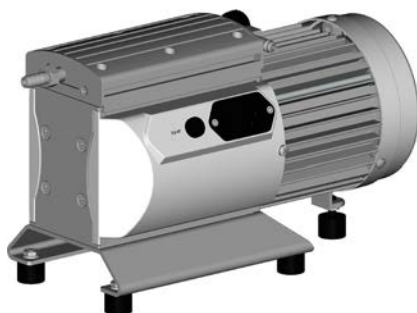
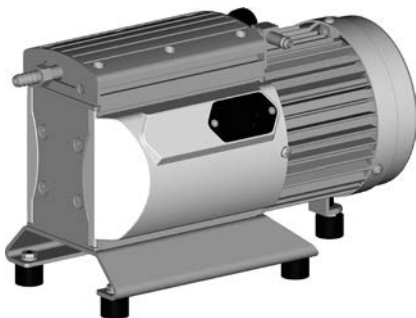




Hei-VAC Valve Tec



Instruction manual



[GB] It is imperative to read this instruction manual prior to initial operation! Comply with safety instructions!
Keep for further use!
This documentation is not subject to revision service!



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



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



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



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



Caution! Hot surface!



Disconnect equipment from AC power.



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



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1 Safety information

1.1 General information

WARNING

- ☞ Read and comply with this manual before installing or operating the equipment.

NOTICE

Remove all packing material, remove the product from its packing-box, remove the protective covers from the inlet and outlet ports and keep, inspect the equipment.

1.2 Intended use

WARNING

- ☞ The pump and all system parts must not be used on humans or animals.
- ☞ Prevent any part of the human body from coming into contact with vacuum.
- ☞ Ensure that the individual components are only connected, combined and operated according to their design and as indicated in the instructions for use.
- ☞ Comply with notes on correct vacuum and electrical connections, see section "Use and operation".

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

NOTICE

Use the equipment **for the intended use only**, i.e. for generation of vacuum in vessels designed for that purpose.

1.3 Setting up and installing the equipment

DANGER

- Equipment must be connected only to a **suitable electrical supply** and a suitable earth point. Failure to connect the motor to ground may result in deadly electrical shock.

WARNING

- ☞ Due to the high compression ratio of the pumps, pressure at the outlet port might be generated being higher than the maximum permissible pressure compatible with the mechanical stability of the system.
- ☞ Do not permit any **uncontrolled pressurizing** (e. g. make sure that the exhaust pipeline cannot become blocked). If there is an exhaust isolation valve, make sure that you cannot operate the equipment with the valve closed. **Risk of bursting!**
- ☞ Always provide a free and pressureless exhaust pipeline.

- ☞ Keep the electrical power cord away from heated surfaces.
- ☞ Keep the electrical power cord away from hot surfaces.

CAUTION

- Provide a firm level platform for the equipment and check that the system to be evacuated is mechanically stable and that all fittings are secure. Ensure a stable position of the pump without any mechanical contact except of the pump feet. Comply with all applicable safety regulations.

- Comply with **maximum permissible pressures** at inlet and outlet and pressure differences between inlet and outlet, see section "Technical data". Do not operate the pump with overpressure at the inlet.
- Avoid overpressure of more than 1.2 bar absolute in the event that gas or inert gas is connected to the pump, to the gas ballast or to a venting valve.
- **Attention:** Flexible elements tend to shrink when evacuated.
- Connect pipes gas tight at inlet and outlet of the pump.
- Check that mains voltage and current conform with the equipment (see rating plate).

NOTICE

Keep a distance of minimum 5 cm between fan and ambient parts (e.g. housing, walls, ...). Check fan regularly for dust/dirt, clean if necessary to avoid a cutback of ventilation.

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

The diameter of the inlet and outlet pipeline should be at least as large as the diameter of the pump connection pipelines.

If the equipment is brought from cold environment into a room for operation, allow the equipment to warm up for one day (pay attention to water condensation on cold surfaces).

Comply with all **applicable and relevant safety requirements** (regulations and guidelines), **implement the required actions and adopt suitable safety measures.**

1.4 Ambient conditions

WARNING

☞ Pay attention to the **permissible maximum ambient and gas inlet temperatures** (see "Technical data").

CAUTION

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

NOTICE

To the best of our knowledge the equipment is in compliance with the requirements of the applicable EC-directives and harmonized standards (see "Declaration of conformity") with regard to design, type and model. Directive IEC 1010 gives in detail conditions under which the equipment can be operated safely (see also IP degree of protection).

1.5 Operating conditions



- ➔ The pumps are **not suitable** to pump
 - **unstable substances** and substances which react explosively under **impact** (mechanical stress) and/or when being exposed to **elevated temperatures** without air,
 - **self inflammable** substances,
 - substances which are **inflammable without air** and
 - **explosive substances**.
- ➔ The pumps have **no approval** for operation below ground.



- ☞ The pumps are **not suitable** for pumping dust.
- The pumps are **not suitable** for pumping substances which may form **deposits** inside the pump. Deposits and condensate in the pump may lead to increased temperatures even to the point of exceeding the maximum permitted temperatures!
- If there is a danger of formation of **deposits** in the pump chamber (check inlet and outlet of the pump), inspect the pump chambers regularly and clean if necessary.
- **Take into consideration interactions and chemical reactions of the pumped media.** Ensure that the materials of the wetted parts are compatible with the pumped substances, see section "Technical data".
If pumping **different substances**, it is recommended to purge the pump with air or inert gas prior to changing the pumped media in order to pump out residues and to avoid reactions of the pumped substances with each other and with the pump materials.

1.6 Safety during operation



- ➔ Adopt suitable measures to prevent the release of dangerous, toxic, explosive, corrosive, noxious or polluting fluids, vapors and gases. In case install an appropriate collecting and disposal system and take protective action for pump and environment.
- ➔ The user must take suitable precautions to prevent any formation of explosive mixtures in the expansion chamber or at the outlet. In case of e.g. a diaphragm crack, mechanically generated sparks, hot surfaces or static electricity may ignite these mixtures. Use inert gas for gas ballast or venting if necessary.
- ➔ Potentially explosive mixtures at the outlet of the pump have to be drained appropriately, sucked off or diluted with inert gas to non-explosive mixtures.



- ☞ Prevent any part of the human body from coming into contact with vacuum.
- ☞ Never aspirate dust into the pump.
- ☞ Make sure that the exhaust pipeline cannot become blocked.

- ☞ Comply with applicable regulations when disposing of chemicals. Take into consideration that chemicals may be contaminated. Take adequate precautions to protect people from the effects of dangerous substances (chemicals, thermal decomposition products of fluoroelastomers). Use appropriate protective clothing and safety goggles.
- ☞ Use only **original manufacturer's spare parts and accessories**. Otherwise the safety and performance of the equipment, as well as the electromagnetic compatibility of the equipment might be reduced.
The CE mark or the cTÜVus mark may be voided if not using original manufacturer's spare parts.
- ☞ Failure of the pump (e.g., due to power interruption), failure of connected components or of parts of the supply, or a change of parameters must not be allowed to lead to a dangerous situation under any circumstances. In case of a diaphragm failure or in case of a leak in the manifold, pumped substances might be released into the environment or into the pump housing or motor.
Especially comply with notes on use and operation and maintenance.
- ☞ The residual **leak rate of the equipment** might render possible an exchange of gas, albeit extremely slight, between the environment and the vacuum system.
Adopt suitable measures to prevent contamination of the pumped substances or the environment.

