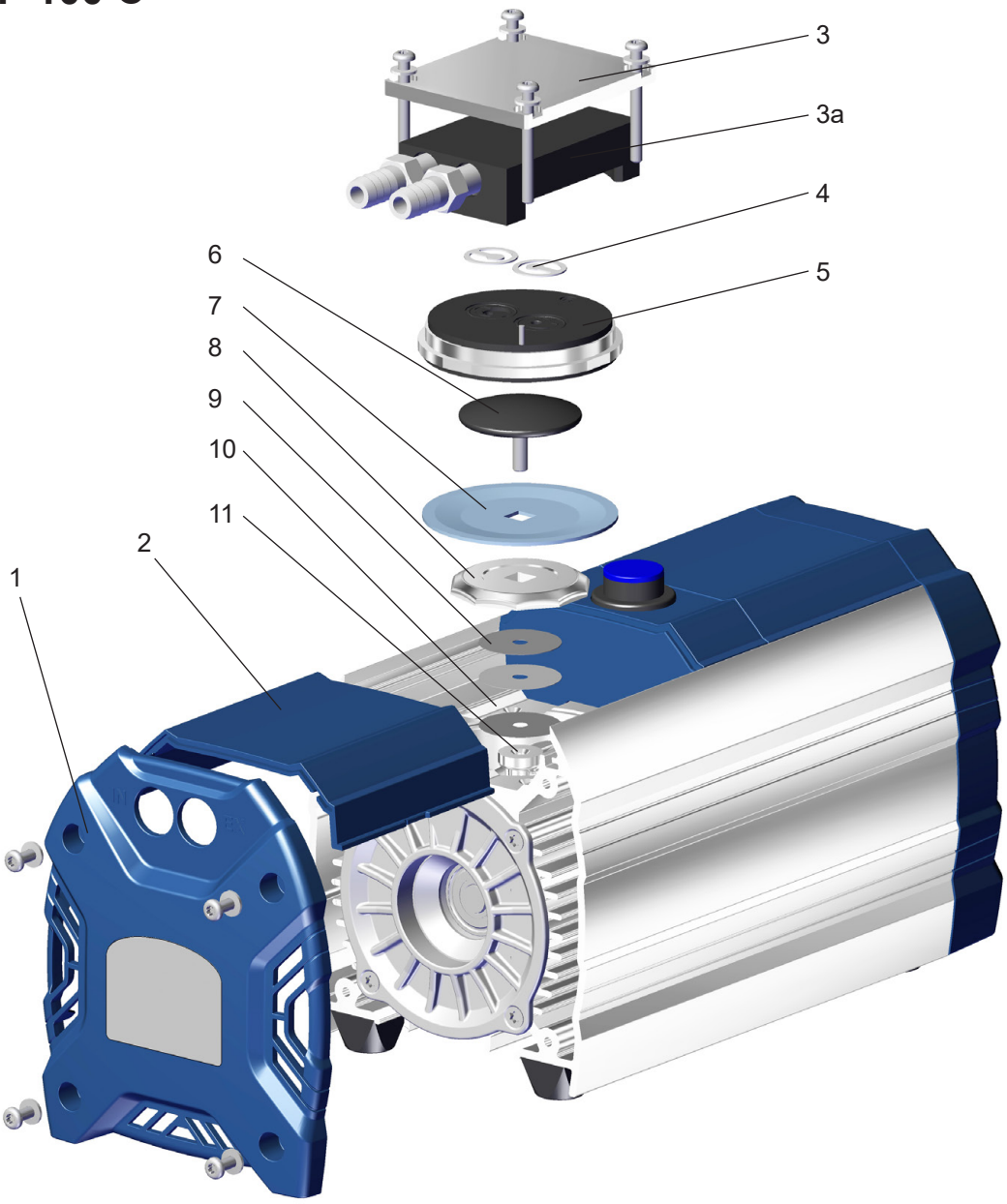
Position	Component
1	Front cover
2	Cover
3	Housing cover
4	Valves
5	Head cover
6	Diaphragm clamping disc with connecting screw

