VACUUBRAND®

CHEMISTRY PUMPING UNIT

PC 3012 NT VARIO select Duo

Customized equipment -
Please observe the notes in the supplementary sheet.

22615741

Instructions for use

Original instructions EN

OI no.: 20901562

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Notice: Customized equipment

Valid from: 13.10.2022
Equipment (Product): PC 3012 NT VARIO select Duo - 200-230V 50/60 Hz
Material No.: 22615741
Instructions for use for the standard equipment: PC 3012 NT VARIO select

The customized product identified above is based on a standard product which has been modified following the customer's requirement for modification.
Therefore, certain features of the customized product are different from those of the corresponding standard product. In general we do not have sufficient experience whether the modifications made meet the customer's requirements.
It is the customers responsibility to check the suitability of the equipment for the intended application *prior* to use.
The instructions for use of the standard product are enclosed.
It is the user's responsibility to check very carefully if specific information given in the instructions for use can be applied to the customized product.

In particular, the following differences have to be considered:

Both chemistry pumping units PC 3012 NT VARIO select are controlled by a single VACUU·SELECT® controller.

Startup:
- ➨ Assemble the separator via small flange connection at the connection hose at the inlet.
- ➨ Establish the VACUU•BUS connections. Connect both pumping units via their VACUU•BUS cables to the VACUU·SELECT®.
- ➨ Plug in the power cords of both pumping units and switch on both pumping units.
- ➨ Switch on the VACUU·SELECT®. Both pumping units will be controlled synchronously.

To avoid communication errors between the VACUU·SELECT® and the VARIO pumping units, each pumping unit has been assigned its own VACUU•BUS address.
Factory-set the pumping units are configured as follows:

Pumping unit with VACUU·SELECT®: VACUU•BUS address VARIO-NT 1
Pumping unit without VACUU·SELECT®: VACUU•BUS address VARIO-NT 2

Error messages:
- ☞ If one pumping unit sends an error message to the VACUU·SELECT®, the controller indicates an error message (warning, yellow). The second pumping unit will carry on running unimpaired.
- ☞ If both pumping units send an error message to the VACUU·SELECT®, both pumping units will stop. The controller indicates an error message (error, red).

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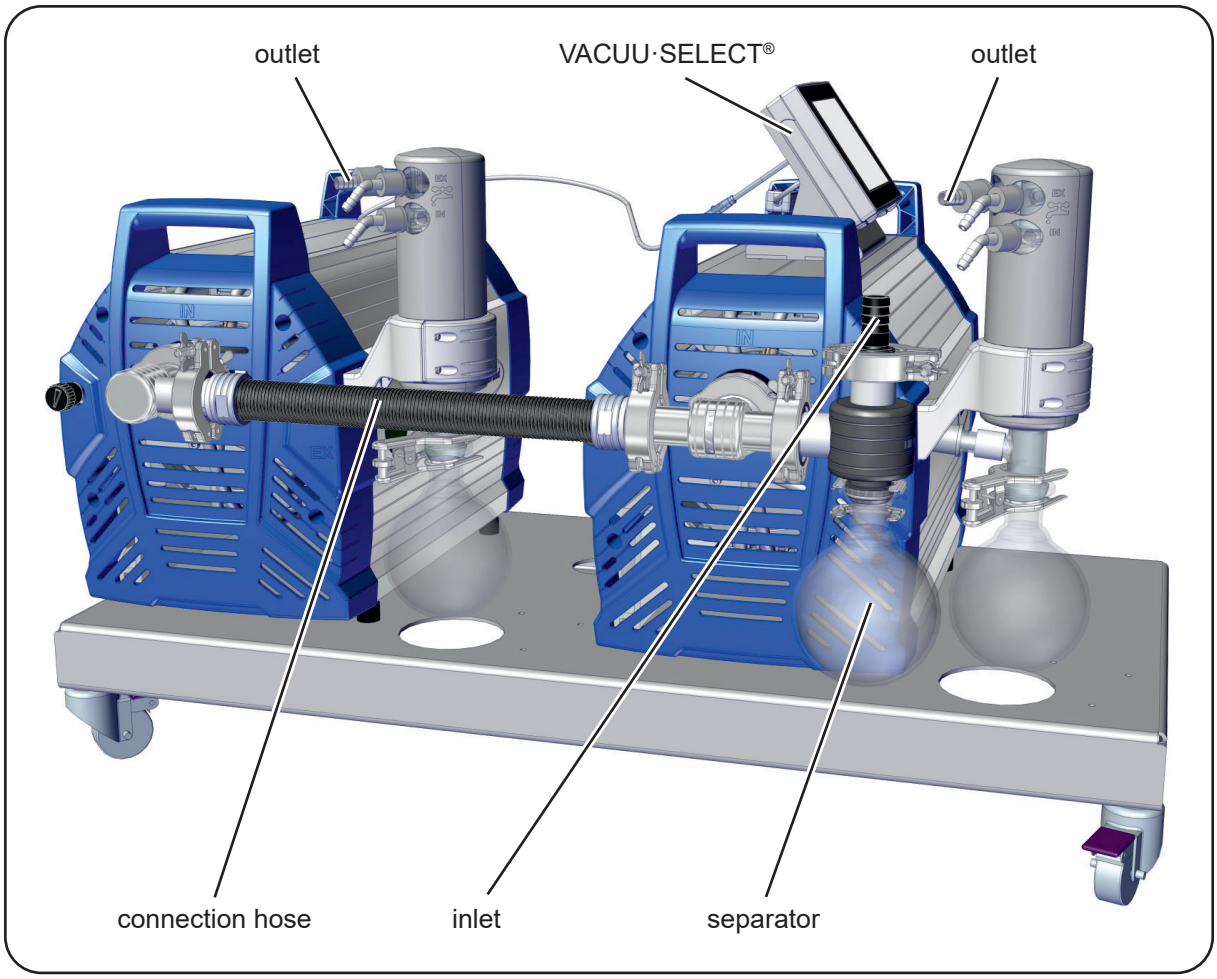

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Type		PC 3012 NT VARIO select Duo
Maximum pumping speed* (ISO 21360)	m^3/h	28
Ultimate vacuum (absolute) without gas ballast**	mbar	1.5
Ultimate vacuum (absolute) with gas ballast**	mbar	3
Maximum permissible inlet / outlet pressure (absolute)	bar	1.1
Maximum pressure difference between inlet and outlet	bar	1.1
Maximum permissible pressure (absolute) at gas ballast valve	bar	1.2
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 motor power (pump motor)	kW	1.06
No-load speed	min^{-1}	30 - 2400
Maximum permissible range of supply voltage (±10%) **Attention: Observe specifications of rating plate!**		200-230 V~ 50-60 Hz
Maximum rated current (pump motor) at: 200-230 V~ 50/60 Hz	A	7
Device fuse		4 slow blow fuses 250 V / 8AT - 5x20
Motor protection		thermal cutout, manual reset
Degree of protection IEC 60529		IP 40
Inlet		small flange DN 25 / hose nozzle DN 15
Outlet		2x hose nozzle DN 10
Volume of catchpot	ml	500
A-weighted emission sound pressure level*** (uncertainty K_{pA}: 3dB(A))	db(A)	53
Dimensions L x W x H approx.	mm	612 x 925 x 585
Weight approx.	kg	65

* Pumping speed of diaphragm pump
** Ultimate vacuum at setting ”Pump down” at speed ”HI”
*** Measurement according to EN ISO 2151:2004 and EN ISO 3744:1995 at 1500rpm and ultimate vacuum with exhaust tube at outlet.

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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
- 2014/30/EU
- 2014/34/EU
- 2011/65/EU, 2015/863

Chemie-Pumpstand / Chemistry pumping unit / Groupe de pompage « chimie »:
Typ / Type / Type: **PC 3012 NT VARIO select Duo**

Artikelnummer / Order number / Numéro d'article: **22615741**

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 1012-2:2011, DIN EN 61010-1:2020, IEC 61010-1:2010 (Ed. 3)
DIN EN 61326-1:2013
DIN EN 1127-1:2019; DIN EN ISO 80079-36:2016
DIN EN IEC 63000:2019

Bevollmächtigter für die Zusammenstellung der technischen Unterlagen / Person authorised to compile the technical file / Personne autorisée à constituer le dossier technique:
Dr. Constantin Schöler · VACUUBRAND GMBH + CO KG · Germany

Ort, Datum / place, date / lieu, date: Wertheim, 08.09.2022

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Declaration of Conformity

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

Hereby the manufacturer declares that the device is in conformity with the directives:

- Supply of Machinery (Safety) Regulations 2008
  (S.I. 2008 No. 1597, as amended by S.I. 2019 No. 696)
- Electromagnetic Compatibility Regulations 2016
  (S.I. 2016 No. 1091, as amended by S.I. 2019 No. 696)
- The Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 2016 (S.I. 2016 No. 1107, as amended by S.I. 2019 No. 696)
- The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012 (S.I. 2012 No. 3032)

Chemistry pumping unit
Type: **PC 3012 NT VARIO select Duo**

Order number: **22615741**

Serial number: See rating plate

Designated standards applied:
EN ISO 12100:2010, EN 1012-2:1996+A1:2009, EN 61010-1:2010+A1:2019
EN 61326-1:2013
EN 1127-1:2019, EN ISO 80079-36:2016
EN IEC 63000:2018

Person authorised to compile the technical file:
Dr. Constantin Schöler · VACUUBRAND GMBH + CO KG · Germany

Place, date: Wertheim, 08.09.2022

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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.

MATERIAL CONTENT DECLARATION FOR VACUUBRAND PRODUCTS						
	有毒有害物质或元素 Hazardous substances					
部件名称	铅	汞	镉	六价铬	多溴联苯	多溴二苯醚
Part name	Pb	Hg	Cd	Cr(+VI)	PBB	PBDE
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
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.						

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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。 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。 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.
电池、玻璃器皿和配件可能不属于所附设备所包含的内容，它们可能有各自单独的EFUP标记和/或可能正在维护其部件EFUP标记的更新。 Batteries, glassware and accessories might not be content of the enclosed device and may have its own EFUP-marking and/or might be maintaining parts with changing EFUP-marking.	

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。
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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).
With these products and appliances in particular, please note the EFUP labeled on these products.
VACUUBRAND will not take responsibility for the EFUP of those products and appliances.

Place, date: Wertheim, 06 September 2022

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VACUUBRAND®

CHEMISTRY PUMPING UNIT SERIES

PC 3010 NT VARIO select
PC 3016 NT VARIO select
PC 3012 NT VARIO select
PC 3012 NT VARIO select EKP

Instructions for use

Original instructions EN-US

20901552

Original instructions

Keep for future use!

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*Thank you for purchasing this product from **VACUUBRAND GMBH + CO KG**. You have chosen a state-of-the-art, high-quality product.*

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1 About this manual

This User manual is part of the pumping unit you have purchased.

This instruction manual is valid for all pumping unit models, together with the instruction manual of the **VACUU SELECT** controller, and is intended specifically for operators.

1.1 User information

Safety

Instruction manual and safety

- Read the User manual carefully before using the product.
- Store the User manual in a place where it is accessible and close at hand at all times.
- Correct use of the product is essential for safe operation. Above all else, please follow the safety instructions!
- In addition to the information in this User manual, please also observe the applicable national regulations on accident prevention and occupational safety.

General

General information

- When passing this product on to third parties, please also include the User manual.
- All figures and drawings are examples and are solely intended for the purpose of better understanding.
- We reserve the right to make technical changes in the course of continuous product improvement.
- In the interest of readability, the **Pumping unit** is equally used in place of the product name **Chemistry pumping unit PC 301x NT VARIO select**.

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Contact

Please contact us

- In case of an incomplete User manual, you can request a replacement from us. Alternatively, our download portal is available to you: www.vacuubrand.com
- Call us or write to us if you have any other questions about the product, need additional information or want to give us feedback on the product.
- When you contact our service department, please have the serial number and product type on hand --> see the nameplate on the product.

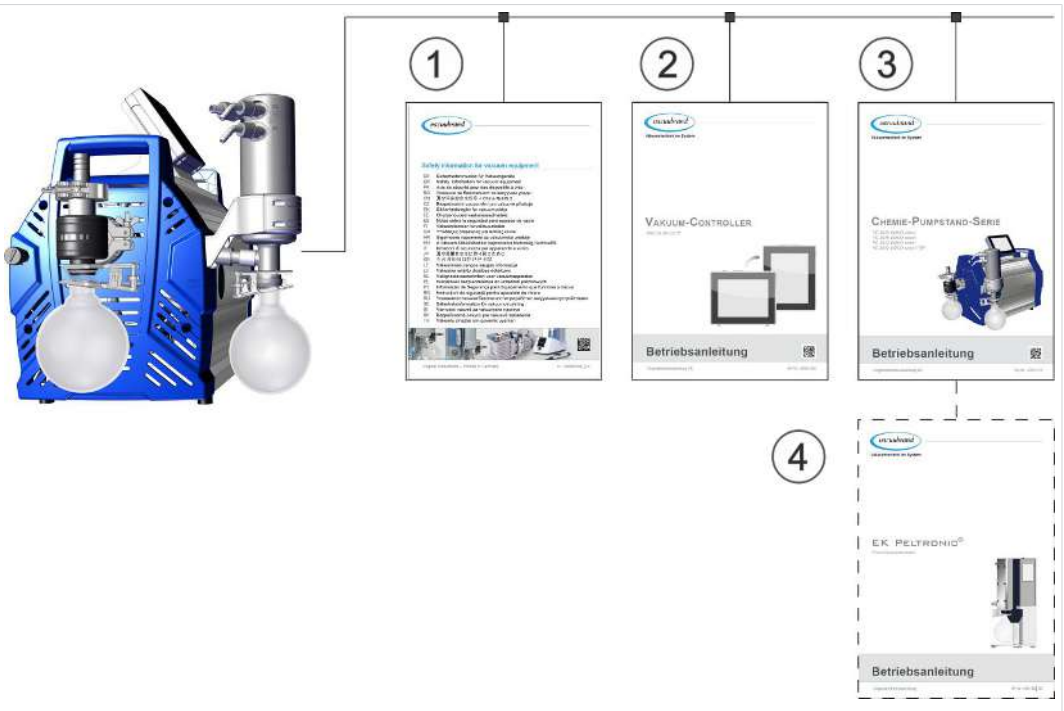
1.2 Manual structure

Breakdown of instructions

The manual has a modular structure with separate individual instruction modules for the pumping unit, controller, and any accessories.

Instruction modules

Pumping unit series and modular manuals



Description

1	Safety information for vacuum equipment
2	Description: Vacuum controller — Control and operation
3	Description: Pumping unit – connection, operation, maintenance, mechanics
4	Optional description: Accessories

1.3 Presentation conventions

Warning messages

Presentation of warning messages

DANGER

Warning of imminent danger.

Failure to observe this warning may result in imminent danger to life or severe injury.

➢ Please follow the instructions for prevention!

WARNING

Warning of a potentially dangerous situation.

Failure to observe this warning may result in danger to life or serious injury.

➢ Please follow the instructions for prevention!

CAUTION

Indicates a potentially dangerous situation.

Failure to observe this caution may result in minor injuries or material damage.

➢ Please follow the instructions for prevention!

NOTICE

Reference to a potentially harmful situation.

Failure to observe this note may result in material damage.

Additional information

Presentation of information and tips

General information about:

⇨ Tips and tricks

⇨ Helpful functions or activities

1.4 Symbols and pictograms

This instruction manual uses symbols and pictograms. These safety symbols and pictograms indicate specific dangers or requirements when handling the product. Warning signs with safety symbols on the product provide a visualization of the potential hazard.

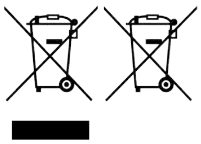
Safety symbols

Explanation of safety symbols

	General danger sign.		Warning of electrical voltage.
	Warning of hot surface.		Electrostatically sensitive components ESD.
	General mandatory action sign.		Disconnect power plug from electrical outlet.

Other symbols and pictograms

Additional symbols

	Positive example – **Right!** Result – **o.k.**		Negative example – **Wrong!**
	Reference to content in this User manual.		Reference to content in supplementary documents.
	Ensure sufficient air circulation.		
	Electrical and electronic equipment and batteries must not be disposed of in household waste at the end of their service life.		
	Inlet current arrow – vacuum connection		
	Outlet current arrow – exhaust gas		

1.5 Action instructions

Action instructions (simple)

Action instructions

⇨ You are requested to take action.

☑ Result of the action

Action instructions (multiple steps)

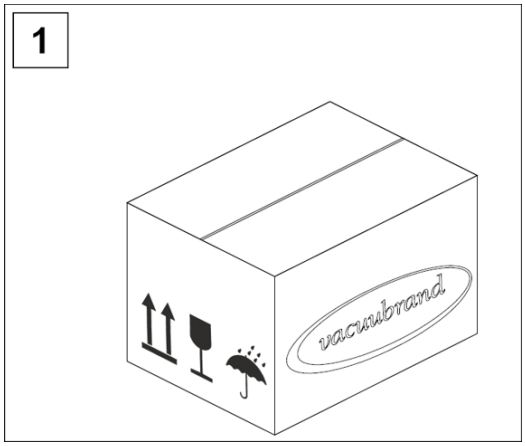
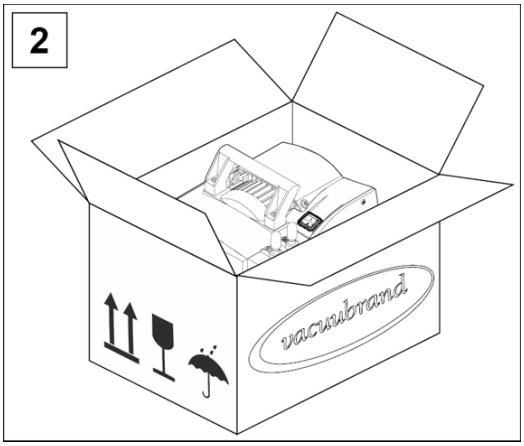
1. First action step
2. Next action step

☑ Result of the action

Action instructions that require several steps must be followed in the order they are described.

Action instructions (image description)

-> Example Principle presentation Operating steps presented in images

	
1. First action step.	2. Next action step. ☑ Interim result or result of the action

1.6 Abbreviations

Abbreviations used

>/	No greater than
abs.	Absolute
AK	Separator flask
ATM	Atmospheric pressure (bar graph, program)
di	Diameter
DN	Diameter nominal
EK	Emissions condenser
EKP	Peltronic emissions condenser or Peltronic EK
EX [1]	Outlet (exhaust, exit), exhaust gas connection
⟨Ex⟩	ATEX device marking
FPM	Fluoropolymer rubber
Gas type ind.	Gas type independent
GB	Gas ballast
If necessary	If necessary
Size	Size
IK	Immissions condenser
IN[1]	Inlet, vacuum connection
KF	Small flange
Max.	Maximum value
Min.	Minimum value
NT	New technology
o. EK	Without emissions condenser
PA	Polyamide
PBT	Polybutylene terephthalate
PC ...	Chemistry pumping unit with type code
PE	Polyethylene
RMA No.	Return authorization number
so-called	so-called
SW	Wrench size (tool)
TE	Dry ice condenser
resp.	Responsible person(s)
e.g.	For example

1 *Labeling on vacuum pump or component, see also product specific abbreviations under: Chemistry pumping unit series*

1.7 Explanation of terms

Product-specific terms

Separator flask	Glass flask/separator installed at the inlet or outlet.
Emission condenser [2]	Cooling condenser with receiving flask installed at the outlet (pressure side).
Fine vacuum	Pressure measurement range in the vacuum technology, from: 1 mbar–0.001 mbar (0.75 Torr–0.00075 Torr)
Rough vacuum	Pressure measurement range in the vacuum technology, from: Atmospheric pressure–1 mbar (atmospheric pressure–0.75 Torr)
Immission condenser [2]	Cooling condenser with receiving flask installed at the inlet (vacuum side).
PC 301x NT VARIO select	Vacuum pumping unit NT version with speed control for precise vacuum regulation with VACUU SELECT controller and VACUU·SELECT sensor.
Peltronic	Electronic cooler with Peltier elements installed at the outlet (pressure side); condenses solvent vapors without external cooling medium.
Dry ice condenser [2]	Cooling condenser with receiving flask and dry ice as cooling medium installed at the outlet (pressure side).
VACUU·BUS	VACUUBRAND bus system for the communication of peripheral devices with VACUU BUS-capable measuring equipment and controllers.
VACUU·BUS address	Address that enables a clear assignment of the VACUU BUS client in the bus system, e.g. for the connection of several sensors of the same measurement range.
VACUU BUS client	Peripheral device or components with VACUU BUS connection, which is integrated in the bus system, e.g. sensors, valves, level indicators, etc.
VACUU BUS plug	4-pin round plug for the VACUUBRAND bus system.
VACUU BUS configuration	Using a measuring device or controller to assign a new VACUU BUS address to a VACUU BUS component.
VACUU·SELECT	Vacuum controller, controller with touchscreen; consisting of control unit and vacuum sensor.
VACUU·SELECT sensor	Vacuum sensor with integrated venting valve.
VARIO drive	Speed control for vacuum pumps; the motor only runs as fast as needed.

2 *Only suitable for the condensation of vapors.*

2 Safety instructions

The information in this chapter must be observed by all persons who work with the device described here.

The safety instructions are valid for all life stages of the product.

2.1 Use

The device may only be used in perfect technical condition.

2.1.1 Proper use

Proper use

A chemistry pumping unit of the **PC 301x NT VARIO select** product series is a vacuum system consisting of a vacuum pump, controller, vacuum sensor and separator for generating and regulating a rough vacuum in installations designed for this purpose.

Attached coolers (emission condenser, immission condenser, dry ice cooler, Peltronic emission condenser), including separator and flask, are exclusively designed for condensing vapors.

The vacuum system should only be used in a dry, non-explosive environment.

Proper use also includes:

- following the instructions in the document *Safety instructions for vacuums,*
- observing the instruction manual,
- observing the instruction manual of connected components,
- complying with inspection and maintenance intervals and having this carried out only by qualified personnel.
- using only approved accessories or replacement parts.

Any other use or use beyond this is considered improper.

2.1.2 Improper use

Improper use

Improper use or any use that does not correspond with the technical data can lead to personal or material damage.

Improper use is considered:

- use that contradicts the proper use,
- operation in unauthorized ambient and operating conditions,
- operation with obvious faults, damages or defective safety equipment,
- unauthorized extensions and modifications, especially when these compromise safety,
- use in an incomplete state,
- operation with sharp-edged objects,
- pulling connectors on the cable out of the socket,
- vacuuming, pumping and condensing solid materials or liquids.

2.1.3 Foreseeable misuse

Misuse

In addition to improper use, there are other types of use that are forbidden when handling the device.

Forbidden types of use are primarily:

- use on people or animals,
- setup and operation in a potentially explosive environment,
- use in mining or underground,
- using the product to generate pressure,
- fully exposing vacuum equipment to the vacuum,
- submerging vacuum equipment in liquids, exposing to spray water or steam spraying,
- pumping oxidizing and pyrophoric materials, liquids or solids,
- pumping media that is hot, unstable, potentially explosive or explosive,
- pumping materials that can react explosively under impact and/or increased temperature without air supply.

The user must prevent the penetration of foreign bodies, hot gases and flames.

2.2 Responsibilities

Follow the instructions for all actions as they are specified in this instruction manual.

Responsibilities of the operator

Operator responsibilities

The operator defines the responsibilities and ensures that only trained or qualified personnel work on the vacuum system. This applies in particular to connection, assembly work, maintenance tasks and fault elimination.