CAUTION



- Pumping at high inlet pressure may lead to overpressure at the gas ballast valve. Pumped gases or condensate might be expelled if the valve is open. If an inert gas supply is connected to the gas ballast, ensure that its inlet pipeline is not contaminated.
- Pay attention to the safety symbol "hot surfaces" on the equipment. Depending on operation conditions and ambient conditions dangers due to hot surfaces may arise. Hot parts may cause burns if touched. Adopt suitable measures to prevent any danger arising from hot surfaces. Ensure that hot surfaces of the pump do not cause burns. Provide a suitable contact guard if necessary.

CAUTION

- Risk of burns from hot surfaces.
In case of failure the pump surface can heat up to temperatures > 105 °C. Provide a suitable contact guard to protect yourself from accidental contact with hot surfaces.
Ensure the cooling-down of the pump prior to any further work. Wear adequate personal protective equipment, if necessary.

NOTICE

Do not start the pump if the pressure difference between inlet and outlet exceeds 1.1 bar at maximum.
Prevent the backpressure of gases and the backflow of condensates at the outlet.

Never suck liquids or dust into the pump.

Provide appropriate protective measures (i.e. precautions which allow for the requirements of the respective application) even for the case of failure and **malfunction**.
Failure of the pump (e.g. due to power failure) or of connected components, of parts of the supply or change of parameters must not lead to a critical dangerous situation under any circumstances.

In case of overload, the motor is shut down by a self-hold thermal cutout in the winding.

Note: Only manual reset is possible. Switch off the pump and disconnect from the power source.

Identify and eliminate the cause of failure. Wait approx. five minutes before restarting the pump.



- Note: In case of supply voltage below 115 V, the lock of the cutout might be impaired and the pump may restart on its own after sufficient cooling down. Take appropriate precautions, if an automatic restart of the pump may lead to a dangerous situation (e.g., switch off the pump and disconnect from the power source).

1.7 Maintenance and repair

Wear parts have to be replaced regularly. In case of normal wear, the lifetime of the diaphragms and valves is > 10000 operating hours. Bearings have a typical durability of 40000 h. Motor capacitors have a typical durability in the range of 10000 to 40000 h depending strongly on operation conditions including ambient temperature, humidity or load.



- Ensure that the pump cannot be operated accidentally. Never operate the pump if covers or other parts of the pump are disassembled. Never operate a defective or damaged pump.
- **Isolate equipment from mains and wait two minutes** before starting maintenance to allow the capacitors to discharge.
- **Attention:** The pump might be contaminated with process chemicals which have been pumped during operation. Ensure that the pump is decontaminated before maintenance and take adequate precautions to protect people from the effects of dangerous substances if contamination has occurred.



- ☞ Take adequate precautions to protect people from the effects of dangerous substances if contamination has occurred. Use appropriate protective clothing, safety goggles and protective gloves.
- ☞ **Wear parts have to be replaced regularly.**
- ☞ **Never operate a defective or damaged pump.**
- ☞ Check every motor capacitor regularly by measuring its capacity and estimating its time in operation. Replace old capacitors early enough to prevent a failure in operation. If an old motor capacitor fails, the capacitor may get hot. It may even melt or emit a flame, which could be **dangerous for persons and equipment in the vicinity**. The capacitors have to be checked and replaced by an electrician.
- ☞ Vent the pump before starting maintenance. Isolate the pump and other components from the vacuum system. Allow sufficient cooling of the pump. Separate the pump from the coolant circuit and drain condensate, if applicable.

NOTICE

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

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

In order to comply with law (occupational, health and safety regulations, safety at work law and regulations for environmental protection) vacuum pumps, components and measuring instruments returned to the manufacturer can be repaired only when certain procedures (see section "**Questions / Repair**") are followed.

2 Standard items and options

	Item	qty	P/N EU version	P/N US version
	Hei-VAC Valve Tec	1	591-00160-00-2	591-00160-01-2
Standard items Hei-VAC Valve Tec				
	Hei-VAC Valve Tec	1		
	Power cord	1	14-300-009-81 (CEE)	14-300-009-82 (US)
	Instruction manual			
	DE	1	01-005-005-89-0	01-005-005-89-0
	EN	1	01-005-005-90-0	01-005-005-90-0
	FR	1	01-005-005-91-0	01-005-005-91-0
	Warranty card / Confirmation of condition of unit	1	01-006-002-58	01-006-002-58

3 Technical data

Type	Hei-VAC Valve Tec	
Maximum pumping speed according ISO 21360	m ³ /h	0.75 / 0.9 ^(a)
Ultimate vacuum (absolute) without gas ballast	mbar	12
Ultimate vacuum (absolute) with gas ballast	mbar	20
Maximum permissible inlet pressure (absolute)	bar	1.1
Maximum permissible outlet pressure (absolute)	bar	1.1
Maximum permissible difference pressure between inlet and outlet	bar	1.1
Maximum permissible pressure (absolute) at gas ballast valve	bar	1.2
Permissible ambient temperature storage	°C	-10 to +60
operation	°C	+10 to +40
Permissible relative atmospheric moisture during operation (no condensation)	%	30 to 85
Maximum installation altitude	m	2000 NN
Nominal power electrical	kW	0.08
No-load speed 50/60 Hz	min ⁻¹	1500 / 1800 ^(a)
Maximum permissible range of supply voltage (±10%) Attention: See rating plate		100-115 V~ 50/60 Hz / 120 V~ 60 Hz 220-230 V~ 50/60 Hz
Maximum rated current at 100-115 V~ 50/60 Hz / 120 V~ 60 Hz	A	1.6 - 1.7
220-230 V~ 50/60 Hz	A	0.8 - 0.85
Motor protection		thermal cutout, manual reset ^(b) 120 V version: additional fuse 2.5 AT
Overvoltage category		II
Degree of protection IEC 60529		IP 40
Degree of protection UL 50E		type 1
Pollution degree		2
Inlet		hose nozzle DN 8 mm
Outlet		hose nozzle DN 8-10 mm
A-weighted emission sound pressure level* (uncertainty K _{PA} : 3 dB(A))	dB(A)	40
Dimensions L x W x H approx.	mm	338 x 143 x 183
Weight approx.	kg	7.9

(a) at 50/60 Hz

(b) In case of supply voltage below 115 V, the lock of the cutout might be restricted.

(c) Measurement according to EN ISO 2151:2004 and EN ISO 3744:1995 at 230V/50Hz and at ultimate vacuum with exhaust tube at outlet

3.1 Gas inlet temperatures

Operating condition	Inlet pressure	Permitted range of gas temperatures at inlet
Continuous operation	> 100 mbar (high gas load)	+10°C to +40°C
Continuous operation	< 100 mbar (low gas load)	0°C to +60°C
Short-time (< 5 minutes)	< 100 mbar (low gas load)	-10°C to +80°C

We reserve the right for technical modification without prior notice!