Position	Component
7	Diaphragm
8	Diaphragm support disc
9	Washers
10	Housing
11	Rod

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View of the disassembled pump head parts

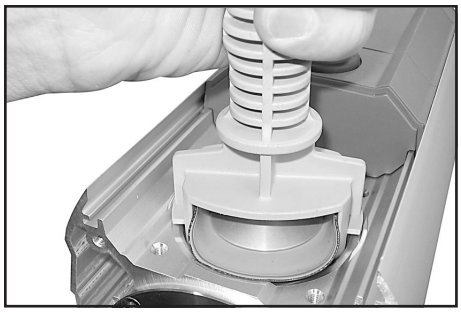
VP 100 C



Position	Component
1	Front cover
2	Cover
3	Housing cover
3a	Housing cover insert
4	Valves
5	Head cover

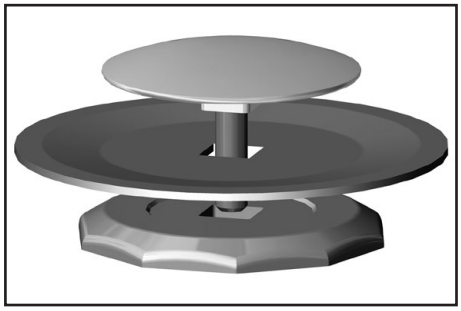
Position	Component
6	Diaphragm clamping disc with connecting screw
7	Diaphragm
8	Diaphragm support disc
9	Washers
10	Housing
11	Rod

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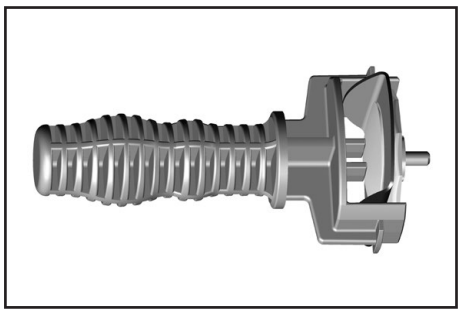


➨ Lift diaphragm carefully sidewise.
☞ Never use a spiky or sharp-edged tool to lift the diaphragm.

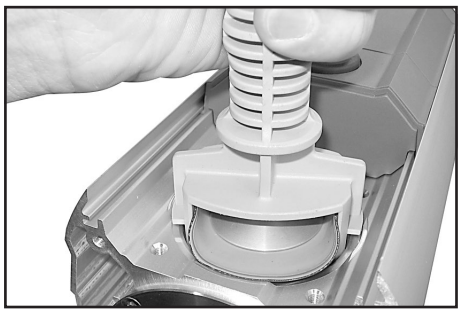
➨ Use the diaphragm key to grip the diaphragm support disc below the diaphragm.
➨ Apply pressure to the clamping disc to bring connecting rod into upper turning point position if necessary.
Press diaphragm key against diaphragm clamping disc, unscrew and remove diaphragm support disc with diaphragm.
☞ If the old diaphragm is difficult to separate from the support disc, immerse assembly in naphtha or petroleum ether. Do not inhale!
☞ Check for washers under clamping disc. Do not mix the washers from the different heads. Make sure that the original number is reassembled at the individual pump head.



➨ Position new diaphragm between diaphragm clamping disc with square head screw and diaphragm support disc.
☞ Attention: Position diaphragm with pale side towards diaphragm clamping disc (to pump chamber).