Users in the competency areas listed in the→ ***Target group description on page 15*** must have the corresponding qualification for the listed activities. Only qualified electricians are permitted to carry out special work on electrical equipment.

Personnel responsibilities

Personnel responsibilities

For activities that require protective clothing, the personal protection equipment specified by the operator must be worn.

When the vacuum system is not in proper operating condition, it must be secured against accidental restart.

- ⇨ Always work with safety in mind.
- ⇨ Follow the operator's instructions and the national regulations on accident prevention and occupational safety.

Personal conduct can contribute to the prevention of occupational accidents.

2.3 Target group description

Target groups

The instruction manual must be read and observed by every person entrusted with one of the following activities.

Personnel qualification

Qualification description

Operator	Laboratory personnel, e.g. chemists, physicists, lab technicians
Qualified employee	Person with professional qualification for maintenance and/or repair in the field of: mechanical systems, electrical systems or laboratory equipment. The assigned work can be assessed and potential dangers detected.
Responsible specialist	Qualified employee with additional field, department or division responsibility who is assigned by the operator.

Responsibility matrix

Who-does-what matrix

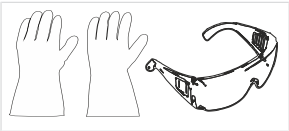
Task	Operator	Qualified employee	Responsible specialist
Installation	x	x	x
Initial operation	x	x	x
Network integration			x
Operation	x	x	x
Fault reporting	x	x	x
Fault elimination	(x)	x	x
Device fuse replacement		x	x
Maintenance		x	x
Repair[3]		x	x
Repair order			x
Cleaning, simple	x	x	x
Emptying separator	x	x	x
Decommissioning	x	x	x
Decontamination[4]		x	x

3 *See also homepage: VACUUBRAND > Support > Repair instructions*

4 *Or have decontamination carried out by a qualified service provider.*

2.4 Protective clothing

Special protective clothing is not required for operation of the vacuum pump. Follow the operator's instructions for your workplace.



For cleaning, maintenance and repair work, we recommend wearing fully adequate protective gloves, clothing and glasses.

⇨ Wear your personal protection equipment when handling chemicals.

2.5 Safety measures

Manufacturer measures

Products of **VACUUBRAND GMBH + CO KG** are subject to high quality control requirements in terms of safety and operation. Each product is put through an extensive test program before delivery.

Operator measures

Operator measures

⇨ Use your vacuum only when you have understood the instruction manual and the operation.

⇨ Replace defective components immediately, e.g. broken power cables, defective hoses or flasks.

⇨ Use only original accessories and components that are designed for the vacuum technology, e.g. vacuum hose, separator, vacuum valve, etc.

⇨ When handling contaminated parts, follow the relevant regulations and protection measures; this also applies to sending parts in for repair.

⇨ For repairs, send us the carefully filled out and signed Clearance Certificate **before** you send your product in for repair. Hazardous materials must be able to be excluded for all repair shipments to our service department.

2.6 Laboratory and work materials

DANGER

Hazardous materials leak at the outlet.

When operating the vacuum, hazardous, toxic substances can leak into the ambient air at the outlet.

- Please observe the safety regulations for handling hazardous materials and media.
- Remember that adhesive process media can present a danger to humans and the environment.
- Install and use suitable separators, filters or extraction equipment.

Dangers posed by different substances

Pumping different substances

Pumping different substances or media can trigger a reaction between materials.

Work materials that leak into the vacuum pump with the gas flow can damage the vacuum pump. Hazardous substances can form deposits in the vacuum pump.

Possible protective measures

Protective measures, depending on the application

- ⇨ Rinse the vacuum pump with inert gas or air before you change the pumping medium.
- ⇨ Use inert gas to dilute critical mixtures.
- ⇨ Prevent the release of hazardous, toxic, explosive, corrosive, health-damaging or environmentally harmful fluids, gases or vapors, e.g. by using suitable laboratory equipment with an extraction system and ventilation control.
- ⇨ Protect the inside of the vacuum pump from deposits or humidity, e.g. by using a gas ballast feed system.
- ⇨ Observe the interactions and possible chemical reactions of the pumped media.
- ⇨ Check the compatibility of the pumped substances with the medium-affected materials of the pumping unit.
- ⇨ Contact us if you have concerns about using your vacuum pump with special work materials or media.

Preventing foreign bodies inside the pump

Observing the vacuum pump design

Particles, liquids and dust are not permitted inside the vacuum pump.

- ⇨ Do not pump any substances that can form deposits inside the vacuum pump.
- ⇨ Install suitable separators and/or filters in front of the inlet. Suitable filters are chemical resistant, clog-free and ensure a constant flow rate.
- ⇨ Replace porous vacuum hoses promptly.

2.7 Possible sources of danger

Considering mechanical stability

Observing mechanical stability

Due to the high compression ratio of the pumps, a higher pressure can build up at the outlet than the mechanical stability of the system allows.

- ⇨ Always ensure that the exhaust line is open and free of pressure. To guarantee an unobstructed emission of gases, the outlet must remain unblocked.
- ⇨ Prevent uncontrolled excess pressure, e.g. due to shut-off or blocked piping system, condensate or clogged exhaust line.
- ⇨ At the gas connections, the connections for inlet (IN) and outlet (EX) must never be confused.
- ⇨ Observe the max. pressure at the inlet and outlet of the pump as well as the max. permissible differential pressure between inlet and outlet, in accordance with the *technical data*.
- ⇨ The system to be evacuated and all hose connections must be mechanically stable.
- ⇨ Attach the coolant hoses to the hose nozzles so that they do not come loose unintentionally.

Preventing condensate return flow

Preventing backlog in the exhaust line

Condensate can damage the pump head. Condensate must never flow back through the hose line into the outlet and into the pump head. Liquid is not allowed to collect in the exhaust line.

- ⇨ Prevent condensate return flow by using a separator. Condensate is not allowed to enter the inner housing through the hose lines.
- ⇨ If possible, lay the exhaust hose so that it is descending from the outlet; i.e. running downward, so that no backlog can form.
- ⇨ Incorrect measurement due to blocked vacuum line, e.g. condensate in the vacuum line can distort the measurements of the vacuum sensor.
- ⇨ Prevent excess pressure in the suction hose (>/ 1060 mbar [>/ 795 Torr]).

Dangers during ventilation

Looking out for dangers during ventilation

Depending on the process, a potentially explosive mixture can form in installations or other dangerous situations can occur.

Dangers due to residual energy

Possible residual energies

After the vacuum pump has been switched off and disconnected from the power network, dangers may still be present due to residual energies:

- Thermal energy: Motor waste heat, hot surface, compression heat.
- Electrical energy: Installed condensers have a discharge time of up to 3 minutes.

Please note the following before performing actions:

- ⇨ Allow the vacuum pump to cool down.
- ⇨ Wait until the condenser have discharged.

Dangers due to hot surfaces or overheating

Surface temperatures

The surface of vacuum pumps can reach temperatures greater than 70 °C during operation, especially when vacuuming heated media.

- ⇨ Avoid direct contact with the surface or wear heat-resistant safety gloves if contact cannot be excluded.
- ⇨ Provide contact protection if the surface temperature should be elevated on a regular basis.
- ⇨ Allow the vacuum pump to cool down before performing maintenance tasks.

Overheating

The vacuum pump can become damaged due to overheating. Potential causes are insufficient air supply to the cooling fan and/or non-compliance with minimum distances.

- ⇨ When setting up the device, observe a minimum distance of 5 cm between the cooling fan and adjacent parts (e.g. housing, walls, etc.).
- ⇨ Always ensure that there is sufficient air supply; if necessary, provide an external forced ventilation system.
- ⇨ Place the device on a stable surface. A soft surface, e.g. foam as sound absorber, can impair and block the supply of air.
- ⇨ Clean dirty ventilation slots.
- ⇨ Remove the cover hood used as transport protection before you put the device into operation.
- ⇨ Avoid applying too much heat due to hot process gases.
- ⇨ Observe the maximum permissible media temperature according to the *technical data*.

Ensure that signs are readable

Labels and signs

Make sure that instructions and signs attached to the device remain in a readable condition:

- ⇨ Labels for connections
- ⇨ Warning and information signs
- ⇨ Motor data and type plates

2.8 Motor protection

CAUTION

Limited winding protection with supply voltages less than 115 V AC.

With supply voltages less than 115 V AC, the self-locking mechanism of the winding protection can be limited. After cooling, this can cause the pump to start automatically.

➢ When overheating, switch the pump off to avoid an automatic restart.

Overheating protection, blockage protection

The pump motor has a temperature sensor in the motor winding. If the temperature is excessive or the motor is blocked, the vacuum pump switches off.

Restart procedure

If the vacuum pump switches off due to these safety measures, the fault must be reset manually: Disconnect the pumping unit from the power supply or acknowledge the fault message on the controller -> Eliminate the cause of the error -> Allow the vacuum pump to cool down -> Restart the pumping unit

2.9 ATEX device category

Installation and explosive environment

Installation and operation in areas where an explosive atmosphere can occur in dangerous quantities is not permitted.

The user is responsible for assessing the hazards for the device, so that any protection measures can be implemented for the installation and safe operation.

The ATEX certification applies only for the inner area in contact with media of the of the vacuum pump, not for the surrounding area.

ATEX device marking

ATEX device category

Vacuums labeled with the marking Ex are certified in accordance with the ATEX marking on the type plate.

Operation is only permitted in technically sound condition.

The product is designed for a low degree of mechanical danger and must be installed so that it cannot be mechanically damaged from the outside.

ATEX device category and peripheral devices

The ATEX device category of the of the vacuum pump depends on the connected components and the periphery. Components and peripheral devices must have the same or higher ATEX classification.

Preventing sources of ignition

The use of ventilation valves is only permitted if it is ensured that this normally does not produce explosive mixtures in the interior of the of the vacuum pump or that in all probability explosive mixtures are only briefly or rarely produced.

⇨ If necessary, ventilate with inert gas.

Information about the ATEX device category can be found online: ATEX information

Restrictions on operating conditions

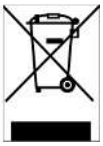
Explanation of usage conditions X

Type plate example

Meaning for devices marked with **X**:

- The devices have a low mechanical protection and must be installed so that they cannot be mechanically damaged from the outside; e.g., installing pumping units with impact protection, attaching shatter protection for glass flasks, etc.
- The devices are designed for an ambient and media temperature of +10 °C to – +40 °C during operation. These ambient and media temperatures must never be exceeded. When conveying/measuring non-explosive gases, extended gas suction temperatures apply, see chapter: Technical data, media temperature (gas).

2.10 Disposal



NOTICE

Improper disposal of electronic components can result in damage to the environment.

Electronic equipment contains hazardous materials that can damage the environment or human health. Discarded electronic equipment also contains valuable raw materials, which can be recovered if properly disposed of for recycling.

End users are required by law to bring waste electrical and electronic equipment to an approved collection site.

⇨ Please properly dispose of electrical waste and electronic components at the end of their service life.

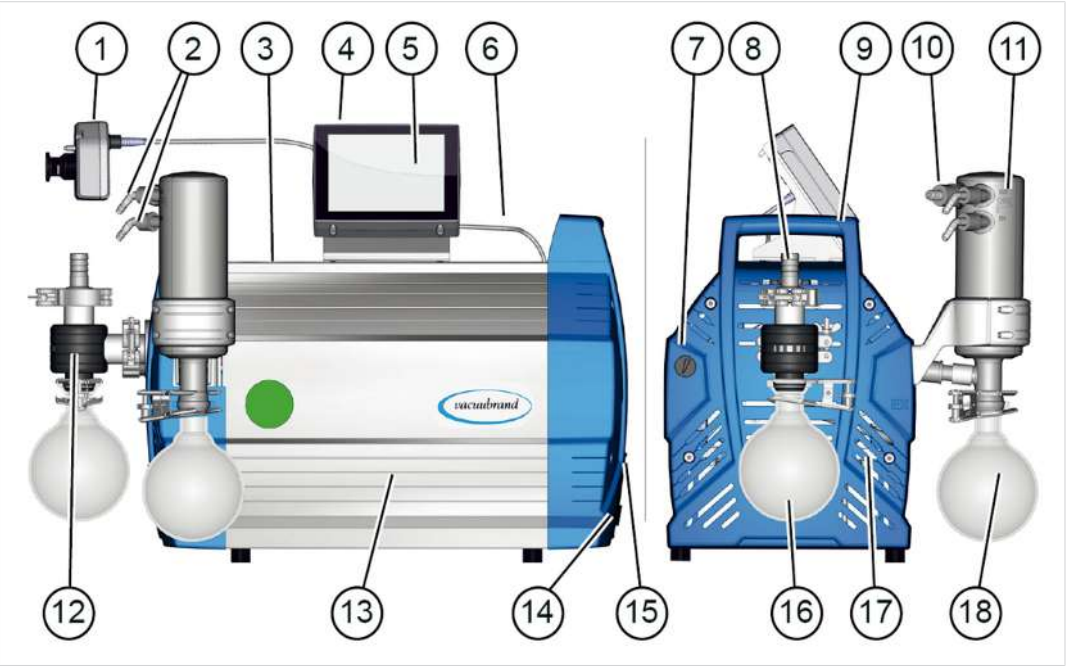
⇨ Observe the national regulations on disposal and environmental protection.

3 Product description

Pumping units of the PC 301x NT VARIO select series essentially consist of a diaphragm pump controlled by VARIO drive, a VACUU·SELECT vacuum controller and a chiller with separator. There are different versions of chiller. The difference lies in how the chillers operate.

3.1 Basic configuration of pumping unit series

View and basic configuration PC 301x NT VARIO select



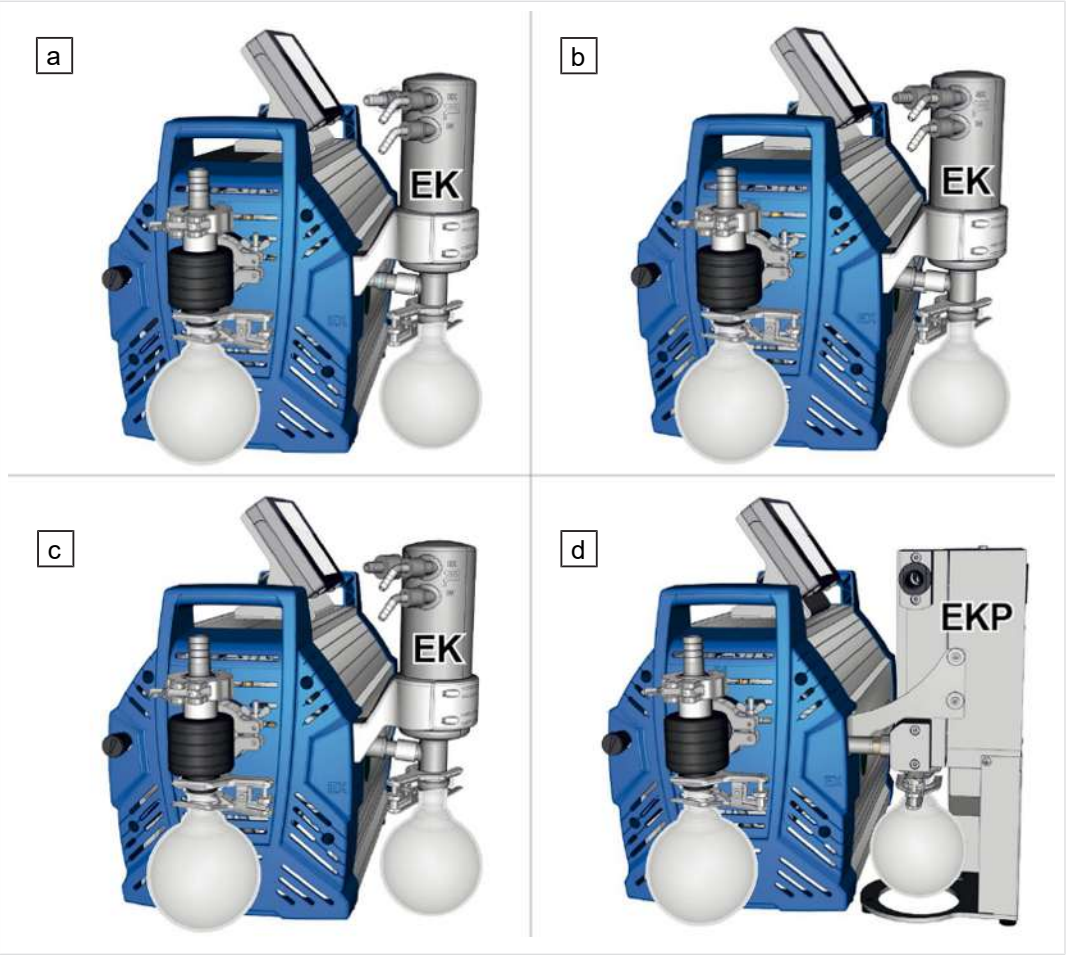
Meaning

1	VACUU·SELECT sensor, mount on suction line
2	Coolant connections
3	Chemical membrane pump
4	On/Off button VACUU·SELECT controller
5	VACUU·SELECT control unit
6	VACUU·BUS cable (power supply controller + control cable)
7	Gas ballast valve
8	Vacuum connection – inlet IN
9	Handle (2x)
10	Outlet connection – outlet EX
11	Emissions condenser EK
12	Inlet separator
13	Side panel, cover
14	Power connection to pumping unit, On/Off switch (rocker switch) + device fuse

15	Nameplate
16	Round bottom flask at the inlet
17	Housing section with handle, front
18	Round bottom flask at outlet

3.2 Chemistry pumping unit series

Overview of chemistry pumping units



Meaning

Chemistry pumping unit		Pump head	Steps	AK	EK	EKP
a	PC 3010 NT VARIO select	8	4	●	●	
b	PC 3016 NT VARIO select	8	1	●	●	
c	PC 3012 NT VARIO select	8	3	●	●	
d	PC 3012 NT VARIO select EKP	8	3	●		●

Product-specific abbreviations

Product-specific abbreviations

AK	Separator flask, installed at inlet or outlet
EK	Emission condenser, installed at outlet
EKP	Peltronic emission condenser, installed at outlet

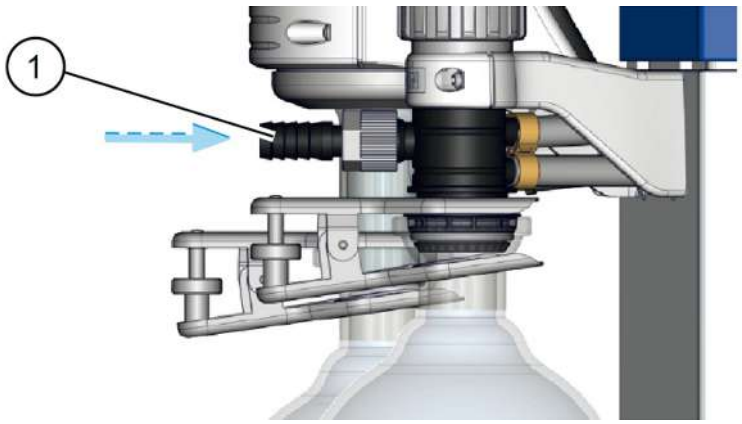
PC	Chemistry pumping unit with type code

3.3 Condensers and coolers

3.3.1 Separator/condenser at inlet

Connection on separator flask

Connections on AK



Meaning

1	Vacuum inlet connection IN

3.3.2 Condenser at outlet

Connection and coolant on emission condenser

Connections on EK

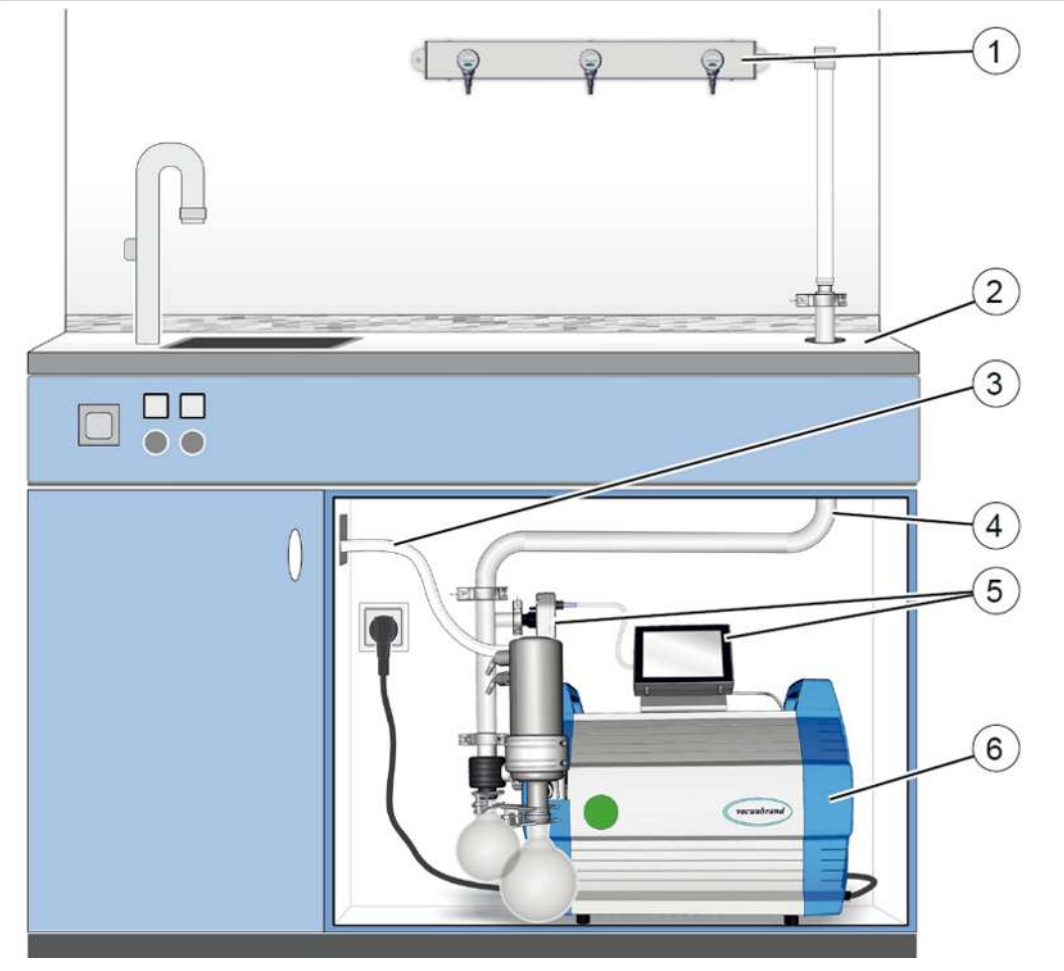
Meaning

1	Outlet connection coolant EX
2	Inlet connection coolant IN, e.g. water
3	Outlet connection EX

3.4 Application example

Local vacuum network

-> Example Local area vacuum network



Meaning

1	Example of use: VACUU·LAN®, network arrangement with three valve modules
2	Laboratory furniture
3	Exhaust gas hose (diverted into a fume hood)
4	Vacuum tubing
5	VACUU·SELECT operating panel + VACUU·SELECT sensor
6	**PC 3012 NT VARIO select** vacuum pumping unit

4 Installation and connection

4.1 Transport

Products from **VACUUBRAND** are packaged in stable, recyclable packaging.

The original packaging is customized to your product for safe transport.

⇨ If possible, keep the original packaging, e.g. for sending in for repairs.