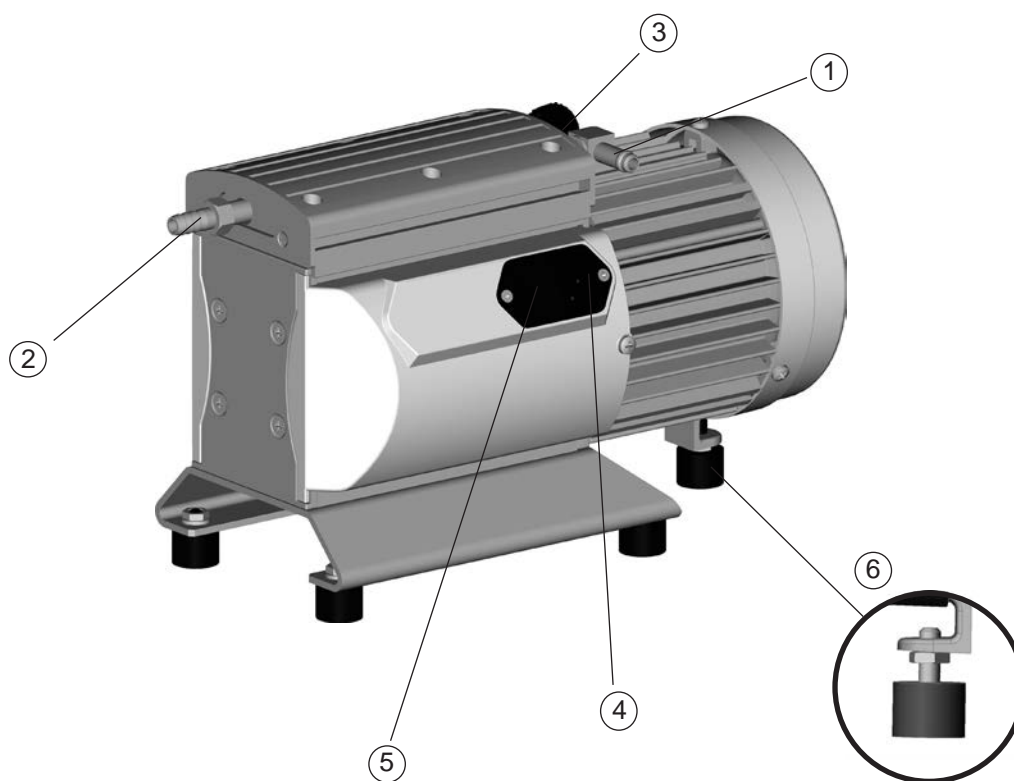
3.2 Wetted parts

Components	Wetted materials
Housing cover inner part	PTFE carbon reinforced
Head cover	ETFE carbon fiber reinforced
Diaphragm clamping disc	ETFE carbon fiber reinforced
Valves	FFKM
Diaphragm	PTFE
Connexions	ETFE
Inlet / outlet	ETFE

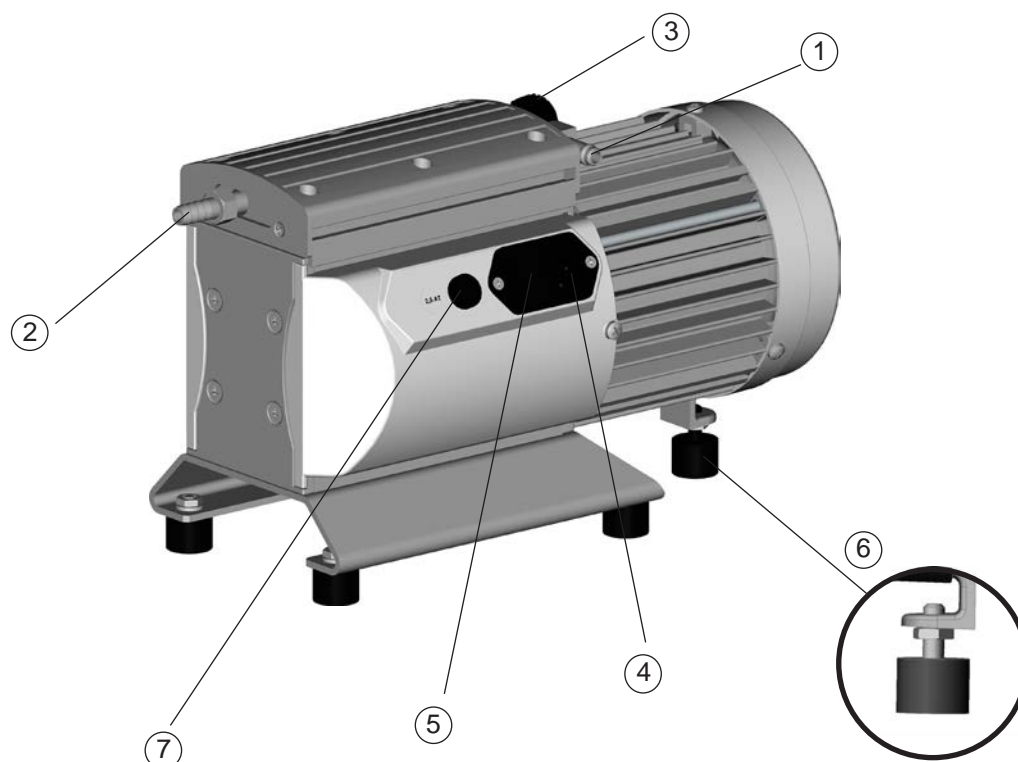
3.3 Pump parts

Position	Component
1	Inlet
2	Outlet
3	Gas ballast valve
4	Mains connection
5	On / Off switch
6	pump foot, height adjustable
7	cover fuse 2,5 A(T)

Hei-VAC Valve Tec (230 V version)



Hei-VAC Valve Tec (120 V version) with motor fuse



3.4 Replacing the device fuse (only 120 V version)

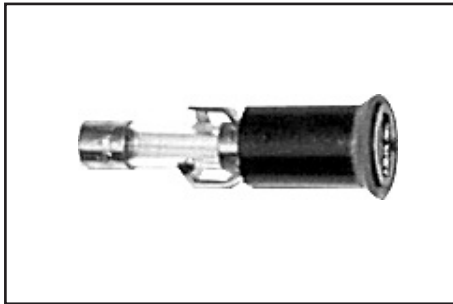
DANGER



- ➔ **Switch off the pump.**
- ➔ **Disconnect the electrical power cord** before unscrewing the fuse holder. Identify and eliminate the cause of failure before switching on the pump again.



- ➔ Unscrew the fuse holder at the side of the pump using a slotted screw driver.



- ➔ Replace the defective fuse by a fuse of the same type, see „Technical data“. Reassemble holder with fuse to the pump.

WARNING

Check the electrical safety of the device according to IEC 61010 and national regulations after replacing the fuse.

4 Use and operation

4.1 Installing in a vacuum system



- If there is risk of release of dangerous or polluting fluids, install an appropriate system to catch and dispose of those fluids.



- ☞ Connect an exhaust line gas tight at the pump outlet if necessary. Always dispose of exhaust gases appropriately (e.g. into a fume hood).
- ☞ Never block the gas outlet. The exhaust line must always be free of obstructions (no back pressure) to ensure an unimpeded discharge of gas.
- ☞ Particles and dust must not be aspirated, the user has to provide appropriate filters if necessary. The user must ensure their suitability concerning gas flow, chemical resistance and safeness against clogging prior to use.
- ☞ Make sure ventilation is adequate if the pumping unit is installed in a housing or if ambient temperature is elevated. Provide external venting if necessary.