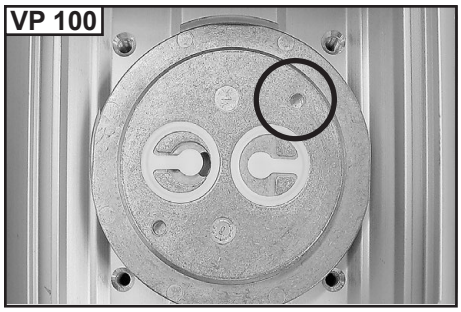
➨ Lift diaphragm at the side and position carefully together with diaphragm clamping disc and diaphragm support disc in the diaphragm key.
☞ Avoid damaging the diaphragm: Do not bend diaphragm too much.
➨ Check for washers. Do not mix the washers from the different heads. Assemble the original number of washers between support disc and connecting rod at the individual pump head.
☞ Smaller number of washers: The pump will not attain final vacuum. More washers: Clamping disc will hit head cover; noise or even blockage of the pump.

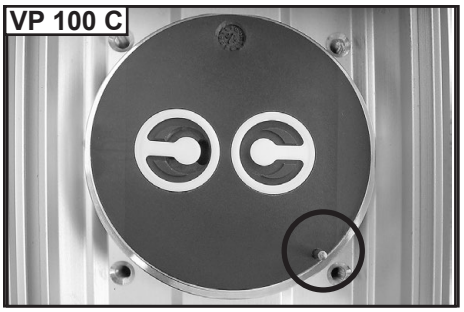


☞ Position washers between diaphragm support disc and rod.
➨ Assemble diaphragm clamping disc, diaphragm and diaphragm support disc to connecting rod.

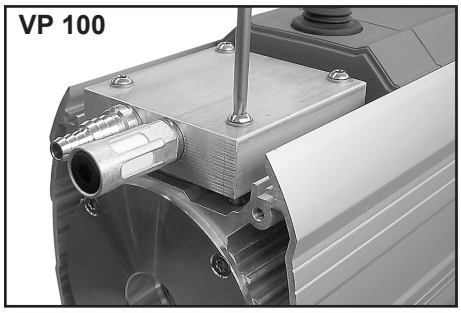
➨ Bring the diaphragm into a position in which it is in contact with the housing and centred with respect to the bore.

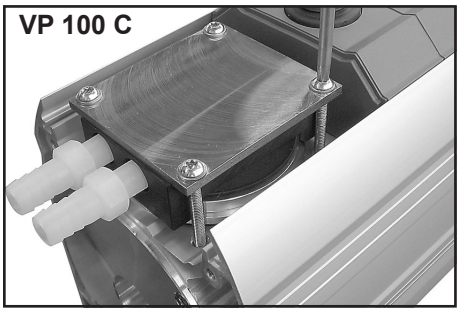
Documents are only to be used and distributed completely and unchanged. It is strictly the users´ responsibility to check carefully the validity of this document with respect to his product.



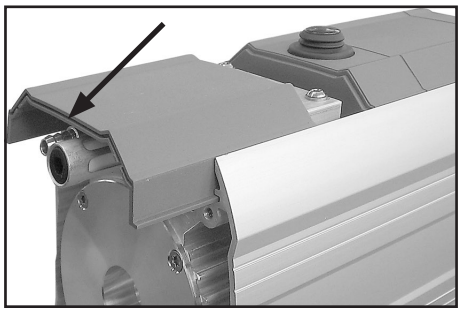


➨ Assemble head covers and valves.
☞ Check for correct position of the valves (see also fig.).
Valve at the inlet: Kidney-shaped opening beside valve.
Valves at the outlet: Round centred opening under valve.
☞ Comply with correct position of the deepening in the head cover for the guidance pin (VP 100) or the guidance pin in the head cover (VP 100 C)!





➨ Position housing cover (VP 100) or housing cover insert with housing cover (VP 100 C).
☞ Move housing cover slightly to make sure that the head covers are correctly positioned.
➨ Screw in the four screws fixing the housing cover cross-wise first slightly, then tighten.
☞ Do not tighten until head cover is in contact with housing, **max. torque 3 Nm.**



➨ Assemble the cover in a way that the groove in the cover points to the inlet / outlet of the pump.



➨ Screw the front cover on.