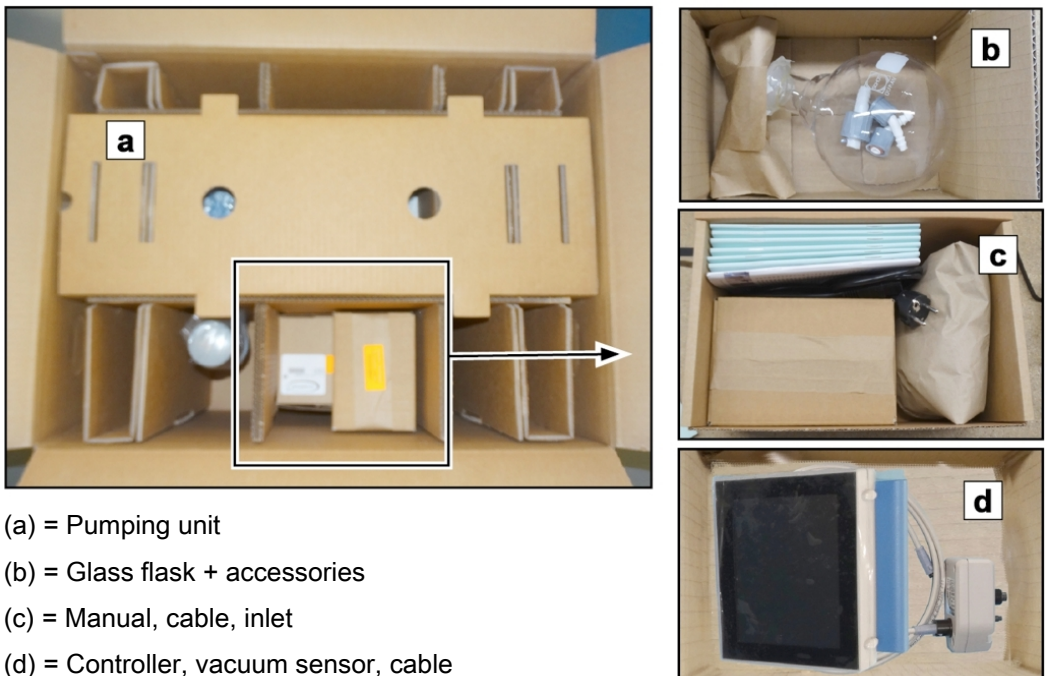
Incoming goods

⇨ Check the delivery immediately after receipt for any transport damage and for completeness.

⇨ Promptly report transport damage to the supplier in writing.

Unpacking

-> Example Pumping unit in original packaging with enclosed package



(a) = Pumping unit

(b) = Glass flask + accessories

(c) = Manual, cable, inlet

(d) = Controller, vacuum sensor, cable

1. Remove all enclosed packages from their original packaging and unpack them.
2. Compare the scope of delivery with the delivery note

Please note that a pumping unit can weigh approx. 30-34 kg.
We recommend using a lifting aid.
Lift the unit out of the packaging by the side handles.

4.2 Installation

NOTICE

Condensate can damage the electronics.

A large difference in temperature between the storage location and the installation site can lead to the formation of condensate.

⇨ After receipt or storage, allow your vacuum to acclimatize for at least 3–4 hours before putting it into operation.

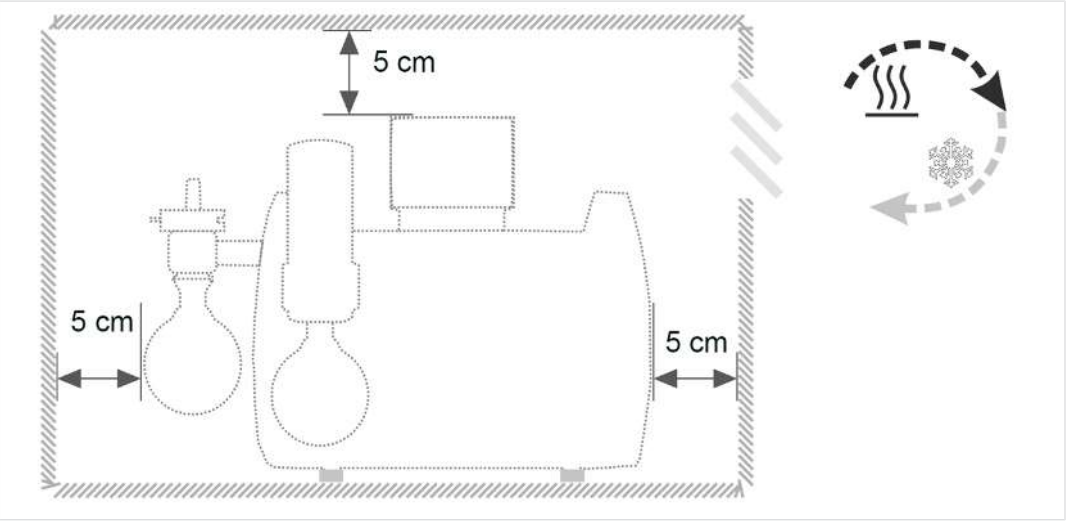
Checking the installation conditions

Calibrating the installation conditions

- The device is acclimatized.
- The ambient conditions are met and lie within the limitations of use.
- The pump must installed on a stable and secure floor, with no other mechanical contact apart from the pump feet.

Installing the vacuum pump

-> Example Sketch of minimum distances in laboratory furniture



- ⇨ Place the vacuum pump on a stable, vibration-free, level surface.
- ⇨ When installing laboratory furniture, maintain the minimum distance of 5 cm (2 in.) to adjacent objects or surfaces.
- ⇨ Avoid heat accumulation and ensure sufficient air circulation, especially in closed housings.

Observing the limitations of use

Ambient conditions

Ambient conditions		(US)
Ambient temperature	10–40 °C	50–104°F
Installation height, max.	2000 m above sea level	6562 ft above sea level
Humidity	30–85 %, non-condensing	
Degree of contamination	2	
Impact energy	5 J	
Protection class (IEC 60529)	IP 40	
Protection class (UL 50E)		Type 1
Avoid condensate or contamination from dust, liquids and corrosive gases.		

- ⇨ Note the indicated IP protection rating. The IP protection is only guaranteed if the device properly installed and connected.
- ⇨ When connecting the device, always take note of the specifications from the type plate and in the chapter technical data.

4.3 Controller base

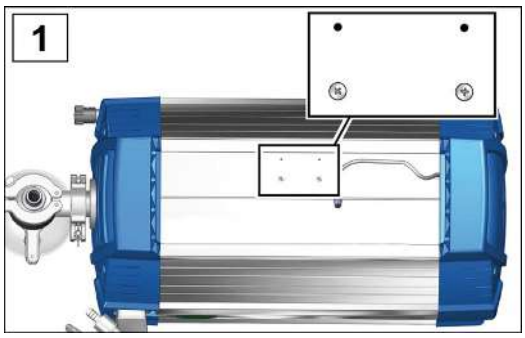
The holding base, controller, screw fasteners and vacuum sensor are enclosed in a separate box.

Before installation, you can mount the holding base on the pumping unit, attach the controller in it and connect the VACUU BUS cable; see the following assembly description.

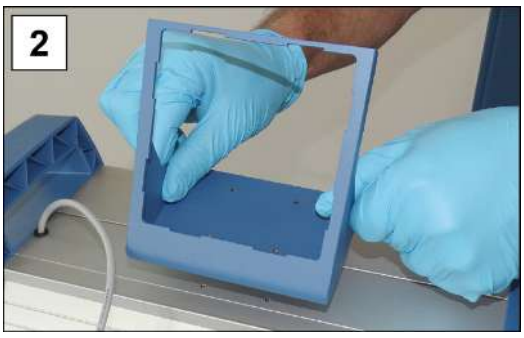
Instead of attaching the controller on the pumping unit, you can also attach it directly in the laboratory furniture with an appropriate gap; then use a VACUU BUS extension cable for the connection.

Mounting the holding base

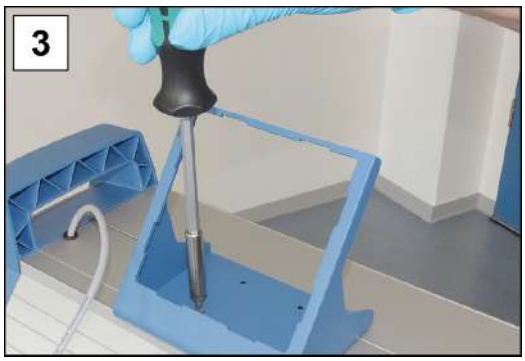
Mounting the holding base on the pumping unit (option)



1. Unscrew the fittings from the pumping unit; Phillips-head screwdriver size 1.



2. Position the holding base on the pumping unit.



3. Screw in the fittings with the holding base.

4. Slide the controller into the holding base.

5. Plug the VACUU BUS cable into the power connector on the back side of the controller.	6. Also plug in the VACUU BUS cable of peripheral devices, such as a vacuum sensor. Use Y-adapters (see accessories) if there are not enough connections.

4.4 Connection (supply connections)

On the pumping unit, supply connections are provided for vacuum and exhaust, and optionally for gas ballast, ventilation and coolant. Set up the connection for your pumping unit as described in the following examples. Also attach the provided screw fasteners and glass flasks to the condensers.

4.4.1 Vacuum connection (IN)

CAUTION

Flexible vacuum hoses can contract during evacuation.

Non-fixed, connected components may cause injury or do damage due to the jerky movement (shrinking) of the flexible vacuum hose. The vacuum hose can come loose.

- Fasten the vacuum hose to the connections.
- Fasten connected components.
- Measure the flexible vacuum hose so that the maximum shrinkage, i.e. the contraction, is taken into account.

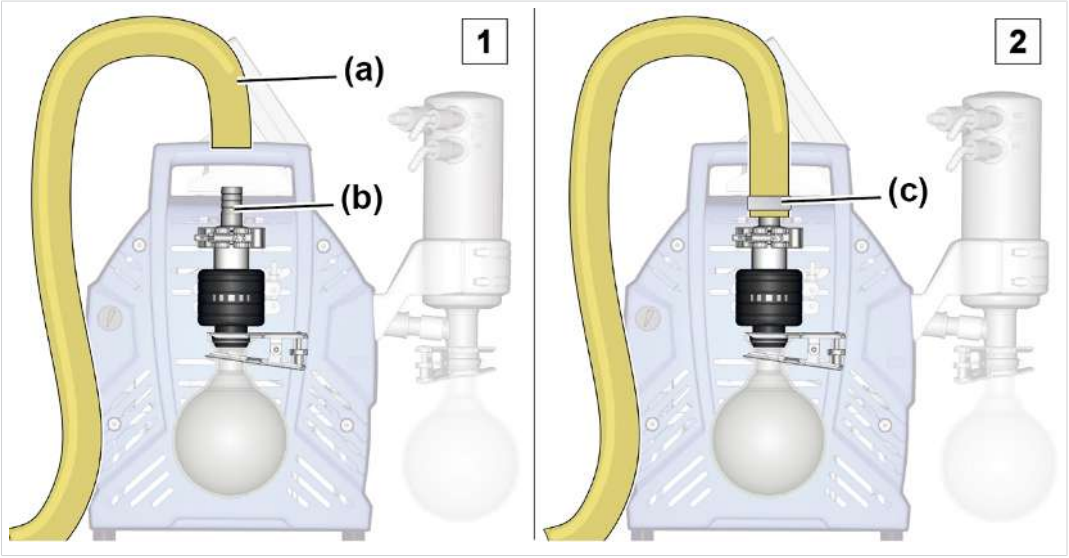
NOTICE

Foreign bodies in the suction line can damage the vacuum pump.

⇨ Prevent particles, liquids or contaminants from being vacuumed or from being able to flow back.

Connecting the vacuum hose

-> Example Vacuum connection at inlet IN



You will achieve the optimal vacuum for your application if you observe the following points:

- ⇨ Connect the shortest possible vacuum line with the maximum possible cross-section.
- ⇨ Use a vacuum hose with sufficient stability that is designed for the vacuum range used.
- ⇨ Connect hose lines so they are gas tight.

4.4.2 Exhaust connection (OUT)

WARNING

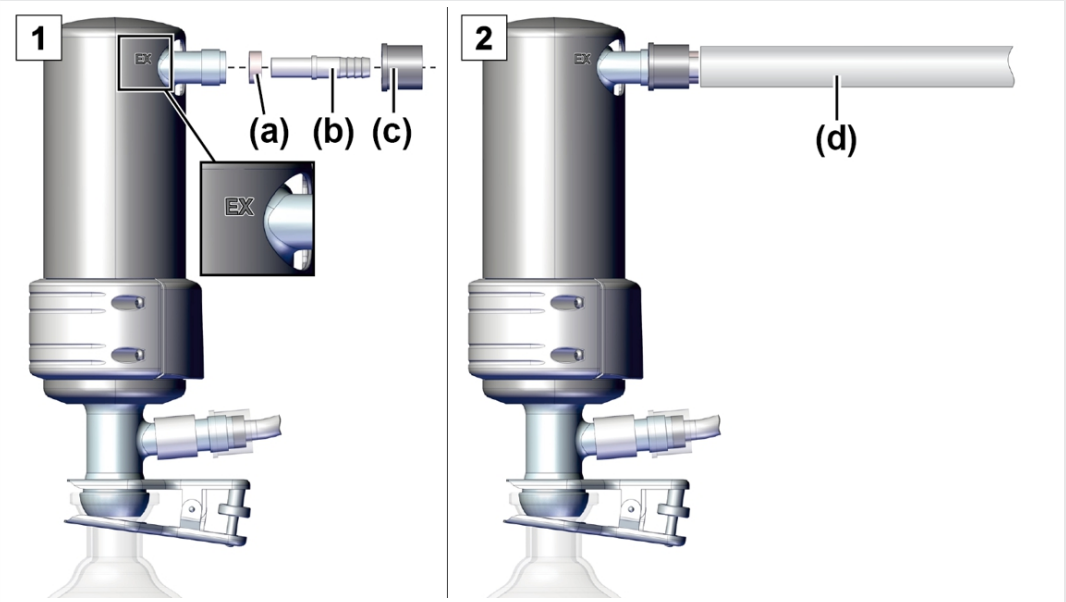
Risk of bursting due to excess pressure in the exhaust line.

Unacceptably high pressure in the exhaust line may cause the vacuum pump to burst or damage seals.

- The exhaust line (outlet, gas outlet) must always be open and free of pressure.
- Always lay the exhaust hose so that it is descending, or take measures to prevent condensate return flow into the vacuum pump.
- Observe the maximum allowable pressures and pressure differentials.

Connecting the exhaust hose

-> Example Exhaust connection at outlet EX



1. Join the rubber sealing ring **(a)**, the hose nozzle **(b)** and the cap nut **(c)** as pictured and screw this onto the connection.
2. Slide the exhaust hose **(d)** onto the hose nozzle and, if necessary, route the hose to a fume hood. If necessary, fasten the exhaust hose, e.g. with a hose clamp.

4.4.3 Coolant connection on the condenser

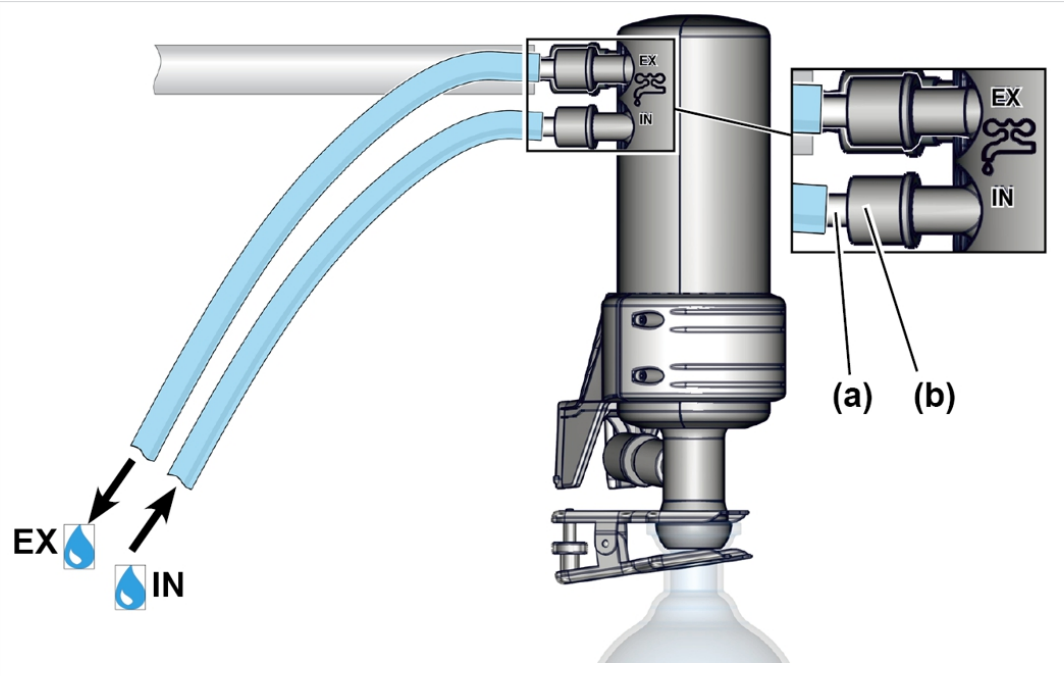
Coolant connection
Inflow and outflow

An emission condenser EK has one connection for coolants. Water or liquid in the circuit of a recirculating chiller, for example, is suitable for cooling.

- In a closed, internal coolant circuit, the pressure should be limited to 3 bar (44 psi).
- A cooling water valve may only be installed in the inflow, the coolant outflow must be open and free of pressure.

Connecting coolant

-> Example
Coolant connection
on EK



1. Fasten both hose nozzles **(a)** with the union nut **(b)** to the condenser as pictured.
2. Attach the hoses for the coolant according to the illustration on the condenser:
   IN = Inflow
   EX = Outflow
3. Fasten the hoses, e.g. with hose clamps.

4.4.4 Venting connection

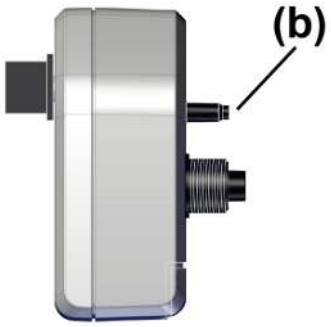
DANGER

Explosion risk due to air ventilation.

Depending on the process, a potentially explosive mixture can form during ventilation, or other dangerous situations can occur.

- Never ventilate processes with air in which a potentially explosive mixture can form.
- When flammable substances are present, use only inert gas for ventilation, e.g. nitrogen (max. 1.2 bar/900 Torr abs.).

VACUU·SELECT® sensor with venting valve

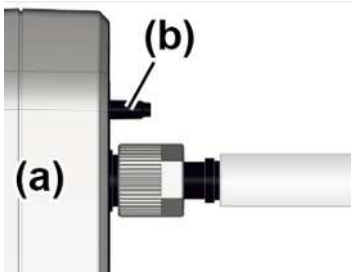


Venting connection (b) for a **VACUU·SELECT® Sensor** is described below.

Alternatively you can use a larger valve, e.g., a **VB M-B** (#20674217), for faster venting.

Vent with ambient air[5]

Position of venting connection



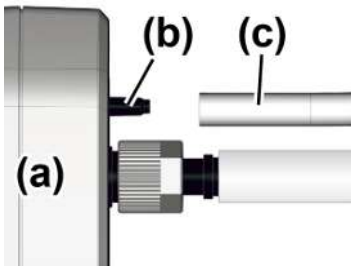
For venting **(b)** with ambient air, nothing needs to be connected to sensor **(a)**.

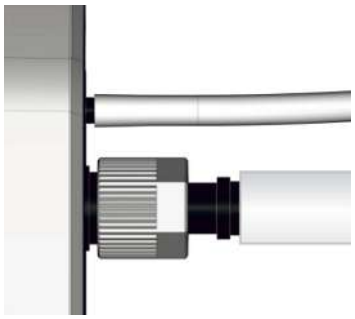
5 *Only applicable to sensors with an integrated venting valve.*

Vent [6] with inert gas – connect venting valve

Required connection material: Hose for hose nozzle, e.g., silicone tube 4/5 mm.

Venting valve inert gas connection





⇨ Push hose **(c)** onto the connection of venting valve **(b)** and connect inert gas (max. 1.2 bar/900 Torr, abs.).

☑ Venting valve with hose for venting with inert gas.

6 *Avoid overpressure.*

4.4.5 Gas ballast (GB)

Use ambient air as gas ballast

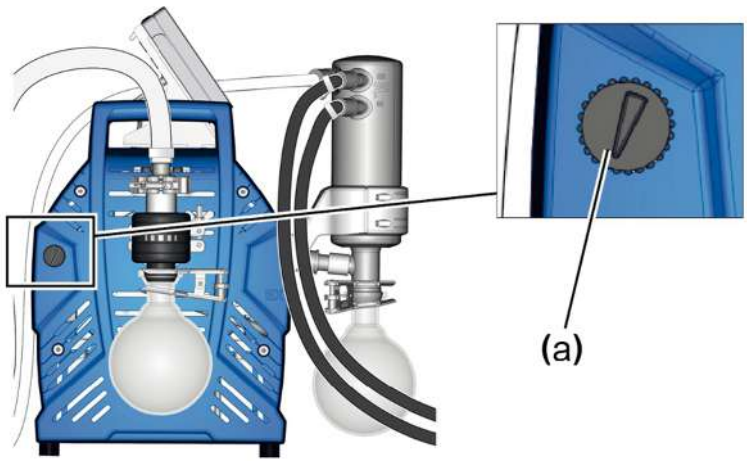
DANGER

Explosion risk due to air as gas ballast.

By using air as a gas ballast, a small amount of oxygen enters the inside of the vacuum pump. Depending on the process, a potentially explosive mixture can form due to oxygen in the air, or other dangerous situations can occur.

- In the presence of flammable substances and for processes in which a potentially explosive mixture can occur, use only inert gas as a gas ballast, e.g. nitrogen (max. 1.2 bar/900 Torr abs.).