- Reduce the transmission of vibration and prevent loading due to rigid pipelines. Insert elastic hoses or flexible elements as couplings between the pump and rigid pipes. **Attention:** Flexible elements tend to shrink when evacuated.
- Risk of burns from hot surfaces.
In case of failure the pump surface can heat up to temperatures > 105 °C. Provide a suitable contact guard to protect yourself from accidental contact with hot surfaces.
Ensure the cooling-down of the pump prior to any further work. Wear adequate personal protective equipment, if necessary.



- Connection lines at the pump inlet have to be gas tight.
- Especially if the gas ballast valve is open, a power failure may cause unintentional ventilation of the pump and the vacuum system. In case this constitutes a potential source of danger, take appropriate safety measures.
- Before switching on check that mains voltage and current conform with the equipment (see rating plate).

NOTICE

Keep a distance of minimum 5 cm between fan and ambient parts.

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

Avoid throttling losses by using connecting pipes with large diameter and keeping them as short as possible.

Install outlet pipelines always falling to avoid backflow of condensate towards the pump.

Use of a suitable valve to isolate the pump from the vacuum system is recommended to allow the pump to warm up before pumping condensable vapors or to clean the pump before it is switched off.

When assembling, ensure **vacuum-tightness**. After assembly, check the whole system for leaks.

Secure hose connections at the pump appropriately against accidental detaching. If exhaust noise is annoying, connect an exhaust hose.

Check hose connections prior to starting operation.

WARNING

- ☞ The gas outlet must not be blocked. The exhaust pipeline has always to be free and pressureless to enable an unhindered discharge of gases.

4.3 During operation

DANGER

- ➔ **Potentially dangerous gases or vapors** at the outlet of the pump have to be drained and disposed appropriately.

WARNING

- ☞ Due to the high compression ratio of the pumps, pressure at the outlet port might be generated being higher than the maximum permissible pressure compatible with the mechanical stability of the system. Ensure that the pump outlet cannot become blocked or restricted.

- ☞ **Maximum ambient temperature:** 40 °C
Make sure ventilation is adequate if pump is installed in a housing or if ambient temperature is elevated.

CAUTION

- If pump is installed in altitudes of more than 2000 m above mean sea level check compatibility with applicable safety requirements, e. g. IEC 60034 (motor may overheat due to insufficient cooling).
- Check compatibility with **maximally permitted pressures** at inlet and outlet.

NOTICE

Do not start the pump if the **pressure at outlet port** exceeds **maximum 1.1 bar (absolute)**. Attempts to start the pump at higher pressures may cause blockade and damage of the motor.

If pumping condensable vapors (water vapor, solvents, etc.), let the pump run with **gas ballast** to help purge any condensation in the pump.

Prevent internal condensation, transfer of liquids or dust. The diaphragm and valves will be damaged, if liquids are pumped in significant amounts.

Check the pump regularly for external soiling and deposits, clean if necessary to avoid an increase of the pump's operating temperature.

In case of overload, the motor is shut down by a **self-hold thermal cutout** in the winding.

Note: Only manual reset is possible. Switch off the pump and disconnect from the power source. Identify and eliminate the cause of failure. Allow the pump to cool down sufficiently before restart.

CAUTION

- **Note:** In case of **supply voltage below 115 V**, the lock of the cutout might be impaired and the pump may restart on its own after sufficient cooling down. Take appropriate precautions, if an automatic restart of the pump may lead to a dangerous situation.

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

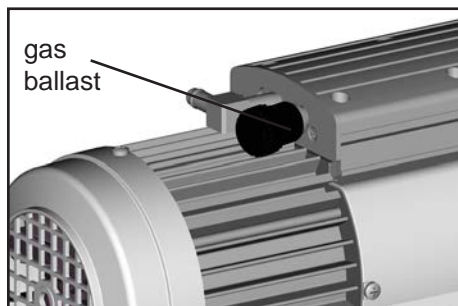
4.3 Attention: Important notes regarding the use of gas ballast

! DANGER

- ➔ When using air rather than inert gas, risk of significant damage to equipment and/or facilities, risk of personal injury or even loss of life exists due to the formation of hazardous and/or explosive mixtures if air and pumped media react inside or at the outlet of the pump.

! WARNING

- ☞ Make sure that air/gas inlet through the gas ballast valve never leads to hazardous, explosive or otherwise dangerous mixtures. If in doubt, use inert gas or close gas ballast valve.



To reduce condensation in the pump, do not pump vapor before the pump has reached its operating temperature. Open the gas ballast valve when pumping condensable vapors.

For **condensable vapors** (water vapor, solvents, etc.):

- Open gas ballast valve.
- With gas ballast valve open, the ultimate vacuum will be reduced.
- Use inert gas for gas ballast to avoid the formation of explosive mixtures. Comply with maximum permitted pressure at the gas ballast connexion: 1.2 bar absolute.
- Close the gas ballast valve by turning the cap 180°.

In case of low boiling solvents (when the formation of condensate is unlikely), the use of gas ballast might be unnecessary.

! WARNING

- ☞ **Important:** Comply with regulations when disposing of solvents/condensates. Recycle if possible; purify if contaminated.

4.4 Shutdown

NOTICE

Short-term:

Has the pump been exposed to condensate?

- Allow the pump to continue to run at atmospheric pressure for a few minutes

Has the pump been exposed to media which may damage the pump materials or forms **deposits**?

- Check and clean pump heads if necessary.

Long-term:

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

5 Troubleshooting

Fault	Possible cause	Remedy
<input type="checkbox"/> Pump does not start or stops immediately.	<ul style="list-style-type: none"> ➔ Supply voltage too low or power supply failure? ➔ Control signal for motor speed is missing? ➔ Pressure in outlet pipeline too high? ➔ Motor overloaded? 	<ul style="list-style-type: none"> ✓ Check supply voltage. Check fuse. ✓ Check control signal. ✓ Remove blockade in line, open valve. ✓ Allow motor to cool down, identify and eliminate cause of failure. Manual reset is necessary. Switch off pump or unplug mains.
<input type="checkbox"/> Pump does not achieve its ultimate vacuum or usual pumping speed.	<ul style="list-style-type: none"> ➔ Leak in the pipeline or vacuum system? ➔ Long, narrow line? ➔ Pump has been exposed to condensate? ➔ Deposits have been formed inside the pump? ➔ Diaphragms or valves damaged? ➔ Outgassing substances or vapor generated in the process? 	<ul style="list-style-type: none"> ✓ Check pump directly - connect vacuum gauge directly at pump inlet - then check connection, pipeline and vacuum system if necessary. ✓ Use lines with larger diameter, length as short as possible. ✓ Allow pump to run for some minutes with atmospheric pressure at the inlet. ✓ Clean and inspect the pump heads. ✓ Replace diaphragms and/or valves. ✓ Check process parameters.
<input type="checkbox"/> Pump too noisy.	<ul style="list-style-type: none"> ➔ Loud exhaust noise? ➔ Diaphragm crack or diaphragm clamping disc loose? ➔ Other than above mentioned causes? 	<ul style="list-style-type: none"> ✓ Connect hose or silencer to pump outlet. ✓ Perform maintenance. ✓ Contact local distributor.
<input type="checkbox"/> Pump seized.		<ul style="list-style-type: none"> ✓ Contact local distributor.