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NOTICE

If the pump does not achieve the ultimate vacuum:

☞ In case the diaphragm and the valves have been replaced, a run-in period of several hours is required before the pump achieves its ultimate vacuum.

☞ In case of unusual noise switch off pump immediately and check clamping disc position.

If the specified ultimate vacuum is not achieved and if this does not change after the run-in period:
If necessary recheck valve seats and pump chamber.

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Replacing the fuse

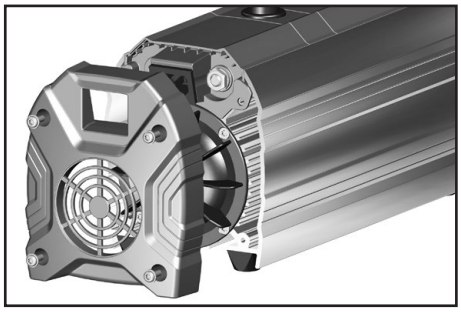
DANGER



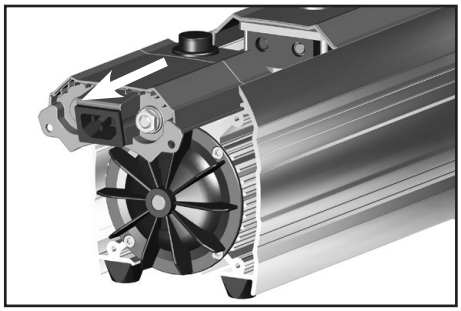
WARNING

- ➨ **Switch off the pump.**
- ➨ **Disconnect the electrical power cord** before removing the covers. After disconnecting from power, **wait five seconds** to allow the capacitors to discharge.

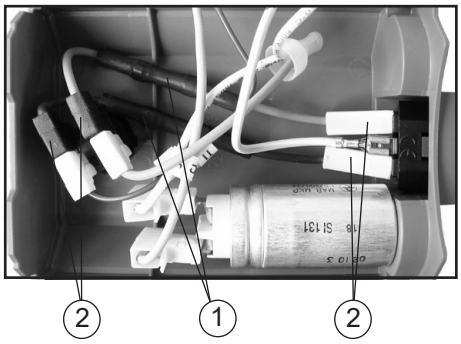
- ☞ The replacing of the fuse has to be carried out by a trained electrician.
- ☞ After replacing the fuse, the pump must be checked for electric safety (see below)! Identify and eliminate the cause of failure before switching on the pump again.



- ➨ Remove the 4 screws affixing the back cover with a Torx driver T20 to replace the fuses. Pay attention to the washers under the screws.
- ➨ Pull off front cover carefully. Do not tilt.



- ➨ Slide the cover containing the electrical system carefully aside. Remove the cover completely from the pump. **Attention**: The electrical system (wires and capacitors) is integrated inside the cover!



- ☞ The pigtail fuses are integrated into wires ((1), black and blue) between the power connection and the ON/Off switch. To replace the fuses it is necessary to replace both wires completely (fixed with flat pin bushings (2)).
- ➨ Remove both wires with integrated fuses (fixed with flat pin bushings (2), see figure). Mount the new wires (flat pin bushings)

- ➨ Slide the cover with the integrated electrical system back onto the pump housing. Be careful not to squeeze or damage any wires.

- ➨ Put back cover on.
- ➨ Install the washers. Use a Torx driver T20 to attach the 4 screws holding the cover.
  Maximum torque: 3 Nm.

VACUUBRAND order no.

Order-no. Set of fuses.....20636050 + 20636051

WARNING

Important: Check operability and safety of the pump after repair and after replacing the device fuse.

Check the electrical safety (protective conductor resistance, insulating resistance, high voltage test) according to IEC 61010 and national regulations.