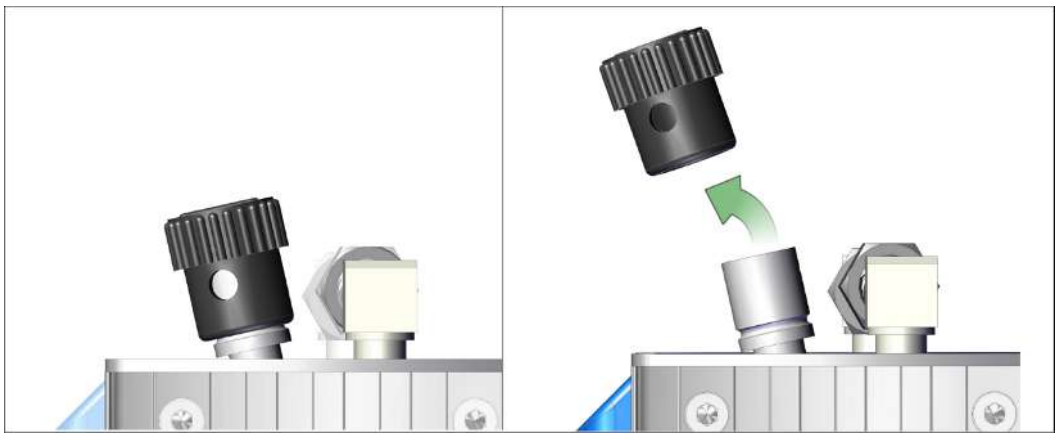
Gas ballast valve position



If ambient air is to be used as gas ballast, nothing needs to be connected at the pumping unit; gas ballast valve **(a)**; *see also chapter:* → ***Operation with gas ballast on page 45***

Use of inert gas as gas ballast – OPTION

Prepare the inert gas connection (GB)



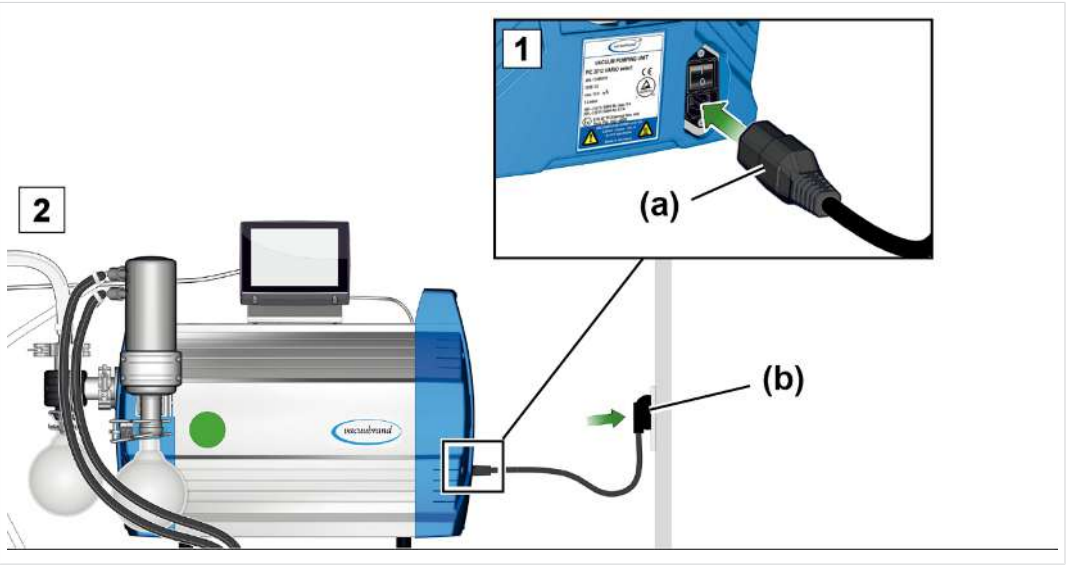
⇨ Remove the black gas ballast cap and connect a gas ballast adapter in its place.

On request, we can send you connection options and adapters for hose nozzles or small flanges.

4.5 Electrical connection

Connecting the pumping unit to the electrical system

-> Example Electrical connection of the pumping unit

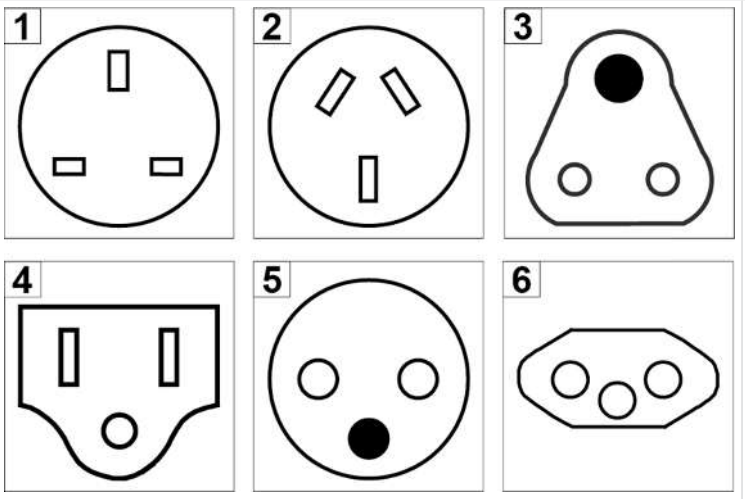


1. Plug the socket **(a)** of the power cable into the power connection of the vacuum pump.
2. Connect the power plug **(b)** to the power outlet.
   ☑ Pumping unit connected to the electrical system.

NOTICE! Lay the power cable so that it cannot be damaged by sharp edges, chemicals or hot surfaces.

Power connections with country code

-> Example Power plug types



Diagrams of standard power connections with ground contact

1 UK	**2** CN	**3** IND
4 US	**5** CEE	**6** CH

The vacuum pump is delivered ready for use with the matching power plug.

NOTICE! .

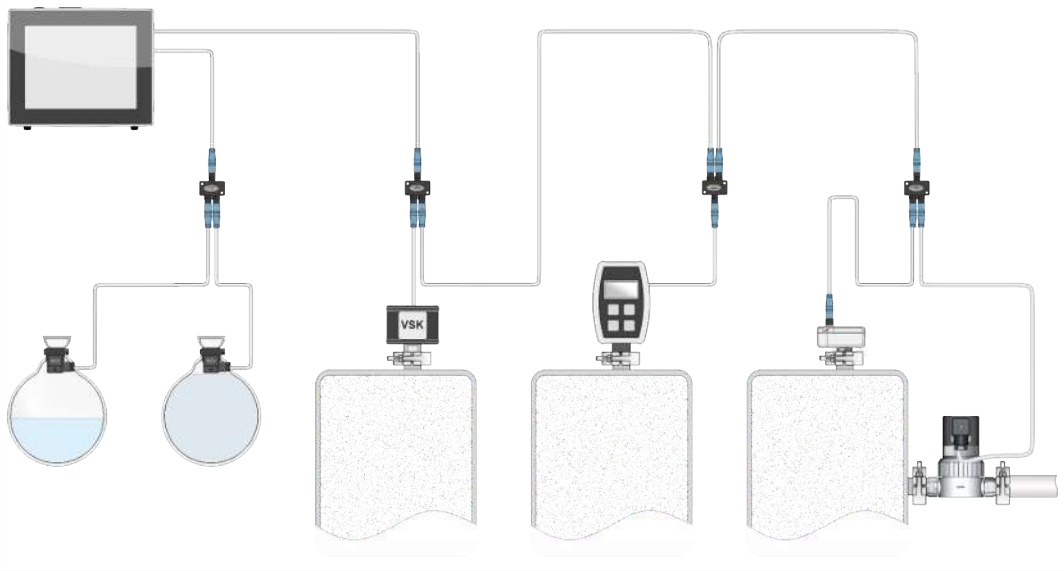
- ⇨ Use the power plug that matches your power connection.
- ⇨ Do not use multiple-socket power strips as a power connection.
- ⇨ The power plug also works as a circuit breaker. Set up the device so that the plug can be easily disconnected from it.

Connection options for vacuum accessories

The VACUU BUS interface functions as the power supply and control line for vacuum accessories.

1. Connect your accessories to your controller via the VACUU·BUS cable.
2. If necessary, increase the range and the number of connections with a suitable Y-adapter and extension cable.

-> Example Schematic drawing of controller with connected valve and sensors



Accessories -> see chapter Ordering information

5 Operation

Before putting into operation, make sure that the activities described in the chapter **Installation and power connection** have been carried out properly.

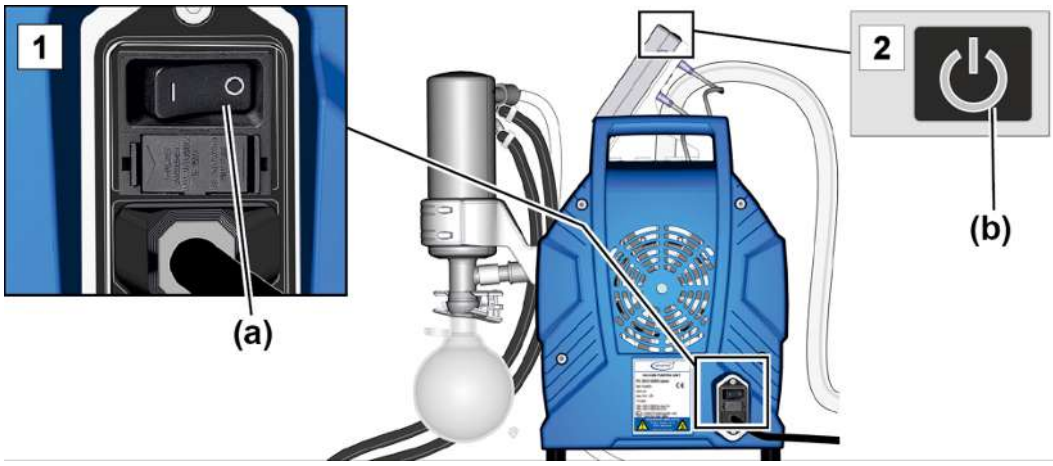
With the exception of the chapter Switching on and off, this instruction manual contains descriptions about the mechanics of a PC 301x NT VARIO select series pumping unit.

The operation of an installed vacuum regulator [7] and its functions are described in the instruction manual of a **VACUU·SELECT**.

5.1 Switching on

Switching on the pumping unit

Switching on



1. Switch on the rocker switch **(a)** – switch position **I**.
2. Press the ON/OFF button **(b)** on the controller.
   - ☑ Display with start screen.
   - ☑ After approx. 30 seconds, the process display appears with the control elements in the display of the controller.

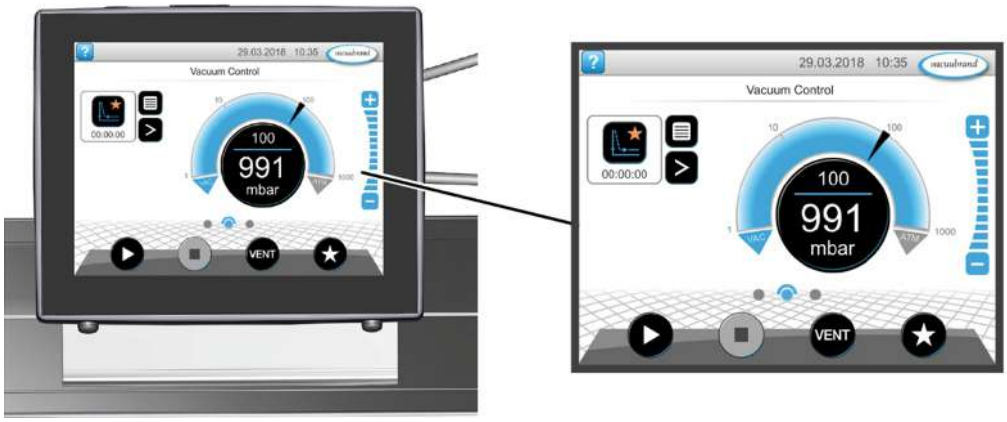
7 *WEB: VACUUBRAND/Produkte/Messgeräte und Controller/Vakuum regeln*

5.2 Operation with controller

5.2.1 Operator interface

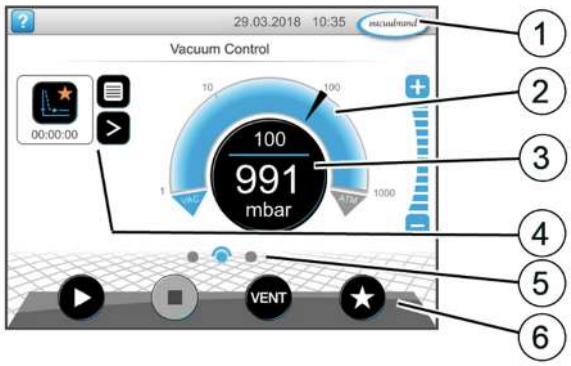
Operator interface

VACUU·SELECT® with process display



Process display

Pressure display for a process



1	Status bar
2	Analog pressure display – pressure curve
3	Digital pressure display – pressure value (target value, actual value, pressure unit)
4	Process display with context functions
5	Screen navigation
6	Controls for the controller

Controls

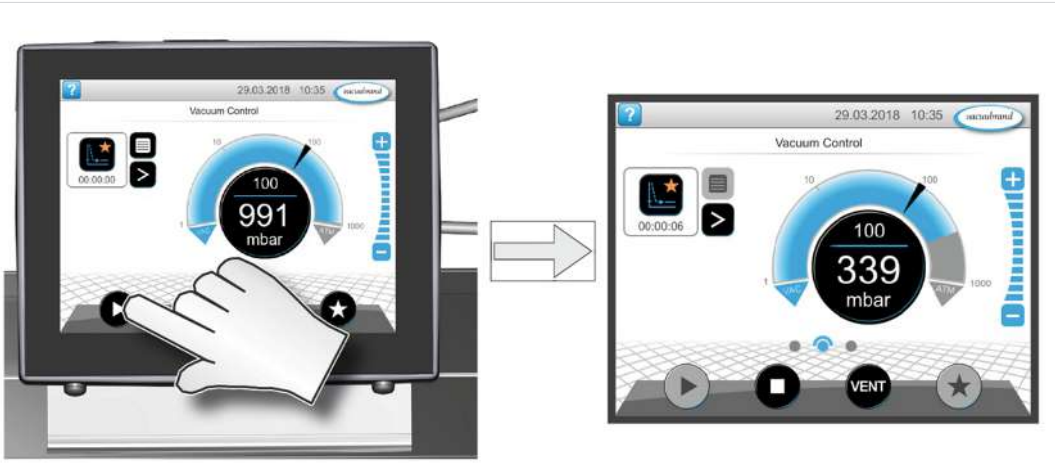
Controls
Vacuum controller

Button	Function
	**Start** **Start an application – only in the process display**
	**Stop** **Stop an application – always possible.**
	**VENT[8] – Ventilate system (Option)** **Button press < 2 Sec. = briefly ventilate, regulation continues.**
	**Button press > 2 Sec. = ventilate to atmospheric pressure, vacuum pump is stopped. Button press during ventilation = ventilation is stopped.**
	**Favorites** **Call up Favorites menu.**

5.2.2 Operation

Starting the vacuum controller

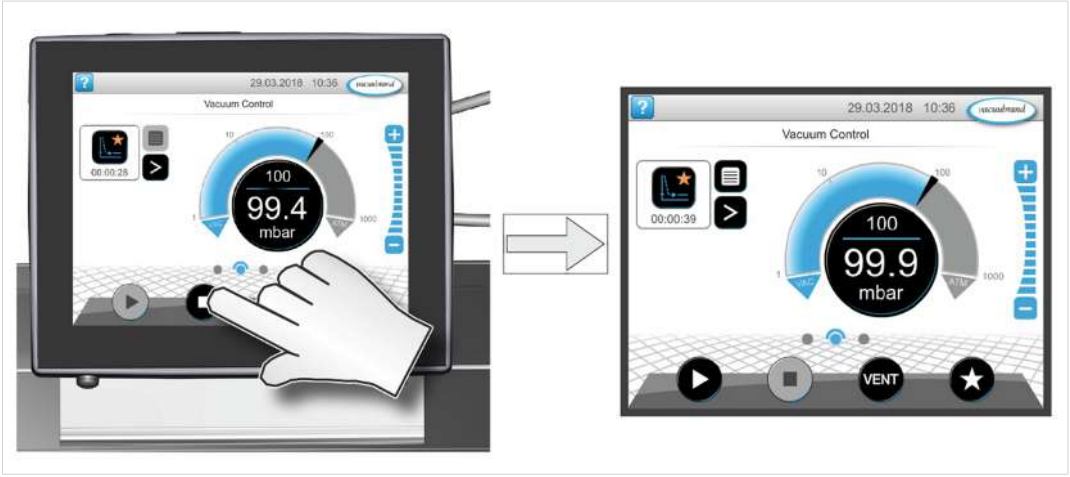
Start



8 *The VENT button is only shown if a ventilation valve is connected or activated.*

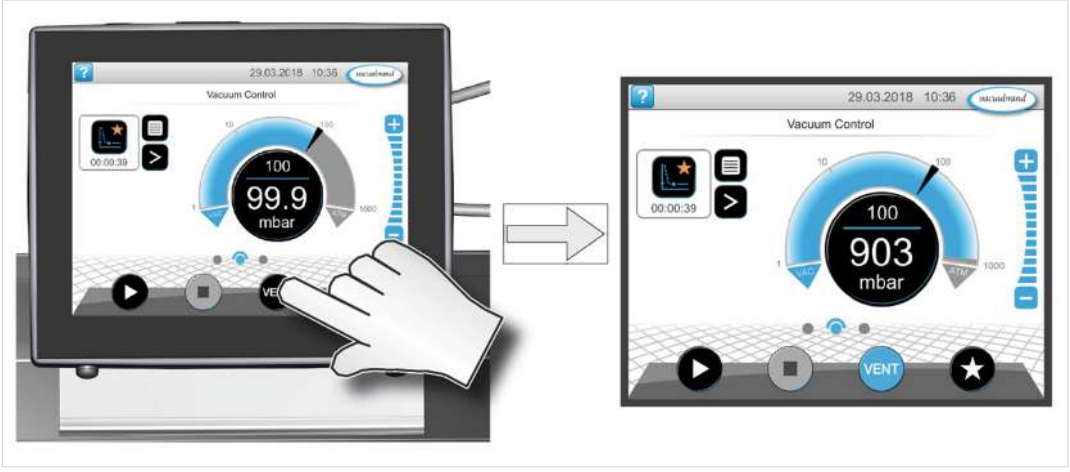
Stopping the vacuum controller

Stop



Ventilating

Ventilating



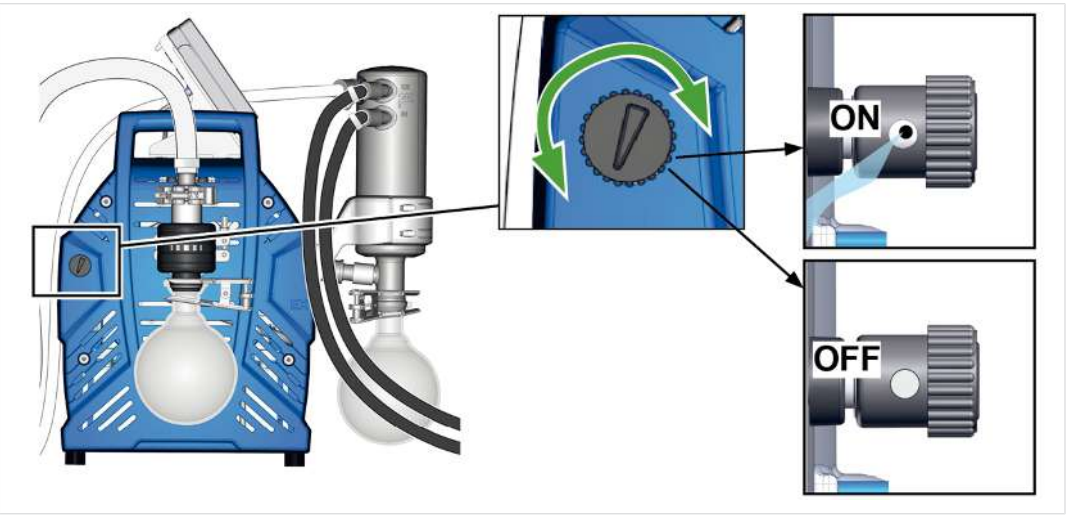
5.2.3 Operation with gas ballast

Meaning

The supply from the gas ballast (= gas addition) ensures that vapors are not condensed in the vacuum pump; instead, they are emitted out of the pump. This allows greater amounts of condensable vapors to be pumped, which extends the service life. The end vacuum with gas ballast is slightly higher.

Opening/closing the gas ballast valve

Operating the gas ballast valve



- ⇨ Turn the black gas ballast cap in any direction to open or close the gas ballast valve.
- ⇨ If possible, only evacuate the condensable vapors, e.g. water vapor, solvents, etc., when the vacuum pump is at operating temperature and the gas ballast valve is open.
- ⇨ Connect inert gas as the gas ballast to prevent and exclude the formation of potentially explosive mixtures during operation.
- ⇨ Comply with the max. permitted pressure of 1.2 bar/900 Torr abs. at the gas ballast connection.

If the gas volume in the vacuum pump is low, a gas ballast can be eliminated in these cases to increase the solvent recovery rate.

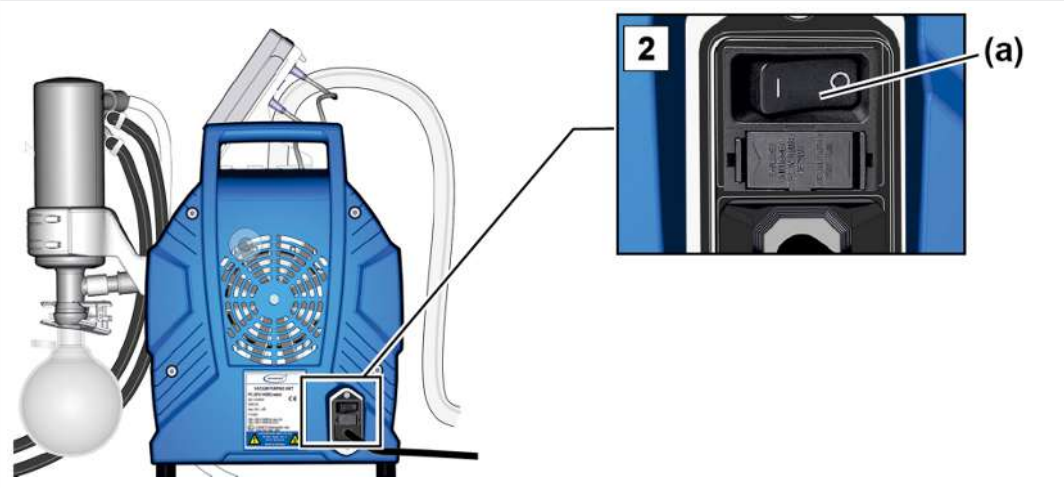
5.3 Switching off (decommissioning)

Switching off the pumping unit

Switching off, e.g. taking the pumping unit out of operation

1. Stop the process and allow the pumping unit to continue running for approx. 30 minutes with open gas ballast or open inlet (IN).
   ☑ Condensate and residual media are rinsed out of the vacuum pump.

NOTICE! Avoid deposits and rinse the condensate out of the pump.



2. Switch off the rocker switch **(a)** – switch position 0.
   ☑ Pumping unit switched off.
3. Disconnect the power plug.
4. Disconnect the pumping unit from the equipment.
5. Empty the glass flasks.
6. Check the pumping unit for any damage and soiling.

5.4 Storage

Storing the pumping unit

1. Clean the The pumping unit if it is dirty.
2. Recommendation: Carry out preventative maintenance before you put The pumping unit into storage. Especially if it has been in operation for more than 15,000 hours.
3. Seal off the suction and exhaust line, e.g. with the transport caps.
4. Pack up The pumping unit so that it is protected from dust; possibly include a drying agent.
5. Store The pumping unit in a cool and dry location.

NOTICE! If for operational reasons damaged parts are stored, these should be clearly marked as non-operational.

6 Troubleshooting

6.1 Technical assistance

To find and eliminate errors, use the table → ***Error – cause – corrective measure on page 48***.

For technical assistance or in case of faults, please contact our Service department.

The device should only be operated in perfect technical condition.

- ⇨ Adhere to the recommended maintenance intervals to ensure a properly functioning system.
- ⇨ Send defective devices to our Service department or your specialist retailer for repairs.