6 Replacing diaphragms and valves

DANGER



- ➔ **Never operate the pump if covers or other parts of the pump are disassembled.** Ensure that the pump cannot be operated accidentally.
- ➔ **Before starting maintenance** isolate the pump from the electrical supply and wait **two minutes** after isolating the equipment from mains to allow the capacitors to discharge.
- ➔ **Attention:** The pump might be contaminated with the process chemicals that have been pumped during operation. Ensure that the pump is decontaminated before maintenance. Avoid the release of pollutants.

WARNING

- ⚠ **Never operate a defective or damaged pump.**
- ⚠ Wear appropriate safety-clothing when you come into contact with contaminated components.
- ⚠ Check every motor capacitor regularly by measuring its capacity and estimating its service life. Replace old capacitors early enough to prevent a failure. The capacitors must be checked and replaced by a trained electrician.
- ⚠ Vent the pump and isolate it from the vacuum system before you start maintenance. Allow sufficient cooling of the pump before starting maintenance.

NOTICE

Ensure that maintenance is done only by suitable trained and supervised technicians.

All bearings are encapsulated and are filled with long-life lubricant. Under normal operating conditions, the pump is maintenance free. The valves and diaphragms as well as the motor capacitors are wear parts. If the rated ultimate vacuum is no longer achieved or in case of increased noise level, the pump interior, the diaphragms and the valves must be cleaned and must be checked for cracks or other damage.

Depending on individual cases it may be efficient to check and clean the pump heads on a regular basis. In case of normal wear the lifetime of the diaphragms and valves is > 10000 operating hours.

- Prevent internal condensation, transfer of liquids or dust. The diaphragm and valves will be damaged, if liquids are pumped in significant amount.
- If the pump is exposed to corrosive gases or vapor or in case of deposits, maintenance should be carried out frequently.
- Regular maintenance will improve the lifetime of the pump and also protect both man and environment.

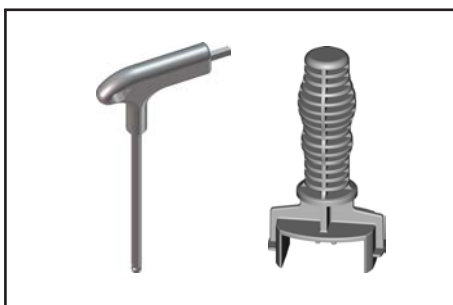
Set of seals

(2 diaphragms, 4 valves, diaphragm key)..... 11-300-009-16

Valve 23-30-01-01-91

Diaphragm..... 23-30-01-01-92

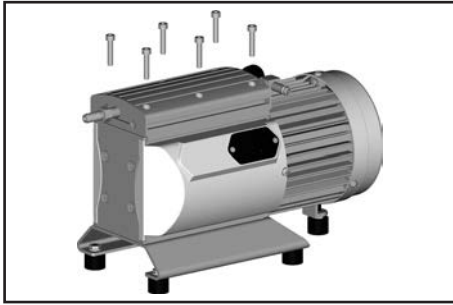
Diaphragm key..... 02-07-02-01-13



Tools:

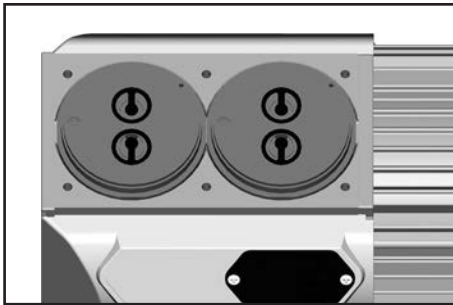
- Diaphragm key SW 46 (enclosed in the set of seals)
- Allen key size 4

6.1 Cleaning and inspecting the pump heads



Use a hex key size to loosen the six socket head screws at the pump head and remove the upper housing (housing cover with housing cover insert).

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



Take the head covers carefully off the housing to check the valves.

Note the position of the valves and remove them.

- ☞ Replace valves if damaged.



Use petroleum ether or industrial solvent to remove deposits. Do not inhale.

Check the diaphragms for damage and replace if necessary.

6.2 Replacing the diaphragm



Lift diaphragm carefully.

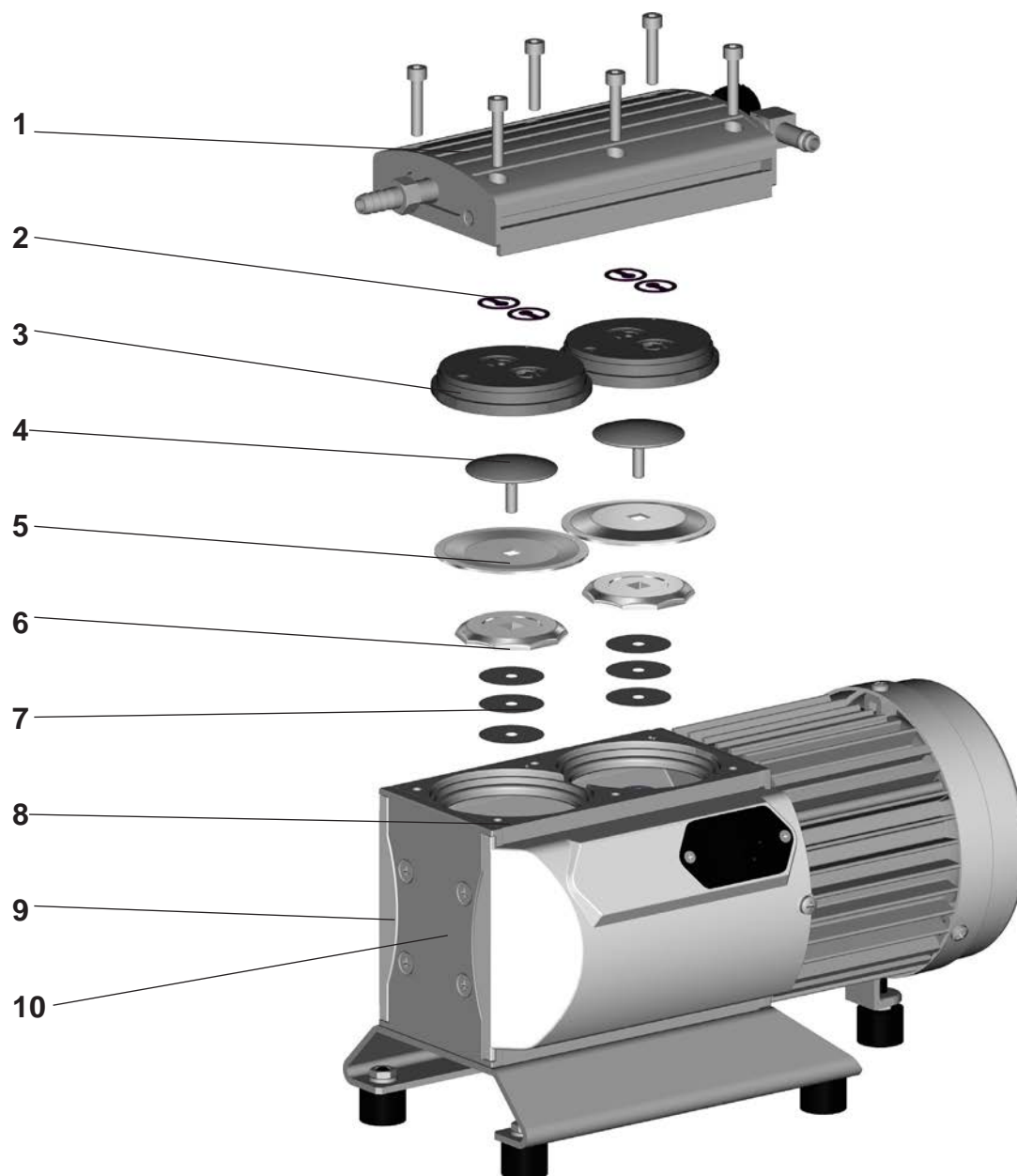
- ☞ Apply pressure to the adjacent clamping disc to bring connecting rod into upper turning point position if necessary.
- ☞ Never use a spiky or sharp-edged tool to lift the diaphragm.