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Repair - Maintenance - Return - Calibration

IMPORTANT

Every employer (user) is held responsible for the health and safety of his employees. This also applies to service personnel performing repair, maintenance, return or calibration.
The **health and safety clearance form** informs the contractor about any possible contamination of the device and forms the basis for the risk assessment.
In case of devices which have been in contact with biological substances of risk level 2 contact the VACUUBRAND service absolutely before dispatching the device. These devices have to be completely disassembled and decontaminated by the user prior to shipment. Do not return devices which have been in contact biological substances of risk level 3 or 4. These devices cannot be checked, maintained or repaired. Also decontaminated devices must not returned to VACUUBRAND due to a residual risk.
The same conditions apply to on-site work.

No repair, maintenance, return or calibration is possible unless the correctly completed health and safety clearance form is returned. Devices sent are rejected if applicable. Send a completed copy of the **health and safety clearance form** to us in advance. The declaration must arrive before the equipment. Enclose a second completed copy with the product.

Remove all components from the device that are no original VACUUBRAND components. VACUUBRAND will not be responsible for lost or damaged components that are no original components.
Drain the device completely of fluids and residues. Decontaminate the device.
Close all openings airtight especially if using substances hazardous to health.
To expedite repair and to reduce costs, please enclose a detailed description of the problem and the product's operating conditions with every product returned.
If you do not wish a repair on the basis of our **quotation**, the device may be returned to you disassembled and at your expense.
In many cases, the components must be cleaned in the factory prior to repair.
For cleaning we use an environmentally friendly water based process. Unfortunately the combined attack of elevated temperature, cleaning agent, ultrasonic treatment and mechanical stress (from pressurised water) may result in damage to the paint. Please mark in the health and safety clearance form if you wish a repaint at your expense just in case such a damage should occur. We will also replace parts for cosmetic reasons at your request and at your expense.

Before returning the device
Pack the device properly, if necessary, please order original packaging materials at your costs.
Mark the package completely
Enclose the completed health and safety clearance form.
Notify the carrier of any possible contamination if required.

Scrapping and waste disposal
Dispose of the equipment and any components removed from it safely in accordance with all local and national safety and environmental requirements. Particular care must be taken with components and waste oil which have been contaminated with dangerous substances from your processes. Do not incinerate fluoroelastomer seals and O-rings. You may authorize us to dispose of the equipment **at your expense.** Otherwise we return the device at your expense.

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Health and safety clearance form

1. Device (Model): .....

2. Serial no.: .....

3. Reason for return / malfunction: .....

   .....

4. Has the device been used in a copper process step (e.g., semiconductor production): ☐ yes ☐ no

5. Substances (gases, liquids, solids, biological material, e. g. bacteria, viruses) in contact with the device / which have been pumped:

   .....

   .....

   .....

   .....

6. Risk level of the used biological material: ☐ none ☐ 1 ☐ 2* ☐ 3** ☐ 4**
   * Contact the VACUUBRAND service absolutely before dispatching the device.
   ** Devices which have been in contact with biological substances of risk level 3 or 4 cannot be checked, maintained or repaired. Also decontaminated devices must not returned to VACUUBRAND due to a residual risk.

7. Radioactive contamination: ☐ yes ☐ no

8. Prior to return to the factory the device has been decontaminated: ☐ yes ☐ no
   Description of the decontamination method and the test / verification procedure:

   .....

   .....

9. All parts of the device are free of hazardous, harmful substances: ☐ yes ☐ no

10. Protective measures required for service staff:

    .....

11. If the paint is damaged, we wish a repaint or a replacement of parts for reason of appearance (repaint and replacement at customer's expense): ☐ yes ☐ no

12. Legally binding declaration

We assure for the returned device that all substances, which have been in contact with the device are listed in section 5 and that the information is complete and that we have not withheld any information. We declare that all measures - where applicable - have been taken listed in section "Repair - Maintenance - Return - Calibration". By our signature below, we acknowledge that we accept liability for any damage caused by providing incomplete or incorrect information and that we shall indemnify VACUUBRAND from any claims as regards damages from third parties. We are aware that as expressed in § 823 BGB (Public Law Code of Germany) we are directly liable for injuries or damages suffered by third parties, particularly VACUUBRAND employees occupied with handling/repairing the product. Shipping of the device must take place according to regulations.