6.2 Error – cause – corrective measure

Error	Cause	Corrective measure	Personnel
Measurements deviate from the reference standard	Sensor dirty. Humidity in sensor. Sensor defective. Sensor not measuring correctly.	Clean sensor measuring chamber. Allow sensor measuring chamber to dry, e.g. by draining. Calibrate sensor with reference measuring device. Replace defective components.	Qualified employee
Sensor does not transmit measurement	No voltage applied. VACUU BUS plug connection or cable defective or not inserted.	Check the VACUU BUS plug connection and cable to the controller.	Operator
Sensor does not transmit measurement	Sensor defective.	Replace defective components.	Qualified employee
Ventilation valve does not switch	No voltage applied. VACUU BUS plug connection or cable defective or not inserted. Ventilation valve dirty.	Check the VACUU BUS plug connection and cable to the controller. Clean the ventilation valve.	Operator

Error	Cause	Corrective measure	Personnel
		Use another external ventilation valve if necessary.	
Ventilation valve does not switch	Ventilation valve sensor defective.	Replace defective components.	Qualified employee
Vacuum pump does not start	Pumping unit switched off. Power plug not connected properly or pulled out. VACUU BUS plug connection or cable defective or not inserted. Excess pressure in the exhaust line.	Switch on Pumping unit. Check the power connection and cable. Check the VACUU BUS plug connection and cable to the controller. Open the exhaust line. Ensure that nothing is blocking the line.	Operator
Vacuum pump stopped Vacuum pump does not start	Motor overloaded. Motor overheating. Thermal protection activated.	Check coolant connection. Ensure coolant supply. Allow the motor to cool down. Manually reset fault: -> Disconnect the pumping unit from the power -> Eliminate the error cause -> Restart the pumping unit	Qualified employee
No suction capacity or very little	Leak in the suction line or on the apparatus. Condensate collection bottle not installed correctly. Condensate in the vacuum pump. Open gas ballast Gas ballast cap porous or no longer present.	Check suction line and apparatus for any leaks. Check condensate collection bottle and install correctly. Check apparatus for leaks. Let the vacuum pump run for a few minutes with open suction intake port. Close gas ballast	Operator

Error	Cause	Corrective measure	Personnel
		Check the gas ballast cap. Replace defective components.	
No suction capacity or very little	Deposits in the vacuum pump. Membrane or valves defective. High amount of vapor build up in process.	Clean and test pump heads. Replace the membrane and valves. Check process parameters.	Qualified employee
No suction capacity or very little	Vacuum line too long.	Use vacuum lines with a larger cross-section.	Resp. specialist
Display off	Pumping unit switched off. Power plug not connected properly or pulled out. VACUU BUS plug connection or cable defective or not inserted. Controller switched off or defective.	Switch on Pumping unit. Check the power connection and cable. Check the VACUU BUS plug connection and cable to the controller. Replace defective components.	Operator
Condenser (cooler) defective	Mechanically damaged.	Send in.	Resp. specialist
Loud operating noises	No hose installed.	Check hose and install correctly.	Operator
Loud operating noises	Exhaust line open. Glass flask on EK missing. Membrane torn or membrane spring washer loose. Ball bearings defective.	Check exhaust line connections. Connect exhaust line to a suction or extraction system. Install glass flask Service vacuum pump and replace defective parts, or send device in for repair.	Qualified employee

7 Cleaning and maintenance

WARNING

Danger due to electrical voltage.

- Switch off the device before cleaning or maintenance.
- Disconnect the power plug from the power outlet.

Danger due to contaminated components.
When pumping dangerous media, hazardous materials can adhere to interior pump components.
If this case applies to you:

- ⇨ Wear your personal protective equipment, e.g. safety gloves, eye protection and, if required, a respirator.
- ⇨ Decontaminate the vacuum pump before you open it. If required, have the vacuum pump decontaminated by an external service provider.
- ⇨ Take safety precautions when handling hazardous materials, in accordance with your operating instructions.

NOTICE

Carrying out work in an improper manner may cause damage.

- ⇨ Have Maintenance tasks carried out by a qualified specialist or at least a trained person.
- ⇨ Before carrying out the first Maintenance, please read through all action instructions to obtain an overview of the service activities required.

7.1 Information on service activities

Recommended maintenance interval [9]

Maintenance intervals

Maintenance intervals	As required	15,000 h
Replace membranes		x
Replace valves		x
Replace O-rings		x
Clean or replace PTFE molded hose	x	
Replace pressure release valve on EC	x	
Clean pumping unit	x	

Recommended auxiliary equipment

->Example Recommended auxiliary equipment for cleaning and maintenance

Meaning

No.	Auxiliary equipment
1	Mat for round flasks
2	Protective gloves
3	Chemical resistant container and funnel

9 *Recommended maintenance interval according to hours of operation and under normal operating conditions; depending on the setting and field of application, we recommend carrying out cleaning and maintenance as needed.*

Tools needed for maintenance

-> Example Tools

Meaning

No.	Tool	Size
1	**Seal set** Seal set PC 3010, PC 3012 #20696839 *or* Seal set PC 3016 #20696867	 **1x** **2x**
2	**Membrane wrench #20636554**	**SW66**
3	**Flat-nose pliers** Closing hose clamps	
4	**Flat-head screwdriver** Opening hose clamps	 **Size 1**
5	**Phillips-head screwdriver** Screw fasteners for controller holding base	 **Size 1**
6	**Torx screwdriver** Screw fasteners for EK counterholder Fastening, loosening clamping brackets	 **TX10** **TX20**
7	**Hexagon socket wrench** Screw fasteners for side panel Screw fasteners for head cover Screw fasteners for EKP or EK bracket Screw fasteners for housing parts with handle Fastening, loosening side panel retaining plates	 **Size 5** **Size 5** **Size 4** **Size 4** **Size 4**
8	**Torque wrench, adjustable 2 –12 Nm**	

7.2 Cleaning

This chapter does not describe how to decontaminate the product. Simple cleaning and care measures are described here.

⇨ Before cleaning, switch off the pumping unit.

CAUTION

Risk of burning due to hot surfaces

An elevated exhaust gas temperature can lead to hot surfaces on the instrument and on attached components, such as glass flasks. The temperatures that are produced during operation may cause burns.

- Use protection against accidental contact, especially when the exhaust temperature is persistently high.
- Allow the instrument to cool before you empty the glass flask or begin performing maintenance tasks.
- For tasks that must be performed during operation, use your personal protection equipment, e.g., heat-resistant safety gloves.

7.2.1 Housing surface

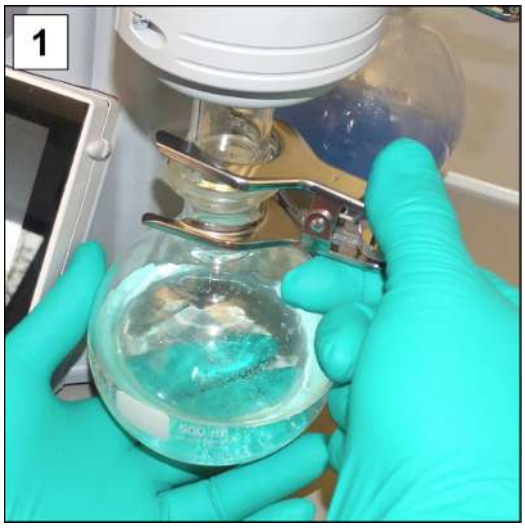
Cleaning the surface

Clean soiled surfaces with a clean, slightly damp cloth. We recommend water or a mild soap solution to moisten the cloth.

7.2.2 Emptying the glass flask

Removing and emptying the glass flask

-> Example Emptying the glass flask



1. Open the joint clamp and remove the glass flask.

2. Empty the glass flask into a suitable container, e.g. a chemical-resistant canister.

3. Reattach the glass flask (separator) to the condenser with the joint clamp.

Depending on the application, the collected liquid can either be recycled or properly disposed of.

7.2.3 Cleaning or replacing PTFE molded hoses

Maintenance provides an opportunity to check the components of the pumping unit, including the hosing.

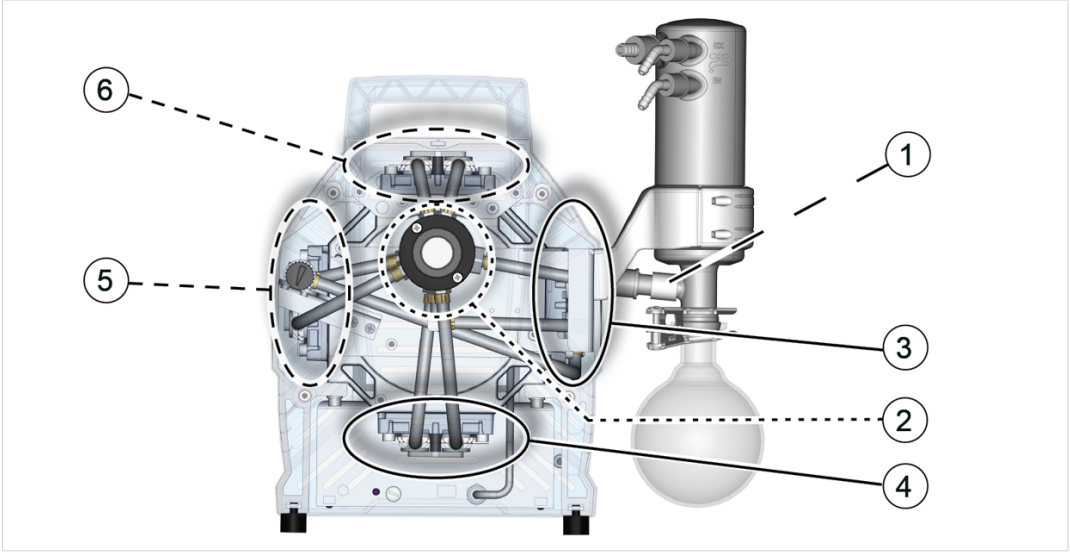
- ⇨ Clean the inside of highly soiled molded hoses, e.g. with a pipe cleaner or similar.
- ⇨ Replace cracked or defective molded hoses.

7.3 Vacuum pump maintenance

7.3.1 Maintenance items

Items to receive maintenance

-> Example Maintenance of pump heads



Meaning

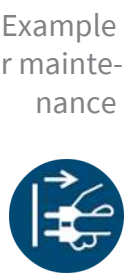
Maintenance items and sequence
1 Silicone pressure release valve EC #20638821
2 Suction-pressure distributer (behind inlet separator)
3 Pump head pair, right
4 Pump head pair, bottom
5 Pump head pair, left
6 Pump head pair, top

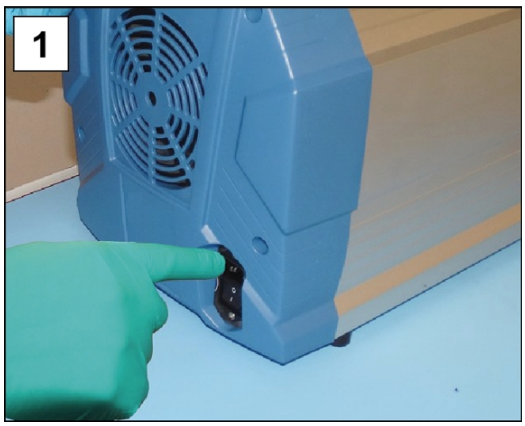
7.3.2 Preparation

Dismantling controller and holding base, see chapter → ***Controller base on page 30***

Dismantling device and housing parts

-> Example Preparing for maintenance



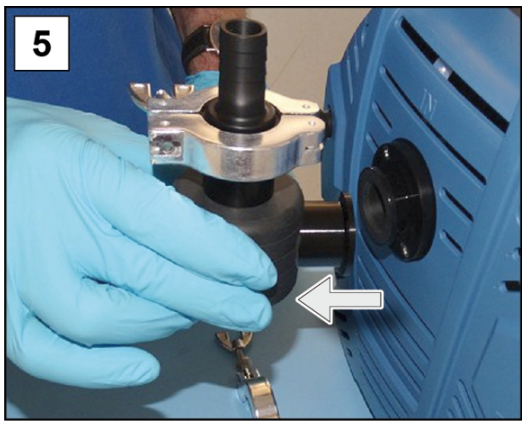


1. Switch off the pumping unit and disconnect the power plug.

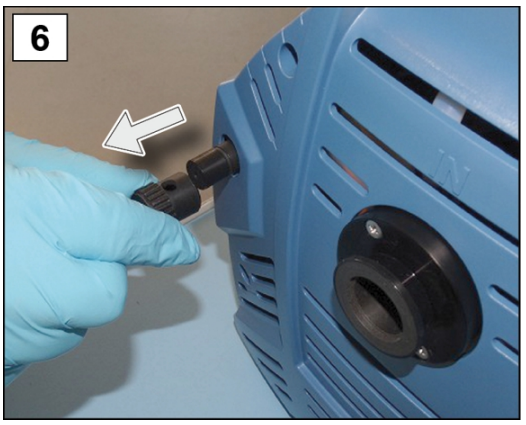
2. Remove the glass flask and connected hoses from the inlet IN.

3. Remove the glass flask and connected hoses from the emissions condenser EC.

4. Open the tension ring from the inlet separator.

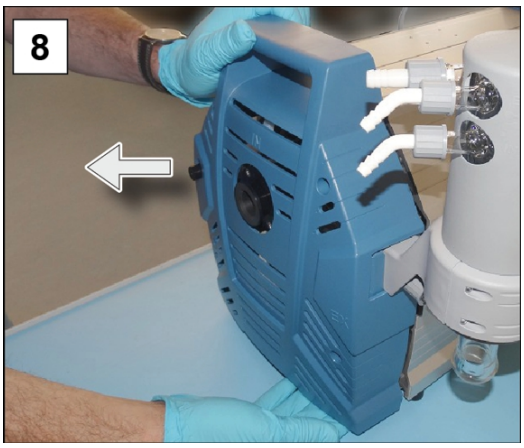


5. Take the inlet separator off and set it aside.



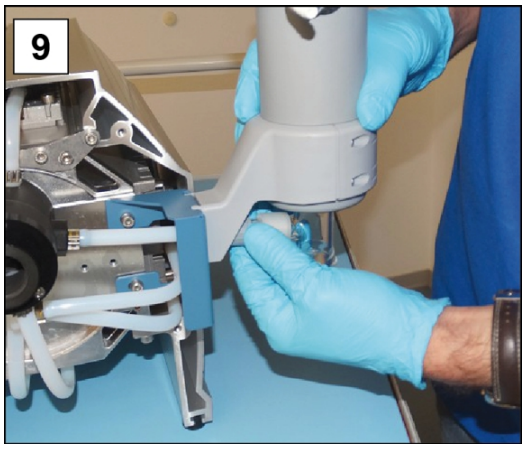
6. Pull the cap off the gas ballast.

7. Remove the 4 screws from the front housing section; hexagon socket wrench size 4.

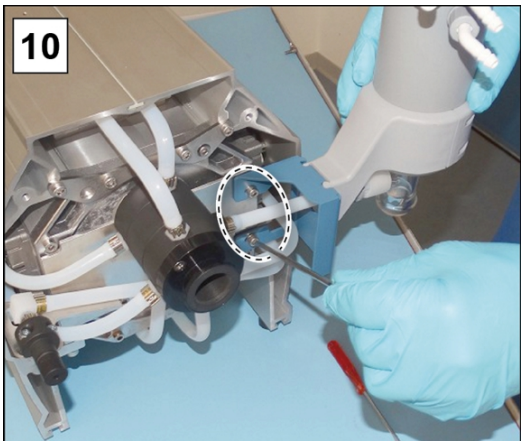


8. Take the housing section off and set it aside.

-> Example Disassembling the EC

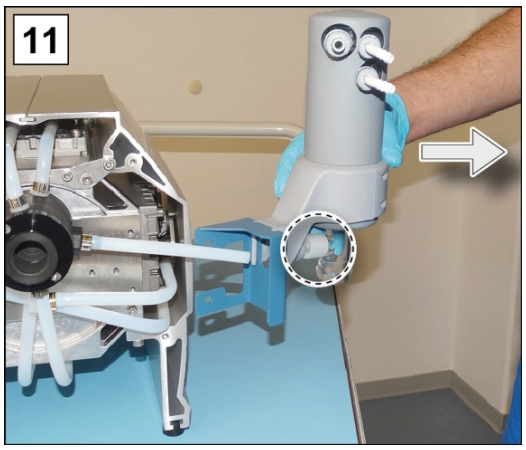


9. Open the union nut from the inflow EC.

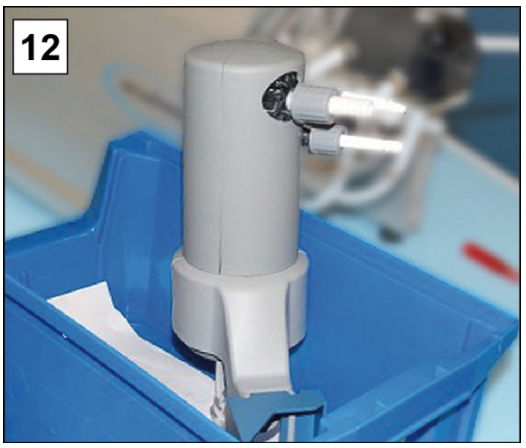


10. Remove the 2 screws from the EC bracket; hexagon socket wrench size 4.

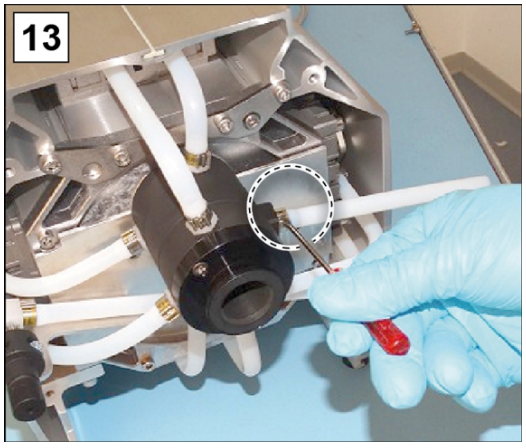
- Here you can check the pressure release valve of the EC and replace it in case of damage.



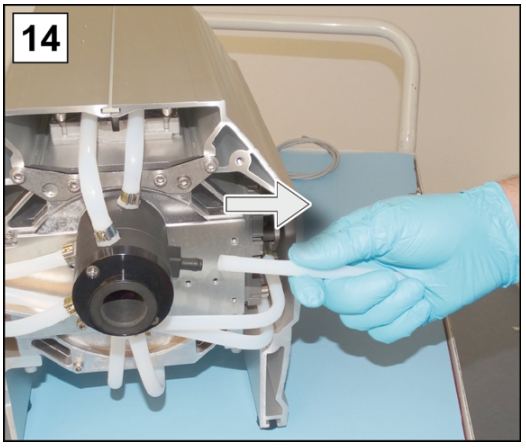
11. Pull the EC together with the bracket from the molded hose. Here you can check the pressure release valve of the EC and replace it in case of damage.



12. Put the cooler down safely so that no liquid can leak out.



13. Open the hose clamp from the molded hose which leads to the EC; flat-head screwdriver size 1.

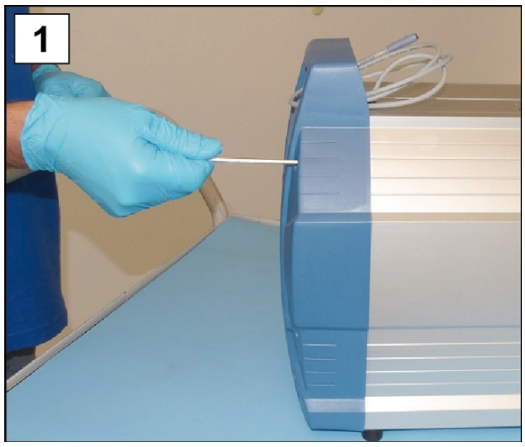


14. Pull the molded hose off.

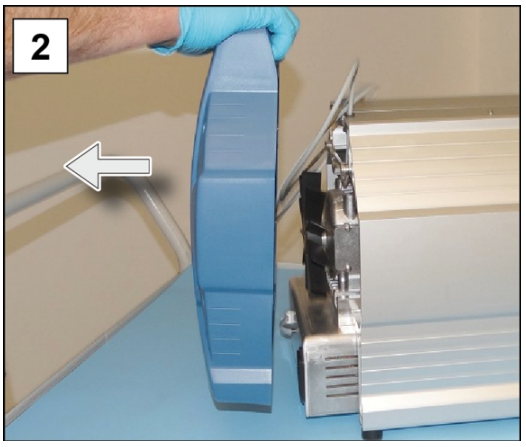
7.3.3 Replacing the membrane and valves

Dismantling other housing parts

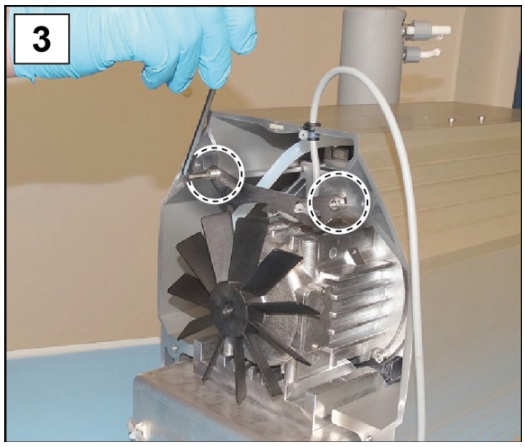
-> Example Dismantling the housing



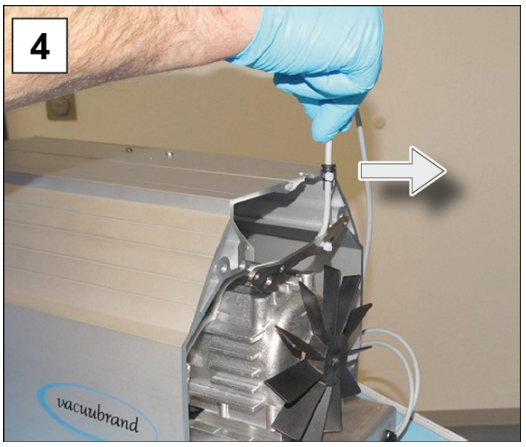
1. Remove the 4 screws from the rear housing section; hexagon socket wrench size 4.



2. Remove the housing section and set it aside.



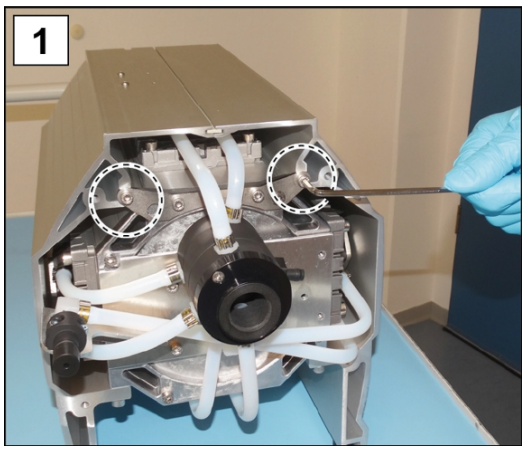
3. Remove the screws from the side panel retaining plate; hexagon socket wrench size 4.



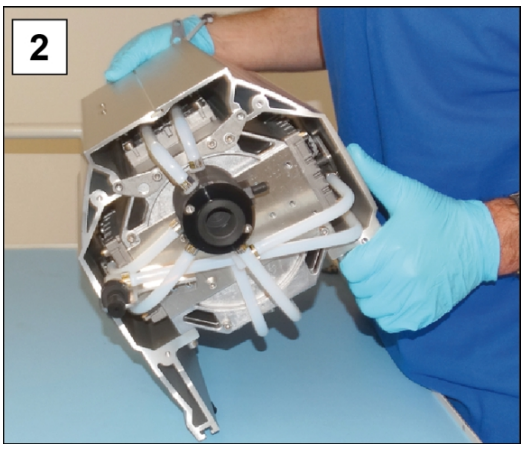
4. Feed the cable out of the gap.