Use the diaphragm key to grip the diaphragm support disc below the diaphragm.

Apply pressure to the diaphragm clamping disc to bring the diaphragm into the lower turning point position. Press diaphragm key against diaphragm clamping disc, unscrew and remove diaphragm support disc with diaphragm.

- ☞ If the old diaphragm is difficult to separate from the support disc, immerse assembly in naphtha or petroleum ether. Do not inhale!
- ☞ Check for washers under clamping disc. Do not mix the washers from the different heads. Make sure that the original number is reassembled at the individual pump head.

View of the disassembled pump head parts

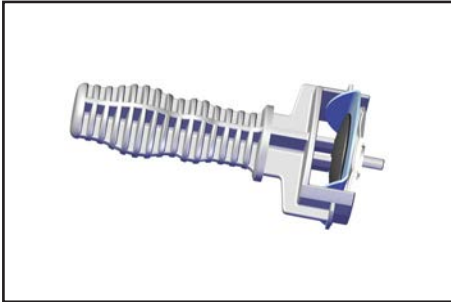


- | | |
|--|---------------------------|
| 1: housing cover | 6: diaphragm support disc |
| 2: valve | 7: washers |
| 3: head cover | 8: rod |
| 4: diaphragm clamping disc with connecting screw | 9: housing |
| 5: diaphragm | 10: bearing plate |



Position new diaphragm between diaphragm clamping disc with square head screw and diaphragm support disc.

- ☞ Attention: Position diaphragm with pale side towards diaphragm clamping disc (to pump chamber).



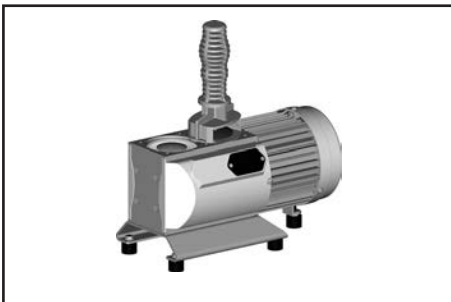
Lift diaphragm at the side and position carefully together with diaphragm clamping disc and diaphragm support disc in the diaphragm key.

- ☞ Avoid damaging the diaphragm: Do not bend diaphragm too much.

Assemble the original number of washers between support disc and connecting rod at the individual pump head.

- ☞ Smaller number of washers: The pump will not attain final vacuum. More washers: Clamping disc will hit head cover; noise or even blockage of the pump.

6.3 Assembly of the pump heads

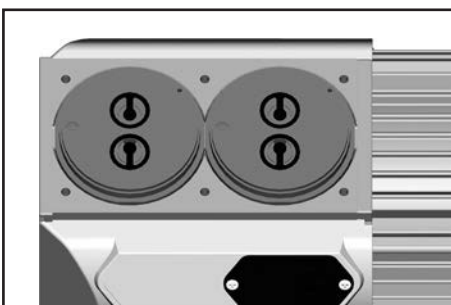


- ☞ Make sure that the square head screw of the diaphragm clamping disc is correctly seated in the guide hole of the diaphragm support disc.

Assemble diaphragm clamping disc, diaphragm and diaphragm support disc to connecting rod.



Bring the diaphragms into a position in which they are in contact with the housing and centred with respect to the bore.

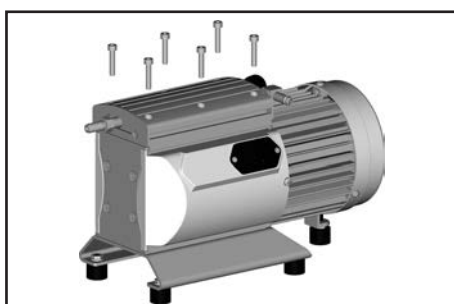
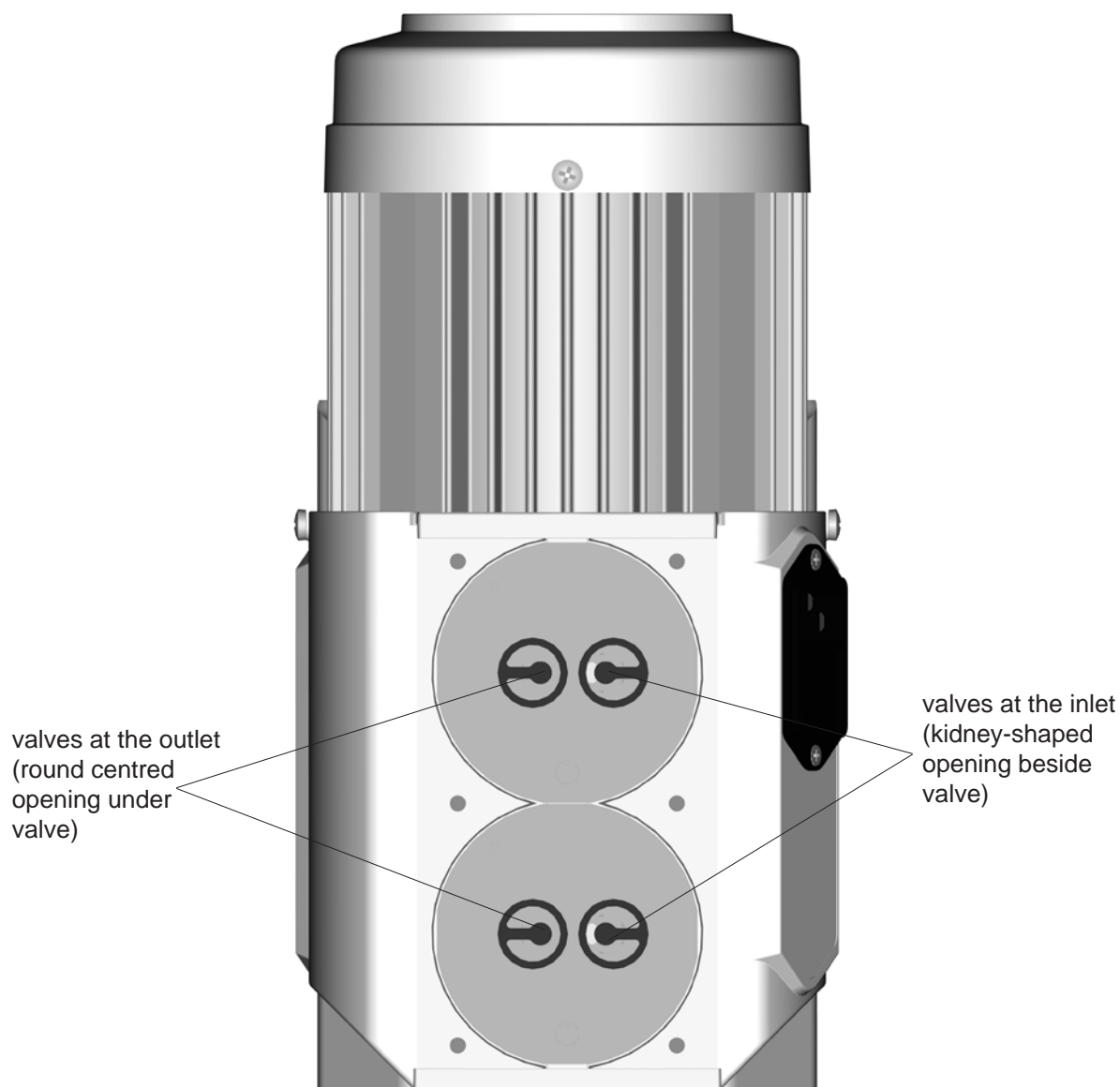