Name: ..... Signature: .....

Job title: ..... Company's seal:

Date: .....

Release for repair grant by VACUUBRAND (date / signature): .....

Protective measures: ☐ Protective gloves, safety goggles ☐ Hood ☐ External cleaning

VACUUBRAND GMBH + CO KG
Alfred-Zippe-Straße 4
97877 Wertheim - Germany

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www.vacuubrand.com

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CE

EG-Konformitätserklärung für Maschinen
EC Declaration of Conformity of the Machinery
Déclaration CE de conformité des machines

Hersteller / Manufacturer / Fabricant:
VACUUBRAND GMBH + CO KG · Alfred-Zippe-Str. 4 · 97877 Wertheim · Germany

Hiermit erklärt der Hersteller, dass das Gerät konform ist mit den Bestimmungen der Richtlinien:
Hereby the manufacturer declares that the device is in conformity with the directives:
Par la présente, le fabricant déclare, que le dispositif est conforme aux directives:

2006/42/EG
2011/65/EU

Membranpumpe / Diaphragm pump / Pompe à membrane:
Typ / Type / Type: VP 100 / VP 100 C
Artikelnummer / Order number / Numéro d'article: 20721010, 20721011, 20721012 / 20721110, 20721111, 20721112
Seriennummer / Serial number / Numéro de série: Siehe Typenschild / See rating plate / Voir plaque signalétique

Angewandte harmonisierte Normen / Harmonized standards applied / Normes harmonisées utilisées:
DIN EN ISO 12100:2011, DIN EN 61010-1:2011, IEC 61010-1:2010 (Ed. 3), DIN EN 1012-2:2011, DIN EN 50581:2013

Bevollmächtigter für die Zusammenstellung der technischen Unterlagen / Person authorised to compile the technical file / Personne autorisée à constituer le dossier technique:
Dr. J. Dirscherl · VACUUBRAND GMBH + CO KG · Alfred-Zippe-Str. 4 · 97877 Wertheim · Germany

Wertheim, 01.07.2018
. . . . . .
Ort, Datum / place, date / lieu, date

. . . . . .
(Dr. F. Gitmans)
Geschäftsführer / Managing Director / Gérant

ppa. . . . . .
(Dr. J. Dirscherl)
Technischer Leiter / Technical Director / Directeur technique

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info@vacuubrand.com - www.vacuubrand.com

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Certificate

TÜVRheinland®

Certificate no. CU 72111636 01

License Holder:
VACUUBRAND GMBH + Co. KG
Alfred-Zippe-Str. 4

97877 Wertheim
Germany

Manufacturing Plant:
VACUUBRAND GMBH + Co. KG
Alfred-Zippe-Str. 4

97877 Wertheim
Germany

Test report no.: USA- 31181600 001 **Client Reference:** M. von Przychowski

Tested to: UL 61010-1:2004 R10.08
CAN/CSA-C22.2 NO. 61010-1-04+GI1 (R2009)

Certified Product: Diaphragm Vacuum Pump for Laboratory Use **License Fee - Units**

Model Designation: ME 1zzz; VP 100z
z = A-Z, blank 7

Rated Voltage: 1) AC 100-120V, 50/60Hz or
2) AC 230V, 50/60Hz or
3) AC 100-120V/200-230V, 50/60Hz

Rated Current: 1) 1.9A, 2) 0,8A, 3) 1.9/0.8A

Protection Class: I

7

Appendix: 1, 1-2

Licensed Test mark: TÜVRheinland C US

Signature

Dipl.-Ing. B. Engels
QA Certification Officer

Date of Issue (day/mo/yr) 12/08/2011

TUV Rheinland of North America, Inc., 12 Commerce Road, Newtown, CT 06470, Tel (203) 426-0888 Fax (203) 426-4009

This certificate is only valid for pumps with the respective mark (Licensed Test mark) on the pump rating plate.