Removing the side panels

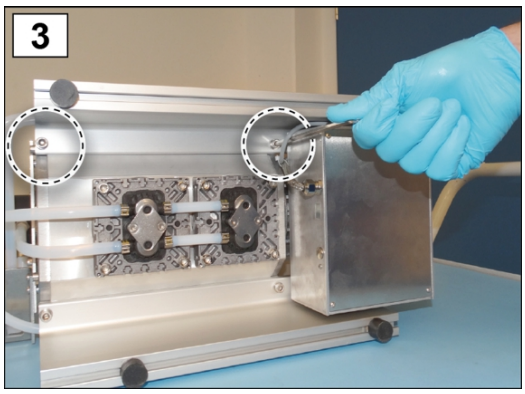
Removing the right-hand side panel (uncovering the first pump head pair)



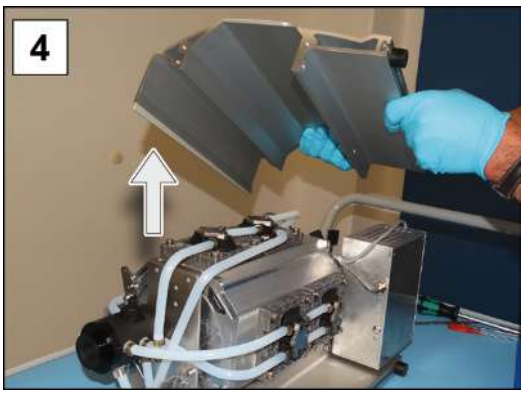
1. Remove the 2 outer screws from the retaining plate; hexagon socket wrench size 4.



2. Carefully set the pump to the side.



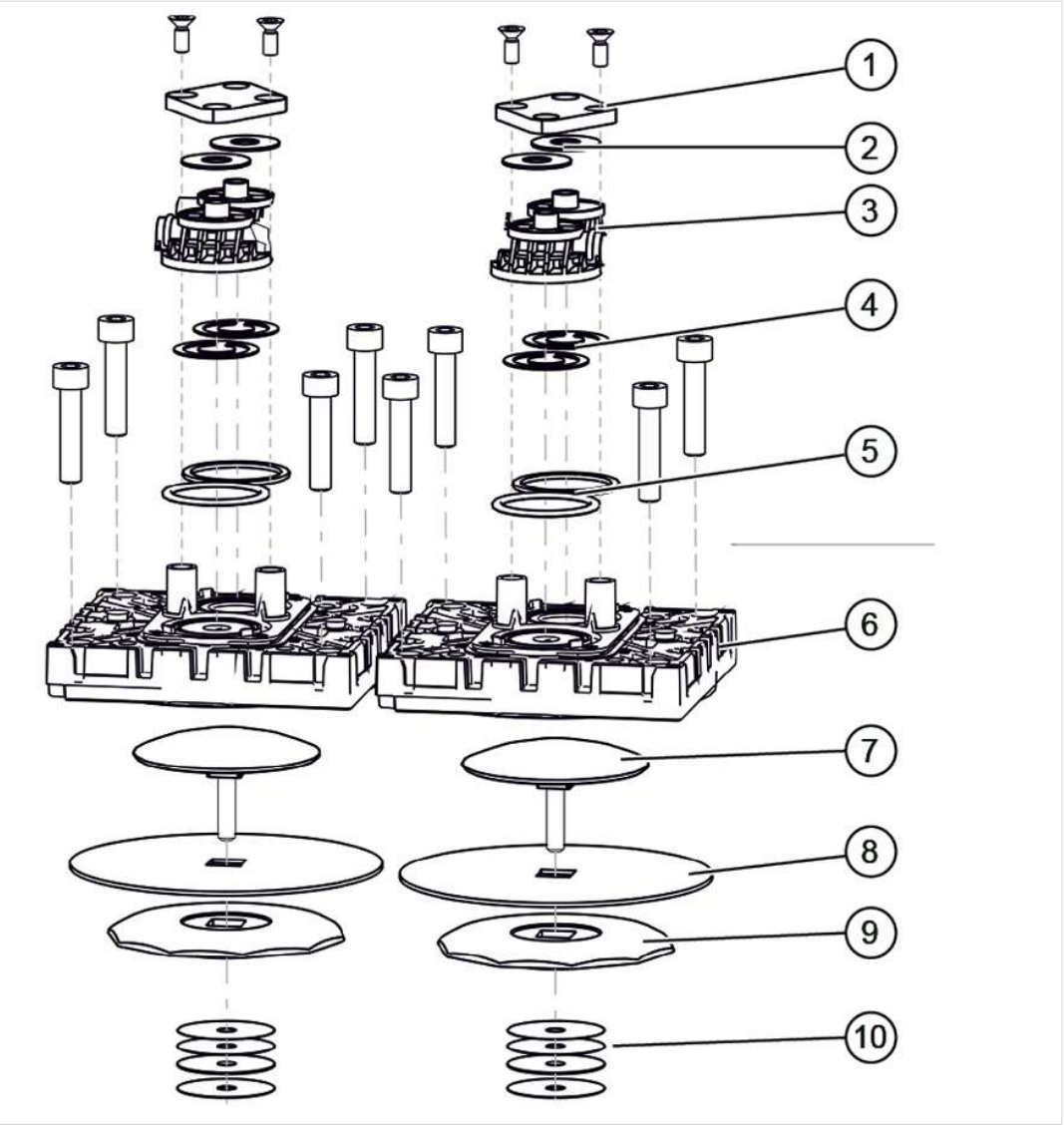
3. Unscrew the screw fasteners of the side panel; hexagon wrench size 5.



4. Lift the side panel from the pump. For the moment, the lower side panel remains attached for stabilization purposes.

Exploded-view drawing of pump head

-> Example Explosion-view drawing of pump head pair



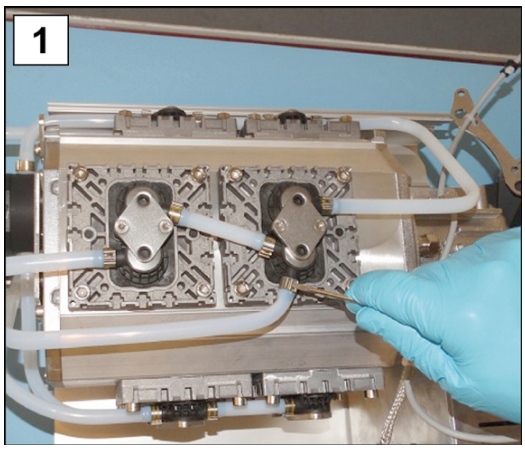
Meaning

Valve maintenance	
1	Clamping bracket + screw fasteners
2	Cup springs
3	Valve clusters
4	Valves
5	O-rings Size 26 x 2

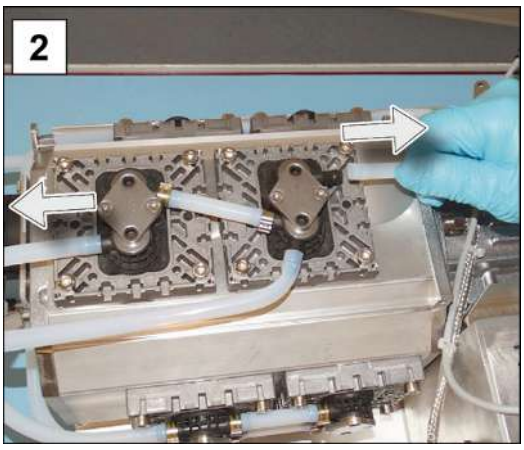
Membrane maintenance	
6	Head cover + screw fasteners
7	Membrane spring washer with square head screw
8	Membrane
9	Membrane support disc
10	Spacers, max. 4 pieces per pump head

Pump head pair, right

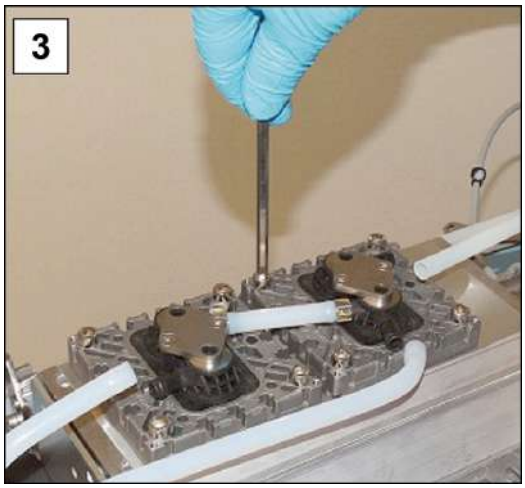
-> Example Maintenance of pump head pair, right-side



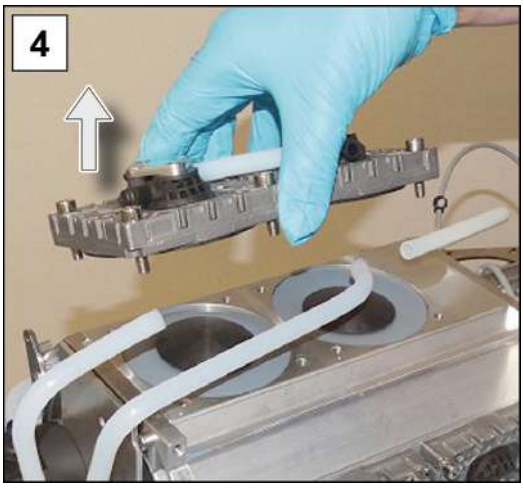
1. Open the hose clamps of the outer hoses. Flat-head screwdriver size 1.



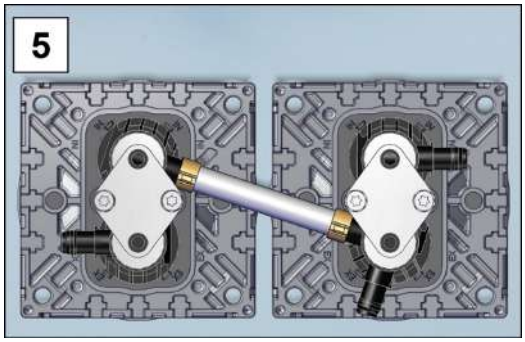
2. Pull the molded hoses off.



3. Unscrew the hexagon socket screws from the head covers. Hexagon socket wrench size 5.



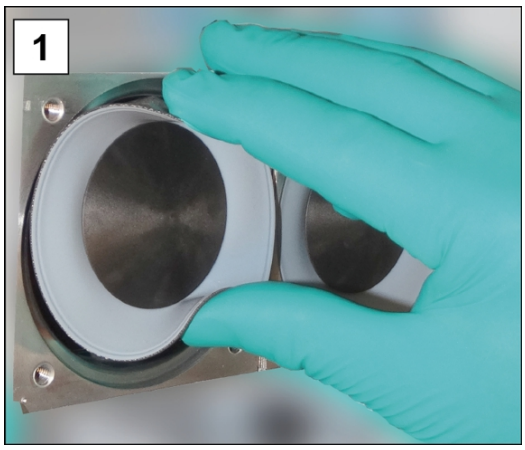
4. Remove the pump head pair with the screw fasteners.



5. Set the pump head pair to the side.

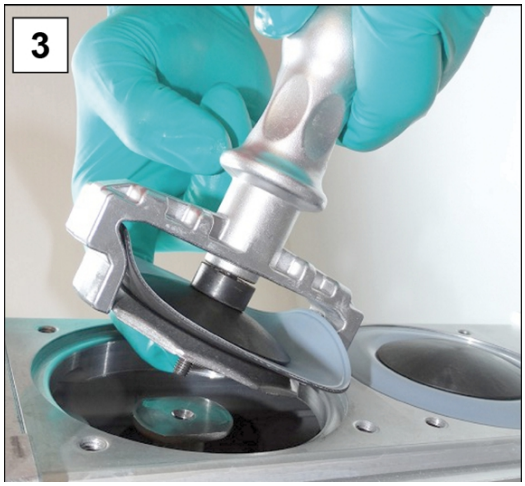
Replacing membranes

-> Example Membrane replacement

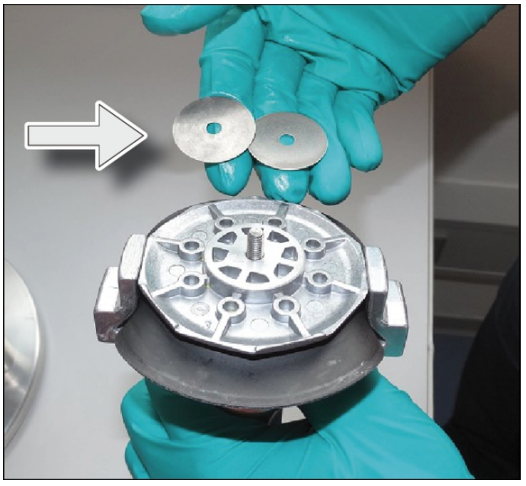


1. Fold the membrane in on the sides.

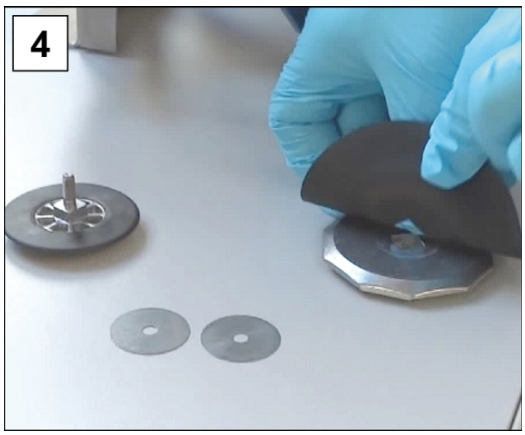
2. Carefully position the membrane wrench onto the membrane support disc and unscrew the assembly with the membrane wrench fixed in place.



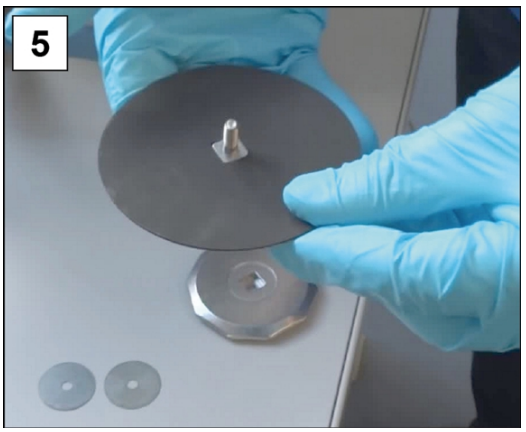
3. Lift the membrane with all its parts out of the vacuum pump. If spacers are stuck to the connecting rod, carefully remove these.



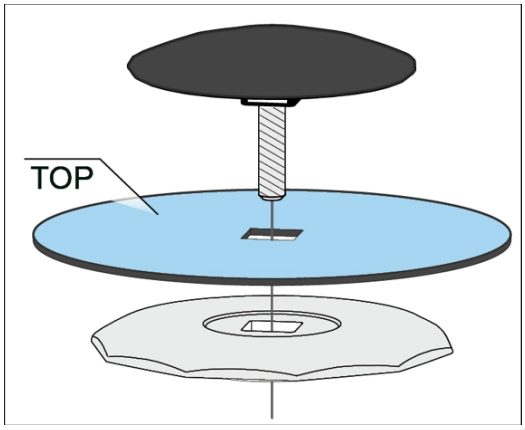
- Do not let any spacers fall into the aluminum housing.
- Make sure there are no spacers stuck to the connecting rod.
- Keep the spacers for later use. It is imperative that these are re-installed in the same quantity.



4. Pull the membrane spring washer out and remove the used membrane.

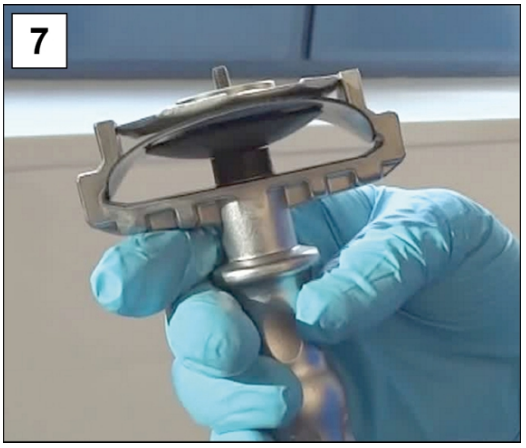


5. Place the new membrane onto the square bolt of the membrane spring washer.

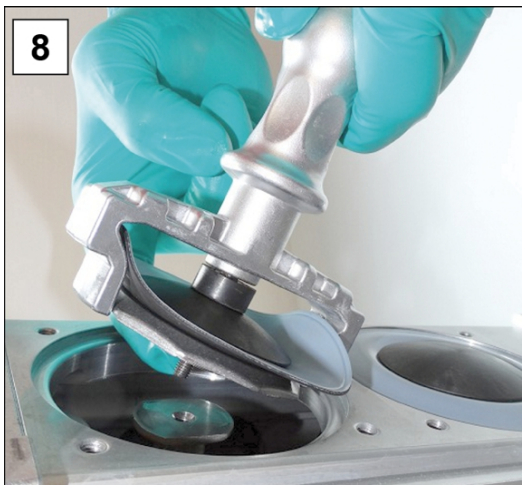


- Make sure that you install the membrane correctly, with the coated, light side on top.
- Ensure that it is correctly positioned on the square bolt.

6. Place all spacers onto the threaded bolt.



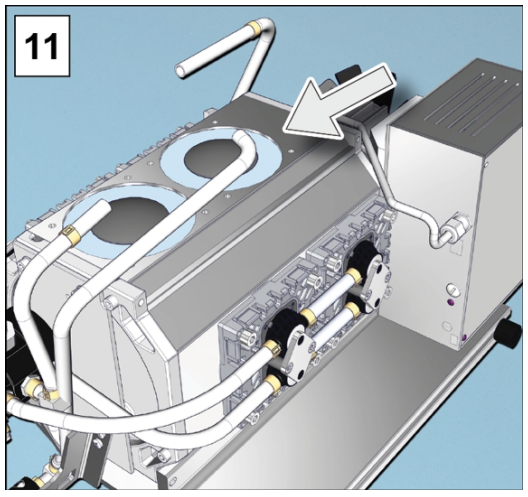
7. Attach the membrane assembly to the membrane wrench.



8. Hold onto the spacers and carefully place all components into the threaded hole of the connecting rod.

9. Tighten the assembly by hand at first using the membrane wrench.

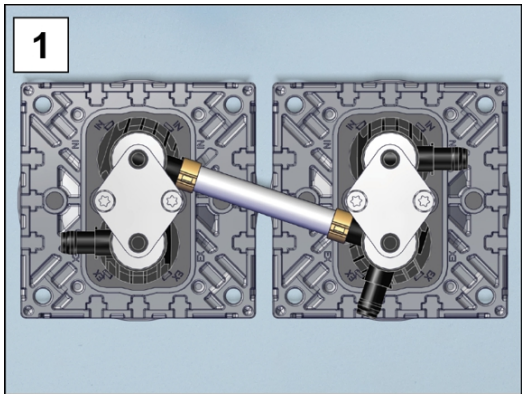
10. Then place a torque wrench with a hexagon socket bit onto the membrane wrench and tighten the assembly to 6 Nm.



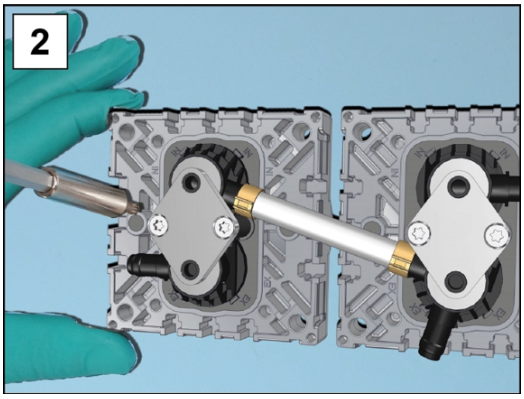
11. Repeat steps 1 to 11 to change the next membrane.

Replacing valves

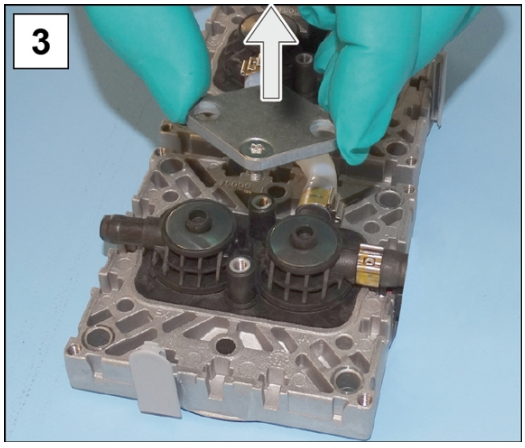
-> Example
Valve replacement



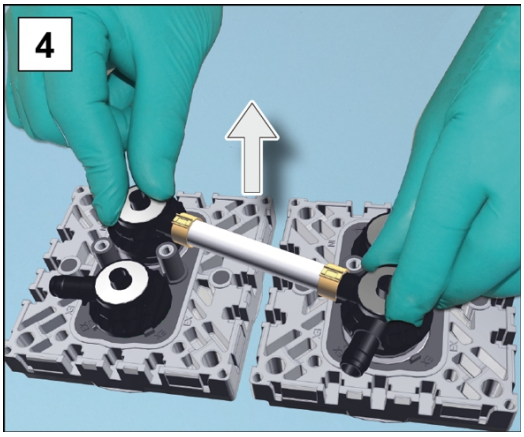
1. Take the pump head pair that was set aside.



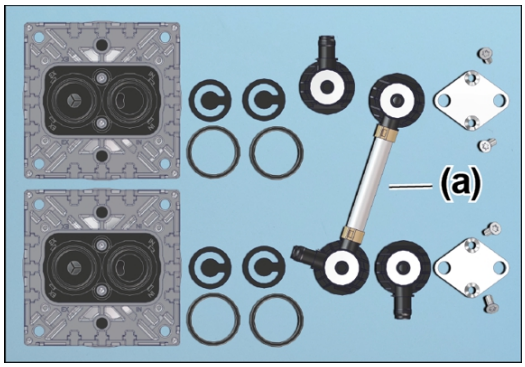
2. Unscrew the Torx screws. Torx screwdriver size Tx20.



3. Remove the clamping bracket from the valve clusters.



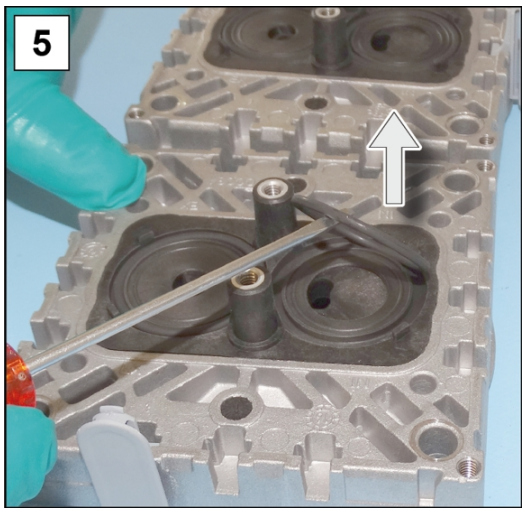
4. Remove the valve clusters with the cup springs.



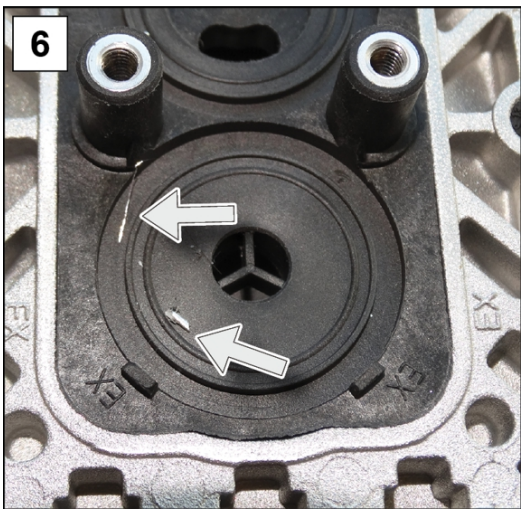
Top view example:
Valve clusters, valves, O-rings and molded hose of a pump head pair.