Assemble head covers and valves.

- ☞ Check for correct position (see also fig. below).

It is absolutely essential to comply with the positions and orientations of the head covers and valves!

Scheme of pump head with head covers and valves



Position housing cover.

- ☞ Move housing cover slightly to make sure that the head covers are correctly positioned.

Screw in the six socket head screws fixing the housing cover crosswise first slightly, then tighten.

- ☞ Do not tighten until head cover is in contact with housing, **max. torque 6 Nm.**

If the pump does not achieve the ultimate vacuum:

- Whenever the diaphragms and valves have been replaced, a break-in period of several hours is required before the pump achieves its ultimate vacuum.
- In case of an unusual noise, switch off pump immediately and check clamping disc positions.

If the specified ultimate vacuum is not achieved, and if this does not change after the break-in period:

If necessary recheck valve seats and diaphragms.

7 Warranty, liability, copyright

Warranty

Heidolph Instruments provides a three-year warranty on the products described here (with the exception of glass and consumable parts) if registered with enclosed warranty card or via internet (www.heidolph.com). Warranty starts with the date of registration. Without registration warranty starts according to serial number. This warranty covers defects in materials and workmanship. Transit damage is excluded from this warranty.

To file for such warranty service, contact Heidolph Instruments or your local Heidolph Instruments Dealer. If defects in material or workmanship are found, your item will be repaired or replaced at no charge. Misuse, abuse, neglect or improper installation are not covered by this warranty. Alterations to the present warranty need Heidolph Instruments' consent in writing.

Exclusion clause

Heidolph Instruments cannot be held liable for damage from improper use or misuse. Remedy for consequential damage is excluded.

Copyright

Copyright in pictures and wording of the present Instruction Manual is held by Heidolph Instruments.



8 Service

Your unit is not working?

1. Please contact Heidolph Instruments or your authorized Heidolph Instruments dealer via telephone or email.

In Germany	Tel.:	0800-5889708 (freecall)
In USA		866-650-9604
In UK		01799-513320
Worldwide		+49-91229920-74
	Fax:	+49 (0) 91 22 99 20 65
	E-Mail:	sales@heidolph.de

2. After consulting with a Heidolph service employee:
 - Package the unit for shipping per the recommended methods of the service department and mail to the following including the declaration of non-objection:

Heidolph Instruments GmbH & Co. KG
 Lab Equipment Sales
 Walpersdorfer Str. 12
 D-91126 Schwabach / Germany

9 Disposal

- Properly dispose of the unit according to the valid national and legal regulations pertaining to disposal of used laboratory equipment.

10 Certificate of Decontamination

CERTIFICATE OF DECONTAMINATION

IN CASE OF RETURNS



Please fill in the required fields.

Note: The sender must package the goods properly and appropriately for transport.

Heidolph Instruments GmbH & Co. KG
 Walpersdorfer Straße 12
 91126 Schwabach, Germany
 Phone: +49 (0) 9122 9920-380
Fax: +49 (0) 9122 9920-19
 Email: service@heidolph.de

SENDER

Name _____ First name _____
 Company/institution _____ Department _____
 _____ Workgroup _____
 Address _____
 ZC/City _____
 Country _____ Phone _____
 Email _____

DEVICE DETAILS

Article number _____ Serial no. _____
 Ticket number _____
 Reason for sending in _____

Has the device been cleaned, decontaminated/disinfected? Yes No (Please mark as applicable)
 If yes, which measures were carried out?

Does this device pose a risk to people and/or the environment due to the processing of substances that are hazardous to health, the environment and/or are biohazardous? Yes No (Please mark as applicable)
 If yes, with which substances did the device come into contact?

LEGALLY BINDING DECLARATION

The principal/consignor is aware that they are liable to the agent/consignee for losses or damage incurred due to incomplete and incorrect information.

_____ Date _____ Signature _____ Company stamp _____





EU-Konformitätserklärung EU Declaration of conformity

CE Vakuumpumpe
Vacuum pump

Wir, die Heidolph Instruments GmbH & Co. KG,
We, Heidolph Instruments GmbH & Co. KG,

Heidolph Instruments GmbH & Co. KG
Walpersdorfer Straße 12
91126 Schwabach / Deutschland

erklären, dass die nachstehend bezeichneten Geräte hinsichtlich ihrer Konzeption und Bauart - in der von uns in Verkehr gebrachten Ausführung - den grundlegenden Anforderungen aller nachfolgend angeführten EU-Richtlinien entsprechen. Bei einer mit uns nicht abgestimmten Änderung an dem Gerät verliert diese Erklärung ihre Gültigkeit.

hereby declare, that the product designated below is in compliance with the basic requirements of all applicable EU-directives stated below with regard to design, type of model sold and manufactured by us. This certificate will be invalid if the product is modified without the prior written consent and agreement of the manufacturer.

Hei-VAC Valve Control	591-00130-xx
Hei-VAC Valve Tec	591-00160-xx
Hei-VAC Vario Station	591-00142-xx
Hei-VAC Vario Control	591-00141-xx
Hei-VAC Vario Tec	591-00171-xx
Hei-VAC Valve Industrial	591-07210-xx

Maschinenrichtlinie / Machinery Directive 2006/42/EG
EMV-Richtlinie / Electromagnetic Compatibility Directive 2014/30/EU
Delegierte (RoHS-) Richtlinie / Delegated (RoHS) Directive 2015/863/EU
Angewandte (harmonisierte) Normen / (Harmonized) Standards applied:
EN ISO 12100:2010, EN 61326-1:2013, EN 61010-1:2010, EN IEC 63000:2018

Bevollmächtigter für die Zusammenstellung der technischen Unterlagen / Person
Authorized to compile the technical file: Jörg Ziel - Heidolph Instruments GmbH & Co. KG,
Walpersdorfer Straße 12, 91126 Schwabach / Germany

Schwabach, 25.06.2021

Wolfgang Jaenicke
Geschäftsführer
Managing Director

Jörg Ziel
Qualitätsmanager
Quality Manager

01-001-025-11-5

**UK
CA**

Declaration of Conformity

In accordance with UK Government guidance

This declaration is issued under the sole responsibility of the manufacturer,
Heidolph Instruments GmbH & Co. KG
Walpersdorfer Straße 12
91126 Schwabach / Germany