Documents are only to be used and distributed completely and unchanged. It is strictly the users´ responsibility to check carefully the validity of this document with respect to his product.

vacuubrand

DECLARATION OF CONFORMITY – China RoHS 2

VACUUBRAND GMBH + CO KG has made reasonable efforts to ensure that hazardous materials and substances may not be used in its products.
In order to determine the concentration of hazardous substances in all homogeneous materials of the subassemblies, a “Product Conformity Assessment” (PCA) procedure was performed. As defined in GB/T 26572 the “Maximum Concentration Value” limits (MCV) apply to these restricted substances:

- Lead (Pb): 0.1%
- Mercury (Hg): 0.1%
- Cadmium (Cd): 0.01%
- Hexavalent chromium (Cr(+VI)): 0.1%
- Polybrominated biphenlys (PBB): 0.1%
- Polybrominated diphenyl ether (PBDE): 0.1%

Environmentally Friendly Use Period (EFUP)

EFUP defines the period in years during which the hazardous substances contained in electrical and electronic products will not leak or mutate under normal operating conditions. During normal use by the user such electrical and electronic products will not result in serious environmental pollution, cause serious bodily injury or damage to the user’s assets.
The Environmentally Friendly Use Period for VACUUBRAND products is 40 years.



此表格是按照SJ/T 11364-2014中规定所制定的。
This table is created according to SJ/T 11364-2014.

MATERIAL CONTENT DECLARATION FOR VACUUBRAND PRODUCTS							
	有毒有害物质或元素 Hazardous substances						
部件名称 Part name	铅 Pb	汞 Hg	镉 Cd	六价铬 Cr(+VI)	多溴联苯 PBB	多溴二苯醚 PBDE	环保期限标识 EFUP
包装 Packaging	O	O	O	O	O	O	
塑料外壳 / 组件 Plastic housing / parts	O	O	O	O	O	O	
真空油 Vacuum oil	O	O	O	O	O	O	
电池 Battery	O	O	O	O	O	O	
玻璃 Glass	X	O	O	O	O	O	
电子电气组件 Electrical and electronic parts	X	O	O	O	O	O	
控制器 / 测量设备 Controller / measuring device	X	O	O	O	O	O	
金属外壳 / 组件 Metal housing / parts	X	O	O	O	O	O	
电机 Motor	X	O	O	O	O	O	
配件 Accessories	X	O	O	O	O	O	

Copyright 2020

注释： 此表格适用于所有产品。以上列出的元件或组件不一定都属于所附产品的组成。
Note: Table applies to all products. Some of the components or parts listed above may not be part of the enclosed product.

O: 表示该有毒有害物质在该部件所有均质材料中的含量均在GB/T 26572规定的限量要求以下。
O: Indicates that the above mentioned hazardous substance contained in all homogeneous materials of the part is below the required limit as defined in GB/T 26572.

X: 表示该有毒有害物质至少在该部件某一均质材料中的含量超出GB/T 26572规定的限量要求。
X: Indicates that the above mentioned hazardous substance contained in at least one of the homogeneous materials of this part is above the required limit as defined in GB/T 26572.

除上表所示信息外，还需声明的是，这些部件并非是有意用铅（Pb）、 汞 （Hg）、铬（Cd）、六价铬（Cr(+VI)）、多溴联苯（PBB）或多溴二苯醚（PBDE）来制造的。
Apart from the disclosures in the above table, the subassemblies are not intentionally manufactured or formulated with lead (Pb), mercury (Hg), cadmium (Cd), hexavalent chromium (Cr+VI), polybrominated biphenyls (PBB), and polybrominated diphenyl ethers (PBDE).

Products manufactured by VACUUBRAND may enter into further devices (e.g., rotary evaporator) or can be used together with other appliances (e.g., usage as booster pumps).
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Place, date: Wertheim, 06/04/2020

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