- The quantity and interconnection of the molded hoses **(a)** depends on the position of the pump head pair. Pump head pairs must never be interchanged.
- Valves can stick to the underside of the valve cluster.
- Depending on the pump type, the valve material is either PTFE (white) or FFKM (black).

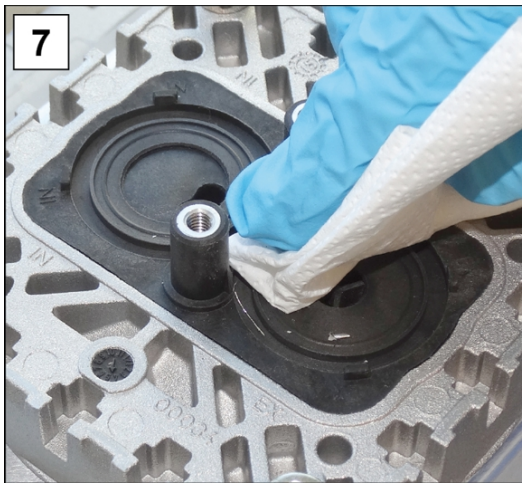
-> Example
Valve replacement



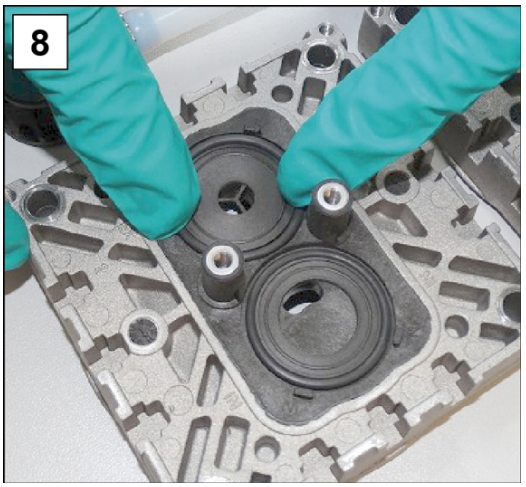
5. Carefully remove the used O-rings and valves.



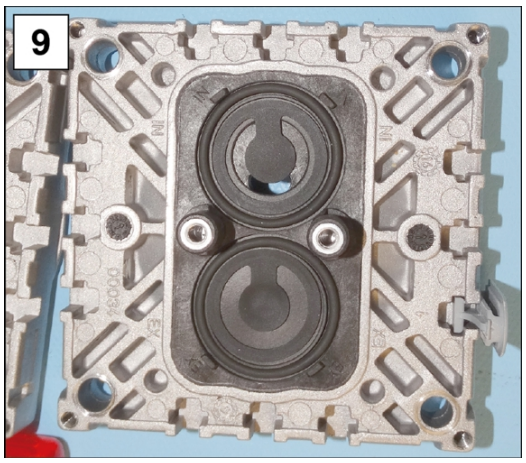
6. Check the surfaces for soiling.



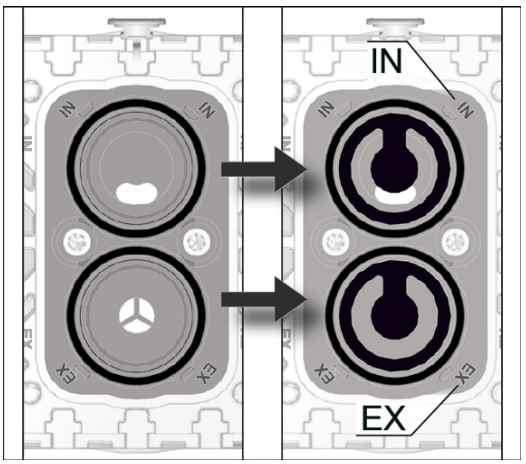
7. Clean soiled surfaces carefully.



8. Insert new sealing rings into the notches.

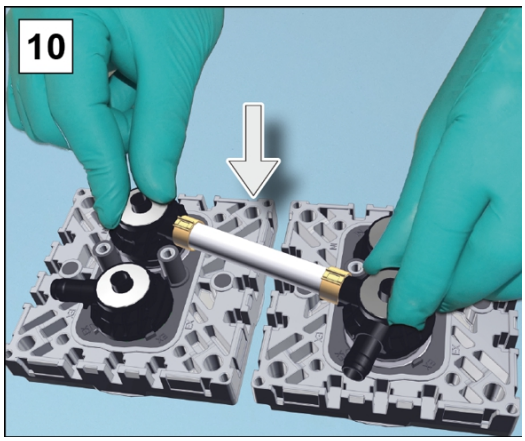


9. Apply the new valves and align them.

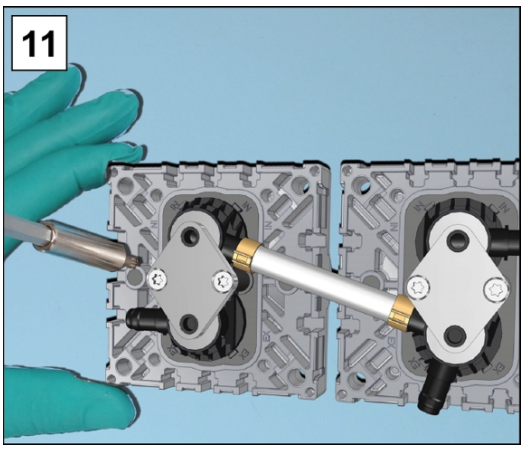


Top view detail: Correct positioning of the valves.
IN = Inlet (Inlet)
EX = Exhaust (Outlet)

-> Example
Valve replacement

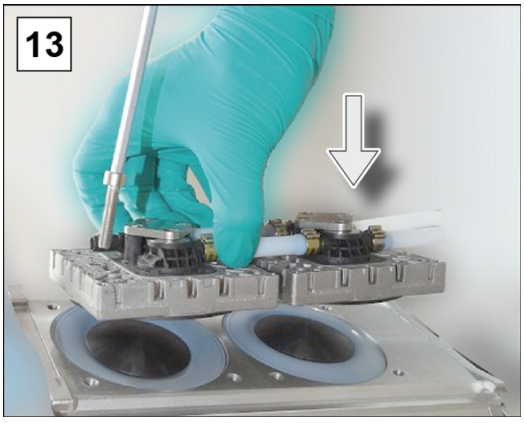


10. Place both valve clusters with the cup springs onto the pump heads.

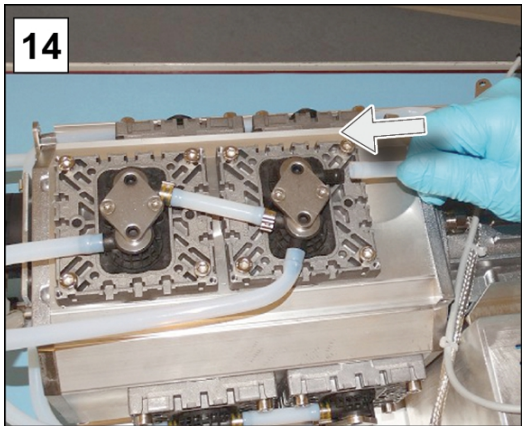


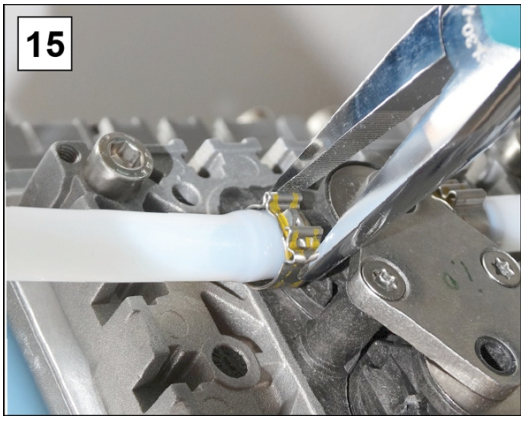
11. Place the clamping brackets onto the valve clusters and tighten the screws by hand at first. Then tighten these with a torque wrench to 3 Nm.

12. Carefully press the membranes centrally and flush into the housing opening.



13. Hold the pump head pair on the vacuum pump and tighten the screw fasteners; hexagon socket wrench size 5.

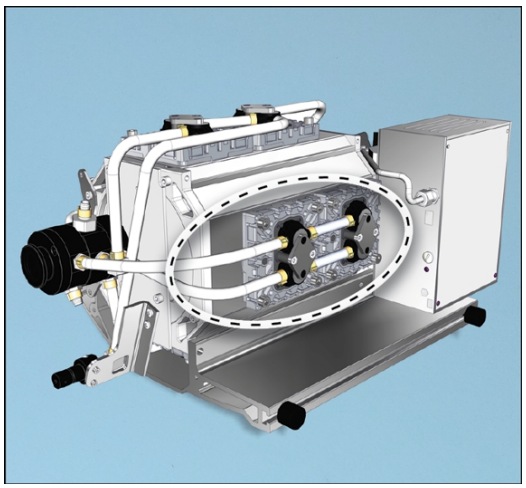




14. Slide the molded hoses back onto the hose nozzles.	15. Close the hose clamps on the hose nozzles, e.g. with flat nose pliers.

Pump head pair, bottom

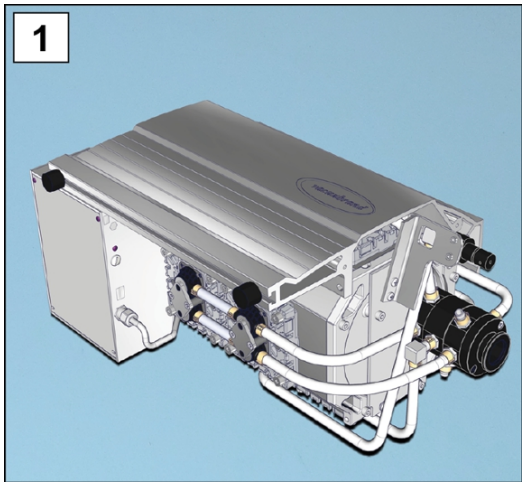
-> Example Maintenance of pump head pair, bottom

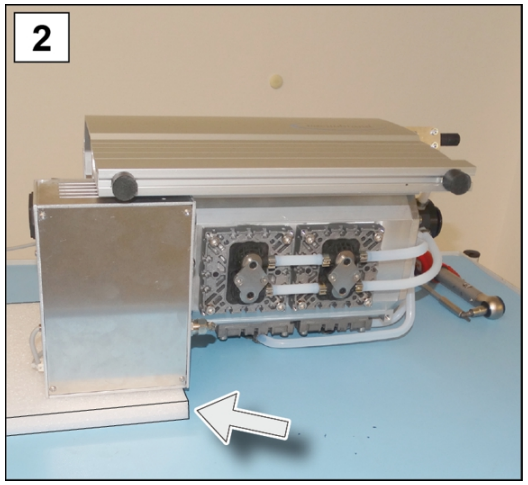


⇨ To change the membranes and valves, proceed exactly as described for the pump head pair, right-side → ***Pump head pair, right on page 63***.

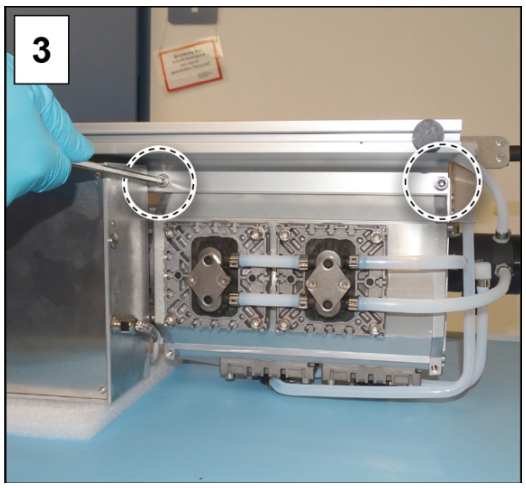
Pump head pair, left side and top

-> Example Maintenance of pump head pair, left and top

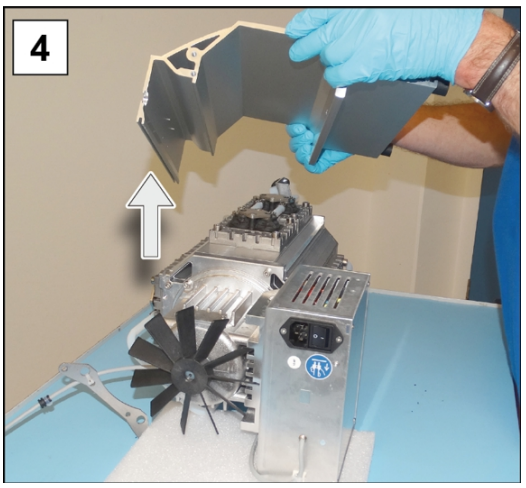




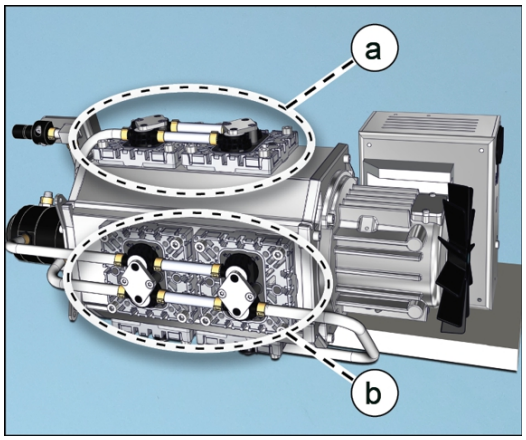
1. Turn the pumping unit so that the side panel is facing upwards.	2. Provide support for the pumping unit, e.g. with rigid foam under the housing of the frequency converter.



3. Unscrew the screw fasteners of the side panel; hexagon wrench size 5.



4. Lift the side panel from the pump.



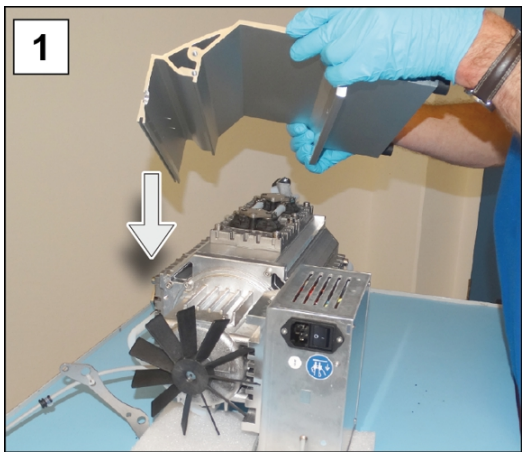
(a) Pump head pair, left
(b) Pump head pair, top

5. To change the membranes and valves, proceed exactly as described for the pump head pair, right-side → ***Pump head pair, right on page 63***.

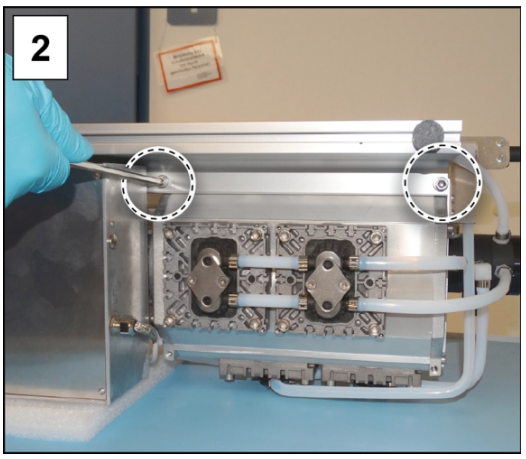
Assembling device and housing parts

Before you put the pumping unit back into operation, all device and housing parts that were removed must first be re-attached.

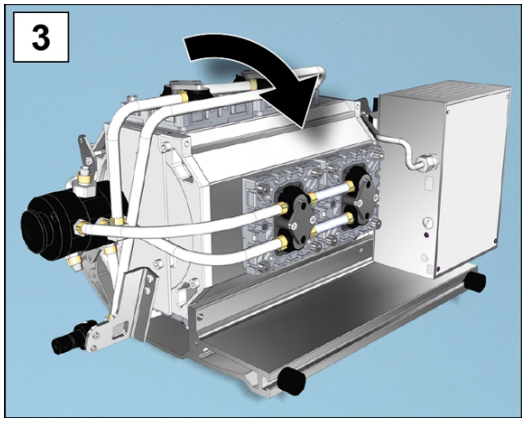
Assembling the side panels



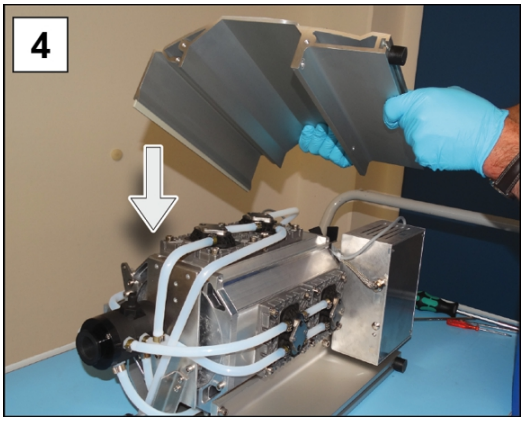
1. Attach the side panels onto the pump.



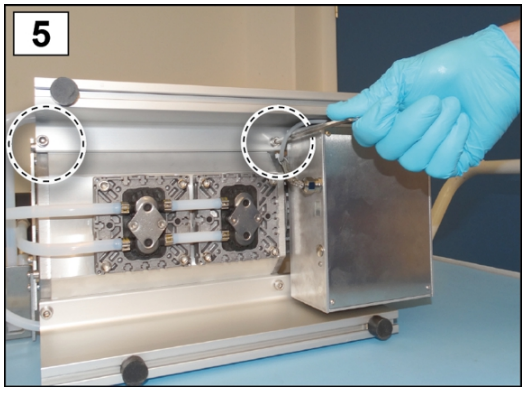
2. Tighten the screw fasteners of the side panel; hexagon wrench size 5.



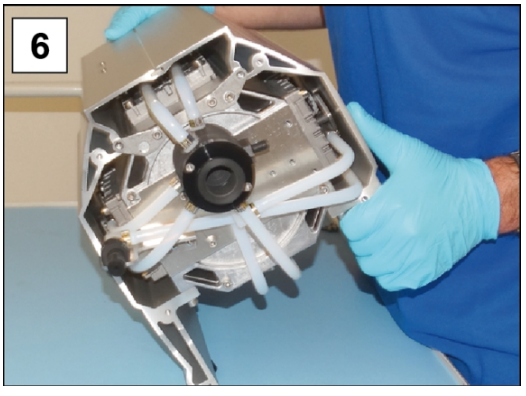
3. Turn the pumping unit upright and make sure that it is in a secure standing position.



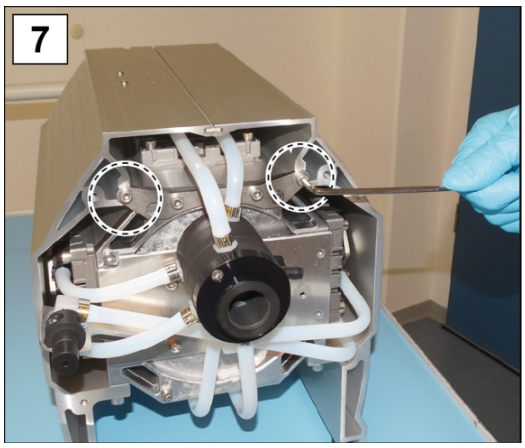
4. Attach the side panels onto the pump.



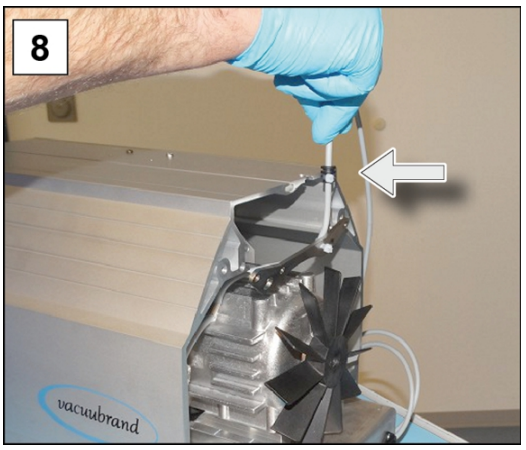
5. Tighten the screw fasteners of the side panel; hexagon wrench size 5.



6. Place the pump on rubber feet.

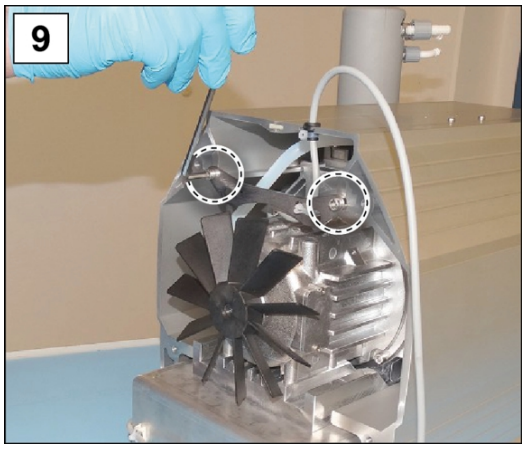


7. Tighten the 2 outer screws from the retaining plate; hexagon socket wrench size 4.

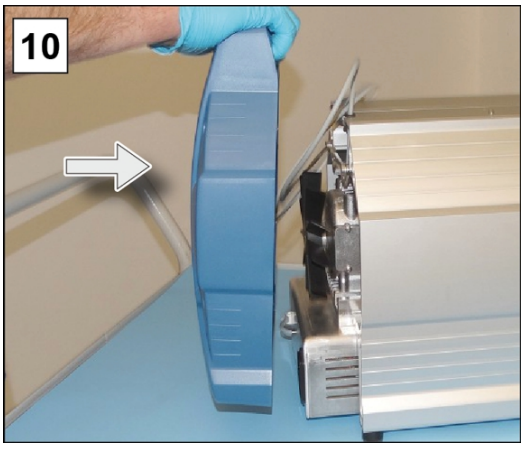


8. Attach the cable in the rear gap.

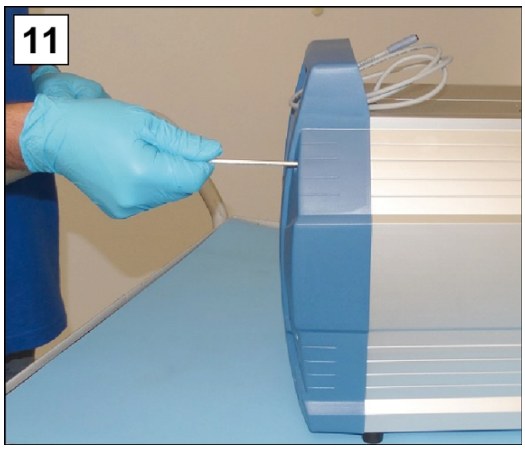
Assembling the rear housing cover

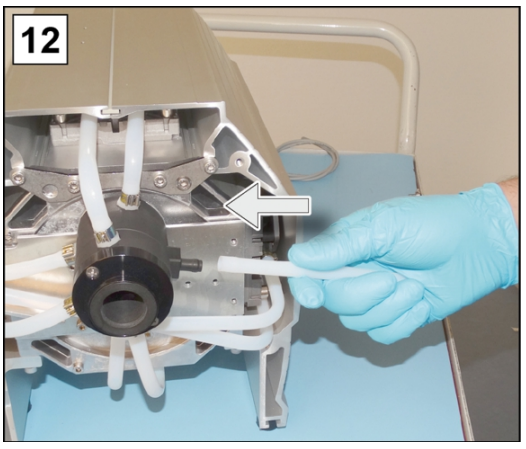


9. Tighten the screws from the side panel retaining plate; hexagon socket wrench size 4.



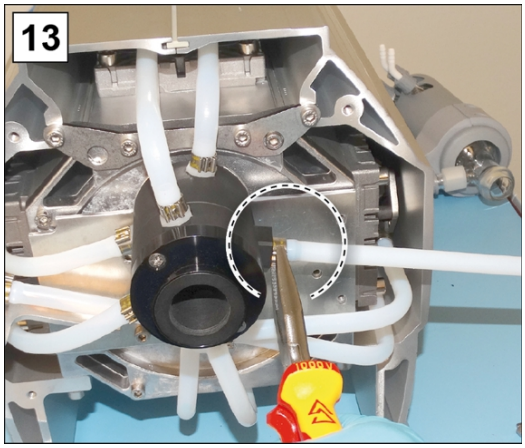
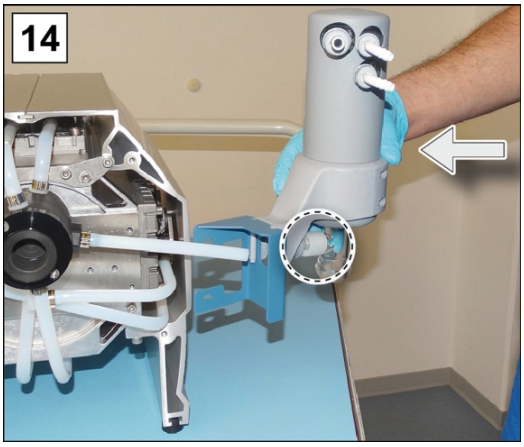
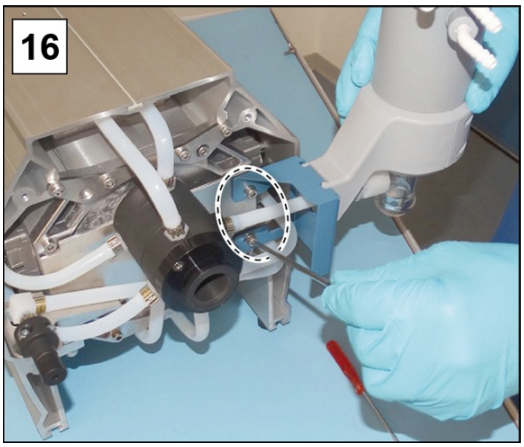
10. Attach the rear housing section.