Product: Laboratory vacuum pump

Model:

Hei-VAC Valve Control	591-00130-xx
Hei-VAC Valve Tec	591-00160-xx
Hei-VAC Vario Station	591-00142-xx
Hei-VAC Vario Control	591-00141-xx
Hei-VAC Vario Tec	591-00171-xx
Hei-VAC Valve Industrial	591-07210-xx

Description:

Laboratory vacuum pump to work with laboratory evaporator

The object of the declaration described above is in conformity with the relevant
UK Statutory Instruments (and their amendments):

2008 No. 1597

The Supply of Machinery (Safety) Regulations

2008 2016 No. 1091

The Electromagnetic Compatibility Regulations 2016

2012 No. 3032

*The Restriction of the Use of Certain Hazardous Substances in
Electrical and Electronic Equipment Regulations 2012*

and complies with the following technical standards :

EN ISO 12100:2010, EN 61326-1:2013, EN 61010-1:2010, EN IEC 63000:2018

UK Authorised Representative (for authorities only):

ProductIP (UK) Ltd.
8. Northumberland Av.
London WC2N 5BY

Signed for and on behalf of Heidolph Instruments GmbH & Co. KG
Walpersdorfer Straße 12, 91126 Schwabach / Germany

Schwabach, 26.11.2021

Wolfgang Jaenicke
Managing Director

Jörg Ziel
Quality Manager

01-001-025-28-0



Zertifikat

RoHS - Konformitätserklärung

Heidolph Instruments GmbH+ Co. KG / Walpersdorfer Straße 12 / D 91126 Schwabach

An die zuständige Person
To whom it may concern

Datum: Juli 2019

RoHS - Konformitätserklärung (Richtlinie 2011 / 65 / EU) und der Erweiterung 2015 / 863
RoHS - Declaration of conformity (Directive 2011 / 65 / EU) and the amended of directive 2015 / 863

Hiermit bestätigt Heidolph Instruments GmbH + Co. KG , dass entsprechend dem heutigen Wissenstand alle von Heidolph Instruments verkauften Laborgeräte der Richtlinie 2011 / 65 / EU (RoHS) und der Erweiterung 2015 / 863 entsprechen.

Diese Geräte erfüllen die derzeitigen Anforderungen der RoHS Direktive für folgende Materialien:
Max. 0,01% des Gewichtes in homogenen Werkstoffen für Cadmium und max. 0,1% des Gewichtes in homogenen Werkstoffen für Blei, Quecksilber, sechswertiges Chrom, polybromierte Biphenyle, polybromierte Diphenylether, Di (2-ethylhexyl) Phthalat, Butylbenzylphthalat, Dibutylphthalat, Diisobutylphthalat.

Bei einzelnen Baugruppen können Maximalkonzentrationsüberschreitungen im Rahmen der zulässigen Ausnahmen der Richtlinie möglich sein.

With this declaration, we confirm (according to current knowledge) that all sold laboratory devices by Heidolph Instruments GmbH & Co. KG fulfill the requirements of the EU directive 2011 / 65 / EU (RoHS) and the amended of directive 2015 / 863.

All devices are compatible with the requirement of the RoHS for the following materials:

Max. 0,01% of the weight in homogeneous material for cadmium and max. 0,1 % of the weight in homogeneous material for lead, mercury, hexavalent chromium, polybrominated biphenyl, polybrominated diphenyl ether, Di (2-ethylhexyl) phthalate, butyl benzyl phthalate, dibutyl phthalate, diisobutyl phthalate.

In the case of individual assemblies, maximum concentrations maybe exceeded within the permissible exceptions of the Directive.

Schwabach, 22.07.2019

Stefan Peters
Vice President Marketing, Innovation & Technologie

Marcell Sarré
Vice President Quality Management & Technical Service

Zchnng.-Nr.



China RoHS DECLARATION OF CONFORMITY

Heidolph Instruments 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 biphenyls (PBB): 0.1%
- Polybrominated diphenyl ether (PBDE): 0.1%

Environmental 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 Environmental Friendly Use Period for Heidolph Instruments GmbH & Co.KG products is 25 years.

此表格是按照 SJ/T 11364-2014 中规定制定。

This table is created according to SJ/T 11364-2014

MATERIAL CONTENT DECLARATION FOR Heidolph Instruments GmbH & Co. KG PRODUCTS							
有毒有害物质或元素 Hazardous substances							
部件名称 Part name	铅 Pb	汞 Hg	铬 Cd	六价铬 Cr(VI)	多溴联 苯 PBB	多溴二 苯醚 PBDE	环保期限 标识 EFUP
包装 Packaging	○	○	○	○	○	○	
塑料外壳/组件 Plastic housing / parts	○	○	○	○	○	○	
电池 Battery	○	○	○	○	○	○	
玻璃 Glass	○	○	○	○	○	○	
电子电气组件 Electrical and electronic parts	X	X	X	○	○	○	
控制器/测量设备 Controller / measuring device	X	○	X	○	○	○	
金属外壳/组件 Metal housing / parts	X	○	○	○	○	○	
电机 Motor	X	○	○	○	○	○	
配件 Accessories	X	○	○	○	○	○	



注释: 此表格适用于所有产品。以上列出的原件或组件不一定都属于所附产品的组成。

Note: Table applies to all products. Some of the components or parts listed above may not be part of the enclosed product.

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

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

除上表所示信息外, 还需声明的是, 这些部件并非是有意图用铅(Pb)、汞(Hg)、镉(Cd)、六价铬(Cr(VI))、多溴联苯(PBB)或多溴二苯醚(PBDE)来制造的。

Apart from the disclosures in the above table, the subassemblies are not intentionally manufactured or formulated with lead (Pb), mercury (Hg), cadmium (Cd), hexavalent chromium (CrVI), polybrominated biphenyls (PBB), and polybrominated diphenyl ethers (PBDE).

Products manufactured by Heidolph Instruments GmbH & Co.KG may enter into further devices or can be used together with other appliances.

With these products and appliances in particular, Heidolph Instruments GmbH & Co.KG will not take responsibility for the EFUP of those products and appliances.

Schwabach, 06.08.2021

Wolfgang Jaenicke
Chief Executive Officer CEO

Jörg Ziel Quality
Manager

Certificate



Certificate no.

CU 72211805 01

License Holder:
 Heidolph Instruments
 GmbH & Co. KG
 Walpersdorfer Str. 12
 91126 Schwabach
 Deutschland

Manufacturing Plant:
 --32195323 001

Test report no.: USA- 32195323 003

Client Reference: Walter Lohmann

Tested to: UL 61010-1:2012 R7.19
 CAN/CSA-C22.2 NO. 61010-1-12 + GI1 + GI2 (R2017) + A1

Certified Product: Diaphragm vacuum pump for laboratory use

License Fee - Units

Model designation: Hei-VAC Valve Tec

7

Ratings: AC 120V; 60Hz /
 AC 100-115V; 50/60Hz;
 1.6-1.7A; class I

7

Licensed Test mark:



Date of Issue
 (day/mo/yr)

21/10/2021

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

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01-005-005-90-0

23/11/2022

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We reserve the right to make technical changes without prior announcement.

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