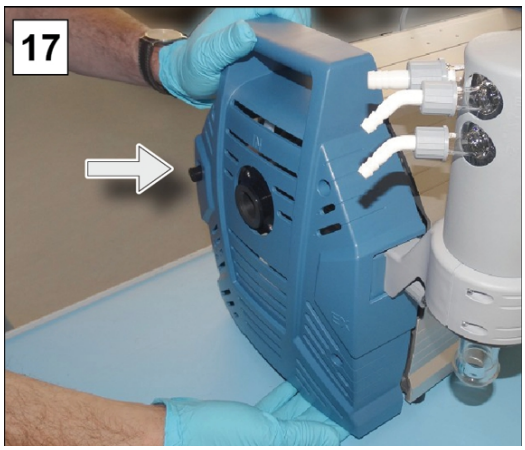
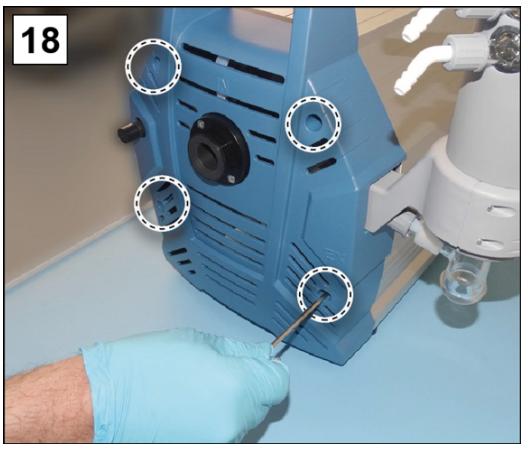


11. Tighten the screws from the housing section; hexagon socket wrench size 4.	12. Attach the molded hose for the EC.

Assembling the EC

	
13. Close the hose clamp, e.g. with flat nose pliers.	14. Push the EC together with the bracket onto the molded hose.
	
15. Fasten the union nut from the inflow EC.	16. Tighten the 2 screws from the EC bracket; hexagon socket wrench size 4.

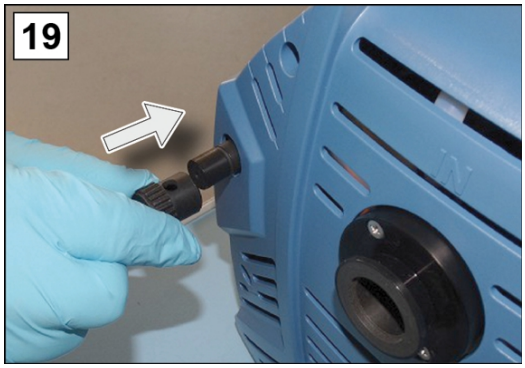
Assembling the front housing cover

17. Attach the front housing section.

18. Tighten the screws from the housing section; hexagon socket wrench size 4.

Assembling attachment parts

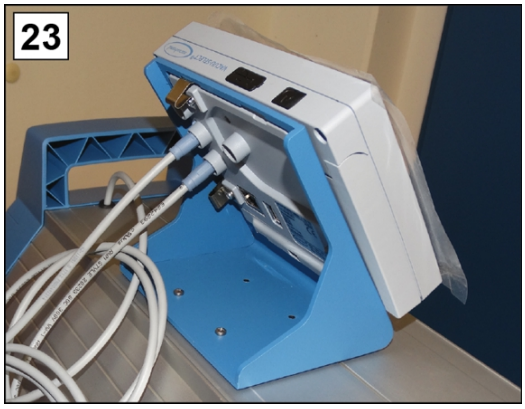


19. Place the cap onto the gas ballast.

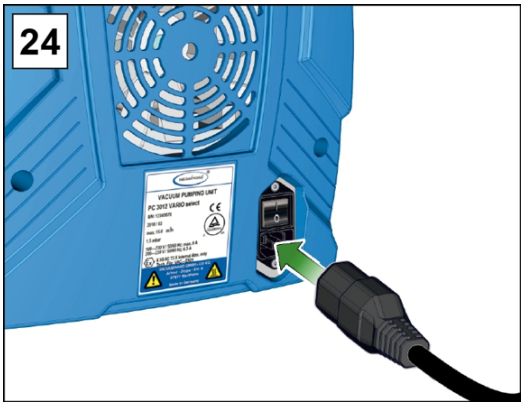
20. Fasten the inlet separator to the tension ring.

21. Fasten the glass flask to the inlet IN.

22. Fasten the glass flask to the EC.



23. Fasten the controller to the pumping unit and connect all cables.



24. Connect the power plug.

If the maintenance work is fully completed:

⇨ Connect the hosing for operation.

⇨ Connect the pumping unit to the power supply.

☑ Pumping unit ready for restart.

☑ Without reconnection -> Pumping unit prepared for storage.

7.3.4 Device fuse replacement

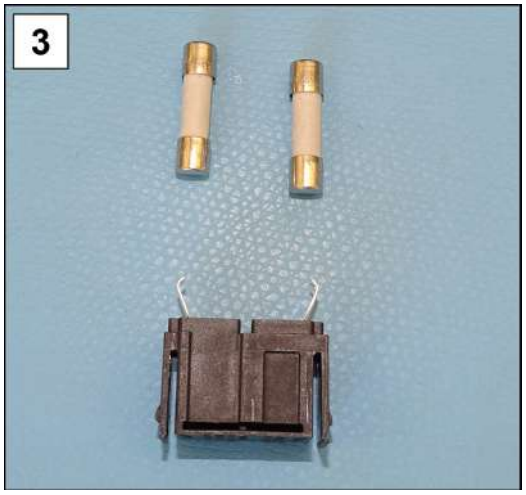
At the rear of the pumping unit, at the power supply, there are 2 device fuses, type: 8 AT 5x20.

Replace device fuse

-> Example Check and replace the device fuse

1. First unplug the power connector and then unlock the fuse drawer.

2. Gently pull the securing drawer out of the appliance connector.



3. Replace defective fuses.

4. Insert the securing drawer into the device connector and press it.

8 Annex

8.1 Technical data

Product description
Product names

Chemistry pumping unit series	
PC 3010 NT VARIO select	PC 3016 NT VARIO select
PC 3012 NT VARIO select	PC 3012 NT VARIO select EKP

Technical data

Technical data

Ambient conditions		(US)
Ambient temperature	10–40 °C	50–104°F
Installation height, max.	2000 m above sea level	6562 ft above sea level
Humidity	30–85 %, non-condensing	
Degree of contamination	2	
Impact energy	5 J	
Protection class (IEC 60529)	IP 40	
Protection class (UL 50E)		Type 1
Avoid condensate or contamination from dust, liquids and corrosive gases.		

Operating conditions		(US)
Operating temperature	10–40 °C	50–104 °F
Storage/transport temperature	-10–60 °C	14–140 °F
Maximum permissible media temperature (gas) of non-explosive atmospheres:		
short-term	80 °C	176 °F
Continuous operation	40 °C	113 °F
ATEX conformity	II 3/- G Ex h IIC T3 Gc X Internal Atm. Only Tech. File: VAC-EX02	
Maximum permissible media temperature (gas) of Ex atmospheres:		
short-term	40 °C	104 °F
Continuous operation	40 °C	104 °F

Connections	
Vacuum, inlet IN	Small flange KF DN 25 / Hose nozzle SW 15
Gas ballast GB	Gas ballast valve, manual
Inert gas adapter – OPTION	Small flange GB NT KF DN 16 Hose nozzle GB NT DN 6-10

Ventilation valve (ventilation with inert gas) – OPTION	Silicon rubber hose 4-5	
Coolant EK	2x (+2x) hose nozzle DN 6-8	
Exhaust, outlet EX	Hose nozzle DN 8-10	
Cold-device plug	+ power connection CEE, CH, CN, UK, IN, US	
Plug-in connector	VACUU·BUS®	
Electrical data		(US)
Rated voltage	200–230 VAC ±10 %	100–120 VAC ±10 %
Power frequency	50/60 Hz	50/60 Hz
Rated current, max.	3.5 A	8 A
Nominal capacity	530 W	0.71 hp
Speed range, min.–max.	30–2,400 rpm	30–2,400 rpm
Overvoltage category	II	
Interface	VACUU·BUS®	
Power cable	2 m	
Appliance fuse 2 pcs.	8A/T 5x20	
Vacuum data		(US)
Inlet pressure / outlet pressure / differential pressure, absolute	1.1 bar	825 Torr
Pressure at gas connections, absolute max.	1.2 bar	900 Torr
Sensor	integrated	integrated
Measurement principle	Ceramic membrane (aluminum oxide), capacitive, gas-type independent, absolute pressure	
Measurement accuracy	±1 mbar/hPa/Torr, ±1 digit (after adjustment, constant temperature)	
Upper measurement limit	1080 mbar	810 Torr
Lower measurement limit	0.1 mbar	0.1 Torr
Temperature drift	< 0.15 mbar/K	0.11 Torr/K

Weights* and dimensions (L x W x H)		(US)
PC 3010 NT VARIO select	616 mm x 387 mm x 450 mm	24.25 in x 15.24 in x 17.72 in
Weight*	29.7 kg	65.5 lb
PC 3016 NT VARIO select	616 mm x 387 mm x 450 mm	24.25 in x 15.24 in x 17.72 in

Weight*	29.7 kg	65.5 lb
PC 3012 NT VARIO select	616 mm x 387 mm x 450 mm	24.25 in x 15.24 in x 17.72 in
Weight*	29.7 kg	65.5 lb
PC 3012 NT VARIO select EKP	616 mm x 387 mm x 450 mm	24.25 in x 15.24 in x 17.72 in
Weight*	33.6 kg	74 lb
* without cable		

PC 3010 NT VARIO select		
Pumping speed, max.	12.8 m^3/h	7.54 cfm
End vacuum, absolute	0.6 mbar	0.45 Torr
End vacuum with GB, absolute	1.2 mbar	0.9 Torr
Number of cylinders/stages	8/4	
PC 3012 NT VARIO select		
Pumping speed, max.	14.3 m^3/h	8.42 cfm
End vacuum, absolute	1.5 mbar	1.1 Torr
End vacuum with GB, absolute	3 mbar	2.2 Torr
Number of cylinders/stages	8/3	
PC 3012 NT VARIO select EKP		
Pumping speed, max.	14.3 m^3/h	8.42 cfm
End vacuum, absolute	1.5 mbar	1.1 Torr
End vacuum with GB, absolute	3 mbar	2.2 Torr
Number of cylinders/stages	8/3	
PC 3016 NT VARIO select		
Pumping speed, max.	19.3 m^3/h	11.4 cfm
End vacuum, absolute	70 mbar	53 Torr
End vacuum with GB, absolute	100 mbar	75 Torr
Number of cylinders/stages	8/1	

Other specifications	
Sensor type	VACUU·SELECT Sensor
Controller	VACUU·SELECT
Volume of condensate collection tanks	500 ml each
Sound pressure level at 1,500 min^{-1}/62% (VARIO)	47 dBA ±3

8.2 Wetted materials

Materials affected by media

Component	Materials affected by media
Pump	
Head cover	Carbon fiber reinforced ETFE
Diaphragm clamping disc	Carbon fiber reinforced ETFE
Diaphragm	PTFE
Valves PC 3010, PC 3012	FFKM
Valves PC 3016	PTFE
O-ring	FPM
Valve terminal	Carbon fiber reinforced ECTFE
Pumping unit	
Inlet	PP glass fiber reinforced
Outlet, hose nozzle	PP
Distributor head	Carbon fiber reinforced PPS
Hose connection to the outlet	Carbon fiber reinforced PPS
O-ring on separator	Fluoroelastomer, NBR
Pressure relief valve at the vapor condenser	Silicone rubber, PTFE film
Emissions condenser outlet	PET
Vapor condenser	Borosilicate glass
Round bottom flask	Borosilicate glass
Hoses	PTFE
Hose fitting	ETFE, ECTFE
Inlet / outlet Peltronic	PP
Cooling surfaces Peltronic	PFA, PA
Separator (AK)	Glass fiber reinforced PP, PE
Sealing ring / centering ring (AK)	FEP
Adapter KF 25 to hose nozzle 15 mm (AK)	PP
Gas ballast tube	Carbon fiber reinforced PTFE
VACUU·SELECT Sensor	
Vacuum sensor	Aluminum oxide ceramic, gold-coated
Measuring chamber	PPS
Small flange OPTION	PP
Seal on sensor	Chemical-resistant fluoroelastomer

Hose nozzle	PP
Seal on ventilation valve	FFKM

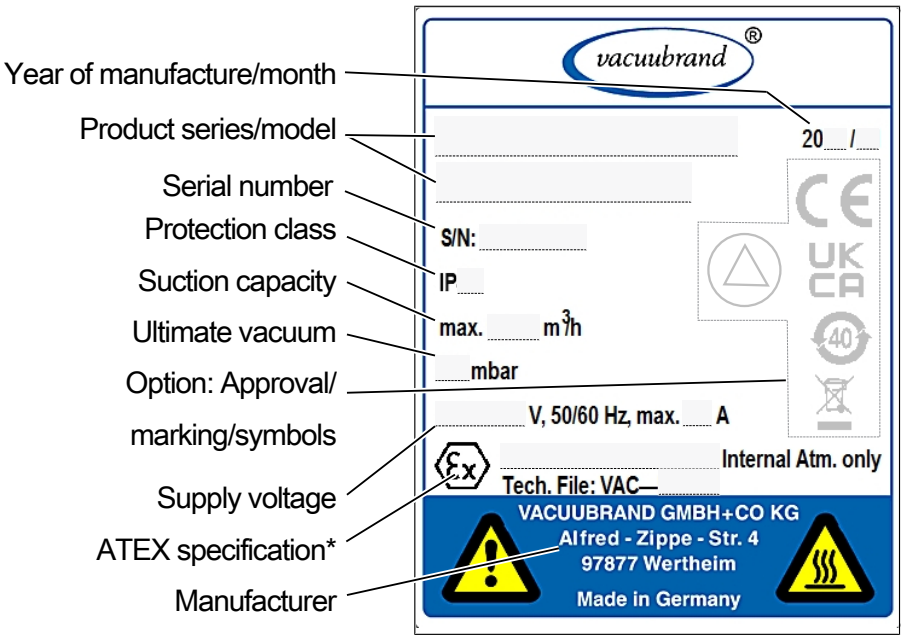
8.3 Rating plate

Specifications from the type plate

- ⇨ In case of error, take note of the type and serial number from the type plate.
- ⇨ When contacting our service department, provide the type and serial number from the type plate. This way we can provide you with targeted support and consultation for your product.

Pumping unit type plate, general

-> Example Type plate details



* Specification of the documentation, group and category, marking G (gas), ignition protection type, explosion group, temperature class (see also: Approval ATEX device category).

8.4 Order data

Ordering information for pumping units

Chemistry pumping unit series	*Order no.
PC 3010 NT VARIO select	257448xx
PC 3012 NT VARIO select	257438xx
PC 3012 NT VARIO select EKP	25743874
PC 3016 NT VARIO select	257418xx

** Order no. depends on power cord CEE, CH, UK, US, CN, IN*

Order data accessories

Accessories	Order No.
Vacuum hose DN 6 mm (l = 1000 mm)	20686000
Vacuum hose DN 8 mm (l = 1000 mm)	20686001
Coolant valve VKW-B	20674220
Ventilation valve VBM-B	20674217
Level sensor	20699908
VACUU·SELECT Sensor	20612881
VSK 3000	20640530
DAkkS calibration with first delivery	20900214
DAkkS recalibration	20900215

Order data replacement parts

Replacement parts	Order No.
Hose nozzle 6 curved	20639948
Hose nozzle DN 6/10	20636635
Small flange KF DN 16	20635008
Extension cable VACUU·BUS, 0.5 m	20612875
Extension cable VACUU·BUS, 2 m	20612552
Extension cable VACUU·BUS, 10 m	22618493
Spherical joint clamp VA KS35/25	20637627
Glass flask/round flask 500 ml	20638497
PA knurled nut M14x1 (union nut)	20637657
PA clamping ring D10 (seal)	20637658
Emissions condenser EK, complete	On request
Dry ice condenser TE	On request
Immissions condenser IK	On request
Peltronic emissions condenser EKP	20636298
Anti-rotation protection D17x17.5	20635113
Gas ballast cap	20639223

Power cable	CEE	20612058
	CH	20676021
	CN	20635997
	IN	20635365
	UK	20612065
	CEE	20612058

⇨ VACUUBRAND > Support > Repair instructions > Chemistry pumping units.

Supply sources

International agents and dealers

Purchase original accessories and original replacement parts from a branch office of VACUUBRAND GMBH + CO KG or from your local dealer.

⇨ Information about the complete range of products can be found in the current product catalog.

⇨ Your local dealer or VACUUBRAND sales office is available for orders, questions about vacuum regulation and the ideal accessories.

8.5 Service information

Use the comprehensive range of services of **VACUUBRAND GMBH + CO KG**.

Detailed overview of services

Range of services

- Product consultation and practical solutions,
- Quick delivery of replacement parts and accessories,
- Professional maintenance,
- Prompt repair process,
- On-site service (on request),
- Calibration (DAkkS accreditation),
- With clearance certificate: Returns, disposal.

Additional information can be found on our website: www.vacuubrand.com.

Service procedure

Follow the description at: VACUUBRAND > Support > Service

Reduce downtimes, speed up processing. When contacting our service department, please have the required information and documents ready.

⇨ Your order can be assigned quickly and easily.

⇨ Risks can be excluded.

⇨ A short description, photos or diagnostics data help to narrow down the error.

8.6 EU declaration of conformity

EU-Konformitätserklärung
EC Declaration of Conformity
Déclaration CE de conformité

CE

Hersteller / Manufacturer / Fabricant:

VACUUBRAND GMBH + CO KG · Alfred-Zippe-Str. 4 · 97877 Wertheim · Germany

Hiermit erklärt der Hersteller, dass das Produkt konform ist mit den Bestimmungen dieser Richtlinien:

Hereby the manufacturer declares that the product is in conformity with the following directives:

Par la présente, le fabricant déclare que le dispositif est conforme aux directives:

2006/42/EG (M-RL), 2014/34/EU (ATEX-RL), 2014/30/EU (EMV-RL), 2011/65/EU, 2015/863 (RoHS-2)

Produkt / Product / Produit – Typ / Type / Type:
PC 3010 NT VARIO select, PC 3016 NT VARIO select,
PC 3012 NT VARIO select, PC 3012 NT VARIO select EKP

Artikelnummer / Order number / Numéro d'article: 25744850, 25744851, 25744852, 25744856, 25744857 / 25741850 / 25743850, 25743851, 25743852, 25743856, 25743857 / 25743874

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 1012-2:2011, DIN EN 61010-1:2020, IEC 61010-1:2010 (Ed. 3), DIN EN 1127-1:2019, DIN EN ISO 80079-36:2016, DIN EN 61326-1:2013, DIN EN IEC 63000:2019

Bevollmächtigter für die Zusammenstellung der technischen Unterlagen / Person authorised to compile the technical file / Personne autorisée à constituer le dossier technique:
Dr. Constantin Schöler · VACUUBRAND GMBH + CO KG · Germany

Ort, Datum / place, date / lieu, date: Wertheim, 16.08.2022

(Dr. Constantin Schöler)
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Web: www.vacuubrand.com

8.7 UKCA conformity declaration

Declaration of Conformity

Manufacturer:

VACUUBRAND GMBH + CO KG · Alfred-Zippe-Str. 4 ·
97877 Wertheim · Germany

Hereby the manufacturer declares that the incomplete machinery is in conformity with the following directives:

- Supply of Machinery (Safety) Regulations 2008 (S.I. 2008 No. 1597, as amended by S.I. 2019 No. 696)
- The Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 2016 (S.I. 2016 No. 1107, as amended by S.I. 2019 No. 696)
- Electromagnetic Compatibility Regulations 2016 (S.I. 2016 No. 1091, as amended by S.I. 2019 No. 696)
- The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012 (S.I. 2012 No. 3032)

Product / Type:
PC 3010 NT VARIO select, PC 3016 NT VARIO select,
PC 3012 NT VARIO select, PC 3012 NT VARIO select EKP

Order number: 25744850, 25744851, 25744852, 25744856, 25744857 /
25741850 / 25743850, 25743851, 25743852, 25743856, 25743857 / 25743874

Serial number: see rating plate

Designated standards applied:

EN ISO 12100:2010, EN 1012-2:1996+A1:2009, EN 61010-1:2010+A1:2019,
EN 1127-1:2019, EN ISO 80079-36:2016, EN 61326-1:2013, EN IEC 63000:2018

Person authorised to compile the technical file:
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Place, date: Wertheim, 16.08.2022

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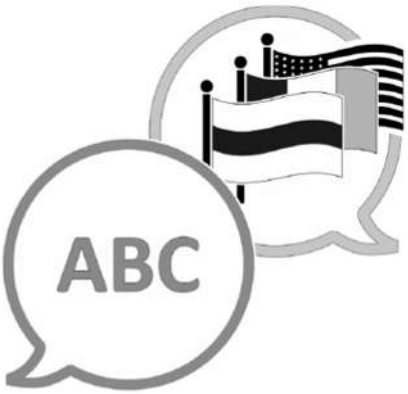

VACUUBRAND > Support > Manuals

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